

212-N, 212-P, and 212-R Facilities Engineering Evaluation/Cost Analysis Addendum 1: Disposition of Railcars

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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Executive Summary

This engineering evaluation and cost analysis (EE/CA) addendum to DOE/RL-2008-07, *212-N, -P, and -R Facilities Engineering Evaluation/Cost Analysis*¹, has been prepared in accordance with Section 300.415(b)(4)(i) of the “National Oil and Hazardous Substances Pollution Contingency Plan” (40 *Code of Federal Regulations* [CFR] 300²). This EE/CA addendum evaluates removal action alternatives for 16 railcars, which are staged in the 200 North Area of the Hanford Site. This addendum to the 212-N, -P, and -R EE/CA is being provided to support additional clean-up objectives associated with the 200 North Area and specifically addresses the disposition of railcars.

The Hanford Site railroad operations were suspended in 1997 and all remaining railcars were staged at selected locations around the Hanford Site. The main railcar storage location was the 212-R rail spur. Currently, 16 radiologically and chemically contaminated railcars are staged outside the former 212-R Facility. Eleven of the railcars are cask cars (used for transportation of irradiated nuclear fuel), which contain lead-lined casks. The remaining railcars include two locomotives, two tank cars, and one flat car. The railcars are contaminated with hazardous substances, primarily radionuclides, polychlorinated biphenyls, and lead.

The specific removal action objectives associated with this addendum include:

- Reduce/eliminate the inventory of hazardous/radioactive substances within the railcars
- Reduce or eliminate the potential for a release to the environment
- Safely manage (treat and/or dispose of) waste streams generated through the removal action
- Be consistent with future remediation plans for the Hanford Site’s 200 North Area
- Prevent adverse impacts to cultural and natural resources

¹ DOE/RL-2008-07, 2008, *212-N, -P, and -R Facilities Engineering Evaluation/Cost Analysis*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://www5.hanford.gov/arpir/?content=findpage&AKey=0098611>.

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

- 1 • Reduce or eliminate the need for future surveillance and maintenance activities
- 2 • Protect human health and the environment from physical, chemical, and radiological
- 3 hazards posed by each railcar.

4 The selected removal action alternative for the railcars must also be protective of human

5 health and the environment, and otherwise meet the removal action objectives. Based on

6 these objectives, the following three removal action alternatives were evaluated:

- 7 • Alternative 1 – No Action
- 8 • Alternative 2 – Continued Surveillance and Maintenance with Future
- 9 Decontamination, Deactivation, Decommissioning, and Disposal of the Railcars
- 10 • Alternative 3 – Near Term Decontamination, Deactivation, Decommissioning, and
- 11 Disposal of the Railcars.

12 The alternatives were evaluated against three criteria: Effectiveness, Implementability,

13 and Cost. The recommended removal action alternative for the railcars is Alternative 3 –

14 Near Term Decontamination, Deactivation, Decommissioning, and Disposal of the

15 Railcars.

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Terms

ARAR	applicable or relevant and appropriate requirement
ARRA	<i>American Reinvestment and Recovery Act of 2009</i>
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
CFR	<i>Code of Federal Regulations</i>
D4	decontamination, deactivation, decommissioning, and disposal
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ID	identification
NEPA	<i>National Environmental Policy Act of 1969</i>
NTCRA	non-time-critical removal action
OMB	Office of Management and Budget
PCB	polychlorinated biphenyl
RAO	removal action objective
RAWP	removal action work plan
RL	Richland Operations Office
S&M	surveillance and maintenance
Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>
WIDS	Waste Information Data System

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1 Introduction

This addendum to the DOE/RL-2008-07, *212-N, -P, and -R Facilities Engineering Evaluation/Cost Analysis*, has been prepared to present the evaluation of additional removal action alternatives in accordance with Section 300.415(b)(4)(i) of the “National Oil and Hazardous Substances Pollution Contingency Plan” (40 *Code of Federal Regulations* [CFR] 300) for 16 railcars currently staged in the 200 North Area. After the public has had an opportunity to comment on this addendum and the recommended approach, the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) will select the most appropriate removal action alternative for the railcars. This addendum satisfies environmental review requirements and provides for stakeholder involvement while providing a framework for selecting the additional removal alternative.

