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Revision 0

Response Action Report for 200-MG-1 Operable Unit Waste Site 600-36

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

U.S. DEPARTMENT OF ENERGY

Richland Operations Office

P.O. Box 550
Richland, Washington 99352

Approved for Public Release;
Further Dissemination Unlimited

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Title: *Response Action Report for 200-MG-1 Operable Unit Waste Site 600-36*

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U.S. Department of Energy, Richland Operations Office

Signature

Date 5/20/11

Executive Summary

This response action report documents the successful completion of the removal action conducted at the 600-36 waste site, Ethel Railroad Siding. The alternative proposed in DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites* (EE/CA)[1] and selected in DOE/RL-2009-48, *Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit* (Action Memorandum)[2] was confirmatory sampling/no further action (CS/NFA).

Waste Site 600-36 was investigated between August 2009 and September 2010 through field observations and sampling to determine the nature and extent of contaminants of potential concern (COPCs) present in the waste site soils as part of the selected removal action alternative of CS/NFA prescribed in the Action Memorandum. Visual inspections and soil samples were collected from the 600-36 waste site between the months of August 2009 and September 2010. This investigation was performed in accordance with DOE/RL-2009-60, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*[3] and DOE/RL-2009-53, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit*[4]. Through the investigation summarized in this report, it was found that analytical results from confirmatory sampling demonstrated that soil conditions at the waste site did not meet removal action levels (RALs). Therefore, in accordance with the methodology prescribed in the Action Memorandum, the alternative was changed to removal, treatment, and disposal (RTD). Verification sampling conducted after RTD activities confirmed that the waste site achieved compliance with RALs and, therefore, met the established removal action objectives.

The analytical results demonstrate that the residual soil concentrations of COPCs support reasonably anticipated future land use recognized in the EE/CA and Action

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[1] DOE/RL-2008-44, 2009, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, Rev. 0, U. S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www2.hanford.gov/arpir/?content=findpage&AKey=0096350.

[2] DOE/RL-2009-48,2009, *Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0096131.

[3] DOE/RL-2009-60, 2009, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=1003290272.

[4] DOE/RL-2009-53, 2009, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0912100290.

Memorandum (for the purposes of this interim action, RAOs were selected that would support unrestricted land use). The analytical results also support reclassification to "interim closed out" status in accordance with the process described in RL-TPA-90-0001, *Tri-Party Agreement Handbook Management Procedures,* Guideline Number TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)."[5]. No institutional controls are required because there is no deep vadose zone contamination associated with the 600-36 waste site.

This waste site and the data obtained from the subject sampling evolutions will be included in the risk assessment and remedial investigation/feasibility study for final remedial decisions of the Outer Area.

[5] RL-TPA-90-0001, 2007, *Tri-Party Agreement Handbook Management Procedures,* Guideline Number TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)," Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/hanford/files/TPA-MP14.pdf.

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Terms

bgs	below ground surface
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COPC	contaminant of potential concern
CS/NFA	confirmatory sampling/no further action
DOE	U.S. Department of Energy
DQA	data quality assessment
Ecology	Washington State Department of Ecology
EE/CA	*Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*
EPA	U.S. Environmental Protection Agency
HEIS	Hanford Environmental Information System
NA	not applicable
NPL	National Priorities List
O&M	operations and maintenance
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
RAL	removal action level
RAO	removal action objective
RAWP	*Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit*
RDL	required detection limit
RI/FS	remedial investigation/feasibility study
ROD	record of decision
RTD	removal, treatment, and disposal
SAP	*Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*
TPH	total petroleum hydrocarbon

Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
VSP	Visual Sample Plan
WIDS	Waste Information Data System
ZPC	zone of potential contamination

1 Introduction

This report documents the successful completion of a non-time-critical removal action conducted at the 600-36 waste site. The removal action alternative confirmatory sampling/no further action (CS/NFA) was selected for this waste site, proposed in the DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites* (EE/CA), and ultimately authorized by the DOE/RL-2009-48, *Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit* (Action Memorandum). Analytical results from samples collected during the CS/NFA evolution demonstrated that the waste site did not achieve compliance with the removal action levels (RALs). Using the methodology prescribed in the Action Memorandum, based on the CS/NFA results, the alternative was changed to removal, treatment, and disposal (RTD). This report documents the successful completion of the RTD action performed at the 600-36 waste site. This documentation has been prepared based on U.S. Environmental Protection Agency (EPA) guidance provided in EPA/540/R-98/016, *Close Out Procedures for National Priorities List Sites* (EPA 2000a).

This report provides a summary of the actions taken and resulting data to support a determination that, through performance of the RTD alternative, conditions remaining at the 600-36 waste site have achieved the established RALs and have met the removal action objectives (RAOs) provided in the Action Memorandum for the 600-36 Waste Site. The documentation process is consistent with the U.S. Department of Energy's (DOE's) *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) and the *Remedial Action Site Closure Guidance* (DOE, 2010).

Statutory authority for the action taken is in accordance with CERCLA (as amended by the *Superfund Amendments and Reauthorization Act of 1986)*, Executive Order 12580, the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989), also known as the Tri-Party Agreement, and 40 Code of Federal Regulations 300,"National Oil and Hazardous Substances Pollution Contingency Plan."

In October 2010, the non-time-critical removal action for the 600-36 Waste Site was completed in accordance with DOE/RL-2009-53, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit* (RAWP). This report provides the following information relative to the completion of the subject removal action:

- Background, historical information, regulatory enforcement history, and environmental setting pertinent to this removal action.
- A description of the selected alternative, RAOs, and exposure and land use assumptions provided in the related regulatory documents.
- A summary of the completed actions, the resulting data collected in support of completion of that removal action, a comparison of that data against objectives, and demonstration that RAOs have been met.

1.1 Site Description

General information on the Hanford Site and the 200-MG-1 Operable Unit (OU) provides a background of the 600-36 waste site and the development of the removal action for the 600-36 waste site and is described in the subsections that follow.

1.1.1 Hanford General Site Information

The Hanford Site, which is part of the DOE nuclear weapons complex, occupies approximately 1,517 km^2 (586 mi^2) along the Columbia River in Benton County, northwest of the City of Richland in the Lower Columbia Basin in southeastern Washington State (Figure 1-1). From the early 1940s to approximately 1989, the Hanford Site mission included building the world's first large-scale plutonium production facility, and until the 1980s, the site was used to produce plutonium for nuclear weapons. Other activities included nuclear research, development, and nuclear materials production. These activities created a wide variety of chemical and radioactive wastes that were released into the environment. The Hanford Site mission is now focused on the cleanup of those wastes and ultimate closure of the Hanford Site.

1.1.2 200-MG-1 Operable Unit

The Washington State Department of Ecology (Ecology), DOE and EPA created the 200-MG-1 OU through the Tri-Party Agreement Milestone M-015-06-02 and Tri-Party Agreement Change Request C-06-02 (Ecology et al., 1989). The 200-MG-1 OU is made up of waste sites in the 200 East and 200 West Areas, and the 600 Area of the Hanford Site. The 600 Area encompasses those areas south of the Columbia River, that are not part of another designated area (that is, 300 Area, 200 East Area, and 100 K), and are not specifically identified (Figure 1-1). The 200-MG-1 OU waste sites consist of French drains, trenches, cribs, ditches, and retention basins with shallow contamination (generally less than 4.6 m [15 ft] deep) where chemical and radioactive contaminants were released during material transfers (i.e., unplanned release sites). Additionally, some 200-MG-1 OU sites were produced by airborne dissemination of radioactive particles, or biodegradation and dispersion of plant or animal matter. For those sites containing radionuclides, the radionuclide inventory for this conceptual model group does not include transuranic isotopes greater than or equal to 100 nCi/g.

All of the waste sites contained in the 200-MG-1 OU are located within the Central Plateau, as specified in the EE/CA and Action Memorandum. The 600-36 waste site is located approximately 1.6 km (1 mi) northeast of the 200 West Area (Figure 1-2).

1.2 Regulatory and Enforcement History

As discussed in Section 1, statutory authority for this removal action is taken in accordance with CERCLA. Further governing requirements for compliance with CERCLA and the *Resource Conservation and Recovery Act of 1976* activities at the Hanford Site are in accordance with the Tri-Party Agreement (Ecology et al., 1989). The Hanford Site was proposed for inclusion in 53 FR 23988, "National Priorities List for Uncontrolled Hazardous Waste Sites – Update 7"hereafter referred to as the National Priorities List (NPL), and was placed on the NPL on November 3, 1989 (54 FR 41015, "National Priorities List for Uncontrolled Hazardous Waste Sites – Final Rule 10/04/89," October 4, 1989) by the EPA. The EPA placed the four aggregate areas (i.e., the 100, 200, 300, and 1100 Areas) on the NPL. The 200 Area NPL site consists of the 200 West Area and 200 East Area, which contain waste management facilities and inactive irradiated-fuel reprocessing facilities. The site also includes the 200 North Area, formerly used for interim storage and staging of irradiated fuel, and the waste sites assigned to the 200-MG-1 OU.

