Waste Site Reclassification Form

Date Submitted: 5/17/06 **Originator**: L. M. Dittmer **Phone**: 948-6650	**Operable Unit(s)**: 100-BC-1 **Waste Site ID**: 100-B-20 **Type of Reclassification Action**: Rejected ☐ Closed Out ☐ Interim Closed Out ☒ No Action ☐	**Control Number**: 2006-019 **Lead Agency**: EPA

This form documents agreement among the parties listed below authorizing classification of the subject unit as rejected, closed out, interim closed out, or no action and authorizing backfill of the site, if appropriate. Final removal from the National Priorities List (NPL) of no action, interim closed-out, or closed-out sites will occur at a future date.

Description of current waste site condition:

The 100-B-20 waste site, located in the 100-BC-1 Operable Unit of the Hanford Site, consisted of an underground oil tank that once serviced the 1716-B Maintenance Garage. In January 2006, two underground oil tanks, encased in an outer containment shell, were located during confirmatory sampling activities at the site. The tanks, their contents, and 0.3 m (1 ft) of underlying soils were removed and placed in a B-25 box to be disposed of and managed separately from the waste site subsurface soils. Prior to backfilling the waste site, confirmatory samples were collected from the soils underlying the oil tank in accordance with the Washington State Department of Ecology's *Guidance for Site Checks and Site Assessments for Underground Storage Tanks*, Publication No. 90-52, Washington State Department of Ecology, Olympia, Washington. The selected action for the 100-B-20 waste site involved removal of the oil tanks and their contents and demonstrating through confirmatory sampling that all cleanup goals have been met.

Basis for reclassification:

In accordance with this evaluation, a reclassification status of interim closed out has been determined for the 100-B-20, 1716-B Maintenance Garage Underground Tank waste site. The site achieves the remedial action objectives and the corresponding remedial action goals established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, DOE/RL-96-17, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington, and the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington. The results demonstrate that the site will support future unrestricted land uses that can be represented (or bounded) by a rural-residential scenario. These results also show that residual concentrations support unrestricted future use of shallow zone soil (i.e., surface to 4.6 m [15 ft]) and that contaminant levels remaining in the soil are protective of groundwater and the Columbia River. The site does not have a deep zone; therefore, no deep zone institutional controls are required. The basis for reclassification is described in detail in the *Remaining Sites Verification Package for the 100-B-20, 1716-B Maintenance Garage Underground Tank* (attached).

D. C. Smith DOE-RL Project Manager	Signature	9/27/06 Date
NA Ecology Project Manager	Signature	Date
D. A. Faulk EPA Project Manager	Signature	9/27/06 Date

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-20, 1716-B MAINTENANCE GARAGE UNDERGROUND TANK

Attachment to Waste Site Reclassification Form 2006-019

September 2006

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-20, 1716-B MAINTENANCE GARAGE UNDERGOUND TANK

EXECUTIVE SUMMARY

The 100-B-20 waste site is a buried oil tank that once serviced the 1716-B Maintenance Garage. The 1716-B Maintenance Garage was built in 1944 and provided automotive repair and light vehicle maintenance and lubrication service for 100-B/C Area vehicles until deactivation of the 105-B Reactor in 1968. The 1716-B Maintenance Garage was declared surplus in 1979 and demolished. Although the underground gasoline tank had been removed in 1992 (Carpenter 1994), the underground oil tank was believed to be abandoned in place. The 100-B-20 waste site is located in the 100-BC-1 Operable Unit and is approximately 300 m (984 ft) northwest of the 105-B Reactor Building on the south side of B Avenue.

Confirmatory sampling of the 100-B-20 waste site was conducted on January 18 and 19, 2006. The objectives of the confirmatory sampling activities were to locate the underground storage tank (UST), and assess the site soils for any unplanned releases from the tank to the environment. The UST was located, removed, and placed in a B-25 box along with the tank contents. The oil tank was located at an approximate depth of 1.8 m (6.0 ft) and an additional 0.3 m (1 ft) of underlying soils was removed from the site and placed in a second B-25 box. The UST, its contents, and excavated soil will be dispositioned in accordance with the Washington State Department of Ecology "Dangerous Waste Regulations" (*Washington Administrative Code* 173-303) and as according to CERCLA requirements, the waste will be disposed at the Environmental Restoration Disposal Facility.

After removal of the UST, the remaining soils underlying the tank footprint were sampled in accordance with the Washington State Department of Ecology *Guidance for Site Checks and Site Assessments for Underground Storage Tanks* (Ecology 2003). A total of five samples were collected at the UST excavation (sample area 1) and consisted of a soil sample from underneath the tank, two soil samples from the excavation sidewalls, one duplicate and one blank. An additional soil sample (sample area 2) was collected at the 100-B-20 waste site from subsurface stained soils. The excavation was backfilled upon completion of sampling with clean soil from the 100-B Area borrow pit. The sample results for both sample areas indicate that the site achieves compliance with the remedial action objectives for the 100-B-20 site. A summary of the cleanup evaluation for the soil results against the applicable criteria is presented in Table ES-1. The results of the confirmation sampling are used to make reclassification decisions for the 100-B-20 site in accordance with the TPA-MP-14 (DOE-RL 1998) process.

In accordance with this evaluation, the confirmatory sampling results support a reclassification of this site to interim closed out. The current site conditions achieve the remedial action objectives and the corresponding remedial action goals established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2005b) and the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD) (EPA 1999). These results

show that residual soil concentrations support future land uses that can be represented (or bounded) by a rural-residential scenario. The results also demonstrate that residual contaminant concentrations support unrestricted future use of shallow zone soil (i.e., surface to 4.6 m [15 ft]) and that contaminant levels remaining in the soil are protective of groundwater and the Columbia River. The depth of the oil tank was approximately 1.8 m (6.0 ft) and the soils collected underlying the tank were at a depth of 2.1 m (6.9 ft). The sample results at the boundaries of the excavation indicate the remedial action objectives for the site are met and no further excavation is required. As such, this site does not have a deep zone; therefore, no deep zone institutional controls are required.

Table ES-1. Summary of Remedial Action Goals for the 100-B-20 Waste Site. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Direct Exposure – Radionuclides	Attain 15 mrem/yr dose rate above background over 1,000 years.	There are no radionuclide COPCs for this site.	Not applicable
Direct Exposure – Nonradionuclides	Attain individual COPC RAGs.	All individual COPC concentrations are below the direct exposure criteria.	Yes
Risk Requirements – Nonradionuclides	Attain a hazard quotient of <1 for all individual noncarcinogens.	All hazard quotients are less than 1.	Yes
	Attain a cumulative hazard quotient of <1 for noncarcinogens.	The cumulative hazard quotient (8.9×10^{-2}) is less than 1.	
	Attain an excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens.	The excess cancer risk for all carcinogens is less than 1×10^{-6}.	
	Attain a cumulative excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.	The cumulative excess cancer risk (3.1×10^{-7}) is less than 1×10^{-5}.	
Groundwater/River Protection – Radionuclides	Attain single COPC groundwater and river protection RAGs.	There are no radionuclide COPCs for this site.	Not applicable
	Attain national primary drinking water standards:[a] 4 mrem/yr (beta/gamma) dose rate to target receptor/organs.		
	Meet drinking water standards for alpha emitters: the most stringent of 15 pCi/L MCL or 1/25th of the derived concentration guides from DOE Order 5400.5.[b]		
	Meet total uranium standard of 30 μg/L (21.2 pCi/L).[c]		

Table ES-1. Summary of Remedial Action Goals for the 100-B-20 Waste Site. (2 Pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Groundwater/River Protection – Nonradionuclides	Attain individual nonradionuclide groundwater and river cleanup requirements.	Maximum detected results for lead, copper, and zinc are above groundwater and river protection RAGs. However, generic RESRAD model results (BHI 2005a)[d] indicate that these constituents will not reach groundwater (and, therefore, the Columbia River) within 1,000 years. Therefore, residual concentrations achieve the RAOs for groundwater and river protection.	Yes

[a] "National Primary Drinking Water Regulations" (40 *Code of Federal Regulations* 141).
[b] *Radiation Protection of the Public and the Environment* (DOE Order 5400.5).
[c] Based on the isotopic distribution of uranium in the 100 Areas, the 30 µg/L MCL corresponds to 21.2 pCi/L. Concentration-to-activity calculations are documented in *Calculation of Total Uranium Activity Corresponding to a Maximum Contaminant Level for Total Uranium of 30 Micrograms per Liter in Groundwater* (BHI 2001).
[d] *100 Area Analogous Sites RESRAD Calculations,* 0100X-CA-V0050, Rev. 0 (BHI 2005a).
COPC = contaminant of potential concern
MCL = maximum contaminant level (drinking water standard)
RAG = remedial action goal
RAO = remedial action objective
RESRAD = RESidual RADioactivity (dose model)

Soil cleanup levels were established in the Remaining Sites ROD (EPA 1999) based on a limited ecological risk assessment. Although not required by the Remaining Sites ROD, a comparison against ecological risk screening levels has been made for the site contaminants of concern, contaminants of potential concern, and other constituents. Screening levels were not exceeded for the site constituents, with the exception of boron, lead, mercury, selenium, vanadium, and zinc. Exceedance of screening values does not necessarily indicate the existence of risk to ecological receptors. It is believed that the presence of these constituents does not pose a risk to ecological receptors as concentrations of lead, mercury, selenium, and vanadium are within the range of Hanford Site background levels and boron concentrations are consistent with those seen elsewhere at the Hanford Site (no established background value is available for boron). The exceedance of soil screening values by zinc concentrations at the site will be evaluated in the context of additional lines of evidence for ecological effects. A baseline risk assessment for the river corridor portion of the Hanford Site began in 2004, which includes a more complete quantitative ecological risk assessment. That baseline risk assessment will be used to support the final closeout decision for the100-B-20 waste site.

