

# Action Memorandum for Non-Time-Critical Removal Action for 11 Waste Sites in 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

P.O. Box 550  
Richland, Washington 99352

Approved for Public Release;  
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Date Published  
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*J. D. Asadul*  
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## Executive Summary

This action memorandum requests and documents approval of the U.S. Department of Energy proposed *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*<sup>1</sup> non-time-critical removal actions for 11 waste sites in the 200-MG-1 Operable Unit. Confirmatory sampling/no further action was selected as the preferred action for eight of the 200-MG-1 Operable Unit waste sites. Removal, treatment, and disposal was selected as the preferred action for three of the 200-MG-1 Operable Unit waste sites. The removal actions for the 200-MG-1 Operable Unit will minimize the release or threat of release of hazardous substances that pose a risk to human health and the environment, and provide an end state consistent with commitments of Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order*.<sup>2</sup> The U.S. Department of Energy is seeking the Washington State Department of Ecology's review and concurrence on this action memorandum.

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<sup>1</sup> *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq. Available at: [http://www4.law.cornell.edu/uscode/42/usc\\_sec\\_42\\_00009601----000-.html](http://www4.law.cornell.edu/uscode/42/usc_sec_42_00009601----000-.html).

<sup>2</sup> Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: <http://www.hanford.gov/?page=91&parent=0>.

## Contents

<b>1</b>	<b>Purpose.....</b>	<b>1</b>
<b>2</b>	<b>Site Background and Conditions .....</b>	<b>1</b>
	2.1 Other Actions to Date.....	2
	2.2 EPA, State, and Local Authorities Role .....	4
<b>3</b>	<b>Threats to Human Health or the Environment .....</b>	<b>4</b>
<b>4</b>	<b>Endangerment Determination .....</b>	<b>4</b>
<b>5</b>	<b>Proposed Actions and Estimated Costs.....</b>	<b>5</b>
	5.1 Confirmatory Sampling/No Further Action .....	6
	5.2 Removal, Treatment, Disposal .....	6
	5.3 Description of Alternative Technologies.....	7
	5.4 Applicable or Relevant and Appropriate Requirements.....	7
	5.5 Project Costs.....	8
	5.6 Project Schedule .....	8
<b>6</b>	<b>Expected Change in the Situation Should Action Be Delayed or Not Taken.....</b>	<b>8</b>
<b>7</b>	<b>Outstanding Policy Issues.....</b>	<b>8</b>
<b>8</b>	<b>Recommendation.....</b>	<b>8</b>
<b>9</b>	<b>References .....</b>	<b>9</b>

## Appendices

A.	Public Comments and Responsiveness Summary .....	A-i
B.	Waste Site Attributes.....	B-i
C.	Site-Specific RAL Tables for 200-MG-1 Operable Unit 11 Waste Sites .....	C-i
D.	Applicable or Relevant and Appropriate Requirements.....	D-i

## 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	contaminants 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
MESC/IC/MNA	maintain existing soil cover/institutional controls/monitored natural attenuation
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
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>

## 1 Purpose

This action memorandum requests and documents approval of the U.S. Department of Energy (DOE) proposed *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), non-time-critical removal actions for 11 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. Appendix A includes a summary of the comments and associated responses. Responses to public comments did not result in changes to DOE/RL-2008-44.

The Washington State Department of Ecology (Ecology) was consulted 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. The DOE is seeking Ecology's review and concurrence on this action memorandum.

## 2 Site Background and Conditions

The Hanford Site encompasses approximately 1,517 km<sup>2</sup> (586 mi<sup>2</sup>) 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) (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 includes 194 waste sites in the 200 Area. The waste sites 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. This action memorandum addresses 11 of the 194 waste sites. The DOE and Ecology have agreed that reducing the footprint of the Central Plateau (see below) by removing outlying waste sites is a priority. The DOE and Ecology selected 11 waste sites because they are outlying sites. The remaining 183 waste sites will be addressed in future action memoranda. Table 1 lists the 11 waste sites. Figure 1 shows the locations of the waste sites and their preferred action.

All of the waste sites contained in the 200-MG-1 OU are located within the Central Plateau, as defined in DOE/EIS-0222-F, *Final Hanford Comprehensive Land Use Plan Environmental Impact Statement*, and DOE/EIS-0222-SA-01, *Supplement Analysis Hanford Comprehensive Land-Use Plan Environmental Impact Statement*. Figure 1-1 shows the boundary of the Industrial-Exclusive Zone around the 200 Area. DOE/EIS-0222-F defines the land use for the Central Plateau outside the Industrial-Exclusive Zone as conservation/mining.

Table 1. 200-MG-1 Operable Unit Waste Sites Considered for Removal Actions from DOE/RL-2009-48

Waste Site Code	Waste Site Type	Waste Site Code	Waste Site Type	Waste Site Code	Waste Site Type
200-E-101	Experiment/Test Site	600-40	Dumping Area	600-275	Foundations
200-E-110	Dumping Area	600-51	Dumping Area	Old Central Shop Area (OCSA)	Foundations
600-36	Burn Pit	600-218	Dumping Area	UPR-600-21	Unplanned Release
600-38	Dumping Area	600-262	Crib	--	--

Appendix B provides details on each of the 11 waste sites.

## 2.1 Other Actions to Date

Table 2 identifies 6 of the 11 waste sites that have undergone previous actions.

Table 2. 200-MG-1 Operable Unit Waste Sites That Have Undergone Previous Actions

Waste Site Code	Previous Action
200-E-101	The open bottom pit was decommissioned in 1994; the access pipes and cables were removed.
200-E-110	In 1999, the bulk of the tumbleweeds were removed, leaving only fragments.
600-38	Most of the trash, including the drums, had been removed by 1996.
600-51	A sample of this material was analyzed with the HAZCAT field analysis kit. The bulk of this material appears to be a sodium compound. The sodium compound has been removed.
600-275	The bunkers, guard house, and fence have been removed. The stored scrap has been removed.
UPR-600-21	Majority removed over the years by buckets and shovels; some decay below detection levels.

The previous actions, while consistent with the proposed actions, have not eliminated the potential threat to human health or the environment. Appendix B contains additional information regarding previous actions.



## 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 Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan* (Tri-Party Agreement Action Plan), lists the 200-MG-1 OU waste sites. 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 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 DOE, as CERCLA Lead Agency, through Executive Order 12580, *Superfund Implementation*.

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

## 3 Threats to Human Health or the Environment

The NCP, Section 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.

## 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.

DOE 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. DOE 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.

## 5 Proposed Actions and Estimated Costs

The DOE performed an EE/CA in which viable 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. The removal action alternatives evaluated must 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, existing cleanup levels from the River Corridor will be used for these 11 waste sites (Appendix C). 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 decisions.

Ecological screening values, based on WAC 173-340-900 Tables, Table 749-3, are included in Appendix C 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. The 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).

CERCLA requires the No Action alternative as a baseline for comparison with other removal action alternatives. 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 11 200-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 are presented in the following sections.

## 5.1 Confirmatory Sampling/No Further Action

Under the CS/NFA, sampling and analysis will be conducted to confirm that soil contaminant concentrations are at or below RALs and that no further action is required. Contaminants of potential concern<sup>1</sup> (COPCs) are not expected to exceed RALs. Radiological surveys will be included in the initial site investigation as appropriate for site conditions to support the selection of sampling locations. A sampling and analysis plan and a removal action work plan will be developed. 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.

The CS/NFA alternative was selected as the preferred action for eight of the 11 200-MG-1 OU waste sites in DOE/RL-2008-44. The waste sites and project costs are summarized in Table 3.

If results of CS indicate that the CS/NFA is inappropriate (i.e., soil concentrations greater than the RALs), then the RTD action will be implemented or the waste site will be removed from the action memorandum authority and will be evaluated as part of the final remedy for 200-MG-1 OU.

Table 3. 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-E-101	Experiment/Test Site	\$180,000	600-218	Dumping Area	\$202,000
200-E-110	Dumping Area	\$87,000	600-262	Crib	\$180,000
600-36	Burn Pit	\$202,000	Old Central Shop Area	Foundations	\$721,000
600-38	Dumping Area	\$447,000	UPR-600-21	Unplanned Release	\$87,000
<b>Total Present Worth for CS/NFA sites: \$2,106,000</b>					

FY = fiscal year

## 5.2 Removal, Treatment, Disposal

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. However, where process knowledge and information are available to make a determination, removal actions may be conducted without prior confirmation sampling to

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

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 or nonradionuclides and radionuclides.

In this action, soils will be removed until the RALs are achieved, generally to a depth less than 4.6 m (15 ft). Direct radiological surveys without additional sampling and analysis may be used for verifying that radiological contamination is below RALs for waste sites contaminated only with radionuclides.

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 outer 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 the removal action work plan.

The RTD alternative was selected as the preferred action for three of the 200-MG-1 OU waste sites in DOE/RL-2008-44. The waste sites and project costs are summarized in Table 4.

Table 4. 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 \$)
600-40	Dumping Area	\$169,000	600-275	Foundations	\$589,000
600-51	Dumping Area	\$131,000	--	--	--
<b>Total Present Worth for RTD sites: \$889,000</b>					

FY = fiscal year

If sampling results indicate that the RTD action is inappropriate (i.e., soil concentrations at or below RALs), then the CS/NFA will be implemented or the waste will be removed from the action memorandum authority and will be evaluated as part of the final remedy for 200-MG-1 OU.

### 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 document substantively comply with applicable or relevant and appropriate requirements (ARARs) to the extent practicable. Appendix D identifies and describes specific regulatory sections that are ARAR to the removal actions.

## 5.5 Project Costs

The present-worth costs for the proposed removal actions are presented in Table 5. The cost estimates can be found in SGW-38383, *Cost Estimate for the 200-MG-1 Operable Unit Engineering Evaluation/Cost Analysis Removal Actions*.

Table 5. Summary of the Proposed Removal Actions

Proposed Removal Action	Number of Waste Sites	Present Worth (FY 2008 \$)
CS/NFA	8	\$2,106,000
RTD	3	\$889,000
Total	11	\$2,995,000

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.

This action memorandum addresses 11 of the 200-MG-1 OU waste sites. The 11 removal actions are expected to be completed by the end of calendar year 2011. The removal action work plan will include a project schedule in accordance with the Tri-Party Agreement Action Plan, Section 11.6.

## 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.

## 7 Outstanding Policy Issues

There are no policy issues associated with this removal action.

## 8 Recommendation

This decision document represents the selected removal action for 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 the NCP. The recommended removal action is a combination of Alternative 3, Confirmatory Sampling/No Further Action and Alternative 4, Removal, Treatment, and Disposal. Conditions at the site meet NCP Section 40 CFR 300.415(b)(2)(i) criteria for a removal action. This decision is based on the information provided in the administrative record for this project.

## 9 References

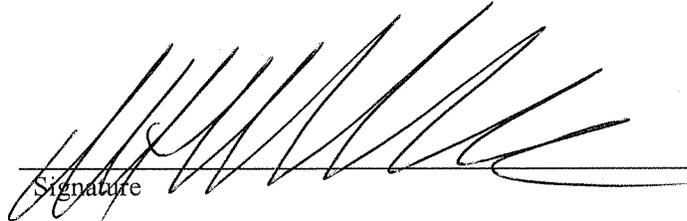
- 40 CFR 300, “National Oil and Hazardous Substances Pollution Contingency Plan,” *Code of Federal Regulations*. Available at: [http://www.access.gpo.gov/nara/cfr/waisidx\\_08/40cfr300\\_08.html](http://www.access.gpo.gov/nara/cfr/waisidx_08/40cfr300_08.html).
- 40 CFR 300, “National Oil and Hazardous Substances Pollution Contingency Plan,” Appendix B, “National Priorities List,” *Code of Federal Regulations*. Available at: [http://edocket.access.gpo.gov/cfr\\_2008/julqtr/40cfr141.50.htm](http://edocket.access.gpo.gov/cfr_2008/julqtr/40cfr141.50.htm).
- 40 CFR 300.415, “Removal Action,” *Code of Federal Regulations*. Available at: [http://edocket.access.gpo.gov/cfr\\_2007/julqtr/pdf/40cfr300.415.pdf](http://edocket.access.gpo.gov/cfr_2007/julqtr/pdf/40cfr300.415.pdf).
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq. Available at: <http://www.epa.gov/oecaagct/lcla.html#Hazardous%20Substance%20Responses>.
- DOE O 5400.4, *CERCLA Requirements*, U.S. Department of Energy, Washington, D.C. Available at: <http://www.directives.doe.gov/cgi-bin/exp/hcgi?qry1145757594;doe-1043>.
- DOE/EIS-0222-F, 1999, *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*, U.S. Department of Energy, Washington, D.C. Available at: [www.hanford.gov/doe/eis/hraeis/hraeis.htm](http://www.hanford.gov/doe/eis/hraeis/hraeis.htm).
- DOE/EIS-0222-SA-01, 2008, *Supplement Analysis Hanford Comprehensive Land-Use Plan Environmental Impact Statement*, Draft, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www5.hanford.gov/arpir/?content=findpage&AKey=DA06917281>.
- DOE/RL-2008-44, 2009, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www5.hanford.gov/arpir/?content=detail&AKey=0096350>.
- Ecology, EPA, and DOE, 1989a, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: <http://www.hanford.gov/?page=91&parent=0>.
- Ecology, EPA, and DOE, 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: <http://www.hanford.gov/?page=117&parent=92>.
- Executive Order 12580, 1987, *Superfund Implementation*, Ronald Regan, January 23. Available at: <http://www.archives.gov/federal-register/codification/executive-order/12580.html>.
- SGW-38383, 2008, *Cost Estimate for the 200-MG-1 Operable Unit Engineering Evaluation/Cost Analysis Removal Actions*, Rev. 0, Fluor Hanford, Inc., Richland, Washington. Available at: <http://www5.hanford.gov/arpir/?content=detail&AKey=0809231026>.
- Superfund Amendments and Reauthorization Act of 1986*. Available at: <http://www.epa.gov/superfund/policy/sara.htm>.
- WAC 173-340-900, “Tables,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-900>.

## DOE Approval Signature

The following signature pages (Approval 1 of 2) provide documented agreement between DOE and Ecology for the action memorandum for non-time-critical removal action at the 200-MG-1 OU. Conditions at the site meet the NCP Section 40 CFR 300.415(b)(2) criteria for a removal action. The total estimated cost for the project is \$2,995,000.