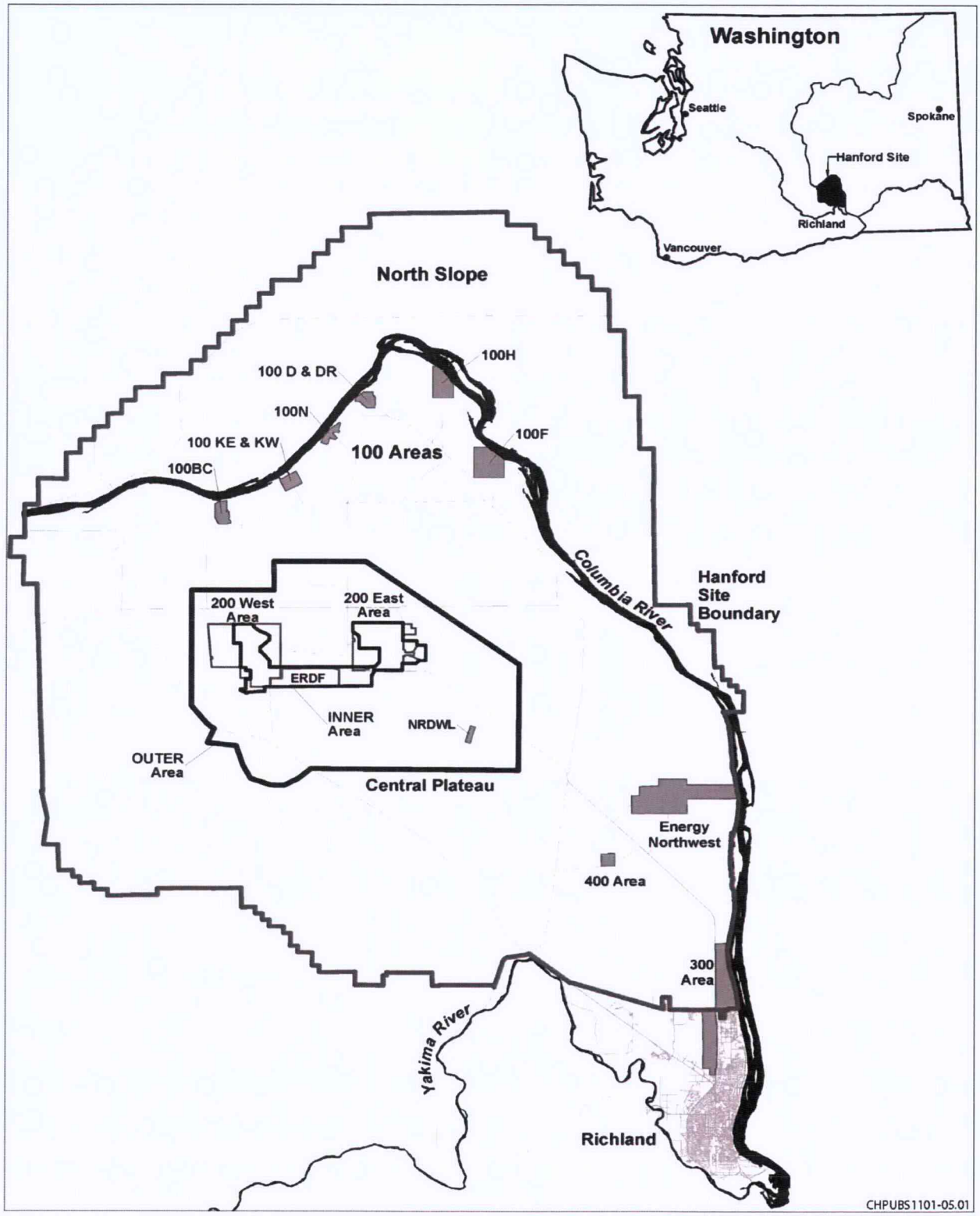

Figure 1-1. Location of the Hanford Site in Washington State

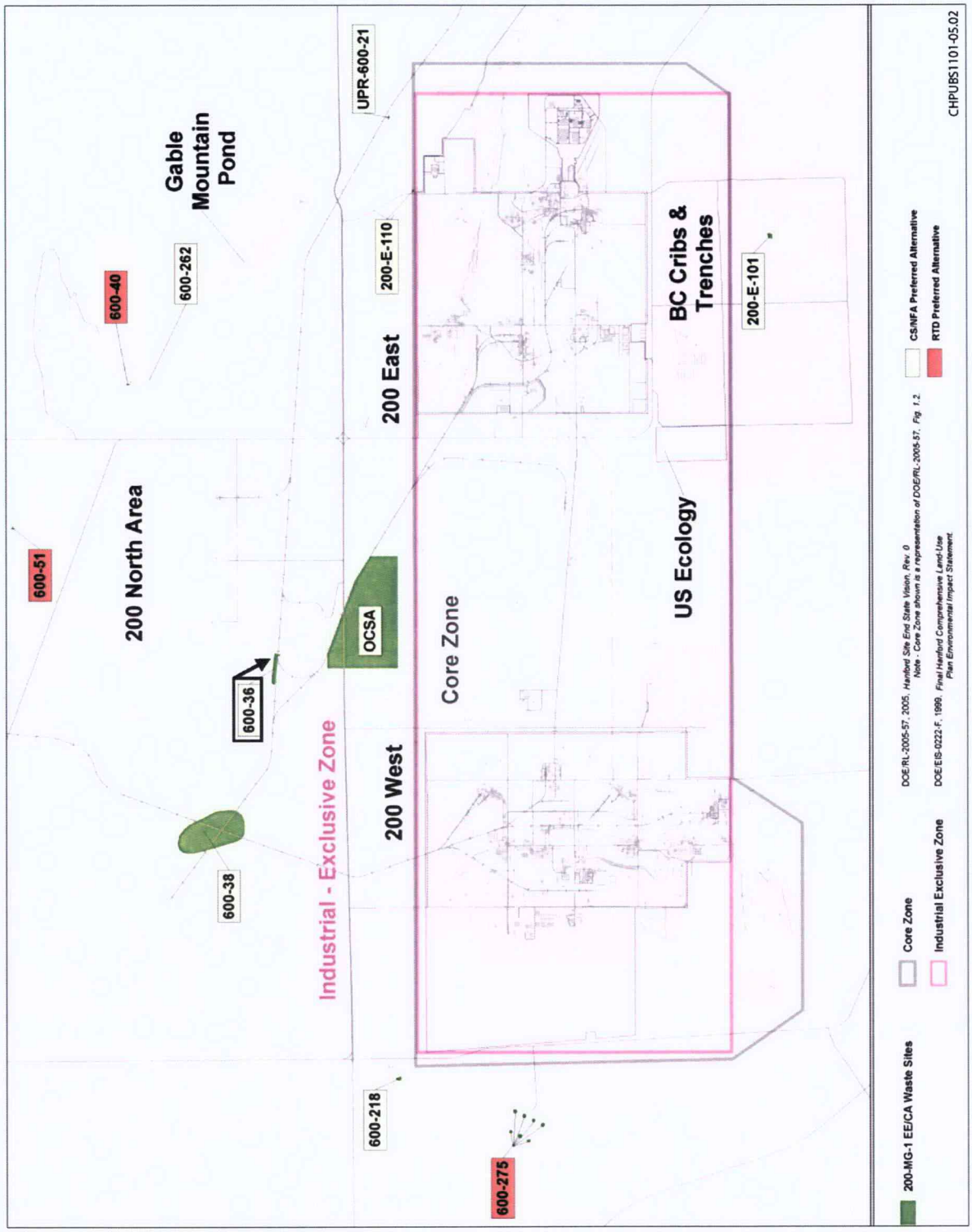

Figure 1-2. 200-MG-1 Operable Unit and Waste Site 600-36

1.3 Environmental Setting

The Hanford Site is located within the semiarid Pasco Basin in the northern portion of the Columbia Plateau. Normal annual precipitation is 17.7 cm (7 in.). According to PNL 10285, *Estimated Recharge Rates at the Hanford Site*, there is an estimated 2.6 to 17.3 mm (0.1 to 0.7 in.) per year of recharge in the 100 Area. Bedrock beneath the site is basalt of the Columbia River Basalt group.

The Ringold Formation and the Hanford formation cover the basalt throughout the Central Plateau. Poorly consolidated, river-deposited, well-drained sands, gravels, cobbles, and boulders dominate these units. The Ringold Formation is an interstratified sequence of unconsolidated clay, silt, sand, and gravel-to-cobble sediment deposited by the ancestral Columbia River. The Hanford formation consists of uncemented gravels, sands, and silts deposited by Pleistocene cataclysmic floodwaters. Groundwater from the Hanford Site discharges to the Columbia River, the dominant surface water body of the Hanford Site. The direction of groundwater flow beneath the Central Plateau is toward the east-northeast. Columbia River usage includes production of hydroelectric power, irrigation, drinking water, recreation, and natural resources.

The average depth from ground surface to groundwater beneath the 200 Area ranges from 50 m (164 ft) to greater than 100 m (328 ft). Additional details on the geology and hydrogeology underlying the 200 Area and the 200-MG-1 OU are not provided in the base response action documents because the 200-MG-1 OU was created for shallow zone (less than 4.6 m [15 ft] in depth) waste sites which are assumed not to be a threat to groundwater quality. This assumption is based on historical and process knowledge regarding the volumes of liquids discharged, the lack of mobility of contaminants, and the shallow depths of the discharge(s).

The nearest natural surface water body to the 600-36 waste site is West Lake (the 216-N-8 Pond) located approximately 4.2 km (2.6 mi) northeast, where the water table is relatively shallow, located approximately 3.7 m (12 ft) below ground surface (bgs). The potential for natural groundwater recharge within the 200 North Area is limited to precipitation infiltration. Estimates of recharge from precipitation at the Hanford Site range from 0 to 10 cm (0 to 4 in.) per year.

2 Waste Site Background

This section provides a description of the 600-36 waste site, information on process and background, describes the selected alternative, and delineates the RAOs and cleanup standards applicable to this removal action as prescribed in the Action Memorandum.

2.1 Waste Site 600-36 Background

The 600-36 waste site is located north of the 200 East and 200 West Areas, adjacent to the railroad (Figure 2-1). The waste site was established and entered into the Waste Information Data System (WIDS) database in 1993 due to the presence of debris and observed evidence of burning which suggested a potential for the release of contaminants into the soil. WIDS identifies this site as an area measuring approximately 396.2 by 36.6 m (1,300 ft by 120 ft). A site walk down conducted in 1997 indicated the presence of devegetated areas and a burn pit with scattered scrap metal near the west end of the 600-36 waste site. Additionally, degraded batteries and metal canisters of nuts and bolts were observed south of the railroad tracks within the eastern portion of the waste site.

Metal and wood debris were observed during the visual inspection performed in August 2009. The previously documented batteries and burn pit were also observed. Visual indicators of the burn pit included a circular area approximately 9.1 m (30 ft) in diameter. Several discrete areas of surface discoloration and devegetation were observed in the eastern portion of the waste site. Historical information suggests the discolored areas may have been caused by a release of oil into the ground surface; however, there is no additional documentation to confirm this information. Tar-like deposits not previously identified were also encountered towards the western portion of the waste site. No visual or documentary evidence exists that stabilizing material was applied to the site. The only existing structures are railroad tracks.

The release mechanism for this waste site is documented as miscellaneous dumping of debris. The debris and waste matrix was primarily solid in nature though small discrete releases of liquids may be a potential component of the waste matrix as well. The current form of all waste material is solid. No evidence exists (historical or present) that chemical or radiological processes involving sustained releases of materials are associated with this waste site.

2.2 Description of the Selected Alternative

As stated in the EE/CA and Action Memorandum, the selected alternative for the subject waste site was CS/NFA. This alternative was selected because, due to historical and process knowledge, contaminants of potential concern (COPCs) were not expected to exceed the RALs. Initial sampling and analysis did not confirm that soil COPC concentrations were less than RALs without the need for further action. As a result, in accordance with the Action Memorandum, the alternative was changed to RTD. Activities involved in the RTD action set forth in the RAWP and DOE/RL-2009-60, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites* (SAP) include soil excavation and verification sampling to demonstrate that the remaining residual soil COPC concentrations are less than or equal to established RALs, and that no additional removal action is required.

The general removal action sampling design criteria are provided in this section, followed by a summary of removal action history, specific sampling design and methodology, and analytical results for the 600-36 waste site.

Figure 2-1. 600-36 Waste Site

The following key features relevant to the 600-36 waste site were considered during the development of a sample design:

- Direct visual inspection of the site surface was performed, using available site information as a guide for visual cues such as staining, discoloration, absence of vegetation, and other anomalies.
- Radiological field screening performed at the surface of the waste site to provide an indication of the presence of radiological COPCs.
- Both focused and random sampling per the methodology prescribed in the SAP. The use of a focused or judgmental methodology based on process knowledge and visual indicators was appropriate for the

initial sampling evolution. Judgmental and random samples collected from the areas of excavation were considered appropriate for the verification sampling evolution.

Based on these key design features, soil samples were collected from the 600-36 waste site and analyzed for COPC concentrations. Evaluation of the initial sampling analytical results demonstrated that concentrations of COPCs were greater than the RALs, resulting in the implementation of the RTD alternative. Under this alternative, soils were removed from the impacted areas, and a verification sampling evolution was conducted, the results of which confirmed that remaining residual COPC concentrations in soil were less than or equal to the RALs. The maximum concentrations for each COPC from the verification sampling analytical data are provided in Table 5-2. Tables A-1 through A-3 provide detailed summaries of all the analytical data results for sampling conducted at the 600-36 waste site (Appendix A).

Personnel with current training and qualifications performed field radiological surveying of the samples and sampling locations during the sampling evolutions. Survey methods and practices were performed in accordance with established contractor procedures and protocols. Radiological surveys performed for the 600-36 waste site resulted in no radiological dose readings greater than measured background and no radiological contamination was found.

2.2.1 Removal Action Objectives

The removal alternatives for the 200-MG-1 OU waste sites were evaluated based on their overall ability to protect human health and the environment and their effectiveness in maintaining both short-term and long-term protection. The selected alternative must meet the following RAOs established in the Action Memorandum:

- **RAO 1**—Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with nonradiological constituents to 4.6 m (15 ft) bgs at concentrations above the appropriate RALs.
- **RAO 2**—Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with radiological constituents to 4.6 m (15 ft) bgs at concentrations above the appropriate RALs.
- **RAO 3**—Control the sources of groundwater contamination to minimize impacts to groundwater resources, protect the Columbia River from adverse impacts, and reduce the degree of groundwater cleanup that may be required under future action.
- **RAO 4**—Prevent adverse impacts to cultural resources and threatened or endangered species, and minimize wildlife habitat disruption.

The RALs for the waste sites identified in the Action Memorandum are based on the RAOs noted above. These RALs are based on attainment of acceptable levels of human health, ecological risk, and protection of groundwater, but are not less than background levels or detection limits for waste sites. Attainment of RALs is intended to meet the first three RAOs and is expected to satisfy the remedial action objectives established in the final record of decision (ROD). The fourth RAO is met through cultural and ecological reviews performed before starting removal action activities. The RALs applicable to the 600-36 waste site are listed in Table 2-1. The attainment of RALs and RAOs is provided in Section 5 of this report.

Table 2-1. Nonradiological Removal Action Levels

Contaminant of Potential Concern	Background Concentration[a] (mg/kg)	Direct Exposure[b] (mg/kg)	Groundwater Protection[c] (mg/kg)	Required Detection Limit (mg/kg)	Removal Action Levels (mg/kg)
Antimony	5	32	5.4	0.6	5.4
Arsenic	6.5	6.5[d]	6.5[d]	1.0	6.5[d]
Barium	132	16,000	1,650	2	1,650
Beryllium	1.51	160	63.2	0.5	63.2
Boron	NA	16,000	210	2	210
Cadmium	0.81	80	0.81[d]	0.5	0.81[d]
Chromium Total	18.5	120,000	2,000	1	2,000
Chromium (VI)	NA	240	NA[e]	0.5	NA[e]
Cobalt	15.7	24	15.7[d]	2	15.7[d]
Copper	22.0	3,200	284	1	284
Lead	10.2	250	3,000	5	250
Lithium	33.5	160	192	2.5	160
Manganese	512	3,760	512[d]	5	512[d]
Mercury	0.33	24	2.09	0.2	2.09
Nickel	19.1	1,600	130	4	130
Selenium	0.78	400	5.2	1	5.2
Silver	0.73	400	13.6	0.2	13.6
Strontium	NA	48,000	2,920	1	2,920
Tin	NA	48,000	48,000	10	48,000
Uranium (Soluble Salts)	3.21	240	3.21[d]	1	3.21[d]
Vanadium	85.1	560	2,240	2.5	560
Zinc	67.8	24,000	5,970	1	5,970
PCB Aroclor 1016	NA	0.5	0.094	0.017	0.094
PCB Aroclor 1221	NA	0.5	0.017[d]	0.017	0.017[d]
PCB Aroclor 1232	NA	0.5	0.017[d]	0.017	0.017[d]
PCB Aroclor 1242	NA	0.5	0.039	0.017	0.039
PCB Aroclor 1248	NA	0.5	0.039	0.017	0.039
PCB Aroclor 1254	NA	0.5	0.066	0.017	0.066
PCB Aroclor 1260	NA	0.5	0.72	0.017	0.5

