WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-NR-1 **Control No.:** 2015-056

Waste Site Code(s)/Subsite Code(s): 100-N-96

Reclassification Category: Interim ☒ Final ☐

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

Approvals Needed: DOE ☒ Ecology ☒ EPA ☐

Description of current waste site condition:

The 100-N-96, 100-N Military Camp Disposal Pits waste site, part of the 100-NR-1 Operable Unit, was added to the *Interim Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington* (100-N Area ROD), U.S. Environmental Protection Agency, Region 10, Seattle, Washington (EPA 1999), as a candidate site for confirmatory sampling via the *Explanation of Significant Differences for the 100-NR-1 and 100-NR-2 Operable Units Interim Remedial Action Record of Decision, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington (EPA 2011). Subsequently, the 100-N-96 waste site was recommended for remedial action (WCH 2014).

The 100-N-96 waste site consisted of three separate suspect disposal pits (#1, #2, and #3) located southwest of the 100-N-47 military camp. The military camp was in use by the Army from 1951 to 1958. The disposal pits included military camp refuse, garbage, and scattered shallow/surface metal debris. Confirmatory sampling was conducted at these three disposal pits in October 2011. The results indicated that residual contaminant concentrations at Disposal Pit #3 met the remedial action goals (RAGs) and, therefore, did not require remedial action. The confirmatory sample results at Disposal Pits #1 and #2 did not meet the RAGs; therefore, Disposal Pits #1 and #2 were recommended for remedial action (WCH 2014).

Remedial action at Disposal Pits #1 and #2 within the 100-N-96 waste site was performed between January 12 and January 22, 2015. The remediation extended to an approximate maximum depth of 2.5 m (8.2 ft) below ground surface, with the deepest points at the center of the excavations. An estimated 2,524 bank cubic meters (3,331 bank cubic yards) of contaminated soil and debris were removed from the excavations and staged in staging pile areas awaiting disposal to the Environmental Restoration Disposal Facility (ERDF). The loadout and disposal of all waste material was completed on February 25, 2015.

Cleanup verification sampling was conducted on April 30, 2015, to determine if the waste site met the remedial action objectives (RAOs) and RAGs established by the *Remedial Design Report/Remedial Action Work Plan for the 100-N Area* (100-N Area RDR/RAWP), DOE/RL-2005-93, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington (DOE-RL 2013), and the 100-N Area ROD (EPA 1999). The selected remedy involved (1) excavating the site to the extent required to meet specified soil cleanup levels, (2) disposing of contaminated excavation materials at ERDF, (3) demonstrating through verification sampling that cleanup goals have been achieved, and (4) proposing the site for reclassification to Interim Closed Out.

Basis for reclassification:

The confirmatory and verification sampling and modeling results for the 100-N-96 waste site demonstrate that the site meets the RAOs and corresponding RAGs established in the 100-N Area RDR/RAWP (DOE-RL 2013) and the 100-N Area ROD (EPA 1999) to support a reclassification to Interim Closed Out. These sampling results established 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. Contamination above direct exposure levels was not observed in shallow zone soils and is concluded to not exist in deep zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone soil are not required. The basis for reclassification is described in detail in the *Remaining Sites Verification Package for the 100-N-96, 100-N Military Camp Disposal Pits Waste Site* (attached).

WASTE SITE RECLASSIFICATION FORM

Operable Unit: 100-NR-1 **Control No.:** 2015-056

Waste Site Code(s)/Subsite Code(s): 100-N-96

Regulator comments:

Waste Site Controls:

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

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

J. P. Neath	J P Neath	9/16/15
DOE Federal Project Director (printed)	Signature	Date
N. Menard	Nina M. Menard	9/18/15
Ecology Project Manager (printed)	Signature	Date
N/A		
EPA Project Manager (printed)	Signature	Date

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-N-96, 100-N MILITARY CAMP DISPOSAL PITS WASTE SITE

Attachment to Waste Site Reclassification Form 2015-056

September 2015

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-N-96, 100-N MILITARY CAMP DISPOSAL PITS WASTE SITE

EXECUTIVE SUMMARY

The 100-N-96, 100-N Military Camp Disposal Pits waste site, part of the 100-NR-1 Operable Unit, consisted of three separate disposal pits located approximately 570 m (1,870 ft) southwest of a former military camp. The military camp (100-N-47) was set up on approximately 8.09 ha (20 ac) of desert land and was in use by the U.S. Army between 1951 and 1958 as battalion headquarters for an anti-aircraft artillery gun battalion. An "Army Agreement" of 1951 provided for the disposal of refuse by the Army and reads as follows: "Army will dispose of its trash and garbage in a manner acceptable to the Atomic Energy Commission (AEC). The Army may make disposal pits off Army land, as necessary, at locations designated by AEC and shall be subject to AEC inspection." The 100-N-96 waste site is composed of three disposal pits (#1, #2, and #3) that included military camp refuse, garbage, and scattered shallow/surface metal debris. The 100-N-96 waste site was identified for remediation based on confirmatory sampling results and field observations.

Confirmatory sampling was conducted at Disposal Pits #1, #2, and #3 in October 2011, per the *Work Instruction for Confirmatory Sampling of the 100-N-96, 100-N Military Camp Disposal Pits* (WCH 2011). The confirmatory sampling design identified a total of eight test pits at the 100-N-96 waste site, six within Disposal Pit #1 and one each in Disposal Pits #2 and #3. Soil samples were collected from the bottom of each of the test pits.

Evaluation of the confirmatory data indicated that residual contaminant concentrations at Disposal Pit #3 met the remedial action objectives and remedial action goals (RAGs) established in the *Remedial Design Report/Remedial Action Work Plan for the 100-N Area* (100-N Area RDR/RAWP) (DOE-RL 2013) and the *Interim Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington* (100-N Area ROD) (EPA 1999). Therefore, remedial action at Disposal Pit #3 was not required. The confirmatory sample results at Disposal Pits #1 and #2 did not meet the RAGs and were recommended for remedial action (WCH 2014).

The 100-N-96 waste site Disposal Pits #1 and #2 were remediated between January 12 and January 22, 2015. Approximately 2,524 bank cubic meters (3,301 bank cubic yards) of contaminated soil and debris were removed from the excavations and staged in a staging pile area prior to being disposed at the Environmental Restoration Disposal Facility. Loadout of waste was completed on February 25, 2015. Materials removed from the excavations included paint cans; food cans; general inert debris; and various bottles, plates, and cups. The remediation extended to an approximate maximum depth of 2.5 m (8.2 ft) below ground surface, with the deepest point being in the center of the excavation. One anomaly, a sealed glass bottle containing approximately 1 tablespoon of clear liquid, was discovered in the Disposal Pit #2 excavation. The glass bottle was downgraded from an anomaly on February 23, 2015, after observing that the water inside froze around 32°F.

Cultural and/or ecological materials were found during remediation and were retrieved by an onsite archeologist. The materials found consisted of food type bottles and cans, cups, plates, and silverware.

Verification soil sampling was conducted on April 30, 2015. A summary of the cleanup evaluation for the verification soil sampling results against the applicable RAGs is presented in Table ES-1. The results of the confirmatory and verification sampling were used to make reclassification decisions for the 100-N-96 waste site in accordance with the TPA-MP-14 procedure in the *Tri-Party Agreement Handbook Management Procedures* (DOE-RL 2011).

Table ES-1. Summary of Remedial Action Goals for the 100-N-96 Waste Site. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Direct Exposure – Radionuclides	Attain dose rate of <15-mrem/yr above background over 1,000 years.	Radionuclides are not COPCs for this site.	NA
Direct Exposure – Nonradionuclides	Attain individual COPC direct exposure RAGs.	All individual COPC concentrations are below the direct exposure RAGs.	Yes
Risk Requirements – Nonradionuclides	Attain a hazard quotient of <1 for all individual noncarcinogens.	All hazard quotients for individual nonradionuclide COPCs are <1.	Yes
	Attain a cumulative hazard quotient of <1 for noncarcinogens.	The cumulative hazard quotient for the 100-N-96 waste site of 4.4×10^{-3} is <1.	
	Attain an excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens.	All excess cancer risk for individual carcinogens is $<1 \times 10^{-6}$.	
	Attain a cumulative excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.	The total excess cancer risk for the 100-N-96 waste site of 1.4×10^{-7} is $<1 \times 10^{-5}$.	
Groundwater/River Protection – Radionuclides	Attain single-COPC groundwater and river protection RAGs.	Radionuclides are not COPCs for this site.	NA
	Attain national primary drinking water standards [a]: 4 mrem/yr (beta/gamma) dose rate to target receptor/organs.		
	Meet drinking water MCL for alpha emitters.		
	Meet total uranium standard of 30 µg/L (21.2 pCi/L) [b].		

Table ES-1. Summary of Remedial Action Goals for the 100-N-96 Waste Site. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Groundwater/river protection – nonradionuclides	Attain individual nonradionuclide groundwater and river RAGs.	All individual nonradionuclide COPC concentrations are below the groundwater and river protection RAGs.	Yes

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

[b] 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).

COPC = contaminant of potential concern
DOE = U.S. Department of Energy
MCL = maximum contaminant level
NA = not applicable
RAG = remedial action goal
RAO = remedial action objective
RDR/RAWP = Remedial Design Report/Remedial Action Work Plan

In accordance with this evaluation, the confirmatory and verification sampling and modeling results support a reclassification of this site to Interim Closed Out. The current site conditions achieve the remedial action objectives and the corresponding RAGs established in the 100-N Area RDR/RAWP (DOE-RL 2013) and the 100-N Area 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 sampling results also demonstrate that residual contaminant concentrations support unrestricted future use of shallow zone soil (i.e., surface to 4.6 m [15 ft] deep), and contaminant levels remaining in the soil are protective of groundwater and the Columbia River. Contamination above direct exposure levels was not observed in the shallow zone soils and is concluded to not exist in deep zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone soil are not required.

Soil cleanup levels were established in the 100-N Area ROD (EPA 1999) based in part on a limited ecological risk assessment. Although not required by the 100-N Area ROD, a comparison against ecological risk screening levels has been made for the 100-N-96 waste site contaminants of potential concern and other constituents (Appendix A). Ecological screening levels from the *Washington Administrative Code* (WAC) 173-340, "Model Toxics Control Act – Cleanup," were exceeded for boron, selenium, and vanadium. The U.S. Environmental Protection Agency ecological soil screening levels were exceeded for manganese, selenium, and vanadium. Exceedance of screening values is intended to trigger additional evaluation and does not necessarily indicate the existence of risk to ecological receptors. Because the concentrations of manganese and vanadium are below the Hanford Site background value, it is believed that the presence of these constituents do not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for risk to ecological receptors as part of the final closeout decision for this site.

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-N-96, 100-N MILITARY CAMP DISPOSAL PITS WASTE SITE

STATEMENT OF PROTECTIVENESS

The 100-N-96, 100-N Military Camp Disposal Pits waste site confirmatory and verification sampling data, site evaluations, and supporting documentation demonstrate that the site meets the objectives established in the *Remedial Design Report/Remedial Action Work Plan for the 100-N Area* (100-N Area RDR/RAWP) (DOE-RL 2013) and the *Interim Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington* (100-N Area ROD) (EPA 1999). The confirmatory and verification sampling and modeling results show that residual soil 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.

Soil cleanup levels were established in the 100-N Area ROD (EPA 1999) based in part on a limited ecological risk assessment. Although not required by the 100-N Area ROD, a comparison against ecological risk screening levels has been made for the 100-N-96 waste site contaminants of potential concern (COPCs) and other constituents (Appendix A). Ecological screening levels from the *Washington Administrative Code* (WAC) 173-340, "Model Toxics Control Act – Cleanup," were exceeded for boron, selenium, and vanadium. The U.S. Environmental Protection Agency (EPA) ecological soil screening levels were exceeded for manganese, selenium, and vanadium. Exceedance of screening values is intended to trigger additional evaluation and does not necessarily indicate the existence of risk to ecological receptors. Because the concentrations of manganese and vanadium are below the Hanford Site background value, it is believed that the presence of these constituents do not pose a risk to ecological receptors. All exceedances will be evaluated in the context of additional lines of evidence for risk to ecological receptors as part of the final closeout decision for this site.

GENERAL SITE INFORMATION AND BACKGROUND

The 100-N-96, 100-N Military Camp Disposal Pits waste site, part of the 100-NR-1 Operable Unit, consisted of three separate disposal pits located approximately 570 m (1,870 ft) southwest of a former military camp. The military camp (100-N-47) was set up on approximately 8.09 ha (20 ac) of desert land and was in use by the U.S. Army between 1951 and 1958 as battalion headquarters for an anti-aircraft artillery gun battalion. An "Army Agreement" of 1951 provided for the disposal of refuse by the Army and reads as follows: "Army will dispose of its trash and garbage in a manner acceptable to the Atomic Energy Commission (AEC). The Army may make disposal pits off Army land, as necessary, at locations designated by AEC and shall be subject to AEC inspection." The 100-N-96 waste site is composed of three disposal pits (#1, #2, and #3) that included military camp refuse, garbage, and scattered shallow/surface metal debris (Figure 1). An aerial photograph from 1957 (Figure 2) shows disturbances to the southwest of the military camp outside the perimeter fence that were suspected to be disposal pits.

Figure 1. The 100-N-96 Waste Site Overall Site Location Map.

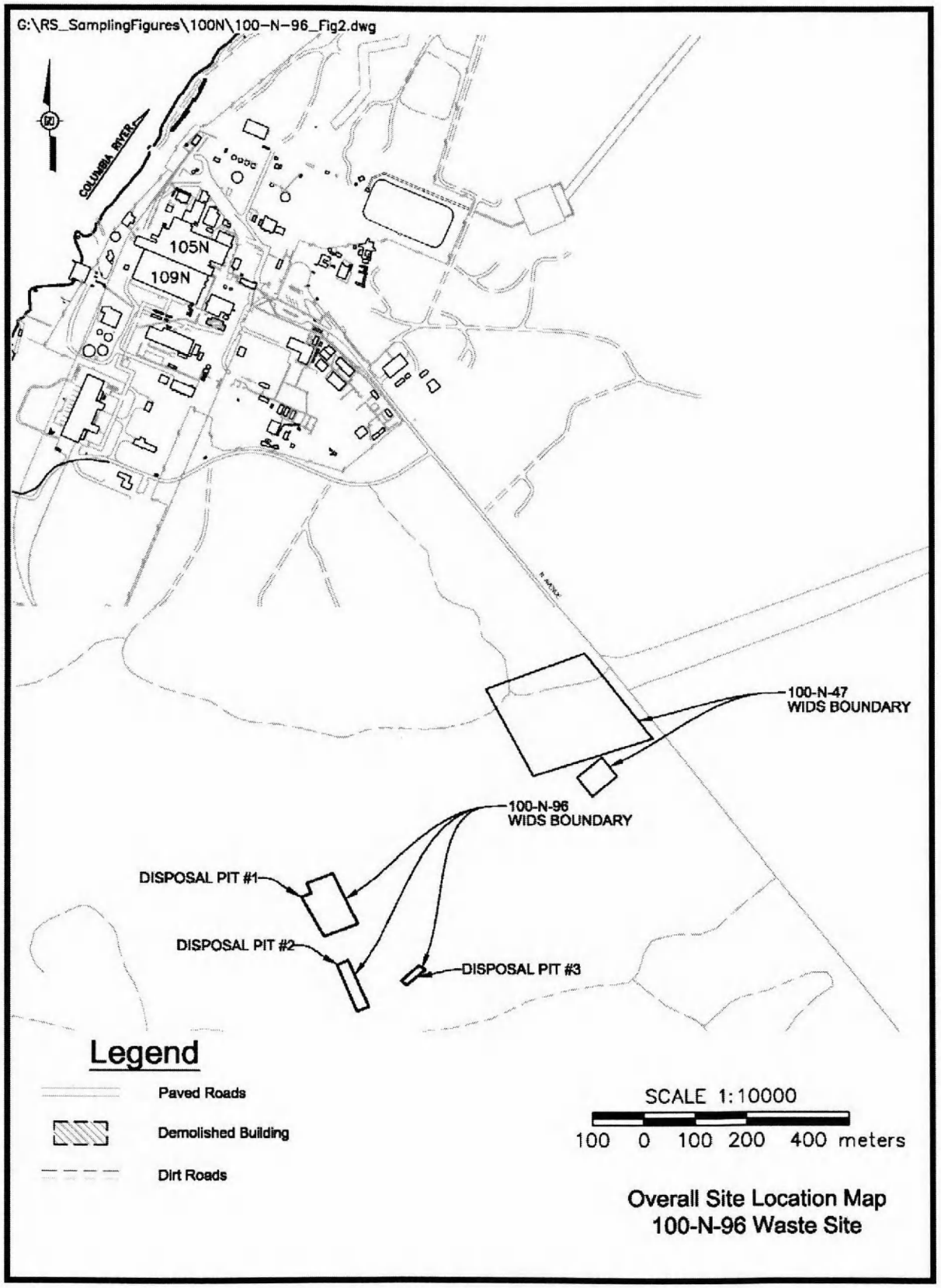


Figure 2. A 1957 Aerial Photograph of the 100-N-96 Waste Site.

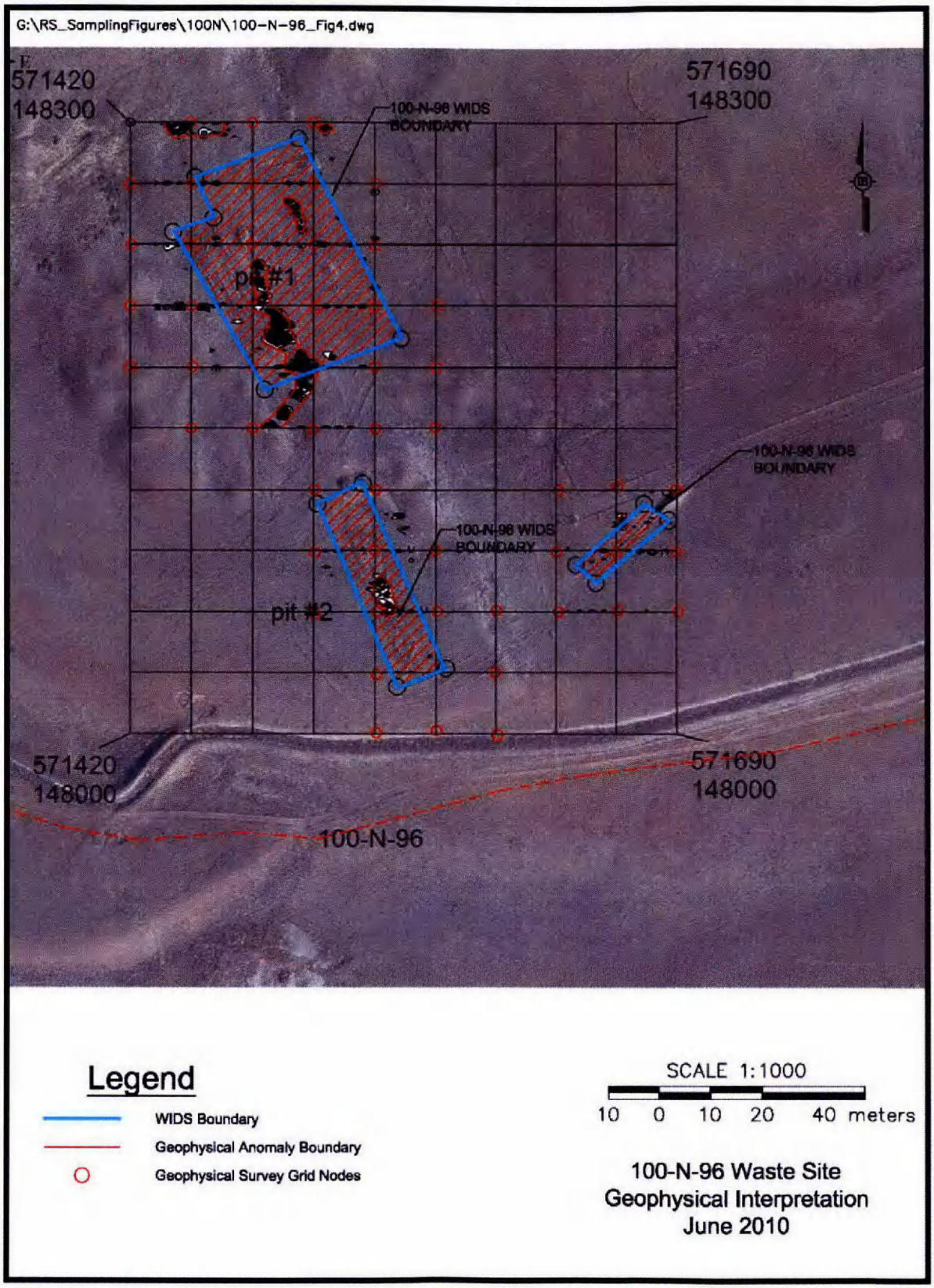
CONFIRMATORY SAMPLING

Confirmatory sampling at the 100-N-96 waste site was performed on October 26 and 27, 2011, per the *Work Instruction for Confirmatory Sampling of the 100-N-96, 100-N Military Camp Disposal Pits* (WCH 2011). The confirmatory samples were collected to support a determination if remedial action would be required.

Geophysical Investigation

A geophysical survey was performed at the 100-N-96 waste site in June 2010 with the objective of detecting potentially buried features (WCH 2010). The survey revealed scattered shallow/surface metallic debris throughout the site. There were six areas with higher concentrations of shallow debris. The geophysical interpretation map is presented in Figure 3.

Figure 3. The 100-N-96 Waste Site Geophysical Interpretation Map.



Contaminants of Potential Concern

The COPCs for the 100-N-96 waste site were identified based on the assumption that the site contained military camp refuse and garbage. The COPCs included the expanded list of inductively coupled plasma (ICP) metals, mercury, polychlorinated biphenyls (PCBs), volatile organic compounds, semivolatile organic compounds, polycyclic aromatic hydrocarbons, and total petroleum hydrocarbons.

Confirmatory Sampling Activities

A focused sampling approach was used at the 100-N-96 waste site to assess areas that were identified during the geophysical investigation (WCH 2010). Test pits were excavated at eight locations to determine if suspect hazardous debris or materials were present. The test pit locations are provided in Figure 4. Focused soil samples were collected at the bottom of each of the test pits. The analytical sample results (Appendix B) were evaluated against the cleanup criteria specified in the 100-N Area RDR/RAWP (DOE-RL 2013).

Nonhazardous debris, including metal and glass, were observed in Test Pits 2 and 5 excavated in Disposal Pit #1, and Test Pit 3, excavated in Disposal Pit #2. No debris was observed within the excavation at Test Pits 1, 7, and 8 in Disposal Pit #1, and Test Pit 4 in Disposal Pit #3. Evidence of burning was observed at approximately 1.5 m (ft) below ground surface at Test Pit 6 in Disposal Pit #1. Several 19-L (5-gal) metal rusted cans were also observed along with solid white material and solid orange material, suspected to be dried paint. A sample of the white material was collected and a composite sample of the soil within the spoil pile was collected. The Test Pit 6 excavation continued to a depth of 3.5 m (12 ft), and a soil sample was collected from the bottom. A summary of all confirmatory samples collected is provided in Table 1.

Confirmatory Sample Results

A confirmatory sample taken of a white material at Test Pit 6, located in Disposal Pit #1 at Washington State plane coordinates N 148228.0, E 571483.3 failed direct exposure, groundwater, and river protection remedial action goals (RAGs) for antimony and lead with concentrations of 32.5 mg/kg and 3,910 mg/kg, respectively. In addition, a confirmatory soil sample collected at Test Pit 3, located in Disposal Pit #2 at Washington State plane coordinates N 148067.7, E 571544.6, exceeded groundwater and river protection RAGs for antimony, chromium, copper, lead, nickel, zinc, aroclor-1254, and aroclor-1260. RESidual RADioactivity (RESRAD) modeling discussed in Appendix C of the 100-N Area RDR/RAWP (DOE-RL 2013) predicts that with approximately 17 m (56 ft) of vadose zone below the excavations, constituents with distribution coefficient (K_d) values greater than 4.4 mL/g will not reach groundwater within 1,000 years. Each of the constituents from Test Pit 3 sample results exceeding groundwater or river RAGS have a K_d value greater than 4.4 mL/g, with the exception of antimony. The sample result of 19 mg/kg for antimony, which has a K_d of 3.76 mL/g, is not predicted to be protective of groundwater or the Columbia River. All confirmatory sampling data are presented in Appendix B.

Figure 4. The 100-N-96 Confirmatory Sampling Test Pit Location.

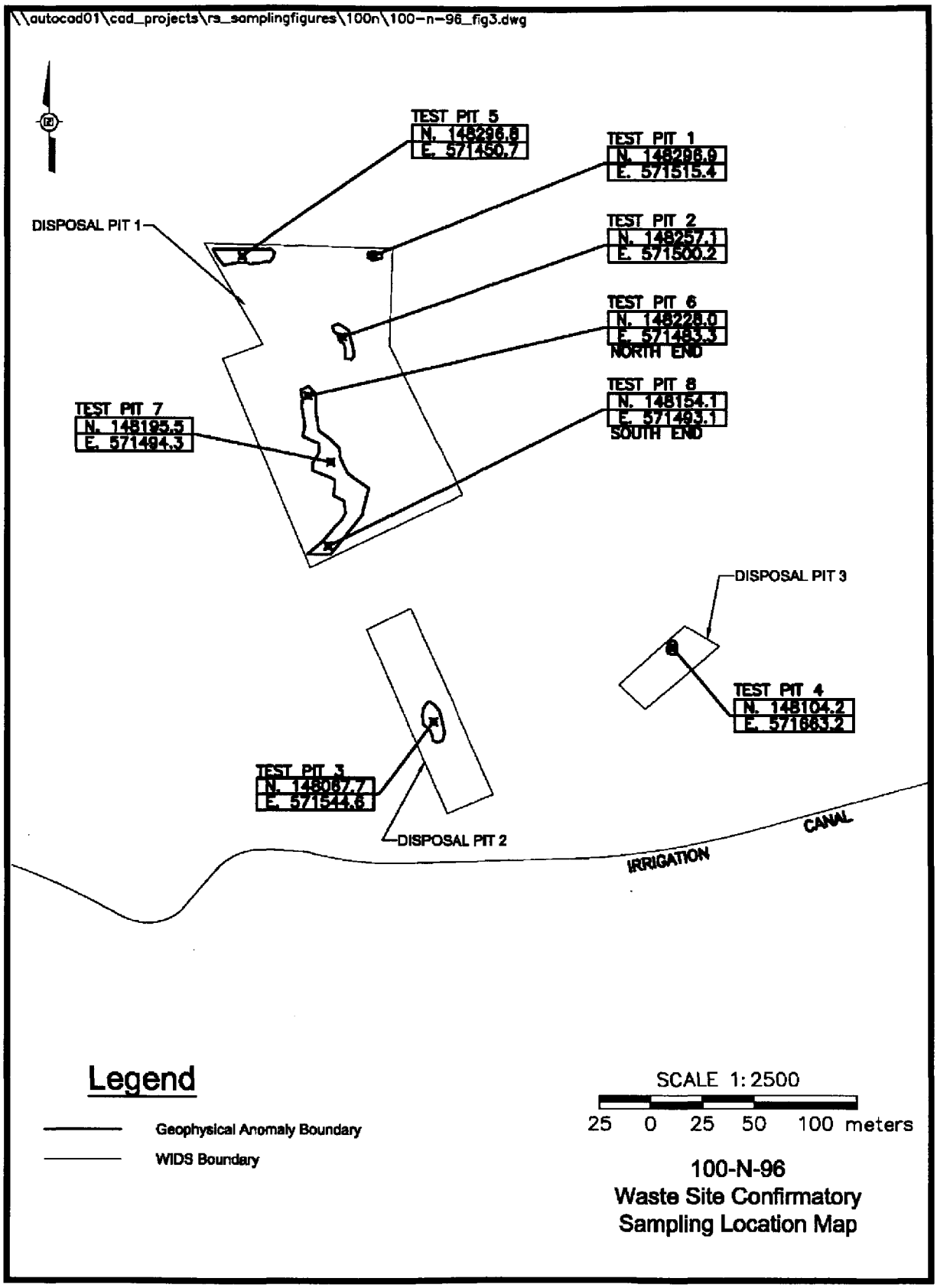


Table 1. The 100-N-96 Confirmatory Sample Summary Table.

Disposal Pit	Sample Location	Sample Description	HEIS Sample Number	Washington State Plane Coordinate		Depth (m bgs)	Sample Analysis
				Northing	Easting		
1	Test Pit 1	Soil	J1L917	148296.9	571515.4	2	ICP metals [a], mercury, PCBs, VOC, SVOC, PAH, TPH
1	Test Pit 2	Soil	J1L915	148257.1	571500.2	2.5	
2	Test Pit 3	Soil	J1L907	148067.7	571544.6	3	
3	Test Pit 4	Soil	J1L906	148104.2	571663.2	2	
1	Test Pit 5	Soil	J1L916	148296.8	571450.7	2	
1	Test Pit 6	Soil	J1L910	148228.0	571493.1	3.5	
		Soil	J1L920			1.5	
		White material	J1L919			1.5	
1	Test Pit 7	Soil	J1L907	148195.5	571494.3	2	
1	Test Pit 8	Soil	J1L908	148154.1	571493.1	3.5	
1	Duplicate of J1L910	Soil	J1L911	148228.0	571493.1	3.5	ICP metals [a], mercury, PCBs, VOC, SVOC, PAH, TPH
Trip blank		Silica sand	J1L905	NA	NA	NA	VOC
Equipment blank		Silica sand	J1L904	NA	NA	NA	ICP metals [a], mercury, TPH, PAH

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

bgs = below ground surface
HEIS = Hanford Environmental Information System
ICP = inductively coupled plasma
NA = not applicable
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

REMEDIAL ACTION SUMMARY

Based on the confirmatory sampling results, the 100-N-96 waste site was recommended for remediation (WCH 2014). Due to cultural sensitivity, remediation was conducted at Test Pit 6 located in Disposal Pit #1 and Test Pit 3 in Disposal Pit #2 only. Remediation of the 100-N-96 waste site, Disposal Pits #1 and #2, was performed between January 12 and January 22, 2015. Approximately 2,524 bank cubic meters (3,301 bank cubic yards) of contaminated soil and debris were removed from the excavations and staged in a staging pile area (SPA) prior to being loaded out and disposed at the Environmental Restoration Disposal Facility. Loadout of waste material was completed on February 25, 2015. An aerial photograph showing the remediated areas is provided in Figure 5. A photograph of the Disposal Pit #1 excavation is provided in Figure 6, and the Disposal Pit #2 excavation is shown in Figure 7.

Figure 5. Aerial Photograph of the 100-N-96 Waste Site Remediation.

Figure 6. Photograph of the 100-N-96 Disposal Pit #1 Excavation.

Figure 7. Photograph of the 100-N-96 Disposal Pit #2 Excavation.

Materials removed from the excavation included paint cans, food cans, general inert debris, and various bottles, plates, and cups. The cultural and ecological items found within the excavation, food type bottles and cans, cups, plates, and silverware, were retrieved by an onsite archeologist. The remediation extended to a maximum depth of 2.5 m (8.2 ft) below ground surface, with the deepest point being in the center of the excavation. A post-excavation civil survey is shown in Figure 8. The excavation boundaries are overlaid on Waste Information Data System boundary shown in Figure 9.

One anomaly, a sealed glass bottle containing approximately 1 tablespoon of clear liquid, was discovered in the Disposal Pit #2 excavation. The glass bottle was downgraded from an anomaly on February 23, 2015, after observing that the water inside froze around 32°F.