**Title:** *Action Memorandum for Non-Time-Critical Removal Action for  
11 Waste Sites in the 200-MG-1 Operable Unit*

**Concurrence** Matthew S. McCormick, Assistant Manager  
U.S. Department of Energy, Richland Operations Office

  
Signature \_\_\_\_\_ Date 7/31/09

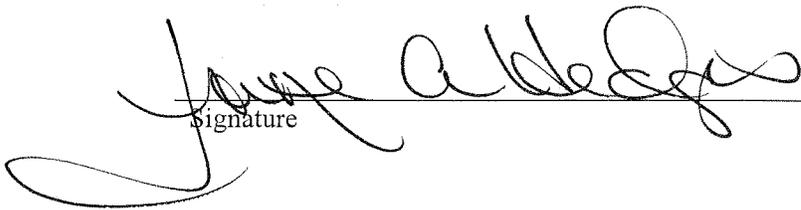
## Ecology Approval Signature

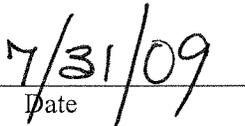
The following signature pages (Approval 2 of 2) provide documented agreement between DOE and Ecology for the action memorandum for non-time-critical removal action at the 200-MG-1 OU. Conditions at the site meet the NCP Section 40 CFR 300.415(b)(2) criteria for a removal action. The total estimated cost for the project is \$2,995,000.

**Title:** *Action Memorandum for Non-Time-Critical Removal Action for  
11 Waste Sites in the 200-MG-1 Operable Unit*

**Concurrence** Jane A. Hedges, Program Manager

Washington State Department of Ecology, Lead Regulatory  
Agency

  
signature

  
Date

## Appendix A

### Public Comments and Responsiveness Summary

## A1 Introduction

The purpose of this Responsiveness Summary is to summarize and respond to public comments on DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit*. The engineering evaluation/cost analysis (EE/CA) was provided for public comment on June 17, 2009.

The Tri-Party Agreement agencies (U.S. Department of Energy, Washington State Department of Ecology, and U.S. Environmental Protection Agency) or “Parties” announced the issuance and public comment period of the EE/CA in the *Tri-Cities Herald*. A 30-day public comment period was held, during which time the public had the opportunity to read, review, and submit comments on the EE/CA. There were no requests for a public meeting, and no public meeting was held. The document identified and evaluated four alternatives for non-time-critical removal actions for 194 waste sites located on the Hanford Central Plateau under the *Comprehensive Environmental Response, Compensation and Liability Act of 1980* (CERCLA).

## A2 Public Involvement

A newspaper ad appeared in the *Tri-City Herald* on June 17, 2009, announcing the availability of the EE/CA and the start of a 30-day public comment period. Approximately fifteen hundred copies of a fact sheet describing the EE/CA were mailed out or sent electronically. A public comment period was held from June 17 through July 17, 2009.

The Parties received written comments from six commenters during the public comment period. Two commenters requested that the preferred alternative for all waste sites be Remove, Treat and Dispose; one commenter recommended that the use of recycled material as cover material be considered along with a passive option, phytoremediation; two commenters agreed with the preferred alternative; and one commenter had recommendations regarding radioactive air emissions.

Other comments included: 1) statements that the document is well written; 2) a request that more detailed cost information be provided in the EE/CA; 3) clarification of terms (e.g., “removal” and “will” versus “may”); 4) a recommendation that waste sites should be carefully tested and evaluated to ensure that remediation by Confirmatory Sampling/No Further Action is appropriate; 5) recommendations for including additional radioactive air emission requirements, control technologies, and reporting of public dose consequences; 6) concern over the use of 150 years as a timeline for waste to remain in place and attenuate under an existing soil cover; 7) clarification on the term “whenever practicable;” 8) use of the “observational approach;” 9) concern over the “plug-in” approach; 10) concern over potential impacts due to climate change, in relation to increased precipitation over the next 150-years; 11) concern over future capping under a barrier; 12) clarification on the identification of the on-scene coordinator; 13) clarification on who determines when removal action levels (RALs) are met; 14) clarification on how the ERDF profile affects when the RTD alternative will be used; and 15) concerns over long-term protectiveness of waste remaining in place.

After reviewing the public comments, the Parties concluded that no change in the preferred removal alternatives is necessary. Commenters received responses to the comments submitted.

## A3 Comments and Responses

Comments and responses are presented in the order which they were received.

**COMMENTS:**

**JEANNE RAYMOND**  
**Corvallis, OR**

**Comment 1:** I am restating my objection to any plan except Removal, Treatment, and Disposal (RTD) for the Hanford Nuclear Site. Since the passage of the legislation to clean up Hanford, it has been the plan to truly "clean" up the radioactive contamination by removing the contaminated soil, and water. That has never meant to cover up the material until it decays.

I remember that several of those trenches were found to have radioactive material that had a half life of tens of thousands of years. It was always going to be problematic about how to go about cleaning it up. I cannot accept the assumption that this material will not get into the groundwater. Please protect the environment, for humans and all of the ecosystem, especially with the possibility of groundwater contamination. And note that I object to any new radioactive materials being brought to the site, for any reason. It was supposed to be cleaned up and closed down.

**Response to Comment 1:** Thank you for your comment on the *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*. All soil sample results will be compared to removal action levels (RALs), as defined by the EE/CA in Section 3.2. If the sample results show contamination above RALs, the Removal, Treatment, and Disposal (RTD) Alternative will be implemented. If the sample results are below RALs, the site is considered protective of human health and the environment and removal is not required.

**COMMENTS:**

**RAY LAM**

**Comment 1:** For Alternative 2, I would really like to see some recycled materials used for additional cover rather than mining other areas and disrupting other area soils. Also I do not see an option of passive phytoremediation.

**Response to Comment 1:** Thank you for your comments on the *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*. The use of alternative materials is considered whenever practicable in accordance with EPA's 2008 technology primer, *Green Remediation Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites* (EPA 542-R-08-002, available at <http://www.clu-in.org/download/remed/Green-Remediation-Primer.pdf>).

Phytoremediation was not evaluated as an alternative in the EE/CA because the technology is considered to be appropriate for a remedial action, not a removal action.

**COMMENTS:**

**RICHARD I. SMITH, P.E.**

**Comment 1:** This EE/CA, like the EE/CA for the 200-MG-2 Operable Unit Waste Sites, is one of the better ones I have seen lately. The waste sites are well- described and the descriptions of alternatives and bases for selection of alternatives for each waste site are well-presented. However, information describing the cost bases and methodologies used in developing the summarized cost estimates is not present in the EE/CA. To obtain any information about the cost analysis methodology, assumptions, and bases, the reader is forced to review another large document (*SGW-38383, Cost Estimates for the 200-MG-1 Operating Unit EE/CA Removal Actions, Rev. 0*). Fortunately, in this document, the on-line address of the detailed document is made available.

**Response to Comment 1:** Thank you for your positive feedback on the *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*. The purpose of an EE/CA is to provide high-level, summary information that is useful for the general public. References to more detailed information are provided to commenters such as yourself, who have a more technical knowledge base.

**Comment 2:** The level of detail in this latter document is very complete, and well-supports the summarized cost information presented in the EE/CA. Some of the higher level cost methodology and assumptions contained in SGW-38383 should be presented in the EE/CA, to provide the reader with some basis for understanding how the summary costs were generated, without having to read through the much larger SGW-38475.

**Response to Comment 2:** Thank you for your positive feedback regarding SGW-38383. A summary of the cost estimates information is provided in Section 5.3 of the EE/CA, as well as in the present-worth cost summary table in Appendix D. Your suggestion to add higher-level cost methodology and assumptions will be considered in future documents.

**Comment 3:** There are several reoccurring phrases and statements throughout the EE/CA that seem incorrect. The first is the use of the phrase “removal action”. Only one of the evaluated actions involves any removal, i.e., RTD. Thus, it would seem more correct and less confusing to use the phrase “remedial action” instead of “removal action”. This change would apply throughout the entire document.

**Response to Comment 3:** While the use of the term “removal action” may appear to be incorrect, the term “removal action” used throughout the document is correct as defined by CERCLA. The CERCLA definition of removal actions are short-term actions taken to clean up or remove released hazardous substances or substances that might pose a threat of a release or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment. Removal actions are categorized by the type of situation, the urgency of the threat of release, and the subsequent time frame in which the action must be initiated.

The identified waste sites in the EE/CA have soil contamination at or near the surface. These contaminants could pose a threat to human health and ecological receptors through direct contact or external exposure. This potential threat warrants a CERCLA non-time-critical removal action.

**Comment 4:** The second reoccurring statement is the following: “If the removal (remedial) action levels are not met at 4.6 m (15 ft), then soil samples MAY be taken at depths greater than 4.6 m (15 ft) to characterize potential groundwater risk drivers.” As I understand the planned procedure, “soil samples WILL be taken at depths greater than 4.6 m (15 ft) to characterize potential groundwater risk drivers.” You got it right on page 1-16, but had it wrong on pages 3-2, 4-3, and 6-14.

**Response to Comment 4:** The commenter is correct. Soil samples will be taken at depths greater than 4.6 m (15 ft.) below ground surface if contamination exceeds the removal action levels (RALs) to characterize potential groundwater risk drivers.

**Comment 5:** It would seem appropriate to include the decision matrix to be used to determine the path forward, so the reader is made aware of what those future actions might be for each situation. That matrix should be presented in the body of the report, together with any supporting information needed to explain the choices.

**Response to Comment 5:** Thank you for this suggestion. The Parties will consider ways to better present this type of information in future public documents.

**Comment 6:** With the exception of the relatively minor nits described above, both EE/CAs for the MG-1 and MG-2 Operable Unit Waste Sites, are excellent reports, containing all you ever wanted to know about those waste sites, and how best to clean them up. I assume that any of these waste sites could be remediated as convenient, once the Work Plan documents are in place and funds are available, making them excellent candidates for ARRA funding.

**Response to Comment 6:** Thank you for the compliment. *American Recovery and Reinvestment Act of 2009* (ARRA) funding is planned for a number of these waste sites. The Parties appreciate your feedback and continued involvement in Hanford cleanup issues.

**COMMENTER:**

**KEN NILES**

**Assistant Director**

**Oregon Department of Energy**

**Comment 1:** Oregon appreciates the opportunity to comment on the “Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites” (DOE/RL-2008-44, Rev. 0). We appreciate that this document – like several others recently – is well written and provides alternative reasoning that is well thought out and scientifically based.

We generally agree with the alternative choices for disposition of the 200-MG-1 waste sites and appreciate the flexibility built into the analysis alternatives to allow site-by-site sampling to determine whether the remove-treat-dispose decision process is appropriate. This flexibility should produce a more protective, efficient, time-saving and cost efficient approach to waste site remediation.

**Response to Comment 1:** Thank you for your positive feedback and comments on the *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*.

**Comment 2:** However, Oregon is concerned about whether sufficient sampling and characterization will be performed to adequately determine how best to treat each of the 200-MG-1 sites. We are particularly concerned about the 216-A-1, 216-A-3, 216-C-6 and 216-S-22 cribs, the 216-A-18, 216-A-20, and 216-S-8 trenches and the 216-S-4 french drain. Each of these sites received up to 265,000 gallons of waste containing technetium, uranium, cesium, strontium, and ruthenium, as well as hexavalent chromium, nitrate and other contaminants. The 216-S-8 trench alone received a reported 193 kg of uranium. We believe these sites should be carefully tested and evaluated to assure remediation by Confirmatory Sampling/No Further Action procedures (CS/NFA) is appropriate. We note that the 216-A-8 and 216-A-20 cribs and the 216-S-8 trench are in areas where most of the adjacent 200-MG-1 sites are already slated for remove-treat-dispose.

**Response to Comment 2:** A sampling and analysis plan (SAP) will be developed to provide data that confirms the CS/NFA removal action alternative, verifies removal actions at RTD sites, and provides characterization data for waste disposal. The SAP will be reviewed and approved by Ecology and EPA prior to being implemented. The Parties will develop site-specific sampling details based on the results of initial site visual inspections, radiological screening, and other pertinent site information. The Parties will approve the final sampling design, and regulator acceptance will be documented on the site-specific sampling plan and included in a removal action completion report. The design for data collection and sampling uses an observational approach with visual inspections, radiological and chemical field screening, focused judgmental sampling, and aerial composite sampling, where appropriate.

All waste sites will be sampled for the contaminants of potential concern (COPCs) listed in the EE/CA. Additional contaminants may be added based on process knowledge.

**Comment 3:** We request that DOE also carefully consider some of the septic systems, tanks and drain fields that have been included in the CS/NFA category, as some of these serviced facilities with chemical and radiological laboratories. The labs were reputed to have disposed of chemical and radiological contaminants down their drains.

**Response to Comment 3:** The Parties will look at the data from those areas as we prepare the sampling and analysis plans (SAPs).

**Comment 4:** We look forward to continuing to work with DOE as it moves forward with clean-up of the Central Plateau. If you have any questions or comments about our recommendations, please contact Dale Engstrom of my staff at 503-378-5584.

**Response to Comment 4:** The Parties appreciate your feedback and continued involvement in Hanford cleanup issues.

**COMMENTER:**

**JOHN MARTELL, MANAGER**

**Radioactive Air Emissions Section, Office of Radiation Protection  
Washington Department of Health**

**Comment 1:** The Radioactive Air Emissions Section (RAES) has reviewed the information contained in the aforementioned EE/CA. The RAES is interested in this project due to the potential for radioactive air emissions and our obligation to assess public impacts from *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) cleanup activities.

The list of Applicable or Appropriate and Relevant Requirements (ARARs) for radioactive air emissions seems to consider some of the minimum design and emission standards of the *Washington Administrative Code* (WAC) 246-247. We understand some of these will be addressed with greater detail in the Removal Action Work Plans and the Air Monitoring Plans for the specific action chosen. We encourage adoption of the full list (Table C-2) pertaining to air emissions in the CERCLA action memorandum.

**Response to Comment 1:** The Action Memorandum contains all of the substantive WAC 246-247 regulations as contained in Table C-2 of the EE/CA.

**Comment 2:** The As Low As Reasonably Achievable Control Technology (ALARACT) ARAR cited WAC 246-247-040(4) for major emission units requires an evaluation of all control technology, whether that is water, fixatives, covers, 1-EPA filters, containments, or confinements as described in WAC 246-247-130. This ensures selection of the superior abatement and the ALARA requirement (WAC 173-480-050 (1)) is satisfied. The control technology requirements must be met only to the extent justified by cost benefit for minor emission units.

**Response to Comment 2:** We appreciate your additional explanation on the implementation of ALARACT for this removal action. The proper abatement controls as well as ALARA concerns will be addressed in the Removal Action Work Plan and the field implementation.

