



**Department of Energy**  
Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

JAN 16 2009

09-AMCP-0055

Ms. J. A. Hedges, Program Manager  
Nuclear Waste Program  
State of Washington  
Department of Ecology  
3100 Port of Benton  
Richland, Washington 99354

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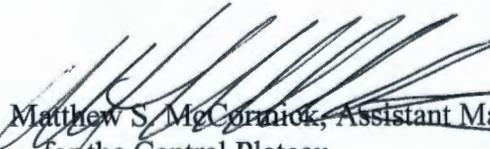
Dear Ms. Hedges:

**ENGINEERING EVALUATION/COST ANALYSIS FOR THE 200-MG-1 OPERABLE UNIT  
WASTE SITES, DOE/RL-2008-44, DRAFT A, REISSUE**

The purpose of this letter is to transmit the Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites, DOE/RL-2008-44, Draft A, Reissue to the State of Washington Department of Ecology (Ecology) for approval. This document contains six sheets that correct a calculational error in some cost estimates. These changes have been discussed with Ecology staff.

If you have any questions, please contact me, or your staff may contact Briant Charboneau, of my staff, on (509) 373-6137.

Sincerely,

  
Matthew S. McCormick, Assistant Manager  
for the Central Plateau

AMCP:FMR

Attachment

cc: See Page 2

Ms. J. A. Hedges  
09-AMCP-0055

-2-

JAN 16 2009

cc w/attach:

G. Bohnee, NPT  
L. Buck, Wanapum  
C. E. Cameron, EPA  
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R. Jim, YN  
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R. A. Lobos, EPA  
K. Niles, ODOE  
J. B. Price, Ecology  
**Administrative Record**  
Environmental Portal

cc w/o attach:

R. E. Piippo, FHI  
J. G. Vance, FFS

DOE/RL-2008-44  
DRAFT A REISSUE

# Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites

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



**United States  
Department of Energy**  
P.O. Box 550  
Richland, Washington 99352

**Approved for Public Release;**  
Further Dissemination Unlimited

# Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites

Date Published  
January 2009

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



**United States  
Department of Energy**  
P.O. Box 550  
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J. D. Randal 01/07/2009  
Release Approval Date

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1 The preferred alternative for each waste site is recommended based on its overall ability to  
 2 protect human health and the environment and its effectiveness in maintaining protection for  
 3 both the short and the long term. These alternatives reduce the potential for further releases to  
 4 the environment; provide the best balance of protecting the health of the workers and the public;  
 5 protect the environment; and provide an end state that is consistent with future cleanup actions  
 6 and commitments of Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent*  
 7 *Order*.<sup>4</sup> Chapter 5.0 describes the bases for these recommendations, including a detailed analysis  
 8 of how well each alternative meets the CERCLA removal action evaluation criteria.

9 Chapter 6.0 provides the summary of preferred removal actions for all sites and contingency  
 10 plans if the site preferred alternative is determined to be inappropriate during the removal action.  
 11 Table ES-1 summarizes the present worth costs of the preferred removal actions across all waste  
 12 sites. The 200-MG-1 OU preferred removal actions have a present worth cost of \$109,614,000.  
 13 The type, size, and extent of hazardous substance contamination vary considerably across the  
 14 200-MG-1 OU waste sites. Thus, it is not possible to prepare meaningful unit cost factors based  
 15 on area or waste volume removed from the analysis in this OU.

16

Table ES-1. Summary of the 200-MG-1 Operable Unit Waste Site  
 Preferred Removal Actions.

Preferred Alternative	Number of Waste Sites	Present Worth
NA	0	\$0
MESC/IC/MNA	0	\$0
CS/NA	89	\$28,649,000
RTD	98	\$80,965,000
Total	187	\$109,614,000

CS/NA = confirmatory sampling/no action.

MESC/IC/MNA = maintain existing soil cover/institutional controls/monitored natural attenuation.

NA = no action.

RTD = removal, treatment, and disposal.

<sup>4</sup> 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. <http://www.hanford.gov/?page=91&parent=0>.