Figure 8. The 100-N-96 Post-Excavation Civil Survey.

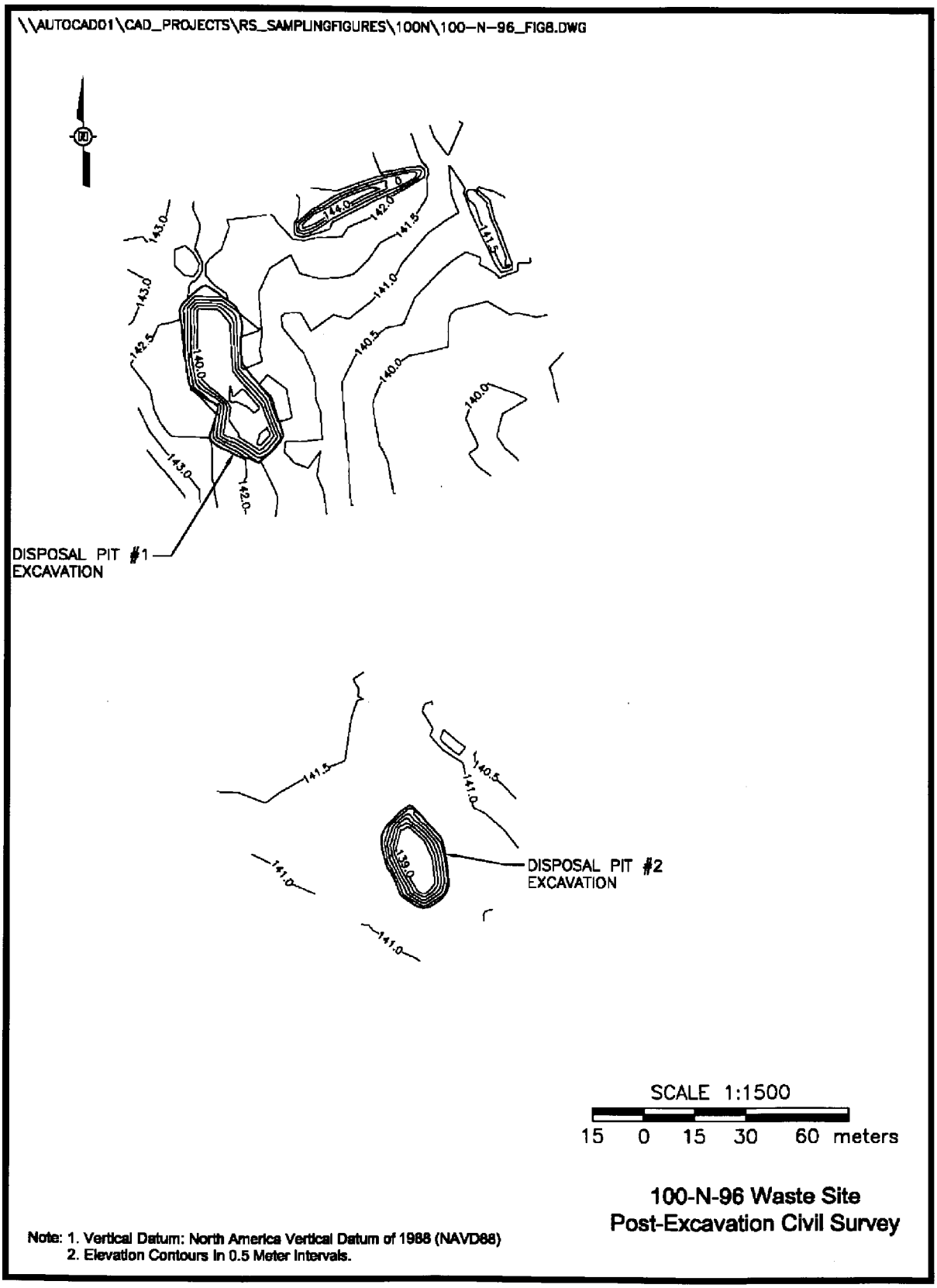
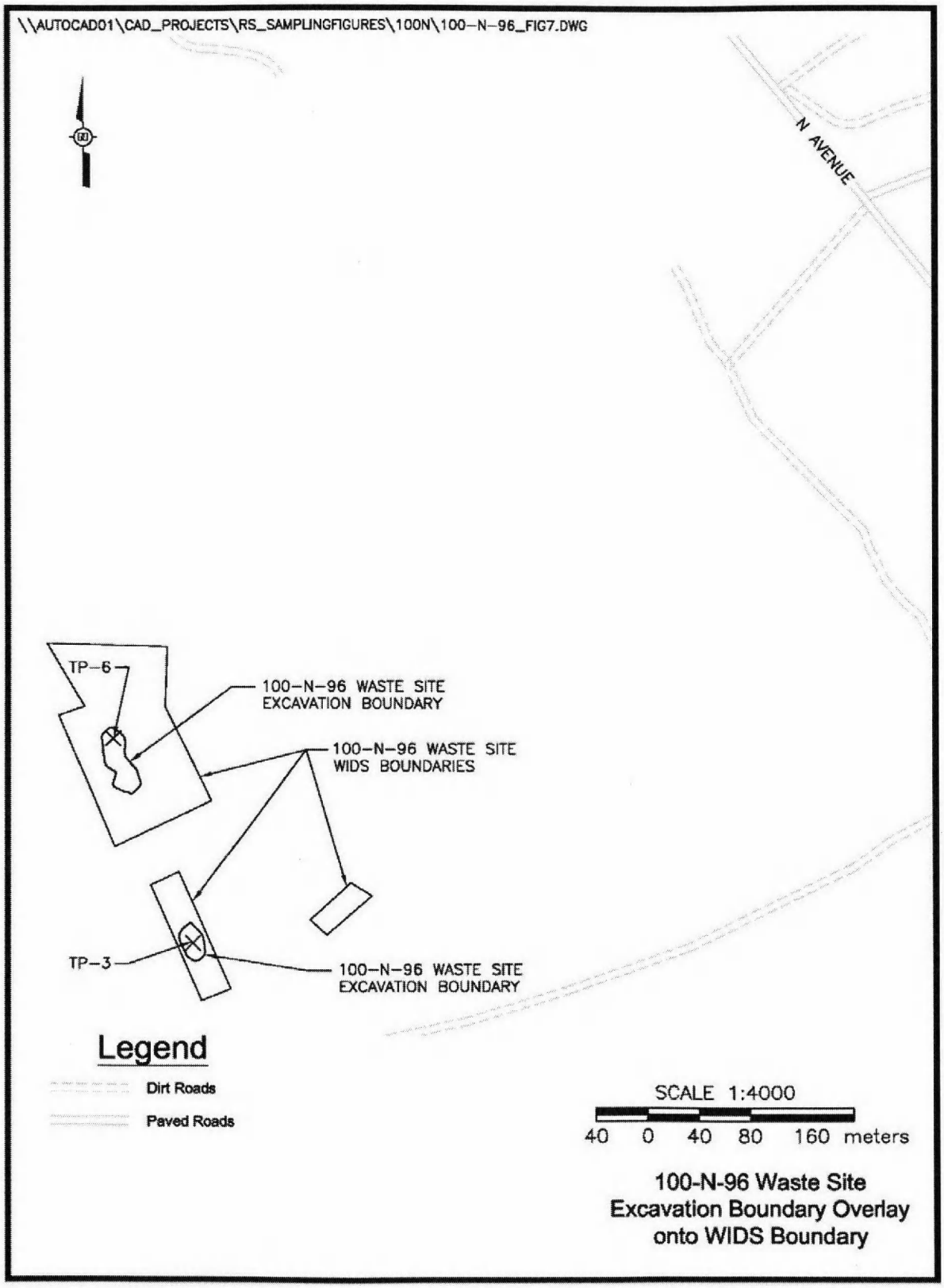


Figure 9. The 100-N-96 Waste Site Excavation Boundary Overlaid on Waste Information Data System Boundary.



VERIFICATION SAMPLING ACTIVITIES

Verification soil sampling was conducted on April 30, 2015. The verification samples were collected to support a determination that residual contaminant concentrations at this site meet the cleanup criteria specified in the 100-N Area RDR/RAWP (DOE-RL 2013) and the 100-N Area ROD (EPA 1999). All verification samples were submitted for full protocol laboratory analysis and analyzed using EPA-approved analytical methods provided in Table 2. The verification sample results are provided in Appendix C.

Table 2. Laboratory Analytical Methods for the 100-N-96 Waste Site.

Analytical Method	COPC
ICP metals [a] – EPA Method 6010	Metals
Mercury – EPA Method 7471	Mercury
PCB – EPA Method 8082	Polychlorinated biphenyls
Hexavalent chromium – EPA Method 7196	Hexavalent chromium
PAH – EPA method 8310	Polycyclic aromatic hydrocarbons
TPH – NWTPH-Dx	Petroleum hydrocarbons
VOA – EPA Method 8260	Volatile organic compounds

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

COPC = contaminant of potential concern
EPA = U.S. Environmental Protection Agency
ICP = inductively coupled plasma
NWTPH-Dx = Northwest total petroleum hydrocarbon – diesel range organics
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
TPH = total petroleum hydrocarbons
VOA = volatile organic analysis

The following subsections provide additional discussion of the information used to develop the verification sampling design. A more detailed discussion of the verification sample design can be found in the *Work Instruction for Verification Sampling of the 100-N-96; 100-N Military Camp Disposal Pits Waste Site* (WCH 2015). The verification sample results indicate that the waste removal action achieved compliance with the remedial action objectives and RAGs for the 100-N-96 waste site.

Contaminants of Potential Concern

The COPCs for the 100-N-96 waste site were identified based on historical knowledge and the confirmatory sample results and included the expanded list of ICP metals, mercury, PCBs, volatile organic compounds, polycyclic aromatic hydrocarbons, and total petroleum hydrocarbons. Although beryllium was included in the ICP metals list, it is not considered a COPC for the 100-N-96 waste site.

Verification Sample Design

Two decision units were identified for the 100-N-96 waste site and included the excavation and the waste SPA. Twelve statistical verification soil samples plus one duplicate soil sample were

collected from each of the decision units. Additionally, one equipment blank sample was collected for the waste site.

All sampling was performed in accordance with ENV-1, *Environmental Monitoring & Management*, to fulfill the requirements of the *100-N Area Sampling and Analysis Plan for CERCLA Waste Sites* (DOE-RL 2006). All samples were grab samples collected at the predetermined coordinates identified in Table 3. The verification sample locations are shown in Figure 10.

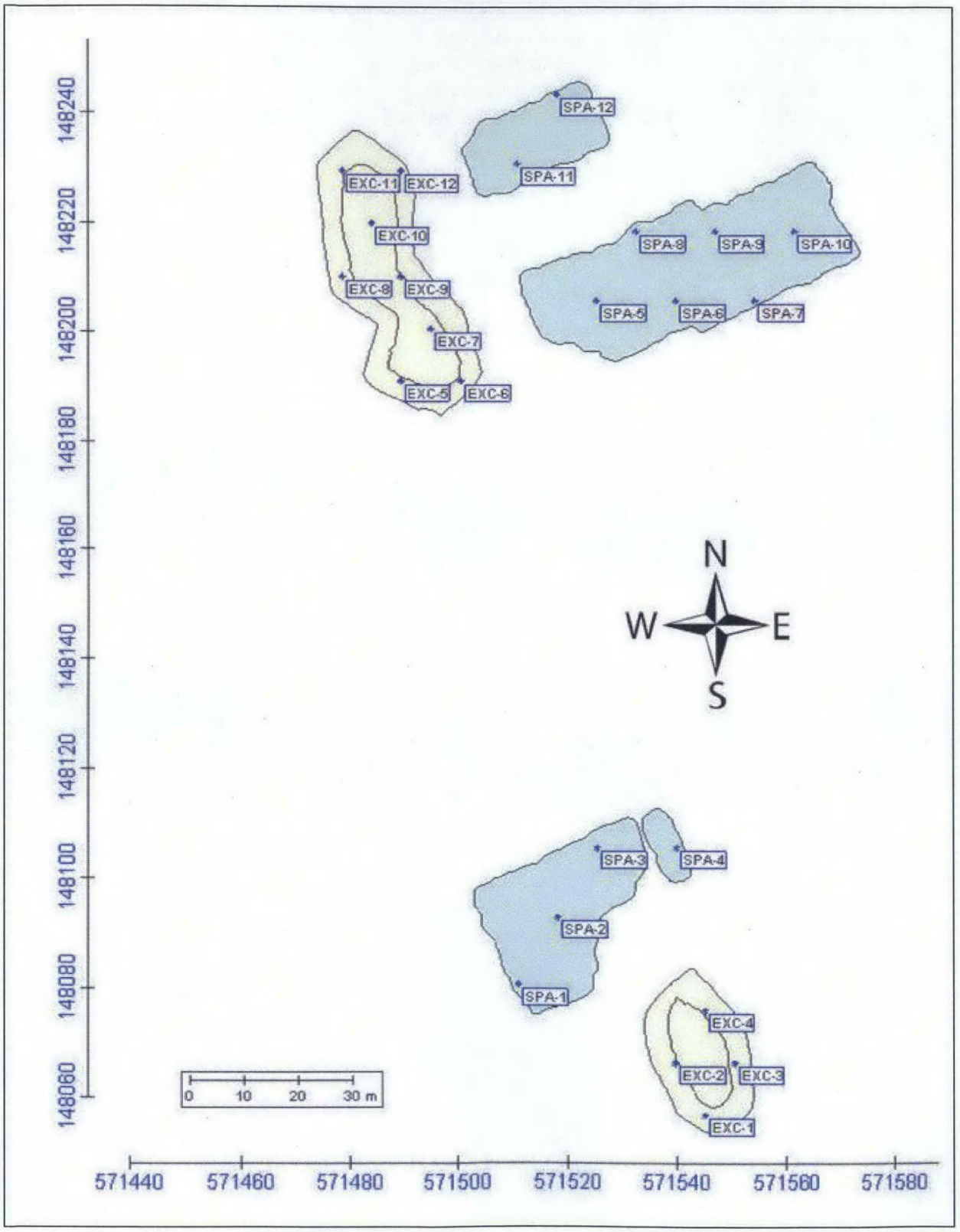
Table 3. The 100-N-96 Waste Site Verification Sample Summary.

Sample Location	HEIS Sample Number	Northing	Easting	Sample Analysis
EXC-1	J1V6V6	148057.0	571545.1	ICP metals [a], mercury, hexavalent chromium, PCB, PAH, TPH, and VOA
EXC-2	J1V6V7	148066.5	571539.6	
EXC-3	J1V6V8	148066.5	571550.6	
EXC-4	J1V6V9	148076.1	571545.1	
EXC-5	J1V6W0	148191.1	571489.8	
EXC-6	J1V6W1	148191.1	571500.8	
EXC-7	J1V6W2	148200.7	571495.3	
EXC-8	J1V6W3	148210.3	571478.7	
EXC-9	J1V6W4	148210.3	571489.8	
EXC-10	J1V6W5	148219.8	571484.2	
EXC-11	J1V6W6	148229.4	571478.7	
EXC-12	J1V6W7	148229.4	571489.8	
Duplicate of J1V6W1	J1V6W8	148191.1	571500.8	
SPA-1	J1V703	148080.6	571511.0	
SPA-2	J1V704	148093.2	571518.2	
SPA-3	J1V705	148105.7	571525.5	
SPA-4	J1V706	148105.7	571539.9	
SPA-5	J1V707	148205.8	571525.5	
SPA-6	J1V708	148205.8	571539.9	
SPA-7	J1V709	148205.8	571554.4	
SPA-8	J1V710	148218.3	571532.7	
SPA-9	J1V711	148218.3	571547.1	
SPA-10	J1V712	148218.3	571561.6	
SPA-11	J1V713	148230.9	571511.0	
SPA-12	J1V714	148243.4	571518.2	
Duplicate of J1V714	J1V715	148243.4	571518.2	
Equipment blank	J1V716	NA	NA	ICP metals [a], mercury, PAH, VOA

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

EXC = excavation
HEIS = Hanford Environmental Information System
ICP = inductively coupled plasma
NA = not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SPA = staging pile area
TPH = total petroleum hydrocarbon
VOA = volatile organic analysis

Figure 10. The 100-N-96 Waste Site Verification Sample Locations.



Verification Sampling Results

The primary statistical calculation to evaluate compliance with cleanup standards is the 95% upper confidence limit (UCL) on the arithmetic mean of the data. The 95% UCL values for each detected COPC are computed for the 100-N-96 excavation and staging pile area decision units as specified by the 100-N Area RDR/RAWP (DOE-RL 2013). The calculations are provided in Appendix C. When a nonradionuclide COPC was detected in fewer than 50% of the verification samples collected for a decision unit, the maximum detected value was used for comparison to RAGs. If no detections for a given COPC were reported in the data set, then no statistical calculation or evaluation was performed for that COPC.

Evaluation of the verification data was performed by direct comparison of the statistical or maximum sample results for each COPC against the cleanup criteria. Comparisons of the statistical results for COPCs against the site RAGs are summarized in Tables 4 and 5. Contaminants that were not detected by laboratory analysis are excluded from these tables. Calculated cleanup levels are not presented in the Cleanup Levels and Risk Calculations Database (Ecology 2015) under WAC 173-340-740(3) for calcium, magnesium, potassium, silicon, and sodium. The EPA's *Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual* (EPA 1989) recommends that aluminum and iron not be considered in site risk evaluations. Therefore, aluminum, calcium, iron, magnesium, potassium, silicon, and sodium are not considered site COPCs and are also not included in these tables. The laboratory-reported data results for all constituents are stored in a Washington Closure Hanford project-specific database prior to inclusion into the Hanford Environmental Information System and are presented as part of the 95% UCL calculation in Appendix C.

Table 4. Comparison of Contaminant Concentrations to Action Levels for the 100-N-96 Waste Site Verification Samples (Excavation Area). (2 Pages)

COPC	Statistical or Maximum Result [b] (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		
Arsenic	2.6 (<BG)	20 [c]	20 [c]	20 [c]	No	--
Barium	63.7 (<BG)	16,000 [d]	200	400	No	--
Beryllium	0.29 (<BG)	10.4 [e]	1.51 [c]	1.51 [c]	No	--
Boron [f]	1.1	16,000 [d]	320	-- [g]	No	--
Cadmium	0.042 (<BG)	13.9 [e]	0.81 [c]	0.81 [c]	No	--
Chromium	9.3 (<BG)	120,000 [d]	18.5 [c]	18.5 [c]	No	--
Cobalt	7.1 (<BG)	1,600 [d]	32	-- [g]	No	--
Copper	17.0 (<BG)	2,960 [d]	59.2	22.0 [c]	No	--
Hexavalent chromium [f]	0.299	2.1 [e]	4.8	2	No	--
Lead	4.1 (<BG)	353 [h]	10.2 [c]	10.2 [c]	No	--
Manganese	290 (<BG)	11,200 [d]	512 [c]	-- [g]	No	--
Mercury	0.0083 (<BG)	24 [d]	0.33 [c]	0.33 [c]	No	--
Molybdenum [f]	0.29	400 [d]	8	-- [g]	No	--

Table 4. Comparison of Contaminant Concentrations to Action Levels for the 100-N-96 Waste Site Verification Samples (Excavation Area). (2 Pages)

COPC	Statistical or Maximum Result [b] (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		
Nickel	10.5 (<BG)	1,600 [d]	19.1 [c]	27.4	No	--
Vanadium	41.5 (<BG)	560 [d]	85.1 [c]	-- [g]	No	--
Zinc	36.2 (<BG)	24,000 [d]	480	67.8 [c]	No	--
TPH – diesel range [f]	3.2	--	200	200	No	--
TPH – diesel range extended [f]	4.2	--	200	200	No	--
1,1-Dichloroethene [f]	0.0012	4,000 [i]	0.7 [i]	4,620 [i]	No	--
Acetone [f]	0.025	72,000 [d]	720	-- [g]	No	--
Methylene chloride [f]	0.0032	133 [j]	0.5	0.47	No	--

[a] RAGs obtained from the 100-N Area RDR/RAWP (DOE-RL 2013).
[b] 95% UCL or maximum results as described in the *100-N-96 Waste Site Cleanup Verification 95% UCL Calculation*, Calculation Number 0100N-CA-V0290, Washington Closure Hanford, Richland, Washington, provided in Appendix C of this document.
[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700(4)(d) (Ecology 1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement project managers as discussed in Section 2.1.2.1 of the 100-N Area RDR/RAWP (DOE-RL 2013).
[d] Noncarcinogenic cleanup level calculated from WAC 173-340-740(3), Method B, Ecology 1996.
[e] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], Ecology 1996).
[f] No Hanford Site-specific or Washington State background value available.
[g] No parameters (bioconcentration factors or ambient water quality criteria values) are available from the Washington State Department of Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], 1996 [Method B for surface waters]).
[h] Use *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children* (EPA 1994).
[i] Cleanup Levels and Risk Calculations (CLARC) Database (Ecology 2015).
[j] Carcinogenic cleanup level calculated per WAC 173-340-740(3), Method B, 1996.

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

Table 5. Comparison of Contaminant Concentrations to Action Levels for the 100-N-96 Waste Site Verification Samples (Staging Pile Area). (2 Pages)

COPC	Statistical or Maximum Result [b] (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		
Arsenic	3.1 (<BG)	20 [c]	20 [c]	20 [c]	No	--
Barium	84.9 (<BG)	16,000 [d]	200	400	No	--
Beryllium	0.30 (<BG)	10.4 [e]	1.51 [c]	1.51 [c]	No	--
Boron [f]	1.7	16,000 [d]	320	-- [g]	No	--
Cadmium	0.16 (<BG)	13.9 [e]	0.81 [c]	0.81 [c]	No	--
Chromium	11.8 (<BG)	120,000 [d]	18.5 [c]	18.5 [c]	No	--

Table 5. Comparison of Contaminant Concentrations to Action Levels for the 100-N-96 Waste Site Verification Samples (Staging Pile Area). (2 Pages)

COPC	Statistical or Maximum Result [b] (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		
Cobalt	8.1 (<BG)	1,600 [d]	32	-- [g]	No	--
Copper	19.7 (<BG)	2,960 [d]	59.2	22.0 [c]	No	--
Hexavalent chromium [f]	0.230	2.1 [e]	4.8	2	No	--
Lead	6.3 (<BG)	353 [h]	10.2 [c]	10.2 [c]	No	--
Manganese	342 (<BG)	11,200 [d]	512 [c]	-- [g]	No	--
Mercury	0.0081 (<BG)	24 [d]	0.33 [c]	0.33 [c]	No	--
Nickel	11.1 (<BG)	1,600 [d]	19.1 [c]	27.4	No	--
Selenium	0.92	400 [d]	5	1	No	--
Vanadium	39.9 (<BG)	560 [d]	85.1 [c]	-- [g]	No	--
Zinc	43.2 (<BG)	24,000 [d]	480	67.8 [c]	No	--
TPH – diesel range [f]	2.0	--	200	200	No	--
TPH – diesel range extended [f]	3.7	--	200	200	No	--
1,1-Dichloroethene [f]	0.00093	4,000 [i]	0.7 [i]	4,620 [i]	No	--
Acetone [f]	0.0083	72,000 [d]	720	-- [g]	No	--
Methylene chloride [f]	0.0032	133 [j]	0.5	0.47	No	--

[a] RAGs obtained from the 100-N Area RDR/RAWP (DOE-RL 2013).
[b] 95% UCL or maximum results as described in the *100-N-96 Waste Site Cleanup Verification 95% UCL Calculation*, Calculation Number 0100N-CA-V0290, Washington Closure Hanford, Richland, Washington, provided in Appendix C of this document.
[c] Where cleanup levels are less than background, cleanup levels default to background per WAC 173-340-700(4)(d) (Ecology 1996). The arsenic cleanup level of 20 mg/kg has been agreed to by the Tri-Party Agreement project managers as discussed in Section 2.1.2.1 of the 100-N Area RDR/RAWP (DOE-RL 2013).
[d] Noncarcinogenic cleanup level calculated from WAC 173-340-740(3), Method B, Ecology 1996.
[e] Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], Ecology 1996).
[f] No Hanford Site-specific or Washington State background value available.
[g] No parameters (bioconcentration factors or ambient water quality criteria values) are available from the Washington State Department of Ecology Cleanup Levels and Risk Calculations database or other databases to calculate cleanup levels (WAC 173-340-730[3][a][iii], 1996 [Method B for surface waters]).
[h] Use *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children* (EPA 1994).
[i] Cleanup Levels and Risk Calculations (CLARC) Database (Ecology 2015).
[j] Carcinogenic cleanup level calculated per WAC 173-340-740(3), Method B, 1996.

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

DATA EVALUATION

This section demonstrates that contaminant concentrations at the 100-N-96 waste site and associated waste SPA achieve the applicable RAGs developed to support unrestricted land use at the 100 Area as documented in the 100-N Area RDR/RAWP (DOE-RL 2013).

Attainment of Nonradionuclide RAGs

Tables 4 and 5 compares the cleanup verification sample values for the 100-N-96 waste site excavation and the waste SPA decision units to the applicable soil RAGs for direct exposure, protection of groundwater, and protection of the Columbia River. All COPCs were quantified below the direct exposure, groundwater, and river protection RAGs. Therefore, residual concentrations of all COPCs are predicted to be protective of groundwater and the Columbia River.

Three-Part Test for Nonradionuclides

When using a statistical sampling approach, a RAG requirement for nonradionuclides is the WAC 173-340-740(7)(e) three-part test. The application of the three-part test for the 100-N-96 remediation footprint is included in the statistical calculations (Appendix C). The results of this evaluation indicate that residual COPC concentrations pass the three-part test in comparison against the applicable RAGs. Therefore, residual concentrations of all COPCs within the 100-N-96 waste site are predicted to be protective of groundwater and the Columbia River.

An additional application of the three-part test is included for the statistical data sets, which default to the maximum because less than half of the data set was detected. The results of this evaluation indicate that all residual COPC concentrations pass the three-part test in comparison against applicable RAGs. Therefore, residual concentrations of all COPCs within the 100-N-96 waste site are predicted to be protective of groundwater and the Columbia River.

Direct Contact Noncarcinogenic Hazard Quotient Remedial Action Goal

Assessment of the risk requirements for the 100-N-96 waste site was determined by calculation of the hazard quotient and excess carcinogenic risk. The requirements include an individual hazard quotient of less than 1.0, a cumulative hazard quotient of less than 1.0, an individual contaminant carcinogenic risk of less than 1×10^{-6}, and a cumulative excess carcinogenic risk of less than 1×10^{-5}. The hazard quotient and excess carcinogenic risk calculations for direct contact were conservatively performed for the 100-N-96 waste site using the highest of the statistical or maximum values from all areas. Risk values were not calculated for constituents that were not detected or were detected at concentrations below Hanford Site or Washington State background values. All individual hazard quotients are below 1.0, and all individual excess carcinogenic risk values are below 1×10^{-6}. The direct contact cumulative hazard quotient for the 100-N-96 waste site is 4.4×10^{-3}, and the cumulative excess carcinogenic risk value is 1.4×10^{-7}, satisfying the criteria of less than 1.0 and less than 1×10^{-5}, respectively. Therefore, the nonradionuclide risk requirements are met.

Hazard Quotient and Carcinogenic Risk Calculation for Groundwater

Assessment of the risk requirements for the 100-N-96 waste site included calculation of the hazard quotient and carcinogenic (excess cancer) risk values for groundwater protection for nonradionuclides. The requirements include an individual and cumulative hazard quotient of

less than 1.0, an individual excess carcinogenic risk of less than 1×10^{-6}, and a cumulative excess carcinogenic risk of less than 1×10^{-5}. These risk values were conservatively calculated for the entire waste site using the highest statistical or maximum value for each COPC from each of the decision units. Risk values were calculated for constituents that were detected at concentrations above Hanford Site or Washington State background values or for which there is no background value. In addition, the distribution coefficients for these contaminants are less than that necessary to show no migration to groundwater in 1,000 years based on RESRAD modeling discussed in Appendix C of the 100-N Area RDR/RAWP (DOE-RL 2013). Based on this model and a vadose zone of approximately 17 m (56 ft) in thickness, a K_d of 4.4 or greater is required to show no predicted migration to groundwater in 1,000 years. All individual hazard quotients for noncarcinogenic constituents are less than 1.0. The cumulative hazard quotient for the 100-N-96 waste site is 6.8×10^{-2}, which is less than 1.0. The excess cancer risk for methylene chloride, the only contaminant subject to the excess cancer risk calculation, is 5.5×10^{-9}, which is less than the individual carcinogenic risk of less than 1×10^{-6} and the cumulative carcinogenic risk of less than 1×10^{-5}. Therefore, the nonradionuclide risk requirements related to groundwater are met.

DATA QUALITY ASSESSMENT

A data quality assessment (DQA) was performed to compare the verification sampling approach, the field logbooks, and resulting analytical data with the sampling and data quality requirements specified by the project objectives and performance specifications. The DQA for the 100-N-96 waste site established that the data are of the right type, quality, and quantity to support site verification decisions within specified error tolerances. All analytical data were found to be acceptable for decision-making purposes. The cleanup verification sample analytical data are stored in a Washington Closure Hanford project-specific database for data evaluation prior to its archival in the Hanford Environmental Information System and are summarized in Appendix C. The detailed DQA is presented in Appendix D.

SUMMARY FOR INTERIM CLOSURE

The 100-N-96 waste site has been evaluated in accordance with the 100-N Area ROD (EPA 1999) and the 100-N Area RDR/RAWP (DOE-RL 2013). Confirmatory and verification sampling and modeling results indicate that the residual concentrations of COPCs at this site meet the remedial action objectives and corresponding RAGs for direct exposure, groundwater protection, and river protection. In accordance with this evaluation, the confirmatory and verification sampling and modeling results support a reclassification of the 100-N-96 waste site to Interim Closed Out. Contamination above direct exposure levels was not observed in the shallow zone soils and is concluded to not exist in deep zone soils; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone soil are not required.

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APPENDIX A

EXCEEDANCES OF ECOLOGICAL SCREENING LEVELS FOR THE 100-N-96 WASTE SITE

Table A-1. Maximum Contaminant Concentrations that Exceed Ecological Screening Levels for the 100-N-96 Waste Site [a].

Hazardous Substance	Background	2007 WAC 173-340, Table 749-3			EPA Ecological Soil Screening Levels [b]				Maximum or Statistical Result
		Plants	Soil Biota	Wildlife	Plants	Soil Biota	Avian [c]	Mammalian [c]	
		Metals (mg/kg):							
Boron	--	0.5	--	--	--	--	--	--	1.7
Manganese	512	1,100	--	1,500	220	450	4,300	4,000	342 (<BG)
Selenium	0.78	1	70	0.3	0.52	4.1	1.2	0.63	0.92
Vanadium	85.1	2	--	--	--	--	7.8	280	41.5 (<BG)

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

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

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

[c] Wildlife.