**Comment 3:** Each existing Removal Action Work Plan and Air Monitoring Plan must be revised to include dose consequences for each waste site remediated under the "plug in" approach. At a minimum, we expect the potential to emit, control technology selection, and compliance monitoring to be accurately addressed in specific detail.

**Response to Comment 3:** If a waste site is added via the “plug in” approach to the removal action, all appropriate documents associated with the removal action, including the removal action work plan and associated air monitoring plan, will be updated as appropriate.

**Comment 4:** We would also request that the Department of Energy report the public dose consequences at the end of this project so they can be compared with the doses projected.

**Response to Comment 4:** The Department of Energy will consider this request.

**COMMENTER:**

**GREGORY DEBRULER**  
**Columbia Riverkeeper**  
**Hanford Project Consultant**

**Comment 1:** I thank the Department of Energy for allowing Columbia Riverkeeper to comment on the *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*. I hope that my comments will stimulate changes to the approach proposed for cleaning up the Central Plateau waste sites.

Columbia Riverkeeper has been working on the cleanup of Hanford since 1989. We have participated in the Future Site Working Group, CRCIA, Exposure Scenario Task Force and Risk Based Ends States to name a few.

The Tri-Party’s are initiating the first critical steps in cleaning up the Central Plateau the most contaminated site in North America. Since its a Tri-Party Agreement it is critically important to identify the specific detailed requirements of how one determines what remediation will occur if any. This present document fails to nail down specific requirements, allows for too many variables and caveats of what will or will not be done.

A successful cleanup of Hanford will be protective of human health and the environment (ecosystem) for as long as the waste remains hazardous.

**Response to Comment 1:** Thank you for your comments on the *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites* and continued involvement in Hanford cleanup issues.

**Comment 2:** The most disturbing piece of the document is USDOE makes an assumption that it is OK to use 150-years as the timeline for waste to remain in place and attenuate. Another way of looking at this is USDOE can continue to dose the ecosystem for the next 150 years as proposed in this document.

The Tri-Parties first broached this idea during the Exposure Scenario Task Force in 2002.

The final report conveyed some major comments in regards to the proposed 150-year timeline:

- Vadose zone contamination must be removed to prevent further groundwater degradation. Waiting 150 years is unacceptable.
- Treaty rights means we have full use of all sustenance resources. Groundwater is a key resource. This timeline is unacceptable.
- Groundwater needs to be cleaned up by 2012/2018, set a deadline and enforce it.
- Need a plan to eliminate the need for institutional controls.
- All Transuranic waste treated by 2020.

Its 2009 and USDOE once again is using the 150 year timeline as something that is acceptable and legal.

I hope to convince USDOE to put this 150-year timeline assumption to rest. I offer two analogies for a cleanup strategy. The presumption is both of these are going to be presented to the public and Congress. The assumption is that the public and Congress will be the final decision makers.

The first strategy: Cleaning up the Central Plateau the most contaminated site in North America was to design your cleanup strategy on a timeline that required cleanup of the 200 Area waste sites within 20 years. All waste sites were, removed, treated, and disposed (RTD). Sites that were capped had a 90% certainty that the waste would be contained would not continue to dose the ecosystem for as long as the waste remained. No further migration of the waste would occur beyond 20 years. Human health and the environment/ecosystem is protected for as long as any waste remained. Establishing a 20-year timeline forces remediation to occur and holds the current decision makers accountable for their actions and does not push out accountability 150-years.

The second strategy: for cleaning up the Central Plateau the most contaminated site in North America was to design your cleanup strategy on a timeline that required cleanup of the 200 Area waste sites to be complete in 150 years. Most waste sites were capped, or left in place and groundwater was treated in 150-years. No further migration of the waste would not occur beyond 150 years, and that human health and the environment (ecosystem) is assumed to protected for as long as the waste remained. Long-term IC's and monitoring was in place for as long as the waste remained hazardous. In some areas these system would have to be working for hundreds of years.

The second approach allows for 150 years for the waste to dose the ecosystem, and assumes 150 years of monitoring, and IC's. There are huge assumptions of how the waste that left in place will migrate or not migrate. There are huge assumptions in regards to future climatic conditions. Will it become dryer or wetter? The current document assumes that the precipitation over 150-years will change very little if any. The 150-year timeline allows the current decision makers to put off what can be done today and creates 150-years of unfunded mandates.

The 150-year timeline allows USDOE to leave waste in place. There is huge uncertainty of how much protection will actually exist over time. In regards to full life cycle costs, no one has a clue of how much these costs will be. USDOE has not been very accurate in estimating costs four years out, let alone 150 years.

If the public and Congress had to chose between 150 year strategy or a 20 year strategy they would choose 20 years. 150-year timeline costs too much and has too many uncertainties. It is much easier to justify spending the money over 20-years complete the cleanup of these waste sites instead of allowing 150+ years or monitoring and IC's. Most everyone in who has heard about the 150-year timeline has rejected it.

A final reason to eliminate the 150-year timeline it's a taking of WA States resources for the next 150 years. USDOE is being paid and has been paid for the last 20 years to cleanup Hanford and is not being paid to continue cleanup out 150-years. The final and most obvious reason is the claims for damages under CERCLA/NRDA. The claims for damages could be more than simply removing, treating and disposing off all the waste sites.

Please remove the 150-years this single change should result in a rewrite of the current document.

**Response to Comment 2:** The 150 year timeline is used as a decision point within the removal action process, as identified in Figure 5-1 of the EE/CA. Based on this criterion, the decision is made to either implement Remove, Treat, and Dispose (RTD) Alternative or the Maintain Existing Soil

Cover/Institutional Controls/Monitored Natural Attenuation Alternative. The selected alternative for these waste sites is RTD or Confirmation Sampling/No Further Action. The MESC/IC/MNA alternative was not proposed as the removal action for any of the 194 waste sites evaluated in the EE/CA. No public comments were received supporting this alternative and the Parties are not selecting it as a removal action in the action memorandum. This is consistent with the current strategy identified in existing Hanford Site guidance and advice.

**Note from responders:** *The following comments may include excerpts from the EE/CA or other documents that have been italicized to distinguish published text from commenter specific questions.*

**Comment 3:** *This EE/CA was prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 19801 (CERCLA). The 200-MG-1 OU includes 194 waste sites in the 200 East and 200 West Areas, hereafter referred to as the “200 Area,” and in the outer area of the Central Plateau. The waste sites include trenches, cribs, pits, ditches, and other areas of shallow contamination (generally less than 4.6 m [15 ft] deep). They also include 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 material. The terms “contamination” or “contaminant,” as used in this document, refer to the presence of contaminants of potential concern that exist above removal action levels.*

*The U.S. Department of Energy (DOE) has determined that the 200-MG-1 OU waste sites have the potential for release of CERCLA hazardous substances, and that a non-time-critical removal action, pursuant to authority delegated under Executive Order 12580, Superfund Implementation,<sup>2</sup> and Section 7.2.4 of Ecology et al., 1989a, Hanford Federal Facility Agreement and Consent Order Action Plan,<sup>3</sup> is warranted to mitigate the threat of release.*

*The purpose of this EE/CA is to evaluate removal action alternatives to mitigate threats to human health and the environment posed by the contaminated soil and other materials in the 200-MG-1 OU. Typically, an EE/CA focuses on a single site or facility after a site investigation and considers a range of alternatives in the evaluation. This EE/CA supports removal action decisions for a large number of waste sites for which little characterization information is available.*

### 1.5 APPROACH TO REMEDIATION

*The remediation approach to the 200-MG-1 OU in part has been determined by the following:*

- *Removal action alternatives consistent with the logic behind the creation of this OU*
- *Preference for RTD, whenever practicable*

This document needs to clearly spell out what exactly is meant by “whenever practicable”.

What are the parameters for determining what is practicable or not practicable?

Has a matrix been created to assess practicability?

Does the matrix include meeting requirements under NRDA to minimize the damage?

Does the decision “if not practicable” meet public and tribal expectations?

What public process is defined for public input if a site is not deemed “practicable”.

**Response to Comment 3:** The terms “whenever practicable” or “extent practicable” are CERCLA terms. Practicability is determined by evaluating each alternative and selecting the alternative that provides the best balance of trade-offs among alternatives in terms of the five primary balancing criteria: protection of

human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness. Cost is also considered for removal actions. This evaluation was completed in Chapter 5 of the EE/CA. EE/CA Table 5-2 summarizes the evaluation.

While Natural Resource Damage Assessment (NRDA) is not specifically called out in the five primary criteria, it is an underlying consideration in each of the five primary criteria. Generally, at large cleanup sites, the final NRDA determination is made after removal actions are complete and remedial actions are operating properly and successfully.

CERCLA requires that state and community acceptance be considered when selecting an action. The public process includes the opportunity for the public to review and comment on decision documents and participate in public meetings should they be requested/held.

**Comment 4:** *Extensive use of the observational approach because of limited site information; particularly for non-engineered structures (e.g., spills, UPRs, and windblown contamination) to support rapid changes to field implementation.*

Extensive use of observational approach creates lots of concern.

Observational by whom?

One observer might say there is “little contamination” therefore no need to sample. When another observer might say, based on the lack of detailed release information its better to sample to insure there is no contamination. If we learn from the mistakes made on the River Corridor the observational approach showed what was ASSUMED was not correct. The drums found in the 300 Area was a big surprise. Considering the size of this proposed Operable Unit there are many waste sites that could become surprises in the future.

**Response to Comment 4:** The observational approach is conducted by the Removal Action Project Manager and the DOE on-scene coordinator as described in the Removal Action Work Plan. The observational approach is a method of planning, designing, and implementing a removal action when a limited amount of initial characterization data is available. Additional information gathered during removal actions will be used to make “real-time” decisions in the field to guide the direction and scope of removal actions, based on contingency planning. The observational approach in removal actions provides the flexibility in the field necessary to adapt the removal action to observed site conditions. Removal actions will proceed until it can be demonstrated through field screening and verification sampling that the RALs and removal action objectives have been met. This method of streamlining is faster and more cost-effective than traditional approaches that require substantial site characterization and detailed planning before taking removal actions.

Regarding what was learned from the 300 Area: Lessons learned are taken into account with each field activity and the observational approach can be a very effective method for determining whether initial assumptions about a specific waste site are or are not correct, and for guiding additional field screening, characterization and removal actions.

**Comment 5:** *Procedure for easy addition of new sites to existing remedies (i.e., plug-in approach), as well as assignment of sites to other OUs if the waste sites do not fit the 200-MG-1 OU conceptual model or the removal actions alternatives.*

Conceptual models and the analogous waste site approach again allows for many potential huge ASSUMPTIONS. To assume that one waste site and another might be analogous at Hanford takes a big

leap of faith. For many Hanford waste sites there is little if any release information. In order to be conservative in ones approach its better to use the I don't know assumption, and therefore I must take random samples to assess what I don't know. This approach is lacking in the current document. Too many times at Hanford it has been the inverse, "if you don't look you don't have a problem" or "out of site out of mind". This document reinforces this mind set.

**Response to Comment 5:** The plug-in approach has been developed to analyze removal alternatives for groups of sites with similar characteristics, designated as the site profile. The action memorandum identifies removal actions (or alternatives) based on the site profiles. New waste sites identified as similar or comparable to a waste site group for which alternatives have already been developed and evaluated will be added to that group through the plug-in approach. 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 are routine activities at Hanford. CERCLA regulations, 40 CFR 300.405(a)(3), (5), and (8), "Discovery or Notification," identify some ways that DOE may discover "new" (previously unknown) waste sites at Hanford. RL-TPA-90-001, *Tri-Party Agreement Handbook Management Procedures*, Guideline MP-14, "Maintenance of the Waste Information Data System (WIDS)," describes how DOE, Ecology, and EPA identify and document new waste sites. The action memorandum may be modified to include the disposition of new waste sites added to this removal action.

In addition, the plug-in approach also allows waste sites with similar characteristics due to common waste management practices, common media, and common contaminant types to use common and/or previously selected response actions. The DOE, in cooperation with EPA, has worked to expand the use of EPA's presumptive remedy and generic approaches as mechanisms to streamline waste site remediation (see DOE's Office of Environment Management [OEM] and Office of Environment, Safety and Health [OESH Fact Sheet], DOE/EH-413-9903, May 1999).

**Comment 6:** *1.5.1 Removal Action Alternatives*

*Because the waste sites in this OU are shallow and simple removal efforts would effectively remove the contaminant exposure pathway to human and environmental receptors, the range of alternatives considered is limited. The 200-MG-1 OU removal action alternatives considered in this EE/CA are consistent with logic behind the creation of this OU, and include NA, MESC/IC/MNA, CS/NFA, and RTD. Sites determined to require other alternatives will be identified for transfer to other OUs. The applicability of each removal action alternative is as follows.*

- *NA. This alternative applies to waste sites that pose no current or potential threat to human health or the environment.*

What is your timeline for no current of potential threat?

How do you define a threat to the ecosystem?

**Response to Comment 6:** The timeline for evaluating whether there is a current or potential threat to human health or the ecosystem is the present. CERCLA requires the No Action alternative as a baseline for comparison with other removal action alternatives. 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 the EE/CA, because the alternative provided no protectiveness.

**Comment 7:** *MESC/IC/MNA. This alternative may be appropriate for waste sites that contain an existing soil cover and only short-lived radionuclides that do not present an immediate endangerment to human health or the environment and that will attenuate to levels below RALs within 150 years.*

150 years is not an acceptable time to allow for contamination and exposure to continue. This is not clean up. It is merely a delay tactic to put off what one can easily remediate today. Its illogical to allow for continued exposure for the next 150 years.

The removal action levels RAL's are nice to site it makes one feel that there is a certain level that will require one to go in and take additional remedial actions. The problem with this is that it allowing for continued monitoring and IC's over a very long period of time and assumes that someone yet undefined will actually be at Hanford taking action if the RAL's are exceeded. There is no citation of whom this will be. Where funding for this will come from and it once again assumes that it will be taken care of later. What doesn't get done today USDOE offers no assurances it will get done later.

This document does not define what is the allowable dose for terrestrial.

What are you using for the acceptable dose limits for terrestrial?

Please furnish me with this information.

The statement of an "immediate endangerment to human health and the environment" does this mean in the timeline of 150-years?

If so, this is not acceptable.

If not please clearly define in what timeline do you call immediate and what parameters are you using to define endangerment?