Table 2-1. Nonradiological Removal Action Levels

Contaminant of Potential Concern	Background Concentration[a] (mg/kg)	Direct Exposure[b] (mg/kg)	Groundwater Protection[c] (mg/kg)	Required Detection Limit (mg/kg)	Removal Action Levels (mg/kg)
Acenaphthene	NA	4,800	98	0.33	98
Acenaphthylene	NA	4,800	98	0.33	98
Anthracene	NA	24,000	2,270	0.33	2,270
Benzo(a)anthracene	NA	1.37	0.86	0.33	0.86
Benzo(a)pyrene	NA	0.137	2.33	0.33	0.33[d]
Benzo(b)fluoranthene	NA	1.37	2.95	0.33	1.37
Benzo(g,h,i)perylene	NA	2,400	25,700	0.33	2,400
Benzo(k)fluoranthene	NA	1.37	21.5	0.33	1.37
Chrysene	NA	13.7	9.56	0.33	9.56
Dibenz(a,h)anthracene	NA	1.37	4.29	0.33	1.37
Fluoranthene	NA	3,200	631	0.33	631
Fluorene	NA	3,200	101	0.33	101
Indeno(1,2,3-cd)pyrene	NA	1.37	8.33	0.33	1.37
Naphthalene	NA	1,600	4.46	0.33	4.46
Phenanthrene	NA	24,000	1,140	0.33	1,140
Pyrene	NA	2,400	655	0.33	655
Nitrate (as Nitrogen)	11.8	128,000	40	0.75	40
TPH Diesel[b,c]	NA	2,000	2,000	5	2,000
TPH Kerosene[b,c]	NA	2,000	2,000	5	2,000

a. If Hanford Site-specific background data are not available, values are then taken from *Natural Background Soil Metals Concentrations in Washington State* (Ecology Publication 94-115). Hanford Site background values are available from nonradiological background data in *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE/RL-92-24), Table D9-2.

b. The direct-contact values were obtained from "Model Toxics Control Act—Cleanup," "Tables" (WAC 173-340-900), Table 740-1.

c. The groundwater protection values were obtained using equations provided in "Deriving Soil Concentrations for Ground Water Protection" (WAC 173-340-747(4)) with the physical parameters obtained from http://www.ecy.wa.gov/.

d. Where cleanup levels are less than background or RDLs, cleanup levels default to background or RDLs in accordance with "Overview of Cleanup Standards" (WAC 173-340-700(6)(d)) and "Analytical Considerations" WAC 173-340-707(2), respectively.

e. Based on process knowledge, chromium (VI) is not expected to be present at 200-MG-1 OU Waste Sites. The following values are given to help guide cleanup:

- 0.2 mg/kg is a calculated value using a distribution coefficient of 0, based on *Hanford Contaminant Distribution Coefficient Database and Users Guide* (PNNL-13895) and "Deriving Soil Concentrations for Groundwater Protection" (WAC 173-340-747), equation 747-1.

Table 2-1. Nonradiological Removal Action Levels

Contaminant of Potential Concern	Background Concentration[a] (mg/kg)	Direct Exposure[b] (mg/kg)	Groundwater Protection[c] (mg/kg)	Required Detection Limit (mg/kg)	Removal Action Levels (mg/kg)

- 2.1 mg/kg is based on *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE/RL-96-17).
- 18.4 mg/kg is based on Cleanup Levels and Risk Calculations database (Ecology, 2007).

Ecological screening values, based on "Model Toxics Control Act—Cleanup," "Tables" (WAC 173-340-900), Table 749-3, are used for screening purposes only, and are not considered cleanup levels for this CERCLA removal action (described more fully in Section 5 of the Action Memorandum). If analytical results exceed the ecological screening values, the results will be further evaluated during the final ecological risk assessment in accordance with the remedial investigation/feasibility study (RI/FS) for the Central Plateau in order to make final cleanup decisions.

2.2.2 Exposure and Land-Use Assumptions

The 600-36 waste site is located within the Central Plateau, as discussed in more detail in the EE/CA and Action Memorandum for the 200-MG-1 OU. Land use for the Central Plateau is designated for reasonably anticipated future uses described in the EE/CA and Action Memorandum (for the purposes of this interim action, RAOs were selected that would support unrestricted use).

2.2.3 Design Summary

The CS/NFA action alternative was the selected alternative for the 600-36 waste site. Sampling and analysis indicated that concentrations of COPCs in the waste site soils were greater than the RALs. Based on those analytical results, and per the methodology prescribed in the Action Memorandum, the alternative progressed to RTD. Following removal of the impacted soil, verification sampling was conducted to confirm that residual concentrations of COPCs in soil were less than or equal to the RALs. The sampling objectives for the 600-36 waste site included visual inspection and collection of discrete soil samples from the waste site as described in Section 3.1 of this report. Key features of the site-specific sampling design for the 600-36 waste site included the following:

- Direct visual inspection of the site surface was performed, using available site information as a guide for visual cues such as staining, discoloration, absence of vegetation, and other anomalies.
- Radiological field screening was performed at the surface of the waste site to provide an indication of the presence of radiological COPCs.
- Both focused and random sampling was performed per the methodology prescribed in the SAP. The use of a focused or judgmental methodology based on process knowledge and visual indicators was appropriate for the initial sampling evolution. Judgmental and random samples collected from the areas of excavation were considered appropriate for the verification sampling evolution.

2.3 Decision Document Amendments, Significant Differences, or Waivers

No amendments to the EE/CA or Action Memorandum, or technical impracticability waivers were associated with this removal action.

3 Response Activity Summary

As stated in the EE/CA and Action Memorandum, the selected alternative for the 600-36 waste site was CS/NFA. The results of the initial sampling indicated COPC concentrations greater than the RALs in the six sampled areas (further details are provided in the text below). Per the provisions of the Action Memorandum, the removal action activities progressed to implementation of the RTD alternative for those areas. Upon completion of RTD activities, verification sampling was conducted to demonstrate that concentrations of COPCs in soil at the 600-36 waste site were less than or equal to the RALs, thus demonstrating that the RAOs were met.

3.1 Summary of Activities

The removal action at the 600-36 waste site was conducted between September 2009 and September 2010 and included the collection of focused and random samples from locations within the waste site, as specified in Section 2.2, and per the methodologies prescribed in the SAP. The following key activities were pertinent to the removal action at the 600-36 waste site:

- Collection of judgmental soil samples based on visual indicators.
- Excavation of soil under the RTD alternative in zones of potential contamination (ZPCs) 2 and 4, and focused sample (FS) locations FS 1, FS 2, FS 3, and FS 5 as a result of analytical results exceeding the RALs. Excavation of soil at FS 4, which was considered analogous to FS 1, FS 2, and FS 3 based on visual indicators.
- Collection of random samples from excavated areas for verification purposes, laboratory analysis for COPCs, and evaluation of analytical results to demonstrate achievement of RALs.

3.1.1 Waste Site 600-36 Confirmatory Sampling

A site evaluation was performed on August 19, 2009 prior to performance of the initial sampling evolution. This evaluation served to support job planning as well as completion of the visual inspection component of the sampling activities described in the SAP. The visual inspection incorporated observational indicators and historical information to identify ZPCs and FS locations within the waste site boundary (Figure 3-1). Observations made during the site walk down included areas of devegetation, areas of discolored soil, and scattered debris consisting of degraded batteries, tar deposits, and metal, as well as evidence of a burn pit. Based on these observations, two individual ZPCs and five FS locations were established at the 600-36 waste site to facilitate an organized removal approach.

For radiological field screening at the 600-36 waste site, survey methods and practices were performed in accordance with established contractor procedures and protocols by personnel with current training and qualifications. No radiological postings were present at the waste site. Of the radiological surveys performed during removal action activities, no radiological readings were greater than the measured background and no radiological contamination was found. The site was confirmed to be a nonradiological site and the radiological COPCs were eliminated from the list of analytes to be included in laboratory analysis.

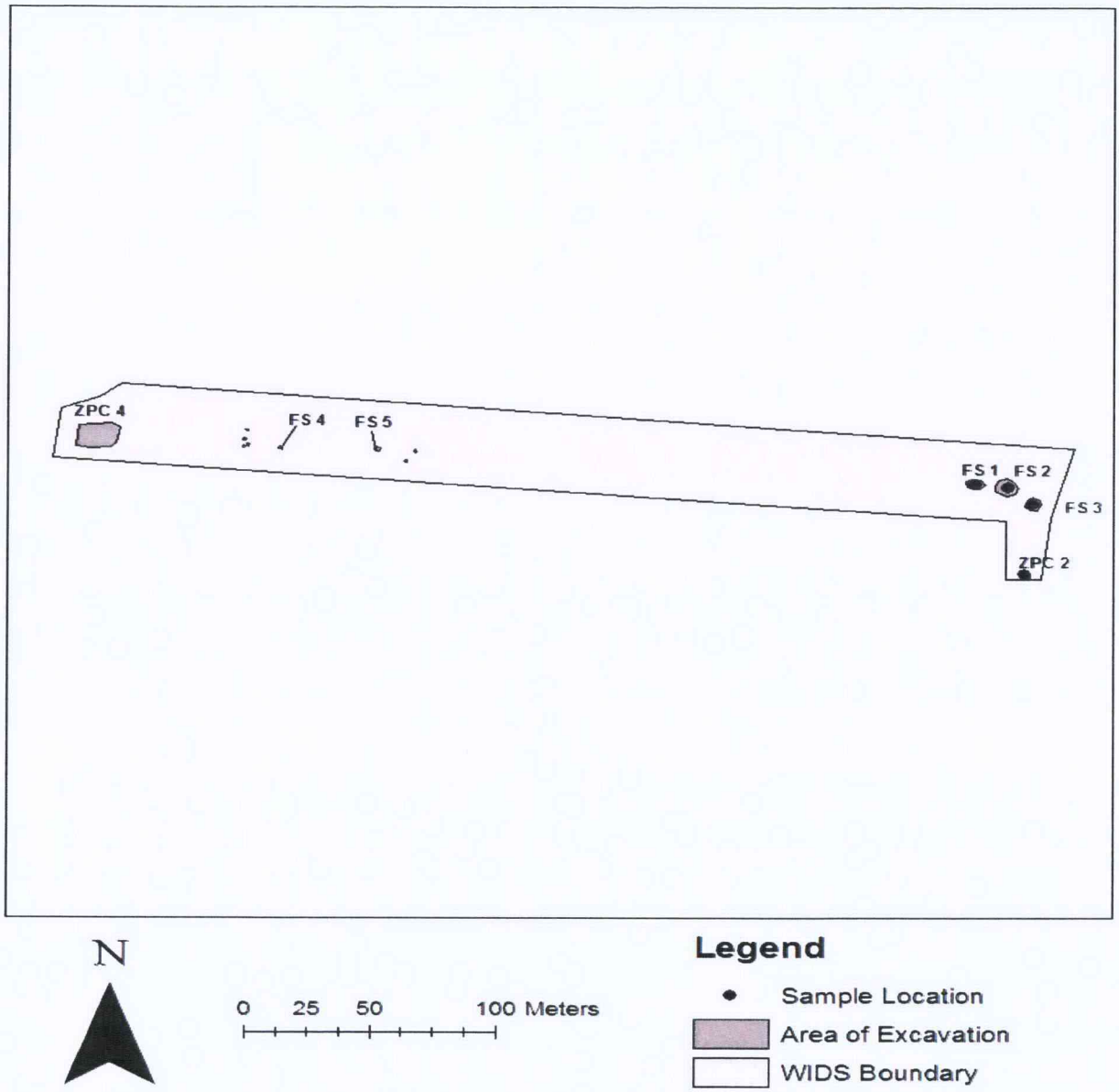

Figure 3-1. ZPCs and FS Locations at the 600-36 Waste Site

Initial soil sampling and analysis was completed in September 2009 at the two ZPCs and four of the five FS locations established during the site evaluation. Samples were collected at the surface (0 to 0.1 m [0 to 0.3 ft]) and at 0.3 m (1 ft). One worst-case location was selected as a representative sampling location for the ZPCs with multiple, similarly impacted areas.

The initial sampling evolution at the 600-36 waste site indicated concentrations of COPCs greater than the RALs at the following areas:

- FS 1, FS 2, FS 3—Stained and devegetated areas, which contained polynuclear aromatic hydrocarbon (PAH) concentrations greater than RALs at the surface and 0.3 m (1 ft) depth. Based on visual indicators observed at FS 4, it is considered analogous to FS 1, FS 2, and FS 3.

- ZPC 2—The area containing batteries contained cadmium at a concentration greater than the RALs at the surface.
- FS 5—PAH concentrations greater than the RALs were found in soil located in the area containing the observed tar-like deposits.
- ZPC 4—The burn pit area contained metal concentrations greater than the RALs at the surface and at 0.3 m (1 ft) depth.

A detailed summary of initial sampling analytical results can be found in Table A-1 (Appendix A).

3.1.2 Waste Site 600-36 Excavation

The results of initial sampling indicated that COPC concentrations were greater than the RALs in the two ZPCs and four of the five FS locations identified during site evaluation. As specified in the RAWP, the RTD alternative was implemented in those areas, as well as at FS 4, followed by a verification sampling evolution to confirm that the residual concentrations of COPCs in soil in the excavated areas are less than or equal to the RALs, therefore demonstrating achievement of the RAOs. Excavation at the 600-36 waste site commenced on January 18, 2010 and was completed on August 31, 2010.