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-20, 1716-B MAINTENANCE GARAGE UNDERGROUND TANK

STATEMENT OF PROTECTIVENESS

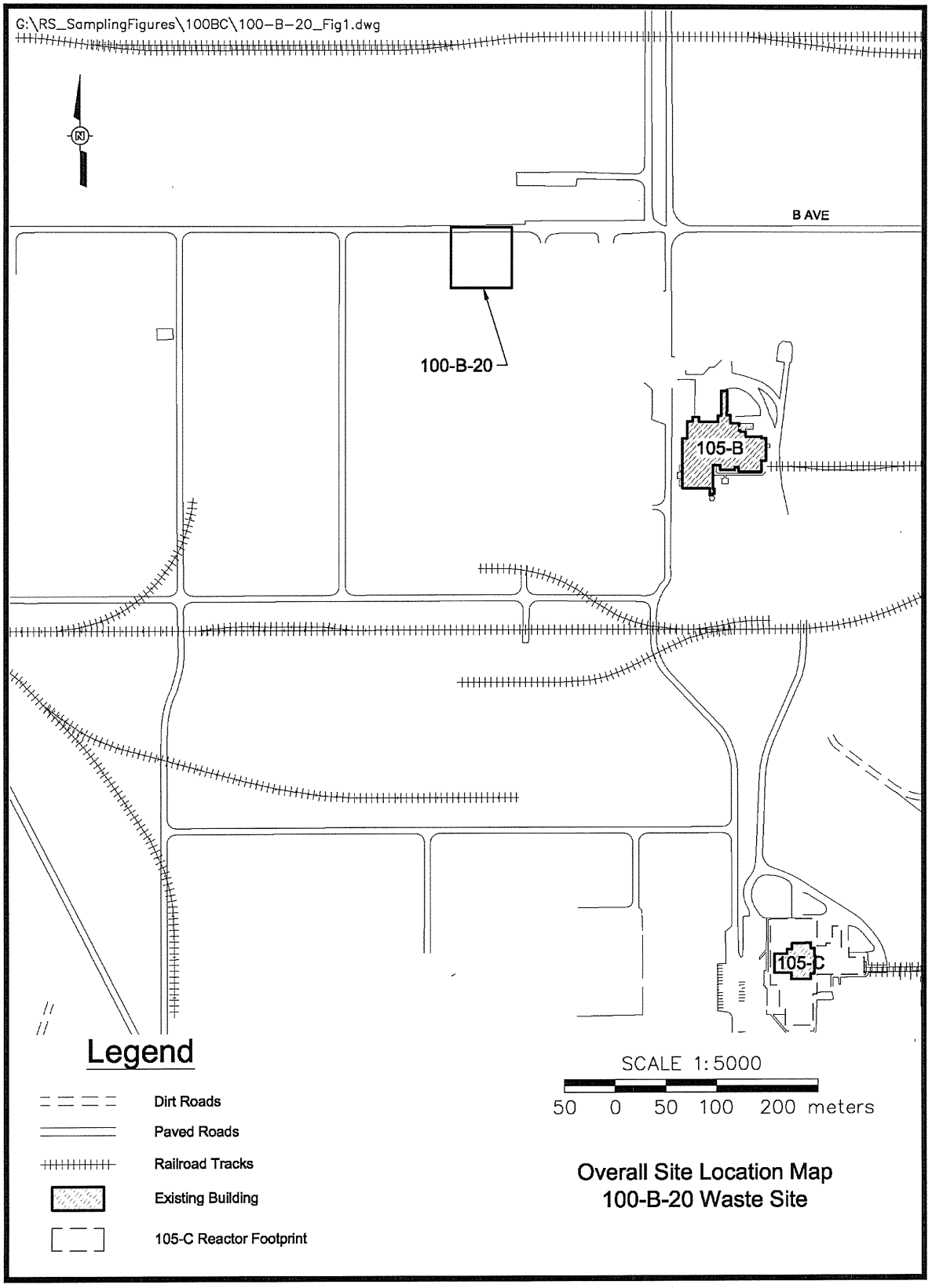
This report demonstrates that the 100-B-20 site meets the objectives for interim closed out as established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2005b) and the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (EPA 1999). These results show that residual soil concentrations support future land uses that can be represented (or bounded) by a rural-residential scenario. The results also demonstrate that residual contaminant concentrations support unrestricted future use of shallow zone soil (i.e., surface to 4.6 m [15 ft]) and that contaminant levels remaining in the soil are protective of groundwater and the Columbia River. The depth of excavation for the 100-B-20 waste site was 2.1 m (6.9 ft). As such, this site does not have a deep zone; therefore, no deep zone institutional controls are required.

GENERAL SITE INFORMATION AND BACKGROUND

According to the Waste Information Data System (BHI 2005b), the 100-B-20 waste site consisted of an underground 454.2-L (120-gal) oil storage tank that serviced the former 1716-B Maintenance Garage. The 1716-B Maintenance Garage was built in 1944 and provided automotive repair and light vehicle maintenance and lubrication service for 100-B/C Area vehicles until deactivation of the 105-B Reactor in 1968. The 1716-B Maintenance Garage was declared surplus in 1979, the equipment was excessed, and the entire facility was removed by a salvage operator. The underground gasoline storage tank (130-B-1) that supported the garage was removed in 1992, and no residual contamination was identified in soil samples taken underneath the gasoline tank (Carpenter 1994). The underground oil tank was believed to be abandoned in place.

The 100-B-20 waste site is located in the 100-BC-1 Operable Unit and is approximately 300 m (984 ft) northwest of the 105-B Reactor Building on the south side of B Avenue (Figure 1). The southeast corner of the former 1716-B Facility was located at Washington State Plane coordinates N 144698, E 565058.

Figure 1. 100-B-20 Waste Site Location Map.



CONFIRMATORY SAMPLING ACTIVITIES

Nonintrusive Investigation Results

The entire surface of the 100-B-20 waste site has been disturbed by remedial action activities throughout the 100-B/C Area. No sensitive plant or animal species are present within the project area, and no adverse impacts to ecological resources were anticipated by this project. The current site soil surface consists of sand, gravel, and cobble, with limited vegetation confined to the northwest corner of the site along B Avenue (Teel 2005). Impacts to ecological resources did not occur during confirmatory sampling activities, nor were cultural resources observed.

A site visit was conducted in May 2005. Observations made during the site visit indicated that the surface area had been disturbed by remedial action activities in the 100-B/C Area. The site visit did not disclose any further details of the extent of buried debris located within the waste site boundary (BHI 2005b).

A geophysical survey of the 100-B-20 waste site, conducted in 2004 (BHI 2004), was used to determine the presence of any anomalies that might indicate the presence of an underground storage tank (UST) (Figure 2). One such anomaly was identified during the survey. This area was determined to be the most likely location for the UST and, therefore, was the primary sampling location. A second area was also identified during the geophysical survey that contained subsurface anomalous material that may potentially contain buried features, material, and/or debris. This site was chosen to be a secondary sampling area if the UST was not discovered in the primary sample location (BHI 2005b).

Contaminants of Potential Concern

The contaminants of potential concern (COPCs) for the 100-B-20 waste site were identified based on existing historical information for the site and process knowledge of the 1716-B Maintenance Garage. The COPCs for the 100-B-20 waste site are associated with the petroleum storage during operation of the 454.2-L (120-gal) UST, including arsenic, barium, cadmium, total chromium, lead, selenium, silver, mercury, total petroleum hydrocarbons (TPHs), semivolatile organic compounds, and polychlorinated biphenyls (PCBs) (BHI 2005b). Although not included in the list of COPCs, antimony, beryllium, boron, cobalt, copper, manganese, molybdenum, nickel, vanadium, and zinc concentrations were evaluated by performing the expanded inductively coupled plasma (ICP) metals analyses. There were no radionuclide COPCs for this site.

During confirmatory sampling (BHI 2005b), field screening for volatile organic compounds (VOCs) was performed to assess the need for volatile organic analysis (VOA). As no VOCs were detected in the field, VOA was not included in the requested analyses for the collected soil samples. The contents of the tank, however, were sampled and analyzed for VOCs to support disposal options for the waste (i.e., to determine if the waste needs further treatment such as macro-encapsulation before its planned disposal at ERDF). If suspect asbestos-containing materials were encountered during field activities, the sample design (BHI 2005b) called for the

suspect material to be sampled and analyzed; however, no suspect asbestos-containing material was found.

Confirmatory Sample Design

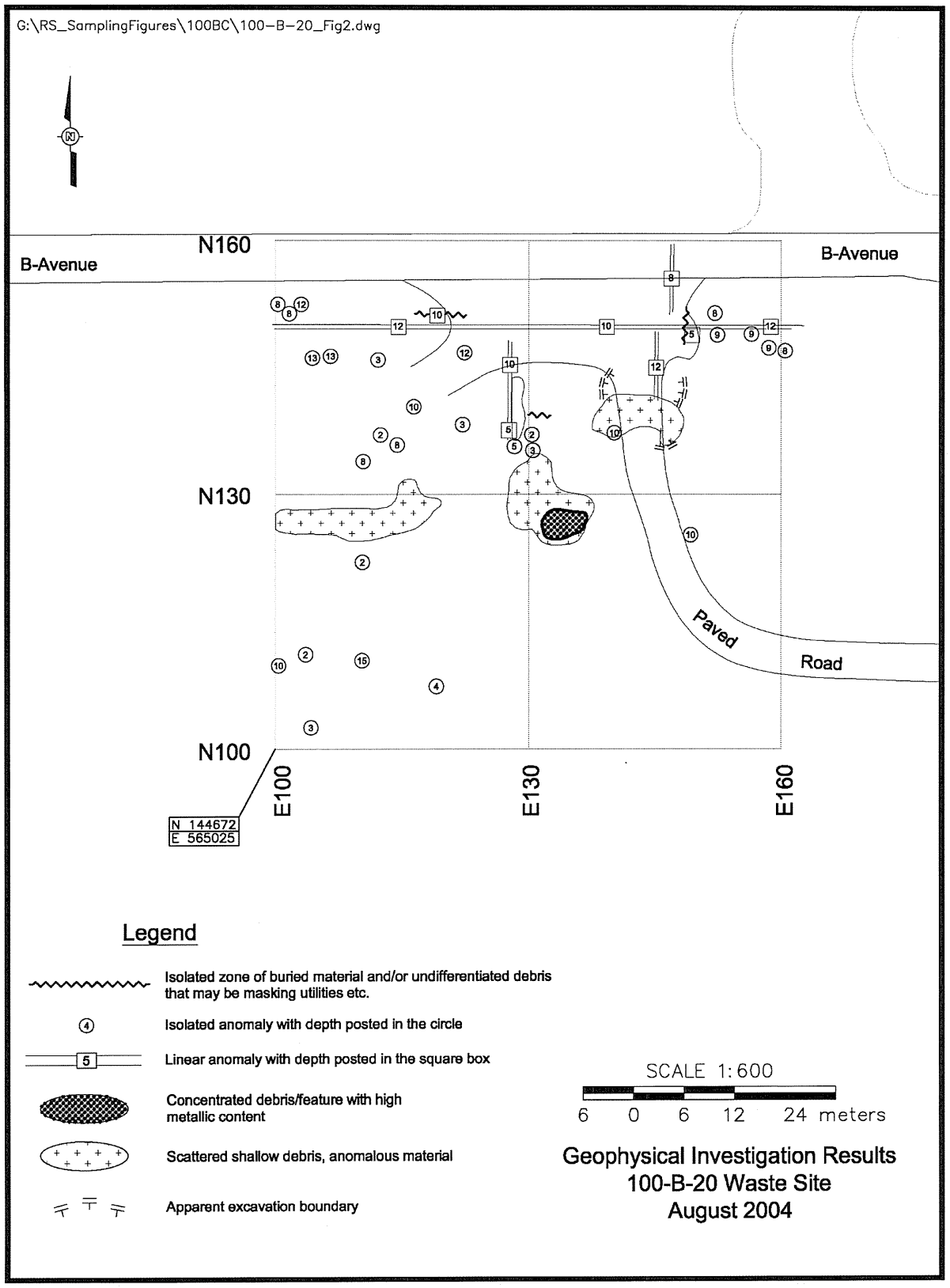
A focused sampling design was implemented on January 18 and 19, 2006, in accordance with the *Work Instruction for the 100-B-20, 1716-B Maintenance Garage Underground Tank* (BHI 2005b). The 100-B-20 site was investigated through field observations and focused sampling and analysis to determine if hazardous contaminants were present at the site.