-- = not applicable

BG = Hanford Site Background

EPA = U.S. Environmental Protection Agency

WAC= *Washington Administrative Code*

APPENDIX B

CONFIRMATORY SAMPLING RESULTS

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

Sample Number	Sample Date	Sample Location	Northing	Easting	Aluminum			Antimony			Arsenic			Barium		
					mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
J1L904	10/26/11	Equipment Blank	148104	571663	219		3.21	0.385	U	0.39	0.641	U	0.64	1.97		0.32
J1L906	10/26/11	TP-4	148104	571663	10300		6.3	0.756	U	0.76	3.35		1.26	70.3		0.63
J1L907	10/26/11	TP-3	148068	571545	8000		4.6	19		0.55	4.73		0.92	109		0.46
J1L908	10/26/11	TP-8	148154	571493	8820		4.98	0.597	U	0.6	3.44		1	74		0.5
J1L909	10/26/11	TP-7	148196	571494	9910		4.56	0.547	U	0.55	2.94		0.91	72.9		0.46
J1L910	10/26/11	TP-6	148228	571483	5200		5.16	0.62	U	0.62	1.89		1.03	47.7		0.52
J1L911	10/26/11	Duplicate of J1L910	148228	571483	5060		4.89	1.45		0.59	8.81		0.98	56.4		0.49
J1L915	10/27/11	TP-2	148257	571500	7950		3.77	0.453	U	0.45	2.35		0.76	60		0.38
J1L916	10/27/11	TP-5	148297	571451	5050		4.48	0.538	U	0.54	2.02		0.9	37.3		0.45
J1L917	10/27/11	TP-1	148297	571515	5570		4.15	0.498	U	0.5	1.72		0.83	37.9		0.42
J1L919	10/26/11	TP-6 (waste characterization)	148228	571483	1280		24.6	32.5		2.95	9.51		4.92	45.4		2.46
J1L920	10/26/11	TP-6 (waste characterization)	148228	571483	7480		4.55	0.545	U	0.55	2.84		0.91	113		0.46

Sample Number	Sample Date	Sample Location	Northing	Easting	Beryllium			Boron			Cadmium			Calcium		
					mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
J1L904	10/26/11	Equipment Blank	148104	571663	0.038	B	0.13	1.28	U	1.28	0.128	U	0.13	38.6	B	64.1
J1L906	10/26/11	TP-4	148104	571663	0.355		0.25	1.74	B	2.52	0.114	B	0.25	6020		126
J1L907	10/26/11	TP-3	148068	571545	0.264		0.18	3.48		1.84	0.773		0.18	7570		92.1
J1L908	10/26/11	TP-8	148154	571493	0.298		0.2	1.68	B	1.99	0.092	B	0.2	6850		99.6
J1L909	10/26/11	TP-7	148196	571494	0.324		0.18	1.9		1.82	0.089	B	0.18	4140		91.1
J1L910	10/26/11	TP-6	148228	571483	0.204	B	0.21	1.02	B	2.07	0.394		0.21	5100		103
J1L911	10/26/11	Duplicate of J1L910	148228	571483	0.186	B	0.2	6.7		1.96	1.88		0.2	5880		97.8
J1L915	10/27/11	TP-2	148257	571500	0.286		0.15	1.23	B	1.51	0.109	B	0.15	4130		75.5
J1L916	10/27/11	TP-5	148297	571451	0.206		0.18	0.566	B	1.79	0.066	B	0.18	6230		89.7
J1L917	10/27/11	TP-1	148297	571515	0.175		0.17	0.566	B	1.66	0.057	B	0.17	6970		83
J1L919	10/26/11	TP-6 (waste characterization)	148228	571483	0.984	U	0.98	2.98	B	9.84	0.303	B	0.98	292000		984
J1L920	10/26/11	TP-6 (waste characterization)	148228	571483	0.241		0.18	2.57		1.82	4.86		0.18	5780		90.9

Sample Number	Sample Date	Sample Location	Northing	Easting	Chromium			Cobalt			Copper			Iron		
					mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
J1L904	10/26/11	Equipment Blank	148104	571663	0.142		0.13	1.28	U	1.28	0.641	U	0.64	351		12.8
J1L906	10/26/11	TP-4	148104	571663	15.7		0.25	8.4		2.52	20.5		1.26	27000		25.2
J1L907	10/26/11	TP-3	148068	571545	22.7		0.18	11.6		1.84	132		0.92	57900		221
J1L908	10/26/11	TP-8	148154	571493	13.7		0.2	6.22		1.99	14.7		1	18700		19.9
J1L909	10/26/11	TP-7	148196	571494	13.6		0.18	6.78		1.82	14.2		0.91	20500		18.2
J1L910	10/26/11	TP-6	148228	571483	8.39		0.21	6.58		2.07	35.4		1.03	21900		20.7
J1L911	10/26/11	Duplicate of J1L910	148228	571483	17.4		0.2	11.3		1.96	101		0.98	115000		235
J1L915	10/27/11	TP-2	148257	571500	10.1		0.15	6.95		1.51	14.3		0.76	20500		15.1
J1L916	10/27/11	TP-5	148297	571451	6.93		0.18	6.9		1.79	14.4		0.9	20700		17.9
J1L917	10/27/11	TP-1	148297	571515	6.41		0.17	5.78		1.66	12.5		0.83	14800		16.6
J1L919	10/26/11	TP-6 (waste characterization)	148228	571483	24.9		0.98	9.84	U	9.84	27.8		4.92	78100		98.4
J1L920	10/26/11	TP-6 (waste characterization)	148228	571483	13.2		0.18	6.84		1.82	495		0.91	26500		18.2

Sample Number	Sample Date	Sample Location	Northing	Easting	Lead			Magnesium			Manganese			Mercury		
					mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
J1L904	10/26/11	Equipment Blank	148104	571663	0.216	B	0.32	24.7	B	48.1	5.4		3.21	1.05	B	6.41
J1L906	10/26/11	TP-4	148104	571663	3.68		0.63	5590		94.5	384		6.3	0.038	U	0.04
J1L907	10/26/11	TP-3	148068	571545	167		0.46	3800		69.1	391		4.6	0.034		0.03
J1L908	10/26/11	TP-8	148154	571493	3.21		0.5	4670		74.7	298		4.98	0.031	U	0.03
J1L909	10/26/11	TP-7	148196	571494	3.44		0.46	4210		68.3	317		4.56	0.027	U	0.03
J1L910	10/26/11	TP-6	148228	571483	33.3		0.52	3300		77.4	283		5.16	0.015	B	0.03
J1L911	10/26/11	Duplicate of J1L910	148228	571483	95.8		0.49	3310		73.4	504		4.89	0.009	B	0.03
J1L915	10/27/11	TP-2	148257	571500	3.12		0.38	3780		56.6	296		3.77	0.024	U	0.02
J1L916	10/27/11	TP-5	148297	571451	1.96		0.45	3940		67.2	272		4.48	0.025	U	0.02
J1L917	10/27/11	TP-1	148297	571515	1.67		0.42	3070		62.2	209		4.15	0.024	U	0.02
J1L919	10/26/11	TP-6 (waste characterization)	148228	571483	3910		2.46	1060		369	275		24.6	0.028	U	0.03
J1L920	10/26/11	TP-6 (waste characterization)	148228	571483	58.1		0.46	3470		68.2	307		4.55	0.764		0.02

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

Sample Number	Sample Date	Sample Location	Northing	Easting	Molybdenum			Nickel			Potassium			Selenium		
					mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
J1L904	10/26/11	Equipment Blank	148104	571663	0.024	U	0.02	1.28	U	1.28	2.56	U	2.56	45.1	B	256
J1L906	10/26/11	TP-4	148104	571663	0.387	B	2.52	14.6		5.04	1680		504	0.378	U	0.38
J1L907	10/26/11	TP-3	148068	571545	1.22	B	1.84	21.2		3.68	1510		368	0.276	U	0.28
J1L908	10/26/11	TP-8	148154	571493	0.292	B	1.99	11.8		3.98	1370		398	0.299	U	0.3
J1L909	10/26/11	TP-7	148196	571494	0.354	B	1.82	11.1		3.64	1850		364	0.273	U	0.27
J1L910	10/26/11	TP-6	148228	571483	0.407	B	2.07	7.41		4.13	798		413	0.31	U	0.31
J1L911	10/26/11	Duplicate of J1L910	148228	571483	2.84		1.96	30.6		3.91	840		391	0.294	U	0.29
J1L915	10/27/11	TP-2	148257	571500	0.312	B	1.51	9.26		3.02	1350		302	0.226	U	0.23
J1L916	10/27/11	TP-5	148297	571451	0.312	B	1.79	8.38		3.59	648		359	0.269	U	0.27
J1L917	10/27/11	TP-1	148297	571515	0.313	B	1.66	8.13		3.32	695		332	0.249	U	0.25
J1L919	10/26/11	TP-6 (waste characterization)	148228	571483	1.94	B	9.84	10.9	B	19.7	1970	U	1970	1.48	U	1.48
J1L920	10/26/11	TP-6 (waste characterization)	148228	571483	0.734	B	1.82	10.8		3.64	1120		364	0.273	U	0.27

Sample Number	Sample Date	Sample Location	Northing	Easting	Silicon			Silver			Sodium			Vanadium		
					mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
J1L904	10/26/11	Equipment Blank	148104	571663	0.192	U	0.19	146		1.28	0.128	U	0.13	32.1	U	32.1
J1L906	10/26/11	TP-4	148104	571663	696		2.52	0.252	U	0.25	296		63	64.8		3.15
J1L907	10/26/11	TP-3	148068	571545	707		1.84	0.184	U	0.18	372		46	54.1		2.3
J1L908	10/26/11	TP-8	148154	571493	593		1.99	0.199	U	0.2	275		49.8	46.3		2.49
J1L909	10/26/11	TP-7	148196	571494	638		1.82	0.182	U	0.18	242		45.6	51.1		2.28
J1L910	10/26/11	TP-6	148228	571483	475		2.07	0.207	U	0.21	230		51.6	53.7		2.58
J1L911	10/26/11	Duplicate of J1L910	148228	571483	512		1.96	0.196	U	0.2	294		48.9	52.2		2.45
J1L915	10/27/11	TP-2	148257	571500	394		1.51	0.151	U	0.15	252		37.7	53.5		1.89
J1L916	10/27/11	TP-5	148297	571451	336		1.79	0.179	U	0.18	293		44.8	62		2.24
J1L917	10/27/11	TP-1	148297	571515	340		1.66	0.166	U	0.17	550		41.5	37.2		2.07
J1L919	10/26/11	TP-6 (waste characterization)	148228	571483	312		9.84	0.984	U	0.98	101	B	246	2.25	B	12.3
J1L920	10/26/11	TP-6 (waste characterization)	148228	571483	482		1.82	0.182	U	0.18	321		45.5	49.8		2.27

Sample Number	Sample Date	Sample Location	Northing	Easting	Zinc			TPH-Diesel			TPH - Motor Oil (high boiling)		
					mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
J1L904	10/26/11	Equipment Blank	148104	571663	0.345	B	1.6	3230	U	3230	3560	J	9700
J1L906	10/26/11	TP-4	148104	571663	49.2		12.6	4590	U	4590	13800	U	13800
J1L907	10/26/11	TP-3	148068	571545	289		9.21	6930		3490	9970	J	10500
J1L908	10/26/11	TP-8	148154	571493	37.6		9.96	3570	U	3570	10700	U	10700
J1L909	10/26/11	TP-7	148196	571494	40.9		9.11	3440	U	3440	10300	U	10300
J1L910	10/26/11	TP-6	148228	571483	70.1		10.3	30800		3380	36900		10100
J1L911	10/26/11	Duplicate of J1L910	148228	571483	95		9.78	3360	J	3380	4650	J	10100
J1L915	10/27/11	TP-2	148257	571500	41.6		7.55	3310	U	3310	9950	U	9950
J1L916	10/27/11	TP-5	148297	571451	40.3		8.97	3400	U	3400	10200	U	10200
J1L917	10/27/11	TP-1	148297	571515	29.9		8.3	3400	U	3400	12200		10200
J1L919	10/26/11	TP-6 (waste characterization)	148228	571483	26	B	49.2	3310	U	3310	9920	U	9920
J1L920	10/26/11	TP-6 (waste characterization)	148228	571483	153		9.09	56700		3330	91900		9980

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

SAMPLE NUMBER		J1L906			J1L907			J1L908			J1L909			J1L910			J1L911			J1L915		
LOCATION		TP-4			TP-3			TP-8			TP-7			TP-6			Duplicate of			TP-2		
CONSTITUENT	CLASS	10/26/11			10/26/11			10/26/11			10/26/11			10/26/11			10/26/11			10/27/11		
		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
Acenaphthene	PAH	4.81		4.58	13.1		3.47	3.64	U	3.64	3.39	U	3.39	1.15	J	3.38	3.41	U	3.41	3.38	U	3.38
Acenaphthylene	PAH	4.58	U	4.58	25.8		3.47	3.64	U	3.64	3.39	U	3.39	4.23		3.38	6.14		3.41	3.38	U	3.38
Anthracene	PAH	4.58	U	4.58	2.78	J	3.47	3.64	U	3.64	3.39	U	3.39	3.38	U	3.38	3.41	U	3.41	3.38	U	3.38
Benzo(a)anthracene	PAH	4.58	U	4.58	1.84	J	3.47	3.64	U	3.64	3.39	U	3.39	3.38	U	3.38	1.07	J	3.41	3.38	U	3.38
Benzo(a)pyrene	PAH	4.58	U	4.58	1.14	J	3.47	3.64	U	3.64	3.39	U	3.39	1.86	J	3.38	1.89	J	3.41	3.38	U	3.38
Benzo(b)fluoranthene	PAH	4.58	U	4.58	3.47	U	3.47	3.64	U	3.64	3.39	U	3.39	3.38	U	3.38	3.41	U	3.41	3.38	U	3.38
Benzo(ghi)perylene	PAH	4.58	U	4.58	0.885	J	3.47	3.64	U	3.64	3.39	U	3.39	3.38	U	3.38	3.41	U	3.41	3.38	U	3.38
Benzo(k)fluoranthene	PAH	4.58	U	4.58	3.47	U	3.47	3.64	U	3.64	3.39	U	3.39	3.38	U	3.38	3.41	U	3.41	3.38	U	3.38
Chrysene	PAH	4.58	U	4.58	1.46	J	3.47	3.64	U	3.64	3.39	U	3.39	1.37	J	3.38	2.83	J	3.41	3.38	U	3.38
Dibenz[a,h]anthracene	PAH	4.58	U	4.58	3.47	U	3.47	3.64	U	3.64	3.39	U	3.39	3.38	U	3.38	3.41	U	3.41	3.38	U	3.38
Fluoranthene	PAH	2.2	J	4.58	19.8		3.47	3.64	U	3.64	5.43		3.39	4.57		3.38	8.02		3.41	3.38	U	3.38
Fluorene	PAH	1.83	J	4.58	2.26	J	3.47	3.64	U	3.64	1.36	J	3.39	3.38	U	3.38	1.02	J	3.41	0.846	J	3.38
Indeno(1,2,3-cd)pyrene	PAH	4.58	U	4.58	3.47	U	3.47	3.64	U	3.64	3.39	U	3.39	7.13		3.38	9.31		3.41	3.38	U	3.38
Naphthalene	PAH	4.58	U	4.58	22.7		3.47	3.64	U	3.64	3.39	U	3.39	3.38	U	3.38	3.07	J	3.41	3.38	U	3.38
Phenanthrene	PAH	4.58	U	4.58	8.15		3.47	3.64	U	3.64	3.39	U	3.39	1.19	J	3.38	1.19	J	3.41	3.38	U	3.38
Pyrene	PAH	4.58	U	4.58	2.71	J	3.47	3.64	U	3.64	3.39	U	3.39	1.02	J	3.38	1.48	J	3.41	3.38	U	3.38
Aroclor-1016	PCB	18	U	18	69.5	UD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
Aroclor-1221	PCB	18	U	18	69.5	UD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
Aroclor-1232	PCB	18	U	18	69.5	UD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
Aroclor-1242	PCB	18	U	18	69.5	UD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
Aroclor-1248	PCB	18	U	18	69.5	UD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
Aroclor-1254	PCB	18	U	18	226	D	69.5	13.8	U	13.8	13.4	U	13.4	8.82	J	13.5	5.61	J	13.1	13.5	U	13.5
Aroclor-1260	PCB	18	U	18	42.1	JD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
Aroclor-1262	PCB	18	U	18	69.5	UD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
Aroclor-1268	PCB	18	U	18	69.5	UD	69.5	13.8	U	13.8	13.4	U	13.4	13.5	U	13.5	13.1	U	13.1	13.5	U	13.5
1,2,4-Trichlorobenzene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
1,2-Dichlorobenzene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
1,3-Dichlorobenzene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
1,4-Dichlorobenzene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2,4,5-Trichlorophenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2,4,6-Trichlorophenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2,4-Dichlorophenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2,4-Dimethylphenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2,4-Dinitrophenol	SVOA	2260	U	2260	1730	U	1730	1810	U	1810	1710	U	1710	1700	U	1700	1680	U	1680	1670	U	1670
2,4-Dinitrotoluene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2,6-Dinitrotoluene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2-Chloronaphthalene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2-Chlorophenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2-Methylnaphthalene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2-Methylphenol (cresol, o-)	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
2-Nitroaniline	SVOA	2260	U	2260	1730	U	1730	1810	U	1810	1710	U	1710	1700	U	1700	1680	U	1680	1670	U	1670

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

SAMPLE NUMBER		J1L906			J1L907			J1L908			J1L909			J1L910			J1L911			J1L915		
LOCATION		TP-4			TP-3			TP-8			TP-7			TP-6			Duplicate of			TP-2		
CONSTITUENT	CLASS	10/26/11			10/26/11			10/26/11			10/26/11			10/26/11			10/26/11			10/27/11		
		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
2-Nitrophenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
3,3'-Dichlorobenzidine	SVOA	903	U	903	691	U	691	722	U	722	684	U	684	679	U	679	672	U	672	669	U	669
3+4 Methylphenol (cresol, m+p)	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
3-Nitroaniline	SVOA	2260	U	2260	1730	U	1730	1810	U	1810	1710	U	1710	1700	U	1700	1680	U	1680	1670	U	1670
4,6-Dinitro-2-methylphenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
4-Bromophenylphenyl ether	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
4-Chloro-3-methylphenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
4-Chloroaniline	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
4-Chlorophenylphenyl ether	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
4-Nitroaniline	SVOA	2260	U	2260	1730	U	1730	1810	U	1810	1710	U	1710	1700	U	1700	1680	U	1680	1670	U	1670
4-Nitrophenol	SVOA	2260	U	2260	1730	U	1730	1810	U	1810	1710	U	1710	1700	U	1700	1680	U	1680	1670	U	1670
Acenaphthene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Acenaphthylene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Anthracene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Benzo(a)anthracene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Benzo(a)pyrene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Benzo(b)fluoranthene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Benzo(ghi)perylene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Benzo(k)fluoranthene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Bis(2-chloro-1-methylethyl)ether	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Bis(2-Chloroethoxy)methane	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Bis(2-chloroethyl) ether	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Bis(2-ethylhexyl) phthalate	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Butylbenzylphthalate	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Carbazole	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Chrysene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Dibenz[a,h]anthracene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Dibenzofuran	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Diethyl phthalate	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Dimethyl phthalate	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Di-n-butylphthalate	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Di-n-octylphthalate	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Fluoranthene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Fluorene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Hexachlorobenzene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Hexachlorobutadiene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Hexachlorocyclopentadiene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Hexachloroethane	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Indeno(1,2,3-cd)pyrene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Isophorone	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Naphthalene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

SAMPLE NUMBER		J1L906			J1L907			J1L908			J1L909			J1L910			J1L911			J1L915		
LOCATION		TP-4			TP-3			TP-8			TP-7			TP-6			Duplicate of			TP-2		
CONSTITUENT	CLASS	10/26/11			10/26/11			10/26/11			10/26/11			10/26/11			10/26/11			10/27/11		
		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
Nitrobenzene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
N-Nitroso-di-n-dipropylamine	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
N-Nitrosodiphenylamine	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Pentachlorophenol	SVOA	2260	U	2260	1730	U	1730	1810	U	1810	1710	U	1710	1700	U	1700	1680	U	1680	1670	U	1670
Phenanthrene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Phenol	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
Pyrene	SVOA	452	U	452	346	U	346	361	U	361	342	U	342	340	U	340	336	U	336	334	U	334
1,1,1-Trichloroethane	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
1,1,2,2-Tetrachloroethane	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
1,1,2-Trichloroethane	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
1,1-Dichloroethane	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
1,1-Dichloroethene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
1,2-Dichloroethane	VOA	7.04	U	7.04	5.38	U	5.38	7.14	U	7.14	5.77	U	5.77	5.45	U	5.45	5.25	U	5.25	5.84	U	5.84
1,2-Dichloroethene(Total)	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
1,2-Dichloropropane	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
2-Butanone	VOA	14.1	U	14.1	10.8	U	10.8	14.3	U	14.3	11.5	U	11.5	10.9	U	10.9	10.5	U	10.5	11.7	U	11.7
2-Hexanone	VOA	14.1	U	14.1	10.8	U	10.8	14.3	U	14.3	11.5	U	11.5	10.9	U	10.9	10.5	U	10.5	11.7	U	11.7
4-Methyl-2-Pentanone	VOA	14.1	U	14.1	10.8	U	10.8	14.3	U	14.3	11.5	U	11.5	10.9	U	10.9	10.5	U	10.5	11.7	U	11.7
Acetone	VOA	8.1	J	14.1	10.8	U	10.8	14.3	U	14.3	11.5	U	11.5	10.9	U	10.9	10.5	U	10.5	11.6	J	11.7
Benzene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Bromodichloromethane	VOA	7.04	U	7.04	5.38	U	5.38	7.14	U	7.14	5.77	U	5.77	5.45	U	5.45	5.25	U	5.25	5.84	U	5.84
Bromoform	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Bromomethane	VOA	11.7	U	11.7	8.97	U	8.97	11.9	U	11.9	9.62	U	9.62	9.09	U	9.09	8.75	U	8.75	9.74	U	9.74
Carbon disulfide	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Carbon tetrachloride	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Chlorobenzene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Chloroethane	VOA	11.7	U	11.7	8.97	U	8.97	11.9	U	11.9	9.62	U	9.62	9.09	U	9.09	8.75	U	8.75	9.74	U	9.74
Chloroform	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Chloromethane	VOA	11.7	U	11.7	8.97	U	8.97	11.9	U	11.9	9.62	U	9.62	9.09	U	9.09	8.75	U	8.75	9.74	U	9.74
cis-1,2-Dichloroethylene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
cis-1,3-Dichloropropene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Dibromochloromethane	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Ethylbenzene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Methylenechloride	VOA	5.72	J	7.04	1.91	J	5.38	3.18	J	7.14	5.77	U	5.77	2.75	J	5.45	2.44	J	5.25	7.08		5.84
Styrene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Tetrachloroethene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Toluene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
trans-1,2-Dichloroethylene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
trans-1,3-Dichloropropene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Trichloroethene	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87
Vinyl chloride	VOA	11.7	U	11.7	8.97	U	8.97	11.9	U	11.9	9.62	U	9.62	9.09	U	9.09	8.75	U	8.75	9.74	U	9.74
Xylenes (total)	VOA	5.86	U	5.86	4.49	U	4.49	5.95	U	5.95	4.81	U	4.81	4.54	U	4.54	4.37	U	4.37	4.87	U	4.87

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

SAMPLE NUMBER		J1L916			J1L917			J1L919			J1L920			J1L904			J1L905			J1L914		
LOCATION		TP-5			TP-1			TP-6			TP-6			Equipment Blank			Trip Blank			Trip Blank		
CONSTITUENT	CLASS	10/27/11			10/27/11			10/26/11			10/26/11			10/26/11			10/26/11			10/27/11		
		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
Acenaphthene	PAH	3.29	U	3.29	1.83	J	3.32	4.28		3.29	14.3		3.31	3.32	U	3.32						
Acenaphthylene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	63.8		3.31	3.32	U	3.32						
Anthracene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	4.97		3.31	3.32	U	3.32						
Benzo(a)anthracene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	4.75		3.31	3.32	U	3.32						
Benzo(a)pyrene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	4.9		3.31	3.32	U	3.32						
Benzo(b)fluoranthene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	3.31	U	3.31	3.32	U	3.32						
Benzo(ghi)perylene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	3.31	U	3.31	3.32	U	3.32						
Benzo(k)fluoranthene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	2.53	J	3.31	3.32	U	3.32						
Chrysene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	3.49		3.31	3.32	U	3.32						
Dibenz[a,h]anthracene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	1.67	J	3.31	3.32	U	3.32						
Fluoranthene	PAH	3.29	U	3.29	3.32	U	3.32	2.67	J	3.31	51.8		3.31	3.32	U	3.32						
Fluorene	PAH	0.988	J	3.29	0.996	J	3.32	3.25	J	3.31	3.31		3.31	1.41	J	3.32						
Indeno(1,2,3-cd)pyrene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	11.3		3.31	3.32	U	3.32						
Naphthalene	PAH	3.29	U	3.29	3.32	U	3.32	1.26	J	3.31	5.47		3.31	3.32	U	3.32						
Phenanthrene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	18.9		3.31	3.32	U	3.32						
Pyrene	PAH	3.29	U	3.29	3.32	U	3.32	3.31	U	3.31	4.89		3.31	3.32	U	3.32						
Aroclor-1016	PCB	13.5	U	13.5	13.2	U	13.2	36.2	U	36.2	12.9	U	12.9									
Aroclor-1221	PCB	13.5	U	13.5	13.2	U	13.2	36.2	U	36.2	12.9	U	12.9									
Aroclor-1232	PCB	13.5	U	13.5	13.2	U	13.2	36.2	U	36.2	12.9	U	12.9									
Aroclor-1242	PCB	13.5	U	13.5	13.2	U	13.2	36.2	U	36.2	12.9	U	12.9									
Aroclor-1248	PCB	13.5	U	13.5	13.2	U	13.2	16.3	J	36.2	12.9	U	12.9									
Aroclor-1254	PCB	13.5	U	13.5	13.2	U	13.2	17.7	J	36.2	105		12.9									
Aroclor-1260	PCB	13.5	U	13.5	13.2	U	13.2	36.2	U	36.2	32.4		12.9									
Aroclor-1262	PCB	13.5	U	13.5	13.2	U	13.2	36.2	U	36.2	12.9	U	12.9									
Aroclor-1268	PCB	13.5	U	13.5	13.2	U	13.2	36.2	U	36.2	12.9	U	12.9									
1,2,4-Trichlorobenzene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
1,2-Dichlorobenzene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
1,3-Dichlorobenzene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
1,4-Dichlorobenzene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2,4,5-Trichlorophenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2,4,6-Trichlorophenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2,4-Dichlorophenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2,4-Dimethylphenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2,4-Dinitrophenol	SVOA	1680	U	1680	1670	U	1670	1610	U	1610	1610	U	1610									
2,4-Dinitrotoluene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2,6-Dinitrotoluene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2-Chloronaphthalene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2-Chlorophenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2-Methylnaphthalene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2-Methylphenol (cresol, o-)	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
2-Nitroaniline	SVOA	1680	U	1680	1670	U	1670	1610	U	1610	1610	U	1610									

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

SAMPLE NUMBER		J1L916			J1L917			J1L919			J1L920			J1L904			J1L905			J1L914		
LOCATION		TP-5			TP-1			TP-6			TP-6			Equipment Blank			Trip Blank			Trip Blank		
CONSTITUENT	CLASS	10/27/11			10/27/11			10/26/11			10/26/11			10/26/11			10/26/11			10/27/11		
		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
2-Nitrophenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
3,3'-Dichlorobenzidine	SVOA	672	U	672	668	U	668	645	U	645	642	U	642									
3+4 Methylphenol (cresol, m+p)	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
3-Nitroaniline	SVOA	1680	U	1680	1670	U	1670	1610	U	1610	1610	U	1610									
4,6-Dinitro-2-methylphenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
4-Bromophenylphenyl ether	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
4-Chloro-3-methylphenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
4-Chloroaniline	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
4-Chlorophenylphenyl ether	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
4-Nitroaniline	SVOA	1680	U	1680	1670	U	1670	1610	U	1610	1610	U	1610									
4-Nitrophenol	SVOA	1680	U	1680	1670	U	1670	1610	U	1610	1610	U	1610									
Acenaphthene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Acenaphthylene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Anthracene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Benzo(a)anthracene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Benzo(a)pyrene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Benzo(b)fluoranthene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Benzo(ghi)perylene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Benzo(k)fluoranthene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Bis(2-chloro-1-methylethyl)ether	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Bis(2-Chloroethoxy)methane	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Bis(2-chloroethyl) ether	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Bis(2-ethylhexyl) phthalate	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Butylbenzylphthalate	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Carbazole	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Chrysene	SVOA	336	U	336	334	U	334	323	U	323	59.1	J	321									
Dibenz[a,h]anthracene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Dibenzofuran	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Diethyl phthalate	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Dimethyl phthalate	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Di-n-butylphthalate	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Di-n-octylphthalate	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Fluoranthene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Fluorene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Hexachlorobenzene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Hexachlorobutadiene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Hexachlorocyclopentadiene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Hexachloroethane	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Indeno(1,2,3-cd)pyrene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Isophorone	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Naphthalene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									

Table B-1. 100-N-96 Waste Site Confirmatory Sampling Results. (8 Pages)

SAMPLE NUMBER		J1L916			J1L917			J1L919			J1L920			J1L904			J1L905			J1L914		
LOCATION		TP-5			TP-1			TP-6			TP-6			Equipment Blank			Trip Blank			Trip Blank		
CONSTITUENT	CLASS	10/27/11			10/27/11			10/26/11			10/26/11			10/26/11			10/26/11			10/27/11		
		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
Nitrobenzene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
N-Nitroso-di-n-dipropylamine	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
N-Nitrosodiphenylamine	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Pentachlorophenol	SVOA	1680	U	1680	1670	U	1670	1610	U	1610	1610	U	1610									
Phenanthrene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Phenol	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
Pyrene	SVOA	336	U	336	334	U	334	323	U	323	321	U	321									
1,1,1-Trichloroethane	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
1,1,2,2-Tetrachloroethane	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
1,1,2-Trichloroethane	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
1,1-Dichloroethane	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
1,1-Dichloroethene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
1,2-Dichloroethane	VOA	7.63	U	7.63	4.88	U	4.88	6.52	U	6.52	6.38	U	6.38				6.67	U	6.67	6.49	U	6.49
1,2-Dichloroethene(Total)	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
1,2-Dichloropropane	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
2-Butanone	VOA	15.3	U	15.3	9.77	U	9.77	13	U	13	12.8	U	12.8				7.16	J	13.3	6.6	J	13
2-Hexanone	VOA	15.3	U	15.3	9.77	U	9.77	13	U	13	12.8	U	12.8				13.3	U	13.3	13	U	13
4-Methyl-2-Pentanone	VOA	15.3	U	15.3	9.77	U	9.77	13	U	13	12.8	U	12.8				13.3	U	13.3	13	U	13
Acetone	VOA	15.3	U	15.3	9.77	U	9.77	12.2	J	13	12.8	U	12.8				34.3		13.3	35		13
Benzene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Bromodichloromethane	VOA	7.63	U	7.63	4.88	U	4.88	6.52	U	6.52	6.38	U	6.38				6.67	U	6.67	6.49	U	6.49
Bromoform	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Bromomethane	VOA	12.7	U	12.7	8.14	U	8.14	10.9	U	10.9	10.6	U	10.6				11.1	U	11.1	10.8	U	10.8
Carbon disulfide	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Carbon tetrachloride	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Chlorobenzene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Chloroethane	VOA	12.7	U	12.7	8.14	U	8.14	10.9	U	10.9	10.6	U	10.6				11.1	U	11.1	10.8	U	10.8
Chloroform	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Chloromethane	VOA	12.7	U	12.7	8.14	U	8.14	10.9	U	10.9	10.6	U	10.6				11.1	U	11.1	10.8	U	10.8
cis-1,2-Dichloroethylene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
cis-1,3-Dichloropropene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Dibromochloromethane	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Ethylbenzene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Methylenechloride	VOA	3.48	J	7.63	2.03	J	4.88	6.52	U	6.52	6.38	U	6.38				6.67	U	6.67	3.23	J	6.49
Styrene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Tetrachloroethene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Toluene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
trans-1,2-Dichloroethylene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
trans-1,3-Dichloropropene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Trichloroethene	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41
Vinyl chloride	VOA	12.7	U	12.7	8.14	U	8.14	10.9	U	10.9	10.6	U	10.6				11.1	U	11.1	10.8	U	10.8
Xylenes (total)	VOA	6.36	U	6.36	4.07	U	4.07	5.43	U	5.43	5.32	U	5.32				5.56	U	5.56	5.41	U	5.41

APPENDIX C

CALCULATIONS

APPENDIX C

CALCULATION BRIEFS

The calculations in this appendix are kept in the active Washington Closure Hanford project files and are available upon request. When the project is completed, the 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-N-96 Waste Site Cleanup Verification, 95% UCL Calculations, 0100N-CA-V0290, Rev. 0, Washington Closure Hanford, Richland, Washington.

