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DOE/RL-2009-86
Revision 0

Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in the 200-MG-1 Operable Unit

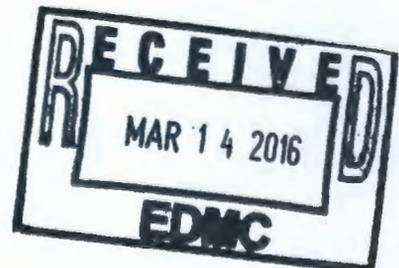
Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management



U.S. DEPARTMENT OF
ENERGY

Richland Operations
Office

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Date Published
March 2010

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



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Release Approval

03/31/2010
Date

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Concurrence

After consideration of the criteria in Section 7.2.4 of Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*, the Washington State Department of Ecology concurs with this Action Memorandum, DOE/RL-2009-86, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in the 200-MG-1 Operable Unit*.

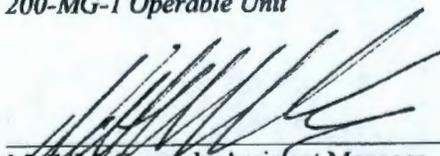


J. A. Hedges, Program Manager
Nuclear Waste Program
Washington State Department of Ecology

4/15/10
Date

Approval

DOE/RL-2009-86, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in the 200-MG-1 Operable Unit*



M. S. McCormick, Assistant Manager
U.S. Department of Energy
Richland Operations Office

4/7/2010
Date

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Contents

1	Purpose.....	1-1
2	Site Background and Conditions	2-1
	2.1 Other Actions to Date.....	2-3
	2.2 EPA, State, and Local Authorities Role	2-7
3	Threats to Human Health or the Environment	3-1
4	Endangerment Determination	4-1
5	Proposed Actions and Estimated Costs	5-1
	5.1 CS/NFA	5-2
	5.2 RTD	5-3
	5.3 Description of Alternative Technologies.....	5-4
	5.4 Applicable or Relevant and Appropriate Requirements.....	5-4
	5.5 Project Costs.....	5-4
	5.6 Project Schedule	5-5
	5.7 Other Considerations.....	5-5
	5.7.1 NEPA Values.....	5-5
6	Expected Change in the Situation Should Action Be Delayed or Not Taken.....	6-1
7	Outstanding Policy Issues.....	7-1
8	Enforcement.....	8-1
9	Recommendation.....	9-1
10	References	10-1

Appendices

A	Waste Site Attributes	A-i
B	Site-Specific Removal Action Level Tables for 37 Waste Sites in the 200-MG-1 Operable Unit	B-i
C	Applicable or Relevant and Appropriate Requirements	C-i

Tables

Table 2-1. 200-MG-1 OU Waste Sites Considered for Removal Actions from DOE/RL-2008-442-2
Table 2-2. 200-MG-1 OU Waste Sites that have Undergone Previous Actions2-3
Table 5-1. 200-MG-1 OU Waste Sites with Proposed CS/NFA Removal Action.....5-2
Table 5-2. 200-MG-1 OU Waste Sites with Proposed RTD Removal Action.....5-4
Table 5-3. Summary of the Proposed Removal Actions Cost.....5-5

Terms

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
CFR	<i>Code of Federal Regulations</i>
COPC	contaminant of potential concern
CS/NFA	confirmatory sampling/no further action
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
MESC/IC/MNA	maintain existing soil cover/institutional controls/monitored natural attenuation
NEPA	<i>National Environmental Policy Act of 1969</i>
NCP	"National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR 300)
NPL	"National Priorities List" (40 CFR 300, Appendix B)
OU	operable unit
RAL	removal action level
RL	U.S. Department of Energy, Richland Operations Office
RTD	removal, treatment, and disposal
Tri-Party Agreement	Ecology et al., 1989a, <i>Hanford Federal Facility Agreement and Consent Order</i>
Tri-Party Agreement Action Plan	Ecology et al., 1989b, <i>Hanford Federal Facility Agreement and Consent Order Action Plan</i>
WAC	<i>Washington Administrative Code</i>
WIDS	Waste Information Data System

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1 Purpose

This action memorandum documents the approval of the U.S. Department of Energy (DOE), Richland Operations Office (RL) proposed *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)*, non-time-critical removal actions for 37 waste sites in the 200-MG-1 Operable Unit (OU). The proposed removal actions for the 200-MG-1 OU will minimize the release or threat of release of hazardous substances that pose a risk to human health and the environment.

A 30-day public comment and review period (June 17 through July 17, 2009) was held for DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, which provides an analysis of the alternatives considered for these removal actions. Comments received generally supported implementation of these actions. The administrative record includes the public comments. DOE/RL-2009-48, *Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit*, provides the full responsiveness summary which includes all of the comments and associated responses. Responses to public comments did not result in changes to DOE/RL-2008-44.

Washington State Department of Ecology (Ecology) provided consultation on the engineering evaluation/cost analysis (EE/CA) and agrees with the selected removal action for the waste sites identified under the 200-MG-1 OU.

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2 Site Background and Conditions

The Hanford Site encompasses approximately 1,517 km² (586 mi²) in the Columbia River Basin of south-central Washington State. In 1989, the U.S. Environmental Protection Agency (EPA) placed the 100, 200, 300, and 1100 Areas of the Hanford Site on the "National Priorities List" (NPL) (*Code of Federal Regulations* Title 40 [40 CFR 300], "National Oil and Hazardous Substances Pollution Contingency Plan" [NCP] Appendix B, "National Priorities List"). The 200 Area NPL site contains the 200 East and 200 West Areas (including waste management facilities and inactive irradiated fuel-reprocessing facilities) and the 200 North Area (formerly used for interim storage and staging of irradiated fuel). The 200 Area NPL includes the 200-MG-1 OU and its assigned waste sites.

The 200-MG-1 OU currently includes 194 waste sites widely dispersed in and around the Hanford Site's 200 Area. The waste site types include French drains, trenches, cribs, ditches, and retention basins with shallow contamination (generally less than 4.6 m [15 ft] deep). This OU also includes waste sites where chemical and radioactive contaminants were released during material transfers (i.e., unplanned release sites). Some sites were produced by airborne dissemination of radioactive particles, or dispersal through plant or animal fecal matter.

RL and Ecology have agreed that reducing the footprint of the Central Plateau by removing outlying waste sites is a priority; thus, the 194 waste sites in the 200-MG-1 OU are being addressed in batches to support strategic goals and priorities. Removal actions for the first 11 waste sites to be addressed in the 200-MG-1 OU were included in DOE/RL-2009-48. This action memorandum addresses the next 37 waste sites in the 200-MG-1 OU. The remaining 146 waste sites will be addressed in future action memoranda. Table 2-1 lists the 37 waste sites. Figure 2-1 shows the locations of the waste sites and their preferred actions.

Newly discovered waste sites identified as similar or comparable to a 200-MG-1 OU waste site group for which removal action alternatives already have been developed and evaluated, will be added to that group through the plug-in approach as further described in DOE/RL-2008-44. Details on these groups of sites are included in DOE/RL-2008-44, Table 2-1. The groupings are based on various factors such as types of releases (i.e., intentional or incidental), estimated volumes of contaminant release, presence of engineered structures, and estimates of potential contamination depth. Confirmatory sampling may be required to determine whether a particular waste site meets the criteria for inclusion in a group. Discovery documentation and response to new waste sites is a routine activity at the Hanford Site. The CERCLA regulations, 40 CFR 300.405, "Discovery or Notification," Subsections (a)(3), (5), and (8), identify some ways that RL may discover "new" (previously unknown) waste sites at the Hanford Site.

RL-TPA-90-0001, *Tri-Party Agreement Handbook Management Procedures*, Guideline TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)," describes how RL, Ecology, and EPA identify and document new waste sites. This action memorandum may be modified to include the disposition of waste sites added to this removal action. Modifications will be processed in accordance with Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan* (Tri-Party Agreement Action Plan), Section 9.0, *Documentation and Records* through the use of Tri-Party Agreement Change Notice(s).

Table 2-1. 200-MG-1 OU Waste Sites Considered for Removal Actions from DOE/RL-2008-44

Waste Site Code	Waste Site Type	Waste Site Code	Waste Site Type	Waste Site Code	Waste Site Type
200 CP	Depression/Pit (nonspecific)	216-B-3-1	Ditch	600-71	Burn Pit
200-E PD	Ditch	216-B-3-2	Ditch	600-220	Dumping Area
200-E-1	Dumping Area	216-B-3-3	Ditch	600-222	Military Compound
200-E-2	Unplanned Release	216-S-16D	Ditch	600-226	Dumping Area
200-E-7	Septic Tank	216-S-19	Pond	600-228	Dumping Area
200-E-46	Dumping Area	216-S-26	Crib	600-281	Dumping Area
200-E-109	Unplanned Release	2607-E1	Septic Tank	CTFN 2703-E	Drain/Tile Field
200-W ADB	Coal Ash Pit	2607-W1	Septic Tank	UPR-200-E-11	Unplanned Release
200-W BP	Burn Pit	2607-WL	Septic Tank	UPR-200-W-58	Unplanned Release
200-W-14	Dumping Area	600 OCL	Sanitary Landfill	UPR-200-W-70	Unplanned Release
200-W-3	Dumping Area	600-37	French Drain	UPR-600-12	Unplanned Release
200-W-33	Dumping Area	600-65	Dumping Area	--	--
200-W-64	Foundation	600-66	Dumping Area	--	--

DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*

ADB = Ash Disposal Basin

PD = Powerhouse Ditch

BP = Burn Pit

OCL = Original Central Landfill

CP = Construction Pit

UPR = Unplanned Release

CTFN = Chemical Tile Field North

Appendix A provides details on each of the 37 waste sites.

2.1 Other Actions to Date

Twenty-one of the 37 waste sites within the scope of this action memorandum have undergone clean-up or stabilization to varying extents in the past. Table 2-2 provides a summary of previous actions that have been undertaken. All 21 waste sites were evaluated in DOE/RL-2008-44.

Table 2-2. 200-MG-1 OU Waste Sites that have Undergone Previous Actions

Waste Site Code	Waste Site Type	Previous Action
216-S-26	Crib	Crib was permanently isolated by filling manhole with concrete.
200 CP	Depression/Pit (nonspecific)	The 2704 HV Building parking lot likely paved over a portion of the old gravel pit.
200-E PD	Ditch	The contaminated portion of the ditch was backfilled, surface stabilized, and the stabilized portion of the ditch was replaced with 366 ft of new underground pipeline located along the axis of the ditch.
216-B-3-1	Ditch	The unit was backfilled in 1964. In 1984 the site was covered with sheets of plastic, sand, and gravel to provide a weed barrier.
216-B-3-2	Ditch	The ditch was surface stabilized in 1984.
216-B-3-3	Ditch	The site was surface stabilized in 1994. The underground pipeline from the Diverter Station to the 216-B-3-3 ditch was cut and filled with concrete.
216-S-16D	Ditch	The ditch has been backfilled and surface stabilized.
200-E-46	Dumping Area	Some wastes have been removed from the site. Such wastes included an aerosol can, a transformer core, and a gallon can contain a tar-like substance.
600-281	Dumping Area	In February 2007, the three compressed gas cylinders were removed from the area. Cylinders previously contained argon, but were confirmed to be empty.
600-65	Dumping Area	In 2001, the listed materials were not present at this site.
200-W-64	Foundation	Laundry facility building was demolished in 1995, however the foundation remains. A radiological survey of the building foundation is done quarterly.
216-S-19	Pond	Wastes were rerouted to the 216-S-26 Crib. Over time, the beta/gamma radioactivity has decayed until presently there is no activity detectable with radiation monitoring field instruments.
600 OCL	Sanitary Landfill	Site has been backfilled to grade. Radiological surveys are performed on this site.
2607-E1	Septic System	The system was abandoned in 1997 in accordance with WAC 246-272-18501, Abandonment. This system was tied into 2607-E1-A.
2607-WL	Septic System	The septic system was abandoned in 1999 per the requirements of WAC 246-272-18501. All septage inside the tank was removed and the empty tank was filled to eliminate void spaces. There are no records of sampling during abandonment activities. Per an agreement with the Washington Department of Health, the septic system lids were left in place.
UPR-200-W-70	Unplanned Release	In 1973, fabro-film was sprayed on contaminated areas and a locked chained gate installed.

Table 2-2. 200-MG-1 OU Waste Sites that have Undergone Previous Actions

Waste Site Code	Waste Site Type	Previous Action
200-E-2	Unplanned Release	Site soil was collected and tested.
UPR-200-E-11	Unplanned Release	In 1957 most of contamination was removed.
UPR-200-W-58	Unplanned Release	After release was identified (1965), the contaminated equipment was isolated and decontamination initiated. Some contaminated dirt was removed from the railroad bed in 1965.
UPR-600-12	Unplanned Release	In 1971, contamination was excavated and removed to a 200 West Burial Ground. In 1998, contamination on the south shoulder of Route 4S near the top of the hill was discovered and in 1999, the area was backfilled with clean material. In January 2006, contaminated (beta/gamma) soil was removed and gravel was added to the site.
200-E-109	Unplanned Release	Contaminated vegetation is removed; however, at times tumbleweeds continue to accumulate. If it is not possible to remove contaminated vegetation, such as tumbleweeds, the contamination is surrounded with a radiation barrier. Although some contaminated fragments and soils were removed, reports indicate that the contaminated fragments and soils keep accumulating. A single area (75.9 by 18.9 m [249 by 62 ft]) was covered with soil.

