



Department of Energy
Richland Operations Office
P.O. Box 550
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AUG 24 2011

11-AMCP-0192

Mr. D. A. Faulk, Program Manager
Office of Environmental Cleanup
Hanford Project Office
U.S. Environmental Protection Agency
309 Bradley Boulevard, Suite 115
Richland, Washington 99352

Dear Mr. Faulk:

WASTE SITE RECLASSIFICATION FORM (CONTROL NUMBER 2011-041), AND
RESPONSE ACTION REPORT FOR 200-MG-1 OPERABLE UNIT WASTE SITE
200-W-33, DOE/RL-2011-57, REVISION 0

This letter transmits signed copies of Waste Site Reclassification Form (Control
Number 2011-041), and the approved Response Action Report for 200-MG-1 Operable Unit
Waste Site 200-W-33, DOE/RL-2011-57, Revision 0.

If you have any questions, please contact me, or your staff may contact, Al Farabee, of my staff,
on (509) 376-8089.

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan A. Dowell".

Jonathan A. Dowell, Assistant Manager
for the Central Plateau

AMCP:FMR

Attachments

cc: See Page 2

Mr. D. A. Faulk
11-AMCP-0192

-2-

AUG 24 2011

cc w/attachs:

G. Bohnee, NPT
L. Buck, Wanapum
L. C. Buelow, EPA
S. Harris, CTUIR
J. A. Hedges, Ecology
R. Jim, YN
S. L. Leckband, HAB
N. M. Menard, Ecology
K. Niles, ODOE
D. Rowland, YN (4) plus 2 CDs
Administrative Record
Environmental Portal

cc w/o attachs:

D. G. Black, CHPRC
R. L. Cathel, CHPRC
R. E. Piippo, MSA
J. G. Vance, MSA
C. B. Walker, CHPRC

WASTE SITE RECLASSIFICATION FORM

Date Submitted: <u>5/23/2011</u>	Operable Unit(s): <u>200-MG-1</u>	Control Number: <u>2011-041</u>
Originator: <u>N. Chandran</u>	Waste Site Code: <u>200-W-33</u>	
Phone: <u>373-4716</u>	Type of Reclassification Action: Closed Out <input type="checkbox"/> Interim Closed Out <input checked="" type="checkbox"/> No Action <input type="checkbox"/> RCRA Postclosure <input type="checkbox"/> Rejected <input type="checkbox"/> Consolidated <input type="checkbox"/>	

This form documents agreement among parties listed authorizing classification of the subject unit as Closed Out, Interim Closed Out, No Action, RCRA Postclosure, Rejected, or Consolidated. This form also authorizes backfill of the waste management unit, if appropriate, for Closed Out and Interim Closed out units. Final removal from the NPL of No Action and Closed Out waste management units will occur at a future date.

Description of current waste site condition:
(Summarize status of investigation/remediation of the waste sites.)

The 200-W-33 waste site is a debris dumpsite located in the 600 Area. The waste site is north of the 200 West Area perimeter fence, northwest of the 609 Gate. According to observations made during a site walkdown in April 1996, numerous rusted metal containers such as cans, 208 L (55 gal) drums, and miscellaneous wood and metal debris were scattered throughout the waste site. Evidence of burning and oil spills were also noted. The results of initial sampling did not justify the application of the confirmatory sampling/no further action alternative described in DOE/RL-2009-86, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in the 200-MG-1 Operable Unit* (Action Memorandum); therefore, the selected alternative was changed to removal, treatment, and disposal (RTD). Upon completion of RTD activities, verification sampling performed in accordance with DOE/RL-2009-60, Revision 1, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, identified no COPCs greater than the RALs, thus confirming that the site has met the removal action objectives (RAOs).

The results show that residual soil concentrations of COPCs at or less than the RALs supports a reclassification of this site to interim closed out. The current site conditions achieve the RAOs established in DOE/RL-2009-53, Revision 1, *Removal Action Work Plan for 48 Waste Sites in the 200-MG-1 Operable Unit*. The results of waste site sampling are used to make reclassification decisions for the 200-W-33 waste site in accordance with the TPA-MP-14 (DOE-RL 2007) process. Debris removal, along with underlying soil, was conducted throughout the 200-W-33 waste site. RAOs were met without requiring additional excavation; therefore, backfill and/or contouring were not required at the waste site.

Basis for reclassification:
(For interim closeout, reference supporting documentation, as listed in Table 3.)

The current site conditions meet the RAOs specified in the Action Memorandum. The results show that the residual soil concentrations support reasonably anticipated future land uses recognized in DOE/RL-2008-44, *Engineering Evaluation/ Cost Analysis for the 200-MG-1 Operable Unit Waste Sites* and Action Memorandum. For the purposes of this interim action, RAOs were selected that would support unrestricted future use of shallow zone soil [i.e., surface to 4.6 meters (15 feet)]. Contaminant levels remaining in the soil are protective of groundwater and the Columbia River. There is no deep zone associated with the 200-W-33 waste site; therefore, no institutional controls are required. The basis for reclassification to interim closed out is described in detail in the DOE/RL-2011-57, *Response Action Report for 200-MG-1 Operable Unit Waste Site 200-W-33*, U.S. Department of Energy, Richland Operation Office, Richland, Washington.

Waste Site Controls:

Engineered Controls: Yes No Institutional Controls: Yes No O&M requirements: Yes No
 If any of the Waste Site Controls are checked Yes specify control requirements including reference to the Record of Decision, TSD Closure Letter, or other relevant documents.

<u>O. A. Farabee</u> DOE Federal Project Director (printed)	<u>[Signature]</u> Signature	<u>6/2/11</u> Date
<u>Laura C. Bellow</u> EPA Project Manager (printed)	<u>[Signature]</u> Signature	<u>6/13/11</u> Date

DOE/RL-2011-57
Revision 0

Response Action Report for the 200-MG-1 Operable Unit Waste Site 200-W-33

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

Response Action Report for the 200-MG-1 Operable Unit Waste Site 200-W-33

Date Published
May 2011

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

J. D. Aandal *06/07/2011*
Release Approval Date

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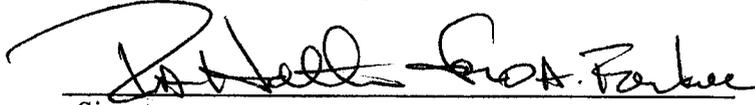
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Approval Page

Title: *Response Action Report for 200-MG-1 Operable Unit Waste Site 200-W-33*

O. A. Farabee
U.S. Department of Energy, Richland Operations Office


Signature _____ Date 6/3/11

Executive Summary

This response action report documents the successful completion of the removal action conducted at the 200-W-33 waste site, also known as the Solid Waste Dumping Area. The alternative proposed in DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*¹ (EE/CA), and selected in DOE/RL-2009-86, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in 200-MG-1 Operable Unit*² (Action Memorandum), was confirmatory sampling/no further action (CS/NFA).

The 200-W-33 waste site was investigated in August 2009 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 (DOE/RL-2009-86). 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 48 Waste Sites in the 200-MG-1 Operable Unit*⁴ (RAWP). Through the investigation summarized in this report, it was found that analytical results from the confirmatory sampling evolution 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 without further removal action.

The results show that the residual soil concentrations of COPCs support reasonably anticipated future land use described in the EE/CA (DOE/RL-2008-44) and Action

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-2009-86, 2010, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in 200-MG-1 Operable Unit*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www2.hanford.gov/arpir/?content=findpage&AKey=0084449>.

³ DOE/RL-2009-60, 2011, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: [http://www5.hanford.gov/pdw/fsd/AR/FSD0001/FSD0064/0084054/11-AMCP-0080 - Letter \[1102030315\] - 1.pdf](http://www5.hanford.gov/pdw/fsd/AR/FSD0001/FSD0064/0084054/11-AMCP-0080 - Letter [1102030315] - 1.pdf).