100-N-96 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations, 0100N-CA-V0291, Rev. 0, Washington Closure Hanford, Richland, Washington.

100-N-96 Waste Site Hazard Quotient and Carcinogenic Risk Calculation for Protection of Groundwater, 0100N-CA-V0292, 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.

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CALCULATION COVER SHEET

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

Area: 100-N

Discipline: Environmental *Calculation No: 0100N-CA-V0290

Subject: 100-N-96 Waste Site Cleanup Verification 95% UCL Calculation

Computer Program: Excel Program No: Excel 2010

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

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Sheets = 16 Attm. 1 = 12 Total = 29	J. D. Skoglie	T. Q. Howell	I. B. Berezovskiy	S. G. Wilkinson	6/25/15

SUMMARY OF REVISION

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

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie	**Date** 06/15/15	**Calc. No.** 0100N-CA-V0290	**Rev. No.** 0
Project 100-N Field Remediation	**Job No.** 14655	**Checked** T. Q. Howell	**Date** 06/15/15
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations			**Sheet No.** 1 of 16

Summary

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

Table of Contents:
Sheets 1 to 4 - Calculation Sheet Summary
Sheets 5 to 10 - Calculation Sheet Verification Data - Excavation and Staging Pile Area Statistical and Maximum Calculations
Sheets 11 to 14 - Ecology Software (MTCAStat) Results
Sheets 15 and 16 - Calculation Sheet Duplicate Analysis
Attachment 1 - 100-N-96, Verification Sampling Results (12 sheets)

Given/References:
1) Sample Results (Attachment 1).
2) DOE-RL, 2006a, 100-N Area Sampling and Analysis Plan for CERCLA Waste Sites, DOE/RL-2005-92, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
3) DOE-RL, 2013, Remedial Design Report/Remedial Action Work Plan for the 100-N Area, DOE/RL-2005-93, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
4) Ecology, 1992, Statistical Guidance for Ecology Site Managers, Publication #92-54, Washington Department of Ecology, Olympia, Washington.
5) Ecology, 1993, Statistical Guidance for Ecology Site Managers, Supplement S-6, Analyzing Site or Background Data with Below-detection Limit or Below-PQL Values (Censored Data Sets), Publication #92-54, Washington Department of Ecology, Olympia, Washington.
6) Ecology, 2011, Cleanup Levels and Risk Calculations (CLARC) Database, Washington State Department of Ecology, Olympia, Washington, <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.
7) EPA, 1989, Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual, Part A; Interim Final, EPA/540/1-89/002, U.S. Environmental Protection Agency, Washington, D. C.
8) WAC 173-340, 1996, "Model Toxic Control Act - Cleanup," Washington Administrative Code.

Solution:
Calculation methodology is described in Ecology Pub. #92-54 (Ecology 1992, 1993), below, and in the RDR/RAWP (DOE-RL 2013). 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-N-96 waste site. The data were entered into an EXCEL 2010 spreadsheet and calculations performed by using the built-in spreadsheet functions and/or creating formulae within the cells. The statistical evaluation of data for use in accordance with the RDR/RAWP (DOE-RL 2013) is documented by this calculation. Duplicate RPD results are used in evaluation of data quality within the RSVP for this site.

Methodology:
The 100-N-96 waste site underwent statistical sampling at two decision units; excavation (EXC) and staging pile area (SPA).

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

Summary (continued)

Methodology, continued:

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

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 2013) and MTCAStat coding and due to a limitation in the MTCAStat coding (no direct capability to address variable quantitation limits within a data set), substitutions for censored data are performed before software input and the resulting data set treated as uncensored.

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

The RPD is calculated when both the primary value and either the duplicate or split value for a given analyte are above detection limits and are greater than 5 times the target detection limit (TDL). The TDL is a laboratory detection limit pre-determined for each analytical method and is listed in Table 2-1 of the SAP (DOE-RL 2013) for certain constituents. All other constituents will have their own pre-determined TDL's based on the laboratory and method used. Where direct evaluation of the attached sample data showed that a given analyte was not detected in the primary and/or duplicate sample, further evaluation of the RPD value was not performed. The RPD calculations use the following formula:

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

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

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

Washington Closure Hanford **CALCULATION SHEET**

Originator J. D. Skoglie	**Date** 06/15/15	**Calc. No.** 0100N-CA-V0290		**Rev. No.** 0
Project 100-N Field Remediation	**Job No.** 14655	**Checked** T. Q. Howell		**Date** 06/15/15
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations				**Sheet No.** 3 of 16

Summary (continued)

QUALIFIER LIST

B = estimated result. Result is less than the RL, but greater than MDL.
C = the analyte was detected in both the sample and associated QC blank, and the sample concentration was ≤ 5X the blank concentration.
D = reported from a dilution.
J = estimate
N = recovery exceeds upper or lower control limits.
U = undetected
X (metals) = serial dilution in the analytical batch indicates that physical and chemical interferences are present (metals).
X (organics) = >40% difference between primary and confirmation dector results.

ACRONYM LIST

– = not applicable
DE = direct exposure
EXC = excavation
GW = groundwater
HEIS - Hanford Environmental Information System
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
SPA = staging pile area
TDL = target detection limit
UCL = upper confidence limit
WAC = Washington Administrative Code

Washington Closure Hanford **CALCULATION SHEET**

Originator J. D. Skoglie **Date** 06/15/15 **Calc. No.** 0100N-CA-V0290 **Rev. No.** 0
Project 100-N Field Remediation **Job No.** 14655 **Checked** T. Q. Howell **Date** 06/15/15
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations **Sheet No.** 4 of 16

Summary (continued)

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

Results Summary - Excavation and Staging Pile Area Samples [a]

Analyte	Excavation		Staging Pile Area		Units
	95% UCL Result	Maximum Result	95% UCL Result	Maximum Result	
Arsenic	2.6	--	3.1	--	mg/kg
Barium	63.7	--	84.9	--	mg/kg
Beryllium	0.29	--	0.30	--	mg/kg
Boron	1.1	--	1.7	--	mg/kg
Cadmium	--	0.042	0.16	--	mg/kg
Chromium	9.3	--	11.8	--	mg/kg
Cobalt	7.1	--	8.1	--	mg/kg
Copper	17.0	--	19.7	--	mg/kg
Hexavalent chromium	0.299	--	--	0.230	mg/kg
Lead	4.1	--	6.3	--	mg/kg
Manganese	290	--	342	--	mg/kg
Mercury	--	0.0083	--	0.0081	mg/kg
Molybdenum	--	0.29	--	--	mg/kg
Nickel	10.5	--	11.1	--	mg/kg
Selenium	--	--	--	0.92	mg/kg
Vanadium	41.5	--	39.9	--	mg/kg
Zinc	36.2	--	43.2	--	mg/kg
TPH - Diesel Range	--	3.2	2.0	--	mg/kg
TPH - Diesel Range EXT	--	4.2	3.7	--	mg/kg
1,1-Dichloroethene	--	0.0012	--	0.00093	mg/kg
Acetone	0.025	--	--	0.0083	mg/kg
Methylene chloride	--	0.0032	--	0.0032	mg/kg

3-Part Test Evaluation:

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

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

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

Analyte	Duplicate Analysis	
	EXC	SPA
Aluminum	7.0%	2.3%
Barium	1.8%	1.9%
Calcium	5.1%	5.7%
Chromium	8.8%	5.1%
Copper	7.4%	2.4%
Iron	4.3%	2.2%
Magnesium	10.7%	0.5%
Manganese	6.2%	1.8%
Silicon	9.9%	0.6%
Vanadium	2.1%	2.5%
Zinc	5.9%	5.6%

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

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

Date 06/15/15
Job No. 14655

Calc. No. 0100N-CA-V0290
Checked T. Q. Howell

Rev. No. 0
Date 06/15/15
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100-N-96 Waste Site Statistical Calculations

Verification Data - Excavation (EXC)

Sample Area	Sample Number	Sample Date	Arsenic			Barium			Beryllium			Boron			Chromium			Cobalt			Copper			Hexavalent Chromium			Lead		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	3.4		0.58	83.3	X	0.066	0.36		0.029	1.5	B	0.86	13.1	X	0.051	7.3	X	0.087	18.1		0.19	0.197		0.155	5.0		0.24
Duplicate of J1V6W1	J1V6W8	4/30/15	3.1		0.63	84.8	X	0.072	0.36		0.031	1.4	B	0.93	14.3	X	0.055	7.9	X	0.095	19.5		0.21	0.155	U	0.155	5.4		0.26
EXC-1	J1V6V6	4/30/15	2.3		0.66	52.8	X	0.076	0.30		0.033	1.3	BN	0.98	8.5	X	0.058	6.8	X	0.10	16.2		0.22	0.240		0.155	3.7		0.27
EXC-2	J1V6V7	4/30/15	2.3		0.64	58.0	X	0.074	0.28		0.032	1.1	B	0.96	7.3	X	0.057	6.5	X	0.097	16.1		0.21	0.155	U	0.155	4.6		0.26
EXC-3	J1V6V8	4/30/15	1.9		0.54	52.6	X	0.063	0.27		0.027	0.84	B	0.81	6.9	X	0.048	7.0	X	0.082	15.2		0.18	0.421		0.155	3.2		0.22
EXC-4	J1V6V9	4/30/15	2.0		0.56	54.0	X	0.065	0.29		0.028	0.93	B	0.84	6.5	X	0.049	7.3	X	0.085	17.9		0.19	0.319		0.155	3.6		0.23
EXC-5	J1V6W0	4/30/15	2.2		0.63	48.2	X	0.073	0.23		0.032	0.94	U	0.94	6.8	X	0.056	6.5	X	0.096	15.5		0.21	0.280		0.155	3.6		0.26
EXC-7	J1V6W2	4/30/15	1.9		0.61	58.5	X	0.070	0.20		0.030	0.90	U	0.90	6.5	X	0.053	7.1	X	0.092	16.1		0.20	0.296		0.155	2.5		0.25
EXC-8	J1V6W3	4/30/15	2.6		0.66	60.2	X	0.076	0.27		0.033	1.1	B	0.98	9.8	X	0.058	6.7	X	0.10	15.2		0.22	0.218		0.155	3.6		0.27
EXC-9	J1V6W4	4/30/15	3.0		0.60	58.5	X	0.069	0.30		0.030	1.2	B	0.89	9.5	X	0.053	7.1	X	0.091	17.2		0.20	0.218		0.155	4.5		0.24
EXC-10	J1V6W5	4/30/15	0.73	B	0.66	17.3	X	0.076	0.11	B	0.033	0.98	U	0.98	1.0	X	0.058	5.6	X	0.10	9.6		0.22	0.277		0.155	1.6		0.27
EXC-11	J1V6W6	4/30/15	1.9		0.56	37.5	X	0.065	0.19		0.028	0.84	U	0.84	7.0	X	0.050	7.2	X	0.085	17.0		0.19	0.237		0.155	2.7		0.23
EXC-12	J1V6W7	4/30/15	2.9		0.64	77.3	X	0.074	0.30		0.032	1.0	B	0.96	10.4	X	0.057	7.1	X	0.098	15.7		0.21	0.319		0.155	4.1		0.26

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Boron mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Hexavalent Chromium mg/kg	Lead mg/kg
EXC-6	J1V6W1/ J1V6W8	4/30/15	3.3	84.1	0.36	1.5	13.7	7.6	18.8	0.137	5.2
EXC-1	J1V6V6	4/30/15	2.3	52.8	0.30	1.3	8.5	6.8	16.2	0.240	3.7
EXC-2	J1V6V7	4/30/15	2.3	58.0	0.28	1.1	7.3	6.5	16.1	0.0775	4.6
EXC-3	J1V6V8	4/30/15	1.9	52.6	0.27	0.84	6.9	7.0	15.2	0.421	3.2
EXC-4	J1V6V9	4/30/15	2.0	54.0	0.29	0.930	6.5	7.3	17.9	0.319	3.6
EXC-5	J1V6W0	4/30/15	2.2	48.2	0.23	0.470	6.8	6.5	15.5	0.280	3.6
EXC-7	J1V6W2	4/30/15	1.9	58.5	0.20	0.45	6.5	7.1	16.1	0.296	2.5
EXC-8	J1V6W3	4/30/15	2.6	60.2	0.27	1.1	9.8	6.7	15.2	0.218	3.6
EXC-9	J1V6W4	4/30/15	3.0	58.5	0.30	1.2	9.5	7.1	17.2	0.218	4.5
EXC-10	J1V6W5	4/30/15	0.73	17.3	0.11	0.49	1.0	5.6	9.6	0.277	1.6
EXC-11	J1V6W6	4/30/15	1.9	37.5	0.19	0.42	7.0	7.2	17.0	0.237	2.7
EXC-12	J1V6W7	4/30/15	2.9	77.3	0.30	1.0	10.4	7.1	15.7	0.319	4.1

Statistical Computations

	Arsenic	Barium	Beryllium	Boron	Chromium	Cobalt	Copper	Hexavalent Chromium	Lead
95% UCL based on	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), 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 normal distribution.	Large data set (n ≥ 10), use MTCAStat normal distribution.
N	12	12	12	12	12	12	12	12	12
% < Detection limit	0%	0%	0%	33%	0%	0%	0%	8%	0%
mean	2.2	54.9	0.26	0.90	7.8	6.9	15.9	0.253	3.6
st. dev.	0.66	17.0	0.066	0.36	3.0	0.52	2.3	0.0890	0.99
95% UCL on mean	2.6	63.7	0.29	1.1	9.3	7.1	17.0	0.299	4.1
max value	3.4	84.8	0.36	1.5	14.3	7.9	19.5	0.421	5.4
Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)	6.5 DE, GW & River Protection	200 GW Protection	1.51 GW & River Protection	320 GW Protection	18.5 GW & River Protection	32 GW Protection	22.0 River Protection	2 River Protection	10.2 GW & River Protection
WAC 173-340 3-PART TEST									
95% UCL > Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NO	NA
> 10% above Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NO	NA
Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NO	NA
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 (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.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	Because all values are below background (10.2 mg/kg) the WAC 173-340 3-part test is not required.

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

Date 06/15/15
Job No. 14655

Calc. No. 0100N-CA-V0290
Checked T. Q. Howell

Rev. No. 0
Date 06/15/15
Sheet No. 6 of 16

1 **100-N-96 Waste Site Statistical Calculations**
2 **Verification Data - Excavation (EXC)**

3	Sample	Sample	Sample	Manganese			Nickel			Vanadium			Zinc			Acetone		
4	Area	Number	Date	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL
5	EXC-6	J1V6W1	4/30/15	344	X	0.087	12.9		0.11	37.9	X	0.082	36.4	X	0.35	35	JB	6.6
6	Duplicate of J1V6W1	J1V6W8	4/30/15	366	X	0.095	14.3		0.12	38.7	X	0.089	38.6	X	0.38	35	JB	6.0
7	EXC-1	J1V6V6	4/30/15	253	X	0.10	10.1		0.12	40.1	X	0.094	34.5	X	0.40	5.0	U	5.0
8	EXC-2	J1V6V7	4/30/15	245	X	0.097	8.6		0.12	40.3	X	0.092	35.9	X	0.39	36	B	6.0
9	EXC-3	J1V6V8	4/30/15	256	X	0.082	8.8		0.10	38.3	X	0.077	31.7	X	0.33	7.1	U	7.1
10	EXC-4	J1V6V9	4/30/15	258	X	0.085	9.5		0.10	38.3	X	0.080	33.8	X	0.34	5.8	J	5.5
11	EXC-5	J1V6W0	4/30/15	233	X	0.096	8.1		0.12	38.6	X	0.090	34.3	X	0.38	35	JB	6.2
12	EXC-7	J1V6W2	4/30/15	316	X	0.092	9.0		0.11	41.4	X	0.087	32.5	X	0.37	9.2	J	8.1
13	EXC-8	J1V6W3	4/30/15	295	X	0.10	11.0		0.12	39.4	X	0.094	36.1	X	0.40	35	JB	5.5
14	EXC-9	J1V6W4	4/30/15	290	X	0.091	10.9		0.11	40.5	X	0.085	38.7	X	0.36	6.1	U	6.1
15	EXC-10	J1V6W5	4/30/15	116	X	0.10	4.1		0.12	18.6	X	0.094	18.8	X	0.40	35	JB	7.2
16	EXC-11	J1V6W6	4/30/15	245	X	0.085	8.9		0.11	45.3	X	0.080	34.8	X	0.34	6.1	U	6.1
17	EXC-12	J1V6W7	4/30/15	290	X	0.098	11.0		0.12	42.1	X	0.092	36.7	X	0.39	7.9	J	6.7

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19 **Statistical Computation Input Data**

20	Sample	Sample	Sample	Manganese	Nickel	Vanadium	Zinc	Acetone
21	Area	Number	Date	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg
22	EXC-6	J1V6W1/ J1V6W8	4/30/15	355	13.6	38.3	37.5	35
23	EXC-1	J1V6V6	4/30/15	253	10.1	40.1	34.5	2.5
24	EXC-2	J1V6V7	4/30/15	245	8.6	40.3	35.9	36
25	EXC-3	J1V6V8	4/30/15	256	8.8	38.3	31.7	3.6
26	EXC-4	J1V6V9	4/30/15	258	9.5	38.3	33.8	5.8
27	EXC-5	J1V6W0	4/30/15	233	8.1	38.6	34.3	35
28	EXC-7	J1V6W2	4/30/15	316	9.0	41.4	32.5	9.2
29	EXC-8	J1V6W3	4/30/15	295	11.0	39.4	36.1	35
30	EXC-9	J1V6W4	4/30/15	290	10.9	40.5	38.7	3.1
31	EXC-10	J1V6W5	4/30/15	116	4.1	18.6	18.8	35
32	EXC-11	J1V6W6	4/30/15	245	8.9	45.3	34.8	3.1
33	EXC-12	J1V6W7	4/30/15	290	11.0	42.1	36.7	7.9

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35 **Statistical Computations**

36		Manganese	Nickel	Vanadium	Zinc	Acetone
37	95% UCL based on	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.
38	N	12	12	12	12	12
39	% < Detection limit	0%	0%	0%	0%	33%
40	mean	263	9.5	38.4	33.8	17.6
41	st. dev.	58.1	2.3	6.6	5.12	15.7
42	95% UCL on mean	290	10.5	41.5	36.2	25.0
43	max value	366	14.3	45.3	38.7	36.0
44	**Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise**	512 GW Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	720,000 ug/kg GW Protection
45	**WAC 173-340 3-PART TEST**					
46	95% UCL > Cleanup Limit?	NA	NA	NA	NA	NO
47	> 10% above Cleanup Limit?	NA	NA	NA	NA	NO
48	Any sample > 2X Cleanup Limit?	NA	NA	NA	NA	NO
49	**WAC 173-340 Compliance?**	Because all values are below background (512 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (19.1mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (85.1 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (67.8 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

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MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

Date 06/17/15
Job No. 14655

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Date 06/17/15
Sheet No. 7 of 16

100-N-96 Waste Site Maximum Calculations
Verification Data - Excavation (EXC)

Sample Area	Sample Number	Sample Date	Cadmium			Mercury			Molybdenum			TPH - Diesel Range			TPH - Diesel Range EXT			1,1-Dichloroethene			Methylenechloride		
			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
EXC-6	J1V6W1	4/30/15	0.042	B	0.036	0.0073	B	0.0063	0.23	U	0.23	1400	J	670	4200		980	0.72	U	0.72	2.7	J	2.0
Duplicate of J1V6W1	J1V6W8	4/30/15	0.039	U	0.039	0.0061	U	0.0061	0.25	U	0.25	1600	J	680	3700	J	1000	0.65	U	0.65	1.8	U	1.8
EXC-1	J1V6V6	4/30/15	0.041	U	0.041	0.0064	U	0.0064	0.29	B	0.26	1200	J	660	2300	J	970	0.55	U	0.55	1.5	U	1.5
EXC-2	J1V6V7	4/30/15	0.040	U	0.040	0.0063	U	0.0063	0.25	U	0.25	1800	J	680	3100	J	1000	0.66	U	0.66	1.8	U	1.8
EXC-3	J1V6V8	4/30/15	0.034	U	0.034	0.0056	U	0.0056	0.21	U	0.21	650	U	650	950	U	950	1.2	J	0.78	2.5	J	2.1
EXC-4	J1V6V9	4/30/15	0.035	U	0.035	0.0067	B	0.0057	0.22	U	0.22	3200	J	660	4100		970	0.60	U	0.60	1.6	U	1.6
EXC-5	J1V6W0	4/30/15	0.039	U	0.039	0.0061	U	0.0061	0.25	U	0.25	670	U	670	980	U	980	0.72	J	0.68	1.8	U	1.8
EXC-7	J1V6W2	4/30/15	0.038	U	0.038	0.0063	U	0.0063	0.24	U	0.24	650	U	650	960	U	960	0.89	U	0.89	2.4	U	2.4
EXC-8	J1V6W3	4/30/15	0.041	U	0.041	0.0061	U	0.0061	0.26	U	0.26	650	U	650	960	U	960	0.73	J	0.61	3.2	J	1.6
EXC-9	J1V6W4	4/30/15	0.037	U	0.037	0.0083	B	0.0060	0.24	U	0.24	1400	J	680	3100	J	1000	0.67	U	0.67	1.8	U	1.8
EXC-10	J1V6W5	4/30/15	0.041	U	0.041	0.0065	U	0.0065	0.26	U	0.26	650	U	650	960	U	960	0.79	U	0.79	2.3	J	2.2
EXC-11	J1V6W6	4/30/15	0.035	U	0.035	0.0066	U	0.0066	0.22	U	0.22	670	U	670	980	U	980	0.88	J	0.66	1.8	U	1.8
EXC-12	J1V6W7	4/30/15	0.040	U	0.040	0.0065	B	0.0059	0.25	U	0.25	660	U	660	960	U	960	0.73	U	0.73	2.0	U	2.0

Statistical Computations

	Cadmium	Mercury	Molybdenum	TPH - Diesel Range	TPH - Diesel Range EXT	1,1-Dichloroethene	Methylenechloride
% < Detection limit	92%	67%	92%	58%	58%	67%	67%
Maximum value	0.042	0.0083	0.29	3200	4200	1.2	3.2
Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise	0.81 GW & River Protection	0.33 GW & River Protection	8 GW Protection	200,000 ug/kg GW & River Protection	200,000 ug/kg GW & River Protection	40,000 ug/kg GW Protection	470 ug/kg River Protection
3-PART TEST							
Maximum > Cleanup Limit?	NA	NA	NO	NO	NO	NO	NO
> 10% above Cleanup Limit?	NA	NA	NO	NO	NO	NO	NO
Any sample > 2X Cleanup Limit?	NA	NA	NO	NO	NO	NO	NO
3-Part Test Compliance?	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 (0.33 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	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 J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

CALCULATION SHEET

Date 06/15/15
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Checked T. Q. Howell

Rev. No. 0
Date 06/15/15
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100-N-96 Waste Site Statistical Calculations

Verification Data - Staging Pile Area (SPA)

Sample Area	Sample Number	Sample Date	Arsenic			Barium			Beryllium			Boron			Cadmium			Chromium			Cobalt			Copper			Lead		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-12	J1V714	4/30/15	3.2		0.62	82.8		0.071	0.30		0.031	1.4	B	0.92	0.18	B	0.038	12.0		0.054	7.5	X	0.094	12.5		0.20	6.0		0.25
Duplicate of J1V714	J1V715	4/30/15	3.2		0.62	84.4		0.071	0.30		0.031	1.3	B	0.91	0.17	B	0.038	11.4		0.054	7.7	X	0.093	12.8		0.20	5.0		0.25
SPA-1	J1V703	4/30/15	2.9		0.57	82.6		0.065	0.32		0.028	1.7		0.84	0.13	B	0.035	12.2		0.050	8.0	X	0.086	13.0		0.19	4.8		0.23
SPA-2	J1V704	4/30/15	3.2		0.61	85.2		0.070	0.29		0.030	2.1		0.90	0.13	B	0.038	11.4		0.053	7.6	X	0.092	12.5		0.20	4.8		0.25
SPA-3	J1V705	4/30/15	3.2		0.58	80.2		0.067	0.27		0.029	1.7	B	0.86	0.13	B	0.036	11.2		0.051	7.7	X	0.088	14.1		0.19	3.9		0.24
SPA-4	J1V706	4/30/15	3.2		0.58	87.9		0.067	0.30		0.029	1.5	B	0.87	0.16	B	0.036	12.2		0.051	7.9	X	0.089	15.9		0.19	8.8		0.24
SPA-5	J1V707	4/30/15	2.9		0.66	76.1		0.076	0.28		0.033	1.8	B	0.98	0.14	B	0.041	10.4		0.058	6.8	X	0.10	11.9		0.22	5.3		0.27
SPA-6	J1V708	4/30/15	3.2		0.66	79.4		0.076	0.28		0.033	1.8	B	0.98	0.15	B	0.041	11.7		0.058	7.3	X	0.10	13.9		0.22	4.8		0.27
SPA-7	J1V709	4/30/15	2.9		0.59	65.6		0.068	0.32		0.030	0.89	B	0.88	0.15	B	0.037	8.6		0.052	9.4	X	0.090	20.6		0.19	4.8		0.24
SPA-8	J1V710	4/30/15	3.1		0.59	79.7		0.068	0.28		0.030	1.6	B	0.88	0.19		0.037	11.8		0.052	7.8	X	0.090	39.1		0.19	8.8		0.24
SPA-9	J1V711	4/30/15	2.8		0.66	91.1		0.076	0.31		0.033	1.4	B	0.98	0.15	B	0.041	11.1		0.058	8.0	X	0.10	13.5		0.22	5.1		0.27
SPA-10	J1V712	4/30/15	2.6		0.61	84.9		0.071	0.31		0.031	1.3	B	0.91	0.16	B	0.038	11.7		0.054	7.7	X	0.093	12.5		0.20	5.3		0.25
SPA-11	J1V713	4/30/15	3.3		0.66	84.9		0.075	0.29		0.033	1.5	B	0.97	0.13	B	0.041	11.8		0.058	7.9	X	0.099	13.4		0.22	4.6		0.27

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Boron mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg
SPA-12	J1V714/ J1V715	4/30/15	3.2	83.6	0.30	1.4	0.18	11.7	7.6	12.7	5.5
SPA-1	J1V703	4/30/15	2.9	82.6	0.32	1.7	0.13	12.2	8.0	13.0	4.8
SPA-2	J1V704	4/30/15	3.2	85.2	0.29	2.1	0.13	11.4	7.6	12.5	4.8
SPA-3	J1V705	4/30/15	3.2	80.2	0.27	1.7	0.13	11.2	7.7	14.1	3.9
SPA-4	J1V706	4/30/15	3.2	87.9	0.30	1.5	0.16	12.2	7.9	15.9	8.8
SPA-5	J1V707	4/30/15	2.9	76.1	0.28	1.8	0.14	10.4	6.8	11.9	5.3
SPA-6	J1V708	4/30/15	3.2	79.4	0.28	1.8	0.15	11.7	7.3	13.9	4.8
SPA-7	J1V709	4/30/15	2.9	65.6	0.32	0.89	0.15	8.6	9.4	20.6	4.8
SPA-8	J1V710	4/30/15	3.1	79.7	0.28	1.6	0.19	11.8	7.8	39.1	8.8
SPA-9	J1V711	4/30/15	2.8	91.1	0.31	1.4	0.15	11.1	8.0	13.5	5.1
SPA-10	J1V712	4/30/15	2.6	84.9	0.31	1.3	0.16	11.7	7.7	12.5	5.3
SPA-11	J1V713	4/30/15	3.3	84.9	0.29	1.5	0.13	11.8	7.9	13.4	4.6

Statistical Computations

	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead
95% UCL based on	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), 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.
N	12	12	12	12	12	12	12	12	12
% < Detection limit	0%	0%	0%	0%	0%	0%	0%	0%	0%
mean	3.0	81.8	0.30	1.6	0.15	11.3	7.8	16.1	5.5
st. dev.	0.22	6.5	0.017	0.31	0.019	0.99	0.60	7.6	1.6
95% UCL on mean	3.1	84.9	0.30	1.7	0.16	11.8	8.1	19.7	6.3
max value	3.3	91.1	0.32	2.1	0.19	12.2	9.4	39.1	8.8
Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)	6.5 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	32 GW Protection	22.0 River Protection	10.2 GW & River Protection
WAC 173-340 3-PART TEST									
95% UCL > Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NO	NA
> 10% above Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NO	NA
Any sample > 2X Cleanup Limit?	NA	NA	NA	NO	NA	NA	NA	NO	NA
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.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	Because all values are below background (10.2 mg/kg) the WAC 173-340 3-part test is not required.