One test trench was excavated in sample area 1 (Figure 3), the area identified as the most likely location of the UST. The UST was discovered within the excavation trench at an approximate depth of 1.7 to 1.8 m (5.5 to 6.0 ft) and consisted of two separate compartments, each of which contained waste material. The larger compartment had an approximate capacity of 946 to 1136 L (250 to 300 gal) and contained 189 to 227 L (50 to 60 gal) of sludge (WCH 2006a). The smaller compartment had an approximate capacity of 379 to 568 L (100 to 150 gal) and contained 19 to 38 L (5 to 10 gal) of a soil/water/diesel mixture.

The UST was unable to be sampled in place and was removed to gain access to the internal contents. A composite sample was collected from the material in the two compartments and analyzed for waste characterization purposes. The tank contents were removed, and the empty tank and waste contents were placed into a B-25 box. In addition to the tank removal, approximately 0.3 m (1 ft) of soil was excavated from the location underlying the UST and placed into a second B-25 box (WCH 2006a). The contents of the B-25 boxes will be managed and disposed of separately in accordance with the Washington State Department of Ecology "Dangerous Waste Regulations" (*Washington Administrative Code* [WAC] 173-303) and as according to CERCLA requirements, the waste will be disposed at the Environmental Restoration Disposal Facility.

The Washington State Department of Ecology *Guidance for Site Checks and Site Assessments for Underground Storage Tanks* (herein referred to as the UST Guidance for Site Closure) (Ecology 2003) was followed during confirmatory sampling activities of the remaining subsurface soils surrounding the UST. Table 5-2, "Minimum Soil Sampling Requirements for Site Checks and Site Assessments," within the UST Guidance for Site Closure (Ecology 2003), requires three samples to be collected from the excavation pit when a single tank less than 75,710 L (20,000 gal) is removed. As such, three samples and a duplicate were collected from within the tank waste site excavation (WCH 2006a). One sample (and its duplicate) was collected from the bottom of the excavation under the footprint of the tank. The two remaining samples were collected from the excavation sidewalls as described in Table 5-2 of the UST Guidance for Site Closure (Ecology 2003). Each sidewall sample was taken as a composite from two adjacent sides of the excavation at the same depth per composite sample. The excavation was backfilled with clean soil upon completion of confirmatory sampling.

Figure 2. 100-B-20 Underground Storage Tank Geophysical Interpretation Map.



According to the sample design, the excavation in sample area 2 was to occur only if the tank was not located in sample area 1 (BHI 2005b). Although the UST was discovered in sample area 1, a test pit was excavated in sample area 2. During the excavation, stained soil was found and a sample was collected from an approximate depth of 1.2 to 1.4 m (4 to 4.5 ft) below ground surface. The sample consisted of stained, reddish-yellowish brown silty soil. The origin of the staining is unknown, however, the staining has been removed and the site backfilled with clean soil upon completion of confirmatory sampling.

Sample Summary

A summary of the collected samples for the 100-B-20 waste site is provided in Table 1. Sample locations are depicted in Figure 3. Sample results are presented in Appendix A.

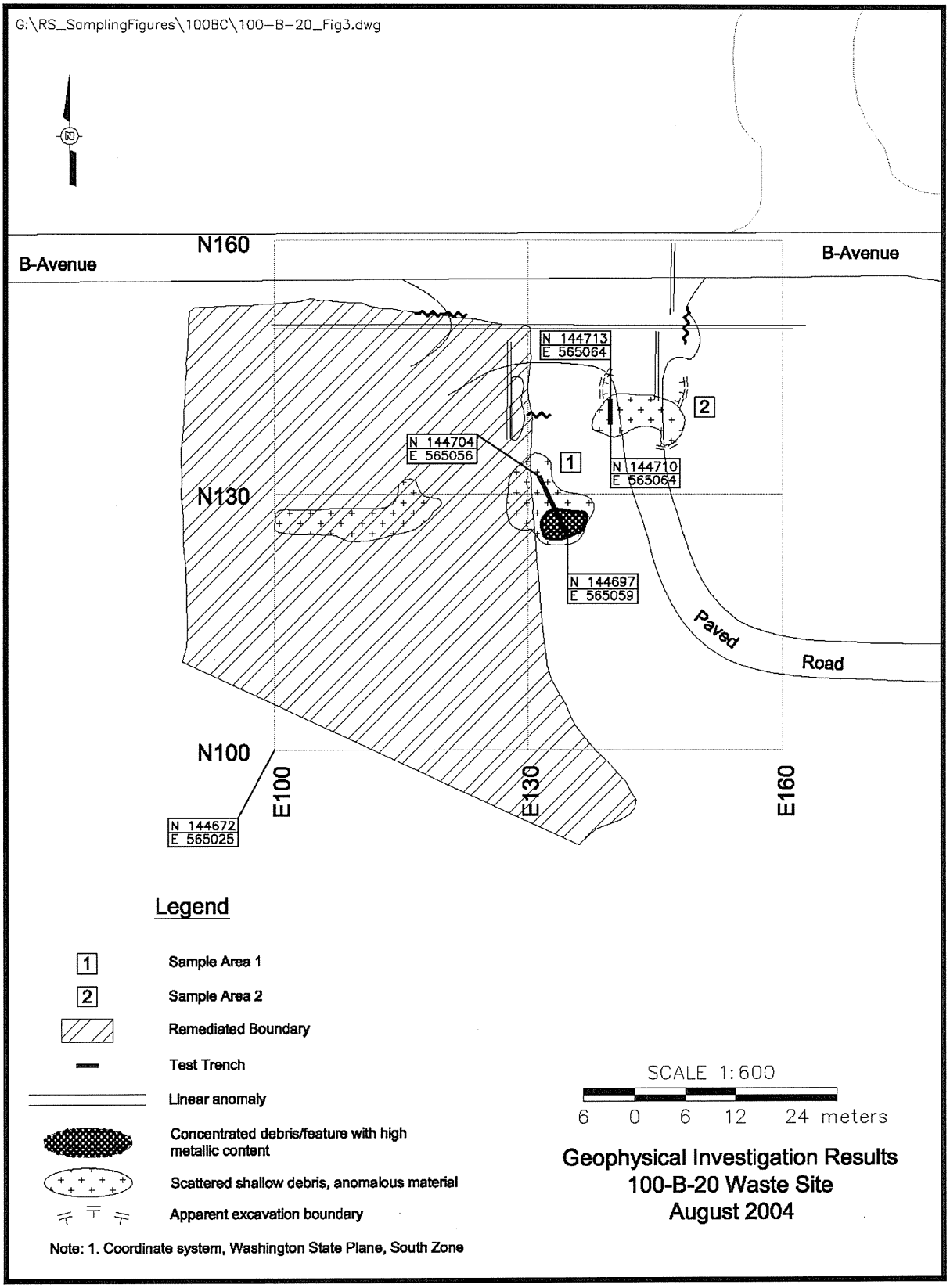
Table 1. Confirmatory Sampling Summary for the 100-B-20 Underground Storage Tank.

Sample Location	Sample Media	Sample Number	Coordinate Locations	Depth (m bgs)	Sample Analysis
Sample area 1	Tank material	J10V68	Trench N 144704, E 565056 to N 144697, E 565059	1.8	ICP metals, mercury, TPH, SVOA, PCB, VOA TCLP metals, TCLP mercury
	Soil beneath tank	J10V70		2.1	ICP metals, mercury, TPH, SVOA, PCB
	Soil from east sidewall	J10V73		2.1	ICP metals, mercury, TPH, SVOA, PCB
	Soil from west sidewall	J10V72		2.1	ICP metals, mercury, TPH, SVOA, PCB
Sample area 2	Stained soil	J11108	Trench N 144710, E 565064 to N 144713, E 565064	1.2 - 1.4	ICP metals, mercury, TPH, SVOA, PCB
Duplicate of J10V70	Soil beneath tank	J10V71	Trench N 144704, E 565056 to N 144697, E 565059	2.1	ICP metals, mercury, TPH, SVOA, PCB
Equipment blank	Silica sand	J10V69	N/A	N/A	ICP metals, mercury

Source: Remaining Sites Field Sampling Logbook (WCH 2006a)

bgs = below ground surface
ICP = inductively coupled plasma
N/A = not applicable
PCB = polychlorinated biphenyl
SVOA = semivolatile organic analysis
TCLP = toxicity characteristic leaching procedure
TPH = total petroleum hydrocarbon
VOA = volatile organic analysis

Figure 3. Confirmatory Sample Locations.



Confirmatory Sampling Results

Confirmatory samples were analyzed using U.S. Environmental Protection Agency-approved analytical methods. A comparison of the maximum concentrations of detected analytes and the site remedial action goals (RAGs) are summarized in Table 2. The maximum values from sample area 1 and sample area 2 were compared for each analyte and the larger of the two values is presented in Table 2 and compared against the RAGs. As such, the 100-B-20 waste site was considered as a whole, using the maximum value for each analyte from the data set of all soil locations sampled.