⁴ DOE/RL-2009-53, 2010, *Removal Action Work Plan for 48 Waste Sites in the 200-MG-1 Operable Unit*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www2.hanford.gov/arpir/?content=findpage&AKey=1010180132>.

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 200-W-33 waste site.

This waste site and the data obtained from the subject sampling evolutions will be included in the risk assessment and the remedial investigation/feasibility study for final remedial decisions for 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	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
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	<i>Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites</i>
EPA	U.S. Environmental Protection Agency
HEIS	Hanford Environmental Information System
N/A	not applicable
NA	not available
NPL	National Priorities List
O&M	operations and maintenance
OU	operable unit
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
RAL	removal action level
RAO	removal action objective
RAWP	<i>Removal Action Work Plan for 48 Waste Sites in the 200-MG-1 Operable Unit</i>
RI/FS	remedial investigation/feasibility study
ROD	record of decision
RTD	removal, treatment, and disposal
SAP	<i>Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites</i>
TPH	total petroleum hydrocarbon

Tri-Party Agreement *Hanford Federal Facility Agreement and Consent Order*
WIDS Waste Identification 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 200-W-33 waste site. The removal action alternative of confirmatory sampling/no further action (CS/NFA) was selected for this waste site, as proposed in DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites (EE/CA)*, and authorized by DOE/RL-2009-86, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in 200-MG-1 Operable Unit* (Action Memorandum). Sampling results from the confirmatory sampling 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 analytical results, the alternative was changed to removal, treatment, and disposal (RTD). This report provides the basis for the successful completion of the RTD action performed at the 200-W-33 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*.

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 200-W-33 waste site have achieved the established RALs and have met the removal action objectives (RAOs) provided in the Action Memorandum (DOE/RL-2009-86). The documentation process is consistent with the U.S. Department of Energy (DOE) *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Remedial Action Site Closure Guidance*.

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, *Superfund Implementation*, the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989), also known as the Tri-Party Agreement, and 40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan."

In March 2011, the non-time-critical removal action for the 200-W-33 waste site was completed in accordance with DOE/RL-2009-53, *Removal Action Work Plan for 48 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
- Descriptions 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 and the development of the removal action for the 200-W-33 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 km² (586 mi²) 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 (i.e., 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, retention basins with shallow contamination (generally less than 4.6 m [15 ft] deep), and 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 described in the EE/CA (DOE/RL-2008-44) and Action Memorandum (DOE/RL-2009-86). The 200-W-33 waste site, also known as the Solid Waste Dumping Area, is located in the 600 Area, just north of the 200 West Area (Figure 1-2).

1.2 Regulatory and Enforcement History

As discussed in Chapter 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 Hanford are in accordance with the Tri-Party Agreement. 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") by EPA. 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 and 200 East Areas, 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.

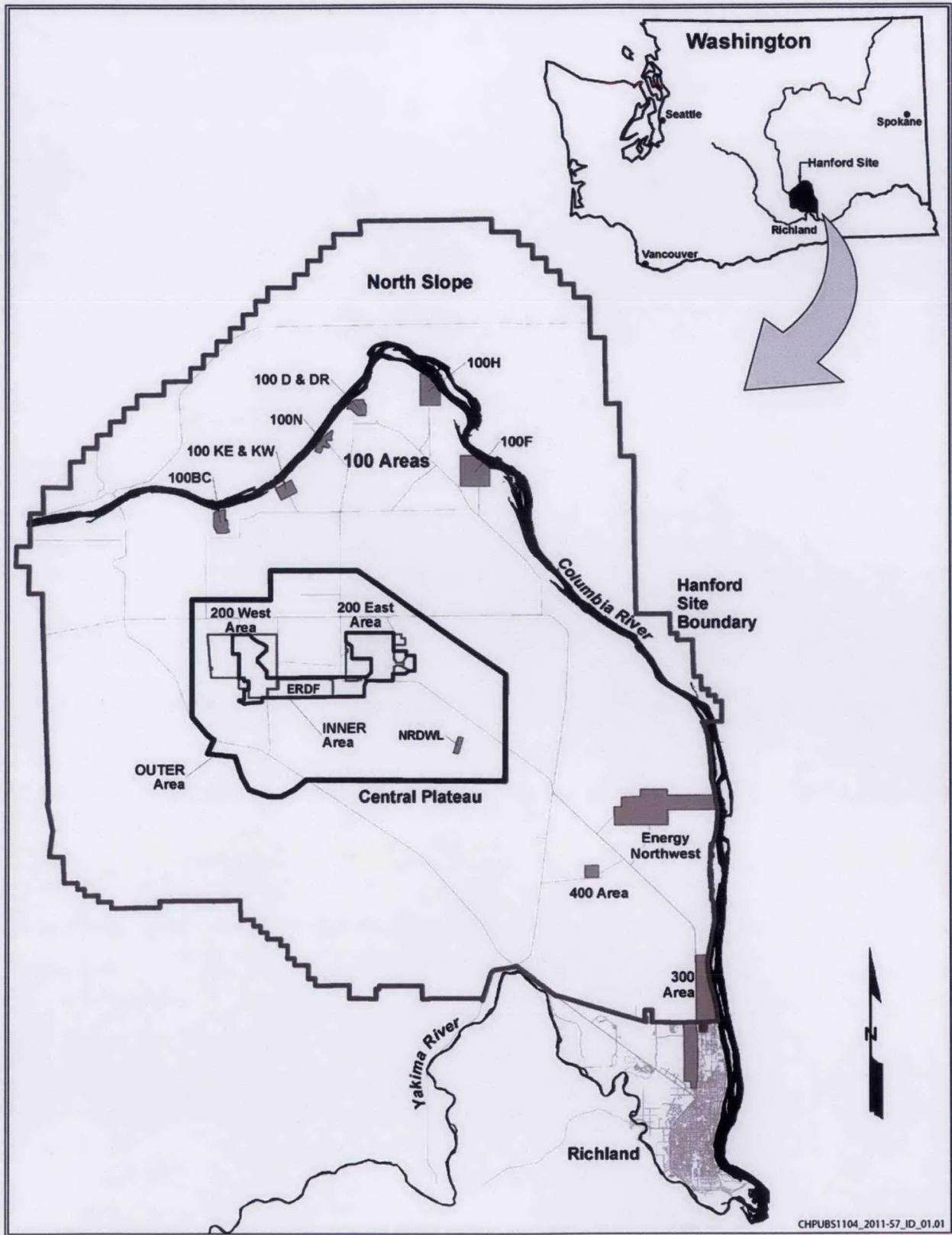


Figure 1-1. Location of the Hanford Site in Washington State

1.3 Environmental Setting

The Hanford Site is located within the semi-arid 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. The uses of the Columbia River include the 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 volumes of liquids discharged, lack of mobility of contaminants, and shallow depth of the discharge(s).

The nearest natural surface water body to the 200-W-33 waste site is the Columbia River, located approximately 7.6 km (4.7 mi) north. The potential for natural groundwater recharge within the 200 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 chapter provides a description of the 200-W-33 waste site and 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 (DOE/RL-2009-86).

2.1 200-W-33 Site Background

The 200-W-33 waste site is a debris dumpsite located in the 600 Area. The waste site is north of the 200 West Area perimeter fence, northwest of the 609 Gate (Figure 2-1). The site is flat although, in numerous areas, the surface is obscured by scattered debris piles. Vegetation cover is typical for the region, dominated by grasses and sagebrush.