CALCULATION SHEET

Washington Closure Hanford
Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

Date 06/15/15
Job No. 14655

Calc. No. 0100N-CA-V0290
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Rev. No. 0
Date 06/15/15
Sheet No. 9 of 16

100-N-96 Waste Site Statistical Calculations
Verification Data - Staging Pile Area (SPA)

Sample Area	Sample Number	Sample Date	Manganese mg/kg	Q	PQL	Nickel mg/kg	Q	PQL	Vanadium mg/kg	Q	PQL	Zinc mg/kg	Q	PQL	TPH - Diesel Range ug/kg	Q	PQL	TPH - Diesel Range EXT ug/kg	Q	PQL
SPA-12	J1V714	4/30/15	330		0.094	11.2		0.12	36.9		0.088	42.4		0.37	1400	J	690	3000	J	1000
Duplicate of J1V714	J1V715	4/30/15	336		0.093	10.8		0.11	36.0		0.088	40.1		0.37	1300	J	680	2700	J	1000
SPA-1	J1V703	4/30/15	358		0.086	10.9		0.11	38.1		0.081	40.9		0.34	1900	J	660	2200	J	970
SPA-2	J1V704	4/30/15	336		0.092	10.7		0.11	37.1		0.087	40.9		0.37	1700	J	670	2800	J	990
SPA-3	J1V705	4/30/15	326		0.088	11.5		0.11	36.4		0.082	38.0		0.35	1100	J	660	980	U	980
SPA-4	J1V706	4/30/15	351		0.089	11.1		0.11	38.8		0.083	48.7		0.35	1700	J	630	2500	J	920
SPA-5	J1V707	4/30/15	295		0.10	9.8		0.12	32.7		0.094	38.5		0.40	1500	J	650	2900	J	960
SPA-6	J1V708	4/30/15	306		0.10	10.7		0.12	36.8		0.094	37.6		0.40	1700	J	640	3400	J	940
SPA-7	J1V709	4/30/15	315		0.090	10.4		0.11	47.2		0.084	41.3		0.36	3100	J	680	5400		1000
SPA-8	J1V710	4/30/15	342		0.090	11.0		0.11	39.1		0.084	48.4		0.36	1900	J	700	4500		1000
SPA-9	J1V711	4/30/15	344		0.10	10.8		0.12	40.2		0.094	41.2		0.40	1900	J	680	4100		990
SPA-10	J1V712	4/30/15	342		0.093	10.8		0.11	39.6		0.088	41.8		0.37	1600	J	680	3400	J	1000
SPA-11	J1V713	4/30/15	338		0.099	11.3		0.12	37.2		0.093	39.6		0.40	690	U	690	1000	U	1000

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Manganese mg/kg	Nickel mg/kg	Vanadium mg/kg	Zinc mg/kg	TPH - Diesel Range ug/kg	TPH - Diesel Range EXT ug/kg
SPA-12	J1V714/ J1V715	4/30/15	333	11.0	36.5	41.3	1350	2850
SPA-1	J1V703	4/30/15	358	10.9	38.1	40.9	1900	2200
SPA-2	J1V704	4/30/15	336	10.7	37.1	40.9	1700	2800
SPA-3	J1V705	4/30/15	326	11.5	36.4	38.0	1100	490
SPA-4	J1V706	4/30/15	351	11.1	38.8	48.7	1700	2500
SPA-5	J1V707	4/30/15	295	9.8	32.7	38.5	1500	2900
SPA-6	J1V708	4/30/15	306	10.7	36.8	37.6	1700	3400
SPA-7	J1V709	4/30/15	315	10.4	47.2	41.3	3100	5400
SPA-8	J1V710	4/30/15	342	11.0	39.1	48.4	1900	4500
SPA-9	J1V711	4/30/15	344	10.8	40.2	41.2	1900	4100
SPA-10	J1V712	4/30/15	342	10.8	39.6	41.8	1600	3400
SPA-11	J1V713	4/30/15	338	11.3	37.2	39.6	345	500

Statistical Computations

	Manganese	Nickel	Vanadium	Zinc	TPH - Diesel Range	TPH - Diesel Range EXT
95% UCL based on	Large data set (n ≥ 10), use MTCAStat lognormal distribution.	Large data set (n ≥ 10), use MTCAStat normal distribution.	Large data set (n ≥ 10), lognormal and normal distribution rejected, use z-statistic.	Large data set (n ≥ 10), 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 normal distribution.
N	12	12	12	12	12	12
% < Detection limit	0%	0%	0%	0%	8%	17%
mean	332	10.8	38.3	41.5	1650	2920
st. dev.	18.6	0.44	3.4	3.57	634	1445
95% UCL on mean	342	11.1	39.9	43.2	1951	3669
max value	358	11.5	47.2	48.7	3100	5400
Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg) unless stated otherwise	512 GW Protection	19.1 GW Protection	85.1 GW Protection	67.8 River Protection	200,000 ug/kg GW & River Protection	200,000 ug/kg GW & River Protection
WAC 173-340 3-PART TEST						
95% UCL > Cleanup Limit?	NA	NA	NA	NA	NO	NO
> 10% above Cleanup Limit?	NA	NA	NA	NA	NO	NO
Any sample > 2X Cleanup Limit?	NA	NA	NA	NA	NO	NO
WAC 173-340 Compliance?	Because all values are below background (512 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (19.1mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (85.1 mg/kg) the WAC 173-340 3-part test is not required.	Because all values are below background (67.8 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

MAXIMUM VALUE 3-PART TEST CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

Date 06/17/15
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Sheet No. 10 of 16

100-N-96 Waste Site Maximum Calculations
Verification Data - Staging Pile Area (SPA)

Sample Area	Sample Number	Sample Date	Hexavalent Chromium			Mercury			Selenium			1,1-Dichloroethene			Acetone			Methylene chloride		
			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-12	J1V714	4/30/15	0.155	U	0.155	0.0061	U	0.0061	0.81	U	0.81	1.0	U	1.0	9.1	U	9.1	2.7	U	2.7
Duplicate of J1V714	J1V715	4/30/15	0.155	U	0.155	0.0063	U	0.0063	0.92	B	0.80	0.66	U	0.66	6.0	U	6.0	3.0	J	1.8
SPA-1	J1V703	4/30/15	0.230		0.155	0.0063	UN	0.0063	0.80	B	0.74	0.75	U	0.75	8.3	JB	6.9	2.0	U	2.0
SPA-2	J1V704	4/30/15	0.155	U	0.155	0.0061	B	0.0058	0.79	U	0.79	0.68	U	0.68	6.2	U	6.2	1.9	U	1.9
SPA-3	J1V705	4/30/15	0.155	U	0.155	0.0067	U	0.0067	0.75	U	0.75	0.69	U	0.69	6.3	U	6.3	1.9	U	1.9
SPA-4	J1V706	4/30/15	0.191		0.155	0.0066	U	0.0066	0.76	U	0.76	0.71	U	0.71	6.8	JB	6.5	3.2	J	1.9
SPA-5	J1V707	4/30/15	0.155	U	0.155	0.0064	U	0.0064	0.87	B	0.86	0.67	U	0.67	6.1	U	6.1	1.8	U	1.8
SPA-6	J1V708	4/30/15	0.155	U	0.155	0.0065	U	0.0065	0.86	U	0.86	0.62	J	0.41	3.8	JB	3.7	1.1	U	1.1
SPA-7	J1V709	4/30/15	0.155	U	0.155	0.0081	B	0.0067	0.77	U	0.77	0.57	J	0.57	5.2	U	5.2	1.5	U	1.5
SPA-8	J1V710	4/30/15	0.155	U	0.155	0.0080	B	0.0064	0.86	B	0.77	0.78	U	0.78	7.1	U	7.1	2.1	U	2.1
SPA-9	J1V711	4/30/15	0.155	U	0.155	0.0067	U	0.0067	0.86	U	0.86	0.85	U	0.85	7.7	U	7.7	2.3	U	2.3
SPA-10	J1V712	4/30/15	0.155	U	0.155	0.0063	B	0.0058	0.80	U	0.80	0.93	J	0.67	6.1	U	6.1	1.8	U	1.8
SPA-11	J1V713	4/30/15	0.155	U	0.155	0.0065	U	0.0065	0.85	U	0.85	0.66	U	0.66	6.0	U	6.0	1.8	U	1.8

Statistical Computations

	Hexavalent Chromium	Mercury	Selenium	1,1-Dichloroethene	Acetone	Methylene chloride
% < Detection limit	83%	67%	67%	75%	75%	83%
Maximum value	0.230	0.0081	0.92	0.93	8.3	3.2
Most Stringent Cleanup Limit for nonradionuclide and RAG type (mg/kg)	2 River Protection	0.33 GW & River Protection	1 River Protection	40,000 ug/kg GW Protection	720,000 ug/kg GW Protection	500 ug/kg GW Protection
3-PART TEST						
Maximum > Cleanup Limit?	NO	NA	NO	NO	NO	NO
> 10% above Cleanup Limit?	NO	NA	NO	NO	NO	NO
Any sample > 2X Cleanup Limit?	NO	NA	NO	NO	NO	NO
3-Part Test Compliance?	The data set meets the 3-part test criteria when compared to the most stringent RAG.	Because all values are below background (0.33 mg/kg) the WAC 173-340 3-part test is not required.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.	The data set meets the 3-part test criteria when compared to the most stringent RAG.

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

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Date 06/15/15
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Ecology Software (MTCAStat) Results, 100-N-96 Waste Site Excavation (EXC)

Arsenic 95% UCL Calculation

DATA	ID
3.3	J1V6W1/ J1V6W8
2.3	J1V6V6
2.3	J1V6V7
1.9	J1V6V8
2.0	J1V6V9
2.2	J1V6W0
1.9	J1V6W2
2.6	J1V6W3
3.0	J1V6W4
0.73	J1V6W5
1.9	J1V6W6
2.9	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	2.2
Censored		Lognormal mean	2.3
Detection limit or PQL		Std. devn.	0.66
Method detection limit		Median	2.3
TOTAL	12	Min.	0.73
		Max.	3.3

Lognormal distribution? r-squared is: 0.760
Normal distribution? r-squared is: 0.913
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 2.6

Barium 95% UCL Calculation

DATA	ID
84.1	J1V6W1/ J1V6W8
52.8	J1V6V6
58.0	J1V6V7
52.6	J1V6V8
54.0	J1V6V9
48.2	J1V6W0
58.5	J1V6W2
60.2	J1V6W3
58.5	J1V6W4
17.3	J1V6W5
37.5	J1V6W6
77.3	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	54.9
Censored		Lognormal mean	56.0
Detection limit or PQL		Std. devn.	17.0
Method detection limit		Median	56.0
TOTAL	12	Min.	17.3
		Max.	84.1

Lognormal distribution? r-squared is: 0.766
Normal distribution? r-squared is: 0.901
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 63.7

Beryllium 95% UCL Calculation

DATA	ID
0.36	J1V6W1/ J1V6W8
0.30	J1V6V6
0.28	J1V6V7
0.27	J1V6V8
0.29	J1V6V9
0.23	J1V6W0
0.20	J1V6W2
0.27	J1V6W3
0.30	J1V6W4
0.11	J1V6W5
0.19	J1V6W6
0.30	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	0.26
Censored		Lognormal mean	0.26
Detection limit or PQL		Std. devn.	0.066
Method detection limit		Median	0.28
TOTAL	12	Min.	0.11
		Max.	0.36

Lognormal distribution? r-squared is: 0.805
Normal distribution? r-squared is: 0.903
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 0.29

Boron 95% UCL Calculation

DATA	ID
1.5	J1V6W1/ J1V6W8
1.3	J1V6V6
1.1	J1V6V7
0.84	J1V6V8
0.93	J1V6V9
0.47	J1V6W0
0.45	J1V6W2
1.1	J1V6W3
1.2	J1V6W4
0.49	J1V6W5
0.42	J1V6W6
1.0	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	0.90
Censored		Lognormal mean	0.91
Detection limit or PQL		Std. devn.	0.36
Method detection limit		Median	0.97
TOTAL	12	Min.	0.42
		Max.	1.5

Lognormal distribution? r-squared is: 0.884
Normal distribution? r-squared is: 0.929
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 1.1

Chromium 95% UCL Calculation

DATA	ID
13.7	J1V6W1/ J1V6W8
8.5	J1V6V6
7.3	J1V6V7
6.9	J1V6V8
6.5	J1V6V9
6.8	J1V6W0
6.5	J1V6W2
9.8	J1V6W3
9.5	J1V6W4
1.0	J1V6W5
7.0	J1V6W6
10.4	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	7.8
Censored		Lognormal mean	8.5
Detection limit or PQL		Std. devn.	3.0
Method detection limit		Median	7.2
TOTAL	12	Min.	1.0
		Max.	13.7

Lognormal distribution? r-squared is: 0.630
Normal distribution? r-squared is: 0.882
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 9.3

Cobalt 95% UCL Calculation

DATA	ID
7.6	J1V6W1/ J1V6W8
6.8	J1V6V6
6.5	J1V6V7
7.0	J1V6V8
7.3	J1V6V9
6.5	J1V6W0
7.1	J1V6W2
6.7	J1V6W3
7.1	J1V6W4
5.6	J1V6W5
7.2	J1V6W6
7.1	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	6.9
Censored		Lognormal mean	6.9
Detection limit or PQL		Std. devn.	0.52
Method detection limit		Median	7.1
TOTAL	12	Min.	5.6
		Max.	7.6

Lognormal distribution? r-squared is: 0.847
Normal distribution? r-squared is: 0.878
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 7.1

Copper 95% UCL Calculation

DATA	ID
18.8	J1V6W1/ J1V6W8
16.2	J1V6V6
16.1	J1V6V7
15.2	J1V6V8
17.9	J1V6V9
15.5	J1V6W0
16.1	J1V6W2
15.2	J1V6W3
17.2	J1V6W4
9.6	J1V6W5
17.0	J1V6W6
15.7	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	15.9
Censored		Lognormal mean	15.9
Detection limit or PQL		Std. devn.	2.3
Method detection limit		Median	16.1
TOTAL	12	Min.	9.6
		Max.	18.8

Lognormal distribution? r-squared is: 0.674
Normal distribution? r-squared is: 0.762
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 17.0

Hexavalent Chromium 95% UCL Calculation

DATA	ID
0.137	J1V6W1/ J1V6W8
0.240	J1V6V6
0.0775	J1V6V7
0.421	J1V6V8
0.319	J1V6V9
0.280	J1V6W0
0.296	J1V6W2
0.218	J1V6W3
0.218	J1V6W4
0.277	J1V6W5
0.237	J1V6W6
0.319	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	0.253
Censored		Lognormal mean	0.259
Detection limit or PQL		Std. devn.	0.0890
Method detection limit		Median	0.259
TOTAL	12	Min.	0.0775
		Max.	0.421

Lognormal distribution? r-squared is: 0.839
Normal distribution? r-squared is: 0.948
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 0.299

Lead 95% UCL Calculation

DATA	ID
5.2	J1V6W1/ J1V6W8
3.7	J1V6V6
4.6	J1V6V7
3.2	J1V6V8
3.6	J1V6V9
3.6	J1V6W0
2.5	J1V6W2
3.6	J1V6W3
4.5	J1V6W4
1.6	J1V6W5
2.7	J1V6W6
4.1	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	3.6
Censored		Lognormal mean	3.6
Detection limit or PQL		Std. devn.	0.99
Method detection limit		Median	3.6
TOTAL	12	Min.	1.6
		Max.	5.2

Lognormal distribution? r-squared is: 0.898
Normal distribution? r-squared is: 0.969
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 4.1

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Washington Closure Hanford

Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

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Ecology Software (MTCAStat) Results, 100-N-96 Waste Site Excavation (EXC)

Manganese 95% UCL Calculation

DATA	ID
355	J1V6W1/ J1V6W8
253	J1V6V6
245	J1V6V7
256	J1V6V8
258	J1V6V9
233	J1V6W0
316	J1V6W2
295	J1V6W3
290	J1V6W4
116	J1V6W5
245	J1V6W6
290	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	263
Censored		Lognormal mean	265
Detection limit or PQL		Std. devn.	58
Method detection limit		Median	257
TOTAL	12	Min.	116
		Max.	355

Lognormal distribution? r-squared is: 0.722
Normal distribution? r-squared is: 0.853
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 290

Nickel 95% UCL Calculation

DATA	ID
13.6	J1V6W1/ J1V6W8
10.1	J1V6V6
8.6	J1V6V7
8.8	J1V6V8
9.5	J1V6V9
8.1	J1V6W0
9.0	J1V6W2
11.0	J1V6W3
10.9	J1V6W4
4.1	J1V6W5
8.9	J1V6W6
11.0	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	9.5
Censored		Lognormal mean	9.6
Detection limit or PQL		Std. devn.	2.3
Method detection limit		Median	9.3
TOTAL	12	Min.	4.1
		Max.	13.6

Lognormal distribution? r-squared is: 0.766
Normal distribution? r-squared is: 0.882
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 10.5

Vanadium 95% UCL Calculation

DATA	ID
38.3	J1V6W1/ J1V6W8
40.1	J1V6V6
40.3	J1V6V7
38.3	J1V6V8
38.3	J1V6V9
38.6	J1V6W0
41.4	J1V6W2
39.4	J1V6W3
40.5	J1V6W4
18.6	J1V6W5
45.3	J1V6W6
42.1	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	38.4
Censored		Lognormal mean	38.7
Detection limit or PQL		Std. devn.	6.6
Method detection limit		Median	39.8
TOTAL	12	Min.	18.6
		Max.	45.3

Lognormal distribution? r-squared is: 0.494
Normal distribution? r-squared is: 0.580
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 41.5

Zinc 95% UCL Calculation

DATA	ID
37.5	J1V6W1/ J1V6W8
34.5	J1V6V6
35.9	J1V6V7
31.7	J1V6V8
33.8	J1V6V9
34.3	J1V6W0
32.5	J1V6W2
36.1	J1V6W3
38.7	J1V6W4
18.8	J1V6W5
34.8	J1V6W6
36.7	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	33.8
Censored		Lognormal mean	33.9
Detection limit or PQL		Std. devn.	5.1
Method detection limit		Median	34.7
TOTAL	12	Min.	18.8
		Max.	38.7

Lognormal distribution? r-squared is: 0.592
Normal distribution? r-squared is: 0.682
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 36.2

Acetone 95% UCL Calculation

DATA	ID
35.0	J1V6W1/ J1V6W8
2.5	J1V6V6
36.0	J1V6V7
3.6	J1V6V8
5.8	J1V6V9
35.0	J1V6W0
9.2	J1V6W2
35.0	J1V6W3
3.1	J1V6W4
35.0	J1V6W5
3.1	J1V6W6
7.9	J1V6W7

Number of samples		Uncensored values	
Uncensored	12	Mean	17.6
Censored		Lognormal mean	20.0
Detection limit or PQL		Std. devn.	15.7
Method detection limit		Median	8.6
TOTAL	12	Min.	2.5
		Max.	36.0

Lognormal distribution? r-squared is: 0.843
Normal distribution? r-squared is: 0.753
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 25.0

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Ecology Software (MTCAStat) Results, 100-N-96 Waste Site Staging Pile Area (SPA)

Arsenic 95% UCL Calculation

DATA	ID
3.2	J1V714/ J1V715
2.9	J1V703
3.2	J1V704
3.2	J1V705
3.2	J1V706
2.9	J1V707
3.2	J1V708
2.9	J1V709
3.1	J1V710
2.8	J1V711
2.6	J1V712
3.3	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	3.0
Censored		Lognormal mean	3.0
Detection limit or PQL		Std. devn.	0.22
Method detection limit		Median	3.2
TOTAL	12	Min.	2.6
		Max.	3.3

Lognormal distribution? r-squared is: 0.862
Normal distribution? r-squared is: 0.871
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 3.1

Barium 95% UCL Calculation

DATA	ID
83.6	J1V714/ J1V715
82.6	J1V703
85.2	J1V704
80.2	J1V705
87.9	J1V706
76.1	J1V707
79.4	J1V708
65.6	J1V709
79.7	J1V710
91.1	J1V711
84.9	J1V712
84.9	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	81.8
Censored		Lognormal mean	81.8
Detection limit or PQL		Std. devn.	6.5
Method detection limit		Median	83.1
TOTAL	12	Min.	65.6
		Max.	91.1

Lognormal distribution? r-squared is: 0.850
Normal distribution? r-squared is: 0.884
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 84.9

Beryllium 95% UCL Calculation

DATA	ID
0.30	J1V714/ J1V715
0.32	J1V703
0.29	J1V704
0.27	J1V705
0.30	J1V706
0.28	J1V707
0.28	J1V708
0.32	J1V709
0.28	J1V710
0.31	J1V711
0.31	J1V712
0.29	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	0.30
Censored		Lognormal mean	0.30
Detection limit or PQL		Std. devn.	0.017
Method detection limit		Median	0.30
TOTAL	12	Min.	0.27
		Max.	0.32

Lognormal distribution? r-squared is: 0.951
Normal distribution? r-squared is: 0.950
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.30

Boron 95% UCL Calculation

DATA	ID
1.4	J1V714/ J1V715
1.7	J1V703
2.1	J1V704
1.7	J1V705
1.5	J1V706
1.8	J1V707
1.8	J1V708
0.89	J1V709
1.6	J1V710
1.4	J1V711
1.3	J1V712
1.5	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	1.6
Censored		Lognormal mean	1.6
Detection limit or PQL		Std. devn.	0.31
Method detection limit		Median	1.6
TOTAL	12	Min.	0.89
		Max.	2.1

Lognormal distribution? r-squared is: 0.893
Normal distribution? r-squared is: 0.951
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 1.7

Cadmium 95% UCL Calculation

DATA	ID
0.18	J1V714/ J1V715
0.13	J1V703
0.13	J1V704
0.13	J1V705
0.16	J1V706
0.14	J1V707
0.15	J1V708
0.15	J1V709
0.19	J1V710
0.15	J1V711
0.16	J1V712
0.13	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	0.15
Censored		Lognormal mean	0.15
Detection limit or PQL		Std. devn.	0.019
Method detection limit		Median	0.15
TOTAL	12	Min.	0.13
		Max.	0.19

Lognormal distribution? r-squared is: 0.911
Normal distribution? r-squared is: 0.898
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 0.16

Chromium 95% UCL Calculation

DATA	ID
11.7	J1V714/ J1V715
12.2	J1V703
11.4	J1V704
11.2	J1V705
12.2	J1V706
10.4	J1V707
11.7	J1V708
8.6	J1V709
11.8	J1V710
11.1	J1V711
11.7	J1V712
11.8	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	11.3
Censored		Lognormal mean	11.3
Detection limit or PQL		Std. devn.	0.99
Method detection limit		Median	11.7
TOTAL	12	Min.	8.6
		Max.	12.2

Lognormal distribution? r-squared is: 0.698
Normal distribution? r-squared is: 0.739
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 11.8

Cobalt 95% UCL Calculation

DATA	ID
7.6	J1V714/ J1V715
8.0	J1V703
7.6	J1V704
7.7	J1V705
7.9	J1V706
6.8	J1V707
7.3	J1V708
9.4	J1V709
7.8	J1V710
8.0	J1V711
7.7	J1V712
7.9	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	7.8
Censored		Lognormal mean	7.8
Detection limit or PQL		Std. devn.	0.60
Method detection limit		Median	7.8
TOTAL	12	Min.	6.8
		Max.	9.4

Lognormal distribution? r-squared is: 0.815
Normal distribution? r-squared is: 0.787
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 8.1

Copper 95% UCL Calculation

DATA	ID
12.7	J1V714/ J1V715
13.0	J1V703
12.5	J1V704
14.1	J1V705
15.9	J1V706
11.9	J1V707
13.9	J1V708
20.6	J1V709
39.1	J1V710
13.5	J1V711
12.5	J1V712
13.4	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	16.1
Censored		Lognormal mean	15.9
Detection limit or PQL		Std. devn.	7.6
Method detection limit		Median	13.5
TOTAL	12	Min.	11.9
		Max.	39.1

Lognormal distribution? r-squared is: 0.635
Normal distribution? r-squared is: 0.521
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 19.7

Lead 95% UCL Calculation

DATA	ID
5.5	J1V714/ J1V715
4.8	J1V703
4.8	J1V704
3.9	J1V705
8.8	J1V706
5.3	J1V707
4.8	J1V708
4.8	J1V709
8.8	J1V710
5.1	J1V711
5.3	J1V712
4.6	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	5.5
Censored		Lognormal mean	5.5
Detection limit or PQL		Std. devn.	1.6
Method detection limit		Median	5.0
TOTAL	12	Min.	3.9
		Max.	8.8

Lognormal distribution? r-squared is: 0.768
Normal distribution? r-squared is: 0.696
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 6.3

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Ecology Software (MTCAStat) Results, 100-N-96 Waste Site Staging Pile Area (SPA)

Manganese 95% UCL Calculation

DATA	ID
333	J1V714/ J1V715
358	J1V703
336	J1V704
326	J1V705
351	J1V706
295	J1V707
306	J1V708
315	J1V709
342	J1V710
344	J1V711
342	J1V712
338	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	332
Censored		Lognormal mean	332
Detection limit or PQL		Std. devn.	19
Method detection limit		Median	337
TOTAL	12	Min.	295
		Max.	358

Lognormal distribution? r-squared is: 0.927
Normal distribution? r-squared is: 0.938
Recommendations:
Use lognormal distribution.

UCL (Land's method) is 342

Nickel 95% UCL Calculation

DATA	ID
11.0	J1V714/ J1V715
10.9	J1V703
10.7	J1V704
11.5	J1V705
11.1	J1V706
9.8	J1V707
10.7	J1V708
10.4	J1V709
11.0	J1V710
10.8	J1V711
10.8	J1V712
11.3	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	10.8
Censored		Lognormal mean	10.8
Detection limit or PQL		Std. devn.	0.44
Method detection limit		Median	10.9
TOTAL	12	Min.	9.8
		Max.	11.5

Lognormal distribution? r-squared is: 0.897
Normal distribution? r-squared is: 0.911
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 11.1

Vanadium 95% UCL Calculation

DATA	ID
36.5	J1V714/ J1V715
38.1	J1V703
37.1	J1V704
36.4	J1V705
38.8	J1V706
32.7	J1V707
36.8	J1V708
47.2	J1V709
39.1	J1V710
40.2	J1V711
39.6	J1V712
37.2	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	38.3
Censored		Lognormal mean	38.3
Detection limit or PQL		Std. devn.	3.4
Method detection limit		Median	37.7
TOTAL	12	Min.	32.7
		Max.	47.2

Lognormal distribution? r-squared is: 0.851
Normal distribution? r-squared is: 0.820
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 39.9

Zinc 95% UCL Calculation

DATA	ID
41.3	J1V714/ J1V715
40.9	J1V703
40.9	J1V704
38.0	J1V705
48.7	J1V706
38.5	J1V707
37.6	J1V708
41.3	J1V709
48.4	J1V710
41.2	J1V711
41.8	J1V712
39.6	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	41.5
Censored		Lognormal mean	41.5
Detection limit or PQL		Std. devn.	3.6
Method detection limit		Median	41.1
TOTAL	12	Min.	37.6
		Max.	48.7

Lognormal distribution? r-squared is: 0.828
Normal distribution? r-squared is: 0.804
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 43.2

TPH - Diesel Range 95% UCL Calculation

DATA	ID
1350	J1V714/ J1V715
1900	J1V703
1700	J1V704
1100	J1V705
1700	J1V706
1500	J1V707
1700	J1V708
3100	J1V709
1900	J1V710
1900	J1V711
1600	J1V712
345	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	1650
Censored		Lognormal mean	1719
Detection limit or PQL		Std. devn.	634
Method detection limit		Median	1700
TOTAL	12	Min.	345
		Max.	3100

Lognormal distribution? r-squared is: 0.716
Normal distribution? r-squared is: 0.847
Recommendations:
Reject BOTH lognormal and normal distributions

UCL (based on Z-statistic) is 1951

TPH - Diesel Range EXT 95% UCL Calculation

DATA	ID
2850	J1V714/ J1V715
2200	J1V703
2800	J1V704
490	J1V705
2500	J1V706
2900	J1V707
3400	J1V708
5400	J1V709
4500	J1V710
4100	J1V711
3400	J1V712
500	J1V713

Number of samples		Uncensored values	
Uncensored	12	Mean	2920
Censored		Lognormal mean	3245
Detection limit or PQL		Std. devn.	1445
Method detection limit		Median	2875
TOTAL	12	Min.	490
		Max.	5400

Lognormal distribution? r-squared is: 0.764
Normal distribution? r-squared is: 0.948
Recommendations:
Use normal distribution.

UCL (based on t-statistic) is 3669

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Duplicate Analysis - 100-N-96 Waste Site Excavation (EXC)

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Calcium			Chromium			Cobalt			Copper		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	9510	X	1.4	3.4		0.58	83.3	X	0.066	0.36		0.029	1.5	B	0.86	4250	X	12.3	13.1	X	0.051	7.3	X	0.087	18.1		0.19
Duplicate of J1V6W1	J1V6W8	4/30/15	10200	X	1.5	3.1		0.63	84.8	X	0.072	0.36		0.031	1.4	B	0.93	4040	X	13.4	14.3	X	0.055	7.9	X	0.095	19.5		0.21

Analysis:

	TDL	5	10	2	0.5	2	100	1	2	1
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	7.0%		1.8%			5.1%	8.8%		7.4%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable	Not applicable

Duplicate Analysis - 100-N-96 Waste Site Excavation (EXC)

Sampling Area	Sample Number	Sample Date	Iron			Lead			Magnesium			Manganese			Nickel			Potassium			Silicon			Sodium			Vanadium		
			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
EXC-6	J1V6W1	4/30/15	18400	X	3.3	5		0.24	4150	X	3.2	344	X	0.087	12.9		0.11	1830		35.8	212	JN	4.9	172		51.6	37.9	X	0.082
Duplicate of J1V6W1	J1V6W8	4/30/15	19200	X	3.6	5.4		0.26	4620	X	3.5	366	X	0.095	14.3		0.12	1960		39.0	192	JN	5.4	177		56.1	38.7	X	0.089

Analysis:

	TDL	5	5	75	5	4	400	2	50	2.5
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)
	RPD	4.3%		10.7%	6.2%			9.9%		2.1%
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable	Not applicable

Duplicate Analysis - 100-N-96 Waste Site Excavation (EXC)

Sampling Area	Sample Number	Sample Date	Zinc			TPH - Diesel Range			TPH - Diesel Range EXT			Acetone		
			mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	36.4	X	0.35	1400	J	670	4200		980	35	JB	6.6
Duplicate of J1V6W1	J1V6W8	4/30/15	38.6	X	0.38	1600	J	680	3700	J	1000	35	JB	6

Analysis:

	TDL	1	5000	5000	35
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	5.9%			
	Difference > 2 TDL?	Not applicable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator J. D. Skoglie
Project 100-N Field Remediation
Subject 100-N-96 Waste Site Cleanup Verification 95% UCL Calculations

Date 06/15/15
Job No. 14655

Calc. No. 0100N-CA-V0290
Checked T. Q. Howell

Rev. No. 0
Date 06/15/15
Sheet No. 16 of 16

Duplicate Analysis - 100-N-96 Waste Site Staging Pile Area (SPA)

Sampling Area	Sample Number	Sample Date	Aluminum			Arsenic			Barium			Beryllium			Boron			Cadmium			Calcium			Chromium			Cobalt		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-12	J1V714	4/30/15	9590		1.5	3.2		0.62	82.8		0.071	0.30		0.031	1.4	B	0.92	0.18	B	0.038	3210		13.2	12.0		0.054	7.5	X	0.094
Duplicate of J1V714	J1V715	4/30/15	9370		1.4	3.2		0.62	84.4		0.071	0.30		0.031	1.3	B	0.91	0.17	B	0.038	3400		13.1	11.4		0.054	7.7	X	0.093

Analysis:

	TDL	5	10	2	0.5	2	0.2	100	1	2
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	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)	No-Stop (acceptable)
	RPD	2.3%		1.9%				5.7%	5.1%	
	Difference > 2 TDL?	Not applicable	No - acceptable	Not applicable	No - acceptable	No - acceptable	No - acceptable	Not applicable	Not applicable	No - acceptable

Duplicate Analysis - 100-N-96 Waste Site Staging Pile Area (SPA)

Sampling Area	Sample Number	Sample Date	Copper			Iron			Lead			Magnesium			Manganese			Nickel			Potassium			Silicon			Sodium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SPA-12	J1V714	4/30/15	12.5		0.20	18000		3.6	6.0		0.25	4050		3.5	330		0.094	11.2		0.12	2010		38.5	162		5.3	170		55.3
Duplicate of J1V714	J1V715	4/30/15	12.8		0.20	18400		3.5	5.0		0.25	4030		3.4	336		0.093	10.8		0.11	1970		38.2	163		5.3	184		55.0

Analysis:

	TDL	1	5	5	75	5	4	400	2	50
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)	Yes (calc RPD)	No-Stop (acceptable)
	RPD	2.4%	2.2%		0.5%	1.8%			0.6%	
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	Not applicable	Not applicable	No - acceptable	No - acceptable	Not applicable	No - acceptable

Duplicate Analysis - 100-N-96 Waste Site Staging Pile Area (SPA)

Sampling Area	Sample Number	Sample Date	Vanadium			Zinc			TPH - Diesel Range			TPH - Diesel Range EXT		
			mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
SPA-12	J1V714	4/30/15	36.9		0.088	42.4		0.37	1400	J	690	3000	J	1000
Duplicate of J1V714	J1V715	4/30/15	36.0		0.088	40.1		0.37	1300	J	680	2700	J	1000

Analysis:

	TDL	2.5	1	5000	5000
Duplicate Analysis	Both > PQL?	Yes (continue)	Yes (continue)	Yes (continue)	Yes (continue)
	Both >5xTDL?	Yes (calc RPD)	Yes (calc RPD)	No-Stop (acceptable)	No-Stop (acceptable)
	RPD	2.5%	5.6%		
	Difference > 2 TDL?	Not applicable	Not applicable	No - acceptable	No - acceptable

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	9510	X	1.4	0.33	UJ	0.33	3.4		0.58	83.3	X	0.066
Duplicate of J1V6W1	J1V6W8	4/30/15	10200	X	1.5	0.36	UJ	0.36	3.1		0.63	84.8	X	0.072
EXC-1	J1V6V6	4/30/15	7260	X	1.5	0.38	UJ	0.38	2.3		0.66	52.8	X	0.076
EXC-2	J1V6V7	4/30/15	6800	X	1.5	0.37	UJ	0.37	2.3		0.64	58.0	X	0.074
EXC-3	J1V6V8	4/30/15	6340	X	1.3	0.31	UJ	0.31	1.9		0.54	52.6	X	0.063
EXC-4	J1V6V9	4/30/15	6840	X	1.3	0.32	UJ	0.32	2.0		0.56	54.0	X	0.065
EXC-5	J1V6W0	4/30/15	5660	X	1.5	0.36	UJ	0.36	2.2		0.63	48.2	X	0.073
EXC-7	J1V6W2	4/30/15	5160	X	1.4	0.35	UJ	0.35	1.9		0.61	58.5	X	0.070
EXC-8	J1V6W3	4/30/15	7350	X	1.5	0.38	UJ	0.38	2.6		0.66	60.2	X	0.076
EXC-9	J1V6W4	4/30/15	8210	X	1.4	0.34	UJ	0.34	3.0		0.60	58.5	X	0.069
EXC-10	J1V6W5	4/30/15	1710	X	1.6	0.38	UJ	0.38	0.73	B	0.66	17.3	X	0.076
EXC-11	J1V6W6	4/30/15	4800	X	1.3	0.32	UJ	0.32	1.9		0.56	37.5	X	0.065
EXC-12	J1V6W7	4/30/15	8000	X	1.5	0.37	UJ	0.37	2.9		0.64	77.3	X	0.074
SPA-12	J1V714	4/30/15	9590		1.5	0.36	U	0.36	3.2		0.62	82.8		0.071
Duplicate of J1V714	J1V715	4/30/15	9370		1.4	0.35	U	0.35	3.2		0.62	84.4		0.071
SPA-1	J1V703	4/30/15	10000		1.3	0.33	U	0.33	2.9		0.57	82.6		0.065
SPA-2	J1V704	4/30/15	9520		1.4	0.35	U	0.35	3.2		0.61	85.2		0.070
SPA-3	J1V705	4/30/15	8720		1.4	0.33	U	0.33	3.2		0.58	80.2		0.067
SPA-4	J1V706	4/30/15	9760		1.4	0.34	U	0.34	3.2		0.58	87.9		0.067
SPA-5	J1V707	4/30/15	8470		1.5	0.38	U	0.38	2.9		0.66	76.1		0.076
SPA-6	J1V708	4/30/15	9360		1.5	0.38	U	0.38	3.2		0.66	79.4		0.076
SPA-7	J1V709	4/30/15	8460		1.4	0.34	U	0.34	2.9		0.59	65.6		0.068
SPA-8	J1V710	4/30/15	9520		1.4	0.34	U	0.34	3.1		0.59	79.7		0.068
SPA-9	J1V711	4/30/15	10100		1.5	0.38	U	0.38	2.8		0.66	91.1		0.076
SPA-10	J1V712	4/30/15	9760		1.4	0.35	U	0.35	2.6		0.61	84.9		0.071
SPA-11	J1V713	4/30/15	9820		1.5	0.38	U	0.38	3.3		0.66	84.9		0.075
Equipment Blank	J1V716	4/30/15	87.4		1.4	0.36	U	0.36	0.62	U	0.62	1.2		0.071

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

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

B = blank contamination (inorganic constituents)

C = </= 5x blank concentration

EXC = excavation

HEIS = Hanford Environmental Information System

J – estimate

N = recovery outside control limits

PQL = practical quantitation limit

Attachment	1	Sheet No.	1 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Q = qualifier

SPA = staging pile area

U = undetected

X (organics) = >40% difference between primary and confirmation dector results.