CP = Construction Pit

UPR = Unplanned Release

OCL = Original Central Landfill

WAC = Washington Administrative Code

PD = Powerhouse Ditch

The previous actions, while potentially consistent with the removal action objectives (see Section 5), have not eliminated the potential threat to human health or the environment. Appendix B contains additional information regarding previous actions.

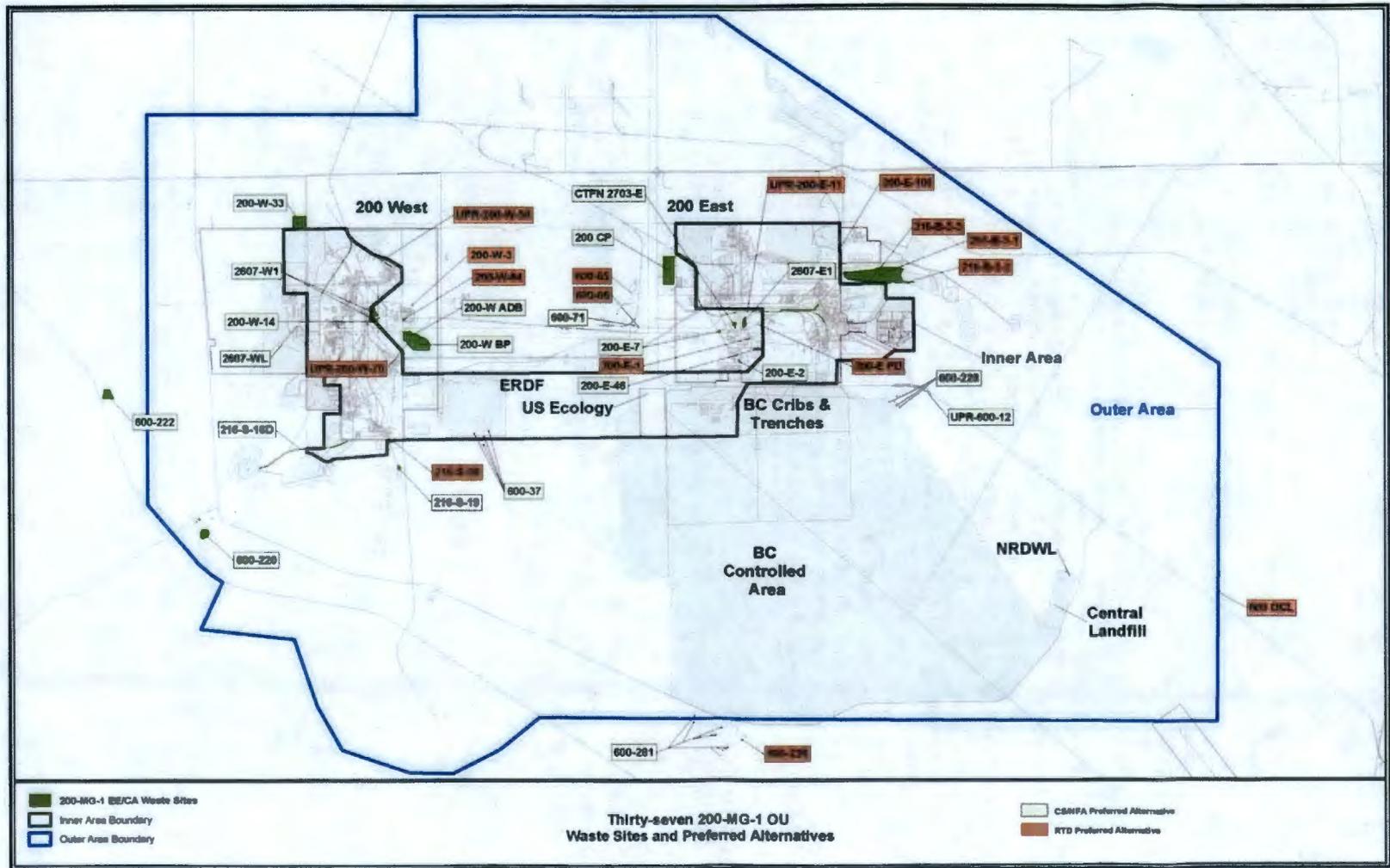


Figure 2-1. Thirty-seven 200-MG-1 OU Waste Sites and Preferred Alternatives

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2.2 EPA, State, and Local Authorities Role

As waste sites listed on the NPL, the 200-MG-1 OU sites are subject to cleanup action under CERCLA. Appendix C of the Tri-Party Agreement Action Plan lists the 200-MG-1 OU waste sites and identifies the lead regulatory agency. The removal actions in this action memorandum will be consistent with the anticipated final remedial action decisions, as required by 40 CFR 300.415(d), "Removal Action." Activities undertaken for cleanup are performed in accordance with the NCP and Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement).

The President is given authority by Section 104 of CERCLA, when there is a threat to public health or welfare of the United States or to the environment, to take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release. This authority is delegated to RL, as CERCLA Lead Agency, through Executive Order 12580, *Superfund Implementation*.

Ecology is the lead regulatory agency for the 200-MG-1 OU. RL is voluntarily submitting its proposal to Ecology for review of and concurrence with this removal action to help ensure consistency with ongoing or subsequent, related remedial actions.

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3 Threats to Human Health or the Environment

The NCP, Section 40 CFR 300.415(b)(2), establishes factors to be considered in determining the appropriateness of a removal action. In particular, 40 CFR 300.415(b)(2)(i) states that "Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants" is justification for performing a removal action. The lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release.

The identified waste sites have contaminants in soils largely at or near the surface. These contaminants may result in direct contact and external exposure to human health and ecological receptors. The potential threat of risks justifies a CERCLA non-time-critical removal action.

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4 Endangerment Determination

Actual or threatened release of hazardous substances, including radioactive substances, from the 200-MG-1 OU waste sites may present an imminent and substantial endangerment to public health, welfare, or the environment if not addressed by implementing the response actions in this action memorandum.

RL will utilize CERCLA response authority whenever a hazardous substance is released, or there is a substantial threat of release into the environment and response is necessary to protect public health, welfare, or the environment. RL is required to respond to any release or substantial threat of release of a hazardous substance into the environment in a manner consistent with CERCLA and the NCP.

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5 Proposed Actions and Estimated Costs

Removal alternatives were evaluated for the disposition of contaminated soil and other materials against their performance to mitigate potential threats to human and ecological receptors as documented in DOE/RL-2008-44. The removal action alternatives evaluated are required to meet the following removal action objectives:

- Removal action objective 1: Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with nonradiological constituents less than 4.6 m (15 ft) below ground surface (bgs) at concentrations above the appropriate removal action levels (RALs).
- Removal action objective 2: Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with radiological constituents less than 4.6 m (15 ft) bgs at concentrations above the appropriate RALs.
- Removal action objective 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.
- Removal action objective 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 this action memorandum will be based on the removal action objectives noted above. To meet the DOE priority in expediting this removal action and to get into the field quickly, cleanup levels from the approved action memorandum (DOE/RL-2009-48) will be used for these 37 waste sites (Appendix B). Protection of the Columbia River will be through the groundwater pathway only. These RALs are based on attainment of acceptable levels of human health, ecological risk, and protection of groundwater, but not lower than background levels or detection limits for waste sites. Attainment of RALs is intended to meet the first three removal action objectives and is expected to satisfy the remedial action objectives established in the final record of decision. The fourth removal action objective is met through cultural and ecological reviews performed before starting removal action activities.

Ecological screening values, based on WAC 173-340-900 Tables, Table 749-3, are included in Appendix B and are for screening purposes only. Ecological screening values are not considered cleanup levels for this removal action. If cleanup verification sampling values exceed the ecological screening values provided, additional analysis will be conducted in the remedial investigation/feasibility study and Ecological Risk Assessment for the Central Plateau in order to make final cleanup decisions.

The descriptions of viable removal alternatives and the analysis of effectiveness, implementability, and cost are provided in detail in DOE/RL-2008-44, Sections 4.0 and 5.0. Alternatives evaluated included the following:

- Alternative 1: No Action
- Alternative 2: Maintain Existing Soil Cover/Institutional Controls/Monitored Natural Attenuation (MESC/IC/MNA)
- Alternative 3: Confirmatory Sampling/No Further Action (CS/NFA)
- Alternative 4: Removal, Treatment, and Disposal (RTD)

The CERCLA requires the No Action alternative as a baseline for comparison with other removal action alternatives. Under the No Action alternative no legal restrictions, institutional controls, or active measures are applied to the waste sites.

The No Action alternative was not selected as the preferred action for any of the 200-MG-1 OU waste sites in DOE/RL-2008-44 because this alternative is not protective to human health or the environment. This alternative is not recommended as a proposed action.

The MESC/IC/MNA alternative was not selected as the preferred action for any of the 200-MG-1 OU waste sites in DOE/RL-2008-44 because of insufficient data. This alternative is not recommended as a proposed action.

The proposed removal actions and estimated costs for the 37 waste sites addressed in this action memorandum are presented in the following sections.

5.1 CS/NFA

Under the CS/NFA, sampling and analysis will be conducted on the waste sites listed in Table 5-1 to confirm that soil contaminant concentrations are at or below RALs and that no further action is required. Contaminants of potential concern¹ (COPCs) are not expected to exceed RALs for these waste sites. Radiological surveys will be included in the initial site investigation as appropriate for site conditions to support the selection of sampling locations. The existing sampling and analysis plan (DOE/RL-2009-60, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*) and removal action work plan (DOE/RL-2009-53, *Removal Action Work Plan for 11 Waste Sites in the 200-MG-1 Operable Unit*) will be revised. The sampling and analysis plan will contain the necessary information to support chemical and radionuclide data collection at a sufficient quantity and quality to determine whether RALs have been met.

If confirmatory sampling results indicate that the RALs are not met (i.e., soil concentrations of COPCs exceed RALs), then the RTD alternative will be implemented or the waste site will be removed from the scope of the action memorandum and will be evaluated as part of the final remedial action for the 200-MG-1 OU.

As noted in DOE/RL-2008-44, Table 5-4, the CS/NFA alternative was selected as the preferred action for 21 of the 37 200-MG-1 OU waste sites included in this action memorandum. The waste sites selected for the CS/NFA alternative and the associated present worth costs are summarized in Table 5-1.

Table 5-1. 200-MG-1 OU Waste Sites with Proposed CS/NFA Removal Action

Waste Site Code	Waste Site Type	Present Worth (FY 2008 \$)	Waste Site Code	Waste Site Type	Present Worth (FY 2008 \$)
200 CP	Depression/Pit (nonspecific)	\$347,000	2607-W1	Septic Tank	\$1,348,000
200-E-2	Unplanned Release	\$168,000	2607-WL	Septic Tank	\$302,000
200-E-46	Dumping Area	\$347,000	600-37	French Drain	\$180,000
200-E-7	Septic Tank	\$290,000	600-71	Burn Pit	\$122,000
200-W ADB	Coal Ash Pit	\$347,000	600-220	Dumping Area	\$638,000
200-W BP	Burn Pit	\$347,000	600-222	Military Compound	\$533,000

¹ DOE/RL-2008-44 provides the list of COPCs.

Table 5-1. 200-MG-1 OU Waste Sites with Proposed CS/NFA Removal Action

Waste Site Code	Waste Site Type	Present Worth (FY 2008 \$)	Waste Site Code	Waste Site Type	Present Worth (FY 2008 \$)
200-W-14	Dumping Area	\$168,000	600-228	Dumping Area	\$122,000
200-W-33	Dumping Area	\$598,000	600-281	Dumping Area	\$168,000
216-S-16D	Ditch	\$168,000	CTFN 2703-E	Drain/Tile Field	\$330,000
216-S-19	Pond	\$878,000	UPR-600-12	Unplanned Release	\$168,000
2607-E1	Septic Tank	\$867,000	--	--	--
Total Present Worth for CS/NFA sites: \$8,436,000					

ADB = Ash Disposal Basin

BP = Burn Pit

FY = fiscal year

CP = Construction Pit

UPR = Unplanned Release

The total present worth costs are further described in Section 5.5.

5.2 RTD

Under the RTD action, sampling and analysis will typically be conducted to confirm that soil contains COPCs above RALs and requires removal. Hazardous chemical and/or radiological wastes are anticipated for this removal action alternative. Segregation of solid waste is not necessary to meet the waste acceptance criteria at the Environmental Restoration Disposal Facility (ERDF). However, where process knowledge and information are available to make a determination, removal actions may be conducted without prior confirmation sampling to remove and dispose of soil and other materials above RALs, with treatment as required for disposal. Through verification sampling and analysis, remaining in situ soils will be demonstrated to be at or below RALs for waste sites contaminated with either nonradionuclides and/or radionuclides.

In this action, soils will be removed until the RALs are achieved, generally to a depth less than 4.6 m (15 ft). In some cases, excavation beyond 4.6 m (15 ft) may be required. These cases include waste sites where removal of an engineered structure is required, or where verification sampling indicates that deeper excavation is required to attain RALs. If waste sites are encountered with contamination deeper than 4.6 m (15 ft) bgs, then soil samples will be taken at depths greater than 4.6 m (15 ft) to characterize potential groundwater risk drivers and the information will be further evaluated in the geographic area remedial investigation/feasibility study. The On-Scene Coordinator, in consultation with Ecology, will determine whether excavation to greater depths is justified to remove soil with concentrations greater than the RALs. Extent of excavation will be consistent with the anticipated remedial action to the extent practicable. A decision matrix for determining the path forward in this situation will be included in a removal action work plan.