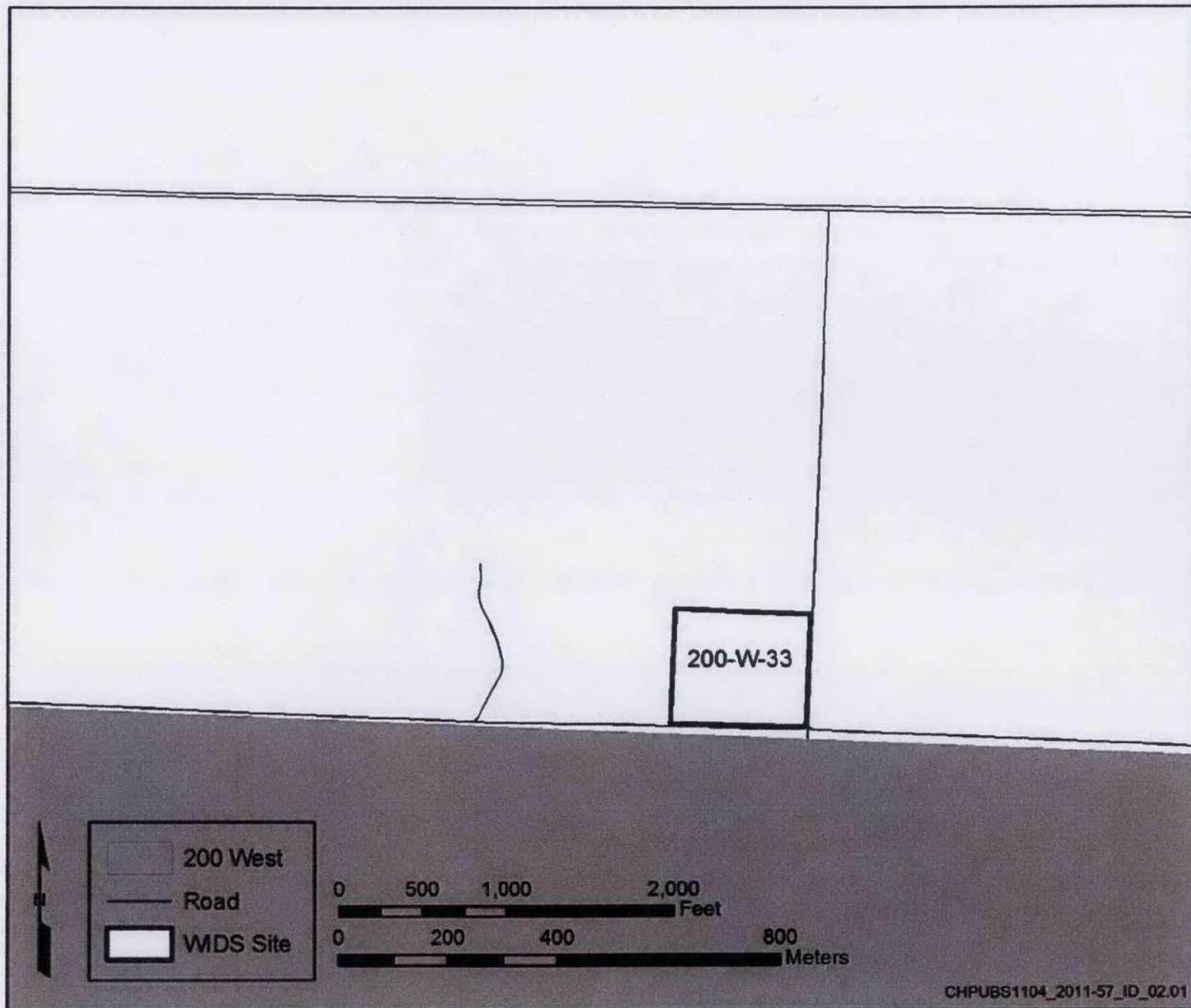


Figure 2-1. 200-W-33 Waste Site Boundary and Operational Areas

The waste site was identified and entered into the Waste Information Data System (WIDS) in April 1996. The original site area, as provided by WIDS, is approximately one acre in size (4,047 m² [43,561 ft²]). The size of the waste site was increased following the 2007 range fire, which exposed additional debris. The calculated area of the 200-W-33 waste site following the 2007 range fire, utilizing the dimensions provided by WIDS, is approximately 52,675 m² (566,991.49 ft²) or 12.63 acres. Observations made during a visual inspection performed in April 1996 included numerous rusted metal containers such as cans, 208 L (55 gal) drums, and miscellaneous wood and metal debris scattered throughout the waste site. Evidence of burning and oil spills were also noted. WIDS indicates that radiological surveys performed in the area did not identify radiological contamination above background.

The release mechanism for this waste site is miscellaneous dumping and abandonment of debris not clearly associated with specific projects or facilities, and the current form of all waste materials is solid. No evidence exists (historical or present) that radiological processes involving a sustained release of materials are associated with this waste site.

2.2 Description of the Selected Alternative

As stated in the EE/CA (DOE/RL-2008-44) and Action Memorandum (DOE/RL-2009-86), the selected alternative for the subject waste site was CS/NFA. This alternative was selected because, due to historical activity and process knowledge, contaminants of potential concern (COPCs) were not expected to exceed the RALs. Initial sampling and analysis did not confirm that concentrations of COPCs in soil were less than or equal to the 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 (DOE/RL-2009-53) 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 concentrations of COPCs in soil 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 waste site history, specific sampling design and methodology, and analytical results for the 200-W-33 waste site.

The following key features relevant to the 200-W-33 waste site were considered during the development of the 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, presence of debris, 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.
- Focused/discrete sampling was performed per the methodology prescribed in the SAP (DOE/RL-2009-60). The use of focused samples based on process knowledge and visual indicators was considered appropriate for the initial sampling evolution. Random sampling in the impacted areas was considered appropriate for the verification sampling evolution.

Based on these key design features, soil samples were collected from the 200-W-33 waste site and analyzed for COPC concentrations. Evaluation of the initial sampling analytical results demonstrated that, for specific areas, concentrations of COPCs were above 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 in situ soils were less than or equal to RALs for COPCs applicable to each impacted area. Table 5-2 provides the maximum

concentrations for each COPC from the verification sampling analytical data. Tables A-1 and A-2 provide detailed summaries of all analytical data results for sampling conducted at the 200-W-33 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 methods and protocols. Of the radiological surveys performed for the 200-W-33 waste site, no radiological dose readings were greater than the measured background and no radiological contamination was found.

2.2.1 Removal Action Objectives

The removal action 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 (DOE/RL-2009-86):

- **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) below ground surface (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 (DOE/RL-2009-86) 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 lower 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. Table 2-1 lists the RALs applicable to the 200-W-33 waste site. The attainment of RALs and RAOs is provided in Chapter 5 of this report.