Contaminants that were not detected by laboratory analysis, or that are not being considered as COPCs for reasons stated in the following text, are excluded from Table 2. Additionally, the contaminant values for the tank contents are not included in Table 2, as they were collected for waste characterization purposes only. The waste characterization data will be used to determine if the waste needs further treatment (i.e. macro-encapsulation) before its planned disposal at ERDF. Calculated cleanup levels are not presented in the Model Toxics Control Act Cleanup Levels and Risk Calculations database under *Washington Administrative Code* (WAC) 173-340-740(3) for aluminum, calcium, iron, magnesium, potassium, silicon, and sodium; therefore, these constituents are not considered COPCs. The laboratory-reported data results for all constituents are stored in the Environmental Restoration project-specific database prior to submitting for inclusion in the Hanford Environmental Information System and are presented in Appendix A.

Table 2. Comparison of Maximum Soil Values to Action Levels for the 100-B-20 Waste Site. (2 Pages)

COPC	Maximum Result (mg/kg)	Remedial Action Goals[a] (mg/kg)			Does the Maximum Result Meet RAGs?	Does the Maximum Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Arsenic	2.8 (<BG)	20[b]	20[b]	20[b]	Yes	--
Barium	72.7 (<BG)	5,600[c]	132[d,e]	224[f]	Yes	--
Beryllium	0.32 (<BG)	10.4[g]	1.51[d]	1.51[d]	Yes	--
Boron[h]	3.7	16,000	320	NA	Yes	--
Chromium (total)	12.1 (<BG)	80,000[c]	18.5[d]	18.5[d]	Yes	--
Cobalt	11.2 (<BG)	1,600	32	NA	Yes	--
Copper	43.3	2,960	59.2	22[d]	No	Yes[i]
Lead	20.9	353[j]	10.2[d]	10.2[d]	No	Yes[i]
Manganese	354 (<BG)	11,200	512[d]	NA	Yes	--
Mercury	0.33 (<BG)	24[b]	0.33[d]	0.33[d]	Yes	--
Molybdenum[h]	0.60	400	8	NA	Yes	--
Nickel	10.8 (<BG)	1,600	19.1[d]	27.4	Yes	--
Selenium[k]	0.44 (<BG)	400	5	1	Yes	--
Vanadium	53.9 (<BG)	560	85.1[d]	NA	Yes	--
Zinc	326	24,000	480	67.8[d]	No	Yes[i]
Aroclor-1260	0.0085	0.5	0.017[l]	0.017[l]	Yes	--
Benzo(a)anthracene	0.029	1.37[m]	0.33[l]	0.33[l]	Yes	--

Table 2. Comparison of Maximum Soil Values to Action Levels for the 100-B-20 Waste Site. (2 Pages)

COPC	Maximum Result (mg/kg)	Remedial Action Goals[a] (mg/kg)			Does the Maximum Result Meet RAGs?	Does the Maximum Result Pass RESRAD Modeling?
		Direct Exposure	Soil Cleanup Level for Groundwater Protection	Soil Cleanup Level for River Protection		
Benzo(a)pyrene	0.032	0.33[l]	0.33[l]	0.33[l]	Yes	--
Benzo(b)fluoranthene	0.035	1.37[m]	0.33[l]	0.33[l]	Yes	--
Benzo(k)fluoranthene	0.035	13.7[m]	0.33[l]	0.33[l]	Yes	--
Benzo(ghi)perylene[n]	0.023	2,400	48	192	Yes	--
Chrysene	0.031	137[m]	1.2[m]	0.33[l]	Yes	
Di-n-butylphthalate	0.15	8,000	160	540	Yes	--
Fluoranthene	0.043	3,200	64	18.0	Yes	--
Indeno(1,2,3-cd) pyrene	0.021	1.37	0.33[l]	0.33[l]	Yes	--
Pyrene	0.040	2,400	48	192	Yes	--

[a] Lookup values and RAGs obtained from the RDR/RAWP (DOE-RL 2005b) or calculated per WAC-173-340-720, 730, and 740, Method B, 1996, unless otherwise noted.

[b] The cleanup value of 20 mg/kg has been agreed to by Tri-Party project managers. The basis for 20 mg/kg is provided in Section 2.1.2.1 of the RDR/RAWP (DOE-RL 2005b).

[c] Noncarcinogenic cleanup level calculated from WAC 173-340-740(3), 1996 (Method B for soils) (as presented in the RDR/RAWP [DOE-RL 2005b]). Updated oral reference dose values (as provided in IRIS) yield Method B direct exposure RAG values of 16,000 mg/kg and 120,000 mg/kg for barium and chromium, respectively.

[d] Where cleanup levels are less than background, cleanup levels default to background (WAC 173-340-700[4][d]) (1996).

[e] Barium soil cleanup level for groundwater protection calculated from WAC 173-340-740(3)(a)(ii)(A), 1996 ("100 times rule") and WAC 173-340-720(3), 1996 (Method B for groundwater) is 112 mg/kg (as presented in the RDR/RAWP [DOE-RL 2005b]). The updated oral reference dose value (as provided in IRIS) yields a Method B groundwater cleanup criteria of 7 mg/L, as compared to the more restrictive maximum contaminant level (drinking water standard) (MCL) of 2 mg/L (40 CFR 141). Per WAC 173-340-740(3)(a)(ii)(A), 1996 ("100 times rule"), the most restrictive updated soil cleanup level for groundwater protection would be 200 mg/kg.

[f] Barium soil cleanup level for river protection calculated from WAC 173-340-740(3)(a)(ii)(A), 1996 ("100 times rule"), a dilution attenuation factor of 2, and WAC 173-340-720(3), 1996 (Method B for groundwater) is 224 mg/kg (as presented in the RDR/RAWP [DOE-RL 2005b]). No surface water bioconcentration factor is available for barium and no ambient water quality criteria value exists; therefore, no WAC 173-340-730(3), 1996 (Method B for surface waters) value can be determined.

[g] Carcinogenic cleanup level calculated based on the inhalation exposure pathway per WAC 173-340-750[3], 1996 (Method B for air quality) and an airborne particulate mass loading rate of 0.0001 g/m^3 (WDOH 1997).

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

[i] Based on the *100 Area Analogous Sites RESRAD Calculations* (BHI 2005a), with the groundwater table elevation of 121.5 m (399 ft) above mean sea level and a clean zone extending from groundwater to an elevation of 137.9 m (452 ft) above mean sea level.

j A WAC 173-340-740(3) (1996) value for lead is not available. This value is based on the *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children* (EPA 1994).

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

[l] Where cleanup levels are less than the RDL, cleanup levels default to the RDL (WAC 173-340-707[2], 1996 and DOE-RL 2005b).

[m] Value listed in the RDR/RAWP (DOE-RL 2005b) is based on the use of benzo(a)pyrene as a surrogate. Compound-specific carcinogenic cleanup level calculated per WAC 173-340-740(3), 1996 (Method B for soils) using the Oak Ridge National Laboratory oral cancer potency factor.

[n] Toxicity data for benzo(ghi)perylene are not available. Cleanup levels are based on the surrogate chemical pyrene.

-- = not applicable
BG = background
COPC = contaminant of potential concern
IRIS = Integrated Risk Information System
NA = not available
RAG = remedial action goal
RESRAD = RESidual RADioactivity
RDL = required detection limit
RDR/RAWP = remedial design report/remedial action work plan
WAC = *Washington Administrative Code*

DATA EVALUATION

All detected analytes, with the exception of lead, copper, and zinc, were reported at concentrations below direct exposure, groundwater protection, and river protection RAGs. Lead, copper, and zinc were detected at concentrations exceeding the soil RAGs for protection of groundwater and/or the Columbia River. However, based on the soil-partitioning coefficient values of lead (30 mL/g), copper (22 mL/g), and zinc (30 mg/L), the results of the *100 Area Analogous Sites RESRAD Calculations* (BHI 2005a) indicate that these constituents will not reach groundwater (and, therefore, the Columbia River) within 1,000 years for a groundwater elevation of 121.5 m (399 ft) above mean sea level and a clean zone extending from groundwater to an elevation of 137.9 m (452 ft) above mean sea level. Therefore, residual concentrations of these constituents satisfy the remedial action objectives.

Nonradionuclide risk requirements for the 100-B-20 site include an individual hazard quotient of less than 1.0, a cumulative hazard quotient of less than 1.0, individual contaminant carcinogenic risks of less than 1×10^{-6}, and a cumulative carcinogenic risk of less than 1×10^{-5}. These risk values were not calculated for constituents that were either not detected or were detected at concentrations below Hanford Site or Washington State background values (Appendix B). All individual hazard quotients for noncarcinogenic constituents were less than 1.0. The cumulative hazard quotient for those noncarcinogenic constituents above background or detection levels is 8.9×10^{-2}. The individual carcinogenic risk values for carcinogenic constituents above background or detection levels are all below 1×10^{-6}. The cumulative carcinogenic risk value for the site is 3.1×10^{-7}, which is below 1×10^{-5}.

When using a statistical sampling approach, a requirement for nonradionuclides is the *Washington Administrative Code* 173-340-740(7)(e) three-part test. However, this test is not applicable to the focused confirmatory sampling results because the maximum detected concentrations are directly compare to the cleanup levels as specified in WAC 173-340-740(7)(d)(iii).

DATA QUALITY ASSESSMENT

A data quality assessment (DQA) was performed to compare the sampling approach and analytical data with the sampling and data requirements specified in the site-specific work instruction (BHI 2005b). This DQA was performed in accordance with WCH-EE-01, *Environmental Investigations Procedures*. Specific data quality objectives for the site are found in the *100 Area Remedial Action Sampling and Analysis Plan* (DOE-RL 2005a). A review of the work instruction, the field logbook (WCH 2006a), and the analytical data packages has been performed as part of this DQA. To ensure quality data, the data assurance requirements (DOE-RL 2005a), as well as the data validation procedures for chemical and radiochemical analysis (BHI 2000a, 2000b), were followed, where 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 [EPA 2000]). The DQA completes the data life cycle

(i.e., planning, implementation, and assessment) that was initiated by the data quality objectives process.