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### 3.0 REMOVAL ACTION OBJECTIVES AND PRELIMINARY REMOVAL CLEANUP LEVELS

This chapter discusses the RAOs and PRCLs to be attained by the removal actions for the 200-MG-1 OU. The development of the RAOs and PRCLs identified in this EE/CA are consistent with preliminary CERCLA remedial investigation/feasibility study processes for the 200-MG-1 OU and for the other 200 Area OUs.

#### 3.1 REMOVAL ACTION OBJECTIVES

RAOs provide a basis for evaluating specific removal alternatives to achieve compliance with potential ARARs (specified in Appendix C) and PRCLs, to the extent practicable. Based on previous remedial action objectives developed for other 200 Area OUs, the RAOs for this EE/CA are listed below.

- RAO 1. Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with nonradiological constituents at concentrations above the appropriate land-use criteria.
- RAO 2. Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with radiological constituents at concentrations above the appropriate land-use criteria.
- RAO 3. Prevent adverse impacts to cultural resources and threatened or endangered species, and minimize wildlife habitat disruption.

Achieving these RAOs can be accomplished by reducing concentrations (or activities) of contaminants to PRCLs or by eliminating potential exposure pathways/routes. DOE will excavate to the depth of unimpacted soil for waste sites within the Industrial Exclusive Area to the extent practicable. This will initially be demonstrated using field instruments that detect beta- or gamma-ionizing radiation. The target excavation depth will be achieved when field radiological surveys show that residual radioactivity approximates non-impacted soil conditions. If this is judged not feasible for the site, DOE will, to the maximum extent practicable, complete the removal action in a manner consistent with the anticipated final remedial action by comparison of COPC concentrations to PRCLs.

Verification sampling and analysis will be performed to assist in closing out the removal action at individual sites. Protection of human health and the environment is met when risks from residual contamination are within the CERCLA  $10^{-6}$  to  $10^{-4}$  excess lifetime cancer risk range or when the hazard index is less than 1.0 for noncarcinogenic effects (EPA, 1991, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, OSWER Directive 9355.0-30).

#### 3.2 PRELIMINARY REMOVAL CLEANUP LEVELS

The conceptual site model in this EE/CA consists of sites with a shallow contamination profile that do not pose a risk to groundwater. PRCLs for the waste sites identified in this EE/CA will be developed and documented in the RAWP. These PRCLs will be based on attainment of

1 acceptable levels of human health and ecological risk for waste sites within the Industrial  
 2 Exclusive Area to the extent practicable. The PRCLs for waste sites inside the Industrial  
 3 Exclusive Area boundary are based on industrial land-use and the protection of wildlife.

4 The PRCLs for waste sites outside the Industrial Exclusive Area boundary will be based on  
 5 conservation land-use and the ecological PRCLs include protection of plants, soil biota, and  
 6 wildlife. Table 3-1 lists the 200-MG-1 OU waste sites that are outside or partially outside the  
 7 Industrial Exclusive Area boundary. The sites not listed in Table 3-1 are within the Industrial  
 8 Exclusive Area boundary.

9 However, if sites are encountered with deeper contamination and are not transferred to another  
 10 OU, then groundwater PRCLs may be developed through site-specific modeling or other  
 11 methods (e.g., leachability testing). If DOE and Ecology agree that those cleanup levels apply to  
 12 a site and will result in residual contamination levels that do not pose an unacceptable threat to  
 13 groundwater for 1,000 years, then those levels will be adopted and documented in the RAWP.

14 Attainment of the PRCLs is intended to meet the RAOs identified in Section 3.1 and are  
 15 expected also to satisfy the remedial action objectives established in a final Record of Decision.

Table 3-1. 200-MG-1 Operable Unit Sites Outside the  
 Central Plateau Industrial Exclusive Area.

Waste Site Code	Waste Site Type	Waste Site Code	Waste Site Type
200-E-101	Experiment/Test Site	600-218	Dumping Area
200-E-109*	Unplanned Release	600-220	Dumping Area
200-E-110	Dumping Area	600-222	Military Compound
200-W-33*	Dumping Area	600-226	Dumping Area
600-36	Burn Pit	600-262	Crib
600-38	Dumping Area	600-275	Foundation
600-40	Dumping Area	Old Central Shop Area	Foundation
600-51	Dumping Area	UPR-600-21	Unplanned Release
600 Original Central Landfill	Sanitary Landfill	--	--

\* Indicates a site only partially outside of the Industrial Exclusive Area.