**Response to Comment 7:** As stated previously, the 150 year timeline is used as a decision point within the removal action process, as identified in Figure 5-1 of the EE/CA. Based on this criterion, the decision is made to either implement the RTD or the MESC/IC/MNA Alternative. The selected alternative for these waste sites is RTD or CS/NFA. The MESC/IC/MNA Alternative was not proposed as the removal action for any of the 194 waste sites evaluated in the EE/CA. No public comments were received supporting this alternative and the Tri-Parties are not selecting it as a removal action in the action memorandum. This is consistent with the current strategy identified in existing Hanford Site guidance and advice.

The additional questions you raised regarding the MESC/IC/MNA alternative were not considered because the MESC/IC/MNA alternative was not selected as a preferred removal action. RALs values will be developed based on ARARs (including *Washington Administrative Code* [WAC] 173-340-7490, *Terrestrial Ecological Evaluation Procedures*) or calculated based on the CERCLA risk range for direct exposure to human health, ecological screening levels and protection of groundwater. Attainment of the RALs is intended to meet the removal action objectives identified in Chapter 3.0 of the EE/CA

**Comment 8:** *CS/NFA. This alternative may be used when empirical data indicate that RTD of the waste site is not required. Confirmatory sampling data will be collected to confirm that soil is at or below RALs, supporting the decision that no further action is required. If the results of CS indicate that the CS/NFA is inappropriate (i.e., > RALs), then the RTD action will be implemented or the waste site will be removed from this EE/CA and will be evaluated as part of the remaining 200-MG-1 OU.*

Just because the current conditions say that RAL's are being met that does not mean that in the future for as long as the waste remains hazardous the RAL's will still be met. It appears that the current

precipitation assumption is that it will not change much from the 10.0 inches per year over the next 150 years. Is this correct?

Due to climate changes precipitation could increase to 20 to 40+ inches of rain per year over the next 125 years. This rainfall could occur during a four-month period of time, the rainy season. A current assumption that you can leave the waste in place or put a cap over it based on present conditions has nothing to do with what might happen in the future.

Please furnish me with more information on what your baseline assumptions are.

Please furnish me with information on how you are determining what should be RTD or not, and how precipitation is a factor in the decision.

Please furnish me with your precipitation assumptions over the next 150-years.

**Response to Comment 8:** Soil and debris below RALs is not considered hazardous. This is an interim removal action and not a final action for these waste sites. Once a final remedy is determined for these waste sites, long term precipitation events will be taken into account.

Sections 2.2 through 2.6 provide the baseline understanding of the conditions for 200-MG-1 OU waste sites. A conceptual site model in this EE/CA established a waste site profile in which removal action objectives (RAOs) were developed. RALs will be based on RAOs and ARARs, as well as preferred alternatives. The evaluation of the alternatives, including RTD, is provided in Chapter 4.0 of the EE/CA. Chapter 5.0 of the EE/CA provides an analysis of each alternative including how the RTD alternative was selected.

The Hanford Meteorological Station (HMS) managed by the Pacific Northwest National Laboratory (PNNL) and the US Department of Energy provides an annual Climate Document (PNNL-151160) that provides monthly and annual precipitation tables for the Hanford Area that include data since 1947. See the following website for the latest available information: <http://hms.pnl.gov/products/>.

**Comment 9:** *RTD. In this alternative, sampling and analysis confirm that soil contains contamination above RALs and requires removal. However, removal actions may be conducted without prior confirmation sampling, or where process knowledge and information are available to make this determination. Remove and dispose of soil and other materials above with treatment as required for disposal. Through verification sampling and analysis, demonstrate remaining in situ soils are at or below RALs.*

When it doubt pull it out! Remove, Treat & Dispose in the end will be much cheaper than leaving waste in place. If you have any uncertainty just RTD the waste, it will save us all time and money.

*In this alternative, contamination will be removed up to 4.6 m (15 ft), including contamination that may have migrated away from the original site, to levels at or below the established RALs. The RALs will be established in the RAWP. Excavated waste will be treated if necessary and disposed of at the Environmental Restoration Disposal Facility (ERDF). The RTD waste sites are typically shallow sites where the depth of contamination is not expected to extend nominally more than 4.6 m bgs. The depth is not restricted to 4.6 m, but that depth will be used as a general guideline for RTD waste sites. If the RALs are not met at 4.6 m, soil samples will be taken at depths greater than 4.6 m to characterize potential groundwater risk drivers. A decision matrix for determining the path forward in this situation will be included in the RAWP. This will include removal of soils, debris, and contaminated structures. In certain cases, using the observational approach, to depths slightly greater than 4.6 m bgs may be performed if necessary to reduce contaminants to levels below RALs, or as directed by the on scene coordinator. If*

*results of CS indicate that the RTD is inappropriate (i.e., at or below RALs), then the CS/NFA action will be implemented.*

The biggest unknown is the precipitation over the next 150-years. Please furnish me with the analysis that shows your 150-year predictions for precipitation.

**Response to Comment 9:** Soil and debris contaminated above RALs will be removed under the RTD alternative. Verification sampling and analysis will be used to demonstrate that remaining soil is at or below the RALs. This is an interim removal action and not a final action for these waste sites. Long term precipitation events will be taken into account in the selection of a final remedy.

As stated in the previous response, Hanford Meteorological Station (HMS) managed by the Pacific Northwest National Laboratory (PNNL) and the US Department of Energy provides an annual Climate Document (PNNL-151160) that provides a monthly and annual precipitation table for the Hanford Area that includes data since 1947. See the following website for the latest available information:  
<http://hms.pnl.gov/products/>.

**Comment 10:** *The anticipated final remedy for several 200-MG-1 OU waste sites is capping under a barrier that will remediate a larger nearby facility. Such sites will be maintained in a safe condition until the barrier is built. However, if these waste sites are determined to be a near term threat, RTD may be implemented as directed by the on scene coordinator. These waste sites likely are not a threat to groundwater. The Tri-Parties are developing a Central Plateau remediation strategy, and this removal action will be consistent with the anticipated final remedy.*

USDOE has suggested capping as many waste sites as possible. Capping does not insure that migration of the waste will not occur over time. Considering the potential for large climatic changes and increased precipitation over the next 150-years capping creates too many long-term uncertainties.

There is full support for RTD. The statement that a “scene coordinator” can implement RTD might be a good thing.

Who employs the “scene coordinator”?

I suggest that the scene coordinator be an EPA or Ecology employee since EPA & Ecology are the regulators.

**Response to Comment 10:** The parties are developing a Central Plateau Cleanup Strategy. If a barrier is selected as a final remedy, the barrier design will include minimizing and preventing infiltration of precipitation. This action memorandum is an interim removal action and not a final action for these waste sites. Long term precipitation events will be taken into account in the selection of a final remedy.

The National Contingency Plan specifies that the on-scene coordinator is an official designated by the CERCLA Lead Agency; DOE is the Lead Agency for remedial and removal actions on DOE facilities. Depth of excavation decisions will be made by the on-scene coordinator in consultation with the lead regulatory agency. For the 200-MG-1 OU waste sites, the lead regulatory agency is Ecology.

**Comment 11:** *1.5.2 Plug-in Approach*

*The waste site remedy selection will be documented in the action memorandum. The “plug-in approach” has been developed to analyze removal alternatives for groups of sites with similar characteristics, designated as the site profile. The action memorandum will identify remedies on the basis of the site profiles. If it is determined that a new waste site(s) is sufficiently similar to, or compatible with, a site group for which the alternatives have already been developed and analyzed, then the site will “plug-in”*

*to that group. Confirmatory sampling may be required to determine whether a particular waste site fits the criteria for plug-in. The plug-in approach eliminates the time and cost required to produce multiple, redundant site-specific EE/CAs (DOE/EH-413-9903, The Plug-In Approach: A Generic Strategy to Expediting Cleanup).*

The plug in approach in some cases might work. The biggest issue in this section is this, “Confirmatory sampling may be required to determine whether a particular waste site fits the criteria for plug-in.

A conservative approach would be to say that the site is contaminated and that sampling needs to take place in order to assess the degree of contamination.

**Response to Comment 11:** Sampling will be conducted to verify that site concentrations are below RALs. Discovery, documentation, and response to new waste sites are routine activities at Hanford. CERCLA regulations, 40 CFR 300.405(a)(3), (5), and (8), “Discovery or Notification,” identify some ways that DOE may discover “new” (previously unknown) waste sites at Hanford. RL-TPA-90-001, *Tri-Party Agreement Handbook Management Procedures*, Guideline MP-14, “Maintenance of the Waste Information Data System (WIDS),” describes how DOE, Ecology, and EPA identify and document new waste sites.

In addition, the plug-in approach also allows waste sites with similar characteristics due to common waste management practices, common media, and common contaminant types to use common and/or previously selected response action. The DOE, in cooperation with EPA, has worked to expand the use of EPA’s presumptive remedy and generic approaches as mechanisms to streamline waste site remediation (see DOE’s OEM and OESH Fact Sheet, DOE/EH-413-9903, May 1999).

**Comment 12: 4.2 MAINTAIN EXISTING SOIL COVER/INSTITUTIONAL CONTROLS/MONITORED NATURAL ATTENUATION ALTERNATIVE**

*Under the MESC/IC/MNA alternative, the existing soil cover on a waste site is maintained and/or augmented as needed to provide protection from intrusion by biological receptors, along with ICs (e.g., excavation permits) and physical barriers (e.g., fencing) that will mitigate contaminant exposure. Appendices A and B identify waste sites that have soil covers (i.e., soil stabilization covers and clean overburden). With this alternative, radioactive contaminants remaining at the site are allowed to decay in place (i.e., to attenuate naturally), thereby reducing risk until RALs are met. This alternative will be considered for waste sites that meet the following conditions.*

- *A soil cover exists on the site.*
- *Contaminant concentrations will attenuate to below RALs within 150 years.*
- *Contaminants do not have a pathway to receptors within 150 years.*
- *Cost for this alternative is lower than the other alternatives and is still protective of human health and the environment.*

Using 150-years is not acceptable and should be changed to 20-years.

Why use 20-years.

In 20-years 90% or more of the 200 Area soil waste sites could be RTD’d. Using 150-years only increases costs. This document fails to calculate the total life cycle costs for the 150-years and the additional work that might be required if your IC’s or MNA’s fail. We have already seen one MNA decision that was reversed in less than 10-years. The ASSUMPTION by the regulators was MNA would work in the 300

Area. CRK said clearly it would not work and that using MNA in the 300 Area was wasting time. You could have cleaned up the entire 300 Area in this timeframe.

It is unacceptable to delay what you can do today for the wait and see approach of 150-years. Spend the money on RTD over the next 20 years and be finished with cleanup of soil sites in the Central Plateau.

*DOE/RL-2001-41, Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions, describes how the ICs are implemented and maintained and serves as a reference for the selection of ICs in the future. Institutional controls generally include non-engineered restrictions on activities and access to land, groundwater, surface water, waste sites, waste-disposal areas, and other areas or media that contain hazardous substances. This is to minimize the potential for human exposure to the substances. Common types of ICs include procedural restrictions for access, warning notices, permits, easements, deed notifications, leases and contracts, and land use controls. Waste sites having a thin soil cover may require more stringent ICs (e.g., physical barriers, biological monitoring, removal of deeply rooted plants, and control of deep-burrowing animals) to be implemented. The RAWP will specify soil cover thickness requirements. Water-and land-use restrictions also will be used, as necessary, to prevent exposure during the attenuation period.*

USDOE does not have the right to condemn the groundwater taking the states resource for the next 150-years. USDOE is paid to cleanup Hanford. USDOE is not paid to delay cleanup. The current proposal allowing for 150-years shows that USDOE has little or no intention of protecting the ecosystem, and does not want to do what has been proven to work, RTD. Pre-70 transuranic waste is another example of USDOE not wanting to RTD these waste sites.

*Attenuation relies on natural processes to lower contaminant concentrations until cleanup levels are met. Monitored natural attenuation includes sampling and/or environmental monitoring, consistent with EPA/540/R-99/006, Radiation Risk Assessment at CERCLA Sites: Q&A, to verify that contaminants are attenuating as expected and to ensure that contaminants remain isolated (e.g., will not be released to air or biota). Monitoring activities will include surface radiological surveys and/or subsurface radiological logging to verify that natural attenuation processes are effective. Collection of confirmatory samples and laboratory analysis is included in this alternative to confirm that the radiological contaminants at the site will attenuate and meet cleanup criteria within 150 years. SGW-38383 describes sample design assumptions for cost estimating.*

Huge assumption that the waste will attenuate in 150-years and that sampling and monitoring will insure that MNA is working like expected.

Who is going to be assessing if MNA is working over the next 150-years?

There are many other variables that will determine the fate and transport of waste.

What are your precipitation assumptions for the next 150-years considering climatic change? Over the entire timeframe the waste remains hazardous?

What are your seismic assumptions over the timeframe the waste remains hazardous?

What are your assurances that over 150-years there will be no exposure to wildlife?

What are your exposure assumptions for biota?

What are your action levels for protection of biota?

What are your acceptable does limits for terrestrial?

**Response to Comment 12:** The alternative was not proposed as the removal action for any of the 194 waste sites evaluated in the EE/CA. The alternative was identified and included in the EE/CA evaluation to provide a complete range of alternatives for the Parties to consider. No public comments were received supporting this alternative and the Parties are not selecting it as a removal action in the action memorandum. The 150 year timeline is used as a decision point within the removal action process, as identified in Figure 5-1 of the EE/CA. Based on this criterion, the decision is made to either implement the RTD or the MESC/IC/MNA Alternative. The selected alternative for these waste sites is RTD or CS/NFA. The MESC/IC/MNA Alternative was not proposed as the removal action for any of the 194 waste sites evaluated in the EE/CA. No public comments were received supporting this alternative and the Tri-Parties are not selecting it as a removal action in the action memorandum. This is consistent with the current strategy identified in existing Hanford Site guidance and advice.

The additional questions you raised regarding the MESC/IC/MNA alternatives were not considered because the MESC/IC/MNA alternative was not selected as a preferred removal action.

**Comment 13: 4.3 CONFIRMATORY SAMPLING/NO FURTHER ACTION ALTERNATIVE**

*Under the CS/NFA alternative, sampling and analysis confirm that soil is at or below RALs and that no further action is required. Radiological surveys will be included in the initial site investigation as appropriate for site conditions to support the selection of sampling locations.*

*A sampling and analysis plan will be prepared as part of the RAWP development. The sampling and analysis plan will contain the necessary information to support both chemical and radionuclide data collection at a sufficient quantity and quality to make a determination whether RALs have been met.*

Who makes the determination whether RAL's have been met?

Is this agreed to by the Tri-Party's or is it left with the contractor to decide?