If sampling results indicate that the RTD alternative is unnecessary because existing site conditions meet RALs without further action (i.e., soil concentrations of COPCs are at or below RALs), then the CS/NFA alternative will be implemented. If sampling results indicate contaminants that, even with treatment, exceed the ERDF waste acceptance criteria, then the waste site may be removed from the scope of the action memorandum and will be evaluated as part of the final remedial action for the 200-MG-1 OU (which could include transferring the waste site to another OU).

From DOE/RL-2008-44, the RTD alternative was selected as the preferred action for 16 of the 37 200-MG-1 OU waste sites for this action memorandum. The waste sites selected for the RTD alternative and their associated present worth costs are summarized in Table 5-2.

Table 5-2. 200-MG-1 OU Waste Sites with Proposed RTD Removal Action

Waste Site Code	Waste Site Type	Present Worth (FY 2008 \$)	Waste Site Code	Waste Site Type	Present Worth (FY 2008 \$)
200-E PD	Ditch	\$1,027,000	216-S-26	Crib	\$983,000
200-E-1	Dumping Area	\$402,000	600 OCL	Sanitary Landfill	\$2,384,000
200-E-109	Unplanned Release	\$445,000	600-65	Dumping Area	\$133,000
200-W-3	Dumping Area	\$729,000	600-66	Dumping Area	\$132,000
200-W-64	Foundation	\$871,000	600-226	Dumping Area	\$132,000
216-B-3-1	Ditch	\$2,086,000	UPR-200E-11	Unplanned Release	\$4,973,000
216-B-3-2	Ditch	\$2,449,000	UPR-200-W-58	Unplanned Release	\$2,085,000
216-B-3-3	Ditch	\$1,829,000	UPR-200-W-70	Unplanned Release	\$137,000
Total Present Worth for RTD sites: \$20,797,000					

FY = fiscal year

PD = Powerhouse Ditch

OCL = Original Central Landfill

UPR = Unplanned Release

The total present worth costs are further discussed in Section 5.5.

5.3 Description of Alternative Technologies

Because the waste sites contain shallow contamination that can be removed easily, alternative technologies were not evaluated.

5.4 Applicable or Relevant and Appropriate Requirements

The NCP (40 CFR 300) requires that the removal actions described in this action memorandum comply with applicable or relevant and appropriate requirements (ARARs) to the extent practicable. Appendix C identifies and describes specific regulatory sections that are ARAR to the removal actions.

5.5 Project Costs

Total present-worth costs for the proposed removal actions are presented in Table 5-3. Cost estimates can be found in SGW-38383, *Cost Estimate for the 200-MG-1 Operable Unit Engineering Evaluation/Cost Analysis Removal Actions*. The costs were developed to act as a discriminator for deciding between similar protective and implementable alternatives for a given waste site. For the CS/NFA alternative, the number of samples is linked to the waste site area and the expected depth of contamination; the actual cost associated with the CS/NFA alternative will include removal of uncontaminated surface debris. Costs associated with the RTD alternative consider removal and disposal of small soil sites and sites that contain structure slabs/foundations, debris, or large volumes of contaminated soil. The RTD costs also include pre-verification sampling and verification sampling and mobilization and demobilization costs on a waste-site-by-waste-site basis. The base assumptions associated with the project costs are

documented in SGW-38383 as well as summarized in DOE/RL-2008-44. The target accuracy for the cost estimates is -30 percent to +50 percent as specified in EPA/540/R-00/002, *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study*.

Table 5-3. Summary of the Proposed Removal Actions Cost

Proposed Removal Action	Number of Waste Sites	Present Worth (FY 2008 \$)
CS/NFA	21	\$8,436,000
RTD	16	\$20,797,000
Total	37	\$29,233,000

FY = fiscal year

5.6 Project Schedule

DOE/RL-2008-44, Section 6.2 references Tri-Party Agreement Milestone M-015-49A-T01 and makes the following commitment for the 200-MG-1 OU.

A draft action memorandum for the 200-MG-1 OU will be submitted with a proposed set of M-016 series of interim milestones to establish specific schedules, adjusted to site priorities, to complete the remediation field work by 2024. The proposed set of M-016 milestones will include a process to reevaluate priorities annually.

The removal actions for the 37 waste sites included in this action memorandum are expected to be completed by the end of calendar year 2014. The removal action work plan will include a project schedule in accordance with the Tri-Party Agreement Action Plan, Section 11.6.

5.7 Other Considerations

Other considerations for this action memorandum are under the *National Environmental Policy Act of 1969* (NEPA) values.

5.7.1 NEPA Values

This action memorandum documents approval of the RL non-time-critical removal action to clean up 37 waste sites in the 200-MG-1 OU. These waste sites were evaluated for cleanup under the 200-MG-1 OU engineering evaluation/cost analysis documented in DOE/RL-2008-44. Twenty-one (21) of the 37 waste sites, comprising an area of approximately 11.2 ha (27.7 a), are expected to be removed under Alternative 3, CS/NFA. Sixteen (16) of the 37 waste sites, comprising an area of approximately 4.0 ha (9.9 a), are expected to be removed under Alternative 4, RTD.

Under the NEPA compliance program per DOE O 451.1B, *National Environmental Policy Act Compliance Program*, Section 5.a.(13), RL will "...incorporate NEPA values, such as analysis of cumulative, offsite, ecological, and socioeconomic impacts, to the extent practicable, in U.S. Department of Energy (DOE) documents prepared under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*." The NEPA values associated with cleanup of the waste sites were generally summarized in Section 5.5 of DOE/RL-2008-44. The aforementioned NEPA values were based on consideration of the more detailed information presented in DOE/RL-2008-44 CERCLA Evaluation Criteria: discussion of the specific site characteristics (Section 2.3), COPC (Section 2.4), and alternative removal actions (Sections 4.0 and 5.0). Applying a "sliding scale" of NEPA analysis to the

200-MG-1 OU (using DOE 2004, *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*), and considering the CERCLA ARARs (detailed in Appendix C of DOE/RL-2008-44), the principle resource areas of concern include the contaminants in the soils; solid and liquid radioactive and hazardous waste management; air emissions; potential adverse effects to historic and cultural resources; ecological resources; socioeconomics, including environmental justice concerns; and transportation.

For purposes of implementing the preferred removal actions, when soils at a site in this OU are found to be contaminated with hazardous substances in concentrations presenting a material threat to human health and the environment, that threat will be mitigated by meeting the applicable ARAR standards as well as following current DOE policy and guidance. The net anticipated effect could be a positive contribution to cumulative environmental effects at the Hanford Site through the RTD cleanup of such hazardous substances and contaminants of concern into a facility that has been designed and legally authorized to safely contain such contaminants. Wastes generated during the proposed activities would be manageable within the capacities of existing facilities. RL expects that the primary facility to receive contaminated soils will be the ERDF. The NEPA values in the planning for the ERDF operation were explained in detail in the original ERDF NEPA Roadmap (DOE/RL-94-41, *NEPA Roadmap for ERDF Regulatory Package*) for the ERDF remedial investigation/feasibility study (DOE/RL-93-99, *Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility*) as described in EPA 2007, *U.S. Department of Energy Environmental Restoration Disposal Facility Hanford Site – 100 Area Benton County, Washington*.

The NEPA values most relevant to and potentially affected by the actions taken place under these removal actions are described in Table C-3.

6 Expected Change in the Situation Should Action Be Delayed or Not Taken

If action is delayed or not taken, waste site contaminants in soils largely at or near the surface may result in contaminants migrating in the environment or may result in direct exposure to human health and ecological receptors. If contamination migrates in the environment over time, the potential for worker, public, and environmental exposures, as well as removal costs, increases.

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7 Outstanding Policy Issues

There are no policy issues associated with this removal action.

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8 Enforcement

RL is conducting this removal action as the lead agency under the authority of 40 CFR 300.5, "Definitions," and 40 CFR 300.415(b)(1).

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9 Recommendation

This decision document represents the selected removal actions for 37 waste sites in the 200-MG-1 OU, developed in accordance with CERCLA, as amended by the *Superfund Amendments and Reauthorization Act of 1986*, and is consistent with NCP. Recommended removal action is a combination of Alternative 3, CS/NFA, and Alternative 4, RTD. Site conditions meet NCP Section 40 CFR 300.415(b)(2)(i) criteria for a removal action. This decision is based on information provided in the administrative record for this project.

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10 References

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Appendix A
Waste Site Attributes

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A1 Introduction

This appendix presents attributes of each site evaluated to determine the preferred removal action alternative. Table A-1 is organized by site type, which allows a row-by-row comparison by waste site type. Table A-1 also lists the attributes of the 200-MG-1 Operable Unit waste sites. The following attributes are given in the table:

- Waste site code
- Current status
- Waste site type
- Waste site name
- Facility area
- Physical setting
- Backfill status
- Surface cover status
- Surface cover thickness
- Site area, length, width, depth
- Potential contaminant interval
- Summary of prior cleanup activities
- Release mechanism
- Release type
- Potential constituents (radioactive and nonradioactive)

Table A-2 is a subset of the 200-MG-1 Operable Unit waste sites not presented in Table A-1. The list consists of four septic systems that have at least one septic tank and one tile field. The tank and tile fields were costed differently and have different attributes. This table was used to evaluate information on each part of the septic system so a preferred alternative could be chosen.

Waste site descriptions and other information are quoted directly from the Waste Information Data System database and other references. No modifications have been made to maintain consistent format, and references cited in those descriptions are not provided.

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Table A-1. 200-MG-1 Operable Unit Waste Site Attributes - 33 Waste Sites

Waste Site Code	Current Status	Waste Site Type	Waste Site Name	Facility Area	Physical Setting	Backfill (Y/N)	Surface Cover Present (Y/N)	Surface Cover Thickness (ft)	Site Area (ft ²)	Site Length (ft)	Site Width (ft)	Site Depth (ft)	Potential Cont. Interval (ft)	Prior Cleanup Activities	Release Mechanism	Release Type (Solid and/or Liquid)	Potential Constituents	
																	Radiological	Nonradiological
200-W BP	Active	Burn Pit	200-W BP, 200-W Burning Pit, Pit 34	T Plant Area	Burn Pit	N	N	None	4.0E+4	200	200	Unk.	0-1 (spotty)	None	Dumping Area	Solid	Beta-gamma radiation measuring from 5,000-50,000 cpm.	Unk.
600-71	Inactive	Burn Pit	600-71, 607 Batch Plant Burn Pit	ERDF Area	Burn Pit	N	N	None	8,000	100	80	Unk.	0-1 (spotty)	None	Unk.	Solid	None	Misc. debris, demolition and inert waste
200-W ADB	Inactive	Coal Ash Pit	200-W ADB, 200-W Ash Disposal Basin	T Plant Area	Coal Ash Pit	N	N	None	4.8E+5	800	600	Unk.	0-1 (spotty)	None	Ash Disposal	Solid	None	Unk.
216-S-26	Inactive	Crib	216-S-26, 216-S-19 Replacement Facility, 216-S-26 Crib	200 West Ponds Area	Crib	Y	N	None	1.5E+4	444	34	12	12-15	Crib was permanently isolated by filling manhole with concrete.	Contaminated Effluent	Liquid	Strontium-90, Technetium-99, H3, Uranium-238.	Arsenic, Hexavalent Chromium, Lead
200 CP	Inactive	Depression/Pit (nonspecific)	200 CP, 200 Area Construction Pit, 200 Area Construction Waste Site, Hanford Site Gravel Pit 29	200 East Admin Area	Depression/Pit	N	N	None	7.5E+5	1,500	500	20	0-1 (spotty)	Believed that a portion of the old gravel pit has been paved over for the parking lot for the 2704 HV Building.	Construction	Solid	None	Unk.
200-E PD	Active	Ditch	200-E PD 200-E Powerhouse Ditch, 200 East Powerhouse Pond	Semi-Works/ Area, PUREX Area	Ditch	Y	Y	2	1.3E+5	2666	50	6	6-8	The contaminated portion of the ditch was backfilled, surface stabilized, and the stabilized portion of the ditch was replaced with 366 ft of new underground pipeline.	Contaminated Effluent	Liquid	Radiological animal feces and windblown specs from nearby contaminated area.	Unk.
216-B-3-1	Inactive	Ditch	216-B-3-1, B Swamp Ditch, 216-B-2, 216-B-3 Ditch, 216-B-2E	200 E Ponds Area	Ditch	Y	Y	1-2	1.2 E+5	3200	36	6	6-10	The unit was backfilled in 1964. In 1984 the site was covered with sheets of plastic, sand and gravel to provide a weed barrier.	Contaminated Effluent	Liquid	Cs-137 and a cooling leak in a process cooling tank in PUREX put an estimated 2,500 Ci of fission products into the ditch.	As, Ba, Cd, Pb, Se, Hg, Hex Cr
216-B-3-2	Inactive	Ditch	216-B-3-2, 216-B Ditch, 216-B-1 Ditch, B Swamp Ditch, 216-B-2E	200 E Ponds Area	Ditch	Y	Y	1-2	5.6E+4	3700	15	6	6-10	The ditch was surface stabilized in 1984.	Contaminated Effluent	Liquid	Cs-137 and in 1970 a maximum dose rate of 450 mR/h measured at the head of the ditch.	As, Ba, Cd, Pb, Se, Hg, Hex Cr
216-B-3-3	Inactive	Ditch	216-B-3-3, B Swamp Ditch, 216-B-3-3 Ditch	200 E Ponds Area	Ditch	Y	Y	1-2	7.4E+4	3700	20	6	6-10	The site was surface stabilized in 1984. The underground pipeline from the Diverter Station to the 216-B-3-3 ditch was cut and filled with concrete.	Contaminated Effluent	Liquid	Cs-137	As, Ba, Cd, Pb, Se, Hg, Hex Cr