- FS 1, FS 2, and FS 3—The extent of excavation at these FS locations was determined visually. Soil removal occurred to a total depth of approximately 1 m (3 ft) and was laterally bounded by the observed devegetated area.
- ZPC 2—The lateral and vertical extents of excavation at ZPC 2 were clearly defined by the batteries, which were removed along with the impacted soil to an approximate depth of 0.3 m (1 ft).
- FS 4—FS 4 was an observed stained/devegetated area that was analogous to FS 1, FS 2, and FS 3, which was excavated during RTD activities based on analytical results greater than RALs reported for FS 1, FS 2, and FS 3. The lateral extent of excavation was determined visually by the area of devegetation; soil was removed to an approximate vertical depth of 1.2 m (4 ft) bgs.
- FS 5—FS 5 was comprised of, and considered analogous to, several minor discontinuous surface deposits of a tar-like substance observed near the west end of the 600-36 waste site. Excavation of the tar-like deposits was conducted to a vertical extent of approximately 0.6 m (2 ft) bgs.
- ZPC 4—Soil removed from ZPC 4 was determined visually, in conjunction with analytical data from in-process samples collected during RTD activities, to further refine the extent of excavation. Soil and debris removal initially occurred to an approximate total depth of 1.2 m (4ft) vertically. The lateral extent was determined using visual indicators of the burn pit; however, over the course of RTD the excavation increased laterally due to sloping requirements, resulting in an area approximately 19 m by 27 m (60 ft by 86.7 ft). Four in-process samples collected from ZPC 4 during the RTD activities were analyzed for the full list of COPCs. Analytical results indicated that arsenic was the only COPC present at a concentration that exceeded the RALs (7.94 mg/kg) at the base of the initial excavation. As a result, further refinement of the vertical extent of excavation resulted in the total excavated depth of approximately 2.8 m (9 ft) bgs.

3.1.3 Waste Site 600-36 Verification Sampling

Analytical results of soil samples collected from the areas identified during site evaluation indicated that COPC concentrations were greater than the RALs. The ZPCs and FS locations became areas of excavation during the implementation of the RTD alternative. The lateral and vertical extent of excavation in each area was determined utilizing visual indicators, and extended based on analytical

results of in-process samples, which were collected from ZPC 4 during RTD activities. Upon completion of RTD activities, a verification sampling design was developed utilizing both focused and random sampling, and Visual Sample Plan[6] (VSP) software to locate samples randomly within each area of excavation. Samples were collected from the excavated areas as described in the following subsections. A detailed summary of verification sampling analytical results can be found in Table A-3 (Appendix A).

3.1.3.1 FS 1, FS 2 and FS 3

Following RTD activities at FS 1, 2, and 3, focused samples were collected at the base of the excavated areas (Figure 3-2). The lateral extents of the excavated areas at FS 1, FS 2, and FS 3 were approximately 37 m^2 (400 ft^2), 46 m^2 (500 ft^2), and 41 m^2 (440 ft^2), respectively, for each stained/devegetated area. One focused sample was collected from the base of each excavation, based on previous visual indicators (e.g., stained/devegetated areas observed during site evaluation).

3.1.3.2 ZPC 2

The area of excavation for ZPC 2 was approximately 3 m^2 (32 ft^2) and one sample was collected from ZPC 2 at the base of the excavation (Figure 3-2).

[6] Available at http://vsp.pnl.gov/.

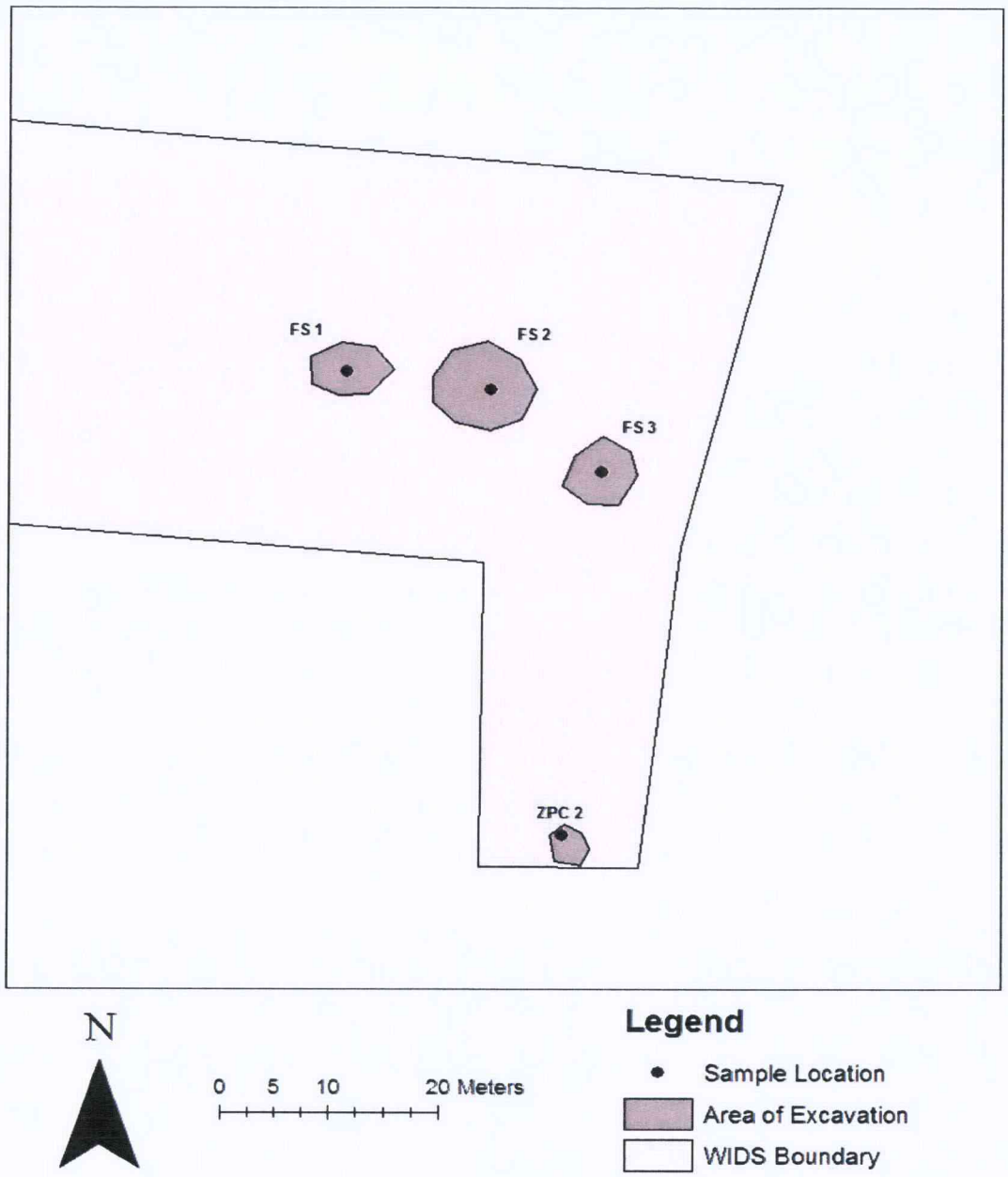

Figure 3-2. Verification Sample Locations FS 1, FS 2, FS 3, and ZPC 2

3.1.3.3 FS 4

FS 4 was considered analogous to FS 1, FS 2, and FS 3 based on visual indicators. The area of excavation at FS 4 totaled approximately 3 m^2 (32 ft^2); therefore, one focused sample was collected from the base of the excavation consistent with the location of previous visual cues (e.g., stained/devegetated areas observed during site evaluation) (Figure 3-3).

3.1.3.4 FS 5

The total area of excavation at FS 5 was approximately 13 m^2 (140 ft^2); therefore, using the representative/analogous approach, one location (FS 5) was sampled from the base of excavation to be representative of the other excavated areas for verification purposes (Figure 3-3).

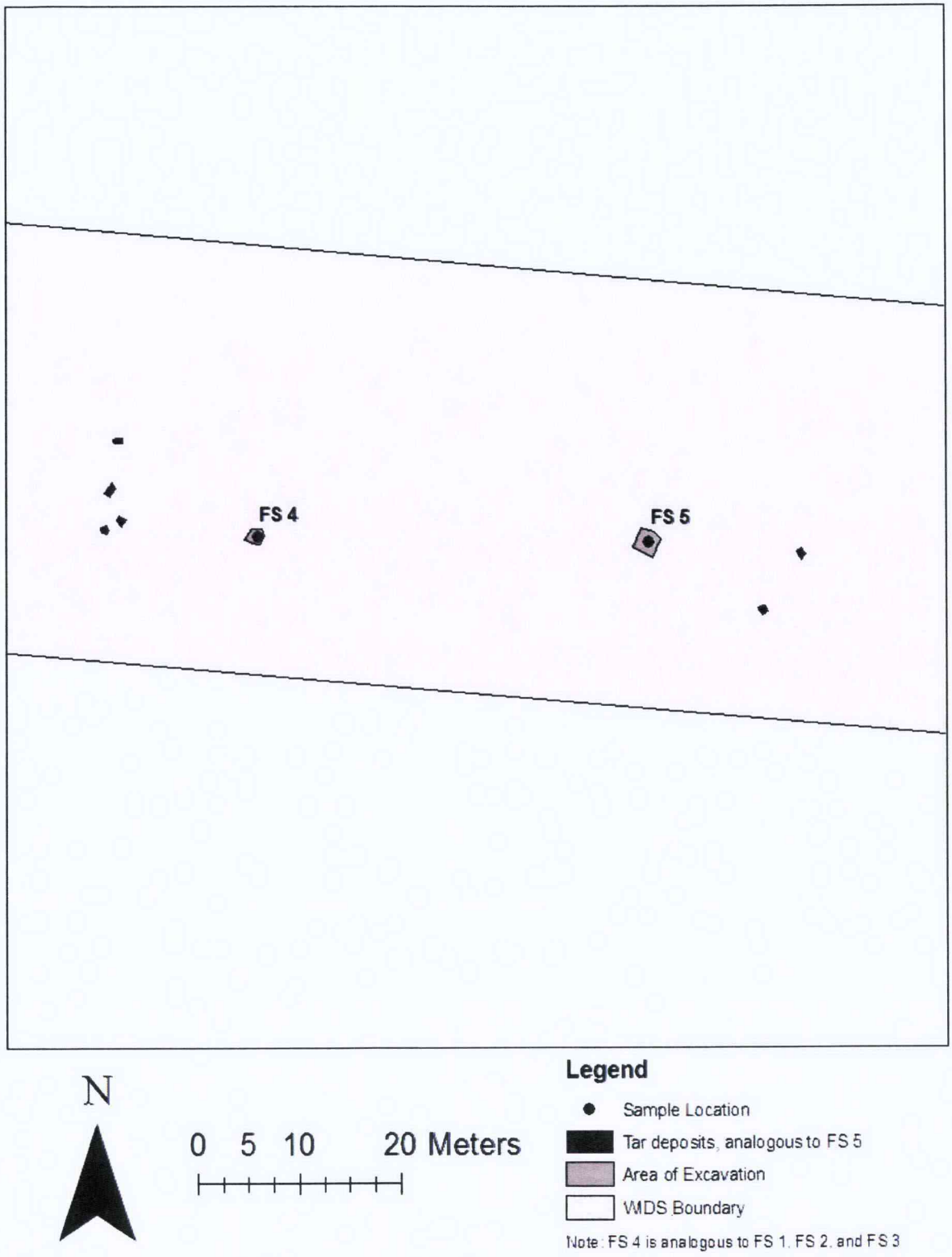

Figure 3-3. Verification Sample Locations FS 4 and FS 5

3.1.3.5 ZPC 4

The area of excavation at ZPC 4 was approximately 178.7 m^2 (1,924 ft^2). Four in-process samples collected from ZPC 4 during the RTD activities resulted in further refinement of the vertical extent of excavation. In-process samples were also used to refine the list of COPCs targeted during verification sampling to arsenic only (a detailed summary of in-process sampling analytical results can be found in Table A-2 in Appendix A). Four verification samples were collected from the base of the final excavated area from locations randomly selected using a random number generator.

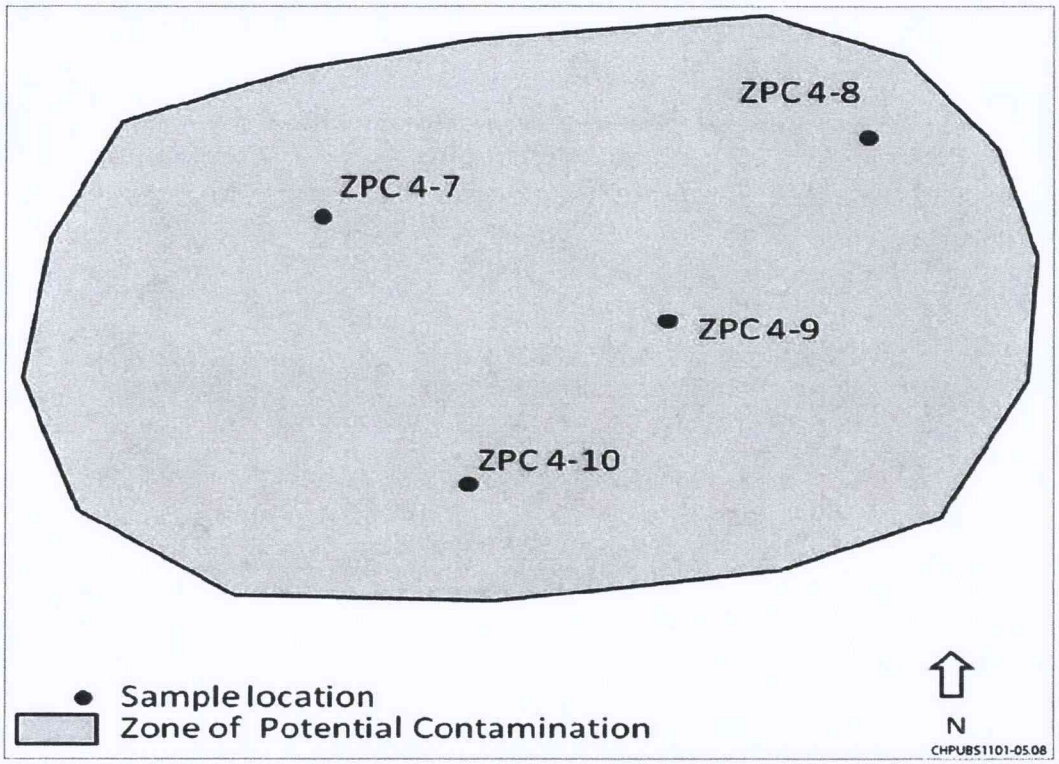

Figure 3-5. ZPC 4-Burn Pit Verification Sample Locations

3.1.4 Backfill and Revegetation

As described in Section 2.1 of the RAWP, backfill and/or contouring may take place at the 600-36 waste site upon concurrence by the signing parties that the RAOs have been attained. Finalization of a backfill concurrence form provided to the agency(ies) provided concurrence that the waste site had achieved the established RAOs and thus backfill and/or contouring proceeded at the 600-36 waste site. The backfill concurrence form was approved by the regulatory agency(ies) on February 16, 2011. Backfill of the 600-36 waste site was completed on February 18, 2011.