Table 2-1. Nonradiological Removal Action Levels

Contaminant of 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)	Ecological Risk Screening Values (mg/kg)
Antimony	5	32	5.4	0.6	5.4	5
Arsenic	6.5	6.5 ^d	6.5 ^d	1.0	6.5 ^d	7
Barium	132	16,000	1,650	2	1,650	102
Beryllium	1.51	160	63.2	0.5	63.2	10
Boron	NA	16,000	210	2	210	0.5
Cadmium	0.81	80	0.81 ^d	0.5	0.81 ^d	4
Chromium Total	18.5	120,000	2,000	1	2,000	42
Chromium (VI)	NA	240	-- ^e	0.5	-- ^e	N/A
Cobalt	15.7	24	15.7 ^d	2	15.7 ^d	20
Copper	22.0	3,200	284	1	284	50
Lead	10.2	250	3,000	5.0	250	50
Lithium	33.5	160	192	2.5	160	35
Manganese	512	3,760	512 ^d	5	512 ^d	1,100
Mercury	0.33	24	2.09	0.2	2.09	0.1
Nickel	19.1	1,600	130	4	130	30
Selenium	0.78	400	5.2	1	5.2	0.3
Silver	0.73	400	13.6	0.2	13.6	2
Strontium	NA	48,000	2,920	1	2,920	N/A
Tin	NA	48,000	48,000	10	48,000	1
Uranium (Soluble Salts)	3.21	240	3.21 ^d	1	3.21 ^d	50
Vanadium	85.1	560	2,240	2.5	560	5
Zinc	67.8	24,000	5,970	1	5,970	2
PCB Aroclor 1016	NA	0.5	0.094	0.017	0.094	86
PCB Aroclor 1221	NA	0.5	0.017 ^d	0.017	0.017 ^d	0.65
PCB Aroclor 1232	NA	0.5	0.017 ^d	0.017	0.017 ^d	0.65
PCB Aroclor 1242	NA	0.5	0.039	0.017	0.039	0.65
PCB Aroclor 1248	NA	0.5	0.039	0.017	0.039	0.65
PCB Aroclor 1254	NA	0.5	0.066	0.017	0.066	0.65
PCB Aroclor 1260	NA	0.5	0.72	0.017	0.5	0.65
Acenaphthene	NA	4,800	98	0.33	98	0.65
Acenaphthylene	NA	4,800	98	0.33	98	20

Table 2-1. Nonradiological Removal Action Levels

Contaminant of 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)	Ecological Risk Screening Values (mg/kg)
Anthracene	NA	24,000	2,270	0.33	2,270	N/A
Benzo(a)anthracene	NA	1.37	0.86	0.33	0.86	N/A
Benzo(a)pyrene	NA	0.137	0.233 ^f	0.33	0.33 ^d	N/A
Benzo(b)fluoranthene	NA	1.37	2.95	0.33	1.37	12
Benzo(g,h,i)perylene	NA	2,400	25,700	0.33	2,400	N/A
Benzo(k)fluoranthene	NA	1.37	2.95 ^f	0.33	1.37	N/A
Chrysene	NA	13.7	9.56	0.33	9.56	N/A
Dibenz(a,h)anthracene	NA	1.37	4.29	0.33	1.37	N/A
Fluoranthene	NA	3,200	631	0.33	631	N/A
Fluorene	NA	3,200	101	0.33	101	N/A
Indeno(1,2,3-cd)pyrene	NA	1.37	8.33	0.33	1.37	30
Naphthalene	NA	1,600	4.46	0.33	4.46	N/A
Phenanthrene	NA	24,000	1,140	0.33	1,140	N/A
Pyrene	NA	2,400	655	0.33	655	N/A
Carbon Tetrachloride ^g	N/A	7.69	0.0031	0.005	0.005	N/A
Xylene ^h	N/A	16,000	14.6	0.01	14.6	N/A
Nitrate (as Nitrogen)	11.8	128,000	40	0.75	40	N/A
TPH-Diesel	NA	2,000	2,000	5	2,000	N/A
TPH-Kerosene	NA	2,000	2,000	5	2,000	200
Fluoride ⁱ	N/A	4,800	16	5	16	200
Asbestos	N/A	N/A ^j	N/A ^j	N/A ^j	1 % ^j	N/A

Table 2-1. Nonradiological Removal Action Levels

Contaminant of 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)	Ecological Risk Screening Values (mg/kg)
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a. If Hanford Site-specific background data are not available, values are then taken from Ecology Publication No. 94-115, *Natural Background Soil Metals Concentrations in Washington State*. Hanford Site background values are available from nonradiological background data in DOE/RL-92-24, Rev. 4, *Hanford Site Soil Background: Part 1, Soil Background for Nonradioactive Analytes*, Table D9-2.

b. Direct contact values were calculated based on WAC 173-340-740, "Model Toxics Control Act—Cleanup," "Unrestricted Land Use Soil Cleanup Standards," using Method B methodology and assumptions.

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

d. Where cleanup levels are less than background or required detection limits, cleanup levels default to background or required detection limits in accordance with WAC 173-340-700(6)(d), "Overview of Cleanup Standards," and WAC 173-340-707(2), "Analytical Considerations," 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—calculated value using $K_d = 0$, based on PNNL-13895, *Hanford Contamination Distribution Coefficient Database and Users Guide*, and WAC 173-340-747, equation 747-1.
- 2.1 mg/kg—based on DOE/RL-96-17, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*.
- 18.4 mg/kg—based on Ecology, 2007, *Cleanup Levels & Risk Calculations (CLARC) database*.

f. The soil concentrations for protection of groundwater values for benzo(a)pyrene and benzo(k)fluoranthene were incorrectly reported in DOE/RL-2009-48, *Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit*, and have been corrected.

g. Carbon tetrachloride is applicable to the 11 waste sites authorized by DOE/RL-2009-48.

h. Xylene is applicable only to the 200-W-3, 216-S-19, and 216-S-26.

i. Fluoride is added as a contaminant of potential concern for select sites, such as 216-S-19 and 216-S-26, based on process history.

j. The removal action level for asbestos in soil is 1 percent by weight (measured using polarized light microscopy). EPA has used this value for determining if response actions for asbestos should be undertaken (Cook, 2004, "Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups"). Further evaluation of removal actions for asbestos will be conducted as needed on a site-specific basis in the Outer Area RI/FS.

Ecological screening values, which are based on WAC 173-340-900 "Model Toxics Control Act—Cleanup," "Tables," Table 749-3, are used for screening purposes only and are not considered cleanup levels for this CERCLA removal action (described more fully in Chapter 5 of the Action Memorandum [DOE/RL-2009-86]). 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 the final cleanup decisions.

2.2.2 Exposure and Land-Use Assumptions

The 200-W-33 waste site is located within the Central Plateau, as discussed in more detail in the EE/CA (DOE/RL-2008-44) and Action Memorandum (DOE/RL-2009-86) for the 200-MG-1 OU. Land use for the Central Plateau is designated for reasonably anticipated future uses recognized in the EE/CA and Action Memorandum (for the purposes of this interim action, RAOs were selected that would support unrestricted land use).

2.2.3 Design Summary

The CS/NFA action alternative was the selected alternative for the 200-W-33 waste site. Sampling and analysis indicated that contaminant concentrations in the waste site soils were greater than the RALs. Based on those analytical results, and per the methodology prescribed in the Action Memorandum (DOE/RL-2009-86), the alternative progressed to RTD. Following removal of the impacted soil, verification sampling was conducted to confirm that remaining in situ soil was less than or equal to the RALs. The sampling objectives for the 200-W-33 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 200-W-33 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, presence of debris, 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.
- Focused/discrete sampling was performed per the methodology prescribed in the SAP (DOE/RL-2009-60). The use of focused samples based on process knowledge and visual indicators was considered appropriate for the initial sampling evolution. Random sampling in the impacted areas was considered appropriate for the verification sampling evolution.

2.3 Decision Document Amendments, Significant Differences, or Waivers

No amendments to the EE/CA (DOE/RL-2008-44) or Action Memorandum (DOE/RL-2009-86), or technical impracticability waivers were associated with this removal action. A Tri-Party Agreement change (TPA-CN-350, *Tri-Party Agreement Change Notice Form: DOE/RL-2009-86 Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in the 200-MG-1 Operable Unit, Rev. 0*) has been approved for the Action Memorandum to add sites to the scope of the removal action; however, the change had no effect on the previously authorized action or on cleanup levels for this waste site.