Table A-1. 200-MG-1 Operable Unit Waste Site Attributes - 33 Waste Sites

Waste Site Code	Current Status	Waste Site Type	Waste Site Name	Facility Area	Physical Setting	Backfill (Y/N)	Surface Cover Present (Y/N)	Surface Cover Thickness (ft)	Site Area (ft ²)	Site Length (ft)	Site Width (ft)	Site Depth (ft)	Potential Cont. Interval (ft)	Prior Cleanup Activities	Release Mechanism	Release Type (Solid and/or Liquid)	Potential Constituents	
																	Radiological	Nonradiological
216-S-16D	Inactive	Ditch	216-S-16D, 202-S Swamp (New) and Ditch, 202-S Swamp #1, REDOX Pond #2, 216-2-24 Ditch	200 W Ponds Area	Ditch	Y	Y	1-2	6800	1700	4	3	3-6	The ditch has been backfilled and surface stabilized.	Contaminated Effluent	Liquid	Unk.	Unk.
CTFN 2703-E	Inactive	Drain/Tile field	CTFN 2703-E, 200-E Chemical Drain Field, Chemical Tile Field North of 2703-E	200 E Admin Area	Drain/Tile Field	N	N	None	2.4E+4	155	155	6	6-10	None	Liquid disposal	Liquid	Unk.	Unk.
200-E-1	Inactive	Dumping Area	200-E-1, 284-E Landfill	200 East Admin Area	Dumping Area	N	N	None	Unk.	irr.	irr.	Unk.	0-6	None	Landfill	Solid	None	Asbestos
200-E-46	Inactive	Dumping Area	200-E-46, RCRA Permit General Inspection #200EFY96 Item #3	200 East Admin Area	Dumping Area	N	N	None	8.1E+4	492	164	Unk.	0-1 (spotty)	Some wastes have been removed from the site an aerosol can, a transformer core, and a gallon can containing a tar-like substance.	Dumping Area	Solid and Liquid	None	Unk.
200-W-3	Inactive	Dumping Area	200-W-3, 2713-W North Parking Lot, 220-W-1	T Plant Area	Dumping Area	N	N	None	1.5E+5	300	500	Unk.	0-3 (spotty)	None	Unk.	Liquid	None	PCBs, lead, xylene, and petroleum hydrocarbons
200-W-33	Inactive	Dumping Area	200-W-33, Solid Waste Dumping Area, Debris near gate 609	WM Area	Dumping Area	N	N	None	5.7E+5	804	705	Unk.	0-3 (spotty)	None	Dumping Area	Solid and Liquid	None	Oil substance, bum residue
600-220	Inactive	Dumping Area	600-220, H-51 Anti-Aircraft Artillery Site Dumping Area	S.W. 200 West Ponds Area	Dumping Area	N	N	None	3.5E+5	647	545	Unk.	0-1 (spotty)	None	Dumping Area	Solid	None	Asbestos, misc. trash and construction debris
600-226	Inactive	Dumping Area	600-226, Gun Site H-42 Dumping Area	S. NRDWL/BC Controlled Area	Dumping Area	N	N	None	Unk.	irr.	irr.	Unk.	0-1 (spotty)	None	Dumping Area	Solid	None	Misc. construction debris
600-228	Inactive	Dumping Area	600-228, H-40 Gun Site Dumping Area	NRDWL/BC Controlled Area	Dumping Area	N	N	None	1,552	39	39	Unk.	0-2 (spotty)	None	Dumping Area	Solid and Liquid	None	Misc. construction debris, possible lead paint

Table A-1. 200-MG-1 Operable Unit Waste Site Attributes - 33 Waste Sites

Waste Site Code	Current Status	Waste Site Type	Waste Site Name	Facility Area	Physical Setting	Backfill (Y/N)	Surface Cover Present (Y/N)	Surface Cover Thickness (ft)	Site Area (ft ²)	Site Length (ft)	Site Width (ft)	Site Depth (ft)	Potential Cont. Interval (ft)	Prior Cleanup Activities	Release Mechanism	Release Type (Solid and/or Liquid)	Potential Constituents	
																	Radiological	Nonradiological
600-281	Inactive	Dumping Area	600-281, Scattered Debris South of Army Loop Road	S. NRDWL/BC Controlled Area	Dumping Area	N	N	None	Unk.	Unk.	Unk.	Unk.	0-1 (spotty)	In February 2007, the three compressed gas cylinders were removed from the area. Cylinders previously contained argon, but were confirmed to be empty.	Dumping Area	Solid	None	Demolition and inert waste, asbestos
600-65	Inactive	Dumping Area	600-65, 607 Batch Plant Drum Site	N. ERDF Area	Dumping Area	N	N	None	100	10	10	Unk.	0-3 (spotty)	In 2001, the listed materials were not present at this site.	Dumping Area	Solid and Liquid	None	Misc. debris, petroleum hydrocarbons
600-65	Inactive	Dumping Area	600-65, 607 Batch Plant Orphan Drums	ERDF Area	Dumping Area	N	N	None	25	5	5	Unk.	0-3 (spotty)	None	Dumping Area	Solid and Liquid	None	Unk. liquids
200-W-14	Inactive	Dumping Area	200-W-14, 200 West Heavy Equipment Storage Area	T Plant Area	Storage Yard	N	Y	1-2	2400	80	30	2	0-6 (spotty)	None	Parking Area	Liquid	None	Petroleum
200-W-64	Inactive	Foundation	200-W-64, 2724-W Contaminated Laundry Facility Building Foundation	T Plant Area	Foundation	N	N	None	1.4E+4	138	105	Unk.	0-1	Laundry facility building was demolished in 1995, the foundation remains. A radiological survey of the building foundation is done quarterly.	Contaminated Foundation	Liquid	Radiological contamination from soiled protective work clothing. There was 9,000 dpm beta/gamma found in the Fixed Contamination Area in March 1988.	None
600-37	Inactive	French Drain	600-37, Brown's Wells, Johnson's Wells	ERDF Area	Tanks and French Drains	N	N	None	70	10	7	16	16-20	None	Unk./ Testing	Liquid	Unk.	Unk.
600-222	Inactive	Military Compound	600-222, H-60 Gun Site	W. 200 West Area	Military Compound	N	N	None	3.8E+5	695	548	Unk.	0-1 (spotty)	None	Abandoned Military Site	Solid and Liquid	None	Battery and oil wastes
216-S-19	Inactive	Pond	216-S-19, 222-S Lab Swamp, 216-SL-1, REDOX Lab Swamp, 216-S-19 Pond	200 West Ponds Area	Pond	N	Y	1-2 ft	1.5E+5	irr.	irr.	irr.	0-3	Wastes were rerouted to the 216-S-26 Crb. Over time, the beta/gamma radioactivity has decayed until presently there is no activity detectable with radiation monitoring field instruments.	Liquid Disposal	Liquid	In 1983, maximum field radiological readings from core sample were 300 cpm near the inlet pipe, at a depth of 8 to 24 inches.	Unk.
600 OCL	Inactive	Sanitary Landfill	600 OCL, 600 Area Original Central Landfill, Original CLF	NRDWL/BC Controlled Area	Sanitary Landfill	Y	N	None	1.5E+4	300	50	15	0-15	Site has been backfilled to grade. Radiological surveys are performed on this site.	Dumping Area	Solid	1,500 cpm beta gamma in test pit on June 5, 1988	Unk.

Table A-1. 200-MG-1 Operable Unit Waste Site Attributes – 33 Waste Sites

Waste Site Code	Current Status	Waste Site Type	Waste Site Name	Facility Area	Physical Setting	Backfill (Y/N)	Surface Cover Present (Y/N)	Surface Cover Thickness (ft)	Site Area (ft ²)	Site Length (ft)	Site Width (ft)	Site Depth (ft)	Potential Cont. Interval (ft)	Prior Cleanup Activities	Release Mechanism	Release Type (Solid and/or Liquid)	Potential Constituents	
																	Radiological	Nonradiological
UPR-200-W-70	Inactive	Unplanned Release	UPR-200-W-70, Contamination Found at the 200 West Burning Ground East of Beloit Ave.	T Plant Area	Burn Pit/Roadway	N	Y	2-3	Unk.	Irr.	Irr.	Unk.	0-1	In 1973, fabro-film was sprayed on contaminated areas and a locked chained gate installed.	Dumping Area	Solid	5,000-50,000 cpm beta/gamma; 20,000 cpm to 30 mrad/h; 100,000 cpm (250 mrad/h); alpha ranging from 5,000 to 200,000 dpm. Americium-plutonium contamination on sample from trench. All in 1973.	Unk.
200-E-2	Inactive	Unplanned Release	200-E-2, Soil Stains at the 2101-M SW Parking Lot, MO-234 Parking Lot	200 East Admin Area	Parking Lot	N	N	None	1.0E+4	100	100	Unk.	0-8	Site soil was taken and tested.	Oil for dust abatement	Liquid	None	PCBs, used oil for dust abatement, heavy metals.
UPR-200-E-11	Inactive	Unplanned Release	UPR-200-E-11, Railroad Track Contamination Spread, UN-200-E-11	Solid Waste Area/ B Plant Area/ 200 E Admin Area/ Semi-Works Area/ PUREX Area	Railroad	N	Y	1-2	1.2E+5	Irr.	Irr.	Unk.	0-2 (spotty)	In 1957 most of contamination was removed.	Leak/ Spill	Liquid	Fission product contamination spots	None
UPR-200-W-58	Inactive	Unplanned Release	UPR-200-W-58, Railroad Track Contamination, UN-200-W-58	T Plant Area	Railroad	N	N	None	7.3E+4	Irr.	Irr.	Unk.	0-2 (spotty)	After release was identified (1965), the contaminated equipment was isolated and decontamination initiated. Some contaminated dirt was removed from the railroad bed in 1965.	Leak/ Spill	Solid and Liquid	Beta/gamma, 5 Rad/h (end of flat car); 100,000 cpm (railroad bed surface); 20,000 cpm (underside of railcar) on April 26, 1965.	Unk.
UPR-800-12	Inactive	Unplanned Release	UPR-800-12, UN-800-12, UNH Spill to Route 4S	NRDWL/ BC Controlled Area	Roadway	N	Y	1-2	175	21	8	Unk.	0-8	In 1971, contamination was dug up and removed to a 200 West Burial Ground; in 1998, contamination on south shoulder of Route 4S near top of hill discovered; and in 1999, area was backfilled with clean material. In January 2006, contaminated (beta/gamma) soil was removed and gravel added to site.	Leak/ Spill	Liquid	Uranium, uranium nitrate hexahydrate solution	Unk.

Table A-1. 200-MG-1 Operable Unit Waste Site Attributes – 33 Waste Sites

Waste Site Code	Current Status	Waste Site Type	Waste Site Name	Facility Area	Physical Setting	Backfill (Y/N)	Surface Cover Present (Y/N)	Surface Cover Thickness (ft)	Site Area (ft ²)	Site Length (ft)	Site Width (ft)	Site Depth (ft)	Potential Cont. Interval (ft)	Prior Cleanup Activities	Release Mechanism	Release Type (Solid and/or Liquid)	Potential Constituents	
																	Radiological	Nonradiological
200-E-109	Inactive	Unplanned Release	200-E-109, Contaminated Tumbleweed Accumulation, Contamination Spread in Northeast Corner of 200 East Area	Solid Waste Area	Roadway/Outlying Area	N	Y	1-2	1.5E+4	249	62	Unk.	0-1 (spotty)	Contaminated vegetation is removed sometimes; tumbleweeds keep accumulating; if not possible to remove, contamination is surrounded with a radiation barrier. Some contaminated fragments and soils were picked up, but reports indicate it keeps accumulating. A single area (75.9 x 18.9 m) was covered with soil.	Vegetation (tumbleweeds)	Solid	Inside 200 East Area perimeter fence: 20,000 to > 100,000 dpm; Outside 200 East Area perimeter fence and around LERF: 2,000 to 800,000 dpm beta/gamma over the years of 1998 through 2000.	None

a. Column titled "Backfill" is defined as soil being replaced inside a waste sites to refill it to grade, however this action is not associated with construction (e.g., cribs being backfilled with gravel) of the waste site.

b. Column titled "Surface Cover Present" is defined as soils that were added to a waste site above grade.

c. Column "Surface Cover Thickness" is only used when there is a "Y" in "Surface Cover Present."

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq. Available at: <http://www.epa.gov/epawaste/inforesources/online/index.htm>.