1.1 Purpose and Scope

This addendum was written to support additional cleanup objectives associated with the 200 North Area and provides the evaluation of additional removal action alternatives for the disposition of the railcars.

Currently, 16 radiologically contaminated railcars are staged south of the former location of the 212-R Facility. Eleven of the railcars are cask cars (used for transportation of irradiated nuclear fuel), which contain lead-lined casks. The remaining railcars include two locomotives, two tank cars, and one flat car. The railcars are currently administered under a surveillance and maintenance (S&M) program while awaiting disposition. DOE has identified no further use for the railcars, and based on the nature and extent of contamination and associated risks (see Sections 2.2 and 2.3), has identified them as candidates for a removal action.

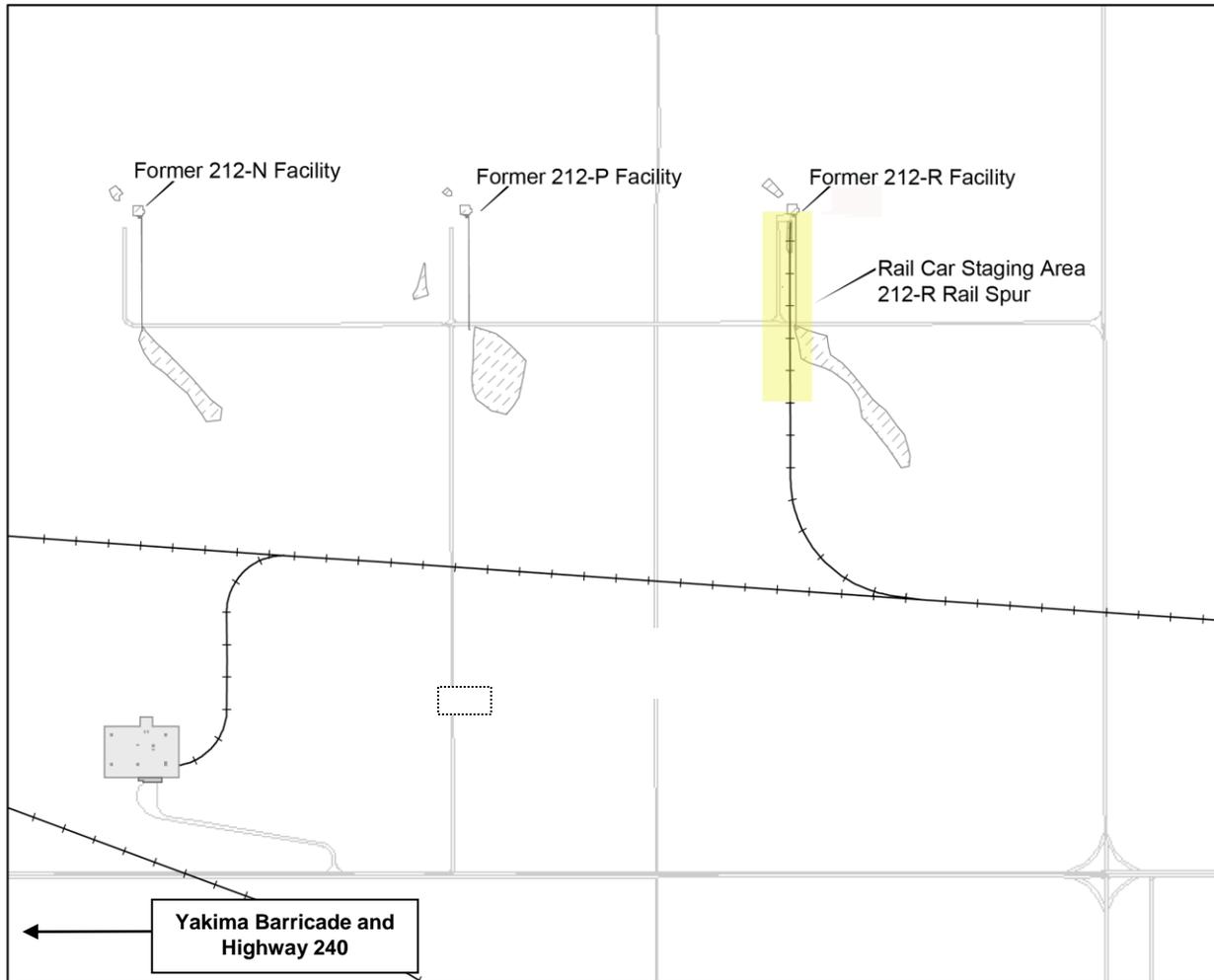
Performance of this removal action alternative will support the ongoing cleanup objectives by placing the railcars in a configuration that is protective of human health and the environment. A threat of release of hazardous substances exists, and, without action, adverse threats to human health and the environment eventually could occur. As the lead agency, DOE has determined that a removal action is an appropriate means to accomplish the final end state. The EPA concurs that an addendum to the existing non-time-critical removal action (NTCRA) is warranted to support placing the railcars in a configuration that is protective of human health and the environment.