*This alternative will be considered for waste sites that meet one or more of the following conditions.*

- *Prior cleanup activities have been performed, but insufficient data are currently available to close out the waste site.*
- *COPC concentrations are not expected to exceed RALs.*
- *The contamination status of the site is uncertain and a strong possibility exists that the site is not contaminated.*

*If the results of CS indicate that the CS/NFA is inappropriate (i.e., >RALs), then the RTD action will be implemented or the waste site will be removed from this EE/CA and will be evaluated as part of the remaining 200-MG-1 OU.*

**Response to Comment 13:** Ecology, as the lead regulatory agency, approves the removal action work plan, including the sampling and analysis plan, for the 200-MG-1 operable unit waste sites. RALs are included in the action memorandum and the removal action work plan, which are approved by DOE and Ecology.

**Comment 14: 4.4 REMOVAL, TREATMENT, AND DISPOSAL ALTERNATIVE**

*Under the RTD alternative, sampling and analysis confirm that soil contains contamination above RALs and requires removal. 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 other materials above RAL, with treatment as required for disposal. Through verification*

*sampling and analysis, demonstrate remaining in situ soils are at or below RALs. This alternative will be considered for waste sites that meet one or more of the following conditions.*

- *Contaminant concentrations are known or expected to exceed RALs.*
- *Contaminants will not naturally attenuate within 150 years or below RALs by 2050.*

Please change to 20 years that contaminants will be below the RAL's.

**Response to Comment 14:** The RALs do not include a 150 year timeline. Each waste site will be compared to the RALs and the alternative selected consistent with Figure 5-1 of the EE/CA. Using this figure, the RALs will be met at the time of the removal action, not a given number of years.

**Comment 15:** *The cleanup of sites under the RTD alternative will be guided by the observational approach. The observational approach is a method of planning, designing, and implementing a removal action that relies on information (e.g., field instrument readings and/or field screening samples) collected during the removal to guide the direction and scope of the activity. Initial screening and sampling data are used for an ERDF profile, to assess the extent of contamination and to make real-time decisions in the field.*

Please explain: Initial screening and sampling data are used for an ERDF profile, to assess the extent of contamination and to make real-time decisions in the field.

How does the ERDF profile affect what will be RTD or not?

**Response to Comment 15:** Everything that will be removed must ultimately be disposed of somewhere. Initial screening and sampling data will be used for an ERDF profile. It is important to have an ERDF profile so that the removal action project manager and the on-scene coordinator know whether the soil or debris requires treatment prior to disposal and whether the ERDF can accept the soil or debris, with or without treatment. If the soil or debris could not be disposed of in the ERDF, even after treatment, the removal action project manager and the on-scene coordinator will consult with Ecology and determine whether a waste disposal facility is available. Soil and debris will not be removed until all Parties are sure that there is a waste disposal facility that can accept the soil or debris based on the quality of screening and/or characterization data.

**Comment 16:** *Following some excavation, the extent of contamination may be further assessed by additional screening and sampling. The extent of removal is then adjusted based on those results. Targeted removals will be conducted under this alternative if contamination is localized in only a portion of a waste site.*

*In this alternative, soils will be removed until the RALs are achieved, generally to a depth of 4.6 m (15 ft). Direct radiological surveys without additional sampling and analysis may be used for verifying that radiological contamination is below RALs for waste sites contaminated only with radionuclides for which the isotopic ratios have been established.*

*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 may be taken at depths greater than 4.6 m to characterize potential groundwater risk drivers. A decision matrix for determining the path forward in this situation will be included in the RAWP.*

*Depth of excavation will be determined by the on scene coordinator in consultation with Ecology. Extent of excavation will be consistent with the anticipated remedial action to the extent practicable. If results of confirmatory sampling indicate that the RTD is inappropriate (i.e., at or below RALs), then the CS/NFA action will be implemented.*

Who is the on scene coordinator? Employed by whom?

Why isn't EPA & Ecology the final decision makers on how deep to dig?

For a long time at Hanford USDOE has asserted certain wastes do not migrate. There is also lots of scientific evidence that this assertion is false that waste over-time will migrate.

What mechanism has been created so that you are conservative in your approach as to determining what waste needs to be removed to prevent migration over time, for as long as the waste remains hazardous? Again, when there is doubt or controversy its better to just RTD.

**Response to Comment 16:** The on-scene coordinator is an official of DOE, who is the CERCLA Lead Agency. Depth of excavations will be determined by the removal action project manager with concurrence from the on-scene coordinator and Ecology. Soil and debris below RALs are not considered waste. The development of RALs included protection of groundwater. Protection of groundwater RALs took into account the potential for contaminants in soil to migrate into groundwater. This is an interim action – not a final action – for these waste sites. Final remedial actions will be documented in a Record of Decision.

**Comment 17:** *2.1.2 Flora and Fauna*

*The 200 Area is a mature shrub-steppe ecosystem, dominated by sagebrush and Sandberg's bluegrass. The native shrub-steppe is interspersed with disturbed areas in which the primary vegetation is made up of annual grasses and forbs. Many sites in the 200 Area are covered with gravel or asphalt, or stabilized with non-native wheatgrass.*

I never knew that gravel and asphalt was considered flora or fauna?

If a site is stabilized with non-native wheatgrass, does stabilization assert that there is protection?

Protection of what?

*(DOE/RL-2001-54). Species of mammals common to the 200 Area include coyotes, Great Basin pocket mice, northern pocket gophers, and deer mice. The most widely distributed bird species are meadowlarks, horned larks, and mourning doves. Gopher snakes and side-blotched lizards are the main reptiles inhabiting the 200 Area. The most common groups of terrestrial invertebrates in these areas are darkling beetles, grasshoppers, and ants. DOE/RL-2001-54 presents a detailed account of the species of the 200 Area.*

**Response to Comment 17:** The commenter is correct that gravel and asphalt are not considered flora or fauna. Gravel, asphalt, or non-native wheatgrass provide protection from direct exposure to waste sites and helped prevent or minimize the uncontrolled spreading of contaminants. These measures are only temporary in nature and were used until a cleanup response was selected.

**Comment 18:** *2.1.3 Climate*

*The Hanford Site lies east of the Cascade Mountains and has a semiarid climate caused by the rain shadow effect of the mountains. Climatological data are monitored at the Hanford Meteorological Station and other locations throughout the Hanford Site. From 1945 through 2001, the recorded maximum*

*temperature was 45 °C (113 °F), and the recorded minimum temperature was –30.6 °C (–23 °F) (PNNL-6415, Hanford Site National Environmental Policy Act (NEPA) Characterization). The two extremes occurred during August and February, respectively. The monthly average temperature ranged from a low of –0.24 °C (31.7 °F) in January to a high of 24.6 °C (76.3 °F) in July. The annual average relative humidity is 54 percent.*

*Most precipitation occurs during late autumn and winter, with more than half of the annual amount occurring from November through February. Normal annual precipitation is 17.7 cm (6.98 in.). Because it typically receives less than 25.5 cm (10 in.) of precipitation a year, the climate is considered to be semiarid (PNNL-6415). The prevailing wind direction at the Hanford Meteorological Station is from the northwest during all months of the year (PNNL-6415). Monthly average wind speeds are lowest during the winter months and average about 3 m/s (6 to 7 mi/h). The highest average wind occurs during the summer and is about 4 m/s (8 to 9 mi/h). The record wind gust was 35.7 m/s (80 mi/h) in 1972 (DOE/RL-2007-50, Central Plateau Terrestrial Ecological Risk Assessment Report).*

I have covered this issue extensively in my comments. I hope that critical changes will be made to this document.

**Response to Comment 18:** The commenter raises vital issues. These are issues that will be considered in the final remedy selection. Traditionally, these issues are not evaluated extensively in interim actions. This is an interim removal action and not a final action for these waste sites. Long term precipitation events will be taken into account in the selection of a final remedy.

As stated in the previous response, the Hanford Meteorological Station (HMS) managed by the Pacific Northwest National Laboratory (PNNL) and the US Department of Energy provides an annual Climate Document (PNNL-151160) that provides a monthly and annual precipitation table for the Hanford Area that includes data since 1947. See the following website for the latest available information:  
<http://hms.pnl.gov/products/>

**Comment 19:** *2.1.4 Geology and Hydrogeology*

*The average depth from ground surface to groundwater beneath the 200 Area ranges from 50 m (164 ft) to greater than 100 m (328 ft). Additional details on the geology and hydrogeology underlying the 200 Area and the 200-MG-1 OU are not provided in this EE/CA because the 200-MG-1 OU waste sites are assumed not to be a threat to groundwater quality. This assumption is based on the volume of liquid discharged, lack of mobility of contaminants, and shallow depth of the discharge. In addition, the geological and hydrological conditions that exist beneath the 200 Area are well known and are described in a number of technical documents, (Lindsey, 1996, *The Miocene to Pliocene Ringold Formation and Associated Deposits of the Ancestral Columbia River System, South-Central Washington and North-Central Oregon*; PNL-5506, *Hanford Site Water Table Changes 1950 Through 1980, Data Observations and Evaluation*; PNNL-6415; PNNL-13116, *Hanford Site Groundwater Monitoring for Fiscal Year 1999*; PNNL-13641, *Uncertainty Analysis Framework – Hanford Site-Wide Groundwater Flow and Transport Model*; PNNL-14187, *Hanford Site Groundwater Monitoring for Fiscal Year 2002*; WHC-SD-ER-TI-003, *Geology and Hydrology of the Hanford Site - A Standardized Text for use in WHC Documents & Reports*). The Tri-Parties created the 200-MG-1 OU through Tri-Party Agreement Milestone M-015-06-02 and Tri-Party Agreement Change Request C-06-02. If confirmation sampling or the observational approach shows that a site is more than a shallow contamination problem, the site will be reevaluated and other alternatives considered. The radionuclide inventory for this conceptual model group does not include transuranic isotopes at or near the level of 100 nCi/g. Examples of 200-MG-1 OU waste sites are unplanned releases, shallow releases or leaks, and contamination spread by burrowing wildlife.*

*If confirmation sampling or the observational approach shows that a site is more than a shallow contamination problem, the site will be reevaluated and other alternatives considered.*

This is very wishy washy. It suggests that something might not be done with the site. The waste might be taken out of this OU and dealt with later. Other “alternatives considered” but maybe not? One would hope that if you find a site that does not fit into this OU that it would be remediated anyway. The looseness of this document does not give the reader the impression that USDOE will be seriously looking to find the contamination. It appears that it is merely an effort to create a document to continue the “do not look we do not have a problem” mind set.

**Response to Comment 19:** Under the CS/NFA alternative, sampling and analysis will confirm that soil concentrations are at or below RALs, and that no further action is required. If soil concentrations are above the RALs, the RTD alternative will be implemented. Under the RTD alternative, sampling and analysis will confirm that soil concentrations are greater than the RALs and require removal. In this alternative, soils concentrations will be removed until the RAL is achieved, generally to a depth of 4.6m (15 ft), indicating ‘shallow’ contamination. In some cases, excavation beyond 4.6 m (15 ft) may be required. If waste sites are encountered with contamination deeper than 4.6 m (15 feet) below the ground surface, then soil samples may be taken at depths greater than 4.6 m (15 feet) to characterize potential groundwater risk drivers. A decision matrix for determining a path forward in this situation will be included in the Removal Action Work Plan.

**Comment 20:** *The radionuclide inventory for this conceptual model group does not include transuranic isotopes at or near the level of 100 nCi/g. Examples of 200-MG-1 OU waste sites are unplanned releases, shallow releases or leaks, and contamination spread by burrowing wildlife.*

Transuranic waste is long-term problem for humans and the eco-system. Using 100nCi/g is unacceptable when it comes to leaving this waste in place. This waste and the so-called Pre-70 Tru waste all of it need to be RTD. Because of the nature of this waste remaining hazardous for thousands of years, it is beyond any logic of why anyone would suggest leaving this waste in place. Shallow waste sites is what this OU is about. This creates even more concern that one would consider leaving transuranic’s at or near the 100nCi/g.

**Response to Comment 20:** Waste sites evaluated in the EE/CA, including process knowledge, do not indicate waste sites that contain transuranic isotopes at or near the level of 100 nCi/g. If a waste site is encountered that contains transuranic isotopes at or near the level of 100 nCi/g, then the waste site may be outside the scope of this conceptual model group; the waste site may be removed from the action memorandum authority and e moved to another operable unit for evaluation.

**Comment 21: 2.2 AVAILABLE WASTE SITE INFORMATION**

*The Waste Information Data System database was the primary source of site information for the 200-MG-1 OU. Because the 200-MG-1 OU waste sites previously had been part of other OUs, certain data gathering activities and evaluations had been completed in conjunction with the prior OU activities for a few of the waste sites. Detailed waste site information is presented in Appendices A and B.*

- *Appendix A contains an information brief for each waste site, including the site history, its known or estimated dimensions and depth, assumptions concerning potential contaminants and their distribution, and references. Engineering diagrams, if available, DOE/RL-2008-44 REV 0 2- are included in each brief where a structure is a component of the waste site. The brief contain current site photographs for many of the sites. The briefs also present the preferred remedy and estimated cost for the remedy for each waste site.*

- *Appendix B includes a large waste-site-summary table identifying primary attributes of the waste sites, organized by waste site type. These attributes were used in selecting preferred removal actions. This table permits a direct comparison of all similar waste sites, including their physical features, waste release mechanisms, potential contaminant types (i.e., radiological or nonradiological), and expected contaminant distribution. Limited data exist for waste sites addressed in this EE/CA. However, two sites in the 200-MG-1 OU (216-B-2-2 and 216-B-3-3 Ditches) previously were characterized as representative waste sites while assigned to the 200-CW-1 OU.*

*For the remaining sites, available information generally is based on descriptions of the process operations that may have resulted in the release of a radiological or hazardous constituent. Radiological surveys and prior cleanup activities are described for some of the waste sites. Cleanup actions include decontamination operations, removal of impacted soils or materials, and/or covering the affected area with clean soil.*

Basing your remedial actions on limited information or assumed releases based on knowledge of the process operations assumes that any release would be the same. Once again, it seems to be a leaf of faith in ones ability to assume what was the chemical or radiological makeup of the waste. When there is doubt confirmatory, sampling should always take precedent over assumptions.

**Response to Comment 21:** These preferred actions are for removal actions and not remedial actions. Sampling and analysis will be used to determine whether soil concentrations are either above or below the RALs and whether removal of the contamination is required.