ADB = Ash Disposal Basin

ERDF = Environmental Restoration Disposal Facility

NRDWL = Nonradioactive Dangerous Waste Landfill

RCRA = Resource Conservation and Recovery Act of 1976

Unk. = unknown

CLF = Central Landfill

Irr = Irregular

OCL = Original Central Landfill

REDOX = Reduction-Oxidation (S Plant)

WM = waste management

CP = construction pit

LERF = Liquid Effluent Retention Facility

PCB = polychlorinated biphenyl

UNH = uranyl nitrate hexahydrate

Y/N = Yes/No

DOE/RL-2009-86, REV. 0

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Table A-2. 200-MG-1 Operable Unit Waste Site Attributes -- 4 Septic Systems

Waste Site Code	Waste Site Name	Facility Area	Related Sites/ Structures (WIDS only)	Prior Cleanup Activities (Summary)	Current Status	Septic System Segments	Back-filled Septic Tank (Yes/ No)	Site Area (ft ²)	Site Length (ft)	Site Width (ft)	Site Depth (ft)	Bottom (bgs in ft)	Potential Cont. Interval (ft)	Design Volume (gal)	Comments	Potential Constituents	
																Radiological	Nonradiological
200-E-7	200-E-7, 2607-EO Septic Tank & Tile Field	200 E Admin Area	Active system supports 2711E (automotive shop). Installed in 1984.	None	Active	Septic Tank	No	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	No useful information found on this ST.	Unk.	Unk.
						Septic Tile Field	N/A	3250	65	50	3	None	0-4	None	Based on drawing H-2-93802.	Unk.	Unk.
2607-E1	The 2607-E1 Septic Tank is associated with the 2607-E1 Tile Field, the 200 East shops and 282-E.	200 E Admin Area	None	The system was abandoned in 1997 in accordance with Washington Administrative Code 246-272-18501. This system was tied into 2607-E1-A.	Active	Septic Tank	No	325	26	13	14	None	0-15	None	Based on Drawings H-2-1196 & W-171192	Unk.	Unk.
						Septic Tile Field	N/A	18300	305	60	7	None	0-7.5	None		Unk.	Unk.
						Septic Tile Field	N/A	8175	95	65	7	None	0-7.5	None		Unk.	Unk.
2607-W1	2607-W1	T Plant Area	The 2607-W1 Septic Tank is associated with the 2607-W1 drain field, 2707-W, 2713-W, 283-W, 277-W, 275-W, 274-W, 284-W, 2723-W, 2704-W, 2719-WB, 272-W, MO-278, MO-279, MO-235, MO-406, MO-412, MO-215, MO-056, MO-204, MO-240, and MO-287.	None	Active	Septic Tank	No	90	10	9	10	None	0-11	None	Based on Drawings H-2-817619 through H-2-817622m W-71192, H-2-2589, H-2-44511 sht 101, 108, 109.	Unk.	Unk.
						Septic Tank	No	153	17	9	12	None	0-13	None		Unk.	Unk.
						Septic Tile Field	N/A	73158	534	137	7	None	0-8	None		Unk.	Unk.
						Septic Tile Field	N/A	19800	165	120	5	None	0-6	None		Unk.	Unk.
						Septic Tile Field	N/A	45500	350	130	6	None	0-7	None		Unk.	Unk.

Table A-2. 200-MG-1 Operable Unit Waste Site Attributes - 4 Septic Systems

Waste Site Code	Waste Site Name	Facility Area	Related Sites/ Structure (WIDS only)	Prior Cleanup Activities (Summary)	Current Status	Septic System Segments	Back-filled Septic Tank (Yes/No)	Site Area (ft ²)	Site Length (ft)	Site Width (ft)	Site Depth (ft)	Bottom (bgs in ft)	Potential Cont. Interval (ft)	Design Volume (gal)	Comments	Potential Constituents	
																Radiological	Nonradiological
2607-WL	Active system supports 272WA (tank farm support facility)	WM Area	The 2607-WL-Septic Tank is associated with a drain field and the 272-WA Building.	The septic system was abandoned in 1999 per the requirements of Washington Administrative Code 246-272-1851. All septage inside the tank was removed and the empty tank was filled to eliminate void spaces. There are no records of sampling during abandonment activities. Per an agreement with the Washington Department of Health, the septic system lids were left in place.	Inactive	Septic Tank	Yes	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	4000		Unk.	Unk.
						Septic Tile Field	n/a	2400	60	40	Unk.	Unk.	Unk.	Unk.		Unk.	Unk.

n/a = not applicable
ST = septic tank
Unk = unknown
WM = Waste Management

Appendix B

Site-Specific Removal Action Level Tables for 37 Waste Sites in the 200-MG-1 Operable Unit

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B1 Introduction

Tables B-1 and B-2 provide the site-specific removal action levels (RALs) to support removal actions at 37 waste sites. Site-specific RALs are based on contaminants of potential concern (COPCs) and process knowledge identified in DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200 MG-1 Operable Unit Waste Sites*.

Tables B-1 and B-2 were carried over from DOE/RL-2009-48, *Action Memorandum for Non Time Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit*, with the following exceptions:

- Carbon tetrachloride and nitrate (as nitrogen) were included in DOE/RL-2009-48 for the first eleven 200-MG-1 waste sites due to process knowledge information for waste sites 600-275 and 600-262, respectively. Carbon tetrachloride and nitrate (as nitrogen) are not COPCs for any of the 37 waste sites in this Removal Action, and therefore were not included in this action memorandum.
- Technetium-99, tritium, and xylene are COPCs that were added to this action memorandum based on process knowledge and are applicable for waste sites 216-S-26 and 200-W-3, as noted in the tables. The analytical methods for these contaminants will be described in the sampling and analysis plan for these sites. Analytical methods used for all other COPCs listed in Tables B-1 and B-2 were approved by the appropriate regulatory agencies in DOE/RL-2009-60, *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites*.

Table B-1. Radioactive RALs for 37 Waste Sites

Contaminant of Potential Concern	Removal Action Levels (pCi/g)				
	Background Concentration (pCi/g) ^a	Direct Exposure ^b (pCi/g)	Soil Cleanup Level for Groundwater Protection ^c (pCi/g)	Required Detection Limit (pCi/g)	Overall Removal Action Levels (pCi/g)
Americium-241	N/A	31.1	N/A ^d	1.0	31.1
Cesium-137	1.1	6.2	1,465	0.1	6.2
Europium-152	N/A	3.3	N/A ^d	0.1	3.3
Europium-154	0.033	3.0	N/A ^d	0.1	3.0
Europium-155	0.054	125	N/A ^d	0.1	125
Plutonium-238	0.004	38.8	N/A ^d	1.0	38.8
Plutonium-239/240	0.025	33.9	N/A ^d	1.0	33.9
Strontium-90	0.18	4.5	27.6	1.0	4.5
Uranium-233/234	1.1	1.1 ^e	1.1 ^e	1.0	1.1
Uranium-235	0.11	0.61	0.5 ^e	0.5	0.5
Uranium-238	1.1	1.1 ^e	1.1 ^e	1.0	1.1
Technetium-99 ^f	N/A	5.8	0.46	15.0	15.0
Tritium ^f	N/A	459	12.6	30.0	30.0

Notes:

- 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 for radiological constituents are provided in DOE/RL-96-12, Hanford Site Background: Part 2, Soil Background for Radionuclides, Table 5-1.
- Radionuclide concentrations for beta/gamma in water correspond to a 4 mrem/yr dose from EPA/540-R-00-007, Soil Screening Guidance for Radionuclides: User's Guide. Calculations are based on either RESRAD or WDOH/320-015, Hanford Guidance for Radiological Cleanup.
- Soil concentration for groundwater protection were calculated using RESRAD with the maximum contaminant levels calculated from National Bureau of Standards (NBS Handbook 69, Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure) or maximum permissible concentration as cited in EPA/540-R-00-007 or from 40 CFR 141.66, "Maximum Contaminant Levels for Radionuclides."
- RESRAD predicts constituent will not reach groundwater within 1,000 years based on 100 Area generic site model using soil column layers and depths.
- Where removal action levels are less than background or required detection limits, removal action levels default to background or required detection limits (whichever is larger).
- Technetium-99 and tritium are applicable only to the 216-S-26 Crib.

N/A = not available

RESRAD = RESidual RADioactivity (dose model)

Table B-2. Nonradioactive RALs for 37 Waste Sites

Contaminant of Potential Concern	Background Concentration ^a (mg/kg)	Removal Action Levels (mg/kg)					Ecological Risk Screening Values ^d (mg/kg)
		Direct Exposure ^b (mg/kg)	Soil Cleanup Level for Groundwater Protection ^c (mg/kg)	Required Detection Limit (mg/kg)	Overall Removal Action Levels (mg/kg)		
Antimony	5	32	5.4	0.6	5.4	5	
Arsenic	6.5	6.5 ^e	6.5 ^e	1.0	6.5 ^e	7	
Barium	132	16,000	1,650	2	1,650	102	
Beryllium	1.51	160	63.2	0.5	63.2	10	
Boron	N/A	16,000	210	2	210	0.5	
Cadmium	0.81	80	0.81 ^e	0.5	0.81 ^e	4	
Chromium Total	18.5	120,000	2,000	1	2,000	42	
Chromium (VI)	N/A	240	- ^f	0.5	- ^f	N/A	
Cobalt	15.7	24	15.7 ^e	2	15.7 ^e	20	
Copper	22.0	3,200	284	1	284	50	
Lead	10.2	250	3,000	5	250	50	
Lithium	33.5	160	192	2.5	160	35	
Manganese	512	3,760	512 ^e	5	512 ^e	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	N/A	48,000	2,920	1	2,920	N/A	
Thallium	N/A	5.6	1.59	1	1.59	1	
Tin	N/A	48,000	48,000	10	48,000	50	
Uranium (soluble salts)	3.21	240	3.21 ^e	1	3.21 ^e	5	
Vanadium	85.1	560	2,240	2.5	560	2	
Zinc	67.8	24,000	5,970	1	5,970	86	
Polychlorinated biphenyls (PCBs) Aroclor-1016	N/A	0.5	0.094	0.017	0.094	0.65	
PCB Aroclor-1221	N/A	0.5	0.017 ^e	0.017	0.017 ^e	0.65	
PCB Aroclor-1232	N/A	0.5	0.017 ^e	0.017	0.017 ^e	0.65	
PCB Aroclor-1242	N/A	0.5	0.039	0.017	0.039	0.65	

Table B-2. Nonradioactive RALs for 37 Waste Sites

Contaminant of Potential Concern	Background Concentration ^a (mg/kg)	Removal Action Levels (mg/kg)			Overall Removal Action Levels (mg/kg)	Ecological Risk Screening Values ^d (mg/kg)
		Direct Exposure ^b (mg/kg)	Soil Cleanup Level for Groundwater Protection ^c (mg/kg)	Required Detection Limit (mg/kg)		
PCB Aroclor-1248	N/A	0.5	0.039	0.017	0.039	0.65
PCB Aroclor-1254	N/A	0.5	0.066	0.017	0.066	0.65
PCB Aroclor-1260	N/A	0.5	0.72	0.017	0.5	0.65
Acenaphthene	N/A	4,800	98	0.33	98	20
Acenaphthylene	N/A	4,800	98	0.33	98	N/A
Anthracene	N/A	24,000	2,270	0.33	2,270	N/A
Benzo(a)anthracene	N/A	1.37	0.86	0.33	0.86	N/A
Benzo(a)pyrene	N/A	0.137	0.233 ⁱ	0.33	0.33 ^o	12
Benzo(b)fluoranthene	N/A	1.37	2.95	0.33	1.37	N/A
Benzo(g,h,i)perylene	N/A	2,400	25,700	0.33	2,400	N/A
Benzo(k)fluoranthene	N/A	1.37	2.95 ⁱ	0.33	1.37	N/A
Chrysene	N/A	13.7	9.56	0.33	9.56	N/A
Dibenz(a,h)anthracene	N/A	1.37	4.29	0.33	1.37	N/A
Fluoranthene	N/A	3,200	631	0.33	631	N/A
Fluorene	N/A	3,200	101	0.33	101	30
Indeno(1,2,3-cd)pyrene	N/A	1.37	8.33	0.33	1.37	N/A
Naphthalene	N/A	1,600	4.46	0.33	4.46	N/A
Phenanthrene	N/A	24,000	1,140	0.33	1,140	N/A
Pyrene	N/A	2,400	655	0.33	655	N/A
Xylene ^h	N/A	16,000	14.6	0.01	14.6	N/A
TPH-diesel ^o	N/A	2,000	2,000	5	2,000	200
TPH-kerosene ^o	N/A	2,000	2,000	5	2,000	200

Notes:

- 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 for nonradiological constituents are provided in DOE/RL-92-24, *Hanford Site Soil Background*.
- Direct-contact values were calculated based on WAC 173-340-740, "Unrestricted Land Use Soil Cleanup Standards;" using method B methodology and assumptions.