In accordance with the ecological compliance review conducted for the 600-36 waste site, this area does not meet the requirements of a Level III or Level IV designation as described in DOE/RL-96-32, *Hanford Site Biological Resources Management Plan*. Revegetation at the 600-36 waste site is not required; however, the 600-36 waste site has been reseeded.

3.1.5 Statement of Protectiveness

In accordance with the SAP, the soil at the 600-36 waste site has been sampled, analyzed, and evaluated. The results obtained through the implementation of the RTD alternative demonstrate that concentrations of COPCs in the soil at the 600-36 waste site are less than the RALs (discussed in further detail in Section 5). These results also indicate that residual concentrations will support reasonably anticipated future land use described in the EE/CA and Action Memorandum, and demonstrate that residual concentrations of COPCs in soil throughout the site are unlikely to affect groundwater or the Columbia River. As summarized in Section 5, a review of the sampling results showed that the removal action at the 600-36 waste site has demonstrated achievement of the RAOs established in Action Memorandum and identified in the RAWP.

4 Chronology of Events

A chronology of major events associated with sampling the subject waste site is presented in Table 4-1. The chronology includes approval of the regulatory documents that form the basis of the removal action and key fieldwork activities associated with the removal action.

Table 4-1. Removal Action Chronology

Date	Event
June 5, 2009	DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, approved
July 31, 2009	DOE/RL-2009-48, Rev. 0, *Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit*, approved
August 19, 2009	Site evaluation
September 1, 2009	DOE/RL-2009-60, Rev. 0, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, approved
September 10, 2009	Initial sampling of Waste Site 600-36 completed
November 25, 2009	DOE/RL-2009-53, Rev. 0, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit*, approved
January 18, 2010	RTD of the 600-36 Waste Site commenced
August 31, 2010	RTD of the 600-36 Waste Site completed
September 1, 2010	Verification sampling of the 600-36 Waste Site completed
September 20, 2010	Data evaluation completed and evaluated against RALs
February 16, 2011	Backfill concurrence form approved
February 18, 2011	Backfill of the 600-36 waste site complete

5 Performance Standards and Construction Quality Control

This section addresses the process for demonstrating achievement of performance standards, which include attaining RALs and RAOs and maintaining the required quality control (QC) during removal activities.

5.1 Attainment of Performance Standards

Confirmatory and verification sampling and analysis confirm that the 600-36 waste site meets the RAOs identified in the Action Memorandum, and that residual levels of COPCs remaining in the soil are less than or equal to the RALs. As shown in Table 5-1, RAOs 1 and 2 are achieved by preventing unacceptable risk to human health and environment through direct exposure to soils and debris by reducing the soil concentration of contaminants to less than or equal to RALs. RAO 3 is achieved by preventing migration and/or leaching of radiological and nonradiological contamination to groundwater by reducing the soil concentration of COPCs to less than or equal to the RALs. RAO 4 is met through cultural and ecological evaluation, performed in August 2009, and by the implementation of considerations and recommendations during work activities. Demonstration that soil concentrations of COPCs are less than or equal to RALs (Table 5-2) meets RAOs 1, 2, and 3.

Per the methodology prescribed in the RAWP and SAP, initial sampling of the 600-36 waste site consisted of visual inspection and focused soil sampling performed in September 2009. Resulting data from the initial sampling evolution greater than the RALs initiated the implementation of the RTD alternative, which included excavation of impacted soils, performed between January and August 2010, followed by verification sampling performed in September 2010. The results, provided in Appendix A, demonstrate that there are no chemical COPC concentrations greater than the RALs remaining in soil at the 600-36 waste site, thus meeting RAOs 1, 2, and 3.

Table 5-1. Summary of Attainment of Cleanup Objectives

Response Action Objective	Compliance Methods	Removal Action Objective Attained?
RAO 1: Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with nonradiological constituents to 4.6 m (15 ft) bgs at concentrations above the appropriate RALs.	Achieved through verification soil sampling, performed upon completion of RTD activities, which demonstrated that all individual COPC concentrations are less than the RALs.	Yes
RAO 2: Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with radiological constituents to 4.6 m (15 ft) bgs at concentrations above the appropriate RALs.	Achieved through the radiological survey of soils within the ZPCs, conducted during the sampling evolutions, which demonstrated all individual COPC concentrations are less than the RALs, as indicated by no measured dose rates greater than background established for the waste site and no detectable radiological contamination.	Yes
RAO 3: Control the sources of groundwater contamination to minimize impacts to groundwater resources, protect the Columbia River from adverse impacts, and reduce the degree of groundwater cleanup that may be required under future actions.	Achieved through verification soil sampling, performed upon completion of RTD activities, which demonstrated concentrations of COPCs in soil were less than established RALs.	Yes
RAO 4: Prevent adverse impacts to cultural resources and threatened or endangered species, and minimize wildlife habitat disruption.	Achieved through cultural/ecological evaluation and the implementation of considerations during removal activities to minimize wildlife habitat and cultural artifact disruption.	Yes

This waste site and the data obtained from the subject sampling evolutions will be included in the RI/FS for final remedial decisions for the Outer Area.

5.1.1 Performance Standard Documentation

This report addresses the individual 600-36 waste site and not an OU; therefore, this section is not applicable.

5.1.2 Response Action Objectives Verification

RAO performance standard attainment involves comparisons of soil analytical data to RALs. The RALs, identified in the Action Memorandum and RAWP, are a direct comparison to the maximum results from the analytical data (Table 5-2). The full set of analytical results from all samples collected is provided in Appendix A.

5.1.3 Contaminant Identification

Table 5-2 provides a direct comparison of maximum verification sample analytical results for each nonradiological COPC against the established RALs for the 600-36 waste site.

Table 5-2. Comparison of Verification Sample Results Against RALs for Nonradiological COPCs

Contaminant of Potential Concern	Background Concentration[a] (mg/kg)	Overall RAL (mg/kg)	Maximum Concentration in Soil (mg/kg)	Does the Maximum Exceed RALs?
Metals				
Antimony	5	5.4	0.45	No
Arsenic	6.5	6.5[b]	5.28	No
Barium	132	1,650	86.1	No
Beryllium	1.51	63.2	0.580	No
Boron	NA	210	29.5	No
Cadmium	0.81	0.81[b]	0.300	No
Chromium (Total)	18.5	2,000	11	No
Chromium (VI)[c]	NA	2.1[c]	0.3	No
Cobalt	15.7	15.7[b]	9.63	No
Copper	22.0	284	22.9	No
Lead	10.2	250	8.71	No
Lithium	33.5	160	10.9	No
Manganese	512	512[b]	436	No
Mercury	0.33	2.09	U	No
Nickel	19.1	130	11.1	No
Selenium	0.78	5.2	1.84	No
Silver	0.73	13.6	0.26	No
Strontium	NA	2,920	35.1	No
Thallium	0.1	1.59	0.35	No
Tin	NA	48,000	0.74	No
Uranium (Soluble Salts)	3.21	3.21[b]	0.740	No
Vanadium	85.1	560	76	No
Zinc	67.8	5,970	51.9	No
Polychlorinated Biphenyls				
Aroclor 1016	NA	0.094	U	No
Aroclor 1221	NA	0.017[b]	U	No
Aroclor 1232	NA	0.017[b]	U	No
Aroclor 1242	NA	0.039	U	No

Table 5-2. Comparison of Verification Sample Results Against RALs for Nonradiological COPCs

Contaminant of Potential Concern	Background Concentration[a] (mg/kg)	Overall RAL (mg/kg)	Maximum Concentration in Soil (mg/kg)	Does the Maximum Exceed RALs?
Aroclor 1248	NA	0.039	U	No
Aroclor 1254	NA	0.066	U	No
Aroclor 1260	NA	0.5	U	No
Polynuclear Aromatic Hydrocarbons				
Acenaphthene	NA	98	U	No
Acenaphthylene	NA	98	U	No
Anthracene	NA	2,270	0.037	No
Benzo(a)anthracene	NA	0.86	0.096	No
Benzo(a)pyrene	NA	0.33[b]	0.062	No
Benzo(b)fluoranthene	NA	1.37	0.180	No
Benzo(g,h,i)perylene	NA	2,400	0.063	No
Benzo(k)fluoranthene	NA	1.37	0.180	No
Chrysene	NA	9.56	0.39	No
Dibenz(a,h)anthracene	NA	1.37	U	No
Fluoranthene	NA	631	0.51	No
Fluorene	NA	101	U	No
Indeno(1,2,3-cd)pyrene	NA	1.37	0.045	No
Naphthalene	NA	4.46	U	No
Phenanthrene	NA	1,140	0.120	No
Pyrene	NA	655	0.42	No
Volatile Organic Analyte				
Carbon Tetrachloride	NA	0.005	U	No
Anion				
Nitrate (as Nitrogen)	11.8	40	1.8	No
Total Petroleum Hydrocarbons				
Diesel	NA	2,000	460	No
Kerosene	NA	2,000	370	No

a. If Hanford Site-specific background data are not available, values are then taken from *Natural Background Soil Metals Concentrations in Washington State* (Ecology Publication 94-115). Hanford Site background values are available from nonradiological background data in *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*

Table 5-2. Comparison of Verification Sample Results Against RALs for Nonradiological COPCs

Contaminant of Potential Concern	Background Concentration[a] (mg/kg)	Overall RAL (mg/kg)	Maximum Concentration in Soil (mg/kg)	Does the Maximum Exceed RALs?

(DOE/RL-92-24), Table D9-2.

b. Where cleanup levels are less than background or RDLs, cleanup levels default to background or RDLs in accordance with "Model Toxics Control Act—Cleanup," "Overview of Cleanup Standards" (WAC 173-340-700(6)(d)), and "Analytical Considerations" (WAC 173-340-707(2)), respectively.

c. Based on process knowledge, chromium (VI) is not expected to be present at 200-MG-1 OU Waste Sites. The following values are given to help guide cleanup:

0.2 mg/kg is the calculated value using K_d=0, based on *Hanford Contamination Distribution Coefficient Database and Users Guide* (PNNL-13895) and "Deriving Soil Concentrations for Groundwater Protection" (WAC 173-340-747), equation 747-1.

- 2.1 mg/kg is based on *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE/RL-96-17).
- 18.4 mg/kg is based on Cleanup Levels and Risk Calculations database (Ecology, 2007).

NA = Not available

U = result is below laboratory detection limit.

5.2 Construction Quality Assurance/Quality Control

No construction-related aspects were implemented as part of the selected alternative for the 600-36 waste site; therefore, this section is not applicable.

5.3 Cleanup Verification Quality Assurance/Quality Control

A data quality assessment (DQA) review was performed to compare the sampling approach and analytical data with the sampling and data requirements specified by the SAP. This review involves evaluation of the data to determine if they are of the right type, quality, and quantity to support the intended use (*Soil Screening Guidance for Radionuclides: User's Guide* [EPA/540-R-00-007]). The assessment review completes the data life cycle (i.e., planning, implementation, and assessment) that was initiated by the data quality process.

Level C data validation as defined in the contractors' validation procedures, which are based on EPA functional guidelines (for example, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses* [Bleyler 1988a]; *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses* [Bleyler, 1988b]), was performed for the entire sampling and analysis data package for the investigative samples collected for the 600-36 waste site. Level C validation is a review of the QC data and specifically requires verification of deliverables and requested versus reported analyses and qualification of the results based on: analytical holding times, method blank results, matrix spike/matrix spike duplicate, surrogate recoveries, duplicates, and analytical method blanks.

Specific data quality objectives for the site are found in the SAP.

All of the sampling and analysis data generated from the investigative sampling of the 600-36 waste site is tracked through the following Hanford Environmental Information System (HEIS) identification numbers. All HEIS numbers associated with this sampling event are in Appendix A.

All of Waste Site 600-36 sampling and analysis data were found to be useable for decision making purposes as provided in the following summary:

- **HEIS Identification Numbers**—B21WC1, B21WC2, B21WC3, B21WC4, B21WC5, B21WC6, B21WD0, B21WD2, B21WD3, B21WD5, B21WD6, B21WD8, B21WD9, B21WF1, B21WF4, B244D4, B244D5, B244D6, B244D7, B21WK8, B21WL1, B21WL4, B21WL7, B21WM0, B21WM3, B21WM6, B21WM9, B244D0, B244D1, B244D2, B244D3, B244D8, B244D9, B244F0, B244F1, B244F2, B244F3, B244F4, B244F5, B244F6, B244F7, B244F8, B244F9, B244H0, B244H1, B244H2, B244H3, B244B0, B244B1, B244B2, B244B3, B244B4, B244B5, B244B6, B244B7, B244C2, B244C3, B244C4, B244C5, B244C6, B244C7, B244C8, B244C9, B25059, B25YF5, B25YF6, B27N61, B25F7, B25YF8, B27N62, B25YF9, B25YH0, B27N63, B25YH1, B25YH2, and B27N64.