Data from samples collected at the 100-B-20 site were provided by the laboratory in sample delivery group (SDG) K0197. Third-party data validation was performed on SDG K0197 (WCH 2006b, 2006c). SDG K0197 consists of six samples that were analyzed for semivolatile organic analysis (SVOA), ICP metals, mercury, TPH, PCBs, and, as needed per the work instruction, VOA. A seventh sample, the equipment blank (J10V69), was also collected and analyzed for ICP metals and mercury. The field samples were J10V68, J10V69, J10V70, J10V71, J10V72, J10V73, and J11108. Sample J10V71 is a field duplicate of sample J10V70. All samples required by the work instruction (BHI 2005b) were collected. Additionally, two soil samples (J10V72 and J10V73) were collected from the sidewalls of the excavation. The added samples were taken as specified in the UST Guidance for Site Closure (Ecology 2003). Sample J10V68 was composed of the UST contents and was analyzed in a separate batch from the other field samples. The third-party validation for sample J10V68 is provided in SDG K0197A (WCH 2006c). This sample is to be used for waste characterization purposes only, and as such the DQA for this sample is discussed separately from the field samples used for site closure. No major deficiencies were found in the 100-B-20 site data set. The minor deficiencies are presented below.

SDG K0197 (Samples J10V69, J10V70, J10V71, J10V72, J10V73, and J11108)

The SVOA analyte bis(2-ethylhexly)phthalate, a common laboratory contaminant, was detected in the method blank and in the field samples at low concentrations (58 to 150 µg/kg). Third-party validation raised the reported values in the field samples to the required detection limit of 660 µg/kg and qualified the results with "U" as nondetected. The data are useable for decision-making purposes.

Seven SVOA analytes had low recoveries in both the matrix spike (MS) and matrix spike duplicate (MSD). The analytes were isophorone (57%, 54%), 2-nitrophenol (42%, 39%), 2,4-dimethylphenol (48%, 44%), 1,2,4-trichlorobenzene (55%, 51%), 2-methylnaphthalene (50%, 52%), 2,4-dinitrophenol (12%, 16%), and 4,6-dinitro-2-methylphenol (21%, 22%). The analyte 4-chloro-3-methylphenol had a low MS recovery at 57%. The analytes isophorone, 2,4-dimethylphenol, 1,2,4-trichlorobenzene, 4-chloro-3-methylphenol, and 2-methylnaphthalene also had low laboratory control sample recoveries at 57%, 41%, 57%, 58%, and 58%, respectively. The data deficiencies for the analytes listed above are typical of the losses observed during the laboratory sample extraction process. Third-party validation qualified the data for these analytes with a "J," as estimates. The data are useable for decision-making purposes.

No analytical deficiencies were found in the TPH analysis. However, the sample jar for sample J11108 was broken/cracked during shipping. The contents were still contained, but the broken/cracked jar is considered a deficiency. Third-party validation qualified the J011108 TPH result with a "J," as an estimate. The data are useable for decision-making purposes.

Low-level detections of silicon and calcium were seen in the method blank and in sample J10V69, the equipment blank. Third-party validation qualified these analytes, in sample J10V69, with "UJ," as nondetected estimates. The data are useable for decision-making purposes.

The MS for mercury was above acceptance criteria at 142.5%. This implies a high bias in the data for mercury. Third-party validation qualified the detected mercury results in samples J10V70 and J11108 with a "J," as estimates. The data are useable for decision-making purposes.

SDG K0197A (Sample J10V68)

Sample J10V68 was a sample of the dark viscous materials found inside the 100-B-20 UST. The tank and its contents will be disposed of and managed separately from the 100-B-20 waste site subsurface soils, and the sample data will be used for waste characterization. Sample J10V68 was analyzed and validated separately from the other 100-B-20 waste site samples, and the following comments on the sample deficiencies pertain only to sample J10V68. They are presented here because the sample was collected under the 100-B-20 work instruction and the data were generated within the same SDG as the other 100-B-20 waste site samples.

The MS and MSD recoveries for the analytes hexachlorocyclopentadiene, 2,4-dinitrophenol, 4-nitrophenol, and 4,6-dinitro-2-methylphenol were lost to dilution. Third-party validation qualified these analytes with a "J," as estimates. The data are useable for decision-making purposes.

The MSD recovery was below acceptance criteria, for phenol, at 45%. Third-party validation qualified this analyte with a "J," as estimates. The data are useable for decision-making purposes.

The MS and MSD recoveries were below acceptance criteria for the analyte 3-nitroanaline. Third-party validation qualified this analyte with a "J," as an estimate. The data are useable for decision-making purposes.

The relative percent differences (RPDs) between the MS and MSD were out of acceptance criteria for the analytes 4-chloroanaline, 2-nitroanaline, and diethylphthalate at 113%, 45%, and 36%, respectively. Third-party validation qualified these analytes with a "J," as estimates. The data are useable for decision-making purposes.

The MSD recovery in the PCB analysis was below acceptance criteria at 54%. This caused the RPD between the MS and the MSD to be above acceptance criteria at 33%. Third-party validation qualified all of the PCB results in sample J10V68, except the aroclor-1260 result, with a "J," as estimates. The data are useable for decision-making purposes.

Sample J10V68 was analyzed for VOA to support characterization of the tank contents. The sample was run at two combinations of sensitivity and dilution to accommodate high concentrations of some analytes. Due to a lack of MS or MSD analysis for the lower dilution, the volatile organic results for sample J10V68, reported at the lower dilution level (all VOA

analytes except acetone, 2-butanone, 4-methyl-2-pentanone, and toluene), were qualified "J" as estimates. The data are useable for decision-making purposes.

The MS recovery in the TPH analysis was below acceptance criteria at 8.7%. The high levels of TPH in the native sample lead to increased variability. The added MS has been minimized by the already present analyte(s). Third-party validation qualified the TPH result in sample J10V68 with a "J" as an estimate. The data are useable for decision-making purposes. The MS recoveries for boron and silicon were out of acceptance criteria at 64.2% and 300%, respectively. The laboratory control sample for silicon was also below acceptance criteria at 58.4%. Third-party validation qualified these analytes with a "J," as estimates. Due to the nature of the sample extract these types of deficiencies are expected. The data are useable for decision-making purposes.

Sample J10V68 was also prepared by the toxicity characteristic leaching procedure (TCLP) where the MS for silver-TCLP was below the acceptance criteria at 28.7%. Similarly, the chromium-TCLP result in the duplicate analysis had an RPD above acceptance criteria at 34%. The thick viscous nature of the sample extract is the probable cause of these deficiencies. The data are useable for decision-making purposes.

Conclusions

Limited, random, or sample matrix-specific influenced batch quality control issues such as these are a potential for any analysis. The number and types seen in these data sets were within expectations for the matrix types and analyses performed. The DQA review for the 100-B-20 site found the results to be accurate within the standard errors associated with the methods, including sampling and sample handling. It is concluded that the data reviewed are of the right type, quality, and quantity to support the intended use. Detection limits, precision, accuracy, and sampling data group completeness were assessed to determine if any analytical results should be rejected as a result of quality assurance and quality control deficiencies. All analytical data were found acceptable for decision-making purposes. The confirmatory sample analytical data are stored in the Environmental Restoration project-specific database prior to archiving in the Hanford Environmental Information System database and are summarized in Appendix A.

SUMMARY FOR INTERIM CLOSED OUT

On January 18 and 19, 2006, focused confirmatory samples were collected as specified in the 100-B-20 confirmatory sampling work instruction (BHI 2005b) and the UST Guidance for Site Closure (Ecology 2003). Examination of the data has led to the conclusion that the site passes the RAGs without further remedial action. In accordance with this evaluation, the confirmatory sampling results support a reclassification of the 100-B-20 site to interim closed out. The analytical results from the soil samples were shown to meet the cleanup objectives for direct exposure, groundwater protection, and river protection.

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APPENDIX A

100-B-20 SAMPLE RESULTS
(10 Pages)

Table A-1. 100-B-20 Confirmatory Sampling Results. (6 Pages)

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium			Boron			Cadmium		
			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
Equipment blank	J10V69	1/19/06	39.8		2.9	0.38	U	0.38	0.32	U	0.32	0.93	C	0.02	0.02	U	0.02	0.25	UJ	0.25	0.46	U	0.46
Soil beneath tank (sample area 1)	J10V70	1/19/06	4580		3.1	0.41	U	0.41	1.5		0.35	52.0	C	0.02	0.24		0.02	1.8		0.28	0.50	U	0.50
Duplicate of J10V70 (sample area 1)	J10V71	1/19/06	5260		3.1	0.41	U	0.41	2.0		0.34	68.1	C	0.02	0.23		0.02	1.7		0.27	0.50	U	0.50
Soil composite west sidewall (sample area 1)	J10V72	1/19/06	5330		3.1	0.41	U	0.41	2.1		0.35	57.1	C	0.02	0.30		0.02	2.2		0.27	0.50	U	0.50
Soil composite east sidewall (sample area 1)	J10V73	1/19/06	7320		3.3	0.43	U	0.43	2.6		0.36	65.3	C	0.02	0.30		0.02	3.7		0.29	0.52	U	0.52
Subsurface stained soils (sample area 2)	J11108	1/19/06	7500		3.3	0.43	U	0.43	2.8		0.37	72.7	C	0.02	0.32		0.02	1.8		0.29	0.53	U	0.53

Sample Location	HEIS Number	Sample Date	Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium		
			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
Equipment blank	J10V69	1/19/06	19.5**	CUJ	1.8	0.49	U	0.49	0.11	U	0.11	0.11	U	0.11	80.0	C	0.93	2.7	U	2.7	6.2		1.3
Soil beneath tank (sample area 1)	J10V70	1/19/06	3840	C	2.0	5.3		0.53	10.7		0.12	15.5		0.12	20000	C	1.0	15.5		2.9	3740		1.4
Duplicate of J10V70 (sample area 1)	J10V71	1/19/06	4240	C	2.0	6.5		0.53	11.2		0.12	15.7		0.12	20700	C	1.0	20.9		2.9	4130		1.4
Soil composite west sidewall (sample area 1)	J10V72	1/19/06	3550	C	2.0	7.7		0.53	9.6		0.12	18.9		0.12	18700	C	1.0	4.0		2.9	4090		1.4
Soil composite east sidewall (sample area 1)	J10V73	1/19/06	3130	C	2.1	12.1		0.56	8.5		0.13	14.0		0.13	21700	C	1.1	7.3		3.0	3920		1.4
Subsurface stained soils (sample area 2)	J11108	1/19/06	3290	C	2.1	9.4		0.56	8.9		0.13	43.3		0.13	20400	C	1.1	8.4		3.1	3950		1.5

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

** The equipment blank results for calcium and silicon have been qualified with a UJ because the reported concentrations are less than 5 times the reported method blank concentrations.