**Comment 22:** *2.3 WASTE SITE ATTRIBUTES*

*The 200-MG-1 OU contains several different types of waste sites as shown in Table 2-1. Site areas range from 10 to 11.0 x 106 ft<sup>2</sup>. The majority of the waste sites are small. Generally, the very small area waste sites are associated with an engineered structure (e.g., French drain, valve pit) or a UPR of very limited extent. Larger area sites include ponds, dumping areas, septic tile fields, or wind-disseminated UPRs. The engineered structures that have been in direct contact with process waste streams (i.e., French drains, reversed wells, cribs, and retention basins) also may be contaminated, and include materials such as concrete and infiltration gravels. Dumping areas include many different types of waste materials, such as scrap materials, construction debris (concrete, wood, and metal), used containers, and other miscellaneous items. The contamination at these sites generally is limited to the soil in immediate contact with the waste materials, with little or no migration into the underlying soil. Sites identified as UPRs consist of areas where a release has been disseminated by wind or liquid was released onto the ground. Large area waste sites are found near some of the tank farms where past releases of particulates from the tanks were locally spread by the wind. In other cases, radioactive tumbleweeds and tumbleweed fragments dispersed contamination over a wide area. The majority of the UPR areas have been cleaned up by previous soil removal actions, and/or placement of a 0.3 to 0.6 m (1- to 2-ft) thick soil stabilization cover over the site. Soil stabilization covers are used to prevent or minimize the uncontrolled spreading of contamination.*

*Appendices A and B note those waste sites with a soil stabilization cover. Approximately one-third of all the 200-MG-1 OU waste sites have soil stabilization covers*

Soil stabilization covers need to be assessed for their protectiveness over the time. Precipitation needs to be a major factor in assessing the long-term performance along with intruder scenarios, failure of IC's etc. It appears that some of these sites might have transuranic wastes below 100nCi/g. It is important to assess any site that are being considered leave in place. Long-term protection should be for as long as the waste remains hazardous.

This document offers no assurances that performance assessments will be performed for any waste sites that have potential risk for the short-term or 150-years plus.

I look forward to receiving answers to my questions in a timely manner. The taxpayers are paying for the cleanup of Hanford and they need to have a cleanup that is completed in a timely manner. This document sets a course that creates more delays. The soil sites in the 200 Area can easily be cleaned up in 20 years if we just put our mind to it. Just do it.

I hope that the time spent on this document and the comments you receive from others result in major changes to the 200-MG-1 Operable Unit EE/CA.

**Response to Comment 22:** The soil stabilization covers mentioned in Section 2.3 for a portion of the waste sites were only temporary in nature and used to prevent or minimize the uncontrolled spreading of contamination until a response could be taken. The preferred removal action is to either take confirmation samples to determine that no further action is required (CS/NFA), or to remove, treat and dispose (RTD) of the soil contamination, which would include removal of the soil stabilization cover. These are interim removal actions and the final remedy for these waste sites will be evaluated after the removal actions are taken. Either the CS/NFA or the RTD alternative will be implemented for each waste site and each waste site will be evaluated against the removal action objectives identified in this EE/CA. The final remedy for these waste sites will be evaluated in the future.

## Appendix B

### Waste Site Attributes

This appendix presents attributes of each site evaluated to determine the preferred removal action alternative. Table B-1 is organized by site type, which allows a row-by-row comparison by waste site type. The table 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).

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.

## Reference

WAC 246-272A-0300, "Abandonment," *Washington Administrative Code*, Washington State Department of Health, Olympia, Washington. Available at:  
<http://apps.leg.wa.gov/WAC/default.aspx?cite=246-272A&full=true#246-272A-0300>.

Table B-1. 200-MG-1 Operable Unit, 11 Waste Site Attributes

Waste Site Code	Current Status	Waste Site Type	Waste Site Name	Facility Area	Physical Setting	Back-fill (Y/N)	Surface Cover Present (Y/N)	Surface Cover Thickness (ft)	Site Area (ft <sup>2</sup> )	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
600-36	Inactive	Burn Pit	600-36, Ethel Railroad Siding (Burn Pit)	200 E Ponds Area	Burn Pit	N	N	None	1.8E+4	60	300	Unk.	0-1 (spotty)	None	Dumping Area	Solid and Liquid	None	Misc. debris, demolition and inert waste
600-262	Inactive	Crib	600-262, West Lake Test Crib	200 E Ponds Area	Test Crib and Wells	N	N	None	4	2	2	2	2-15	None	Test Site	Liquid	Sr-85	Calcium nitrate
200-E-110	Inactive	Dumping Area	200-E-110, Contaminated Tumbleweed Dump Site	200 E Ponds Area	Dumping Area	N	N	None	5046	87	58	Unk.	0-1 (spotty)	In 1999, the bulk of the tumbleweeds were removed, leaving only fragments.	Vegetation (tumbleweeds)	Solid	Contaminated Vegetation	None
600-218	Inactive	Dumping Area	600-218, H-61-H Anti-Aircraft Artillery Site Dumping Area	W. 200 W Area	Dumping Area	N	N	None	1.6E+4	243	67	Unk.	0-3 (spotty)	None	Dumping Area	Solid and Liquid	None	Oil and paint, misc. trash and construction debris
600-38	Inactive	Dumping Area	600-38, Railroad Siding Susie, 600-25, Susie Junction	W. 200 E Ponds Area	Dumping Area	N	N	None	3.6E+6	Irr.	Irr.	Unk.	0-3 (spotty)	Most of the trash, including the drums, had been removed by 1996.	Dumping Area	Solid and Liquid	None	Misc. debris, demolition and inert waste, asbestos, petroleum hydrocarbon
600-40	Inactive	Dumping Area	600-40, West of West Lake Dumping Area	200 E Ponds Area	Dumping Area	N	N	None	5242	Irr.	Irr.	Unk.	0-1 (spotty)	None	Dumping Area	Solid	None	Misc. debris, demolition and inert waste
600-51	Inactive	Dumping Area	600-51, Chemical Dump, Pile of White Powder	N. 200 E Ponds Area	Dumping Area	N	N	None	15	3	5	Unk.	0-1	A sample of this material was analyzed with the HAZCAT field analysis kit. The bulk of this material appears to be a sodium compound. The sodium compound has been removed.	Dumping Area	Solid	None	Unk.
200-E-101	Active	Experiment/Test Site	200-E-101, 200 East Deep Lysimeter Site	BC Controlled Area	Experiment/Test Site	N	N	None	591	59	10	Unk.	58-60	The open bottom pit was decommissioned in 1994; the access pipes and cables were removed.	Test Site	Unk.	Short-lived isotope tracers	Lead bricks
600-275	Inactive	Foundations	600-275, 218-W-14, Igloo Site, Army Ammo Site, Regulated Storage Area	W. 200 W Area	Storage Yard	N	N	None	3.3E+6	2050	1625	Unk.	0-6 (spotty)	The bunkers, guard house and fence have been removed. The stored scrap has been removed.	Leak/ Spill	Solid and Liquid	Plutonium scrap	Carbon tetrachloride
OCSA	Inactive	Foundations	Old Central Shop Area, Central Shop Area	200 E Ponds Area	Foundations	N	N	None	1.1E+7	Irr.	Irr.	Unk.	0-2 (spotty)	None	Former Construction Staging Area With Fuel Tanks	Solid and Liquid	None	Misc. debris, demolition and inert waste, petroleum hydrocarbons

Table B-1. 200-MG-1 Operable Unit, 11 Waste Site Attributes

Waste Site Code	Current Status	Waste Site Type	Waste Site Name	Facility Area	Physical Setting	Back-fill (Y/N)	Surface Cover Present (Y/N)	Surface Cover Thickness (ft)	Site Area (ft <sup>2</sup> )	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-600-21	Inactive	Unplanned Release	UPR-600-21, Contamination found Northeast of 200 East Area, UN-216-E-31	200 E Ponds Area	Outlying Area	N	N	None	Unk.	Irr.	Irr.	Unk.	0-1 (spotty)	The majority of contamination was removed using buckets and shovels. Other specs may have decayed below detectable limits. An additional radiation survey was done on June 22, 1993 of the previously down posted railroad track area. This survey concluded contamination levels were at less than detection levels.	Vegetation (tumble-weeds)	Solid	Unk.	None

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. Column titled "Surface cover present" is defined as soils that were added to a waste site above grade and column "Surface cover thickness" is only used when there is a "Y" in surface cover present.

HAZCAT = Hazard Categorization

OSCA = Old Central Shop Area

Irr = irregular

Unk. = unknown

LERF = Liquid Effluent Retention Facility

WM = waste management

## Appendix C

### Site-Specific RAL Tables for 200-MG-1 Operable Unit 11 Waste Sites

## C1 Introduction

Tables C-1 and C-2 provide the site-specific RALs (based on contaminants of potential concern and process knowledge identified in DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*) to support removal actions at the 11 waste sites.

## C2 References

- 40 CFR 141.66, “Maximum Contaminant Levels for Radionuclides,” *Code of Federal Regulations*, as amended. Available at [http://edocket.access.gpo.gov/cfr\\_2006/julqtr/pdf/40cfr141.66.pdf](http://edocket.access.gpo.gov/cfr_2006/julqtr/pdf/40cfr141.66.pdf).
- DOE/RL-92-24, 1992, *Hanford Site Soil Background*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www2.hanford.gov/arpir/?content=detail&AKey=D196102741>.
- DOE/RL-96-12, 1996, *Hanford Site Background: Part 2, Soil Background for Radionuclides*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www2.hanford.gov/arpir/?content=findpage&AKey=D1808987>.
- DOE/RL-96-17, 2004, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www5.hanford.gov/arpir/?content=findpage&AKey=D6542354>
- DOE/RL-2008-44, 2009, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www5.hanford.gov/arpir/?content=detail&AKey=0096350.k>
- Ecology, 2007, *Cleanup Levels & Risk Calculations (CLARC)* database. Available at: <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>. Ecology Publication 94-115, 1994, *Natural Background Soil Metals Concentrations in Washington State*, Toxics Cleanup Program, Washington State Department of Ecology, Olympia, Washington.
- EPA/540-R-00-007, 2000, *Soil Screening Guidance for Radionuclides: User’s Guide*, OSWER Directive 9355.4-16A, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C. Available at <http://epa.gov/superfund/health/contaminants/radiation/pdfs/ssuserguide.pdf>.
- NBS Handbook 69, 1963, *Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure*, U.S. National Bureau of Standards, Washington, D.C.
- PNNL-13895, 2003, *Hanford Contaminant Distribution Coefficient Database and Users Guide*, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington. Available at: [http://www.pnl.gov/main/publications/external/technical\\_reports/PNNL-13895rev1.pdf](http://www.pnl.gov/main/publications/external/technical_reports/PNNL-13895rev1.pdf).
- WAC 173-340-700, “Overview of Cleanup Standards,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-700>.
- WAC 173-340-707, “Analytical Considerations,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-707>.

WAC-173-340-747, “Deriving Soil Concentrations for Ground Water Protection,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-747>.

WAC 173-340-900, “Tables,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-900>.

WDOH/320-015, 1997, *Hanford Guidance for Radiological Cleanup*, Washington State Department of Health, Olympia, Washington. Available at [http://209.85.173.132/search?q=cache:Gu\\_zJQjH5bsJ:www.doh.wa.gov/ehp/rp/environmental/cleanup.doc+wdoh/320-015&cd=1&hl=en&ct=clnk&gl=us](http://209.85.173.132/search?q=cache:Gu_zJQjH5bsJ:www.doh.wa.gov/ehp/rp/environmental/cleanup.doc+wdoh/320-015&cd=1&hl=en&ct=clnk&gl=us)

Table C-1. Radioactive Removal Action Levels for Eleven Waste Sites

Contaminant of Concern	Removal Action Levels (pCi/g)				
	Background Concentration (pCi/g) <sup>a</sup>	Direct Exposure <sup>b</sup> (pCi/g)	Soil Cleanup Level for Groundwater Protection <sup>c</sup> (pCi/g)	Required Detection Limit (pCi/g)	Overall Removal Action Levels (pCi/g)
Americium-241	NA	31.1	NA <sup>d</sup>	1.0	31.1
Cesium-137	1.1	6.2	1,465	0.1	6.2
Europium-152	NA	3.3	NA <sup>d</sup>	0.1	3.3
Europium-154	0.033	3.0	NA <sup>d</sup>	0.1	3.0
Europium-155	0.054	125	NA <sup>d</sup>	0.1	125
Plutonium-238	0.004	38.8	NA <sup>d</sup>	1.0	38.8
Plutonium-239/240	0.025	33.9	NA <sup>d</sup>	1.0	33.9
Strontium-90	0.18	4.5	27.6	1.0	4.5
Uranium-233/234	1.1	1.1	1.1	1.0	1.1
Uranium-235	0.11	0.61	0.5	0.5	0.5
Uranium-238	1.1	1.1	1.1	1.0	1.1

- a. If Hanford Site-specific background data are not available, values are then taken from Ecology Publication No. 94-115, *Natural Background Soil Metals Concentrations in Washington State*. Hanford Site background values are available from nonradiological background data in DOE/RL-92-24, *Hanford Site Soil Background*, Table D9-2; radiological background data are from DOE/RL-96-12, *Hanford Site Background: Part 2, Soil Background for Radionuclides*, Table 5-1.
- b. 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*.
- c. 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*) maximum permissible concentration as cited in EPA/540-R-00-007 or from 40 CFR 141.66, "Maximum Contaminant Levels for Radionuclides."
- d. RESRAD predicts constituent will not reach groundwater within 1,000 years based on 100 Area generic site model using soil column layers and depths.