## 6.0 CONCLUSIONS AND RECOMMENDED ALTERNATIVES

Chapter 4.0 provided a description of the four alternative removal actions, and Chapter 5.0 analyzed each of the alternatives against the three CERCLA evaluation criteria for non-time-critical removal actions: effectiveness, implementability, and cost. This chapter provides a summary of the preferred removal actions and the path forward for implementing the removal actions for the 200-MG-1 OU waste sites.

### 6.1 SUMMARY OF PREFERRED REMOVAL ACTIONS

Table 6-1 summarizes the present worth costs of the preferred removal alternatives across all waste sites. The 200-MG-1 OU preferred removal actions have a present worth cost of \$109,614,000. The type, size, and extent of hazardous substance contamination vary considerably across the 200-MG-1 OU waste sites. Thus, it is not possible to prepare meaningful unit cost factors based on area or waste volume removed from the analysis in this OU.

Table 6-1. Summary of the 200-MG-1 Operable Unit Waste Site Preferred Removal Actions.

Preferred Alternative	Number of Waste Sites	Present Worth
NA	0	\$0
MESC/IC/MNA	0	\$0
CS/NA	89	\$28,649,000
RTD	98	\$80,965,000
Total	187	\$109,614,000

CS/NA = confirmatory sampling/no action.

MESC/IC/MNA = maintain existing soil cover/institutional controls/monitored natural attenuation.

NA = no action.

RTD = removal, treatment, and disposal.

The preferred removal action for each site is summarized in Tables 6-2 and 6-3 for CS/NA and RTD, respectively. As discussed earlier, the NA and MESC/IC/MNA alternatives were not selected as the preferred alternatives for any of the 200-MG-1 OU waste sites.

Table 6-2. Waste Sites with CS/NA Preferred Removal Action Alternative. (3 Pages)

Waste Site Code	Waste Site Type	Present Worth	Waste Site Code	Waste Site Type	Present Worth
200 CP	Depression/Pit (nonspecific)	\$347,000	2607-W4	Septic System	\$290,000
200-E-2	Unplanned Release	\$168,000	2607-W6	Septic System	\$1,008,000
200-E-6	Septic System	\$180,000	2607-W8	Septic System	\$302,000
200-E-7	Septic System	\$290,000	2607-W9	Septic System	\$302,000
200-E-13	Dumping Area	\$347,000	2607-WC	Septic System	\$290,000
200-E-26	Unplanned Release	\$180,000	2607-WL	Septic System	\$302,000

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Table 6-2. Waste Sites with CS/NA Preferred Removal Action Alternative. (3 Pages)