Table B-2. Nonradioactive RALs for 37 Waste Sites

Contaminant of Potential Concern	Removal Action Levels (mg/kg)					
	Background Concentration ^a (mg/kg)	Direct Exposure ^b (mg/kg)	Soil Cleanup Level for Groundwater Protection ^c (mg/kg)	Required Detection Limit (mg/kg)	Overall Removal Action Levels (mg/kg)	Ecological Risk Screening Values ^d (mg/kg)

- c. Groundwater protection values were calculated using equations provided in WAC 173-340-747, "Deriving Soil Concentrations for Ground Water Protection," Subsection (4), "Fixed Parameter Three-Phase Partitioning Model," with the physical parameters obtained from <http://www.ecy.wa.gov/>.
- d. Ecological values provided in this table are for screening purposes only and are not considered cleanup levels for this removal action. If cleanup verification sampling values exceed the ecological screening values provided, additional analysis will be conducted in the remedial investigation/feasibility study and Ecological Risk Assessment for the Central Plateau in order to make final cleanup decisions. The ecological screening values provided in this table come from WAC 173-340-900, "Tables," Table 749-3, "Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals."
- e. Where removal action levels are less than background or RDLs, removal action levels default to background or RDLs in accordance with WAC 173-340-700, "Overview of Cleanup Standards," Subsection (6)(d), "Natural Background and Analytical Considerations," and WAC 173-340-707(2), "Analytical Considerations," respectively.
- f. Based on process knowledge, chromium (VI) is not expected to be present at 200-MG-1 Operable Unit 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)*
- g. Direct-contact values were obtained from WAC 173-340-900, Table 740-1, "Method A Soil Cleanup Levels for Unrestricted Land Uses." The groundwater protection values were obtained using equations provided in WAC-173-340-747(4) with the physical parameters obtained from <http://www.ecy.wa.gov/>.
- h. Xylene is applicable only to the 200-W-3 Dumping Area.
- i. The soil concentration for protection of groundwater values for Benzo(a)pyrene and Benzo(k)fluoranthene were incorrectly reported in DOE/RL-2009-48 and have been corrected.

K_d = distribution coefficient
N/A = not applicable

PCB = polychlorinated biphenyl
RDL = required detection limit

RSL = regional screening level table
TPH = total petroleum hydrocarbon

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B2 References

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Appendix C

Applicable or Relevant and Appropriate Requirements

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Terms

ARAR	applicable or relevant and appropriate requirement
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
CFR	<i>Code of Federal Regulations</i>
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
LLW	low-level waste
NEPA	<i>National Environmental Policy Act of 1969</i>
OU	operable unit
PCB	polychlorinated biphenyl
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RL	U.S. Department of Energy, Richland Operations Office
TSCA	<i>Toxic Substances Control Act of 1976</i>
WAC	<i>Washington Administrative Code</i>

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C1 Identification of Applicable or Relevant and Appropriate Requirements for the 200-MG-1 Operable Unit

This appendix identifies applicable or relevant and appropriate requirements (ARARs) for the 200-MG-1 Operable Unit (OU) removal action.

C1.1 Compliance with Applicable or Relevant and Appropriate Requirements

For a site where material will remain onsite after completion of a *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) action, the level or standard of control that must be met for the hazardous substance, pollutant, or contaminant is at least that of any applicable or relevant and appropriate standard, requirement, criteria, or limitation under federal environmental law, or any more stringent standard, requirement, criteria, or limitation promulgated pursuant to a state environmental statute. An applicable requirement is one with which a private party would have to comply by law if the same action was being undertaken apart from CERCLA authority. All jurisdictional prerequisites of the requirement must be met for the requirement to be applicable. A requirement that is relevant and appropriate may "miss" on one or more jurisdictional prerequisites for applicability, but still make sense at the site, given the circumstances of the site and release.

Removal actions are required to comply with the substantive aspects of ARARs to the extent practicable, not with corresponding administrative requirements. That is, permit applications and other administrative procedures, such as administrative reviews and reporting and recordkeeping requirements, are considered administrative for actions conducted entirely onsite (40 CFR 300.400[e], "Permit Requirements") and therefore not required.

For the removal action being considered in this document, implementation of the selected action will be designed to comply with the ARARs cited in this section to the extent practicable. The ARARs are selected from promulgated environmental regulations that have been evaluated to determine whether they may be pertinent to the removal action. The purpose of this appendix is to identify the key ARARs for the actions proposed in the action memorandum.

In addition, ARARs were evaluated to determine if they fall into one of three categories: chemical-specific, location-specific, or action-specific. These categories are defined as follows.

- Chemical-specific requirements are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of public- and worker-safety levels and site-cleanup levels.
- Location-specific requirements are restrictions placed on the concentration of dangerous substances or the conduct of activities solely because they occur in special geographic areas.
- Action-specific requirements are usually technology- or activity-based requirements or limitations triggered by the removal actions performed at the site.

Federal and state ARARs are presented in Tables C-1 and C-2, respectively. The chemical-specific ARARs relevant to removal actions in the 200-MG-1 OU are elements of the Washington State regulations that implement WAC 173-340, "Model Toxics Control Act—Cleanup," specifically associated with developing risk-based concentrations for cleanup (WAC 173-340-740, "Unrestricted Land Use Soil Cleanup Levels;" WAC 173-340-747, "Deriving Soil Concentrations for Groundwater Protection;" WAC 173-340-720, "Groundwater Cleanup Standards"). The requirements of WAC 173-340-740 help establish soil cleanup standards for nonradioactive contaminants at waste sites. The state air emission standards are likely to be important in identifying air emission limits and control

requirements for any removal actions that produce air emissions. The *Resource Conservation and Recovery Act of 1976* (RCRA) land-disposal restrictions will be important standards during the management of wastes generated during removal actions. If soil contamination is deeper than what can be readily excavated, the waste site will be addressed in the final remedy for 200-MG-1 OU (which could include transferring the waste site to another OU) and the requirements of WAC 173-340-720 will be addressed.

C1.2 Waste Management Standards

A variety of waste streams would be generated under the proposed removal actions. A waste management plan will be included in the removal action work plan. It is anticipated that most of the waste will be designated as low-level waste (LLW). However, quantities of dangerous or mixed waste, polychlorinated biphenyl (PCB)-contaminated waste, and asbestos and asbestos-containing material also could be generated. The great majority of the waste will be in a solid form. However, some aqueous solutions might be generated (e.g., liquid in railcars).

Radioactive waste is managed by U.S. Department of Energy, Richland Operations Office (RL) under the authority of the *Atomic Energy Act of 1954*.

The identification, storage, treatment, and disposal of hazardous waste and the hazardous component of mixed waste are governed by RCRA. The State of Washington, which implements RCRA requirements under WAC 173-303, "Dangerous Waste Regulations," has been authorized to implement most elements of the RCRA program. The dangerous waste standards for generation and storage would apply to the management of any dangerous or mixed waste generated at the 200-MG-1 OU waste sites. Treatment standards for dangerous or mixed waste subject to RCRA land-disposal restrictions are specified in WAC 173-303-140, "Land Disposal Restrictions," which incorporates 40 CFR 268, "Land Disposal Restrictions," by reference.

The *Toxic Substances Control Act of 1976* (TSCA) and regulations at 40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," govern the management and disposal of PCB wastes. The TSCA regulations contain specific provisions for PCB waste, including PCB waste that contains a radioactive component. The PCBs also are considered underlying hazardous constituents under RCRA and thus could be subject to WAC 173-303 and 40 CFR 268 requirements.

Removal and disposal of asbestos and asbestos-containing material are regulated under the *Clean Air Act of 1990* and 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Subpart M, "National Emission Standards for Asbestos." These regulations provide for special precautions to prevent environmental releases or exposure to personnel of airborne emissions of asbestos fibers during removal actions.

Waste designated as LLW that meets the Environmental Restoration Disposal Facility (ERDF) acceptance criteria (WCH-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*) is assumed to be disposed at the ERDF, which is engineered to meet appropriate performance standards.

The ERDF is considered to be onsite for management and/or disposal of waste from removal actions proposed in this document. CERCLA Section 104(d)(4) states the following:

... where two or more noncontiguous facilities are reasonably related on the basis of geography, or on the basis of the threat or potential threat to the public health or welfare or the environment, the President may, at his discretion, treat these facilities as one." The preamble to 40 CFR 300 clarifies the stated EPA interpretation that when noncontiguous facilities are reasonably close to one another, and wastes at these sites are compatible for a selected treatment or disposal approach, CERCLA Section 104(d)(4) allows the lead agency to treat these related facilities as one for response purposes. This allows the lead agency to manage waste transferred between such noncontiguous facilities without having to obtain a permit. The ERDF is considered to be onsite for response purposes under this removal action. It should be noted that the scope of work covered in this removal action is for a facility and waste contaminated with hazardous substances. Materials encountered during implementation of the selected removal action that are not contaminated with hazardous substances will be dispositioned by the DOE.

There is no requirement to obtain a permit to manage or dispose of CERCLA waste at the ERDF. It is expected that the majority of the waste generated during the removal action proposed in this document can be disposed onsite at the ERDF. In accordance with the ERDF record of decision (EPA/ESD/R10-96/145, *Explanation of Significant Differences: USDOE Environmental Restoration Disposal Facility (ERDF), Hanford Site, Benton County, Washington*), authorization to dispose of waste generated during this removal action at the ERDF is granted with the issuance of this action memorandum and through EPA approval of the sampling and analysis plan. Waste that must be sent offsite will be sent to a facility that has been or could be approved by EPA in accordance with 40 CFR 300.440, "Procedures for Planning and Implementing Off-Site Response Actions" for receiving CERCLA waste.

Waste designated as dangerous or mixed waste would be treated as appropriate to meet land disposal restrictions and ERDF acceptance criteria and disposed at the ERDF. The ERDF is an engineered facility that provides a high degree of protection to human health and the environment and meets RCRA minimum technical requirements for landfills, including standards for a double liner, a leachate collection system, leak detection, monitoring, and final cover. Construction and operation of the ERDF was authorized using a separate CERCLA record of decision (EPA/ROD/R10-95/100, *Declaration of the Interim Record of Decision for the Environmental Restoration Disposal Facility*; EPA/AMD/R10-02/030, *Record of Decision Amendment for the Environmental Restoration Disposal Facility*). EPA/ESD/R10-96/145 modified the ERDF record of decision to clarify the eligibility of waste generated during cleanup of the Hanford Site. Per EPA/ESD/R10-96/145, the ERDF is eligible for disposal of any LLW, mixed waste, and hazardous/dangerous waste generated as a result of cleanup actions (e.g., removal action waste and investigation-derived waste), provided the waste meets the ERDF waste acceptance criteria and appropriate CERCLA decision documents are in place.

Some of the aqueous waste designated as LLW, dangerous, or mixed waste would be transported to the Effluent Treatment Facility for treatment and disposal. The Effluent Treatment Facility is a RCRA-permitted facility authorized to treat aqueous waste streams generated on the Hanford Site and dispose of these streams at a designated state-approved land-disposal facility in accordance with applicable requirements.

Waste designated as PCB remediation waste likely would be disposed at the ERDF, depending on whether it meets the waste acceptance criteria. The PCB waste that does not meet ERDF waste acceptance criteria would be retained at a PCB storage area that meets the requirements for TSCA storage and would be transported for future disposal at an appropriate disposal facility.

Asbestos and asbestos-containing material would be removed, packaged as appropriate, and disposed in the ERDF.

All actions can be performed in compliance with the waste management ARARs. Waste streams will be evaluated, designated, and managed in compliance with the ARARs. Before disposal, waste will be managed in a protective manner to prevent releases to the environment or unnecessary exposure to personnel.

C1.3 Standards Controlling Emissions to the Environment

The proposed removal actions have the potential to generate both radioactive and toxic/criteria airborne emissions. An air monitoring plan will be included in the removal action work plan.

C1.3.1 Radiological Air Emissions

Per RCW 70.94, "Washington Clean Air Act," requires regulation of radioactive air pollutants. The state implementing regulation WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides," sets standards which are as stringent or more so than the standards under the federal *Clean Air Act of 1990* and Amendments, and under the federal implementing regulation 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities." The U.S. Environmental Protection Agency's (EPA) partial delegation of the 40 CFR 61 authority to the State of Washington includes all substantive emissions monitoring, abatement, and reporting aspects of the federal regulation. The state standards protect the public by conservatively establishing exposure standards applicable to the maximally exposed public individual. Under WAC 246-247-030(15), "Definitions," the "maximally exposed individual" is any member of the public (real or hypothetical) who abides or resides in an unrestricted area, and may receive the highest total effective dose equivalent from the emission unit(s) under consideration, taking into account all exposure pathways affected by the radioactive air emissions. All combined radionuclide airborne emissions from the RL Hanford Site "facility" are not to exceed amounts that would cause an exposure to any member of the public of greater than 10 mrem/yr effective dose equivalent. The state implementing regulation WAC 246-247, "Radiation Protection – Air Emissions," which adopts the WAC 173-480 standards, and the 40 CFR 61, Subpart H standard, require verification of compliance with the 10 mrem/yr standard, and potentially would be applicable to the removal action.

State implementing regulation WAC 246-247 further addresses sources emitting radioactive airborne emissions by requiring monitoring of such sources. Such monitoring requires physical measurement (i.e., sampling) of the effluent or ambient air. The substantive provisions of WAC 246-247 that require monitoring of radioactive airborne emissions potentially would be applicable to the removal action.

The above state implementing regulations further address control of radioactive airborne emissions where economically and technologically feasible (WAC 246-247-040[3] and -040[4], "General Standards," and associated definitions). To address the substantive aspect of these requirements, best or reasonably achieved control technology could be addressed by ensuring that applicable emission control technologies (those successfully operated in similar applications) would be used when economically and technologically feasible (i.e., based on cost/benefit). Controls will be administered as appropriate using the best methods from among those that are reasonable and effective.