NA = not available

REDRAD = RESidual RADioactivity (dose model)

Table C-2. Nonradioactive Removal Action Levels for Eleven Waste Sites

Contaminant of Concern	Background Concentration <sup>a</sup> (mg/kg)	Removal Action Levels (mg/kg)			Overall Removal Action Levels (mg/kg)	Ecological Risk Screening Values <sup>g</sup> (mg/kg)
		Direct Exposure <sup>b</sup> (mg/kg)	Soil Cleanup Level for Groundwater Protection <sup>c</sup> (mg/kg)	Required Detection Limit (mg/kg)		
Antimony	5	32	5.4	0.6	5.4	5
Arsenic	6.5	6.5 <sup>d</sup>	6.5 <sup>d</sup>	10	6.5 <sup>d</sup>	7
Barium	132	16,000	1,650	2	1,650	102
Beryllium	1.51	160	63.2	0.5	63.2	10
Boron	NA	16,000	210	2	210	0.5
Cadmium	0.81	80	0.81 <sup>d</sup>	0.5	0.81 <sup>d</sup>	4
Chromium Total	18.5	120,000	2,000	1	2,000	42
Chromium (VI)	NA	240	f	0.5	f	N/A
Cobalt	15.7	24	15.7 <sup>d</sup>	2	15.7 <sup>d</sup>	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 <sup>d</sup>	5	512 <sup>d</sup>	1100
Mercury	0.33	24	2.09	0.2	2.09	0.1
Nickel	19.1	1,600	130	4	130	30
Selenium	0.78	400	5.2	1	5.2	0.3
Silver	0.73	400	13.6	0.2	13.6	2
Strontium	NA	48,000	2,920	1	2,920	N/A
Tin	NA	48,000	48,000	10	48,000	50
Uranium (soluble salts)	3.21	240	3.21 <sup>d</sup>	1	3.21 <sup>d</sup>	5
Vanadium	85.1	560	2,240	2.5	560	2
Zinc	67.8	24,000	5,970	1	5,970	86
Polychlorinated biphenyls (PCB) Aroclor-1016	NA	0.5	0.094	0.017	0.094	0.65
PCB Aroclor-1221	NA	0.5	0.017 <sup>d</sup>	0.017	0.017 <sup>d</sup>	0.65
PCB Aroclor-1232	NA	0.5	0.017 <sup>d</sup>	0.017	0.017 <sup>d</sup>	0.65
PCB Aroclor-1242	NA	0.5	0.039	0.017	0.039	0.65
PCB Aroclor-1248	NA	0.5	0.039	0.017	0.039	0.65
PCB Aroclor-1254	NA	0.5	0.066	0.017	0.066	0.65

Table C-2. Nonradioactive Removal Action Levels for Eleven Waste Sites

Contaminant of Concern	Background Concentration <sup>a</sup> (mg/kg)	Removal Action Levels (mg/kg)			Overall Removal Action Levels (mg/kg)	Ecological Risk Screening Values <sup>g</sup> (mg/kg)
		Direct Exposure <sup>b</sup> (mg/kg)	Soil Cleanup Level for Groundwater Protection <sup>c</sup> (mg/kg)	Required Detection Limit (mg/kg)		
PCB Aroclor-1260	NA	0.5	0.72	0.017	0.5	0.65
Acenaphthene	NA	4,800	98	0.33	98	20
Acenaphthylene	NA	4,800	98	0.33	98	N/A
Anthracene	NA	24,000	2,270	0.33	2,270	N/A
Benzo(a)anthracene	NA	1.37	0.86	0.33	0.86	N/A
Benzo(a)pyrene	NA	0.137	2.33	0.33	0.33 <sup>d</sup>	12
Benzo(b)fluoranthene	NA	1.37	2.95	0.33	1.37	N/A
Benzo(g,h,i)perylene	NA	2,400	25,700	0.33	2,400	N/A
Benzo(k)fluoranthene	NA	1.37	21.5	0.33	1.37	N/A
Chrysene	NA	13.7	9.56	0.33	9.56	N/A
Dibenz(a,h)anthracene	NA	1.37	4.29	0.33	1.37	N/A
Fluoranthene	NA	3,200	631	0.33	631	N/A
Fluorene	NA	3,200	101	0.33	101	30
Indeno(1,2,3-cd) pyrene	NA	1.37	8.33	0.33	1.37	N/A
Naphthalene	NA	1,600	4.46	0.33	4.46	N/A
Phenanthrene	NA	24,000	1,140	0.33	1,140	N/A
Pyrene	NA	2,400	655	0.33	655	N/A
Carbon Tetrachloride	NA	7.69	0.0031	0.005	0.005	N/A

Table C-2. Nonradioactive Removal Action Levels for Eleven Waste Sites

Contaminant of Concern	Background Concentration <sup>a</sup> (mg/kg)	Removal Action Levels (mg/kg)			Overall Removal Action Levels (mg/kg)	Ecological Risk Screening Values <sup>g</sup> (mg/kg)
		Direct Exposure <sup>b</sup> (mg/kg)	Soil Cleanup Level for Groundwater Protection <sup>c</sup> (mg/kg)	Required Detection Limit (mg/kg)		
Nitrate (as Nitrogen)	11.8	128,000	40	0.75	40	N/A
TPH-diesel <sup>e</sup>	NA	2,000	2,000	5	2,000	200
TPH-kerosene <sup>e</sup>	NA	2,000	2,000	5	2,000	200

a. If Hanford Site-specific background data are not available, values are then taken from Ecology Publication No. 94-115, *Natural Background Soil Metals Concentrations in Washington State*. Hanford Site background values are available from nonradiological background data in DOE/RL-92-24, *Hanford Site Soil Background*, Table D9-2; radiological background data are from DOE/RL-96-12, *Hanford Site Background: Part 2, Soil Background for Radionuclides*, Table 5-1.

b. The direct-contact values were obtained from WAC 173-340-900, "Tables," Table 740-1.

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

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

e. The direct-contact values were obtained from WAC 173-340-900, Table 740-1. 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/>.

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, "Deriving Soil Concentrations for Groundwater Protection," 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. The 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.

N/A = not applicable

TPH = total petroleum hydrocarbon

## Appendix D

### Applicable or Relevant and Appropriate Requirements

## Contents

<b>D1</b>	<b>Identification of Applicable or Relevant and Appropriate Requirements for the 200-MG-1 Operable Unit.....</b>	<b>D-1</b>
	D1.1 Compliance with Applicable or Relevant and Appropriate Requirements .....	D-1
	D1.2 Waste Management Standards .....	D-2
	D1.3 Standards Controlling Emissions to the Environment.....	D-4
	D1.3.1 Radiological Air Emissions .....	D-4
	D1.3.2 Criteria/Toxic Air Emissions .....	D-4
<b>D2</b>	<b>National Environmental Policy Act.....</b>	<b>D-14</b>
<b>D3</b>	<b>References .....</b>	<b>D-16</b>

## Terms

ALARA	as low as reasonably achievable
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
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>
T-BACT	toxics – best available control technology
TSCA	<i>Toxic Substances Control Act of 1976</i>
WAC	<i>Washington Administrative Code</i>

## D1 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.

### D1.1 Compliance with Applicable or Relevant and Appropriate Requirements

For a site where material will remain on-site 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.

## D1.2 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. 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 (DOE) 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 low-level waste 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 low-level waste, 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 low-level waste, 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.

## D1.3 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.

### D1.3.1 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 DOE 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.

Per 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.

### D1.3.2 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 D-1. Identification of Federal Applicable or Relevant and Appropriate Requirements 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 D-1. Identification of Federal Applicable or Relevant and Appropriate Requirements for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
<i>Toxic Substances Control Act of 1976</i>			
<b>“Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions,” 40 CFR 761</b>			
“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)  “Disposal Requirements,” 40 CFR 761.60(a ) 40 CFR 761.60(b) 40 CFR 761.60(c)  “Remediation Waste,” 40 CFR 761.61	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 $\geq 50$ 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.

ARAR = applicable or relevant and appropriate requirement

CFR = Code of Federal Regulations

Table D-2. Identification of State Applicable or Relevant and Appropriate Requirement for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
<b>Regulations Pursuant to the <i>Resource Conservation and Recovery Act of 1976</i> and Implemented Through WAC 173-303, "Dangerous Waste Regulations."</b>			
"Identifying Solid Waste," WAC 173-303-016  "Recycling Processes Involving Solid Waste," WAC 173-303-017	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.
"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).	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.	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.
"Requirements for Universal Waste," WAC 173-303-077	ARAR	Identifies waste exempted from regulation under WAC 173-303-140 and WAC 173-303-170 through 173-303-9907 (excluding WAC 173-303-960). This waste is subject to regulation under WAC 173-303-573.	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.

Table D-2. Identification of State Applicable or Relevant and Appropriate Requirement for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
"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 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.
"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 -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.

Table D-2. Identification of State Applicable or Relevant and Appropriate Requirement for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
<b>“Model Toxics Control Act-Cleanup” WAC 173-340</b>			
<p>“Standard Method B Unrestricted Soil Cleanup Standards Direct Contact” WAC 173-340-740</p> <p>“Soil Concentrations for Groundwater Protection,” WAC 173-340-747</p> <p>“Groundwater Cleanup Standards,” WAC 173-340-720</p> <p>“Terrestrial Ecological Evaluation Procedures,” WAC 173-340-7490</p> <p>“Tables,” WAC 173-340-900, Table 749-3</p>	ARAR	Method B equations -740, -747, and -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 Operable Unit. This is a chemical-specific requirement.
<b>“General Regulations for Air Pollution Sources,” WAC 173-400 and WAC 173-460</b>			
<p>“Washington Clean Air Act,” RCW 70.94;</p> <p>State Government – Executive,” “Department of Ecology,” RCW 43.21A</p> <p>“General Regulations for Air Pollution – Sources,” WAC 173-400</p> <p>Specific subsection: WAC 173-400-040</p>	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.
<p>Specific subsections: WAC 173-400-060, “Emission Standards for General Process Units”</p> <p>WAC 173-400-075, “Emission Standards for Sources Emitting Hazardous Air Pollutants”</p>	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 and 40 CFR 63. 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.

Table D-2. Identification of State Applicable or Relevant and Appropriate Requirement for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
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.
“Controls for New Sources of Toxic Air Pollutants,” WAC 173-460  Specific subsections: WAC 173-460-030 WAC 173-460-060 WAC 173-460-070 WAC 173-460-080 WAC 173-460-150	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.
<b>“Asbestos” <i>Benton Clean Air Authority</i>, 2005, Regulation 1, Article 8</b>			
Section 8.02 “CFR Adoption by Reference”; Section 8.03 “General Requirements”	ARAR	Incorporates the Federal requirements of 40 CFR 61, Subpart M. Requires established controls and work practices for managing and disposing regulated asbestos-containing material.	The removal action may include the removal or disturbance of regulated asbestos containing material that must be conducted in accordance with the applicable requirements and work practices. This requirement is action specific.
<b>“Radiation Protection -- Air Emissions,” WAC 246-247</b>			
“National Standards Adopted by Reference for Sources of Radionuclide Emissions,” WAC 246-247-035(1)(a)(ii)	ARAR	Establishes requirements equivalent to 40 CFR 61, Subpart H, 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.

Table D-2. Identification of State Applicable or Relevant and Appropriate Requirement for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
<p>“General Standards,” WAC 246-247-040(3) WAC 246-247-040(4)</p>	ARAR	<p>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.</p>	<p>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.</p>

Table D-2. Identification of State Applicable or Relevant and Appropriate Requirement for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
<p>“Monitoring, Testing, and Quality Assurance,” WAC 246-247-075(1), (2), and (4)</p>	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. 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>

Table D-2. Identification of State Applicable or Relevant and Appropriate Requirement for the Removal Action Sites

ARAR Citation	ARAR	Requirement	Rationale for Use
“Monitoring, Testing, and Quality Assurance,” WAC 246-247-075(3)	ARAR	Methods to implement periodic confirmatory monitoring for minor sources may include estimating the emissions or other methods as approved by the lead agency.	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.
“Monitoring, Testing, and Quality Assurance,” WAC 246-247-075(8)	ARAR	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.	Fugitive and diffuse emissions of airborne radioactive material due to demolition and excavation and related activities will require measurement. This requirement is action-specific.
“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 as low as reasonably achievable control technology.	The 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.

ALARA = as low as reasonably achievable

CFR = *Code of Federal Regulations*

ARAR = applicable or relevant and appropriate requirement

RCRA = *Resource Conservation and Recovery Act of 1976*CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*

T-BACT = toxics – best available control technology

WAC = *Washington Administrative Code*

## D2 National Environmental Policy Act

This action memorandum documents approval of a DOE non-time-critical removal action to cleanup 11 waste sites in the 200-MG-1 OU. These 11 waste sites are among 194 waste sites which were evaluated for cleanup under the 200-MG-1 OU engineering evaluation/cost analysis (EE/CA) (DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*). As noted in Section 2 of this action memorandum, these 11 sites have been segregated from the remaining 183 waste sites because DOE and Washington State Department of Ecology (Ecology) have agreed that reducing the footprint of the Central Plateau by removing the outer zone waste sites is a priority.

The DOE and Ecology selected these 11 waste sites because they are located outside the Industrial-Exclusive Zone (in a land area designated as Conservation [Mining] under the Hanford Comprehensive Land-Use Plan [DOE/EIS-0222-F, *Final Hanford Comprehensive Land Use Plan Environmental Impact Statement*]). In addition, this reprioritization for implementing the preferred removal actions for the 11 waste sites is consistent with the 200-MG-1 EE/CA, Section 1.5.5. DOE has determined that these 11 waste sites can be cleaned up expeditiously, allowing efficient use of cleanup funding provided to DOE, Richland Operations Office in the *American Recovery and Reinvestment Act of 2009*. The cleanup of this subset can be accomplished regardless of the disposition of the remaining 183 waste sites, which is still pending, and will not predetermine or constrain DOE's decision on those remaining sites. A separate action memorandum (DOE/RL-2009-46, *Action Memorandum for Non-Time-Critical Removal Action for Waste Sites in 200-MG-1 Operable Unit*) is being prepared to govern the disposition of the remaining sites, and any cumulative impacts or other values from a *National Environmental Policy Act of 1969* (NEPA) perspective associated with these preferred removal actions for the 11 waste sites will be factored into the remaining 183 waste sites CERCLA documentation.

Under DOE's NEPA compliance program (DOE O 451.1B, section 5.a.(13)), DOE will "...incorporate NEPA values, such as analysis of cumulative, off-site, ecological, and socioeconomic impacts, to the extent practicable, in DOE documents prepared under the Comprehensive Environmental Response, Compensation, and Liability Act." NEPA values associated with cleanup of the 194 waste sites were generally summarized in Section 5.5 of the 200-MG-1 OU EE/CA. The aforementioned NEPA values were based on considering the more detailed information presented in the 200-MG-1 OU EE/CA CERCLA Evaluation Criteria, the 200-MG-1 OU EE/CA discussion of the specific site characteristics (Section 2.3), contaminants of potential concern (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 in Section C.1, 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 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. DOE expects that the primary facility to receive contaminated soils will be the ERDF. 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*.