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

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Beryllium			Boron			Cadmium			Calcium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	0.36		0.029	1.5	B	0.86	0.042	B	0.036	4250	X	12.3
Duplicate of J1V6W1	J1V6W8	4/30/15	0.36		0.031	1.4	B	0.93	0.039	U	0.039	4040	X	13.4
EXC-1	J1V6V6	4/30/15	0.30		0.033	1.3	BN	0.98	0.041	U	0.041	4810	X	14.0
EXC-2	J1V6V7	4/30/15	0.28		0.032	1.1	B	0.96	0.040	U	0.040	5040	X	13.7
EXC-3	J1V6V8	4/30/15	0.27		0.027	0.84	B	0.81	0.034	U	0.034	4120	X	11.6
EXC-4	J1V6V9	4/30/15	0.29		0.028	0.93	B	0.84	0.035	U	0.035	5250	X	12.0
EXC-5	J1V6W0	4/30/15	0.23		0.032	0.94	U	0.94	0.039	U	0.039	6150	X	13.5
EXC-7	J1V6W2	4/30/15	0.20		0.030	0.90	U	0.90	0.038	U	0.038	4910	X	13.0
EXC-8	J1V6W3	4/30/15	0.27		0.033	1.1	B	0.98	0.041	U	0.041	6220	X	14.0
EXC-9	J1V6W4	4/30/15	0.30		0.030	1.2	B	0.89	0.037	U	0.037	5520	X	12.8
EXC-10	J1V6W5	4/30/15	0.11	B	0.033	0.98	U	0.98	0.041	U	0.041	2850	X	14.2
EXC-11	J1V6W6	4/30/15	0.19		0.028	0.84	U	0.84	0.035	U	0.035	5810	X	12.0
EXC-12	J1V6W7	4/30/15	0.30		0.032	1.0	B	0.96	0.040	U	0.040	4220	X	13.8
SPA-12	J1V714	4/30/15	0.30		0.031	1.4	B	0.92	0.18	B	0.038	3210		13.2
Duplicate of J1V714	J1V715	4/30/15	0.30		0.031	1.3	B	0.91	0.17	B	0.038	3400		13.1
SPA-1	J1V703	4/30/15	0.32		0.028	1.7		0.84	0.13	B	0.035	3460		12.1
SPA-2	J1V704	4/30/15	0.29		0.030	2.1		0.90	0.13	B	0.038	3370		13.0
SPA-3	J1V705	4/30/15	0.27		0.029	1.7	B	0.86	0.13	B	0.036	4390		12.3
SPA-4	J1V706	4/30/15	0.30		0.029	1.5	B	0.87	0.16	B	0.036	3710		12.5
SPA-5	J1V707	4/30/15	0.28		0.033	1.8	B	0.98	0.14	B	0.041	3160		14.0
SPA-6	J1V708	4/30/15	0.28		0.033	1.8	B	0.98	0.15	B	0.041	3600		14.0
SPA-7	J1V709	4/30/15	0.32		0.030	0.89	B	0.88	0.15	B	0.037	4850		12.7
SPA-8	J1V710	4/30/15	0.28		0.030	1.6	B	0.88	0.19		0.037	4100		12.6
SPA-9	J1V711	4/30/15	0.31		0.033	1.4	B	0.98	0.15	B	0.041	3900		14.1
SPA-10	J1V712	4/30/15	0.31		0.031	1.3	B	0.91	0.16	B	0.038	3320		13.1
SPA-11	J1V713	4/30/15	0.29		0.033	1.5	B	0.97	0.13	B	0.041	3540		14.0
Equipment Blank	J1V716	4/30/15	0.031	U	0.031	0.92	U	0.92	0.038	U	0.038	36.0	BC	13.2

Sample Location	HEIS Number	Sample Date	Chromium			Cobalt			Copper			Hexavalent Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	13.1	X	0.051	7.3	X	0.087	18.1		0.19	0.197		0.155
Duplicate of J1V6W1	J1V6W8	4/30/15	14.3	X	0.055	7.9	X	0.095	19.5		0.21	0.155	U	0.155
EXC-1	J1V6V6	4/30/15	8.5	X	0.058	6.8	X	0.10	16.2		0.22	0.240		0.155
EXC-2	J1V6V7	4/30/15	7.3	X	0.057	6.5	X	0.097	16.1		0.21	0.155	U	0.155
EXC-3	J1V6V8	4/30/15	6.9	X	0.048	7.0	X	0.082	15.2		0.18	0.421		0.155
EXC-4	J1V6V9	4/30/15	6.5	X	0.049	7.3	X	0.085	17.9		0.19	0.319		0.155
EXC-5	J1V6W0	4/30/15	6.8	X	0.056	6.5	X	0.096	15.5		0.21	0.280		0.155
EXC-7	J1V6W2	4/30/15	6.5	X	0.053	7.1	X	0.092	16.1		0.20	0.296		0.155
EXC-8	J1V6W3	4/30/15	9.8	X	0.058	6.7	X	0.10	15.2		0.22	0.218		0.155
EXC-9	J1V6W4	4/30/15	9.5	X	0.053	7.1	X	0.091	17.2		0.20	0.218		0.155
EXC-10	J1V6W5	4/30/15	1.0	X	0.058	5.6	X	0.10	9.6		0.22	0.277		0.155
EXC-11	J1V6W6	4/30/15	7.0	X	0.050	7.2	X	0.085	17.0		0.19	0.237		0.155
EXC-12	J1V6W7	4/30/15	10.4	X	0.057	7.1	X	0.098	15.7		0.21	0.319		0.155
SPA-12	J1V714	4/30/15	12.0		0.054	7.5	X	0.094	12.5		0.20	0.155	U	0.155
Duplicate of J1V714	J1V715	4/30/15	11.4		0.054	7.7	X	0.093	12.8		0.20	0.155	U	0.155
SPA-1	J1V703	4/30/15	12.2		0.050	8.0	X	0.086	13.0		0.19	0.230		0.155
SPA-2	J1V704	4/30/15	11.4		0.053	7.6	X	0.092	12.5		0.20	0.155	U	0.155
SPA-3	J1V705	4/30/15	11.2		0.051	7.7	X	0.088	14.1		0.19	0.155	U	0.155
SPA-4	J1V706	4/30/15	12.2		0.051	7.9	X	0.089	15.9		0.19	0.191		0.155
SPA-5	J1V707	4/30/15	10.4		0.058	6.8	X	0.10	11.9		0.22	0.155	U	0.155
SPA-6	J1V708	4/30/15	11.7		0.058	7.3	X	0.10	13.9		0.22	0.155	U	0.155
SPA-7	J1V709	4/30/15	8.6		0.052	9.4	X	0.090	20.6		0.19	0.155	U	0.155
SPA-8	J1V710	4/30/15	11.8		0.052	7.8	X	0.090	39.1		0.19	0.155	U	0.155
SPA-9	J1V711	4/30/15	11.1		0.058	8.0	X	0.10	13.5		0.22	0.155	U	0.155
SPA-10	J1V712	4/30/15	11.7		0.054	7.7	X	0.093	12.5		0.20	0.155	U	0.155
SPA-11	J1V713	4/30/15	11.8		0.058	7.9	X	0.099	13.4		0.22	0.155	U	0.155
Equipment Blank	J1V716	4/30/15	0.087	B	0.054	0.097	BX	0.093	0.34	B	0.20			

Attachment	1	Sheet No.	2 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Iron			Lead			Magnesium			Manganese		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	18400	X	3.3	5		0.24	4150	X	3.2	344	X	0.087
Duplicate of J1V6W1	J1V6W8	4/30/15	19200	X	3.6	5.4		0.26	4620	X	3.5	366	X	0.095
EXC-1	J1V6V6	4/30/15	17800	X	3.8	3.7		0.27	3790	X	3.7	253	X	0.10
EXC-2	J1V6V7	4/30/15	17800	X	3.7	4.6		0.26	3410	X	3.6	245	X	0.097
EXC-3	J1V6V8	4/30/15	17700	X	3.1	3.2		0.22	3340	X	3.0	256	X	0.082
EXC-4	J1V6V9	4/30/15	17800	X	3.2	3.6		0.23	3830	X	3.2	258	X	0.085
EXC-5	J1V6W0	4/30/15	16400	X	3.6	3.6		0.26	3140	X	3.5	233	X	0.096
EXC-7	J1V6W2	4/30/15	17500	X	3.5	2.5		0.25	3640	X	3.4	316	X	0.092
EXC-8	J1V6W3	4/30/15	17300	X	3.8	3.6		0.27	3980	X	3.7	295	X	0.10
EXC-9	J1V6W4	4/30/15	18300	X	3.4	4.5		0.24	4000	X	3.4	290	X	0.091
EXC-10	J1V6W5	4/30/15	12000	X	3.8	1.6		0.27	2180	X	3.7	116	X	0.10
EXC-11	J1V6W6	4/30/15	18400	X	3.2	2.7		0.23	3630	X	3.2	245	X	0.085
EXC-12	J1V6W7	4/30/15	18000	X	3.7	4.1		0.26	3970	X	3.6	290	X	0.098
SPA-12	J1V714	4/30/15	18000		3.6	6.0		0.25	4050		3.5	330		0.094
Duplicate of J1V714	J1V715	4/30/15	18400		3.5	5.0		0.25	4030		3.4	336		0.093
SPA-1	J1V703	4/30/15	19300		3.3	4.8		0.23	4160		3.2	358		0.086
SPA-2	J1V704	4/30/15	18300		3.5	4.8		0.25	3990		3.4	336		0.092
SPA-3	J1V705	4/30/15	18600		3.3	3.9		0.24	4450		3.2	326		0.088
SPA-4	J1V706	4/30/15	19600		3.4	8.8		0.24	4120		3.3	351		0.089
SPA-5	J1V707	4/30/15	16600		3.8	5.3		0.27	3700		3.7	295		0.10
SPA-6	J1V708	4/30/15	18400		3.8	4.8		0.27	4100		3.7	306		0.10
SPA-7	J1V709	4/30/15	22800		3.4	4.8		0.24	4770		3.3	315		0.090
SPA-8	J1V710	4/30/15	19400		3.4	8.8		0.24	4280		3.3	342		0.090
SPA-9	J1V711	4/30/15	20700		3.8	5.1		0.27	4150		3.7	344		0.10
SPA-10	J1V712	4/30/15	19000		3.5	5.3		0.25	4000		3.4	342		0.093
SPA-11	J1V713	4/30/15	18700		3.8	4.6		0.27	4280		3.7	338		0.099
Equipment Blank	J1V716	4/30/15	129		3.6	0.25	U	0.25	16.6	BC	3.5	2.8		0.093

Sample Location	HEIS Number	Sample Date	Mercury			Molybdenum			Nickel			Potassium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	0.0073	B	0.0063	0.23	U	0.23	12.9		0.11	1830		35.8
Duplicate of J1V6W1	J1V6W8	4/30/15	0.0061	U	0.0061	0.25	U	0.25	14.3		0.12	1960		39.0
EXC-1	J1V6V6	4/30/15	0.0064	U	0.0064	0.29	B	0.26	10.1		0.12	1150		40.9
EXC-2	J1V6V7	4/30/15	0.0063	U	0.0063	0.25	U	0.25	8.6		0.12	1270		40.0
EXC-3	J1V6V8	4/30/15	0.0056	U	0.0056	0.21	U	0.21	8.8		0.10	1080		33.7
EXC-4	J1V6V9	4/30/15	0.0067	B	0.0057	0.22	U	0.22	9.5		0.10	1120		35.0
EXC-5	J1V6W0	4/30/15	0.0061	U	0.0061	0.25	U	0.25	8.1		0.12	956		39.2
EXC-7	J1V6W2	4/30/15	0.0063	U	0.0063	0.24	U	0.24	9.0		0.11	872		37.8
EXC-8	J1V6W3	4/30/15	0.0061	U	0.0061	0.26	U	0.26	11.0		0.12	1280		40.9
EXC-9	J1V6W4	4/30/15	0.0083	B	0.0060	0.24	U	0.24	10.9		0.11	1450		37.1
EXC-10	J1V6W5	4/30/15	0.0065	U	0.0065	0.26	U	0.26	4.1		0.12	274	B	41.2
EXC-11	J1V6W6	4/30/15	0.0066	U	0.0066	0.22	U	0.22	8.9		0.11	821		35.0
EXC-12	J1V6W7	4/30/15	0.0065	B	0.0059	0.25	U	0.25	11.0		0.12	1350		40.0
SPA-12	J1V714	4/30/15	0.0061	U	0.0061	0.24	U	0.24	11.2		0.12	2010		38.5
Duplicate of J1V714	J1V715	4/30/15	0.0063	U	0.0063	0.24	U	0.24	10.8		0.11	1970		38.2
SPA-1	J1V703	4/30/15	0.0063	UN	0.0063	0.22	U	0.22	10.9		0.11	2100		35.3
SPA-2	J1V704	4/30/15	0.0061	B	0.0058	0.24	U	0.24	10.7		0.11	2120		37.8
SPA-3	J1V705	4/30/15	0.0067	U	0.0067	0.23	U	0.23	11.5		0.11	1990		35.9
SPA-4	J1V706	4/30/15	0.0066	U	0.0066	0.23	U	0.23	11.1		0.11	2160		36.3
SPA-5	J1V707	4/30/15	0.0064	U	0.0064	0.26	U	0.26	9.8		0.12	1990		40.8
SPA-6	J1V708	4/30/15	0.0065	U	0.0065	0.26	U	0.26	10.7		0.12	2000		40.8
SPA-7	J1V709	4/30/15	0.0081	B	0.0067	0.23	U	0.23	10.4		0.11	1390		36.8
SPA-8	J1V710	4/30/15	0.0080	B	0.0064	0.23	U	0.23	11.0		0.11	2000		36.8
SPA-9	J1V711	4/30/15	0.0067	U	0.0067	0.26	U	0.26	10.8		0.12	2160		41.0
SPA-10	J1V712	4/30/15	0.0063	B	0.0058	0.24	U	0.24	10.8		0.11	2020		38.2
SPA-11	J1V713	4/30/15	0.0065	U	0.0065	0.26	U	0.26	11.3		0.12	2040		40.7
Equipment Blank	J1V716	4/30/15	0.0063	U	0.0063	0.24	U	0.24	0.11	U	0.11	38.3	U	38.3

Attachment	1	Sheet No.	3 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Selenium			Silicon			Silver			Sodium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	0.75	U	0.75	212	JN	4.9	0.14	U	0.14	172		51.6
Duplicate of J1V6W1	J1V6W8	4/30/15	0.82	U	0.82	192	JN	5.4	0.15	U	0.15	177		56.1
EXC-1	J1V6V6	4/30/15	0.86	U	0.86	249	JN	5.6	0.16	U	0.16	271		58.8
EXC-2	J1V6V7	4/30/15	0.84	U	0.84	205	JN	5.5	0.16	U	0.16	253		57.5
EXC-3	J1V6V8	4/30/15	0.71	U	0.71	200	JN	4.7	0.13	U	0.13	243		48.5
EXC-4	J1V6V9	4/30/15	0.73	U	0.73	175	JN	4.8	0.14	U	0.14	315		50.3
EXC-5	J1V6W0	4/30/15	0.82	U	0.82	177	JN	5.4	0.15	U	0.15	311		56.5
EXC-7	J1V6W2	4/30/15	0.79	U	0.79	130	JN	5.2	0.15	U	0.15	308		54.4
EXC-8	J1V6W3	4/30/15	0.86	U	0.86	233	JN	5.6	0.16	U	0.16	278		58.8
EXC-9	J1V6W4	4/30/15	0.78	U	0.78	239	JN	5.1	0.14	U	0.14	299		53.5
EXC-10	J1V6W5	4/30/15	0.86	U	0.86	63.8	JN	5.7	0.16	U	0.16	181		59.2
EXC-11	J1V6W6	4/30/15	0.73	U	0.73	145	JN	4.8	0.14	U	0.14	234		50.4
EXC-12	J1V6W7	4/30/15	0.84	U	0.84	264	JN	5.5	0.16	U	0.16	208		57.6
SPA-12	J1V714	4/30/15	0.81	U	0.81	162		5.3	0.15	U	0.15	170		55.3
Duplicate of J1V714	J1V715	4/30/15	0.92	B	0.80	163		5.3	0.15	U	0.15	184		55.0
SPA-1	J1V703	4/30/15	0.80	B	0.74	184	N	4.9	0.14	U	0.14	237		50.8
SPA-2	J1V704	4/30/15	0.79	U	0.79	212		5.2	0.15	U	0.15	195		54.4
SPA-3	J1V705	4/30/15	0.75	U	0.75	204		5.0	0.14	U	0.14	198		51.6
SPA-4	J1V706	4/30/15	0.76	U	0.76	190		5.0	0.14	U	0.14	185		52.2
SPA-5	J1V707	4/30/15	0.87	B	0.86	142		5.6	0.16	U	0.16	188		58.8
SPA-6	J1V708	4/30/15	0.86	U	0.86	185		5.6	0.16	U	0.16	211		58.7
SPA-7	J1V709	4/30/15	0.77	U	0.77	204		5.1	0.14	U	0.14	260		53.0
SPA-8	J1V710	4/30/15	0.86	B	0.77	206		5.1	0.14	U	0.14	247		52.9
SPA-9	J1V711	4/30/15	0.86	U	0.86	233		5.7	0.16	U	0.16	207		58.9
SPA-10	J1V712	4/30/15	0.80	U	0.80	155		5.3	0.15	U	0.15	180		54.9
SPA-11	J1V713	4/30/15	0.85	U	0.85	200		5.6	0.16	U	0.16	217		58.6
Equipment Blank	J1V716	4/30/15	0.80	U	0.80	76.7		5.3	0.15	U	0.15	55.1	U	55.1

Sample Location	HEIS Number	Sample Date	Vanadium			Zinc			TPH - Diesel Range			TPH - Diesel Range EXT		
			mg/kg	Q	PQL	mg/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
EXC-6	J1V6W1	4/30/15	37.9	X	0.082	36.4	X	0.35	1400	J	670	4200		980
Duplicate of J1V6W1	J1V6W8	4/30/15	38.7	X	0.089	38.6	X	0.38	1600	J	680	3700	J	1000
EXC-1	J1V6V6	4/30/15	40.1	X	0.094	34.5	X	0.40	1200	J	660	2300	J	970
EXC-2	J1V6V7	4/30/15	40.3	X	0.092	35.9	X	0.39	1800	J	680	3100	J	1000
EXC-3	J1V6V8	4/30/15	38.3	X	0.077	31.7	X	0.33	650	U	650	950	U	950
EXC-4	J1V6V9	4/30/15	38.3	X	0.080	33.8	X	0.34	3200	J	660	4100		970
EXC-5	J1V6W0	4/30/15	38.6	X	0.090	34.3	X	0.38	670	U	670	980	U	980
EXC-7	J1V6W2	4/30/15	41.4	X	0.087	32.5	X	0.37	650	U	650	960	U	960
EXC-8	J1V6W3	4/30/15	39.4	X	0.094	36.1	X	0.40	650	U	650	960	U	960
EXC-9	J1V6W4	4/30/15	40.5	X	0.085	38.7	X	0.36	1400	J	680	3100	J	1000
EXC-10	J1V6W5	4/30/15	18.6	X	0.094	18.8	X	0.40	650	U	650	960	U	960
EXC-11	J1V6W6	4/30/15	45.3	X	0.080	34.8	X	0.34	670	U	670	980	U	980
EXC-12	J1V6W7	4/30/15	42.1	X	0.092	36.7	X	0.39	660	U	660	960	U	960
SPA-12	J1V714	4/30/15	36.9		0.088	42.4		0.37	1400	J	690	3000	J	1000
Duplicate of J1V714	J1V715	4/30/15	36.0		0.088	40.1		0.37	1300	J	680	2700	J	1000
SPA-1	J1V703	4/30/15	38.1		0.081	40.9		0.34	1900	J	660	2200	J	970
SPA-2	J1V704	4/30/15	37.1		0.087	40.9		0.37	1700	J	670	2800	J	990
SPA-3	J1V705	4/30/15	36.4		0.082	38.0		0.35	1100	J	660	980	U	980
SPA-4	J1V706	4/30/15	38.8		0.083	48.7		0.35	1700	J	630	2500	J	920
SPA-5	J1V707	4/30/15	32.7		0.094	38.5		0.40	1500	J	650	2900	J	960
SPA-6	J1V708	4/30/15	36.8		0.094	37.6		0.40	1700	J	640	3400	J	940
SPA-7	J1V709	4/30/15	47.2		0.084	41.3		0.36	3100	J	680	5400		1000
SPA-8	J1V710	4/30/15	39.1		0.084	48.4		0.36	1900	J	700	4500		1000
SPA-9	J1V711	4/30/15	40.2		0.094	41.2		0.40	1900	J	680	4100		990
SPA-10	J1V712	4/30/15	39.6		0.088	41.8		0.37	1600	J	680	3400	J	1000
SPA-11	J1V713	4/30/15	37.2		0.093	39.6		0.40	690	U	690	1000	U	1000
Equipment Blank	J1V716	4/30/15	0.22	B	0.088	0.80	B	0.37						

Attachment	1	Sheet No.	4 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Metals, TPH, and Physical).

Sample Location	HEIS Number	Sample Date	Percent moisture (wet sample)		
			%	Q	PQL
EXC-6	J1V6W1	4/30/15	1.4		0.10
Duplicate of J1V6W1	J1V6W8	4/30/15	3.5		0.10
EXC-1	J1V6V6	4/30/15	1.6		0.10
EXC-2	J1V6V7	4/30/15	5.0		0.10
EXC-3	J1V6V8	4/30/15	0.10	U	0.10
EXC-4	J1V6V9	4/30/15	0.61		0.10
EXC-5	J1V6W0	4/30/15	1.4		0.10
EXC-7	J1V6W2	4/30/15	0.51		0.10
EXC-8	J1V6W3	4/30/15	1.6		0.10
EXC-9	J1V6W4	4/30/15	1.5		0.10
EXC-10	J1V6W5	4/30/15	0.42		0.10
EXC-11	J1V6W6	4/30/15	0.74		0.10
EXC-12	J1V6W7	4/30/15	0.55		0.10
SPA-12	J1V714	4/30/15	1.3		0.10
Duplicate of J1V714	J1V715	4/30/15	0.65		0.10
SPA-1	J1V703	4/30/15	0.67		0.10
SPA-2	J1V704	4/30/15	0.43		0.10
SPA-3	J1V705	4/30/15	0.66		0.10
SPA-4	J1V706	4/30/15	0.93		0.10
SPA-5	J1V707	4/30/15	0.58		0.10
SPA-6	J1V708	4/30/15	0.57		0.10
SPA-7	J1V709	4/30/15	1.5		0.10
SPA-8	J1V710	4/30/15	3.9		0.10
SPA-9	J1V711	4/30/15	0.88		0.10
SPA-10	J1V712	4/30/15	1.5		0.10
SPA-11	J1V713	4/30/15	1.3		0.10
Equipment Blank	J1V716	4/30/15	0.10	U	0.10
Trip Blank	J1V717	4/30/15	0.10	U	0.10

Attachment	1	Sheet No.	5 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-6 - J1V6W1			Duplicate of J1V6W1 - J1V6W8			EXC-1 - J1V6V6			EXC-2 - J1V6V7		
		4/30/15			4/30/15			4/30/15			4/30/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.8	U	2.8	2.8	U	2.8	2.7	U	2.7	2.8	U	2.8
Aroclor-1221	PCB	8.0	U	8.0	8.1	U	8.1	7.9	U	7.9	8.2	U	8.2
Aroclor-1232	PCB	2.0	U	2.0	2.0	U	2.0	2.0	U	2.0	2.0	U	2.0
Aroclor-1242	PCB	4.7	U	4.7	4.7	U	4.7	4.6	U	4.6	4.7	U	4.7
Aroclor-1248	PCB	4.7	U	4.7	4.7	U	4.7	4.6	U	4.6	4.7	U	4.7
Aroclor-1254	PCB	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6
Aroclor-1260	PCB	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6	2.6	U	2.6
Acenaphthene	PAH	9.8	U	9.8	9.8	U	9.8	9.6	U	9.6	9.8	U	9.8
Acenaphthylene	PAH	8.9	U	8.9	8.9	U	8.9	8.7	U	8.7	8.9	U	8.9
Anthracene	PAH	3.0	U	3.0	3.0	U	3.0	2.9	U	2.9	3.0	U	3.0
Benzo(a)anthracene	PAH	3.1	U	3.1	3.1	U	3.1	3.1	U	3.1	3.1	U	3.1
Benzo(a)pyrene	PAH	6.3	U	6.3	6.3	U	6.3	6.2	U	6.2	6.3	U	6.3
Benzo(b)fluoranthene	PAH	4.1	U	4.1	4.1	U	4.1	4.1	U	4.1	4.1	U	4.1
Benzo(ghi)perylene	PAH	7.1	U	7.1	7.1	U	7.1	6.9	U	6.9	7.1	U	7.1
Benzo(k)fluoranthene	PAH	3.9	U	3.9	3.9	U	3.9	3.8	U	3.8	3.9	U	3.9
Chrysene	PAH	4.8	U	4.8	4.8	U	4.8	4.7	U	4.7	4.8	U	4.8
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	11	U	11	11	U	11
Fluoranthene	PAH	13	U	13	13	U	13	13	U	13	13	U	13
Fluorene	PAH	5.2	U	5.2	5.2	U	5.2	5.1	U	5.1	5.2	U	5.2
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Naphthalene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Phenanthrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Pyrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
1,1,1-Trichloroethane	VOA	0.64	UJ	0.64	0.58	UJ	0.58	0.49	U	0.49	0.58	UJ	0.58
1,1,2,2-Tetrachloroethane	VOA	0.75	U	0.75	0.68	U	0.68	0.57	U	0.57	0.68	U	0.68
1,1,2-Trichloroethane	VOA	1.1	U	1.1	0.98	U	0.98	0.83	U	0.83	0.98	U	0.98
1,1-Dichloroethane	VOA	0.26	U	0.26	0.23	U	0.23	0.20	U	0.20	0.23	U	0.23
1,1-Dichloroethene	VOA	0.72	U	0.72	0.65	U	0.65	0.55	U	0.55	0.66	U	0.66
1,2-Dichloroethane	VOA	0.86	U	0.86	0.78	U	0.78	0.66	U	0.66	0.78	U	0.78
1,2-Dichloroethene(Total)	VOA	0.48	U	0.48	0.43	U	0.43	0.37	U	0.37	0.44	U	0.44
1,2-Dichloropropane	VOA	0.67	U	0.67	0.61	U	0.61	0.52	U	0.52	0.61	U	0.61
2-Butanone	VOA	2.2	U	2.2	2.0	U	2.0	1.7	U	1.7	2.0	U	2.0
2-Hexanone	VOA	6.0	U	6.0	5.4	U	5.4	4.6	U	4.6	5.5	U	5.5
4-Methyl-2-Pentanone	VOA	5.3	U	5.3	4.8	U	4.8	4.1	U	4.1	4.9	U	4.9
Acetone	VOA	35	UJB	6.6	35	UJB	6.0	5.0	U	5.0	36	JB	6.0
Benzene	VOA	0.58	U	0.58	0.52	U	0.52	0.44	U	0.44	0.52	U	0.52
Bromodichloromethane	VOA	0.27	U	0.27	0.24	U	0.24	0.21	U	0.21	0.25	U	0.25
Bromoform	VOA	0.28	U	0.28	0.26	U	0.26	0.22	U	0.22	0.26	U	0.26
Bromomethane	VOA	0.61	U	0.61	0.55	U	0.55	0.47	U	0.47	0.56	U	0.56
Carbon disulfide	VOA	0.51	UJ	0.51	0.47	UJ	0.47	0.39	U	0.39	0.47	UJ	0.47
Carbon tetrachloride	VOA	0.77	U	0.77	0.70	U	0.70	0.59	U	0.59	0.70	U	0.70
Chlorobenzene	VOA	0.66	U	0.66	0.60	U	0.60	0.51	UX	0.51	0.60	U	0.60
Chloroethane	VOA	1.1	U	1.1	0.99	U	0.99	0.84	U	0.84	0.99	U	0.99
Chloroform	VOA	0.36	U	0.36	0.32	U	0.32	0.27	U	0.27	0.32	U	0.32
Chloromethane	VOA	0.94	U	0.94	0.85	U	0.85	0.72	UJ	0.72	0.86	U	0.86
cis-1,3-Dichloropropene	VOA	1.6	U	1.6	1.4	U	1.4	1.2	U	1.2	1.4	U	1.4
Dibromochloromethane	VOA	0.70	U	0.70	0.63	U	0.63	0.53	U	0.53	0.64	U	0.64
Ethylbenzene	VOA	0.82	U	0.82	0.74	U	0.74	0.63	UX	0.63	0.75	U	0.75
Methylenechloride	VOA	2.7	J	2.0	1.8	U	1.8	1.5	U	1.5	1.8	U	1.8
Styrene	VOA	0.77	U	0.77	0.70	U	0.70	0.59	UX	0.59	0.70	U	0.70
Tetrachloroethene	VOA	0.72	U	0.72	0.65	U	0.65	0.55	UX	0.55	0.66	U	0.66
Toluene	VOA	0.85	U	0.85	0.77	U	0.77	0.65	U	0.65	0.77	U	0.77
trans-1,3-Dichloropropene	VOA	0.82	U	0.82	0.74	U	0.74	0.63	U	0.63	0.75	U	0.75
Trichloroethene	VOA	0.28	U	0.28	0.26	U	0.26	0.22	U	0.22	0.26	U	0.26
Vinyl chloride	VOA	1.6	U	1.6	1.5	U	1.5	1.3	U	1.3	1.5	U	1.5
Xylenes (total)	VOA	0.75	U	0.75	0.68	U	0.68	0.57	UJX	0.57	0.68	U	0.68