2 Site Characterization

This section describes the relevant background and site descriptions for the railcars and their source, nature, and extent of contamination. Also provided is the justification for an addendum to the existing NTCRA and Action Memorandum.

2.1 Site Description and Background

The railcars are located in the 200 North Area of the Hanford Site as identified on Figure 2-1 in the existing NTCRA. Highway 240 is located to the southwest of the 200 North Area and the Columbia River is north-northwest (the highway and the river are each located less than 10 kilometers from the railcars). Figure 2-1 identifies the location of the railcars within this geographical area.



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Figure 2-1. Location of Railcars within the 200 North Area

3 2.1.1 Description of the Railcars

4 Sixteen radiologically and chemically contaminated railcars are staged on the rail spur immediately south
 5 of the former location of the 212-R Facility (Figure 2-2). All of the cask cars and locomotives were
 6 acquired in the 1940s through 1960s; 11 of the railcars (i.e., cask or well cars) supported the 212-N, -P,
 7 and -R facility interim storage mission by storing the fuel rods during transport between facilities. One
 8 flatcar, which is also staged on the 212-R rail spur, was used to transport miscellaneous equipment over
 9 the years and the two tanker cars were used to transport radiologically-contaminated liquid wastes on the
 10 Hanford Site. Note: For convenience in this document, the term 'railcars' will be used when generically
 11 referring to the 14 railcars and the two locomotives.



Figure 2-2. Railcars on 212-R Rail Spur Leading into the 212-R Facility

The former 212-N, -P, and -R facilities provided interim storage for irradiated fuel rods and the railcars (i.e., cask or well cars) which supported this activity by housing the fuel rods during transport. As cited in PNL-7008, *Resource Book - Decommissioning of Contaminated Facilities at Hanford*, fuel operations in the 200 North Area were terminated in 1952.

The Hanford Site railroad operations were suspended in 1997, and all remaining railcars were staged at selected locations around the Hanford Site. The main location for the storage of the railcars is the 212-R rail spur.

Table 2-1 provides the railcar identification (ID) number and railcar type, along with a photograph for the railcars.