3 Response Activity Summary

As stated in the EE/CA (DOE/RL-2008-44) and Action Memorandum (DOE/RL-2009-86), the selected alternative for the 200-W-33 waste site was CS/NFA. The results of the confirmatory sampling indicated COPC concentrations greater than the RALs in two of the 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, and for debris removal at the waste site. Upon completion of RTD activities, verification sampling was conducted to demonstrate that contaminant concentrations in soil at the 200-W-33 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 200-W-33 waste site was conducted from February 2010 through March 2011 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 (DOE/RL-2009-60). The following key activities were pertinent to the removal action at the 200-W-33 waste site:

- Collection of judgmental soil samples based on historical and process knowledge, and visual indicators.
- Excavation of soil, under the RTD alternative, in zones of potential contamination (ZPCs) 5 and 9 (Figure 3-2), and the additional removal of debris scattered throughout the waste site, along with underlying soil.
- Collection of random samples from ZPCs 5 and 9 for verification purposes, laboratory analysis of soil samples for COPCs, and evaluation of analytical results to demonstrate achievement of RALs.

3.1.1 Waste Site 200-W-33 Confirmatory Sampling

A site evaluation was performed on February 17, 2010, prior to performance of the initial sampling evolution, during which the revised waste site area (12.6 ac) was evaluated. This evaluation served to support job planning as well as completion of the visual inspection component of the sampling activities described in the SAP (DOE/RL-2009-60). Visual inspection confirmed the inert metal and wood debris identified in previous inspections and recorded in historical data remains dispersed unevenly across the site. The vegetation and wood debris in the area showed indication of involvement in the 2007 range fire. Debris encountered during the site evaluation was observed within the original waste site area of approximately one acre, and consisted primarily of fencing materials and miscellaneous metal containers of various sizes, all degraded and empty. In several areas, visual indications of contamination were noted and included discoloration, staining, or disturbed vegetation existing at this location. Figure 3-1 presents the nine ZPCs established at the 200-W-33 waste site.

For radiological field screening at the 200-W-33 waste site, surveys were performed in accordance with established contractor methods and protocols by personnel with current training and qualifications. No radiological postings were present at the waste site. Radiological surveys performed during sampling activities indicated no radiological readings 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 for laboratory analysis.

Initial soil sampling was conducted in March 2010 at the nine ZPCs established during site evaluation. Focused samples were collected from each ZPC based on historical and process knowledge and visual indicators from the surface, which is generally defined as 0 to 0.3 m (0 to 1 ft) bgs. The samples were

analyzed for the full suite of COPCs (metals, polynuclear aromatic hydrocarbons, polychlorinated biphenyls [PCBs], volatile organic analytes, anions, and total petroleum hydrocarbons). Analytical results from the initial sampling evolution indicated concentrations of antimony and nitrate-nitrogen exceeded RALs in ZPCs 5 and 9, respectively, resulting in the implementation of the RTD alternative. Table 3-1 provides a summary of analytical results exceeding the RALs.

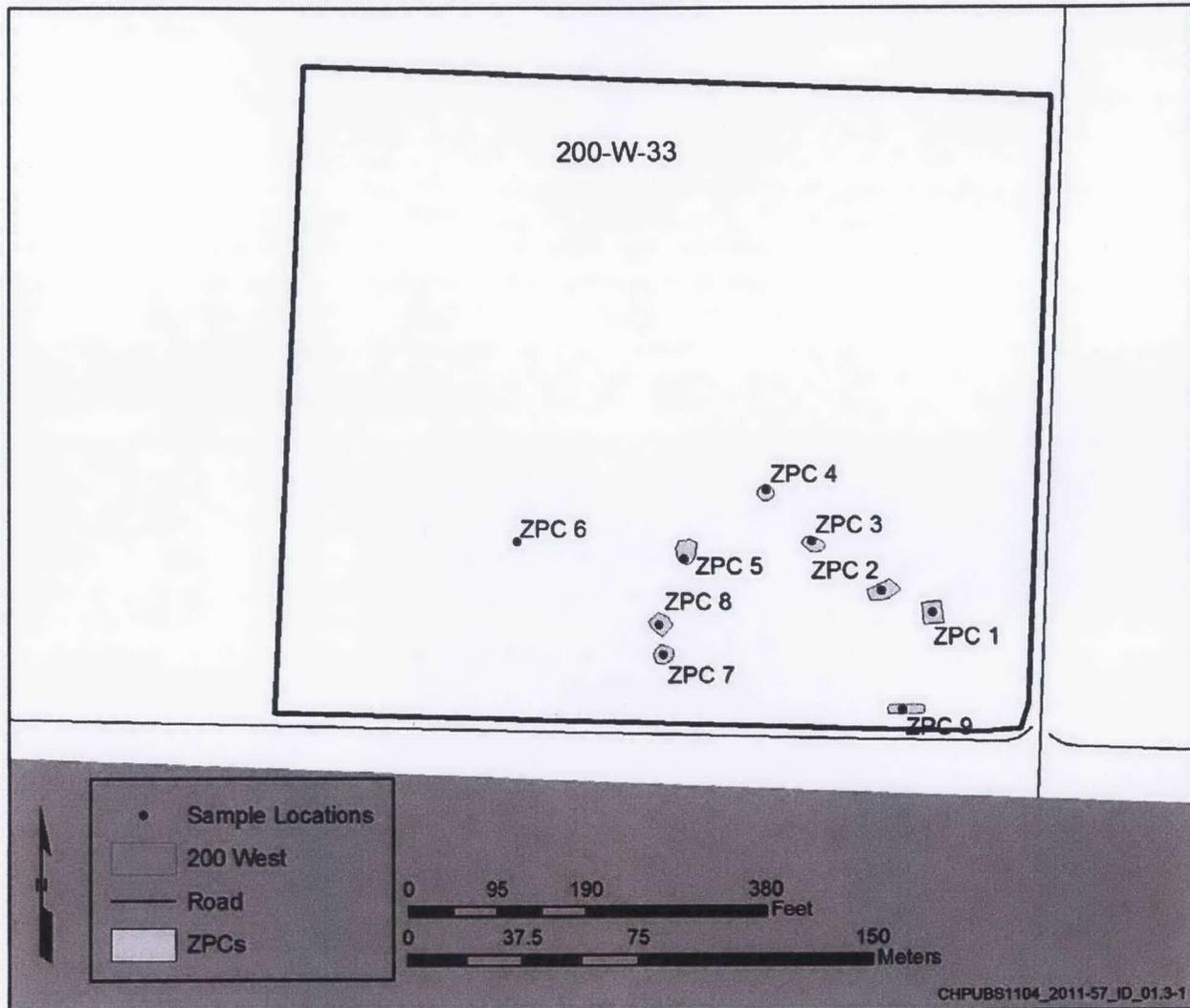


Figure 3-1. Initial Sampling Locations at the 200-W-33 Waste Site

Table 3-1. Concentrations of Contaminants of Potential Concern Exceeding Removal Action Levels

Contaminant Of Potential Concern	Removal Action Level (mg/kg)	Initial Sampling	
		B24M83 ZPC 5 Surface (mg/kg)	B24M88 ZPC 9 Surface (mg/kg)
Antimony	5.4	22.6	U
Nitrate-N	40	12.5	176

Note: Surface is 0 to 0.3 m (0 to 1 ft) bgs.

U = analyzed for, but not detected above, laboratory detection limit

3.1.2 Waste Site Excavation

The results of initial sampling indicated that concentrations of COPCs were greater than the RALs at ZPCs 5 and 9. Removal of impacted soils in these areas commenced on March 7, 2011 with the lateral extent of excavation at the ZPCs determined utilizing visual indicators. Debris at ZPCs 5 and 9 was removed along with approximately 0.3 m (1 ft) of underlying soil. In addition to the debris removal at ZPCs 5 and 9, debris scattered throughout the 200-W-33 waste site was removed along with underlying soil to a depth of approximately 0.3 m (1 ft) during RTD activities.