Attachment	1	Sheet No.	6 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-3 - J1V6V8			EXC-4 - J1V6V9			EXC-5 - J1V6W0			EXC-7 - J1V6W2		
		4/30/15			4/30/15			4/30/15			4/30/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.6	U	2.6	2.7	U	2.7	2.6	U	2.6	2.6	U	2.6
Aroclor-1221	PCB	7.4	U	7.4	7.9	U	7.9	7.6	U	7.6	7.6	U	7.6
Aroclor-1232	PCB	1.9	U	1.9	2.0	U	2.0	1.9	U	1.9	1.9	U	1.9
Aroclor-1242	PCB	4.3	U	4.3	4.6	U	4.6	4.4	U	4.4	4.4	U	4.4
Aroclor-1248	PCB	4.3	U	4.3	4.6	U	4.6	4.4	U	4.4	4.4	U	4.4
Aroclor-1254	PCB	2.4	U	2.4	2.6	U	2.6	2.5	U	2.5	2.5	U	2.5
Aroclor-1260	PCB	2.4	U	2.4	2.6	U	2.6	2.5	U	2.5	2.5	U	2.5
Acenaphthene	PAH	9.6	U	9.6	9.9	U	9.9	9.8	U	9.8	9.7	U	9.7
Acenaphthylene	PAH	8.6	U	8.6	8.9	U	8.9	8.8	U	8.8	8.7	U	8.7
Anthracene	PAH	2.9	U	2.9	3.0	U	3.0	3.0	U	3.0	3.0	U	3.0
Benzo(a)anthracene	PAH	3.1	U	3.1	3.2	U	3.2	3.1	U	3.1	3.1	U	3.1
Benzo(a)pyrene	PAH	6.2	U	6.2	6.3	U	6.3	6.3	U	6.3	6.2	U	6.2
Benzo(b)fluoranthene	PAH	4.0	U	4.0	4.2	U	4.2	4.1	U	4.1	4.1	U	4.1
Benzo(ghi)perylene	PAH	6.9	U	6.9	7.1	U	7.1	7.1	U	7.1	7.0	U	7.0
Benzo(k)fluoranthene	PAH	3.8	U	3.8	3.9	U	3.9	3.9	U	3.9	3.8	U	3.8
Chrysene	PAH	4.7	U	4.7	4.8	U	4.8	4.8	U	4.8	4.7	U	4.7
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	11	U	11	11	U	11
Fluoranthene	PAH	12	U	12	13	U	13	13	U	13	13	U	13
Fluorene	PAH	5.1	U	5.1	5.2	U	5.2	5.2	U	5.2	5.1	U	5.1
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Naphthalene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Phenanthrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Pyrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
1,1,1-Trichloroethane	VOA	0.69	UJ	0.69	0.53	U	0.53	0.60	UJ	0.60	0.78	U	0.78
1,1,2,2-Tetrachloroethane	VOA	0.81	U	0.81	0.62	U	0.62	0.70	U	0.70	0.92	U	0.92
1,1,2-Trichloroethane	VOA	1.2	U	1.2	0.89	U	0.89	1.0	U	1.0	1.3	U	1.3
1,1-Dichloroethane	VOA	0.28	U	0.28	0.21	U	0.21	0.24	U	0.24	0.32	U	0.32
1,1-Dichloroethene	VOA	1.2	J	0.78	0.60	U	0.60	0.72	J	0.68	0.89	U	0.89
1,2-Dichloroethane	VOA	0.93	U	0.93	0.71	U	0.71	0.80	U	0.80	1.1	U	1.1
1,2-Dichloroethene(Total)	VOA	0.52	U	0.52	0.40	U	0.40	0.45	U	0.45	0.59	U	0.59
1,2-Dichloropropane	VOA	0.73	U	0.73	0.56	U	0.56	0.63	U	0.63	0.83	U	0.83
2-Butanone	VOA	2.4	U	2.4	1.9	U	1.9	2.1	U	2.1	2.8	U	2.8
2-Hexanone	VOA	6.5	U	6.5	5.0	U	5.0	5.6	U	5.6	7.4	U	7.4
4-Methyl-2-Pentanone	VOA	5.8	U	5.8	4.4	U	4.4	5.0	U	5.0	6.6	U	6.6
Acetone	VOA	7.1	U	7.1	5.8	J	5.5	35	UJB	6.2	9.2	J	8.1
Benzene	VOA	0.62	U	0.62	0.48	U	0.48	0.54	U	0.54	0.71	U	0.71
Bromodichloromethane	VOA	0.29	U	0.29	0.22	U	0.22	0.25	U	0.25	0.33	U	0.33
Bromoform	VOA	0.31	U	0.31	0.23	U	0.23	0.26	U	0.26	0.35	U	0.35
Bromomethane	VOA	0.66	U	0.66	0.51	UJ	0.51	0.57	U	0.57	0.75	UJ	0.75
Carbon disulfide	VOA	0.56	UJ	0.56	0.43	U	0.43	0.48	UJ	0.48	0.63	U	0.63
Carbon tetrachloride	VOA	0.84	U	0.84	0.64	U	0.64	0.72	U	0.72	0.95	U	0.95
Chlorobenzene	VOA	0.72	U	0.72	0.55	U	0.55	0.62	U	0.62	0.81	U	0.81
Chloroethane	VOA	1.2	U	1.2	0.90	U	0.90	1.0	U	1.0	1.3	U	1.3
Chloroform	VOA	0.38	U	0.38	0.29	U	0.29	0.33	U	0.33	0.44	U	0.44
Chloromethane	VOA	1.0	U	1.0	0.78	U	0.78	0.88	U	0.88	1.2	U	1.2
cis-1,3-Dichloropropene	VOA	1.7	U	1.7	1.3	U	1.3	1.5	U	1.5	1.9	U	1.9
Dibromochloromethane	VOA	0.76	U	0.76	0.58	U	0.58	0.65	U	0.65	0.86	U	0.86
Ethylbenzene	VOA	0.89	U	0.89	0.68	U	0.68	0.77	U	0.77	1.0	U	1.0
Methylenechloride	VOA	2.5	J	2.1	1.6	U	1.6	1.8	U	1.8	2.4	U	2.4
Styrene	VOA	0.84	U	0.84	0.64	U	0.64	0.72	U	0.72	0.95	U	0.95
Tetrachloroethene	VOA	0.78	U	0.78	0.60	U	0.60	0.68	U	0.68	0.89	U	0.89
Toluene	VOA	0.92	U	0.92	0.70	U	0.70	0.79	U	0.79	1.0	U	1.0
trans-1,3-Dichloropropene	VOA	0.89	U	0.89	0.68	U	0.68	0.77	U	0.77	1.0	U	1.0
Trichloroethene	VOA	0.31	U	0.31	0.23	U	0.23	0.26	U	0.26	0.35	U	0.35
Vinyl chloride	VOA	1.8	U	1.8	1.4	U	1.4	1.5	U	1.5	2.0	U	2.0
Xylenes (total)	VOA	0.81	U	0.81	0.62	UJ	0.62	0.70	U	0.70	0.92	UJ	0.92

Attachment	1	Sheet No.	7 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-8 - J1V6W3			EXC-9 - J1V6W4			EXC-10 - J1V6W5			EXC-11 - J1V6W6		
		4/30/15			4/30/15			4/30/15			4/30/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.8	U	2.8	2.7	U	2.7	2.6	U	2.6	2.8	U	2.8
Aroclor-1221	PCB	8.1	U	8.1	7.9	U	7.9	7.6	U	7.6	8.0	U	8.0
Aroclor-1232	PCB	2.0	U	2.0	2.0	U	2.0	1.9	U	1.9	2.0	U	2.0
Aroclor-1242	PCB	4.7	U	4.7	4.6	U	4.6	4.4	U	4.4	4.6	U	4.6
Aroclor-1248	PCB	4.7	U	4.7	4.6	U	4.6	4.4	U	4.4	4.6	U	4.6
Aroclor-1254	PCB	2.6	U	2.6	2.6	U	2.6	2.5	U	2.5	2.6	U	2.6
Aroclor-1260	PCB	2.6	U	2.6	2.6	U	2.6	2.5	U	2.5	2.6	U	2.6
Acenaphthene	PAH	9.8	U	9.8	9.7	U	9.7	9.8	U	9.8	9.9	U	9.9
Acenaphthylene	PAH	8.8	U	8.8	8.8	U	8.8	8.8	U	8.8	8.9	U	8.9
Anthracene	PAH	3.0	U	3.0	3.0	U	3.0	3.0	U	3.0	3.0	U	3.0
Benzo(a)anthracene	PAH	3.1	U	3.1	3.1	U	3.1	3.1	U	3.1	3.2	U	3.2
Benzo(a)pyrene	PAH	6.3	U	6.3	6.2	U	6.2	6.3	U	6.3	6.3	U	6.3
Benzo(b)fluoranthene	PAH	4.1	U	4.1	4.1	U	4.1	4.1	U	4.1	4.1	U	4.1
Benzo(ghi)perylene	PAH	7.0	U	7.0	7.0	U	7.0	7.1	U	7.1	7.1	U	7.1
Benzo(k)fluoranthene	PAH	3.9	U	3.9	3.8	U	3.8	3.9	U	3.9	3.9	U	3.9
Chrysene	PAH	4.7	U	4.7	4.7	U	4.7	4.7	U	4.7	4.8	U	4.8
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	11	U	11	11	U	11
Fluoranthene	PAH	13	U	13	13	U	13	13	U	13	13	U	13
Fluorene	PAH	5.2	U	5.2	5.1	U	5.1	5.2	U	5.2	5.2	U	5.2
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Naphthalene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Phenanthrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
Pyrene	PAH	12	U	12	12	U	12	12	U	12	12	U	12
1,1,1-Trichloroethane	VOA	0.53	UJ	0.53	0.59	UJ	0.59	0.70	UJ	0.70	0.59	UJ	0.59
1,1,2,2-Tetrachloroethane	VOA	0.63	U	0.63	0.69	U	0.69	0.82	U	0.82	0.69	U	0.69
1,1,2-Trichloroethane	VOA	0.90	U	0.90	0.99	U	0.99	1.2	U	1.2	0.99	U	0.99
1,1-Dichloroethane	VOA	0.22	U	0.22	0.24	U	0.24	0.28	U	0.28	0.24	U	0.24
1,1-Dichloroethene	VOA	0.73	J	0.61	0.67	U	0.67	0.79	U	0.79	0.88	J	0.66
1,2-Dichloroethane	VOA	0.72	U	0.72	0.79	U	0.79	0.94	U	0.94	0.79	U	0.79
1,2-Dichloroethene(Total)	VOA	0.40	U	0.40	0.44	U	0.44	0.52	U	0.52	0.44	U	0.44
1,2-Dichloropropane	VOA	0.56	U	0.56	0.62	U	0.62	0.74	U	0.74	0.62	U	0.62
2-Butanone	VOA	1.9	U	1.9	2.1	U	2.1	2.5	U	2.5	2.1	U	2.1
2-Hexanone	VOA	5.0	U	5.0	5.5	U	5.5	6.6	U	6.6	5.5	U	5.5
4-Methyl-2-Pentanone	VOA	4.5	U	4.5	4.9	U	4.9	5.9	U	5.9	4.9	U	4.9
Acetone	VOA	35	UJB	5.5	6.1	U	6.1	35	UJB	7.2	6.1	U	6.1
Benzene	VOA	0.48	U	0.48	0.53	U	0.53	0.63	U	0.63	0.53	U	0.53
Bromodichloromethane	VOA	0.23	U	0.23	0.25	U	0.25	0.30	U	0.30	0.25	U	0.25
Bromoform	VOA	0.24	U	0.24	0.26	U	0.26	0.31	U	0.31	0.26	U	0.26
Bromomethane	VOA	0.51	U	0.51	0.56	U	0.56	0.67	U	0.67	0.56	U	0.56
Carbon disulfide	VOA	0.43	UJ	0.43	0.47	UJ	0.47	0.56	UJ	0.56	0.47	UJ	0.47
Carbon tetrachloride	VOA	0.65	U	0.65	0.71	U	0.71	0.85	U	0.85	0.71	U	0.71
Chlorobenzene	VOA	0.55	U	0.55	0.61	U	0.61	0.73	U	0.73	0.61	U	0.61
Chloroethane	VOA	0.91	U	0.91	1.0	U	1.0	1.2	U	1.2	1.0	U	1.0
Chloroform	VOA	0.30	U	0.30	0.33	U	0.33	0.39	U	0.39	0.33	U	0.33
Chloromethane	VOA	0.79	U	0.79	0.87	U	0.87	1.0	U	1.0	0.87	U	0.87
cis-1,3-Dichloropropene	VOA	1.3	U	1.3	1.5	U	1.5	1.7	U	1.7	1.5	U	1.5
Dibromochloromethane	VOA	0.59	U	0.59	0.64	U	0.64	0.77	U	0.77	0.64	U	0.64
Ethylbenzene	VOA	0.69	U	0.69	0.76	U	0.76	0.90	U	0.90	0.75	U	0.75
Methylenechloride	VOA	3.2	J	1.6	1.8	U	1.8	2.3	J	2.2	1.8	U	1.8
Styrene	VOA	0.65	U	0.65	0.71	U	0.71	0.85	U	0.85	0.71	U	0.71
Tetrachloroethene	VOA	0.61	U	0.61	0.67	U	0.67	0.79	U	0.79	0.66	U	0.66
Toluene	VOA	0.71	U	0.71	0.78	U	0.78	0.93	U	0.93	0.78	U	0.78
trans-1,3-Dichloropropene	VOA	0.69	U	0.69	0.76	U	0.76	0.90	U	0.90	0.75	U	0.75
Trichloroethene	VOA	0.24	U	0.24	0.26	U	0.26	0.31	U	0.31	0.26	U	0.26
Vinyl chloride	VOA	1.4	U	1.4	1.5	U	1.5	1.8	U	1.8	1.5	U	1.5
Xylenes (total)	VOA	0.63	U	0.63	0.69	U	0.69	0.82	U	0.82	0.69	U	0.69

Attachment	1	Sheet No.	8 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	EXC-12 - J1V6W7			SPA-12 - J1V714			Duplicate of J1V714 - J1V715			SPA-1 - J1V703		
		4/30/15			4/30/15			4/30/15			4/30/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.7	U	2.7	2.6	U	2.6	2.7	U	2.7	2.7	U	2.7
Aroclor-1221	PCB	7.9	U	7.9	7.4	U	7.4	7.9	U	7.9	7.9	U	7.9
Aroclor-1232	PCB	2.0	U	2.0	1.8	U	1.8	2.0	U	2.0	2.0	U	2.0
Aroclor-1242	PCB	4.6	U	4.6	4.3	U	4.3	4.6	U	4.6	4.6	U	4.6
Aroclor-1248	PCB	4.6	U	4.6	4.3	U	4.3	4.6	U	4.6	4.6	U	4.6
Aroclor-1254	PCB	2.6	U	2.6	2.4	U	2.4	2.6	U	2.6	2.6	U	2.6
Aroclor-1260	PCB	2.6	U	2.6	2.4	U	2.4	2.6	U	2.6	2.6	U	2.6
Acenaphthene	PAH	9.5	U	9.5	9.8	U	9.8	9.4	U	9.4	9.9	U	9.9
Acenaphthylene	PAH	8.5	U	8.5	8.8	U	8.8	8.5	U	8.5	8.9	U	8.9
Anthracene	PAH	2.9	U	2.9	3.0	U	3.0	2.9	U	2.9	3.0	U	3.0
Benzo(a)anthracene	PAH	3.0	U	3.0	3.1	U	3.1	3.0	U	3.0	3.1	U	3.1
Benzo(a)pyrene	PAH	6.1	U	6.1	6.3	U	6.3	6.0	U	6.0	6.3	U	6.3
Benzo(b)fluoranthene	PAH	4.0	U	4.0	4.1	U	4.1	4.0	U	4.0	4.1	U	4.1
Benzo(ghi)perylene	PAH	6.8	U	6.8	7.1	U	7.1	6.8	U	6.8	7.1	U	7.1
Benzo(k)fluoranthene	PAH	3.7	U	3.7	3.9	U	3.9	3.7	U	3.7	3.9	U	3.9
Chrysene	PAH	4.6	U	4.6	4.7	U	4.7	4.6	U	4.6	4.8	U	4.8
Dibenz[a,h]anthracene	PAH	10	U	10	11	U	11	10	U	10	11	U	11
Fluoranthene	PAH	12	U	12	13	U	13	12	U	12	13	U	13
Fluorene	PAH	5.0	U	5.0	5.2	U	5.2	5.0	U	5.0	5.2	U	5.2
Indeno(1,2,3-cd)pyrene	PAH	11	U	11	12	U	12	11	U	11	12	U	12
Naphthalene	PAH	11	U	11	12	U	12	11	U	11	12	U	12
Phenanthrene	PAH	11	U	11	12	U	12	11	U	11	12	U	12
Pyrene	PAH	11	U	11	12	U	12	11	U	11	12	U	12
1,1,1-Trichloroethane	VOA	0.65	U	0.65	0.88	U	0.88	0.58	U	0.58	0.66	U	0.66
1,1,2,2-Tetrachloroethane	VOA	0.76	U	0.76	1.0	U	1.0	0.68	U	0.68	0.78	U	0.78
1,1,2-Trichloroethane	VOA	1.1	U	1.1	1.5	U	1.5	0.99	U	0.99	1.1	U	1.1
1,1-Dichloroethane	VOA	0.26	U	0.26	0.36	U	0.36	0.24	U	0.24	0.27	U	0.27
1,1-Dichloroethene	VOA	0.73	U	0.73	1.0	U	1.0	0.66	U	0.66	0.75	U	0.75
1,2-Dichloroethane	VOA	0.87	U	0.87	1.2	U	1.2	0.78	U	0.78	0.89	U	0.89
1,2-Dichloroethene(Total)	VOA	0.49	U	0.49	0.66	U	0.66	0.44	U	0.44	0.50	U	0.50
1,2-Dichloropropane	VOA	0.68	U	0.68	0.93	U	0.93	0.62	U	0.62	0.70	U	0.70
2-Butanone	VOA	2.3	U	2.3	3.1	U	3.1	2.0	U	2.0	2.3	U	2.3
2-Hexanone	VOA	6.1	U	6.1	8.3	U	8.3	5.5	U	5.5	6.2	U	6.2
4-Methyl-2-Pentanone	VOA	5.4	U	5.4	7.4	U	7.4	4.9	U	4.9	5.6	U	5.6
Acetone	VOA	7.9	J	6.7	9.1	U	9.1	6.0	U	6.0	8.3	JB	6.9
Benzene	VOA	0.58	U	0.58	0.80	U	0.80	0.53	U	0.53	0.60	U	0.60
Bromodichloromethane	VOA	0.27	U	0.27	0.37	U	0.37	0.25	U	0.25	0.28	U	0.28
Bromoform	VOA	0.29	U	0.29	0.39	U	0.39	0.26	U	0.26	0.29	U	0.29
Bromomethane	VOA	0.62	U	0.62	0.85	U	0.85	0.56	U	0.56	0.64	U	0.64
Carbon disulfide	VOA	0.52	U	0.52	0.71	U	0.71	0.47	U	0.47	0.54	U	0.54
Carbon tetrachloride	VOA	0.78	U	0.78	1.1	U	1.1	0.71	U	0.71	0.81	U	0.81
Chlorobenzene	VOA	0.67	U	0.67	0.91	U	0.91	0.60	U	0.60	0.69	U	0.69
Chloroethane	VOA	1.1	U	1.1	1.5	U	1.5	1.0	U	1.0	1.1	U	1.1
Chloroform	VOA	0.36	U	0.36	0.49	U	0.49	0.32	U	0.32	0.37	U	0.37
Chloromethane	VOA	0.96	UJ	0.96	1.3	U	1.3	0.86	U	0.86	0.98	U	0.98
cis-1,3-Dichloropropene	VOA	1.6	U	1.6	2.2	U	2.2	1.4	U	1.4	1.6	U	1.6
Dibromochloromethane	VOA	0.71	U	0.71	0.96	U	0.96	0.64	U	0.64	0.73	U	0.73
Ethylbenzene	VOA	0.83	U	0.83	1.1	U	1.1	0.75	U	0.75	0.86	U	0.86
Methylenechloride	VOA	2.0	U	2.0	2.7	U	2.7	3.0	J	1.8	2.0	U	2.0
Styrene	VOA	0.78	U	0.78	1.1	U	1.1	0.71	U	0.71	0.81	U	0.81
Tetrachloroethene	VOA	0.73	U	0.73	1.0	U	1.0	0.66	U	0.66	0.75	U	0.75
Toluene	VOA	0.86	U	0.86	1.2	U	1.2	0.77	U	0.77	0.88	U	0.88
trans-1,3-Dichloropropene	VOA	0.83	U	0.83	1.1	U	1.1	0.75	U	0.75	0.86	U	0.86
Trichloroethene	VOA	0.29	U	0.29	0.39	U	0.39	0.26	U	0.26	0.29	U	0.29
Vinyl chloride	VOA	1.7	U	1.7	2.3	U	2.3	1.5	U	1.5	1.7	U	1.7
Xylenes (total)	VOA	0.76	UJ	0.76	1.0	U	1.0	0.68	U	0.68	0.78	U	0.78

Attachment	1	Sheet No.	9 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	SPA-2 - J1V704			SPA-3 - J1V705			SPA-4 - J1V706			SPA-5 - J1V707		
		4/30/15			4/30/15			4/30/15			4/30/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.7	U	2.7	2.7	U	2.7	2.7	U	2.7	2.7	U	2.7
Aroclor-1221	PCB	7.9	U	7.9	7.9	U	7.9	7.8	U	7.8	7.8	U	7.8
Aroclor-1232	PCB	2.0	U	2.0	2.0	U	2.0	2.0	U	2.0	2.0	U	2.0
Aroclor-1242	PCB	4.6	U	4.6	4.6	U	4.6	4.6	U	4.6	4.6	U	4.6
Aroclor-1248	PCB	4.6	U	4.6	4.6	U	4.6	4.6	U	4.6	4.6	U	4.6
Aroclor-1254	PCB	2.6	U	2.6	2.5	U	2.5	2.5	U	2.5	2.5	U	2.5
Aroclor-1260	PCB	2.6	U	2.6	2.5	U	2.5	2.5	U	2.5	2.5	U	2.5
Acenaphthene	PAH	9.6	U	9.6	9.5	U	9.5	10	U	10	9.4	U	9.4
Acenaphthylene	PAH	8.6	U	8.6	8.5	U	8.5	9.1	U	9.1	8.5	U	8.5
Anthracene	PAH	2.9	U	2.9	2.9	U	2.9	3.1	U	3.1	2.9	U	2.9
Benzo(a)anthracene	PAH	3.1	U	3.1	3.0	U	3.0	3.2	U	3.2	3.0	U	3.0
Benzo(a)pyrene	PAH	6.1	U	6.1	6.1	U	6.1	6.5	U	6.5	6.0	U	6.0
Benzo(b)fluoranthene	PAH	4.0	U	4.0	4.0	U	4.0	4.2	U	4.2	4.0	U	4.0
Benzo(ghi)perylene	PAH	6.9	U	6.9	6.8	U	6.8	7.3	U	7.3	6.8	U	6.8
Benzo(k)fluoranthene	PAH	3.8	U	3.8	3.7	U	3.7	4.0	U	4.0	3.7	U	3.7
Chrysene	PAH	4.6	U	4.6	4.6	U	4.6	4.9	U	4.9	4.6	U	4.6
Dibenz[a,h]anthracene	PAH	11	U	11	10	U	10	11	U	11	10	U	10
Fluoranthene	PAH	12	U	12	12	U	12	13	U	13	12	U	12
Fluorene	PAH	5.1	U	5.1	5.0	U	5.0	5.3	U	5.3	5.0	U	5.0
Indeno(1,2,3-cd)pyrene	PAH	11	U	11	11	U	11	12	U	12	11	U	11
Naphthalene	PAH	11	U	11	11	U	11	12	U	12	11	U	11
Phenanthrene	PAH	11	U	11	11	U	11	12	U	12	11	U	11
Pyrene	PAH	11	U	11	11	U	11	12	U	12	11	U	11
1,1,1-Trichloroethane	VOA	0.60	U	0.60	0.61	U	0.61	0.63	U	0.63	0.59	U	0.59
1,1,2,2-Tetrachloroethane	VOA	0.71	U	0.71	0.72	U	0.72	0.73	U	0.73	0.69	U	0.69
1,1,2-Trichloroethane	VOA	1.0	U	1.0	1.0	U	1.0	1.1	U	1.1	1.0	U	1.0
1,1-Dichloroethane	VOA	0.24	U	0.24	0.25	U	0.25	0.25	U	0.25	0.24	U	0.24
1,1-Dichloroethene	VOA	0.68	U	0.68	0.69	U	0.69	0.71	U	0.71	0.67	U	0.67
1,2-Dichloroethane	VOA	0.81	U	0.81	0.82	U	0.82	0.84	U	0.84	0.79	U	0.79
1,2-Dichloroethene(Total)	VOA	0.45	U	0.45	0.46	U	0.46	0.47	U	0.47	0.44	U	0.44
1,2-Dichloropropane	VOA	0.64	U	0.64	0.65	U	0.65	0.66	U	0.66	0.62	U	0.62
2-Butanone	VOA	2.1	U	2.1	2.1	U	2.1	2.2	U	2.2	2.1	U	2.1
2-Hexanone	VOA	5.7	U	5.7	5.7	U	5.7	5.9	U	5.9	5.5	U	5.5
4-Methyl-2-Pentanone	VOA	5.1	U	5.1	5.1	U	5.1	5.3	U	5.3	4.9	U	4.9
Acetone	VOA	6.2	U	6.2	6.3	U	6.3	6.8	JB	6.5	6.1	U	6.1
Benzene	VOA	0.54	U	0.54	0.55	U	0.55	0.57	U	0.57	0.53	U	0.53
Bromodichloromethane	VOA	0.25	U	0.25	0.26	U	0.26	0.26	U	0.26	0.25	U	0.25
Bromoform	VOA	0.27	U	0.27	0.27	U	0.27	0.28	U	0.28	0.26	U	0.26
Bromomethane	VOA	0.58	U	0.58	0.59	U	0.59	0.60	U	0.60	0.57	U	0.57
Carbon disulfide	VOA	0.49	U	0.49	0.49	U	0.49	0.51	U	0.51	0.48	U	0.48
Carbon tetrachloride	VOA	0.73	U	0.73	0.74	U	0.74	0.76	U	0.76	0.71	U	0.71
Chlorobenzene	VOA	0.63	U	0.63	0.63	U	0.63	0.65	U	0.65	0.61	U	0.61
Chloroethane	VOA	1.0	U	1.0	1.0	U	1.0	1.1	U	1.1	1.0	U	1.0
Chloroform	VOA	0.34	U	0.34	0.34	U	0.34	0.35	U	0.35	0.33	U	0.33
Chloromethane	VOA	0.89	U	0.89	0.90	U	0.90	0.93	U	0.93	0.87	U	0.87
cis-1,3-Dichloropropene	VOA	1.5	U	1.5	1.5	U	1.5	1.6	U	1.6	1.5	U	1.5
Dibromochloromethane	VOA	0.66	U	0.66	0.67	U	0.67	0.69	U	0.69	0.65	U	0.65
Ethylbenzene	VOA	0.78	U	0.78	0.79	U	0.79	0.81	U	0.81	0.76	U	0.76
Methylenechloride	VOA	1.9	U	1.9	1.9	U	1.9	3.2	J	1.9	1.8	U	1.8
Styrene	VOA	0.73	U	0.73	0.74	U	0.74	0.76	U	0.76	0.71	U	0.71
Tetrachloroethene	VOA	0.68	U	0.68	0.69	U	0.69	0.71	U	0.71	0.67	U	0.67
Toluene	VOA	0.80	U	0.80	0.81	U	0.81	0.83	U	0.83	0.78	U	0.78
trans-1,3-Dichloropropene	VOA	0.78	U	0.78	0.79	U	0.79	0.81	U	0.81	0.76	U	0.76
Trichloroethene	VOA	0.27	U	0.27	0.27	U	0.27	0.28	U	0.28	0.26	U	0.26
Vinyl chloride	VOA	1.6	U	1.6	1.6	U	1.6	1.6	U	1.6	1.5	U	1.5
Xylenes (total)	VOA	0.71	U	0.71	0.72	U	0.72	0.73	U	0.73	0.69	U	0.69