C1.3.2 Criteria/Toxic Air Emissions

Under WAC 173-400, "General Regulations for Air Pollution Sources," and WAC 173-460, "Controls for New Sources of Toxic Air Pollutants," requirements are established for the regulation of emissions of criteria/toxic air pollutants. The primary nonradioactive emissions resulting from this removal action will

be fugitive particulate matter. In accordance with WAC 173-400-040, "General Standards for Maximum Emissions," reasonable precautions must be taken to (1) prevent the release of air contaminants associated with fugitive emissions resulting from excavation, materials handling, or other operations; and (2) prevent fugitive dust from becoming airborne from fugitive sources of emissions. The use of treatment technologies that would result in emissions of toxic air pollutants that would be subject to the substantive applicable requirements of WAC 173-460 are not anticipated to be a part of this removal action. Treatment of some waste encountered during the removal action may be required to meet ERDF waste acceptance criteria. In most cases, the type of treatment anticipated would consist of solidification/stabilization techniques such as macroencapsulation or grouting, and WAC 173-460 would not be considered an ARAR. If more aggressive treatment is required that would result in the emission of regulated air pollutants, the substantive requirements of WAC 173-400-113(2), "Requirements for New Sources in Attainment or Unclassifiable Areas," and WAC 173-460-060, "Control Technology Requirements," would be evaluated to determine applicability.

Emissions to the air will be minimized during implementation of the removal action through use of standard industry practices such as the application of water sprays and fixatives. These techniques are considered to be reasonable precautions to control fugitive emissions as required by the regulatory standards.

Table C-1. Identification of Federal ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
<i>Archaeological and Historic Preservation Act of 1976,</i> 16 USC 469aa-mm	ARAR	Requires that removal actions at the 200 North Area do not cause the loss of any archaeological or historic data. This act mandates preservation of the data and does not require protection of the actual site.	Archeological and historic sites have been identified within the 100 and 200 Areas; therefore, the substantive requirements of this act are applicable to actions that might disturb these sites. This requirement is location-specific.
<i>National Historic Preservation Act of 1966,</i> 16 USC 470, Section 106	ARAR	Requires federal agencies to consider the impacts of their undertaking on cultural properties through identification, evaluation and mitigation processes, and consultation with interested parties.	Cultural and historic sites have been identified within the 100 and 200 Areas; therefore, the substantive requirements of this act are applicable to actions that might disturb these types of sites. This requirement is location-specific.
<i>Native American Graves Protection and Repatriation Act,</i> 25 USC 3001, et seq.	ARAR	Establishes federal agency responsibility for discovery of human remains, associated and unassociated funerary objects, sacred objects, and items of cultural patrimony.	Substantive requirements of this act are applicable if remains and sacred objects are found during removal action and will require Native American Tribal consultation in the event of discovery. This requirement is location-specific.
<i>Endangered Species Act of 1973,</i> 16 USC 1531 et seq., subsection 16 USC 1536(c)	ARAR	Prohibits actions by federal agencies that are likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification or critical habitat. If the removal action is within critical habitat or buffer zones surrounding threatened or endangered species, mitigation measures must be taken to protect the resource.	Substantive requirements of this act are applicable if threatened or endangered species are identified in areas where removal actions will occur. This requirement is location-specific.

Table C-1. Identification of Federal ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
Toxic Substances Control Act of 1976			
40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions"			
"Applicability," Specific Subsections: 40 CFR 761.50(b)(1) 40 CFR 761.50(b)(2) 40 CFR 761.50(b)(3) 40 CFR 761.50(b)(4) 40 CFR 761.50(b)(7) 40 CFR 761.50(c)	ARAR	These regulations establish standards for the storage and disposal of PCB wastes.	The substantive requirements of these regulations are applicable to the storage and disposal of PCB wastes (e.g., liquids, items, remediation waste, and bulk product waste) at ≥ 50 ppm. The specific subsections identified from 40 CFR 761.50(b) reference the specific sections for the management of PCB waste type. The disposal requirements for radioactive PCB waste are addressed in 40 CFR 761.50(b)(7). This is a chemical-specific requirement.
"Disposal Requirements," 40 CFR 761.60(a) 40 CFR 761.60(b) 40 CFR 761.60(c)			
"Remediation Waste," 40 CFR 761.61			

Notes:

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions."

- 40 CFR 761.50(b), "Applicability," "PCB Waste."
- 40 CFR 761.50(c), "Applicability," "Storage for Disposal."

Toxic Substances Control Act of 1976, 15 USC 2601, et seq.

Table C-2. Identification of State ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
Regulations Pursuant to the <i>Resource Conservation and Recovery Act of 1976</i> and Implemented Through WAC 173-303, "Dangerous Waste Regulations."			
"Identifying Solid Waste," WAC 173-303-016	ARAR	Identifies those materials that are and are not solid waste.	Substantive requirements of these regulations are applicable because they define how to determine which materials are subject to the designation regulations. Specifically, materials that are generated for removal from the CERCLA site during the removal action would be subject to the procedures for identifying solid waste to ensure proper management. This requirement is action-specific.
"Recycling Processes Involving Solid Waste," WAC 173-303-017			
"Designation of Dangerous Waste," "Designation Procedures," WAC 173-303-070(3)	ARAR	Establishes the method for determining whether a solid waste is or is not a dangerous waste or an extremely hazardous waste.	Substantive requirements of these regulations are applicable to materials encountered during the removal action. Specifically, solid waste generated for removal from the CERCLA site during this removal action would be subject to the dangerous waste designation procedures to ensure proper management. This requirement is action-specific.
"Excluded Categories of Waste," WAC 173-303-071	ARAR	Describes those waste categories that are excluded from the requirements of WAC 173-303 (excluding WAC 173-303-050, "Department of Ecology Cleanup Authority").	The conditions of this requirement are applicable to this removal action if wastes identified in WAC 173-303-071 are encountered. This requirement is action-specific.
"Conditional Exclusion of Special Wastes," WAC 173-303-073	ARAR	Establishes the conditional exclusion and the management requirements of special wastes, as defined in WAC 173-303-040, "Definitions."	Substantive requirements of these regulations are applicable to materials encountered during the removal action. Specifically, the substantive standards for management of special waste are applicable to the interim management of certain waste that will be generated during the removal action. This requirement is action-specific.

Table C-2. Identification of State ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
"Requirements for Universal Waste," WAC 173-303-077	ARAR	Identifies waste exempted from regulation under WAC 173-303-140, "Land Disposal Restrictions," and WAC 173-303-170, "Requirements for Generators of Dangerous Waste," through 173-303-9907, "Reserved" (excluding WAC 173-303-960, "Special Powers and Authorities of the Department"). This waste is subject to regulation under WAC 173-303-573, "Standards for Universal Waste Management."	Substantive requirements of these regulations are applicable to materials encountered during the removal action. Specifically, the substantive standards for management of universal waste are applicable to the interim management of certain waste that will be generated during the removal action. This requirement is action-specific.
"Recycled, Reclaimed, and Recovered Wastes," WAC 173-303-120	ARAR	Provides for management of certain recyclable materials.	Recycled, reclaimed, and recovered wastes may be generated during the removal action. This requirement is action-specific.
"Land Disposal Restrictions," WAC 173-303-140	ARAR	This regulation establishes state standards for land disposal of dangerous waste and incorporates, by reference, the federal land-disposal restrictions of 40 CFR 268, "Land Disposal Restrictions," that are applicable to solid waste designated as dangerous or mixed waste in accordance with WAC 173-303-070(3).	The substantive requirements of this regulation are applicable to materials encountered during the removal action. Specifically, dangerous and/or mixed waste that is generated and removed from the CERCLA site during the removal action for offsite (as defined by CERCLA) land disposal would be subject to the identification of applicable land-disposal restrictions at the point of waste generation. The actual offsite treatment of such waste would not be an ARAR to this removal action, but would be subject to all applicable laws and regulations. This requirement is action-specific.

Table C-2. Identification of State ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
"Requirements for Generators of Dangerous Waste," WAC 173-303-170	ARAR	Establishes the requirements for dangerous waste generators.	Substantive requirements of these regulations are applicable to materials encountered during the removal action. Specifically, the substantive standards for management of dangerous and/or mixed waste are applicable to the interim management of certain waste that will be generated during the removal action. For purposes of this removal action, WAC 173-303-170(3) includes the substantive provisions of WAC 173-303-200 by reference. WAC 173-303-200 further includes certain substantive standards from WAC 173-303-630 and 173-303-640 by reference. This requirement is action-specific.
"Corrective action, Requirements," WAC 173-303-64620(4)	ARAR	Established the requirements to meet RCRA corrective action.	Substantive requirements of these regulations are applicable to show consistency between the removal action and RCRA corrective action requirements. This requirement is action- and location-specific.
"Model Toxics Control Act-Cleanup," WAC 173-340			
"Standard Method B Unrestricted Soil Cleanup Standards Direct Contact" WAC 173-340-740	ARAR	Method B equations WAC 173-340-740, 173-340-747, and 173-340-720 are used to evaluate risk and calculate cleanup levels for chemical noncarcinogens and carcinogens.	The substantive requirements of the specified subsections are used to develop cleanup standards for the selected removal action for the 200-MG-1 OU. This is a chemical-specific requirement.
"Soil Concentrations for Groundwater Protection," WAC 173-340-747			
"Groundwater Cleanup Standards," WAC 173-340-720			
"Terrestrial Ecological Evaluation Procedures," WAC 173-340-7490			
"Tables," WAC 173-340-900, Table 749-3			

Table C-2. Identification of State ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
"General Regulations for Air Pollution Sources," WAC 173-400 and "Controls for New Sources of Toxic Air Pollutants," WAC 173-460			
"Public Health and Safety," "Washington Clean Air Act," RCW 70.94; State Government – Executive," "Department of Ecology," RCW 43.21A "General Regulations for Air Pollution – Sources," WAC 173-400 Specific subsection: "General Standards for Maximum Emissions," WAC 173-400-040	ARAR	Requires all sources of air contaminants to meet standards for visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust. Requires use of reasonably available control technology.	Substantive requirements of the general standards for control of fugitive emissions are applicable to removal actions at the site due to the generation of fugitive dust that occurs during excavation or other types of construction activities. These requirements are action-specific.
Specific subsections: WAC 173-400-060, "Emission Standards for General Process Units" WAC 173-400-075, "Emission Standards for Sources Emitting Hazardous Air Pollutants"	ARAR	Requires specifically identified types of emission sources to meet additional standards beyond the general emission standards imposed by WAC 173-400-040. Incorporates the applicable federal requirements from 40 CFR 60, "Standards of Performance for New Stationary Sources," and 40 CFR 63, "National Emission Standards for Hazardous Air Pollutants for Source Categories." Requires use of either reasonably available control technology, best available control technology, or maximum achievable control technology, depending on the specific type of emission source.	The selected alternative may include or result in one or more defined types of emission sources that would need to be controlled in accordance with these requirements. These requirements are action-specific.
Specific subsection: WAC 173-400-113	ARAR	Incorporates by reference the applicable federal requirements from 40 CFR 60 (new source performance standards); 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants;" and 40 CFR 63 (minimum available control technology). Requires controls to minimize the release of air contaminants resulting from new or modified sources of regulated criteria and toxic air emissions. Emissions are to be minimized through application of best available control technology.	Substantive requirements of this regulation are applicable to removal actions performed at the site if a treatment technology that emits regulated air emissions were necessary during the implementation of the removal action. This requirement is action-specific.

Table C-2. Identification of State ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
<p>"Controls for New Sources of Toxic Air Pollutants," WAC 173-460</p> <p>Specific subsections: WAC 173-460-030 WAC 173-460-060 WAC 173-460-070 WAC 173-460-080 WAC 173-460-150</p>	ARAR	Requires best available control technology for regulated emissions of toxic air pollutants (T-BACT) and demonstration that emissions of toxic air pollutants will not endanger human health or safety.	Substantive requirements of these regulations are applicable to removal actions performed at the site, if a treatment technology that emits toxic air emissions were necessary during the implementation of the removal action. These requirements are action-specific.
"Radiation Protection – Air Emissions," WAC 246-247			
<p>"National Standards Adopted by Reference for Sources of Radionuclide Emissions," WAC 246-247-035(1)(a)(ii)</p>	ARAR	Establishes requirements equivalent to 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities," by reference. Radionuclide airborne emissions from the waste site shall be controlled so as not to exceed amounts that would cause an exposure to any member of the public of greater than 10 mrem/yr effective dose equivalent.	Substantive requirements of this standard are applicable because this removal action may include activities such as excavation, demolition, decontamination and stabilization of contaminated areas and equipment, each of which may provide airborne emissions of radioactive particulates to unrestricted areas. As a result, requirements limiting emissions apply. This is a risk-based standard for the purposes of protecting human health and the environment. This requirement is action-specific.
<p>"General Standards," WAC 246-247-040(3) WAC 246-247-040(4)</p>	ARAR	Emissions shall be controlled to ensure that emission standards are not exceeded. Actions creating new sources or significantly modified sources shall apply best available controls. All other actions shall apply reasonably achievable controls.	Substantive requirements of this standard are applicable because fugitive, diffuse and point source emissions of radionuclides to the ambient air may result from activities, such as demolition and excavation of contaminated soils and operation of exhausters and vacuums, performed during the removal action. This standard exists to ensure compliance with emission standards. These requirements are action-specific.