- **Blanks**—All field, equipment, and trip blanks (B21WF5, B21WF6, B21WF7, B21WF8, B244J2, B244J3, B244J6, B25061, B25YJ4, B244J4, B244J5, B246P5, B246P6, B246P7, B246P8, B25057, B25058, B25YJ0, B25YJ1, and B27N68) were received intact to the laboratory and holding times where acceptable.

- **Field Duplicates**—The duplicate (B21WC7, B21WC8, B21WC9, B244B8, B244B9, B244C0, B244C1, B25YH3, B25YF4, and B27N65) results were acceptable.

- **Data Completeness**—Analytical reports submitted for validation and verified for completeness based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100 percent. The data has been determined to be useable for decision-making purposes. The final results, narrative supporting the sampling analysis activities and findings, and copies of chains of custody were transmitted in letter reports from the laboratory.

- **Field Screening**—Relative to analytical data in sample media, physical data, and/or field screening results are of lesser importance in making inferences of risk. Because of the secondary importance of such data, no validation for physical property data and/or field screening results was performed. However, field quality assessment (QA)/QC was reviewed to ensure that the data are useable. Field instrumentation, calibration, and QA checks were performed in accordance with the following:

  - Calibration of radiological field instruments (such as Geiger-Mueller and portable alpha meters) on the Hanford Site is performed under contract by Pacific Northwest National Laboratory, as specified in their program documentation.

  - Daily calibration checks are performed and documented for each instrument used in support of waste site sampling and investigation. These checks are made on standard materials that are sufficiently like the matrix under consideration that direct comparison of data can be made. Daily calibration checks of radiological field instruments were performed by trained and qualified radiological control technicians in accordance with established program and procedural requirements.

The review and approval of completed field radiation surveys by the radiological controls organization represents the data validation and usability review for handheld field radiological measurements.

The DQA review for these waste sites found the analytical results to be accurate within the standard errors associated with the methods, including sampling and sample handling. The data are of the correct 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 because of QA/QC deficiencies. All analytical data were found acceptable for decision-making purposes. All of the sampling analytical data are stored in HEIS.

5.4 Regulatory Oversight

This document provides a summary of the removal action taken at the 600-36 waste site; it shows a comparison of the data collected to RALs authorized in approved regulatory documents and provides the basis to reclassify the waste site status (see Section 9). Though this report does not require approval by Ecology or the EPA, concurrence of those agencies is necessary, under CERCLA Section 120 and the Tri-Party Agreement, for determinations concerning follow-on remedial actions. This report is therefore provided to the agency(ies) for review, in accordance with the approval process for waste site reclassification, as supporting documentation. Upon approval of the waste site reclassification, a copy of this report will be maintained in the Administrative Record. No additional regulatory oversight was required for the confirmatory and verification sampling of the 600-36 waste site.

6 Final Inspection and Certifications

There were no final inspections or certifications required in the implementation of the selected alternative for the 600-36 waste site; therefore, this section is not applicable.

7 Operations & Maintenance Activities

This section discusses the operations and maintenance for the 600-36 waste site.

7.1 Remedy-Related Operations and Maintenance or Monitoring

There are no operations and maintenance activities or monitoring requirements for the 600-36 waste site; therefore, this section is not applicable.

7.2 Institutional Controls

Based on the analyses performed and presented in this report, there are no waste site-specific institutional controls required at the 600-36 waste site.

7.3 Five-Year Reviews

Five-year reviews are required by CERCLA for post-record-of-decision remedial actions, but do not apply to the 600-36 waste site. This waste site and the data obtained from the subject sampling evolutions will be included in the risk assessment and RI/FS for final remedial decisions of the Outer Area.

8 Summary of Project Costs

For the purposes of reporting costs of removal action for the 600-36 waste site, costs are prorated utilizing an activity/schedule-based methodology. This method is not considered to be audit quality data. Actual costs for waste site cleanup will continue to be collected for each OU or closure area in accordance with the current cost tracking methodology. These costs will then be included, in accordance with CERCLA requirements, in the response action report for the final remedial action of the OU or closure area. The current summary costs are located in Table 8-1.

Table 8-1. Cost Summary

Cost Item	Actual Cost Fiscal Year 2009	Actual Cost Fiscal Year 2010	Actual Total Cost
Removal Action Capital (Construction) Costs	0	0	0
Removal Action Operating Costs	0	301,000	301,000
Total Removal Action Cost	0	301,000	301,000
Projected Yearly Operations and Maintenance Costs	0	0	0

9 Waste Site Reclassification

The waste site reclassification form for the subject waste site is proposed and processed in accordance with the procedures and definitions described in *Tri-Party Agreement Handbook Management Procedures* (RL-TPA-90-0001), TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)." Reclassification form 2010-085 for the 600-36 waste site proposes the status of this waste site be changed to "Interim Closed Out." Per TPA-MP-14, "Interim Closed Out" status indicates that a site meets the cleanup standards specified in the approved Action Memorandum (i.e., the interim response action decision document). This site will be evaluated under the cleanup standards established for the final ROD for the Outer Area.

10 Observations and Lessons Learned

There were no observations or lessons learned applicable for inclusion in this report.

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12 References

40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr300_09.html.

40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," Appendix B, "National Priorities List," *Code of Federal Regulations*. Available at: http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr300AppB.htm.

53 FR 23988, "National Priorities List for Uncontrolled Hazardous Waste Sites – Update 7," *Federal Register*, Vol. 53, No. 122, pp. 23988 – 23998, June 24, 1988. Available at: http://www.epa.gov/superfund/sites/npl/p880624.htm#23988.

54 FR 41015, "National Priorities List for Uncontrolled Hazardous Waste Sites – Final Rule 10/04/89," *Federal Register*, Vol. 54, No. 191, pp. 41015 – 41025, October 4, 1989. Available at: http://www.epa.gov/superfund/sites/npl/f891004.htm#41015.

Bleyler, Ruth, 1988a, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, Hazardous Site Evaluation Division, U.S. Environmental Protection Agency, Washington, D.C. Available at: http://www2.hanford.gov/ARPIR/index.cfm?content=findpage&AKey=D196013784.

Bleyler, Ruth, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, Hazardous Site Evaluation Division, U.S. Environmental Protection Agency, Washington, D.C. Available at: http://www2.hanford.gov/ARPIR/index.cfm?content=findpage&AKey=D196013785.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq. Available at: http://uscode.house.gov/download/pls/42C103.txt.

DOE, 2010, *CERCLA Remedial Action Site Closure Guidance*, Draft, Office of Nuclear Safety and Environmental Assistance, U.S. Department of Energy, Washington, D.C. Available at: http://homer.ornl.gov/nuclearsafety/env/guidance/cercla/siteclosure/index.cfm.

DOE/EIS-0222-F, 1999, *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*, U.S. Department of Energy, Washington, D.C. Available at:
http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158842.
http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158843.
http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158844.
http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158845.
http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158846.
http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158847.

DOE/RL-92-24, 2001, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Rev. 4, 2 vols., U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at:
http://www2.hanford.gov/arpir/?content=findpage&AKey=0096062.
http://www2.hanford.gov/arpir/?content=findpage&AKey=0096061.

DOE/RL-96-17, 2009, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, Rev. 6, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0095436.

DOE/RL-2008-44, 2009, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0096350.

DOE/RL-2009-48, 2009, *Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0096131.

DOE/RL-2009-53, 2009, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0912100290.

DOE/RL-2009-60, 2009, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=1003290272.

Ecology Publication 94-115, 1994, *Natural Background Soil Metals Concentrations in Washington State*, Washington State Department of Ecology, Olympia, Washington. Available at: http://www.ecy.wa.gov/pubs/94115.pdf.

Ecology, 2007, Cleanup Levels and Risk Calculations (CLARC) database. Available at: https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: http://www.hanford.gov/?page=82.

EPA/540-R-00-007, 2000, *Soil Screening Guidance for Radionuclides: User's Guide*, OSWER 9355.4-16A, Office of Radiation and Indoor Air, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. Available at: http://www.epa.gov/superfund/health/contaminants/radiation/pdfs/sec_0clean.pdf.

EPA 540-R-98-016, 2000, *Close Out Procedures for National Priorities List Sites*, OSWER 9320.2-09A-P, Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. Available at: http://www.epa.gov/superfund/programs/npl_hrs/closeout/pdf/guidance.pdf

PNL-10285, 1995, *Estimated Recharge Rates at the Hanford Site*, Pacific Northwest Laboratory, Richland, Washington. Available at: http://www.osti.gov/energycitations/servlets/purl/10122247-XORHkt/webviewable/10122247.pdf.

PNNL-13895, 2003, *Hanford Contaminant Distribution Coefficient Database and Users Guide*, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0911300341.

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq. Available at: http://epw.senate.gov/rcra.pdf.

RL-TPA-90-0001, 2007, *Tri-Party Agreement Handbook Management Procedures,* Guideline Number TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)," Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/hanford/files/TPA-MP14.pdf.

Superfund Amendments and Reauthorization Act of 1986, 42 USC 103, et seq. Available at: http://www.epa.gov/superfund/policy/sara.htm.

WAC 173-340-700, "Model Toxics Control Act—Cleanup," "Overview of Cleanup Standards," *Washington Administrative Code,* Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-700.

WAC 173-340-707, "Model Toxics Control Act—Cleanup," "Analytical Considerations," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-707.

WAC 173-340-747, "Model Toxics Control Act—Cleanup," "Deriving Soil Concentrations for Groundwater Protection," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/wac/default.aspx?cite=173-340-747.

WAC 173-340-900, "Model Toxics Control Act—Cleanup," "Tables," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-900.

Appendix A

Sampling Results for Waste Site 600-36

A1 Introduction

This appendix contains laboratory analytical results, provided in Table A-1 through Table A-3, from the sampling conducted at the 600-36 waste site. Depths provided in the table are below ground surface. Sample numbers are from the HEIS database.

- Table A-1 provides analytical results from samples collected during the initial phase of sampling from ZPCs and FS locations that did not meet the established RALs, therefore requiring the initiation of the RTD alternative.
- Table A-2 provides analytical results from in-process samples collected from ZPC 4. The analytical results from these in-process samples were used to refine the depth of excavation, and the list of COPCs targeted in the verification sampling evolution to arsenic only.
- Table A-3 includes final verification sampling results, which demonstrate achievement of the established RALs.