3.1.3 Waste Site 200-W-33 Verification Sampling

Analytical results from initial sampling indicated COPC concentrations were greater than the RALs at ZPCs 5 and 9. Debris and approximately 0.3 m (1 ft) of underlying soil was removed from the ZPCs and the remainder of the waste site during implementation of the RTD alternative. Upon completion of the RTD activities, a verification sampling design was developed for ZPCs 5 and 9 utilizing Visual Sample Plan™ software to place samples randomly within each ZPC. Samples were collected from the ZPC areas as described in the following subsections.

3.1.3.1 ZPC 5

Initial sampling results indicated antimony as the only constituent greater than the RALs. As a result, the list of COPCs targeted during the verification sampling evolution at ZPC 5 was further refined to include only antimony. The area that comprised ZPC 5 was approximately 48 m² (520 ft²); therefore, two randomly selected samples were collected from the surface (Figure 3-2).

3.1.3.2 ZPC 9

Initial sampling results indicated nitrate-nitrogen as the only constituent greater than the RALs at ZPC 9. As a result, the list of COPCs targeted during the verification sampling evolution at ZPC 9 was further refined to include only nitrate-nitrogen. The area that comprised ZPC 9 was approximately 37 m² (400 ft²), and two randomly selected samples were collected from the surface.

™ PNNL-16939, *Visual Sample Plan, Version 5.0 User's Guide*. Visual Sample Plan is a registered trademark of Pacific Northwest National Laboratory, Richland, Washington.

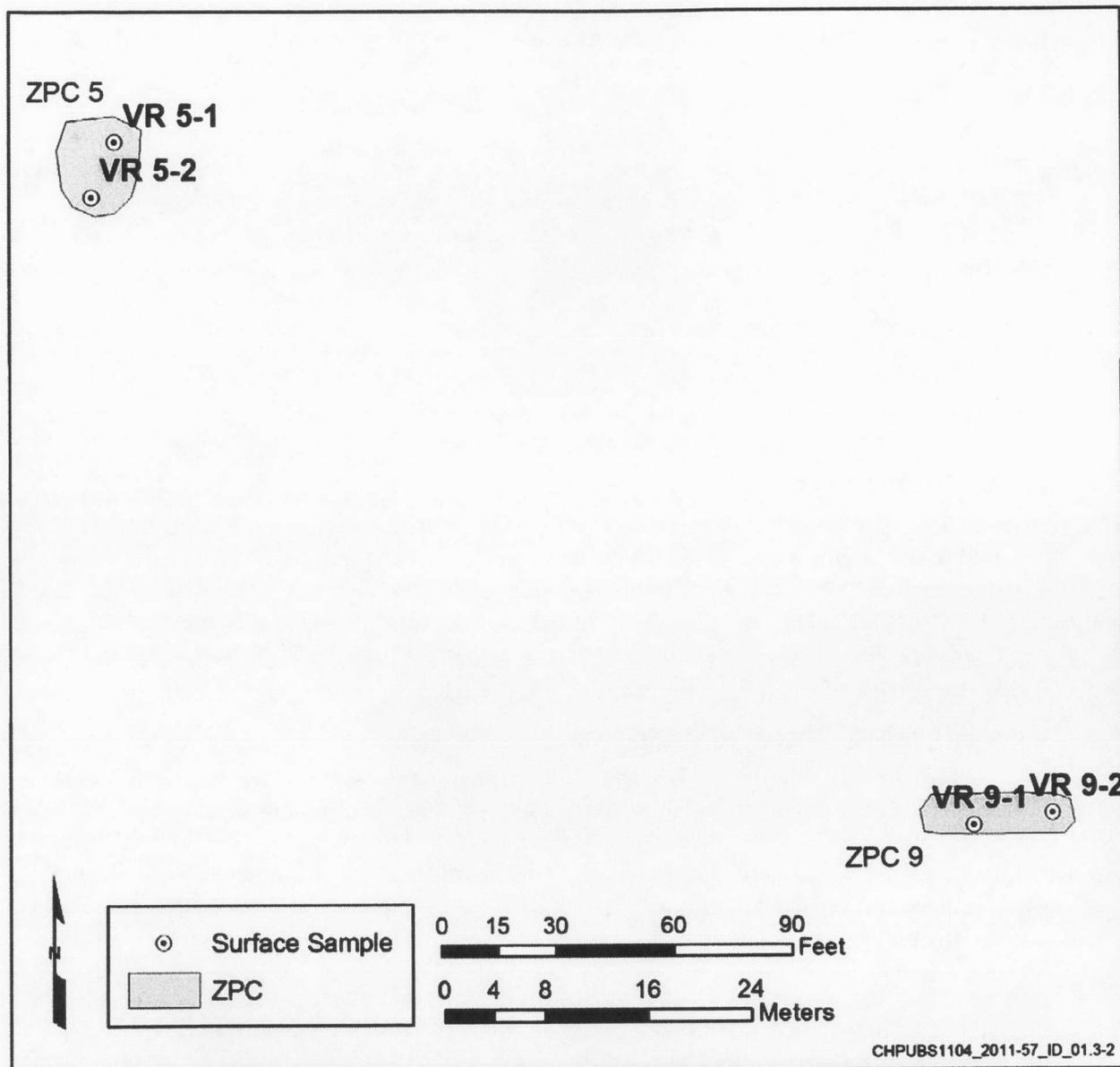


Figure 3-2. Verification Sampling Locations at the 200-W-33 Waste Site

3.1.4 Backfill and Revegetation

As described in Sections 2.1 and 5.5.1 of the RAWP (DOE/RL-2009-53), backfill and/or contouring may take place at the 200-W-33 waste site upon concurrence by the signing parties that the RAOs have been attained. Debris removal, along with approximately 0.3 m (1 ft) of underlying soil, was conducted at the two ZPCs, as well as at the remainder of the 200-W-33 waste site. RAOs were met without requiring additional excavation; therefore, backfill and/or contouring are not required at the 200-W-33 waste site.

In accordance with the ecological compliance review conducted for the 200-W-33 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 200-W-33 waste site is not required; however, the 200-W-33 waste site has been reseeded.

3.1.5 Statement of Protectiveness

In accordance with the SAP (DOE/RL-2009-60), the soil at the 200-W-33 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 200-W-33 waste site are less than established RALs (discussed in further detail in Chapter 5). These results also indicate that residual concentrations will support reasonably anticipated future land use recognized in the EE/CA (DOE/RL-2008-44) and Action Memorandum (DOE/RL-2009-86), and demonstrate that residual concentrations of COPCs in soil throughout the site are unlikely to affect groundwater or the Columbia River. As summarized in Chapter 5, a review of the sampling results showed that the removal action at the 200-W-33 waste site has demonstrated achievement of the RAOs established in the Action Memorandum and identified in the RAWP (DOE/RL-2009-53).

4 Chronology of Events

Table 4-1 presents a chronology of major events associated with sampling the subject waste site. 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, Rev. 0, <i>Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites</i> , approved
February 7, 2010	Site evaluation of the 200-W-33 waste site completed
March 5, 2010	Initial sampling of the 200-W-33 waste site completed
March 26, 2010	Laboratory analytical data evaluation completed
April 15, 2010	DOE/RL-2009-86, Rev. 0, <i>Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in 200-MG-1 Operable Unit</i> , approved
April 21, 2010	Draft of DOE/RL-2009-53, Rev. 1, <i>Removal Action Work Plan for 48 Waste Sites in the 200-MG-1 Operable Unit</i> , completed and routed for approval
May 20, 2010	Draft of DOE/RL-2009-60, Rev. 1, <i>Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites</i> , completed and routed for approval
October 7, 2010	DOE/RL-2009-53, Rev. 1, approved
January 10, 2011	DOE/RL-2009-60, Rev. 1, approved
March 7, 2011	RTD of the 200-W-33 waste site commenced
March 25, 2011	RTD of the 200-W-33 waste site completed
March 28, 2011	Verification sampling of the 200-W-33 waste site completed
April 4, 2011	Laboratory analytical data evaluation completed

5 Performance Standards and Construction Quality Control

This chapter 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 200-W-33 waste site meets the RAOs identified in the Action Memorandum (DOE/RL-2009-86), and 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 the environment through direct exposure to soils and debris by reducing the soil concentration of COPCs to less than or equal to the 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 May 2010 and January 2010, respectively, and by the implementation of considerations and recommendations during work activities. Demonstration that the soil concentration of COPCs is less than or equal to RALs (Table 5-2) meets RAOs 1, 2, and 3.