Table 2-1. Rail Car Identification Number and Railcar Type

ID Number	Railcar Type and Photograph
3731	Diesel Locomotives 
3729	

Table 2-1. Rail Car Identification Number and Railcar Type

ID Number	Railcar Type and Photograph	
HO-10B-3637 HO-10B-3643 HO-10B-5598 HO-10B-3640 HO-10B-3641 HO-10B-3636 HO-10B-3639 HO-10B-5599 HO-10B-3645 HO-10B-3642	Irradiated Fuel Cask Cars	
HO-10B-19945	Tall Irradiated Fuel Cask Car	
HO-10H-3712	Rail Tank Car	
HO-10H-3663	Rail Tank Car	
HO-10A-3602	Flatbed Railcar	

2.2 Source, Nature, and Extent of Contamination

Based on process knowledge of the historical irradiated fuel activities at the Hanford Site, the primary hazardous substances of concern for these railcars are radioactive materials. Key radionuclide contaminants are uranium-234, uranium-235, uranium-238, plutonium-239/240, americium-241, and mixed fission products such as strontium-90 and cesium-137. Based on historical and process knowledge, the majority of contaminants are normally found in the form of adherent films and residues encrusted in the rail casks and tanks, and as surface contamination on the locomotives and the flatcar.

The railcars are also anticipated to contain one or more of the following materials commonly found in or on most railcars that were used for similar applications:

- Polychlorinated biphenyls (PCBs) used in paint coatings and in the oil and grease from the old journal boxes associated with the rail wheels
- Lead paint
- Lead for shielding, as in the case of the cask cars
- Used oil from motors, hydraulics and pumps
- Lead-acid batteries, residual fuel, hydraulic oil, and antifreeze associated with locomotives.

2.3 Risk Evaluation Results

The railcars are contaminated with hazardous substances, primarily radionuclides, lead, and PCBs. The 11 railcars that were used as irradiated fuel cask cars are internally contaminated and contain lead-lined casks. The cask housing in several of the railcars contains water and mineral oil. The water is used for radiation shielding and the mineral oil is used to minimize evaporation. As water levels within the cask housing decrease due to evaporation, radiological dose rates increase. The steel housing for the irradiated fuel cask cars is deteriorating. The tank cars also contain contaminated liquids that could be released if the metal tanks deteriorate. The locomotives and the flatcar presently have fixed surface contamination that over time could be released to the environment through deterioration of the surface coatings. Continued exposure to water and to weather conditions is accelerating the deterioration of the railcars. This continued deterioration contributes to an increased risk of release to the environment. The potential also exists for animal intrusion into the railcars, which could also result in contamination spread or release. Although no spills or releases have been discovered to date, continued exposure to natural processes could lead to deterioration of the metal to the point of failure.

In general, the risk of an accidental radiological release increases the longer the railcars remain in the S&M program awaiting disposition. Under a continued S&M scenario, the residual contamination presents sufficient threat to human health and the environment to justify a NTCRA.

Timely disposition of the railcars supports overall Hanford cleanup priorities and the geographical area closure approach. Issuance of this decision could also support DOE plans for use of *American Reinvestment and Recovery Act of 2009* (ARRA) funding.

3 Identification of Removal Action Objectives

Based on the potential hazards, and the presence of hazardous substances, identified in Sections 2.2 and 2.3, the specific objectives identified in DOE/RL-2008-07, Section 3, and listed below, remain appropriate for the scope of the removal action for the 212-N, 212-R and 212-P facilities with the addition of the disposition of the railcars.

- 1 • Reduce/eliminate the inventory of hazardous/radioactive substances within the facilities
- 2 • Reduce or eliminate the potential for a release to the environment
- 3 • Safely manage (treat and/or dispose) of waste streams generated through the removal action
- 4 • Be consistent with the future remediation plans for the 200 North Area
- 5 • Prevent adverse impacts to cultural and natural resources
- 6 • Reduce or eliminate the need for future S&M activities.

7 The first removal action objective (RAO) listed is extended to the railcars (in addition to the facilities).
8 The following RAO is added for the scope of dispositioning the railcars:

- 9 • Protect human health and the environment from physical, chemical, and radiological hazards posed
10 by each railcar.

11 **3.1 Determination of Removal Scope**

12 The scope of this action is limited to the 16 railcars staged on the 212-R rail spur, which are listed in
13 Section 2.1.1, Table 2-1. One of the locomotives is being considered for use in the B Reactor museum and
14 will be removed from the scope of this removal action for transfer from the site upon concurrence by the
15 EPA.