Table A-1. Analytical Results for Investigative Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a] (mg/kg)	Background Concentration[b] (mg/kg)	B21WC3 B21WC2 B21WC1 FS 3 Surface (mg/kg)	B21WC6 B21WC5 B21WC4 ZPC 1; FS 3 0.3 m (1 ft) (mg/kg)	B21WD2, B21WD0 ZPC 1; FS 2 Surface (mg/kg)	B21WD5, B21WD3 ZPC 1; FS 2 0.3 m (1 ft) (mg/kg)	B21WD8 B21WD6 ZPC 1; FS 1 Surface (mg/kg)	B21WF1 B21WD9 ZPC 1; FS 1 0.3 m (1 ft) (mg/kg)	Battery B21WF4 ZPC 2; B1 Surface (mg/kg)	B244D4 B244D5 B244D6 B244D7 FS 5 Surface (mg/kg)	B21WK8 ZPC 4 (9,-2) Surface (mg/kg)	B21WL1 ZPC 4 (9,-2) 0.3 m (1 ft) bgs (mg/kg)	B21WL4 ZPC 4 (11,3) Surface (mg/kg)	B21WL7 ZPC 4 (11,3) 0.3 m (1 ft) bgs (mg/kg)	B21WM0 ZPC 4 (10,-4) Surface (mg/kg)	B21WM3 ZPC 4 (10,-4) 0.3 m (1 ft) bgs (mg/kg)	B21WM6 ZPC 4 (11,7) Surface (mg/kg)	B21WM9 ZPC 4 (11,7) 0.3 m (1 ft) bgs (mg/kg)
Metals																		
Antimony	5.4	5	U	U	U	U	U	U	U	U	3.64	0.45	0.99	2.59	32.3	U	3.2	0.3
Arsenic	6.5[c]	6.5	2.6	3.3	2.29	2.68	2.26	3.47	8.73	3.67	17.7	4.86	46.4	15.1	131	4.2	16.8	5.17
Barium	1,650	132	91.2	100	69	80.1	74.4	68	69.7	74.8	80	84	85.5	107	71.7	67.7	88.3	71
Beryllium	63.2	1.51	0.452	0.460	0.408	0.486	0.404	0.559	U	0.370	0.534	0.506	0.616	0.574	1.09	0.461	0.845	0.49
Boron	210	N/A	7.24	7.24	6.81	7.17	6.11	7.38	7.37	24.8	28.6	15	30.9	32.1	105	9.72	56.2	10.6
Cadmium	0.81[c]	0.81	0.13	0.13	3.39	1.19	0.21	U	4.12	U	0.46	0.31	0.52	0.55	1.52	0.13	1.09	0.19
Chromium (Total)	2,000	18.5	8.72	9.96	8.44	9.34	10.1	9.25	7.25	9.53	46.5	18.9	40.9	50.6	114	15	50.3	12
Chromium (VI)	2.1	N/A	NR	NR	NR	NR	NR	NR	NR	U	NR	NR	NR	NR	NR	NR	NR	NR
Cobalt	15.7[c]	15.7	7.6	9.48	6.14	6.87	6.16	8.3	9.09	7.7	10.7	8.73	10.2	11.5	18	9.46	12.9	9.14
Copper	284	22	12.4	15.3	19.6	11.8	9.81	14.4	12.4	14.6	167	49.1	126	139	734	30.9	195	41.7
Lead	250	10.2	7.59	6.92	7.9	5.62	6.93	6.57	10.4	6.29	106	36	110	210	548	19.5	168	30.8
Lithium	160	33.5	5.86	6.08	5.09	6.22	5.08	7.02	5.64	8.04	5.2	6.17	5.78	4.99	3.36	6.09	3.98	5.71
Manganese	512[c]	512	336	378	257	313	249	340	7020	361	506	423	498	547	777	423	607	360
Mercury	2.09	0.33	U	U	U	U	U	U	0.390	U	0.08	0.0477	0.0496	0.0498	0.250	U	0.310	U
Nickel	130	19.1	9.41	13.9	8.26	8.77	9.79	9.59	13.8	10.6	42.7	17.7	27.2	40.5	132	11.5	52.8	14.8
Selenium	5.2	0.78	0.44	0.37	0.3	U	U	0.3	0.43	1.45	0.66	0.61	0.47	0.57	U	0.39	U	0.57
Silver	13.6	0.73	U	U	U	U	U	U	U	U	0.64	0.45	0.2	0.18	5.24	U	0.94	U
Strontium	2,920	N/A	23.8	26.6	22	21	19.4	21.9	26.7	23.9	20.2	21.3	24.9	20.8	15.4	21.4	20.7	20.9
Thallium	1.59	0.1	U	U	0.16	1.16	0.29	0.52	0.1	0.1	0.16	0.98	0.44	0.21	0.11	U	U	U
Tin	48,000	N/A	0.39	0.41	0.43	0.44	0.44	0.46	1	0.64	6.72	2	3.6	1	24.8	0.96	11.1	1.4
Uranium	3.21[c]	3.21	0.95	0.49	0.35	0.62	0.3	0.42	0.33	0.410	0.32	0.52	0.4	0.36	0.27	0.37	0.35	0.37
Vanadium	560	85.1	36.6	40.8	40.7	40.9	43.3	41.7	37.8	52.3	32.8	40.8	35.4	38.8	28.3	38.6	38.6	40.1
Zinc	5,970	67.8	38.5	42.0	55.6	5.62	281	56.6	1940	41.2	79.0	53.9	87.0	108	204	42.3	188	51.0
Anion																		
Nitrate (as Nitrogen)	40	11.8	NR	NR	NR	NR	NR	NR	U	4.74	NR	NR	NR	NR	NR	NR	NR	NR

Table A-1. Analytical Results for Investigative Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a] (mg/kg)	Background Concentration[b] (mg/kg)	B21WC3 B21WC2 B21WC1 FS 3 Surface (mg/kg)	B21WC6 B21WC5 B21WC4 ZPC 1; FS 3 0.3 m (1 ft) (mg/kg)	B21WD2, B21WD0 ZPC 1; FS 2 Surface (mg/kg)	B21WD5, B21WD3 ZPC 1; FS 2 0.3 m (1 ft) (mg/kg)	B21WD8 B21WD6 ZPC 1; FS 1 Surface (mg/kg)	B21WF1 B21WD9 ZPC 1; FS 1 0.3 m (1 ft) (mg/kg)	Battery B21WF4 ZPC 2; B1 Surface (mg/kg)	B244D4 B244D5 B244D6 B244D7 FS 5 Surface (mg/kg)	B21WK8 ZPC 4 (9,-2) Surface (mg/kg)	B21WL1 ZPC 4 (9,-2) 0.3 m (1 ft) bgs (mg/kg)	B21WL4 ZPC 4 (11,3) Surface (mg/kg)	B21WL7 ZPC 4 (11,3) 0.3 m (1 ft) bgs (mg/kg)	B21WM0 ZPC 4 (10,-4) Surface (mg/kg)	B21WM3 ZPC 4 (10,-4) 0.3 m (1 ft) bgs (mg/kg)	B21WM6 ZPC 4 (11,7) Surface (mg/kg)	B21WM9 ZPC 4 (11,7) 0.3 m (1 ft) bgs (mg/kg)
Polynuclear Aromatic Hydrocarbons																		
Acenapthene	98	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Acenapthylene	98	N/A	0.56	U	U	6.6	0.66	0.330	0.15	U	NR	NR	NR	NR	NR	NR	NR	NR
Anthracene	2,270	N/A	1.6	U	U	5.6	1.7	0.51	0.27	U	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(a)anthracene	0.86	N/A	6.8	U	U	34	U	0.069	0.23	0.25	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(a)pyrene	0.33[c]	N/A	0.67	U	U	20	0.98	0.39	0.21	0.53	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(b)fluoranthene	1.37	N/A	8.4	U	U	35	5.4	U	0.45	0.75	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(k)fluoranthene	1.37	N/A	5.4	U	U	33	2.7	U	0.36	0.40	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(g,h,i)perylene	2,400	N/A	2.1	U	U	7.6	1.8	0.6	0.59	U	NR	NR	NR	NR	NR	NR	NR	NR
Chrysene	9.56	N/A	15	U	U	52	3.1	0.16	0.41	1	NR	NR	NR	NR	NR	NR	NR	NR
Dibenzo(a,h)anthracene	1.37	N/A	U	U	U	3.2	0.69	U	0.072	U	NR	NR	NR	NR	NR	NR	NR	NR
Fluoranthene	631	N/A	2.4	U	U	37	0.48	0.094	0.57	1.5	NR	NR	NR	NR	NR	NR	NR	NR
Fluorene	101	N/A	U	U	U	U	0.059	0.045	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Indeno(1,2,3-cd)pyrene	1.37	N/A	2.5	U	U	7.5	1.9	0.38	0.37	U	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	4.46	N/A	U	U	U	U	U	U	0.051	U	NR	NR	NR	NR	NR	NR	NR	NR
Phenanthrene	1,140	N/A	U	U	U	U	U	U	0.39	0.36	NR	NR	NR	NR	NR	NR	NR	NR
Pyrene	655	N/A	57	U	U	440	2	0.120	0.65	1.1	NR	NR	NR	NR	NR	NR	NR	NR
Polychlorinated Biphenyls																		
Aroclor 1016	0.094	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Aroclor 1221	0.017[c]	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Aroclor 1232	0.017[c]	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Aroclor 1242	0.039	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Aroclor 1248	0.039	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Aroclor 1254	0.066	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Aroclor 1260	0.5	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR

Table A-1. Analytical Results for Investigative Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a] (mg/kg)	Background Concentration[b] (mg/kg)	B21WC3 B21WC2 B21WC1 FS 3 Surface (mg/kg)	B21WC6 B21WC5 B21WC4 ZPC 1; FS 3 0.3 m (1 ft) (mg/kg)	B21WD2, B21WD0 ZPC 1; FS 2 Surface (mg/kg)	B21WD5, B21WD3 ZPC 1; FS 2 0.3 m (1 ft) (mg/kg)	B21WD8 B21WD6 ZPC 1; FS 1 Surface (mg/kg)	B21WF1 B21WD9 ZPC 1; FS 1 0.3 m (1 ft) (mg/kg)	Battery B21WF4 ZPC 2; B1 Surface (mg/kg)	B244D4 B244D5 B244D6 B244D7 FS 5 Surface (mg/kg)	B21WK8 ZPC 4 (9,-2) Surface (mg/kg)	B21WL1 ZPC 4 (9,-2) 0.3 m (1 ft) bgs (mg/kg)	B21WL4 ZPC 4 (11,3) Surface (mg/kg)	B21WL7 ZPC 4 (11,3) 0.3 m (1 ft) bgs (mg/kg)	B21WM0 ZPC 4 (10,-4) Surface (mg/kg)	B21WM3 ZPC 4 (10,-4) 0.3 m (1 ft) bgs (mg/kg)	B21WM6 ZPC 4 (11,7) Surface (mg/kg)	B21WM9 ZPC 4 (11,7) 0.3 m (1 ft) bgs (mg/kg)
Total Petroleum Hydrocarbons																		
Diesel	2,000	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Kerosene	2,000	N/A	U	U	U	U	U	U	U	U	NR	NR	NR	NR	NR	NR	NR	NR
Volatile Organic Analyte																		
Carbon Tetrachloride	0.005	N/A	U	U	U	U	U	U	NR	U	NR	NR	NR	NR	NR	NR	NR	NR

a. RALs are from DOE/RL-2009-53, Revision 0, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit.*

b. If Hanford Site-specific background data are not available, values are then taken from *Natural Background Soil Metals Concentrations in Washington State* (Ecology Publication 94-115). Hanford Site background values are available in nonradiological background data from *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE/RL-92-24), Table D9-2.

c. Where cleanup levels are less than background or RDLs, cleanup levels default to background or RDLs per *Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC* (Ecology Publication 94-06); "Model Toxics Control Act—Cleanup," "Overview of Cleanup Standards" (WAC 173-340-700(6)(d)); and "Analytical Considerations" (WAC 173-340-707(2)), respectively.

N/A = not applicable

NR = analysis not requested

U = result is below laboratory detection limit

Table A-2. Analytical Results for In-Process Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a]	Background Concentration[b]	B244D8, B244D9, B244F0, B244F1 ZPC 4-7 1.2 m (4 ft) bgs (mg/kg)	B244F2, B244F3, B244F4, B244F5 ZPC 4-8 1.2 m (4 ft) bgs (mg/kg)	B244F6, B244F7, B244F8, B244F9 ZPC 4-9 1.2 m (4 ft) bgs (mg/kg)	B244H0, B244H1, B244H2, B244H3 ZPC 4-10 1.2 m (4 ft) bgs (mg/kg)
			Metals			
Antimony	5.4	5	0.36	U	U	0.33
Arsenic	6.5[c]	6.5	8.09	3.76	3.86	5.55
Barium	1,650	132	64.9	70.3	78.9	62.7
Beryllium	63.2	1.51	0.340	0.300	0.330	0.390
Boron	210	N/A	29.0	31.3	35.0	33.4
Cadmium	0.81[c]	0.81	0.150	0.120	0.130	0.340
Chromium Total	2,000	18.5	11.5	8.52	10.9	11.4
Chromium VI	2.1	N/A	U	U	U	U
Cobalt	15.7[c]	15.7	9.81	8.35	7.8	9.05
Copper	284	22	23.4	18.4	18.2	26.6
Lead	250	10.2	14	9.33	9.41	19
Lithium	160	33.5	9.5	9	8.51	8.32
Manganese	512[c]	512	463	385	408	422
Mercury	2.09	0.33	U	U	U	U
Nickel	130	19.1	11.7	10.9	10.4	12.5
Selenium	5.2	0.78	1.21	0.94	0.8	1.33

Table A-2. Analytical Results for In-Process Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a]	Background Concentration[b]	B244D8, B244D9, B244F0, B244F1 ZPC 4-7 1.2 m (4 ft) bgs (mg/kg)	B244F2, B244F3, B244F4, B244F5 ZPC 4-8 1.2 m (4 ft) bgs (mg/kg)	B244F6, B244F7, B244F8, B244F9 ZPC 4-9 1.2 m (4 ft) bgs (mg/kg)	B244H0, B244H1, B244H2, B244H3 ZPC 4-10 1.2 m (4 ft) bgs (mg/kg)
Silver	13.6	0.73	U	U	U	U
Strontium	2,920	N/A	25.3	23.8	23.8	23.6
Thallium	1.59	0.1	0.12	U	U	U
Tin	48,000	N/A	1.41	1.15	0.79	1.34
Uranium	3.21[c]	3.21	0.430	0.540	0.380	1.07
Vanadium	560	85.1	57.7	61.7	57.7	65.9
Zinc	5,970	67.8	47.2	48.6	52.7	213
Anion						
Nitrate-N	40	11.8	U	U	U	U
Polynuclear Aromatic Hydrocarbons						
Acenapthene	98	N/A	U	U	U	U
Acenapthylene	98	N/A	U	U	U	U
Anthracene	2,270	N/A	U	U	U	U
Benzo(a)anthracene	0.86	N/A	U	U	0.280	U
Benzo(a)pyrene	0.33[c]	N/A	U	U	0.350	U
Benzo(b)fluoranthene	1.37	N/A	U	U	0.46	U
Benzo(k)fluoranthene	1.37	N/A	U	U	0.280	U

Table A-2. Analytical Results for In-Process Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a]	Background Concentration[b]	B244D8, B244D9, B244F0, B244F1 ZPC 4-7 1.2 m (4 ft) bgs (mg/kg)	B244F2, B244F3, B244F4, B244F5 ZPC 4-8 1.2 m (4 ft) bgs (mg/kg)	B244F6, B244F7, B244F8, B244F9 ZPC 4-9 1.2 m (4 ft) bgs (mg/kg)	B244H0, B244H1, B244H2, B244H3 ZPC 4-10 1.2 m (4 ft) bgs (mg/kg)
Benzo(g,h,i)perylene	2,400	N/A	U	U	U	U
Chrysene	9.56	N/A	U	0.190	0.57	U
Dibenzo(a,h)anthracene	1.37	N/A	U	U	U	U
Fluoranthene	631	N/A	U	U	0.65	U
Fluorene	101	N/A	U	U	U	U
Indeno(1,2,3-cd)pyrene	1.37	N/A	U	U	U	U
Naphthalene	4.46	N/A	U	U	U	U
Phenanthrene	1140	N/A	U	U	U	U
Pyrene	655	N/A	U	0.430	2.6	U
Polychlorinated Biphenyls						
Aroclor 1016	0.094	N/A	U	U	U	U
Aroclor 1221	0.017[c]	N/A	U	U	U	U
Aroclor 1232	0.017[c]	N/A	U	U	U	U
Aroclor 1242	0.039	N/A	U	U	U	U
Aroclor 1248	0.039	N/A	U	U	U	U
Aroclor 1254	0.066	N/A	U	U	U	U
Aroclor 1260	0.5	N/A	U	U	U	U