Waste Site Code	Waste Site Type	Present Worth	Waste Site Code	Waste Site Type	Present Worth
200-E-46	Dumping Area	\$347,000	2607-WZ	Septic System	\$290,000
200-E-101	Experiment/ Test Site	\$180,000	2607-Z	Septic System	\$527,000
200-E-110	Dumping Area	\$87,000	2607-Z1	Septic System	\$336,000
200-E-121	Unplanned Release	\$242,000	600-36	Burn Pit	\$202,000
200-W Ash Disposal Basin	Coal Ash Pit	\$347,000	600-37	French Drain	\$180,000
200-W BP	Burn Pit	\$347,000	600-38	Dumping Area	\$447,000
200-W-2	Spoils Pile/Berm	\$180,000	600-70	Dumping Area	\$347,000
200-W-11	Dumping Area	\$202,000	600-71	Burn Pit	\$122,000
200-W-14	Dumping Area	\$168,000	600-218	Dumping Area	\$202,000
200-W-33	Dumping Area	\$598,000	600-220	Dumping Area	\$638,000
200-W-51	Septic System	\$290,000	600-222	Military Compound	\$533,000
200-W-53	Unplanned Release	\$310,000	600-228	Dumping Area	\$122,000
200-W-55	Dumping Area	\$122,000	600-262	Crib	\$180,000
200-W-101	Dumping Area	\$87,000	600-281	Dumping Area	\$168,000
216-A-1	Crib	\$180,000	Chemical Tile Field North 2703-E	Drain/Tile field	\$330,000
216-A-3	Crib	\$180,000	Old Central Shop Area	Foundations	\$721,000
216-A-18	Trench	\$180,000	UPR-200-E-2	Unplanned Release	\$208,000
216-A-20	Trench	\$180,000	UPR-200-E-37	Unplanned Release	\$453,000
216-C-5	Crib	\$180,000	UPR-200-E-43	Unplanned Release	\$110,000
216-C-6	Crib	\$180,000	UPR-200-E-50	Unplanned Release	\$208,000
216-C-9	Pond	\$1,138,000	UPR-200-E-54	Unplanned Release	\$122,000
216-C-10	Crib	\$180,000	UPR-200-E-55	Unplanned Release	\$87,000
216-S-4	French Drain	\$180,000	UPR-200-E-62	Unplanned Release	\$87,000
216-S-8	Trench	\$180,000	UPR-200-E-66	Unplanned Release	\$242,000
216-S-22	Crib	\$180,000	UPR-200-E-89	Unplanned Release	\$202,000
216-T-4A	Pond	\$1,386,000	UPR-200-E-143	Unplanned Release	\$311,000
2607-E1	Septic System	\$867,000	UPR-200-W-43	Unplanned Release	\$87,000
2607-E3	Septic System	\$855,000	UPR-200-W-51	Unplanned Release	\$242,000
2607-E4	Septic System	\$290,000	UPR-200-W-57	Unplanned Release	\$122,000
2607-E5	Septic System	\$348,000	UPR-200-W-61	Unplanned Release	\$180,000
2607-E6	Septic System	\$624,000	UPR-200-W-63	Unplanned Release	\$87,000
2607-E7A	Septic System	\$168,000	UPR-200-W-67	Unplanned Release	\$87,000
2607-E7B	Septic System	\$168,000	UPR-200-W-71	Unplanned Release	\$347,000

Table 6-2. Waste Sites with CS/NA Preferred Removal Action Alternative. (3 Pages)

Waste Site Code	Waste Site Type	Present Worth	Waste Site Code	Waste Site Type	Present Worth
2607-E9	Septic System	\$290,000	UPR-200-W-96	Unplanned Release	\$110,000
2607-E12	Septic System	\$1,416,000	UPR-200-W-101	Unplanned Release	\$168,000
2607-EA	Septic System	\$336,000	UPR-200-W-165	Unplanned Release	\$242,000
2607-EE	Septic System	\$290,000	UPR-600-12	Unplanned Release	\$168,000
2607-W1	Septic System	\$1,348,000	UPR-600-21	Unplanned Release	\$87,000
2607-W3	Septic System	\$510,000	--	--	--
<b>Total Present Worth for CS/NA sites:</b>		<b>\$28,649,000</b>			

CS/NA = confirmatory sampling/no action.

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Table 6-3. Waste Sites with RTD Preferred Removal Action Alternative. (2 Pages)

Waste Site Code	Waste Site Type	Present Worth	Waste Site Code	Waste Site Type	Present Worth
200-E BP	Burn Pit	\$906,000	216-C-3	Crib	\$498,000
200-E PD	Ditch	\$1,027,000	216-C-7	Crib	\$517,000
200-E-1	Dumping Area	\$402,000	216-S-26	Crib	\$983,000
200-E-29	Unplanned Release	\$828,000	216-T-20	Trench	\$164,000
200-E-53	Unplanned Release	\$373,000	216-Z-4	Trench	\$448,000
200-E-58	Neutralization Tank	\$480,000	216-Z-6	Crib	\$495,000
200-E-103	Unplanned Release	\$2,177,000	270-E-1	Neutralization Tank	\$483,000
200-E-107	Unplanned Release	\$754,000	291-C-1	Burial Ground	\$731,000
200-E-109	Unplanned Release	\$445,000	600 Original Central Landfill	Sanitary Landfill	\$2,384,000
200-E-115	Unplanned Release	\$138,000	600-40	Dumping Area	\$169,000
200-E-117	Unplanned Release	\$106,000	600-51	Dumping Area	\$131,000
200-E-123	Unplanned Release	\$153,000	600-65	Dumping Area	\$133,000
200-E-124	Unplanned Release	\$506,000	600-66	Dumping Area	\$132,000
200-E-125	Unplanned Release	\$116,000	600-226	Dumping Area	\$132,000
200-E-128	Unplanned Release	\$116,000	600-275	Foundation	\$589,000
200-E-129	Unplanned Release	\$119,000	UPR-200-E-28	Unplanned Release	\$134,000
200-E-130	Unplanned Release	\$390,000	UPR-200-E-35	Unplanned Release	\$442,000
200-E-139	Unplanned Release	\$627,000	UPR-200-E-39	Unplanned Release	\$137,000
200-W-1	Mud Pit	\$394,000	UPR-200-E-52	Unplanned Release	\$149,000
200-W-3	Dumping Area	\$729,000	UPR-200-E-64	Unplanned Release	\$851,000
200-W-6	Dumping Area	\$796,000	UPR-200-E-69	Unplanned Release	\$756,000
200-W-12	Dumping Area	\$149,000	UPR-200-E-95	Unplanned Release	\$822,000
200-W-21	Pump Station	\$612,000	UPR-200-E-98	Unplanned Release	\$106,000