16 There is a potential for encountering contamination in surrounding soils during the implementation of the
17 removal action. Soil that is found to be contaminated with hazardous substances that can be readily
18 cleaned up during the work would be removed for disposal during implementation, if practicable. Such
19 excavation would be performed using an observational approach with visual inspections, radiological, and
20 chemical field screening, and focused judgmental sampling where appropriate. Depth of and completion
21 of excavation in these situations would be determined by the on-scene coordinator in consultation with
22 the EPA. Alternatively, if the soil contamination is extensive or unusually complex, the site would be
23 identified by DOE for placement in the waste information data system (WIDS) and evaluation as a new
24 site under the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology
25 et al. 1989), with concurrence by the EPA and the Washington State Department of Ecology (Ecology).

26 **3.2 Identification of Applicable or Relevant and Appropriate Requirements**

27 For this removal action addendum, implementation of any selected alternative will be designed to comply
28 with the applicable or relevant and appropriate requirements (ARARs) to the extent practicable. Federal
29 and state ARARs are delineated in the approved DOE/RL-2008-80, *Action Memorandum for the*
30 *Non-Time-Critical Removal Action for the 212-N, -P and -R Facilities*, Section 5, and are included in
31 Tables 3-1 and 3-2 below, with modifications appropriate for the rail car disposition scope.

Table 3-1. Identification of Federal Applicable or Relevant and Appropriate Requirements and To Be Considered for the Removal Action

	ARAR or TBC	Requirement	Rationale for Use
<i>National Archaeological and Historic Preservation Act of 1976,</i> 16 U.S.C. 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.

Table 3-1. Identification of Federal Applicable or Relevant and Appropriate Requirements and To Be Considered for the Removal Action

	ARAR or TBC	Requirement	Rationale for Use
<i>National Historic Preservation Act of 1966,</i> 16 U.S.C. 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 U.S.C. 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 U.S.C. 1531 et seq, subsection 16 U.S.C. 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.
<i>Migratory Bird Treaty Act of 1918,</i> 16 USC 703 et seq.	ARAR	This law was enacted to implement international treaties for the protection of birds native to the United States which migrate to and through other treaty nations. The act protects migratory birds by governing the taking, killing, possession, transportation, and importation of such birds, their eggs, parts, and nests; and any product manufactured or not from such items.	Migratory birds are not anticipated to be impacted by this removal action. However, if migratory birds are encountered during the work, the substantive requirements of this act will be implemented to avoid known locations where removal of hazardous substances would “take” birds or their eggs and to mitigate impacts in the event of an inadvertent take.

Table 3-1. Identification of Federal Applicable or Relevant and Appropriate Requirements and To Be Considered for the Removal Action

	ARAR or TBC	Requirement	Rationale for Use
40 CFR 82, "Protection of Stratospheric Ozone"			
40 CFR 82.156, "Required Practices" 40 CFR 82.158, "Standards for Recycling and Recovery Equipment" 40 CFR 82.161, "Technician Certification"	ARAR	Specifies the procedures and processes that will be followed for recycling and recovery of ODSs. Establishes the required performance standards for ODS recycling and recovery equipment; and requires appropriate certification for workers who recover or recycle ODSs.	Selected alternative may include the recycling or recovery of ODSs that must be conducted in accordance with the applicable requirements and work practices. These requirements are action-specific.
40 CFR 761.50(b)1, 2, 3, 4, and 7, "Applicability," "PCB Waste" 40 CFR 761.50(c), "Applicability," "Storage for Disposal" Disposal Requirements," 40 CFR 761.60(a), "Disposal Requirements" "PCB liquids" 40 CFR 761.60 (b), "Disposal Requirements" "PCB Articles" 40 CFR 761.60 (c), "Disposal Requirements" "PCB Containers" 40 CFR 761.61, "PCB Remediation Waste" 40 CFR 761.62, "PCB Bulk Product Waste" 40 CFR 761.79, "Decontamination Standards and Procedures"	ARAR	These regulations apply to the storage and disposal of PCB wastes including liquid PCB wastes, PCB items, PCB remediation waste, PCB bulk product wastes, and PCB/radioactive wastes at concentrations equal to or greater than 50 ppm. These regulations also provide options for decontamination of materials contaminated with PCBs.	Substantive requirements of these regulations will apply to PCB wastes, including, but not limited to, PCB items, PCB liquids, and PCB articles, and/or containers that would be managed in accordance with the substantive requirements of these standards if encountered and or generated during the NTCRA.
40 CFR 61.92, "Standard"	ARAR	This regulation set limits for radionuclide emissions, which cannot exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem/yr or greater.	Substantive requirements of this regulation are applicable to potential emissions from work under the NTCRA.