Any airborne releases of contaminants that could occur during these removal actions will be controlled in accordance with DOE radiation control and Washington State Department of Health air pollution control standards to minimize emissions of air pollutants at the Hanford Site, and protect all communities residing outside the Site boundaries. Impacts on ecological resources in the vicinity of the removal actions will continue to be mitigated in accordance with DOE/RL-96-32, *Hanford Site Biological Resources Management Plan* and DOE/RL-96-88, *Hanford Site Biological Resources Mitigation Strategy* and with the applicable standards of all relevant biological species protection regulations. Although these sites previously have been disturbed, only isolated cultural resources artifacts would be potentially encountered during project activities. Impacts to other cultural values including the viewshed from nearby traditional cultural properties will be minimized through implementation of DOE/RL-98-10, *Hanford Cultural Resources Management Plan*, DOE/RL-2005-27, *Revised Mitigation Action Plan for Environmental Restoration Disposal Facility*, and consultation with area Tribes throughout the design and project implementation. This will help ensure appropriate mitigation to avoid or minimize any adverse effects to natural and cultural resources and address any other relevant concerns.

Per Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, DOE seeks to ensure that no group of people bears a disproportionate share of negative environmental consequences resulting from proposed federal actions. Because access to the Hanford Site is restricted to the public, the majority of potential environmental impacts from the proposed action would be associated with onsite activities and would not affect populations residing offsite; thus, the potential for environmental justice concerns is small. 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 disproportionately adverse impacts on minority or low-income groups.

The proposed activity also aligns with the parameters of a DOE categorical exclusion (10 CFR 1021, Appendix B to subpart D, “Categorical Exclusions Applicable to Specific Agency Actions,” B.6.1.(a)); (i.e., no significant environmental impact from small-scale, short-term cleanup actions that are less than approximately 5 million dollars in cost, less than 5 years duration, and do not involve high-level radioactive waste or spent nuclear fuel). The action would meet the basic criteria for applying a categorical exclusion : there are no extraordinary circumstances associated with this action, ‘connectivity’ to other actions is not an issue under CERCLA as the concern is associated directly with the targeted area, and the action is independent of other actions with cumulative significant impacts. The actions associated with these 11 waste sites are being implemented to reduce risk to human health or the environment from the release or threat of release of a hazardous substance, and include excavation and recovery, storage, and disposal of contaminated soils at existing facilities, including the ERDF, currently handling the type of waste involved in the action. These actions will reduce the spread of, or direct contact with, the contamination.

In addition to the above, DOE is including the combined effects anticipated from ongoing CERCLA/ Tri-Party Agreement (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. Cumulative groundwater impacts from the proposed actions evaluated in the EIS as well as from other ongoing Hanford Site activities, including Tri-Party Agreement cleanup actions, are included in this site-wide cumulative impact analysis. This will present the public with an additional, separate opportunity for comment as part of the Tank Closure and Waste

Management environmental impact statement NEPA process, and will be used to inform the public concerning the effects of ongoing cleanup actions on the Hanford Site in combination with other planned site activities.

### D3 References

10 CFR 1021, Appendix B to subpart D, “Categorical Exclusions Applicable to Specific Agency Actions,” *Code of Federal Regulations*. Available at: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=%2Findex.tpl>.

40 CFR 60, “Standards of Performance for New Stationary Sources,” *Code of Federal Regulations*. Available at: <http://www.epa.gov/lawsregs/search/40cfr.html>.

40 CFR 61, “National Emission Standards for Hazardous Air Pollutants,” *Code of Federal Regulations*. Available at: <http://www.epa.gov/lawsregs/search/40cfr.html>.

- 40 CFR 61, Subpart H, “National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities.”
- 40 CFR 61, Subpart M, “National Emission Standards for Asbestos.”

40 CFR 63, “National Emission Standards for Hazardous Air Pollutants for Source Categories,” *Code of Federal Regulations*. Available at: <http://www.epa.gov/lawsregs/search/40cfr.html>.

40 CFR 268, “Land Disposal Restrictions,” *Code of Federal Regulations*. Available at: <http://www.epa.gov/lawsregs/search/40cfr.html>.

40 CFR 300.400(e), “Permit Requirements,” *Code of Federal Regulations*. Available at: <http://www.epa.gov/lawsregs/search/40cfr.html>.

40 CFR 300.440, “Procedures for Planning and Implementing Off-site Response Actions,” *Code of Federal Regulations*. Available at: <http://www.epa.gov/lawsregs/search/40cfr.html>.

40 CFR 761, “Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions,” *Code of Federal Regulations*. Available at: <http://www.epa.gov/lawsregs/search/40cfr.html>.

- 40 CFR 761.50(b), “Applicability,” “PCB Waste.”
- 40 CFR 761.50(c), “Applicability,” “Storage for Disposal.”
- 40 CFR 761.60, “Disposal Requirements.”
- 40 CFR 761.61, “Remediation Waste.”

*American Recovery and Reinvestment Act of 2009*, Public Law 111-5, February 17, 2009. Available at: [www.rules.house.gov/111/LegText/111\\_hr1\\_text.pdf](http://www.rules.house.gov/111/LegText/111_hr1_text.pdf).

*Archaeological and Historic Preservation Act of 1976*, 16 USC 469aa-mm, et seq. Available at: <http://www.olfeis.com/documents/regulations/ArchaeologicalAndHistoricPreservationActOf1974.pdf>.

*Atomic Energy Act of 1954*, 42 USC 2011, et seq. Available at: [http://www.nuclearfiles.org/menu/library/treaties/atomic-energy-act/trty\\_atomic-energy-act\\_1954-08-30.htm](http://www.nuclearfiles.org/menu/library/treaties/atomic-energy-act/trty_atomic-energy-act_1954-08-30.htm).

*Benton Clean Air Authority*, 2005, Regulation 1, Article 8, Benton County, Washington. Available at: <http://www.bcaa.net/RegPol.htm>.

- Clean Air Act of 1990*, 42 USC 7401, et seq., Pub. L. 101-549. Available at: <http://www.epa.gov/air/caa/>.
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq. Available at: <http://www.epa.gov/oecaagct/lcla.html#Hazardous%20Substance%20Responses>.
- DOE, 2004, *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*, 2<sup>nd</sup> Edition, U.S. Department of Energy, Office of NEPA Policy and Compliance, Washington, D.C. Available at: [www.gc.energy.gov/NEPA/nepa\\_documents/TOOLS/GUIDANCE/Volume2/2-10-greenbook-recommendations.pdf](http://www.gc.energy.gov/NEPA/nepa_documents/TOOLS/GUIDANCE/Volume2/2-10-greenbook-recommendations.pdf).
- DOE O 451.1B, *National Environmental Policy Act Compliance Program*, U.S. Department of Energy, Washington, D.C. Available at: [www.directives.doe.gov/pdfs/doe/doetext/neword/.../o4511bc1.pdf](http://www.directives.doe.gov/pdfs/doe/doetext/neword/.../o4511bc1.pdf).
- DOE/EIS-0222-F, 1999, *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*, U.S. Department of Energy, Washington, D.C. Available at: [www.hanford.gov/doe/eis/hraeis/hraeis.htm](http://www.hanford.gov/doe/eis/hraeis/hraeis.htm).
- DOE/RL-93-99, 1994, *Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://rrcatalog.pnl.gov/rrcat/query.cfm>.
- DOE/RL-94-41, 1994, *NEPA Roadmap for ERDF Regulatory Package*, U.S. Department of Energy, Washington, D.C. Available at: <http://www5.hanford.gov/arpir/?content=detail&AKey=D196074918>.
- DOE/RL-96-32, 1996, *Hanford Site Biological Resources Management Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. <http://www.pnl.gov/ecomon/Docs/brmap/BRMAP.html>.
- DOE/RL-96-88, 2003, *Hanford Site Biological Resources Mitigation Strategy*, U.S. Department of Energy, Richland Operations Office, Richland, Washington. <http://www.pnl.gov/ecomon/Docs/BRMiS.pdf>.
- DOE/RL-98-10, 2003, *Hanford Cultural Resources Management Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://rrcatalog.pnl.gov/rrcat/query.cfm>.
- DOE/RL-2005-27, 2005, *Revised Mitigation Action Plan for Environmental Restoration Disposal Facility*, Draft A, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://rrcatalog.pnl.gov/rrcat/query.cfm>.
- DOE/RL-2008-44, 2009, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www5.hanford.gov/arpir/?content=detail&AKey=0096350>.
- DOE/RL-2009-46, pending, *Action Memorandum for Non-Time-Critical Removal Action for Waste Sites in 200-MG-1 Operable Unit*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: <http://www.hanford.gov/?page=91&parent=0>.

*Endangered Species Act of 1973*, 16 USC 1531, et seq. Available at: <http://www4.law.cornell.edu/uscode/16/ch35.html>.

EPA, 2007, *U.S. Department of Energy Environmental Restoration Disposal Facility Hanford Site – 100 Area Benton County, Washington*, U.S. Environmental Protection Agency, Washington State Department of Ecology, and U.S. Department of Energy, Olympia, Washington. Available at: [http://yosemite.epa.gov/r10/CLEANUP.NSF/sites/hanford2/\\$FILE/ERDF-Amended-ROD-2007.pdf](http://yosemite.epa.gov/r10/CLEANUP.NSF/sites/hanford2/$FILE/ERDF-Amended-ROD-2007.pdf).

EPA/AMD/R10-02/030, 2002, *Record of Decision Amendment for the Environmental Restoration Disposal Facility*, U.S. Environmental Protection Agency, Washington State Department of Ecology, and U.S. Department of Energy, Olympia, Washington. Available at: <http://www.epa.gov/superfund/sites/rods/fulltext/a1002030.pdf>.

EPA/ESD/R10-96/145, 1996, *Explanation of Significant Differences: USDOE Environmental Restoration Disposal Facility (ERDF), Hanford Site, Benton County, Washington*, Office of Emergency and Remedial Response, Office of Radiation and Indoor Air, U.S. Environmental Protection Agency, Washington, D.C. Available at: <http://www.epa.gov/superfund/sites/rods/fulltext/e1096145.pdf>.

EPA/ROD/R10-95/100, 1995, *Declaration of the Interim Record of Decision for the Environmental Restoration Disposal Facility*, U.S. Environmental Protection Agency, Washington State Department of Ecology, and U.S. Department of Energy, Olympia, Washington. Available at: <http://www.epa.gov/superfund/sites/rods/fulltext/r1095100.pdf>.

Executive Order 12898, 1994, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, William J. Clinton, February 11. Available at: [www.dotcr.ost.dot.gov/documents/ycr/eo12898.pdf](http://www.dotcr.ost.dot.gov/documents/ycr/eo12898.pdf).

*National Environmental Policy Act of 1969*, 42 USC 4321, et seq. Available at: <http://www.nepa.gov/nepa/regs/nepa/nepaeqia.htm>.

*National Historic Preservation Act of 1966*, 16 USC 470, et seq. Available at: <http://www.law.cornell.edu/uscode/16/470.html>.

*Native American Graves Protection and Repatriation Act*, 25 USC 3001, et seq. Available at: <http://www4.law.cornell.edu/uscode/25/ch32.html>.

RCW 43.21A, “State Government – Executive,” “Department of Ecology,” Title 43, Chapter 21A, *Revised Code of Washington*, as amended, Washington State, Olympia, Washington. Available at: <http://apps.leg.wa.gov/RCW/dispo.aspx?cite=43>.

RCW 70.94, “Public Health and Safety,” “Washington Clean Air Act,” Title 70, Chapter 94, *Revised Code of Washington*, as amended, Washington State, Olympia, Washington. Available at: <http://apps.leg.wa.gov/RCW/default.aspx?cite=70.94&full=true>.

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

*Toxic Substances Control Act of 1976*, 15 USC 2601, et seq. Available at:

<http://www.osha.gov/dep/oia/whistleblower/acts/tsca.html>.

WAC 173-303, “Dangerous Waste Regulations,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at:

<http://apps.leg.wa.gov/wac/>.

- 173-303-016, “Identifying Solid Waste.”
- 173-303-017, “Recycling Processes Involving Solid Waste.”
- 173-303-040, “Definitions.”
- 173-303-050, “Department of Ecology Cleanup Authority.”
- 173-303-070(3), “Designation of Dangerous Waste,” “Designation Procedures.”
- 173-303-071, “Excluded Categories of Waste.”
- 173-303-073, “Conditional Exclusion of Special Wastes.”
- 173-303-077, “Requirements for Universal Waste.”
- 173-303-140, “Land Disposal Restrictions.”
- 173-303-120, “Recycled, Reclaimed and Recovery Waste.”
- 173-303-140, “Land Disposal Restrictions.”
- 173-303-170, “Requirements for Generators of Dangerous Waste.”
- 173-303-200, “Accumulating Dangerous Waste On-Site.”
- 173-303-573, “Standards for Universal Waste Management.”
- 173-303-630, “Closure and Post-Closure,” “Use and Management of Containers.”
- 173-303-640, “Tank Systems.”
- 173-303-960, “Special Powers and Authorities of the Department.”
- 173-303-9907, “Reserved.”
- 173-303-64620, “Requirements.”

WAC 173-340, “Model Toxics Control Act—Cleanup,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at:

<http://apps.leg.wa.gov/wac/>.

- 173-340-720, “Groundwater Cleanup Standards.”
- 173-340-740, “Unrestricted Land Use Soil Cleanup Standards.”
- 173-340-747, “Deriving Soil Concentrations for Groundwater Protection.”
- 173-340-900, “Tables.”
- 173-340-7490, “Terrestrial Ecological Evaluation Procedures.”

WAC 173-400, “General Regulations for Air Pollution Sources,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at:

<http://apps.leg.wa.gov/wac/>.

- 173-400-040, “General Standards for Maximum Emissions.”
- 173-400-060, “Emission Standards for General Process Units.”
- 173-400-075, “Emission Standards for Sources Emitting Hazardous Air Pollutants.”
- 173-400-113, “Requirements for New Sources in Attainment or Unclassifiable Areas.”

WAC 173-460, “Controls for New Sources of Toxic Air Pollutants,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at:

<http://apps.leg.wa.gov/wac/>.

- 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.”

WAC 173-480, “Ambient Air Quality Standards and Emission Limits for Radionuclides,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington. Available at: <http://apps.leg.wa.gov/wac/>.

- 173-480-050, “Standards.”
- 173-480-070, “Emission Monitoring and Compliance Procedures.”

WAC 246-247, “Department of Health,” “Radiation Protection – Air Emissions,” *Washington Administrative Code*, as amended, Washington State Department of Health, Olympia, Washington. Available at: <http://apps.leg.wa.gov/wac/>.

- 246-247-030(15), “Definitions.”
- 246-247-035, “National Standards Adopted by Reference for Sources of Radionuclide Emissions.”
- 246-247-040, “General Standards.”
- 246-247-075, “Monitoring, Testing, and Quality Assurance.”

WCH-191, 2008, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, Rev. 0, Washington Closure Hanford, Richland, Washington. Available at: <http://www2.hanford.gov/arpir/?content=findpage&AKey=DA05739818>.