Table A-2. Analytical Results for In-Process Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a]	Background Concentration[b]	B244D8, B244D9, B244F0, B244F1 ZPC 4-7 1.2 m (4 ft) bgs (mg/kg)	B244F2, B244F3, B244F4, B244F5 ZPC 4-8 1.2 m (4 ft) bgs (mg/kg)	B244F6, B244F7, B244F8, B244F9 ZPC 4-9 1.2 m (4 ft) bgs (mg/kg)	B244H0, B244H1, B244H2, B244H3 ZPC 4-10 1.2 m (4 ft) bgs (mg/kg)
Volatile Organic Analyte						
Carbon Tetrachloride	0.005	N/A	U	U	U	U
Total Petroleum Hydrocarbons						
Diesel	2,000	N/A	29	U	24	30
Kerosene	2,000	N/A	U	U	U	U

a. RALs are from DOE/RL-2009-53, Revision 0, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit.*

b. If Hanford Site-specific background data are not available, values are then taken from *Natural Background Soil Metals Concentrations in Washington State* (Ecology Publication 94-115). Hanford Site background values are available in nonradiological background data from *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE/RL-92-24), Table D9-2.

c. Where cleanup levels are less than background or RDLs, cleanup levels default to background or RDLs per *Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC* (Ecology Publication 94-06); "Model Toxics Control Act—Cleanup," "Overview of Cleanup Standards" (WAC 173-340-700(6)(d)); and "Analytical Considerations" (WAC 173 340 707(2)), respectively.

N/A = Not available

U = result is below laboratory detection limit

Table A-3. Analytical Results for Verification Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a] (mg/kg)	Background Concentration[b] (mg/kg)	Required Detection Limit (mg/kg)	Maximum Reported Laboratory Detection Limit (mg/kg)	B244B2, B244B3, B244B0, B244B1 FS 3 1 m (3 ft) bgs (mg/kg)	B244B6, B244B7, B244B4, B244B5 FS 2 1 m (3 ft) bgs (mg/kg)	B244C4, B244C5, B244C2, B244C3 FS 1 1 m (3 ft) bgs (mg/kg)	B244C6, B244C7, B244C8, B244C9 ZPC 2-4 0.6 m (2 ft) bgs (mg/kg)	B244D0, B244D1, B244D2, B244D3 FS 4 1 m (3 ft) bgs (mg/kg)	B25059 FS 5 1.2 m (4 ft) bgs (mg/kg)	B25YF6, B25YF5, B27N61 ZPC 4-7 1.8 m (6 ft) bgs (mg/kg)	B25YF8, B25YF7, B27N62 ZPC 4-8 1.8 m (6 ft) bgs (mg/kg)	B25YH0, B25YF9, B27N63 ZPC 4-9 1.8 m (6 ft) bgs (mg/kg)	B25YH2, B25YH1, B27N64 ZPC 4-10 1.8 m (6 ft) bgs (mg/kg)
Metals														
Antimony	5.4	5	0.6	0.295	U	0.45	U	U	U	U	U	0.23	U	U
Arsenic	6.5[c]	6.5	1	0.393	3.91	3.4	4.95	2.43	5.28	3.51	1.66[d]	0.903[d]	1.73[d]	1.89[d]
Barium	1,650	132	2	0.197	68.2	86.1	63.0	81.3	64.5	65.1	59.5	49	50	51.1
Beryllium	63.2	1.51	0.5	0.0492	0.46	0.580	0.430	0.320	0.320	0.23	0.37	0.25	0.37	0.26
Boron	210	N/A	2	1.9	29.5	28.6	29.4	29.3	29.2	13.5	10.4	7.50	9.11	10.5
Cadmium	0.81[c]	0.81	0.5	0.0983	U	0.300	0.130	0.120	U	U	U	U	0.11	U
Chromium (Total)	2,000	18.5	1	0.492	8.06	11	7.08	9.21	7.56	7.04	8.07	6.76	6.21	4.68
Chromium (VI)	2.1	N/A	0.5	0.1	U	U	0.3	U	U	U	U	U	U	U
Cobalt	15.7[c]	15.7	2	0.0492	8.23	7.8	8.13	7.08	8.05	7.03	9.38	7.2	9.58	9.63
Copper	284	22	1	0.0983	18.4	14.8	18.6	10.4	16.8	12	22.9	13.3	18.6	17
Lead	250	10.2	5	0.0983	6.38	6.53	6.83	5.72	6.35	6.17	8.71	7.27	8.04	4.37
Lithium	160	33.5	2.5	0.4	9.48	9.89	10.9	8.39	9.74	7.69	5.09	7.46	4.92	3.84
Manganese	512[c]	512	5	0.0983	351	380	396	365	436	307	362	313	377	322
Mercury	2.09	0.33	0.2	0.0492	U	U	U	U	U	U	U	U	U	U
Nickel	130	19.1	4	0.197	9.91	11.1	9.69	9.04	9.32	7.52	9.36	8.14	8.71	7.23
Selenium	5.2	0.78	1	0.295	1.2	1.62	1.33	0.99	1.54	0.94	1.84	1.27	1.38	1.63
Silver	13.6	0.73	0.2	0.0983	U	0.26	0.11	U	U	U	U	U	U	U
Strontium	2,920	N/A	1	0.0983	24.8	25.8	25.6	21.7	26	19.9	24.3	31	35.1	26
Thallium	1.59	0.1	1	0.0983	0.14	0.35	0.16	U	0.11	U	0.1	0.09	U	U
Tin	48,000	N/A	10	0.0492	0.52	0.74	0.56	0.48	0.46	0.39	0.53	0.29	0.49	0.47
Uranium	3.21[c]	3.21	1	0.0492	0.530	0.740	0.460	0.420	0.590	0.41	0.48	0.49	0.48	0.41
Vanadium	560	85.1	2.5	0.197	54.3	47	57.4	50.6	62.6	44.2	69.6	46.9	68.5	76
Zinc	5,970	67.8	1	0.787	43.3	38.5	46.3	40.1	43.1	35	50	39.8	51.9	46.6
Anion														
Nitrate (as Nitrogen)	40	11.8	0.75	1.6[e]	U	U	U	U	U	1.8	U	U	U	U

Table A-3. Analytical Results for Verification Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a] (mg/kg)	Background Concentration[b] (mg/kg)	Required Detection Limit (mg/kg)	Maximum Reported Laboratory Detection Limit (mg/kg)	B244B2, B244B3, B244B0, B244B1 FS 3 1 m (3 ft) bgs (mg/kg)	B244B6, B244B7, B244B4, B244B5 FS 2 1 m (3 ft) bgs (mg/kg)	B244C4, B244C5, B244C2, B244C3 FS 1 1 m (3 ft) bgs (mg/kg)	B244C6, B244C7, B244C8, B244C9 ZPC 2-4 0.6 m (2 ft) bgs (mg/kg)	B244D0, B244D1, B244D2, B244D3 FS 4 1 m (3 ft) bgs (mg/kg)	B25059 FS 5 1.2 m (4 ft) bgs (mg/kg)	B25YF6, B25YF5, B27N61 ZPC 4-7 1.8 m (6 ft) bgs (mg/kg)	B25YF8, B25YF7, B27N62 ZPC 4-8 1.8 m (6 ft) bgs (mg/kg)	B25YH0, B25YF9, B27N63 ZPC 4-9 1.8 m (6 ft) bgs (mg/kg)	B25YH2, B25YH1, B27N64 ZPC 4-10 1.8 m (6 ft) bgs (mg/kg)
Polynuclear Aromatic Hydrocarbons														
Acenapthene	98	N/A	0.33	0.17	U	U	U	U	U	U	U	U	U	U
Acenaphthylene	98	N/A	0.33	0.17	U	U	U	U	U	U	U	U	U	U
Anthracene	2,270	N/A	0.33	0.17	U	U	U	U	U	0.037	U	U	U	U
Benzo(a)anthracene	0.86	N/A	0.33	0.17	U	U	U	U	U	0.096	U	U	U	U
Benzo(a)pyrene	0.33[c]	N/A	0.33	0.25	U	U	U	U	U	0.062	U	U	U	U
Benzo(b)fluoranthene	1.37	N/A	0.33	0.22	U	U	U	U	U	0.180	U	U	U	U
Benzo(k)fluoranthene	1.37	N/A	0.33	0.22	U	U	U	U	U	0.180	U	U	U	U
Benzo(g,h,i)perylene	2,400	N/A	0.33	0.35[e]	U	U	U	U	U	0.063	U	U	U	U
Chrysene	9.56	N/A	0.33	0.17	U	U	U	U	U	0.39	U	U	U	U
Dibenzo(a,h)anthracene	1.37	N/A	0.33	0.37[e]	U	U	U	U	U	U	U	U	U	U
Fluoranthene	631	N/A	0.33	0.17	U	U	U	U	U	0.51	U	U	U	U
Fluorene	101	N/A	0.33	0.17	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	1.37	N/A	0.33	0.36[e]	U	U	U	U	U	0.045	U	U	U	U
Naphthalene	4.46	N/A	0.33	0.17	U	U	U	U	U	U	U	U	U	U
Phenanthrene	1,140	N/A	0.33	0.17	U	U	U	U	U	0.120	U	U	U	U
Pyrene	655	N/A	0.5	0.17	U	U	U	U	U	0.42	U	U	U	U
Polychlorinated Biphenyls														
Aroclor 1016	0.094	N/A	0.017	0.0044	U	U	U	U	U	U	U	U	U	U
Aroclor 1221	0.017[c]	N/A	0.017	0.0089	U	U	U	U	U	U	U	U	U	U
Aroclor 1232	0.017[c]	N/A	0.017	0.0044	U	U	U	U	U	U	U	U	U	U
Aroclor 1242	0.039	N/A	0.017	0.0044	U	U	U	U	U	U	U	U	U	U
Aroclor 1248	0.039	N/A	0.017	0.0044	U	U	U	U	U	U	U	U	U	U
Aroclor 1254	0.066	N/A	0.017	0.0044	U	U	U	U	U	U	U	U	U	U
Aroclor 1260	0.5	N/A	0.017	0.0044	U	U	U	U	U	U	U	U	U	U

Table A-3. Analytical Results for Verification Sampling for Nonradiological Contaminants of Potential Concern

Contaminants of Potential Concern	Removal Action Levels[a] (mg/kg)	Background Concentration[b] (mg/kg)	Required Detection Limit (mg/kg)	Maximum Reported Laboratory Detection Limit (mg/kg)	B244B2, B244B3, B244B0, B244B1 FS 3 1 m (3 ft) bgs (mg/kg)	B244B6, B244B7, B244B4, B244B5 FS 2 1 m (3 ft) bgs (mg/kg)	B244C4, B244C5, B244C2, B244C3 FS 1 1 m (3 ft) bgs (mg/kg)	B244C6, B244C7, B244C8, B244C9 ZPC 2-4 0.6 m (2 ft) bgs (mg/kg)	B244D0, B244D1, B244D2, B244D3 FS 4 1 m (3 ft) bgs (mg/kg)	B25059 FS 5 1.2 m (4 ft) bgs (mg/kg)	B25YF6, B25YF5, B27N61 ZPC 4-7 1.8 m (6 ft) bgs (mg/kg)	B25YF8, B25YF7, B27N62 ZPC 4-8 1.8 m (6 ft) bgs (mg/kg)	B25YH0, B25YF9, B27N63 ZPC 4-9 1.8 m (6 ft) bgs (mg/kg)	B25YH2, B25YH1, B27N64 ZPC 4-10 1.8 m (6 ft) bgs (mg/kg)
Volatile Organic Analyte														
Carbon Tetrachloride	0.005	N/A	0.005	0.001	U	U	U	U	U	U	U	U	U	U
Total Petroleum Hydrocarbons														
Diesel	2,000	N/A	5	5.4	U	U	U	U	460	U	U	U	U	U
Kerosene	2,000	N/A	5	5.4	U	U	U	U	370	U	U	U	U	U

a. RALs are from DOE/RL-2009-53, Revision 0, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit* (RAWP).

b. If Hanford Site-specific background data is not available, values are then taken from *Natural Background Soil Metals Concentrations in Washington State* (Ecology Publication 94-115). Hanford Site background values are available in nonradiological background data from *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE/RL-92-24), Table D9-2.

c. Where cleanup levels are less than background or RDLs, cleanup levels default to background or RDLs per "Model Toxics Control Act—Cleanup," "Overview of Cleanup Standards" (WAC 173-340-700(6)(d)), and "Analytical Considerations" (WAC 173-340-707(2)), respectively.

d. Excavation depth refined to approximately 2.7 m (9 ft) bgs and resampled for arsenic only.

e. Maximum reported laboratory detection limits were greater than the required detection limits per RAWP; however, analytical results are less than the established RALs and meet the corresponding RAOs.

N/A = Not Available

U = result is below laboratory detection limit