40 CFR 82, "Protection of Stratospheric Ozone"
ARAR= applicable or relevant and appropriate requirement
CFR = *Code of Federal Regulations*
ODS = ozone-depleting substance
TBC = to-be-considered

Table 3-2. Identification of State Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
<i>Regulations pursuant to the Resource Conservation and Recovery Act of 1976 and implemented through WAC 173-303, "Dangerous Waste Regulations"</i>			
"Identifying Solid Waste," WAC 173-303-016	ARAR	This regulation applies for determining which materials 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," WAC 173-303-070(3)	ARAR	This regulation applies for the evaluation of a solid waste to determine if such waste is or is not a dangerous or mixed 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 removal actions identified in WAC 173-303-071 be 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 waste, 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.

Table 3-2. Identification of State Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
“Land Disposal Restrictions,” WAC 173-303-140(4)	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 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 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.
<i>General Regulations for Air Pollution Sources, WAC 173-400 and WAC 173-460</i>			
Specific subsection: WAC 173-400-040	ARAR	Requires all sources of air contaminants to meet standards for visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust. Requires use of reasonably available control technology.	Substantive requirements of the general standards for control of fugitive emissions are applicable to removal actions at the site due to the generation of fugitive dust that occurs during disposition of rail cars or other types of related activities. These requirements are action-specific.

Table 3-2. Identification of State Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
“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, WAC 173-460-160	ARAR	Requires best available control technology for regulated emissions of toxic air pollutants (toxic best available control technology) and demonstration that emissions of toxic air pollutants will not endanger human health or safety.	Substantive requirements of these regulations would be 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.
<i>“Asbestos” Benton Clean Air Agency, Regulation 1, Article 8</i>			
Section 8.02 “CFR Adoption by Reference”; Section 8.03 “General Requirements”	TBC	Incorporates the Federal requirements of 40 CFR 61, Subpart M and 40 CFR 763, Subpart E by reference. Requires established controls and work practices for managing and disposing regulated asbestos-containing material (reasonable available control technology).	Selected alternative may include the removal or disturbance of regulated asbestos containing material (reasonable available control technology) that must be conducted in accordance with the applicable requirements and work practices.
<i>Radiation Protection -- Air Emissions, WAC 246-247</i>			
“Radiation Protection -- Air Emissions,” “Standards,” WAC 246-247-040(3) WAC 246-247-040(4)	ARAR	These regulations require all new construction and significant modifications of emission units to utilize BARCT and require all existing emission units and nonsignificant modifications to utilize ALARCT in controlling emissions to the environment.	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, deactivation, treatment (as needed) and stabilization of contaminated components and operation of exhausters and vacuums, performed during the removal action. This standard exists to ensure compliance with emission standards. These requirements are action-specific.