Table C-2. Identification of State ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
"Monitoring, Testing, and Quality Assurance," WAC 246-247-075(1), (2), and (4)	ARAR	<p>Establishes the monitoring, testing, and quality assurance requirements for radioactive air emissions from major sources. Effluent flow rate measurements shall be made and the effluent stream shall be directly monitored continuously with an in-line detector or representative samples of the effluent stream shall be withdrawn continuously from the sampling site following the specified guidance.</p> <p>The requirements for continuous sampling are applicable to batch processes when the unit is in operation. Periodic sampling (grab samples) may be used only with lead agency prior approval. Such approval may be granted in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. In such cases, grab samples shall be collected with sufficient frequency so as to provide a representative sample of the emissions. When it is impractical to measure the effluent flow rate at a source in accordance with the requirements or to monitor or sample an effluent stream at a source in accordance with the site selection and sample extraction requirements, the waste site owner or operator may use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures as approved by the lead agency.</p> <p>Emissions from nonpoint and fugitive sources of airborne radioactive material shall be measured.</p> <p>Measurement techniques may include, but are not limited to, sampling, calculation, smears, or other reasonable method for identifying emissions as determined by the lead agency.</p>	<p>Substantive requirements of this standard are applicable because fugitive and nonpoint source emissions of radionuclides to the ambient air may result from activities, such as demolition and excavation of contaminated soils and operation of exhausters and vacuums, performed during the removal action. This standard exists to ensure compliance with emission standards. These requirements are action-specific.</p>
"Monitoring, Testing, and Quality Assurance," WAC 246-247-075(3)	ARAR	<p>Methods to implement periodic confirmatory monitoring for minor sources may include estimating the emissions or other methods as approved by the lead agency.</p>	<p>Fugitive and diffuse emissions from the demolition and excavation and related activities will require periodic confirmatory measurements to verify low emissions. This requirement is action-specific.</p>
"Monitoring, Testing, and Quality Assurance," WAC 246-247-075(8)	ARAR	<p>Site emissions resulting from nonpoint and fugitive sources of airborne radioactive material shall be measured. Measurement techniques may include ambient air measurements, or in-line radiation detector or withdrawal of representative samples from the effluent stream, or other methods as determined by the lead agency.</p>	<p>Fugitive and diffuse emissions of airborne radioactive material due to demolition and excavation and related activities will require measurement. This requirement is action-specific.</p>

Table C-2. Identification of State ARARs for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
"General Standards for Maximum Permissible Emissions," WAC 173-480-050(1)	ARAR	At a minimum, all emission units shall make every reasonable effort to maintain radioactive materials in effluents to unrestricted areas, ALARA. Control equipment of sites operating under ALARA shall be defined as reasonably available control technology and ALARA control technology.	Potential for fugitive and diffuse emissions due to demolition and excavation and related activities will require efforts to minimize those emissions. This requirement is action-specific.
"Emission Monitoring and Compliance Procedures," WAC 173-480-070(2)	ARAR	Determine compliance with the public dose standard by calculating exposure at the point of maximum annual air concentration in an unrestricted area where any member of the public may be.	Fugitive and diffuse emissions resulting from demolition and excavation and related activities will require assessment and reporting. This requirement is action-specific.

Notes:

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq.

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq.

WAC 173-303, "Dangerous Waste Regulations."

- 173-303-200, "Accumulating Dangerous Waste On-Site."
- 173-303-630, "Use and Management of Containers."
- 173-303-640, "Tank Systems."

WAC 173-460, "Controls for New Sources of Toxic Air Pollutants."

- 173-460-030, "Requirements, Applicability and Exemptions."
- 173-460-060, "Control Technology Requirements."
- 173-460-070, "Ambient Impact Requirement."
- 173-460-080, "Demonstrating Ambient Impact Compliance."
- 173-460-150, "Class A Toxic Air Pollutants."

ALARA = as low as reasonably achievable

T-BACT = toxics – best available control technology

CFR = Code of Federal Regulations

WAC = Washington Administrative Code

C2 National Environmental Policy Act

Table C-3 provides detailed information about NEPA values most relevant to and potentially affected by this removal action.

Table C-3. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
Transportation	Considers impacts of the proposed action on local traffic (i.e., traffic at the Hanford Site) and traffic in the surrounding region.	Implementation of Alternatives 2 and 3 would be expected to produce short term impacts on local traffic. A majority of the impact is associated with increased truck traffic associated with Alternative 3, Removal, Treatment, and Disposal, as contaminated soil is moved from a waste site(s) to the ERDF. Transportation impacts were considered in DOE/RL-93-99, <i>Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility</i> , as part of the evaluation of short term effectiveness and implementability. The NEPA values in the planning for the ERDF operation were explained in detail in DOE/RL-94-41, <i>NEPA Roadmap for ERDF Regulatory Package</i> . Transportation associated with a waste site for sampling under Alternative 2, Confirmation Sampling/No Further Action, is considerably smaller than for Alternative 3, since there are no trips to the ERDF. See the discussion of cumulative impacts for a perspective of transportation to the ERDF.
Air Quality	Considers potential air quality concerns associated with emissions generated during the proposed action.	<p>Airborne releases associated with Alternatives 2 and 3, are expected to be minor with the use of appropriate work controls (e.g., sampling during favorable wind conditions, use of dust suppressants). DOE/RL-2008-44, <i>Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites</i>, Appendix B, contains the site history for these waste sites. Thirteen of these waste sites, comprising an approximate area of 5.7 ha (14.1 a) are expected to be removed under Alternative 2, Confirmation Sampling/No Further Action, and the remaining ten waste sites comprising approximately 0.93 ha (2.3 a), are expected to be removed under Alternative 3, Removal, Treatment, and Disposal. These waste sites have limited shallow contamination which will have negligible potential to emit hazardous constituents into the air. Any potential of airborne release of contaminants during these removal actions will be controlled in accordance with DOE radiation control and air pollution control standards, to minimize emissions of air pollutants at the Hanford Site, and protect all communities outside the Site boundaries.</p> <p>Operation of trucks and other diesel-powered equipment for these alternatives would be expected, in the short-term, to introduce quantities of sulfur dioxide, nitrogen dioxide, particulates, and other pollutants to the atmosphere, typical of similar-sized construction projects. These releases would not be expected to cause any air-quality standards to be exceeded and (as needed) dust generated during removal activities would be minimized by watering or other dust-control measures. Vehicular and equipment emissions will be controlled and mitigated in compliance with the substantive standards for air quality protection that apply to the Hanford Site.</p>

Table C-3. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
Natural, Cultural, and Historical Resources	Considers impacts of the proposed action on wildlife, wildlife habitat, archeological sites and artifacts, and historically significant properties.	<p>Impacts on ecological resources in the vicinity of the removal actions will continue to be mitigated in accordance with DOE/RL-96-32, <i>Hanford Site Biological Resources Management Plan</i>, and DOE/RL-96-88, <i>Hanford Site Biological Resources Mitigation Strategy</i>, and with the applicable standards of all relevant biological species protection regulations.</p> <p>Because these sites have already been disturbed, and only isolated artifacts could be encountered during project activities, implementation of DOE/RL-98-10, <i>Hanford Cultural Resources Management Plan</i>, and consultation with area Tribes will help ensure appropriate mitigation to avoid or minimize any adverse cultural or historical resource effects and address any relevant concerns. Four of the eleven waste sites from DOE/RL-2009-48, <i>Action Memorandum for the Non-Time-Critical Removal Action for 11 Waste Sites in 200-MG-1 Operable Unit</i>, that are similar to the waste sites in this Action Memorandum have each undergone a cultural and ecological review. The DOE Hanford Cultural Resource Manager responded and determined per 36 CFR 800, "Protection of Historic Properties," Subpart B, "The Section 106 Process," 800.3.a, that this project is not the type of undertaking with potential to cause effects to historic properties and no further actions are required. It will be noted that all workers should be directed to watch for cultural materials (e.g. bones, artifacts) during all work activities. If any cultural materials are encountered, work in the vicinity of the discovery must stop until a Hanford Cultural Resource Protection archaeologist has been notified, the significance of the find is assessed, and, if necessary, mitigation of the impacts to the find are arranged.</p> <p>Impacts to other cultural values will be minimized through implementation of DOE/RL-98-10; DOE/RL-2005-27, <i>Revised Mitigation Action Plan for Environmental Restoration Disposal Facility</i>, and consultation with area Tribes as needed. This will help ensure appropriate mitigation to avoid or minimize any adverse effects to natural and cultural resources and address any other relevant concerns.</p> <p>Potential impacts to cultural and historical resources that may be encountered during the short-term construction activities associated with implementing the removal action will be mitigated through compliance with the appropriate substantive requirements of the <i>National Historic Preservation Act of 1966</i> and other ARARs related to cultural preservation.</p>
Socioeconomic Impacts	Considers impacts pertaining to employment, income, other services (e.g., water and power utilities), and the effect of implementation of the proposed action on the availability of services and materials.	The proposed action is within the scope of current RL environmental restoration activities and will have minimal impact on the current availability of services and materials. This work is expected to be accomplished largely using employees from the existing contractor workforce. Even if the removal activities creates additional service sector jobs, the total expected increase in employment would be expected to be less than 1 percent of the current employment levels at the Hanford Site. The socioeconomic impact of the project will contribute to the continuing overall positive employment and economic impacts on eastern Washington communities from Hanford Site cleanup operations.

Table C-3. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
Environmental Justice	Considers whether the proposed remedial actions would have inappropriately or disproportionately high and adverse human health or environmental effects on minority or low income populations.	Per Executive Order 12898, <i>Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations</i> , DOE seeks to ensure that no group of people bears a disproportionate share of negative environmental consequences resulting from proposed federal actions. There are no impacts associated with proposed activities associated with the 200-MG-1 OU that could reasonably be determined to affect any member of the public; therefore, they would not have the potential for high and disproportional adverse impacts on minority or low-income groups.
Cumulative Impacts (Direct and Indirect)	Considers whether the proposed action could have cumulative impacts on human health or the environment when considered together with other activities locally, at the Hanford Site, or in the region.	<p>The concern is associated directly with the targeted area. Because of the temporary nature of the activities and their remote location, cumulative impacts on air quality or noise with other Hanford Site or regional construction and cleanup projects would be minimal. When soils at a site in this OU are found to be contaminated with hazardous substances in concentrations presenting a material threat to human health and the environment, that threat will be mitigated. The net anticipated effect could be a positive contribution to cumulative environmental effects at the Hanford Site through removal, treatment, and disposal of such hazardous substances and contaminants of concern into a facility that has been designed and legally authorized to safely contain such contaminants, like the ERDF. The soil removed under Alternative 3 will meet the ERDF waste acceptable criteria as described in WCH-191, <i>Environmental Restoration Disposal Facility Waste Acceptance Criteria</i>.</p> <p>The volume of soil that will be generated for disposal during this removal action period could be approximately 22,000 tons over the expected duration of this removal action (the removal action is scheduled for completion in 2024 [see Section 5.7 and Milestone M-015-49A-T01]); this represents less than 2,000 tons per year (and attendant transportation requirements).</p> <p>Wastes generated during the proposed activities would be manageable within the capacities of existing facilities. For perspective, the ERDF received over 700,000 tons of waste in calendar year (CY) 2008 and over 430,000 tons in CY 2007. Radiological contamination is expected to be minimal; by definition these are waste sites that are believed to be shallow in nature, do not impact groundwater, and have relatively small inventories. The ERDF received approximately 22,500 Ci in CY 2008 and approximately 13,000 Ci in CY 2007.</p>

Table C-3. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
Mitigation	Consider whether or not if adverse impacts cannot be avoided, remedial action planning should minimize impact to the extent practicable. This value identifies required mitigation activities.	Compliance with the substantive requirements of the ARARs will mitigate potential environmental impacts on the natural environment, including migratory birds, endangered species, and soil. The DOE has also established policies and procedures for the management of ecological and cultural resources when actions might affect such resources (DOE/RL-96-32; DOE/RL-96-88, and DOE/RL-98-10). Cultural resource and biological species reviews/surveys are undertaken that also provide suggested mitigation activities to assure adverse effects associated with implementing the actions are minimized or avoided. Health and safety procedures, documented in the health and safety plan, established by site contractors would mitigate risks to workers from the removal activities.
Irreversible and Irretrievable Commitment of Resources	<p>Considers the use of nonrenewable resources for the proposed remedial actions and the effects that resource consumption would have on future generations.</p> <p>When a resource (e.g., energy minerals, water, wetland) is used or destroyed and cannot be replaced within a reasonable amount of time, its use is considered irreversible.</p>	Materials that will be used to backfill waste site removed under Alternative 3 will be taken, if needed, from the surrounding area and/or existing borrow pits to contour the backfill to match the surrounding area. For both Alternatives 2 and 3, normal usage of resources during construction activities, such as fuel and water, will be irreversibly used. Restoration of formerly disturbed areas to a more natural state is expected to result in a net benefit to the ecological and visual resources within the region.

National Environmental Policy Act of 1969, 42 USC 4321, et seq.

National Historic Preservation Act of 1966, 16 USC 470, et seq.

CY = calendar year

In addition, the RL is including the combined effects anticipated from ongoing CERCLA/ Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order* response actions as part of the cumulative impact analysis in the forthcoming draft tank closure and waste management environmental impact statement. The tank closure and waste management environmental impact statement will include a site-wide cumulative impact groundwater analysis. This will present the public with a separate opportunity for comment as part of that NEPA process, and will be used to inform the public concerning ongoing implementing cleanup actions on the Hanford Site.

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