Attachment	1	Sheet No.	10 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	SPA-6 - J1V708			SPA-7 - J1V709			SPA-8 - J1V710			SPA-9 - J1V711		
		4/30/15			4/30/15			4/30/15			4/30/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.6	U	2.6	2.7	U	2.7	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	8.1	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
Aroclor-1242	PCB	4.4	U	4.4	4.5	U	4.5	4.7	U	4.7	4.7	U	4.7
Aroclor-1248	PCB	4.4	U	4.4	4.5	U	4.5	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
Aroclor-1260	PCB	2.4	U	2.4	2.5	U	2.5	2.6	U	2.6	2.6	U	2.6
Acenaphthene	PAH	9.4	U	9.4	9.9	U	9.9	10	U	10	10	U	10
Acenaphthylene	PAH	8.5	U	8.5	8.9	U	8.9	9.3	U	9.3	9.0	U	9.0
Anthracene	PAH	2.9	U	2.9	3.0	U	3.0	3.1	U	3.1	3.0	U	3.0
Benzo(a)anthracene	PAH	3.0	U	3.0	3.1	U	3.1	3.3	U	3.3	3.2	U	3.2
Benzo(a)pyrene	PAH	6.0	U	6.0	6.3	U	6.3	6.6	U	6.6	6.4	U	6.4
Benzo(b)fluoranthene	PAH	4.0	U	4.0	4.1	U	4.1	4.3	U	4.3	4.2	U	4.2
Benzo(ghi)perylene	PAH	6.8	U	6.8	7.1	U	7.1	7.4	U	7.4	7.2	U	7.2
Benzo(k)fluoranthene	PAH	3.7	U	3.7	3.9	U	3.9	4.1	U	4.1	3.9	U	3.9
Chrysene	PAH	4.6	U	4.6	4.8	U	4.8	5.0	U	5.0	4.8	U	4.8
Dibenz[a,h]anthracene	PAH	10	U	10	11	U	11	11	U	11	11	U	11
Fluoranthene	PAH	12	U	12	13	U	13	13	U	13	13	U	13
Fluorene	PAH	5.0	U	5.0	5.2	U	5.2	5.4	U	5.4	5.3	U	5.3
Indeno(1,2,3-cd)pyrene	PAH	11	U	11	12	U	12	12	U	12	12	U	12
Naphthalene	PAH	11	U	11	12	U	12	12	U	12	12	U	12
Phenanthrene	PAH	11	U	11	12	U	12	12	U	12	12	U	12
Pyrene	PAH	11	U	11	12	U	12	12	U	12	12	U	12
1,1,1-Trichloroethane	VOA	0.36	U	0.36	0.50	U	0.50	0.69	U	0.69	0.75	U	0.75
1,1,2,2-Tetrachloroethane	VOA	0.42	U	0.42	0.59	U	0.59	0.81	U	0.81	0.88	U	0.88
1,1,2-Trichloroethane	VOA	0.61	U	0.61	0.85	U	0.85	1.2	U	1.2	1.3	U	1.3
1,1-Dichloroethane	VOA	0.14	U	0.14	0.20	U	0.20	0.28	U	0.28	0.30	U	0.30
1,1-Dichloroethene	VOA	0.62	J	0.41	0.57	J	0.57	0.78	U	0.78	0.85	U	0.85
1,2-Dichloroethane	VOA	0.48	U	0.48	0.67	U	0.67	0.93	U	0.93	1.0	U	1.0
1,2-Dichloroethene(Total)	VOA	0.27	U	0.27	0.37	U	0.37	0.52	U	0.52	0.56	U	0.56
1,2-Dichloropropane	VOA	0.38	U	0.38	0.53	U	0.53	0.73	U	0.73	0.79	U	0.79
2-Butanone	VOA	1.3	U	1.3	1.8	U	1.8	2.4	U	2.4	2.6	U	2.6
2-Hexanone	VOA	3.4	U	3.4	4.7	U	4.7	6.5	U	6.5	7.0	U	7.0
4-Methyl-2-Pentanone	VOA	3.0	U	3.0	4.2	U	4.2	5.8	U	5.8	6.3	U	6.3
Acetone	VOA	3.8	JB	3.7	5.2	U	5.2	7.1	U	7.1	7.7	U	7.7
Benzene	VOA	0.32	U	0.32	0.45	U	0.45	0.62	U	0.62	0.68	U	0.68
Bromodichloromethane	VOA	0.15	U	0.15	0.21	U	0.21	0.29	U	0.29	0.32	U	0.32
Bromoform	VOA	0.16	U	0.16	0.22	U	0.22	0.30	U	0.30	0.33	U	0.33
Bromomethane	VOA	0.34	U	0.34	0.48	U	0.48	0.66	U	0.66	0.72	U	0.72
Carbon disulfide	VOA	0.29	U	0.29	0.40	U	0.40	0.56	U	0.56	0.60	U	0.60
Carbon tetrachloride	VOA	0.43	U	0.43	0.61	U	0.61	0.84	U	0.84	0.91	U	0.91
Chlorobenzene	VOA	0.37	U	0.37	0.52	U	0.52	0.72	U	0.72	0.78	U	0.78
Chloroethane	VOA	0.61	U	0.61	0.85	U	0.85	1.2	U	1.2	1.3	U	1.3
Chloroform	VOA	0.20	U	0.20	0.28	U	0.28	0.38	U	0.38	0.42	U	0.42
Chloromethane	VOA	0.53	U	0.53	0.74	U	0.74	1.0	U	1.0	1.1	U	1.1
cis-1,3-Dichloropropene	VOA	0.89	U	0.89	1.2	U	1.2	1.7	U	1.7	1.9	U	1.9
Dibromochloromethane	VOA	0.39	U	0.39	0.55	U	0.55	0.76	U	0.76	0.82	U	0.82
Ethylbenzene	VOA	0.46	U	0.46	0.64	U	0.64	0.89	U	0.89	0.96	U	0.96
Methylenechloride	VOA	1.1	U	1.1	1.5	U	1.5	2.1	U	2.1	2.3	U	2.3
Styrene	VOA	0.43	U	0.43	0.61	U	0.61	0.84	U	0.84	0.91	U	0.91
Tetrachloroethene	VOA	0.41	U	0.41	0.57	U	0.57	0.78	U	0.78	0.85	U	0.85
Toluene	VOA	0.48	U	0.48	0.66	U	0.66	0.91	U	0.91	0.99	U	0.99
trans-1,3-Dichloropropene	VOA	0.46	U	0.46	0.64	U	0.64	0.89	U	0.89	0.96	U	0.96
Trichloroethene	VOA	0.16	U	0.16	0.22	U	0.22	0.30	U	0.30	0.33	U	0.33
Vinyl chloride	VOA	0.92	U	0.92	1.3	U	1.3	1.8	U	1.8	1.9	U	1.9
Xylenes (total)	VOA	0.42	U	0.42	0.59	U	0.59	0.81	U	0.81	0.88	U	0.88

Attachment	1	Sheet No.	11 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Attachment 1. 100-N-96 Waste Site Verification Sample Results (Organics).

CONSTITUENT	CLASS	SPA-10 - J1V712			SPA-11 - J1V713			Equipment Blank - J1V716			Trip Blank - J1V717		
		4/30/15			4/30/15			4/30/15			4/30/15		
		ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL	ug/kg	Q	PQL
Aroclor-1016	PCB	2.7	U	2.7	2.7	U	2.7						
Aroclor-1221	PCB	7.9	U	7.9	7.7	U	7.7						
Aroclor-1232	PCB	2.0	U	2.0	1.9	U	1.9						
Aroclor-1242	PCB	4.6	U	4.6	4.5	U	4.5						
Aroclor-1248	PCB	4.6	U	4.6	4.5	U	4.5						
Aroclor-1254	PCB	2.6	U	2.6	2.5	U	2.5						
Aroclor-1260	PCB	2.6	U	2.6	2.5	U	2.5						
Acenaphthene	PAH	10	U	10	9.8	U	9.8	9.6	U	9.6			
Acenaphthylene	PAH	9.1	U	9.1	8.9	U	8.9	8.7	U	8.7			
Anthracene	PAH	3.1	U	3.1	3.0	U	3.0	2.9	U	2.9			
Benzo(a)anthracene	PAH	3.2	U	3.2	3.1	U	3.1	3.1	U	3.1			
Benzo(a)pyrene	PAH	6.5	U	6.5	6.3	U	6.3	6.2	U	6.2			
Benzo(b)fluoranthene	PAH	4.3	U	4.3	4.1	U	4.1	4.0	U	4.0			
Benzo(ghi)perylene	PAH	7.3	U	7.3	7.1	U	7.1	6.9	U	6.9			
Benzo(k)fluoranthene	PAH	4.0	U	4.0	3.9	U	3.9	3.8	U	3.8			
Chrysene	PAH	4.9	U	4.9	4.8	U	4.8	4.7	U	4.7			
Dibenz[a,h]anthracene	PAH	11	U	11	11	U	11	11	U	11			
Fluoranthene	PAH	13	U	13	13	U	13	13	U	13			
Fluorene	PAH	5.4	U	5.4	5.2	U	5.2	5.1	U	5.1			
Indeno(1,2,3-cd)pyrene	PAH	12	U	12	12	U	12	12	U	12			
Naphthalene	PAH	12	U	12	12	U	12	12	U	12			
Phenanthrene	PAH	12	U	12	12	U	12	12	U	12			
Pyrene	PAH	12	U	12	12	U	12	12	U	12			
1,1,1-Trichloroethane	VOA	0.59	U	0.59	0.58	U	0.58	0.63	U	0.63	0.85	U	0.85
1,1,2,2-Tetrachloroethane	VOA	0.70	U	0.70	0.68	U	0.68	0.74	U	0.74	1.0	U	1.0
1,1,2-Trichloroethane	VOA	1.0	U	1.0	0.98	U	0.98	1.1	U	1.1	1.4	U	1.4
1,1-Dichloroethane	VOA	0.24	U	0.24	0.23	U	0.23	0.26	U	0.26	0.35	U	0.35
1,1-Dichloroethene	VOA	0.93	J	0.67	0.66	U	0.66	0.72	U	0.72	0.97	U	0.97
1,2-Dichloroethane	VOA	0.80	U	0.80	0.78	U	0.78	0.85	U	0.85	1.2	U	1.2
1,2-Dichloroethene(Total)	VOA	0.44	U	0.44	0.43	U	0.43	0.47	U	0.47	0.64	U	0.64
1,2-Dichloropropane	VOA	0.63	U	0.63	0.61	U	0.61	0.67	U	0.67	0.90	U	0.90
2-Butanone	VOA	2.1	U	2.1	2.0	U	2.0	5.0	J	2.2	6.2	J	3.0
2-Hexanone	VOA	5.6	U	5.6	5.4	U	5.4	6.0	U	6.0	8.0	U	8.0
4-Methyl-2-Pentanone	VOA	5.0	U	5.0	4.9	U	4.9	5.3	U	5.3	7.2	U	7.2
Acetone	VOA	6.1	U	6.1	6.0	U	6.0	17	JB	6.5	8.8	U	8.8
Benzene	VOA	0.54	U	0.54	0.52	U	0.52	0.57	U	0.57	0.77	U	0.77
Bromodichloromethane	VOA	0.25	U	0.25	0.25	U	0.25	0.27	U	0.27	0.36	U	0.36
Bromoform	VOA	0.26	U	0.26	0.26	U	0.26	0.28	U	0.28	0.38	U	0.38
Bromomethane	VOA	0.57	U	0.57	0.56	U	0.56	0.61	U	0.61	0.82	U	0.82
Carbon disulfide	VOA	0.48	U	0.48	0.47	U	0.47	0.51	U	0.51	0.69	U	0.69
Carbon tetrachloride	VOA	0.72	U	0.72	0.70	U	0.70	0.77	U	0.77	1.0	U	1.0
Chlorobenzene	VOA	0.62	U	0.62	0.60	U	0.60	0.66	U	0.66	0.89	U	0.89
Chloroethane	VOA	1.0	U	1.0	0.99	U	0.99	1.1	U	1.1	1.5	U	1.5
Chloroform	VOA	0.33	U	0.33	0.32	U	0.32	0.35	U	0.35	0.48	U	0.48
Chloromethane	VOA	0.88	U	0.88	0.86	U	0.86	0.94	U	0.94	1.3	U	1.3
cis-1,3-Dichloropropene	VOA	1.5	U	1.5	1.4	U	1.4	1.6	U	1.6	2.1	U	2.1
Dibromochloromethane	VOA	0.65	U	0.65	0.63	U	0.63	0.69	U	0.69	0.94	U	0.94
Ethylbenzene	VOA	0.76	U	0.76	0.75	U	0.75	0.82	U	0.82	1.1	U	1.1
Methylenechloride	VOA	1.8	U	1.8	1.8	U	1.8	1.9	U	1.9	2.6	U	2.6
Styrene	VOA	0.72	U	0.72	0.70	U	0.70	0.77	U	0.77	1.0	U	1.0
Tetrachloroethene	VOA	0.67	U	0.67	0.66	U	0.66	0.72	U	0.72	0.97	U	0.97
Toluene	VOA	0.79	U	0.79	0.77	U	0.77	0.84	U	0.84	1.1	U	1.1
trans-1,3-Dichloropropene	VOA	0.76	U	0.76	0.75	U	0.75	0.82	U	0.82	1.1	U	1.1
Trichloroethene	VOA	0.26	U	0.26	0.26	U	0.26	0.28	U	0.28	0.38	U	0.38
Vinyl chloride	VOA	1.5	U	1.5	1.5	U	1.5	1.6	U	1.6	2.2	U	2.2
Xylenes (total)	VOA	0.70	U	0.70	0.68	U	0.68	0.74	U	0.74	1.0	U	1.0

Attachment	1	Sheet No.	12 of 12
Originator	J. D. Skoglie	Date	6/15/15
Checked	T. Q. Howell	Job No.	14655
Calc. No.	0100N-CA-V0290	Rev. No.	0

Acrobat 8.0

CALCULATION COVER SHEET

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

Area: 100-N

Discipline: Environmental *Calculation No: 0100N-CA-V0291

Subject: 100-N-96 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations

Computer Program: Excel Program No: Excel 2010

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

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Sheets = 3 Total = 4	J. D. Skoglie	T. Q. Howell	A. B. Berezovskiy	S. G. Wilkinson	6/25/15

SUMMARY OF REVISION

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

Washington Closure Hanford CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	6/16/2015	Calc. No.:	0100N-CA-V0291	Rev.:	0
Project:	100-N Field Remediation	Job No:	14655	Checked:	T. Q. Howell	Date:	6/16/2015
Subject:	100-N-96 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No.	1 of 3

PURPOSE:

Provide documentation to support the calculation of the direct contact hazard quotient (HQ) and excess carcinogenic risk for the 100-N-96 waste site. In accordance with the remedial action goals (RAGs) in the remedial design report/remedial action work plan (RDR/RAWP) (DOE-RL 2013), 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, 2006, *100-N Area Sampling and Analysis Plan for CERCLA Waste Sites*, DOE/RL-2005-92, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

2) DOE-RL, 2013, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area*, DOE/RL-2005-93, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

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

4) WCH, 2015, 100-N-96 *Waste Site Cleanup Verification 95% UCL Calculations, Calculation Number 0100N-CA-V0290*, Washington Closure Hanford, Richland, Washington.

SOLUTION:

1) Generate an HQ for each noncarcinogenic constituent detected above background or required detection limit/practical quantitation limit and compare it to the individual HQ of <1.0 (DOE-RL 2013).

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 2013).

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

Washington Closure Hanford CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	6/16/2015	Calc. No.:	0100N-CA-V0291	Rev.:	0
Project:	100-N Field Remediation	Job No:	14655	Checked:	T. Q. Howell	Date:	6/16/2015
Subject:	100-N-96 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No. 2 of 3	

METHODOLOGY:

The 100-N-96 waste site underwent statistical sampling at two decision units; the excavation and staging pile area. The direct contact hazard quotient and carcinogenic risk calculations for the 100-N-96 waste site were conservatively calculated for the entire waste site using the greater of the maximum or statistical verification soil sample results (WCH 2015). Of the contaminants of potential concern (COPCs) for this site, boron, hexavalent chromium, molybdenum, and the detected volatiles require HQ and risk calculations because these analytes were detected and a Washington State or Hanford Site background value is not available. Selenium is included because it was quantitated at a concentration above Hanford Site background. Although total petroleum hydrocarbons (TPH diesel range extended) were detected and no background value is available, the risk associated with total petroleum hydrocarbons do not contribute to the cumulative toxicity calculation. All other site nonradionuclide COPCs were not detected or were quantified below background levels. An example of the HQ and risk calculations is presented below:

1) For example, the statistical value for boron is 1.7 mg/kg, divided by the noncarcinogenic RAG value of 16,000 mg/kg (calculated in accordance with the noncarcinogenic toxics effects formula in WAC 173-340-740[3]), produces a value of 1.1×10^{-4}. Comparing this value, and all other individual values, to the requirement of <1.0, this criterion is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ can be obtained by summing the individual values. To avoid errors due to intermediate rounding, the individual HQ values prior to rounding are used for this calculation. The sum of the HQ values is 4.4×10^{-3}. Comparing this value to the requirement of <1.0, this criterion is met.

3) To calculate the excess cancer risk, the maximum or statistical value is divided by the carcinogenic RAG value, then multiplied by 1.0×10^{-6}. For example, the statistical value for hexavalent chromium is 0.299 mg/kg, divided by 2.1 mg/kg, and multiplied as indicated, is 1.4×10^{-7}. Comparing this value to the requirement of $<1 \times 10^{-6}$, this requirement is met.

4) After these calculations are completed for the carcinogenic analytes, the cumulative excess cancer risk can be obtained by summing the individual values. To avoid errors due to intermediate rounding, the individual cancer risk values prior to rounding are used for this calculation. The sum of the excess cancer risk values is 1.4×10^{-7}. Comparing this value to the requirement of $<1 \times 10^{-5}$, this requirement 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 CALCULATION SHEET

Originator:	J. D. Skoglie	Date:	6/16/2015	Calc. No.:	0100N-CA-V0291	Rev.:	0
Project:	100-N Field Remediation	Job No:	14655	Checked:	T. Q. Howell	Date:	6/16/2015
Subject:	100-N-96 Waste Site Direct Contact Hazard Quotient and Carcinogenic Risk Calculations					Sheet No. 3 of 3	

Table 1. Direct Contact Hazard Quotient and Excess Cancer Risk Results for the 100-N-96 Waste Site.

Contaminants of Potential Concern	Maximum or Statistical Value [a] (mg/kg)	Noncarcinogen RAG [b] (mg/kg)	Hazard Quotient	Carcinogen RAG [b] (mg/kg)	Carcinogen Risk
Metals					
Boron	1.7	16,000	1.1E-04	--	--
Chromium, hexavalent [c]	0.299	240	1.2E-03	2.1	1.4E-07
Molybdenum	0.29	400	7.3E-04	--	--
Selenium	0.92	400	2.3E-03	--	--
Total Petroleum Hydrocarbons					
TPH - Diesel Range EXT [d]	4.2	200	--	--	--
Volatiles					
Acetone	0.025	72,000	3.5E-07	--	--
Dichloroethene; 1,1	0.0012	4,000	3.0E-07	1.67	7.2E-10
Methylene chloride	0.0032	4,800	6.7E-07	133	2.4E-11
Totals					
Cumulative Hazard Quotient:			**4.4E-03**		
Cumulative Excess Cancer Risk:					**1.4E-07**

Notes:

[a] = From (WCH 2015).

[b] = Value obtained from the 100-N Area RDR/RAWP (DOE-RL 2013) or *Washington Administrative Code* (WAC) 173-340-740(3), Method B, 1996, unless otherwise noted.

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

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

-- = not applicable

RAG = remedial action goal

CONCLUSION:

The calculations in Table 1 demonstrates that the 100-N-96 waste site meets the requirements for the direct contact hazard quotients and carcinogenic (excess cancer) risk, respectively, as identified in the RDR/RAWP (DOE-RL 2013) and SAP (DOE-RL 2006). The direct contact hazard quotients and carcinogenic (excess cancer) risk calculations are for use in the RSVP for this site.

Acrobat 8.0

CALCULATION COVER SHEET

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

Area: 100-N

Discipline: Environmental *Calculation No: 0100N-CA-V0292

Subject: 100-N-96 Waste Site Hazard Quotient and Carcinogenic Risk Calculations for Protection of Groundwater

Computer Program: Excel Program No: Excel 2010

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

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Sheets = 3 Total = 4	R. J. Nielson	I. B. Berezovskiy	T. Q. Howell	S. G. Wilkinson	7/21/15

SUMMARY OF REVISION

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

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	R. J. Nielson	Date:	07/21/15	Calc. No.:	0100N-CA-V0292	Rev.:	0
Project:	100-N Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	07/21/15
Subject:	100-N-96 Waste Site Hazard Quotient and Carcinogenic Risk Calculations for Protection of Groundwater					Sheet No.	1 of 3

PURPOSE:

Provide documentation to support the calculation of the hazard quotient (HQ) and excess carcinogenic risk associated with soil contaminant levels compared to soil cleanup levels for protection of groundwater for the 100-N-96 waste site. In accordance with the remedial action goals (RAGs) in the remedial design report/remedial action work plan (RDR/RAWP) for the 100-N Area (DOE-RL 2013), 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, 2013, *Remedial Design Report/Remedial Action Work Plan for the 100-N Area*, DOE/RL-2005-93, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

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

3) WCH, 2015, 100-N-96 *Waste Site Cleanup Verification 95% UCL Calculations, Calculation Number 0100N-CA-V0290*, Washington Closure Hanford, Richland, Washington.

SOLUTION:

1) Generate a HQ for each noncarcinogenic constituent detected above background in soil and with a K_d less than that required to show no migration to groundwater in 1,000 years using the RESRAD generic site model (DOE-RL 2013).

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

3) Generate an excess cancer risk value for each carcinogenic constituent detected above background in soil and with a K_d less than that required to show no migration to groundwater in 1,000 years using the RESRAD generic site model (DOE-RL 2013).

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:	R. J. Nielson	Date:	07/21/15	Calc. No.:	0100N-CA-V0292	Rev.:	0
Project:	100-N Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	07/21/15
Subject:	100-N-96 Waste Site Hazard Quotient and Carcinogenic Risk Calculations for Protection of Groundwater					Sheet No. 2 of 3	

METHODOLOGY:

The 100-N-96 waste site underwent statistical sampling at two decision units; the excavation and the staging pile area. The protection of groundwater hazard quotient and carcinogenic risk calculations for the 100-N-96 waste site were conservatively calculated for the entire waste site using the statistical or maximum value for each analyte (WCH 2015). Based on the generic site RESRAD model (DOE-RL 2013) and a vadose zone of approximately 17 m (56 ft) thickness, a K_d of 4.4 or greater is required to show no predicted migration to groundwater in 1,000 years. Boron, hexavalent chromium, and the detected volatiles are included because they have a K_d of less than 4.4, and no Hanford background value has been established. All other site nonradionuclide COPCs were undetected, quantified below background levels, or have a K_d greater than or equal to 4.4. An example of the HQ and risk calculations for soil constituents with a potential impact to groundwater is presented below.

1) The hazard quotient is defined as the ratio of the dose of a substance obtained over a specified time (mg/kg/day) to a reference dose for the same substance derived over the same specified time (mg/kg/day). The hazard quotient can also be calculated as the ratio of the concentration in soil (maximum or statistical value) (mg/kg) to the soil RAG (mg/kg) for protection of groundwater, where the RAG is the groundwater cleanup level (µg/L) (calculated with, and related to the hazard quotient through, WAC 173-340-720 (3)(a)(ii)(A), (1996) x 100 x 1 mg/1000 µg (conversion factor). This is based on the "100 times rule" of WAC 173-340-740(3)(a)(ii) (A) (1996). For example, the statistical value for boron is 1.7 mg/kg, divided by the noncarcinogenic RAG value of 320 mg/kg is 5.3×10^{-3}. Comparing this value to the requirement of <1.0, this criterion is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ can be obtained by summing the individual values. (To avoid errors due to intermediate rounding, the individual HQ values prior to rounding are used for this calculation.) The cumulative HQ for the 100-N-96 waste site is 6.8×10^{-2}. Comparing this value to the requirement of <1.0, this criterion is met.

3) To calculate the excess cancer risk, the maximum or statistical value is divided by the carcinogenic RAG value, and then multiplied by 1×10^{-6}. For example, the maximum value for methylene chloride of 0.0032 mg/kg, divided by the carcinogenic RAG value of 0.583 mg/kg, and multiplied as indicated, is 5.5×10^{-9}. Comparing this value to the requirement of $<1 \times 10^{-6}$, this criterion is met.

4) After the individual carcinogenic risk calculations have been completed for the appropriate analytes, the cumulative excess cancer risk can be obtained by summing the individual values. (To avoid errors due to intermediate rounding, the individual carcinogenic risk values prior to rounding are used for this calculation.) The cumulative excess cancer risk for the 100-N-96 waste site is 5.5×10^{-9}. Comparing this value to the requirement of $<1 \times 10^{-5}$, this criterion is met.

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

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	R. J. Nielson	Date:	07/21/15	Calc. No.:	0100N-CA-V0292	Rev.:	0
Project:	100-N Closure Operations	Job No:	14655	Checked:	I. B. Berezovskiy	Date:	07/21/15
Subject:	100-N-96 Waste Site Hazard Quotient and Carcinogenic Risk Calculations for Protection of Groundwater					Sheet No.	3 of 3

RESULTS:

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

Table 1 shows the results of the calculations.

Table 1. Hazard Quotient and Excess Cancer Risk Results for the 100-N-96 Waste Site.

Contaminants of Potential Concern	Maximum or Statistical Value[a] (mg/kg)	Noncarcinogen RAG[b] (mg/kg)	Hazard Quotient	Carcinogen RAG[b] (mg/kg)	Carcinogen Risk
Metals					
Boron	1.7	320	5.3E-03	--	--
Chromium, hexavalent	0.299	4.8	6.2E-02	--	--
Volatiles					
Acetone	0.025	720	3.5E-05	--	--
1,1-dichloroethene	0.0012	40	3.0E-05	--	--
Methylene chloride	0.0032	48	6.7E-05	0.583	5.5E-09
Totals					
Cumulative Hazard Quotient:			**6.8E-02**		
Cumulative Excess Cancer Risk:					**5.5E-09**

Notes:

[a] = From (WCH 2015).

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

-- = not applicable

RAG = remedial action goal

CONCLUSION:

This calculation demonstrates that the 100-N-96 waste site meets the requirements for the hazard quotients and excess carcinogenic risk as identified in the RDR/RAWP (DOE-RL 2013). The hazard quotient and carcinogenic risk calculations for protection of groundwater are for use in the RSVP for this site.

APPENDIX D

100-N-96 DATA QUALITY ASSESSMENT

APPENDIX D

DATA QUALITY ASSESSMENT

VERIFICATION SAMPLING

A data quality assessment (DQA) was performed to compare the verification sampling approach and resulting analytical data with the sampling and data requirements specified in the site-specific sample design (WCH 2015b). This DQA was performed in accordance with site-specific data quality objectives found in the *100-N Area Sampling and Analysis Plan for CERCLA Waste Sites* (100-N Area SAP) (DOE-RL 2006).

A review of the sample design (WCH 2015b), field logbook (WCH 2015a), and applicable analytical data packages has been performed as part of this DQA. All samples were collected and analyzed per the sample design. To ensure quality data, the 100-N Area SAP (DOE-RL 2006) data assurance requirements and the data validation procedures for chemical analysis (BHI 2000) are used as appropriate. This review involves evaluation of the data to determine if they are of the right type, quality, and quantity to support the intended use (i.e., closeout decisions). The DQA completes the data life cycle (i.e., planning, implementation, and assessment) that was initiated by the data quality objectives process (EPA 2006).

Verification sample data collected at the 100-N-96 waste site were provided by the laboratories in two sample delivery groups (SDGs): JP0961 and JP0962. SDG JP0961was submitted for third-party validation.

No major deficiencies were identified in this data set. Minor deficiencies identified in the analytical data sets are discussed in the minor deficiencies section. If no comments are made about a specific analysis, it should be assumed that no deficiencies affecting the quality of the data were found.

MINOR DEFICIENCIES

SDG JP0961

This SDG is comprised of 13 statistical verification soil samples (J1V6V6 through J1V6V9, J1V6W0 through J1V6W8) from the 100-N-96 excavation. Samples J1V6W1 and J1V6W8 comprise a field duplicate pair. These samples were collected on April 30, 2015. All samples were analyzed for inductively coupled plasma (ICP) metals; mercury; polychlorinated biphenyls (PCBs); hexavalent chromium; polycyclic aromatic hydrocarbons (PAH); Northwest total petroleum hydrocarbons, diesel range organics (NWTPH-Dx); and volatile organic compounds (VOCs). SDG JP0961 was submitted for third-party validation. Minor deficiencies are as follows.

In the VOC analysis, the common laboratory contaminant acetone was detected in the method blank. Third-party validation has qualified the associated acetone data as undetected with "U" flags. The data are usable for decision-making purposes.

In the VOC analysis, the laboratory control sample recovery for chloromethane (48%) is outside of the quality control (QC) limits. Third-party validation qualified the chloromethane results for samples J1V6V6, J1V6V9, J1V6W2, and J1V6W7 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the VOC analysis, the matrix spike (MS) recovery for chloromethane (46%) is outside of the QC limits. Third-party validation qualified the chloromethane results for samples J1V6V6, J1V6V9, J1V6W2, and J1V6W7 as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the VOC analysis, the relative percent difference calculated for total xylenes (31%) between the MS and the matrix spike duplicate is outside the QC range. Third-party validation qualified the total xylenes results in samples J1V6V6, J1V6V9, J1V6W2, and J1V6W7 as estimated. Estimated data are usable for decision-making purposes.

In the VOC analysis, the relative percent difference (RPD) calculated between the MS and matrix spike duplicate for carbon disulfide (37%) and 1,1,1-trichloroethane (34%) is outside the QC limits for all samples except samples J1V6V6, J1V6V9, J1V6W2, and J1V6W7. Third-party validation qualified the associated data as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries for antimony (48%) and silicon (4%) are outside the QC limits. Third-party validation qualified the associated data as estimated with "J" flags. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the laboratory control sample recovery for silicon (7%) is outside the QC limits. Silicon is known to be a poorly performing analyte for this analysis. Third-party validation qualified the associated data as estimated with "J" flags. Estimated data are usable for decision-making purposes.

SDG JP0962

This SDG is comprised of 13 statistical verification soil samples (J1V703 through J1V715) from the 100-N-96 staging pile area, an equipment blank (J1V716), and a VOC trip blank (J1V717). Samples J1V714 and J1V715 comprise a field duplicate pair. These samples were collected on April 30, 2015. The field samples were analyzed for ICP metals, mercury, PCBs, hexavalent chromium, PAHs, NWTPH-Dx), and VOCs. The equipment blank (J1V716) was analyzed for ICP metals, mercury, PAHs, and VOCs. The VOC trip blank was analyzed for VOCs. Minor deficiencies are as follows.

In the VOC analysis, low levels of the common laboratory contaminant were detected in the method blank at concentrations less than the reporting limit. The laboratory has qualified the

associated data with "B" flags. These data may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, serial dilution of a digestate indicates that physical and chemical interferences are present for cobalt. The laboratory has qualified the associated data with "X" flags. These data may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, low levels of barium, calcium, and magnesium were detected in the MB at concentrations less than the reporting limit. The laboratory has qualified the associated data with "B" flags. These data may be considered estimated. Estimated data are usable for decision-making purposes.

In the ICP metals analysis, the MS recoveries for silicon and mercury are outside the QC limits. The laboratory has qualified the associated data with "N" flags. These data may be considered estimated. Estimated data are usable for decision-making purposes.

FIELD QUALITY ASSURANCE/QUALITY CONTROL

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

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

Table D-1. 100-N-96 Waste Site Field QA/QC Samples.

Sample Area	Main Sample	Duplicate Sample
Excavation	J1V6W1	J1V6W8
Staging Pile Area	J1V714	J1V715

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

None of the RPDs calculated for the excavation or the staging pile area were above the QC limit.

A secondary check of the data variability is used when one or both of the samples being evaluated (main and duplicate) is less than five times the target detection limit, including undetected analytes. In these cases, a control limit of ±2 times the target detection limit is used (Appendix C) to indicate that a visual check of the data is required by the reviewer. Additionally, 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-N-96 waste site verification sampling data found that the analytical results are accurate within the standard errors associated with the analytical methods, sampling, and sample handling. The DQA review for the 100-N-96 waste site concludes that the reviewed data are of the right type, quality, and quantity to support the intended use. The analytical data were found acceptable for decision-making purposes. The verification sample analytical data are stored in a Washington Closure Hanford project-specific database prior to being submitted for inclusion in the Hanford Environmental Information System database. The verification sample analytical data are also summarized in Appendix C.

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