Table 3-2. Identification of State Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
<p>“Monitoring, Testing, and Quality Assurance,” WAC 246-247-075(1) and –(2) and –(4)</p>	ARAR	<p>These regulations establish the monitoring, testing, and quality assurance requirements for radioactive air emissions from major sources. These regulations also include requirements for continuous sampling and provide for periodic sampling (grab samples) in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. These regulations also provide for the waste site owner or operator to use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures as approved by the lead agency.</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 diffuse and point source emissions of radionuclides to the ambient air may result from activities, such as decontamination, deactivation, treatment (as needed), stabilization of contaminated components, 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>
<p>“Monitoring, Testing, and Quality Assurance,” WAC 246-247-075(3)</p>	ARAR	<p>Methods to implement periodic confirmatory monitoring for minor sources may include estimating the emissions or other methods as approved by the lead agency.</p>	<p>Fugitive and diffuse emissions from the disposition of rail cars and related activities will require periodic confirmatory measurements to verify low emissions. This requirement is action-specific and applicable.</p>
<p>“Monitoring, Testing, and Quality Assurance,” WAC 246-247-075(8)</p>	ARAR	<p>Site emissions resulting from non-point and fugitive sources of airborne radioactive material shall be measured. Measurement techniques may include ambient air measurements, or in-line radiation detector or withdrawal of representative samples from the effluent stream, or other methods as determined by the lead agency.</p>	<p>Fugitive and diffuse emissions of airborne radioactive material due to rail car disposition and related activities will require measurement. This requirement is action-specific and applicable.</p>
<p>“General Standards for Maximum Permissible Emissions,” WAC 173-480-050(1)</p>	ARAR	<p>This regulation establishes general standards for all emission units and requires emission units to make every reasonable effort to maintain radioactive materials in effluents to unrestricted areas ALARA. This regulation indicates that control equipment of sites operating under ALARA shall be defined as reasonably available control technology and as low as reasonably achievable control technology.</p>	<p>The potential for fugitive and diffuse and point source emissions due to rail car disposition and related activities will require efforts to minimize those emissions. This requirement is action-specific and applicable.</p>

Table 3-2. Identification of State Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
“Emission Monitoring and Compliance Procedures,” WAC 173-480-070-(2)	ARAR	This regulation applies for determining 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.	The potential for fugitive and diffuse and point source emissions resulting from rail car disposition and related activities will be addressed in compliance with the public dose standard during the NTCRA. This requirement is action-specific and applicable.

40 CFR 61, Subpart H, “National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities.”
40 CFR 268, “Land Disposal Restrictions.”
WAC 173-303, “Dangerous Waste Regulations.”

WAC 173-400, “General Regulations for Air Pollution Sources.”
WAC 173-460, “Controls for New Sources of Toxic Air Pollutants.”
WAC 173-480, “Ambient Air Quality Standards and Emission Limits for Radionuclides.”
WAC 246-247, “Radiation Protection -- Air Emissions.”

ALARA = as low as reasonably achievable

ARAR = applicable or relevant and appropriate requirement

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*

CFR = *Code of Federal Regulations*

DOE = U.S. Department of Energy

TBC = to-be-considered

WAC = *Washington Administrative Code*

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4 Identification of Removal Action Alternatives

3 The selected removal action alternative for the railcars must be protective of human health and the
4 environment, and otherwise meet the RAOs. Based on these considerations, the following three removal
5 action alternatives were identified for assessment:

- 6
- 7 • Alternative 1 – No Action
 - 8 • Alternative 2 – Continued Surveillance and Maintenance with Future Decontamination, Deactivation,
9 Decommissioning, and Disposal of the Railcars
 - 10 • Alternative 3 – Near Term Decontamination, Deactivation, Decommissioning, and Disposal of the
11 Railcars

4.1 Alternative 1 – No Action

12 Under Alternative 1, it is assumed that the railcars would be abandoned without any further actions.
13 Surveillance, maintenance, and periodic inspection activities would be discontinued and degradation of
14 the railcars could continue indefinitely. Ultimately, under Alternative 1, access to the railcars is assumed
15 to be unrestricted. Industrial and radiological hazards would continue to exist because controls to prevent
16 access would not be maintained. The initial risks of Alternative 1 are minimal to the environment,
17 provided there are no significant weather or fire events or contamination spread from animal intrusion.
18 Risks over time are expected to increase as railcar deterioration progresses and structural integrity is
19 compromised. Alternative 1 would do nothing to address the potential for release and/or spread of
20 contamination in the environment or minimize access to hazardous substances and is used as a baseline
21 for comparison only, as it would not comply with ARARs.