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Table 6-3. Waste Sites with RTD Preferred Removal Action Alternative. (2 Pages)

Waste Site Code	Waste Site Type	Present Worth	Waste Site Code	Waste Site Type	Present Worth
200-W-22	Unplanned Release	\$1,850,000	UPR-200-E-101	Unplanned Release	\$241,000
200-W-54	Unplanned Release	\$2,211,000	UPR-200-E-112	Unplanned Release	\$2,444,000
200-W-63	Unplanned Release	\$318,000	UPR-200-W-23	Unplanned Release	\$109,000
200-W-64	Foundation	\$871,000	UPR-200-W-39	Unplanned Release	\$416,000
200-W-67	Unplanned Release	\$287,000	UPR-200-W-56	Unplanned Release	\$162,000
200-W-75	Experiment/Test Site	\$359,000	UPR-200-W-70	Unplanned Release	\$137,000
200-W-80	Spoils Pile/Berm	\$279,000	UPR-200-W-116	Unplanned Release	\$736,000
200-W-82	Pump Station/ Product Piping	\$429,000	200-E-43	Storage	\$903,000
200-W-86	Unplanned Release	\$107,000	UPR-200-E-88	Unplanned Release	
200-W-90	Unplanned Release	\$106,000	200-W-81	Unplanned Release	\$2,085,000
200-W-92	Dumping Area	\$634,000	UPR-200-W-58	Unplanned Release	
200-W-106	Unplanned Release	\$270,000	200-W-83	Unplanned Release	\$2,776,000
207-B	Retention Basin	\$2,524,000	UPR-200-W-41	Unplanned Release	
207-SL	Retention Basin	\$691,000	UPR-200-W-44	Unplanned Release	
209-E-WS-3	Valve Pit	\$317,000	UPR-200-W-46	Unplanned Release	
216-A-9	Crib	\$4,375,000	216-B-59	Trench	\$2,279,000
216-A-28	Crib	\$406,000	216-B-59B	Retention Basin	
216-A-34	Ditch	\$1,379,000	UPR-200-E-10	Unplanned Release	\$4,973,000
216-A-40	Retention Basin	\$1,590,000	UPR-200-E-11	Unplanned Release	
216-A-42	Retention Basin	\$4,576,000	UPR-200-E-12	Unplanned Release	
216-B-2-1	Ditch	\$2,482,000	UPR-200-E-20	Unplanned Release	
216-B-2-2	Ditch	\$2,482,000	UPR-200-E-33	Unplanned Release	
216-B-2-3	Ditch	\$2,794,000	UPR-200-W-3	Unplanned Release	\$2,274,000
216-B-3-1	Ditch	\$2,086,000	UPR-200-W-4	Unplanned Release	
216-B-3-2	Ditch	\$2,449,000	UPR-200-W-65	Unplanned Release	
216-B-3-3	Ditch	\$1,829,000	UPR-200-W-73	Unplanned Release	
<b>Total Present Worth for RTD sites: \$80,965,000</b>					

NOTE: Sites grouped together and shaded were costed together; the present worth value represents the total cleanup cost associated with that group of waste sites.

RTD = removal, treatment, and disposal.