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

B = blank contamination (organic constituents)
C = blank contamination (inorganic constituents)
D = diluted
HEIS = Hanford Environmental Information System
J = estimate
MDA = minimum detectable activity
PQL = practical quantitation limit
Q = qualifier
TPH = total petroleum hydrocarbon
U = undetected

Table A-1. 100-B-20 Confirmatory Sampling Results. (6 Pages)

Sample Location	HEIS Number	Sample Date	Manganese			Mercury			Molybdenum			Nickel			Potassium			Selenium			Silicon		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Equipment blank	J10V69	1/19/06	1.9		0.50	0.02	U	0.02	0.12	U	0.12	1.2	U	1.2	50.9	U	50.9	0.34	U	0.34	31.1**	UJ	0.77
Soil beneath tank (sample area 1)	J10V70	1/19/06	287		0.54	0.02	J	0.02	0.58		0.13	7.9		1.3	758		55.5	0.37	U	0.37	511	C	0.84
Duplicate of J10V70 (sample area 1)	J10V71	1/19/06	347		0.54	0.02	U	0.02	0.56		0.13	8.0		1.3	862		54.7	0.44		0.37	435	C	0.83
Soil composite west sidewall (sample area 1)	J10V72	1/19/06	354		0.54	0.01	U	0.01	0.60		0.13	10.3		1.3	956		54.8	0.37	U	0.37	708	C	0.83
Soil composite east sidewall (sample area 1)	J10V73	1/19/06	242		0.57	0.02	U	0.02	0.39		0.14	10.8		1.4	1600		57.7	0.39	U	0.39	571	C	0.88
Subsurface stained soils (sample area 2)	J11108	1/19/06	289		0.57	0.33	J	0.02	0.51		0.14	10.5		1.4	1290		58.2	0.39	U	0.39	543	C	0.88

Sample Location	HEIS Number	Sample Date	Silver			Sodium			TPH[a]			Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Equipment blank	J10V69	1/19/06	0.13	U	0.13	6.9		2.7				0.08	U	0.08	0.63		0.05
Soil beneath tank (sample area 1)	J10V70	1/19/06	0.14	U	0.14	121		2.9	144	U	144	53.9		0.09	62.3		0.05
Duplicate of J10V70 (sample area 1)	J10V71	1/19/06	0.14	U	0.14	119		2.9	145	U	145	51.6		0.09	67.6		0.05
Soil composite west sidewall (sample area 1)	J10V72	1/19/06	0.14	U	0.14	130		2.9	144	U	144	51.7		0.09	43.9		0.05
Soil composite east sidewall (sample area 1)	J10V73	1/19/06	0.15	U	0.15	127		3.0	150	U	150	51.7		0.10	45.1		0.05
Subsurface stained soils (sample area 2)	J11108	1/19/06	0.15	U	0.15	168		3.0	150	UJ	150	51.9		0.10	326		0.05

[a] The equipment blank was not analyzed for TPH

Table A-1. 100-B-20 Confirmatory Sampling Results.* (6 Pages)

Constituents	J10V70 Soil beneath tank (sample area 1) Sample Date 1/19/06			J10V71 Duplicate of J10V70 Sample Date 1/19/06		
	µg/kg	Q	PQL	µg/kg	Q	PQL
Polychlorinated Biphenyls (PCB)						
Aroclor-1016	15	U	15	14	U	14
Aroclor-1221	15	U	15	14	U	14
Aroclor-1232	15	U	15	14	U	14
Aroclor-1242	15	U	15	14	U	14
Aroclor-1248	15	U	15	14	U	14
Aroclor-1254	15	U	15	14	U	14
Aroclor-1260	8.5	J	15	8.0	J	14
Semivolatile Organic Analysis (SVOA)						
1,2,4-Trichlorobenzene	360	UJ	360	360	UJ	360
1,2-Dichlorobenzene	360	U	360	360	U	360
1,3-Dichlorobenzene	360	U	360	360	U	360
1,4-Dichlorobenzene	360	U	360	360	U	360
2,4,5-Trichlorophenol	910	U	910	900	U	900
2,4,6-Trichlorophenol	360	U	360	360	U	360
2,4-Dichlorophenol	360	U	360	360	U	360
2,4-Dimethylphenol	360	UJ	360	360	UJ	360
2,4-Dinitrophenol	910	UJ	910	900	UJ	900
2,4-Dinitrotoluene	360	U	360	360	U	360
2,6-Dinitrotoluene	360	U	360	360	U	360
2-Chloronaphthalene	360	U	360	360	U	360
2-Chlorophenol	360	U	360	360	U	360
2-Methylnaphthalene	360	UJ	360	360	UJ	360
2-Methylphenol (cresol, o-)	360	U	360	360	U	360
2-Nitroaniline	910	U	910	900	U	900
2-Nitrophenol	360	UJ	360	360	UJ	360
3+4 Methylphenol (cresol, m+p)	360	U	360	360	U	360
3,3'-Dichlorobenzidine	360	U	360	360	U	360
3-Nitroaniline	910	U	910	900	U	900
4,6-Dinitro-2-methylphenol	910	UJ	910	900	UJ	900
4-Bromophenylphenyl ether	360	U	360	360	U	360
4-Chloro-3-methylphenol	360	UJ	360	360	UJ	360
4-Chloroaniline	360	U	360	360	U	360
4-Chlorophenylphenyl ether	360	U	360	360	U	360
4-Nitroaniline	910	U	910	900	U	900
4-Nitrophenol	910	U	910	900	U	900
Acenaphthene	360	U	360	360	U	360
Acenaphthylene	360	U	360	360	U	360
Anthracene	360	U	360	360	U	360
Benzo(a)anthracene	360	U	360	29	J	360
Benzo(a)pyrene	360	U	360	32	J	360
Benzo(b)fluoranthene	360	U	360	35	J	360
Benzo(ghi)perylene	360	U	360	23	J	360
Benzo(k)fluoranthene	360	U	360	35	J	360
Bis(2-chloro-1-methylethyl)ether	360	U	360	360	U	360
Bis(2-Chloroethoxy)methane	360	U	360	360	U	360
Bis(2-chloroethyl) ether	360	U	360	360	U	360
Bis(2-ethylhexyl) phthalate	660	U	660	660	U	660
Butylbenzylphthalate	360	U	360	360	U	360

* TPH results located with inorganic data.

Table A-1. 100-B-20 Confirmatory Sampling Results. (6 Pages)

Constituents	J10V70 Soil beneath tank (sample area 1) Sample Date 1/19/06			J10V71 Duplicate of J10V70 Sample Date 1/19/06		
	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOA (continued)						
Carbazole	360	U	360	360	U	360
Chrysene	360	U	360	31	J	360
Di-n-butylphthalate	360	U	360	360	U	360
Di-n-octylphthalate	360	U	360	360	U	360
Dibenz[a,h]anthracene	360	U	360	360	U	360
Dibenzofuran	360	U	360	360	U	360
Diethylphthalate	360	U	360	360	U	360
Dimethyl phthalate	360	U	360	360	U	360
Fluoranthene	360	U	360	43	J	360
Fluorene	360	U	360	360	U	360
Hexachlorobenzene	360	U	360	360	U	360
Hexachlorobutadiene	360	U	360	360	U	360
Hexachlorocyclopentadiene	360	U	360	360	U	360
Hexachloroethane	360	U	360	360	U	360
Indeno(1,2,3-cd)pyrene	360	U	360	21	J	360
Isophorone	360	UJ	360	360	UJ	360
N-Nitroso-di-n-dipropylamine	360	U	360	360	U	360
N-Nitrosodiphenylamine	360	U	360	360	U	360
Naphthalene	360	U	360	360	U	360
Nitrobenzene	360	U	360	360	U	360
Pentachlorophenol	910	U	910	900	U	900
Phenanthrene	360	U	360	360	U	360
Phenol	360	U	360	360	U	360
Pyrene	360	U	360	40	J	360

Table A-1. 100-B-20 Confirmatory Sampling Results. (6 Pages)

Constituents	J10V72 Soil composite west sidewall (sample area 1) Sample Date 1/19/06			J10V73 Soil composite east sidewall (sample area 1) Sample Date 1/19/06			J11108 Subsurface stained soils (sample area 2) Sample Date 1/19/06		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
Polychlorinated Biphenyls (PCB)									
Aroclor-1016	14	U	14	15	U	15	15	U	15
Aroclor-1221	14	U	14	15	U	15	15	U	15
Aroclor-1232	14	U	14	15	U	15	15	U	15
Aroclor-1242	14	U	14	15	U	15	15	U	15
Aroclor-1248	14	U	14	15	U	15	15	U	15
Aroclor-1254	14	U	14	15	U	15	15	U	15
Aroclor-1260	14	U	14	8.5	J	15	15	U	15
Semivolatile Organic Analysis (SVOA)									
1,2,4-Trichlorobenzene	360	UJ	360	380	UJ	380	380	UJ	380
1,2-Dichlorobenzene	360	U	360	380	U	380	380	U	380
1,3-Dichlorobenzene	360	U	360	380	U	380	380	U	380
1,4-Dichlorobenzene	360	U	360	380	U	380	380	U	380
2,4,5-Trichlorophenol	910	U	910	940	U	940	940	U	940
2,4,6-Trichlorophenol	360	U	360	380	U	380	380	U	380
2,4-Dichlorophenol	360	U	360	380	U	380	380	U	380
2,4-Dimethylphenol	360	UJ	360	380	UJ	380	380	UJ	380
2,4-Dinitrophenol	910	UJ	910	940	UJ	940	940	UJ	940
2,4-Dinitrotoluene	360	U	360	380	U	380	380	U	380
2,6-Dinitrotoluene	360	U	360	380	U	380	380	U	380
2-Chloronaphthalene	360	U	360	380	U	380	380	U	380
2-Chlorophenol	360	U	360	380	U	380	380	U	380
2-Methylnaphthalene	360	UJ	360	380	UJ	380	380	UJ	380
2-Methylphenol (cresol, o-)	360	U	360	380	U	380	380	U	380
2-Nitroaniline	910	U	910	940	U	940	940	U	940
2-Nitrophenol	360	UJ	360	380	UJ	380	380	UJ	380
3+4 Methylphenol (cresol, m+p)	360	U	360	380	U	380	380	U	380
3,3'-Dichlorobenzidine	360	U	360	380	U	380	380	U	380
3-Nitroaniline	910	U	910	940	U	940	940	U	940
4,6-Dinitro-2-methylphenol	910	UJ	910	940	UJ	940	940	UJ	940
4-Bromophenylphenyl ether	360	U	360	380	U	380	380	U	380
4-Chloro-3-methylphenol	360	UJ	360	380	UJ	380	380	UJ	380
4-Chloroaniline	360	U	360	380	U	380	380	U	380
4-Chlorophenylphenyl ether	360	U	360	380	U	380	380	U	380
4-Nitroaniline	910	U	910	940	U	940	940	U	940
4-Nitrophenol	910	U	910	940	U	940	940	U	940
Acenaphthene	360	U	360	380	U	380	380	U	380
Acenaphthylene	360	U	360	380	U	380	380	U	380
Anthracene	360	U	360	380	U	380	380	U	380
Benzo(a)anthracene	360	U	360	380	U	380	380	U	380
Benzo(a)pyrene	360	U	360	380	U	380	380	U	380
Benzo(b)fluoranthene	360	U	360	380	U	380	380	U	380
Benzo(ghi)perylene	360	U	360	380	U	380	380	U	380
Benzo(k)fluoranthene	360	U	360	380	U	380	380	U	380
Bis(2-chloro-1-methylethyl)ether	360	U	360	380	U	380	380	U	380
Bis(2-Chloroethoxy)methane	360	U	360	380	U	380	380	U	380
Bis(2-chloroethyl) ether	360	U	360	380	U	380	380	U	380
Bis(2-ethylhexyl) phthalate	660	U	660	660	U	660	660	U	660
Butylbenzylphthalate	360	U	360	380	U	380	380	U	380