Table 5-1. Summary of Attainment of Cleanup Objectives

Removal 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 or equal to 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 waste site, conducted during site evaluation and sampling evolutions, which resulted in no measured dose rates greater than background established for the waste site and no detectable radiological contamination. This demonstrates that all individual radiological COPC concentrations are less than or equal to the RALs.	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 that 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 and ecological evaluation and the implementation of considerations during removal activities to minimize wildlife habitat and cultural artifact disruption.	Yes

Per the methodology prescribed in the RAWP (DOE/RL-2009-53) and SAP (DOE/RL-2009-60), initial sampling of the 200-W-33 waste site consisted of visual inspection, radiological survey, and soil sampling performed in March 2010. Resulting data from the sampling evolution indicating concentrations of COPCs greater than the RALs initiated the removal of debris and impacted soils, performed in March 2011, followed by verification sampling performed in April 2011. The results, provided in Tables A-1 and A-2 (Appendix A), demonstrate that there are no chemical COPC concentrations greater than the RALs remaining in soil at the 200-W-33 waste site, thus meeting RAOs 1, 2, and 3.

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

5.1.1 Performance Standard Documentation

This response action report addresses the individual 200-W-33 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 (DOE/RL-2009-86) and RAWP (DOE/RL-2009-53), are a direct comparison to the maximum results from the verification 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 verification sample analytical results for each nonradiological COPC against the established RALs for the 200-W-33 waste site.

Table 5-2. Comparison of Verification Sample Results Against Removal Action Levels for Nonradiological Contaminants of Potential Concern

Contaminant of Potential Concern	Background Concentration* (mg/kg)	Removal Action Level (mg/kg)	Maximum Concentration in Soil (mg/kg)	Does the Maximum Exceed Removal Action Levels?
Metals				
Antimony	5	5.4	U	No
Anion				
Nitrate (as Nitrogen)	11.8	40	29.1	No

* If Hanford Site-specific background data are not available, values are then taken from Ecology Publication 94-115, *Natural Background Soil Metals Concentrations in Washington State*. Hanford Site background values are available from nonradiological background data in DOE/RL-92-24, Rev. 4, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Table D9-2.

U = analyzed for, but not detected above, laboratory detection limit

5.2 Construction Quality Assurance/Quality Control

No construction-related aspects were implemented as part of the selected remedy for the 200-W-33 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 (DOE/RL-2009-60). This review involves evaluation of the data to determine if they are of the right type, quality, and quantity to support the intended use. 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 contractor's validation procedures, which are based on EPA functional guidelines (Bleyler, 1988a, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*; Bleyler, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*), was performed for the entire sampling and analysis data package for the verification samples collected for the 200-W-33 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 duplicates, surrogate recoveries, duplicates, and analytical method blanks. Specific data quality objectives for the site are found in the SAP (DOE/RL-2009-60).

All of the sampling and analysis data generated from the sampling at the 200-W-33 waste site are tracked through the Hanford Environmental Information System (HEIS). All of the sampling and analysis data for the 200-W-33 waste site were found to be useable for decision making purposes as provided in the following summary:

HEIS Identification Numbers: B24M79, B24M80, B24M81, B24M82, B24M83, B24M85, B24M86, B24M87, B24M88, B2CT80, B2CT81, B2CT83, and B2CT84.

Blanks: Equipment blanks (B24MB2, B24MB4, and B2CT87) were received intact to the laboratory and holding times were acceptable.

Field Duplicates: The duplicate (B24M84 and B2CT82) 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 assurance (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-Müller 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 the 200-W-33 waste site 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 200-W-33 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 Chapter 9). Though this report does not require approval by Ecology or 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 (or agencies) 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 shall be maintained in the Administrative Record. No additional regulatory oversight was required for the sampling of the 200-W-33 waste site.

6 Final Inspection and Certifications

There were no final inspections or certifications required in the implementation of the selected alternative for the 200-W-33 waste site; therefore, this chapter is not applicable.

7 Operations and Maintenance Activities

This chapter discusses the operations and maintenance (O&M) for the 200-W-33 waste site.

7.1 Remedy Related Operations and Maintenance or Monitoring

There are no O&M activities or monitoring requirements for the 200-W-33 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 200-W-33 waste site.

7.3 Five-Year Reviews

Five-year reviews are required by CERCLA for post-ROD remedial actions, but do not apply to the 200-W-33 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 action of the Outer Area.

8 Summary of Project Costs

For the purposes of reporting costs of removal action for the 200-W-33 waste site, costs are pro rated utilizing an activity/schedule-based methodology (Table 8-1). 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.

Table 8-1. Cost Summary

Cost Item	Actual Cost Fiscal Year 2010 (\$)	Actual Cost Fiscal Year 2011 (\$)	Actual Total Cost (\$)
Removal Action Capital (Construction) Costs	0	0	0
Removal Action Operating Costs	193,300.00	524,276.41	717,576.41
Total Removal Action Cost	193,300.00	524,276.41	717,576.41
Projected Yearly Operations and Maintenance Cost	0	0	0

9 Waste Site Reclassification

The waste site reclassification form for the 200-W-33 waste site is proposed and processed in accordance with the procedures and definitions 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)." Reclassification form 2011-041 for the 200-W-33 waste site proposes that the status of this waste site be changed to "interim closed out." Per RL-TPA-90-0001, "interim closed out" status indicates that a site meets the cleanup standards specified in the approved 200-MG-1 Action Memorandum (DOE/RL-2009-86) (i.e., the interim response action decision document). This site will be evaluated under the cleanup standards established for the final ROD for this area.

10 Observations and Lessons Learned

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

11 Contact Information

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Appendix A
Sampling Results for the 200-W-33 Waste Site

A1 Sampling Results for the 200-W-33 Waste Site

This appendix contains laboratory analytical results, provided in Tables A-1 and A-2, from the sampling conducted at the 200-W-33 waste site.

- Table A-1 provides analytical results from samples collected during the initial phase of sampling, the results of which initiated execution of the RTD alternative.
- Table A-2 includes final verification sampling results, which demonstrate that concentrations of COPCs were below RALs, thereby attesting to the achievement of established RALs and corresponding RAOs.