Table A-1. 100-B-20 Confirmatory Sampling Results. (6 Pages)

Constituents	J10V72 Soil composite west sidewall (sample area 1) Sample Date 1/19/06			J10V73 Soil composite east sidewall (sample area 1) Sample Date 1/19/06			J11108 Subsurface stained soils (sample area 2) Sample Date 1/19/06		
	µg/kg	Q	PQL	µg/kg	Q	PQL	µg/kg	Q	PQL
SVOA (continued)									
Carbazole	360	U	360	380	U	380	380	U	380
Chrysene	360	U	360	380	U	380	380	U	380
Di-n-butylphthalate	360	U	360	380	U	380	150	J	380
Di-n-octylphthalate	360	U	360	380	U	380	380	U	380
Dibenz[a,h]anthracene	360	U	360	380	U	380	380	U	380
Dibenzofuran	360	U	360	380	U	380	380	U	380
Diethylphthalate	360	U	360	380	U	380	380	U	380
Dimethyl phthalate	360	U	360	380	U	380	380	U	380
Fluoranthene	360	U	360	380	U	380	380	U	380
Fluorene	360	U	360	380	U	380	380	U	380
Hexachlorobenzene	360	U	360	380	U	380	380	U	380
Hexachlorobutadiene	360	U	360	380	U	380	380	U	380
Hexachlorocyclopentadiene	360	U	360	380	U	380	380	U	380
Hexachloroethane	360	U	360	380	U	380	380	U	380
Indeno(1,2,3-cd)pyrene	360	U	360	380	U	380	380	U	380
Isophorone	360	UJ	360	380	UJ	380	380	UJ	380
N-Nitroso-di-n-dipropylamine	360	U	360	380	U	380	380	U	380
N-Nitrosodiphenylamine	360	U	360	380	U	380	380	U	380
Naphthalene	360	U	360	380	U	380	380	U	380
Nitrobenzene	360	U	360	380	U	380	380	U	380
Pentachlorophenol	910	U	910	940	U	940	940	U	940
Phenanthrene	360	U	360	380	U	380	380	U	380
Phenol	360	U	360	380	U	380	380	U	380
Pyrene	360	U	360	380	U	380	380	U	380

Table A-2. 100-B-20 Waste Characterication Results. (3 Pages)

Sample Location	HEIS Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium			Boron			Cadmium		
			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
Tank contents	J10V68	1/18/06	1100		13.9	16.9		3.0	6.6		2.6	2350	C	0.15	0.08	U	0.08	105	J	2.0	10.8		0.53

Sample Location	HEIS Number	Sample Date	Calcium			Chromium			Cobalt			Copper			Iron			Lead			Magnesium		
			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
Tank contents	J10V68	1/18/06	19600	C	9.0	49.7		1.2	1.4		0.91	165		0.91	9300		24.3	52800	C	2.4	829		10.2

Sample Location	HEIS Number	Sample Date	Manganese			Mercury			Molybdenum			Nickel			Potassium			Selenium			Silicon		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Tank contents	J10V68	1/18/06	90.2	C	0.15	0.15		0.10	4.1		0.99	19.3		0.99	358		68.2	2.7	U	2.7	242	CJ	6.2

Sample Location	HEIS Number	Sample Date	Silver			Sodium			TPH			Vanadium			Zinc		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Tank contents	J10V68	1/18/06	1.1	U	1.1	588		3.6	385000	J	86800	10.7		0.68	4180		0.38

Table A-2. 100-B-20 Waste Characterization Results.* (3 Pages)

Constituents	J10V68 Tank Contents Sample Date 1/18/06		
	µg/kg	Q	PQL
Polychlorinated Biphenyls (PCB)			
Aroclor-1016	530	UJ	530
Aroclor-1221	530	UJ	530
Aroclor-1232	530	UJ	530
Aroclor-1242	530	UJ	530
Aroclor-1248	530	UJ	530
Aroclor-1254	3400	J	530
Aroclor-1260	530	U	530
Semivolatile Organic Analysis (SVOA)			
1,2,4-Trichlorobenzene	330000	UD	330000
1,2-Dichlorobenzene	330000	UD	330000
1,3-Dichlorobenzene	330000	UD	330000
1,4-Dichlorobenzene	330000	UD	330000
2,4,5-Trichlorophenol	820000	UD	820000
2,4,6-Trichlorophenol	330000	UD	330000
2,4-Dichlorophenol	330000	UD	330000
2,4-Dimethylphenol	330000	UD	330000
2,4-Dinitrophenol	820000	UDJ	820000
2,4-Dinitrotoluene	330000	UD	330000
2,6-Dinitrotoluene	330000	UD	330000
2-Chloronaphthalene	330000	UD	330000
2-Chlorophenol	330000	UD	330000
2-Methylnaphthalene	120000	JD	330000
2-Methylphenol (cresol, o-)	330000	UD	330000
2-Nitroaniline	820000	UDJ	820000
2-Nitrophenol	330000	UD	330000
3+4 Methylphenol (cresol, m+p)	41000	JD	330000
3,3'-Dichlorobenzidine	330000	UD	330000
3-Nitroaniline	820000	UDJ	820000
4,6-Dinitro-2-methylphenol	820000	UDJ	820000
4-Bromophenylphenyl ether	330000	UD	330000
4-Chloro-3-methylphenol	330000	UD	330000
4-Chloroaniline	330000	UDJ	330000
4-Chlorophenylphenyl ether	330000	UD	330000
4-Nitroaniline	820000	UDJ	820000
4-Nitrophenol	820000	UDJ	820000
Acenaphthene	330000	UD	330000
Acenaphthylene	330000	UD	330000
Anthracene	330000	UD	330000
Benzo(a)anthracene	330000	UD	330000
Benzo(a)pyrene	330000	UD	330000
Benzo(b)fluoranthene	330000	UD	330000
Benzo(ghi)perylene	330000	UD	330000
Benzo(k)fluoranthene	330000	UD	330000
Bis(2-chloro-1-methylethyl)ether	330000	UD	330000
Bis(2-Chloroethoxy)methane	330000	UD	330000
Bis(2-chloroethyl) ether	330000	UD	330000
Bis(2-ethylhexyl) phthalate	34000	JBD	330000
Butylbenzylphthalate	330000	UD	330000
Carbazole	330000	UD	330000
Chrysene	330000	UD	330000
Di-n-butylphthalate	330000	UD	330000
Di-n-octylphthalate	19000	JD	330000
Dibenz[a,h]anthracene	330000	UD	330000
Dibenzofuran	330000	UD	330000
Diethylphthalate	330000	UDJ	330000
Dimethyl phthalate	330000	UD	330000
Fluoranthene	330000	UD	330000
Fluorene	330000	UD	330000

* TPH results located with inorganic data.

Table A-2. 100-B-20 Waste Characterization Results. (3 Pages)

Constituents	J10V68 Tank Contents Sample Date 1/18/06		
	µg/kg	Q	PQL
SVOA (continued)			
Hexachlorobenzene	330000	UD	330000
Hexachlorobutadiene	330000	UD	330000
Hexachlorocyclopentadiene	330000	UDJ	330000
Hexachloroethane	330000	UD	330000
Indeno(1,2,3-cd)pyrene	330000	UD	330000
Isophorone	330000	UD	330000
N-Nitroso-di-n-dipropylamine	330000	UD	330000
N-Nitrosodiphenylamine	330000	UD	330000
Naphthalene	61000	JD	330000
Nitrobenzene	330000	UD	330000
Pentachlorophenol	820000	UD	820000
Phenanthrene	17000	JD	330000
Phenol	54000	JD	330000
Pyrene	19000	JD	330000
Volatile Organic Analysis (VOA)			
1,1,1-Trichloroethane	30	UJ	35
1,1,2,2-Tetrachloroethane	30	UJ	30
1,1,2-Trichloroethane	30	UJ	30
1,1-Dichloroethane	30	UJ	30
1,1-Dichloroethene	30	UJ	30
1,2-Dichloroethane	21	J	30
1,2-Dichloroethene(Total)	6	J	30
1,2-Dichloropropane	30	UJ	30
2-Butanone	820	JD	1700
2-Hexanone	60	UJ	60
4-Methyl-2-Pentanone	1400	JD	1700
Acetone	1400	JD	1700
Benzene	400	J	60
Bromodichloromethane	30	UJ	30
Bromoform	30	UJ	30
Bromomethane	60	UJ	60
Carbon disulfide	9	J	60
Carbon tetrachloride	30	UJ	30
Chlorobenzene	6	J	30
Chloroethane	60	UJ	60
Chloroform	30	UJ	30
Chloromethane	60	UJ	60
cis-1,2-Dichloroethylene	6	J	60
cis-1,3-Dichloropropene	30	UJ	30
Dibromochloromethane	30	UJ	30
Ethylbenzene	530	J	30
m-Xylene	2200	J	30
Methylenechloride	180	BJ	30
o-Xylene	1100	J	30
Styrene	30	UJ	30
Tetrachloroethene	79	J	30
Toluene	5100	D	840
trans-1,2-Dichloroethylene	30	UJ	30
trans-1,3-Dichloropropene	30	UJ	30
Trichloroethene	9	J	30
Vinyl chloride	60	UJ	60
Xylenes (total)	3200	J	60

Table A-3. 100-B-20 Toxic Characterization Leaching Procedure (TCLP) Waste Characterization.