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

Contaminants of Potential Concern	Removal Action Levels ^a	Background Concentration ^b	Maximum Reported Laboratory Detection Limits	B24M79 ZPC 1 Surface ^d	B24M80 ZPC 2 Surface ^d	B24M81 ZPC 3 Surface ^d	B24M82 ZPC 4 Surface ^d	B24M83 ZPC 5 Surface ^d	B24M85 ZPC 6 Surface ^d	B24M86 ZPC 7 Surface ^d	B24M87 ZPC 8 Surface ^d	B24M88 ZPC 9 Surface ^d
Metals	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Antimony	5.4	5	0.295	3.5	2.75	U	U	22.6	U	U	U	U
Arsenic	6.5 ^c	6.5	0.393	6.26	4.17	2.54	2.75	3.17	2.46	2.76	3.24	2.71
Barium	1,650	132	0.196	119	93.5	83.6	79.3	72.8	73.2	69	81.4	72.5
Beryllium	63.2	1.51	0.0491	0.39	0.13	0.19	0.19	0.15	0.16	0.15	0.2	0.17
Boron	210	N/A	1.9	37.5	13.4	9.16	8.94	9.8	8.56	9.78	13.6	11.4
Cadmium	0.81 ^c	0.81	0.0982	0.33	0.8	U	U	U	U	U	0.68	U
Chromium (Total)	2,000	18.5	0.491	16.6	8.54	7.46	7.24	7.64	6.04	6.93	9.63	8
Chromium (VI)	N/A	N/A	0.47	U	U	U	U	U	D 0.6	U	U	U
Cobalt	15.7 ^c	15.7	0.0491	9.8	6.75	5.92	6.04	6.24	5.56	5.77	6.45	5.69
Copper	284	22	0.0982	33.8	19	12.3	13.4	14	9.28	9.64	14.8	11.1
Lead	250	10.2	0.0982	76.1	16.2	8.82	6.62	7.73	6.32	5.92	19.4	8.48
Lithium	160	33.5	0.4	5.34	5.26	6.08	5.96	6.27	5.84	6.34	5.92	6.18
Manganese	512 ^c	512	0.0982	442	404	309	324	311	300	299	330	292
Mercury	2.09	0.33	0.0491	U	U	U	U	U	U	U	U	U
Nickel	130	19.1	0.196	29.4	12.2	7.89	7.95	7.64	6.94	7.07	8.81	8.38
Selenium	5.2	0.78	0.295	1.19	1.11	0.71	0.72	0.64	0.71	0.85	0.75	0.82
Silver	13.6	0.73	0.0982	0.19	U	U	U	U	U	U	U	U
Strontium	2,920	N/A	0.0982	45	40.2	20.3	23.5	20.7	22.2	21.6	20.5	29
Thallium	1.59	0.1	0.0982	U	U	U	U	U	U	U	U	U
Tin	48,000	N/A	0.0491	27.3	2.67	0.23	0.18	0.23	0.17	0.21	2.24	0.24
Uranium	3.21 ^c	3.21	0.0491	0.53	0.28	0.29	0.28	0.38	0.23	0.2	0.44	0.21
Vanadium	560	85.1	0.196	38.4	37.5	43.7	39.6	49.2	36.2	41.3	44.8	39.4
Zinc	5,970	67.8	0.786	79.5	631	53.6	46.8	76.3	43.1	47	433	46.4
Anion	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Nitrate-N	40	11.8	1.5	U	U	6.5	11.4	12.5	13.9	28.4	U	176

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

Contaminants of Potential Concern	Removal Action Levels ^a	Background Concentration ^b	Maximum Reported Laboratory Detection Limits	B24M79 ZPC 1 Surface ^d	B24M80 ZPC 2 Surface ^d	B24M81 ZPC 3 Surface ^d	B24M82 ZPC 4 Surface ^d	B24M83 ZPC 5 Surface ^d	B24M85 ZPC 6 Surface ^d	B24M86 ZPC 7 Surface ^d	B24M87 ZPC 8 Surface ^d	B24M88 ZPC 9 Surface ^d
Polynuclear Aromatic Hydrocarbons	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Acenaphthene	98	N/A	0.036	U	U	U	U	U	U	U	U	U
Acenaphthylene	98	N/A	0.036	U	U	U	U	U	U	U	U	U
Anthracene	2,270	N/A	0.036	U	U	U	U	U	U	U	U	U
Benzo(a)anthracene	0.86	N/A	0.036	U	U	U	U	U	U	U	U	U
Benzo(a)pyrene	0.33 ^c	N/A	0.036	U	U	U	U	U	U	U	U	U
Benzo(b)fluoranthene	1.37	N/A	0.036	U	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	1.37	N/A	0.036	U	U	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	2,400	N/A	0.036	U	U	U	U	U	U	U	U	U
Chrysene	9.56	N/A	0.036	U	U	U	U	0.038	U	U	U	U
Dibenzo(a,h)anthracene	1.37	N/A	0.036	U	U	U	U	U	U	U	U	U
Fluoranthene	631	N/A	0.036	40	U	U	U	U	U	U	U	U
Fluorene	101	N/A	0.036	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	1.37	N/A	0.036	U	U	U	U	U	U	U	U	U
Naphthalene	4.46	N/A	0.036	U	U	U	U	U	U	U	U	U
Phenanthrene	1,140	N/A	0.036	U	U	U	U	U	U	U	U	U
Pyrene	655	N/A	0.036	U	U	U	U	U	U	U	U	U
Polychlorinated Biphenyls	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aroclor 1016	0.094	N/A	0.0059	U	U	U	U	U	U	U	U	U
Aroclor 1221	0.017 ^c	N/A	0.0059	U	U	U	U	U	U	U	U	U
Aroclor 1232	0.017 ^c	N/A	0.0059	U	U	U	U	U	U	U	U	U
Aroclor 1242	0.039	N/A	0.0059	U	U	U	U	U	U	U	U	U
Aroclor 1248	0.039	N/A	0.0059	U	U	U	U	U	U	U	U	U
Aroclor 1254	0.066	N/A	0.0066	U	U	U	U	U	U	U	U	U
Aroclor 1260	0.5	N/A	0.0066	U	U	U	U	0.0079	U	U	U	U

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

Contaminants of Potential Concern	Removal Action Levels ^a	Background Concentration ^b	Maximum Reported Laboratory Detection Limits	B24M79 ZPC 1 Surface ^d	B24M80 ZPC 2 Surface ^d	B24M81 ZPC 3 Surface ^d	B24M82 ZPC 4 Surface ^d	B24M83 ZPC 5 Surface ^d	B24M85 ZPC 6 Surface ^d	B24M86 ZPC 7 Surface ^d	B24M87 ZPC 8 Surface ^d	B24M88 ZPC 9 Surface ^d
Total Petroleum Hydrocarbons	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Diesel	2,000	N/A	3.4	27	U	U	U	U	U	U	U	U
Kerosene	2,000	N/A	3.4	27	U	U	U	U	U	U	U	U

a. Removal action levels are from DOE/RL-2009-53, Rev. 1, *Removal Action Work Plan for 48 Waste Sites in the 200-MG-1 Operable Unit*.

b. If Hanford Site-specific background data are not available, values are then taken from Ecology Publication 94-115, *Natural Background Soil Metals Concentrations in Washington State*. Hanford Site background values are from DOE/RL-92-24, Rev. 1, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Table D39-2.

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

d. Surface is 0 to 0.3 m (0 to 1 ft) bgs.

U = analyzed for, but not detected above, laboratory detection limit.

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

Contaminant of Potential Concern	Removal Action Levels ^a	Background Concentration ^b	Maximum Reported Laboratory Detection Limit	B2CT80 VR 5-1 Surface ^c	B2CT81 VR 5-2 Surface ^c	B2CT83 VR 9-1 Surface ^c	B2CT84 VR 9-2 Surface ^c
Metals	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Antimony	5.4	5	0.32	U	U	NA	NA
Anion	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Nitrate-N	40	11.8	1.6	NA	NA	29.1	1.6

a. Removal action levels are from DOE/RL-2009-53, Rev. 1, *Removal Action Work Plan for 48 Waste Sites in the 200-MG-1 Operable Unit*.

b. If Hanford Site-specific background data are not available, values are then taken from Ecology Publication 94-115, *Natural Background Soil Metals Concentrations in Washington State*. Hanford Site background values in nonradiological background data are from DOE/RL-92-24, Rev. 1, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Table D39-2.

c. Surface is 0 to 0.3 m (0 to 1 ft) bgs.

U = analyzed for, but not detected above, laboratory detection limit.