Sample Location	HEIS Number	Sample Date	Arsenic			Barium			Cadium			Chromium			Lead			Mercury		
			µg/L	Q	MDA	µg/L	Q	MDA	µg/L	Q	MDA	µg/L	Q	MDA	µg/L	Q	MDA	µg/L	Q	MDA
Tank contents	J10V68	1/18/06	42.4		34.0	412	C	2.0	76.6		7.0	18.3		16.0	88100		31.0	1.0	U	1.0

Sample Location	HEIS Number	Sample Date	Selenium			Siver		
			µg/L	Q	MDA	µg/L	Q	MDA
Tank contents	J10V68	1/18/06	36.0	U	36.0	14	U	14.0

APPENDIX B

100-B-20 HAZARD QUOTIENT AND CARCINOGENIC RISK CALCULATION (4 Pages)

CALCULATION COVER SHEET

Project Title 100-B/C Field Remediation **Job No.** 14655
Area 100-B/C
Discipline Environmental ***Calc. No.** 0100B-CA-V0275
Subject 100-B-20 Hazard Quotient and Carcinogenic Risk Calculation
Computer Program Excel **Program No.** Excel 2003

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

Committed Calculation ☒ **Preliminary** ☐ **Superseded** ☐ **Voided** ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Summary = 3 Total = 4	M. J. Appel M J Appel 4/27/06	T. M. Blakley T.M. Blakley 5/2/06	L. M. Dittmer LM Dittmer 5/3/06	R. A. Carlson RA Carlson	5/8/06

SUMMARY OF REVISION

WCH-DE-018 (4/14/06) *Obtain Calc. No. from R&DC and Form from Intranet

Washington Closure Hanford, LLC CALCULATION SHEET

Originator:	M. J. Appel MJA	Date:	7/27/06	Calc. No.:	0100B-CA-V0275	Rev.:	0
Project:	100-B/C Field Remediation	Job No:	14655	Checked:	T. M. Blakley TMB	Date:	8/2/06
Subject:	100-B-20 Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	1 of 3

PURPOSE:

Provide documentation to support the calculation of the hazard quotient (HQ) and carcinogenic (excess cancer) risk for the 100-B-20 Remaining Sites Verification Package (WCH 2006). In accordance with the remedial action goals (RAGs) in *Remedial Design Report/Remedial Action Work Plan for the 100 Areas* (RDR/RAWP) (DOE-RL 2005), 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, 2005, *Remedial Design Report/Remedial Action Work Plan for the 100 Areas,* DOE/RL-96-17, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

2) EPA, 1994, *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children,* EPA/540/R-93/081, Publication No. 9285.7, U.S. Environmental Protection Agency, Washington, D.C.

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

4) WCH, 2006, Waste Site Reclassification Form 2006-019, and Attachment *Remaining Sites Verification Package for the 100-B-20, 1716-B Maintenance Garage Underground Tank,* Washington Closure Hanford, Richland, Washington.

SOLUTION:

1) Generate an HQ for each noncarcinogenic constituent detected above background and compare it to the individual HQ of <1.0 (DOE-RL 2005).

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

3) Generate an excess cancer risk value for each carcinogenic constituent detected above background and compare it to the excess cancer risk of $<1 \times 10^{-6}$ (DOE-RL 2005).

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

Washington Closure Hanford, LLC CALCULATION SHEET

Originator:	M. J. Appel	Date:	4/27/06	Calc. No.:	0100B-CA-V0275	Rev.:	0
Project:	100-B/C Field Remediation	Job No:	14655	Checked:	T. M. Blakley	Date:	5/2/06
Subject:	100-B-20 Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	2 of 3

METHODOLOGY:

Hazard quotient and carcinogenic risk calculations were computed for the 100-B-20 waste site as a whole, using the maximum value for each analyte in the data set of both sample locations. Of the contaminants of potential concern for the site, boron and molybdenum require the HQ and risk calculations because these analytes were detected and a Washington State or Hanford Site background value is not available. Aroclor-1260 and multiple semivolatile analytes (as shown in Table 1, below) are included because they were detected by laboratory analysis and could not be attributed to natural occurrence. An example of the HQ and risk calculations is presented below:

1) For example, the maximum value for boron is 3.7 mg/kg, divided by the noncarcinogenic RAG value of 16,000 mg/kg (boron is identified as a noncarcinogen in WAC 173-340-740[3]), is 2.3×10^{-4}. Comparing this value, and all other individual values, to the requirement of <1.0, this criterion is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ is obtained by summing the individual values. The sum of the HQ values is 8.9×10^{-2}. Comparing this value to the requirement of <1.0, this criterion is met.

3) To calculate the excess cancer risk, the maximum value is divided by the carcinogenic RAG value, then multiplied by 1×10^{-6}. For example, the maximum value for aroclor-1260 is 0.0085 mg/kg; divided by 0.5 mg/kg, multiplied as indicated is 1.7×10^{-8}. Comparing this value, and all other individual values, to the requirement of $<1 \times 10^{-6}$, this criterion is met.

4) After these calculations are completed for the carcinogenic analytes, the cumulative excess cancer risk is obtained by summing the individual values. The sum of the excess cancer risk values is 3.1×10^{-7}. Comparing this value to the requirement of $<1 \times 10^{-5}$, this criterion is met.

RESULTS:

1) List individual noncarcinogens and corresponding HQs >1.0: None
2) List the cumulative noncarcinogenic HQ: 8.9×10^{-2}
3) List individual carcinogens and corresponding excess cancer risk $>1 \times 10^{-6}$: None
4) List the cumulative excess cancer risk: 3.1×10^{-7}.

Table 1 shows the results of the calculations.

Washington Closure Hanford, LLC CALCULATION SHEET

Originator:	M. J. Appel MJA	Date:	4/27/06	Calc. No.:	0100B-CA-V0275	Rev.:	0
Project:	100-B/C Field Remediation	Job No:	14655	Checked:	T. M. Blakley TMB	Date:	5/2/06
Subject:	100-B-20 Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	3 of 3

Table 1. Hazard Quotient and Excess Cancer Risk Results for the 100-B-20, 1716-B Maintenance Garage Underground Tank.

Contaminants of Potential Concern[a]	Maximum Value[a] (mg/kg)	Noncarcinogen RAG[b] (mg/kg)	Hazard Quotient	Carcinogen RAG[b] (mg/kg)	Carcinogen Risk
Metals					
Boron	3.7	16,000	2.3E-04	--	--
Copper	43.3	2,960	1.5E-02	--	--
Lead[d]	20.9	353	5.9E-02	--	--
Molybdenum	0.60	400	1.5E-03	--	--
Zinc	326	24,000	1.4E-02	--	--
Semivolatiles					
Benzo(a)anthracene	0.029	--	--	1.37	2.1E-08
Benzo(a)pyrene	0.032	--	--	0.137	2.3E-07
Benzo(b)fluoranthene	0.035	--	--	1.37	2.6E-08
Benzo(k)fluoranthene	0.035	--	--	13.7	2.6E-09
Benzo(ghi)perylene	0.023	2,400	9.6E-06	--	--
Chrysene	0.031	--	--	137	2.3E-10
Di-n-butylphthalate	0.15	8,000	1.9E-05	--	--
Fluoranthene	0.043	3,200	1.3E-05	--	--
Indeno(1,2,3-cd) pyrene	0.021	--	--	1.37	1.5E-08
Pyrene	0.040	2,400	1.7E-05	--	--
Polychlorinated Biphenyls					
Aroclor-1260	0.0085	--	--	0.5	1.7E-08
Totals					
Cumulative Hazard Quotient:			**8.9E-02**		
Cumulative Excess Cancer Risk:					**3.1E-07**

Notes:
RAG = remedial action goal
-- = not applicable
[a] = From WCH 2006.
[b] = Value obtained from *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] = Value for the noncarcinogen RAG obtained from EPA (1994).

CONCLUSION:

This calculation demonstrates that the 100-B-20 waste site meets the requirements for the hazard quotients and carcinogenic (excess cancer) risk as identified in the RDR/RAWP (DOE-RL 2005).

APPENDIX C

DEPARTMENT OF ECOLOGY CONCURRENCE LETTER
(1 Page)

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99352 • (509) 372-7950

September 27, 2006

Mr. Keith A. Klein
Richland Operations Office
United States Department of Energy
P.O. Box 550, MSIN: A7-50
Richland, Washington 99352

Re: 100-B-20, 1716-B Maintenance Garage Underground Tank, Compliance with Washington Administrative Code 173-360

Dear Mr. Klein:

The Department of Ecology reviewed information provided by the United States Department of Energy (USDOE) for the 100-B-20, 1716-B Maintenance Garage Underground Tank. Washington Administrative Code (WAC) chapter 173-360 is the Underground Storage Tank regulations for tanks holding petroleum substances. Ecology evaluated the information provided by USDOE for those tank regulations. Ecology finds that the 100-B-20, 1716-B Maintenance Garage Underground Tank is no longer a threat to human health or the environment. Therefore, USDOE has no further environmental liability under WAC 173-360. This finding applies only to the 100-B-20, 1716-B Maintenance Garage Underground Tank.

If you have any questions, please contact John Price at 509-372-7921.

Sincerely,

John B Price /for

Cheryl L. Whalen
Cleanup Section Manager
Nuclear Waste Program

cc: Dennis Faulk, EPA
Kevin Bazzell, USDOE
Jeff Shearer, FH
Dru Butler, WCH
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Todd Martin, HAB
Ken Niles, ODOE
Administrative Record: 100-BC, Underground Storage Tanks