4.2 Alternative 2 – Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Disposal of the Railcars

Under Alternative 2, the railcars would remain in the S&M program for 25 years³ followed by decontamination, deactivation, decommissioning, and disposal (D4) as described in Alternative 3. The railcars would be maintained in a quiescent state for a considerable duration while ongoing preventive measures are implemented. These measures would include periodic monitoring for radiological and industrial hazards, preventive maintenance, and general visual inspections. Additionally, limited decontamination and application of fixatives would occur to control the spread of radiological contamination for the railcars. Initially, minimal waste would be generated with little or no need for waste treatment prior to disposal. Over time, degradation and other factors could result in an increased need for maintenance and possibly increased waste generation. Alternative 2 would merely result in a delay of the start of D4 and would require expenditures for the continued surveillance, maintenance, and periodic inspections over the interim period. The cost analysis includes the period of S&M, followed by D4. Disposal of the railcars would consist of treatment and disposal at the Environmental Restoration Disposal Facility (ERDF), recycling, or a combination of both as discussed in Alternative 3.

4.3 Alternative 3 – Near Term Decontamination, Deactivation, Decommissioning, and Disposal of the Railcars

This alternative consists of performing D4 and packaging and shipping the railcars to the ERDF or an EPA-approved offsite facility for treatment, as needed, and disposal. Under this alternative, one of the locomotives would be recycled by being sent to the B Reactor museum, if practicable. Prior to relocating the locomotive, it would be prepared for safe transfer and concurrence would be obtained from the EPA to remove it from the scope of the removal action. Alternative 3 would ensure that any hazardous substances potentially within or on the railcars are placed in a protective and safe condition for the foreseeable future, without the need for ongoing preventive measures and inspections. This alternative would include the following primary elements:

- Decontamination of and/or application of fixative to the railcars, as needed
- Physical modification, as required for shipment to and acceptance at the ERDF or other EPA-approved facility, such as removal of equipment protrusions on the railcars, and sealing of penetrations or openings
- Treatment, as needed, to meet waste acceptance criteria (WCH-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*) and disposal of railcars; the 11 cask cars will require macroencapsulation due to the lead-lined casks in each railcar, to meet requirements for 40 CFR 268, “Land Disposal Restrictions”
- Deactivation of railcars prior to decommissioning, (e.g., perform visual inspections and radiological surveys of internal surfaces, characterize liquids and debris for designation, drain liquids for treatment and disposal, remove hazardous materials, etc) as appropriate for disposition purposes
- Evaluation of recycling non-contaminated (or decontaminated) portions of the railcars and contents, as applicable.

³ For purposes of this evaluation, it was determined that in the absence of available ARRA funds, continuation of S&M for 25 years prior to D4 represents a reasonable assumption for Alternative 2 based on historical funding profiles.

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5 Analysis of Removal Action Alternatives

The alternatives included in this addendum, as with the original removal action alternatives, these alternatives will be evaluated against three criteria: effectiveness, implementability, and cost. To provide a more comprehensive evaluation, the criterion of effectiveness is divided into subcriteria that are consistent with the requirements for *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) actions. The removal action alternatives are evaluated against the following criteria:

- Effectiveness
 - Overall protection of human health and the environment
 - Compliance with applicable federal and state laws and regulations (i.e., ARARs)
 - Long-term effectiveness and permanence
 - Reduction of toxicity, mobility, or volume through treatment
 - Short-term effectiveness.
- Implementability
- Cost.

State and public acceptance will be evaluated after individuals have an opportunity to review and comment on this engineering evaluation and cost analysis (EE/CA) addendum. Each criterion is explained briefly in the following subsections; a detailed analysis of each alternative relative to each criterion follows.

The No Action alternative (Alternative 1) is included in this EE/CA addendum for completeness only. As discussed in Section 4.1, the No Action alternative cannot be considered a viable alternative and is not considered further. However, the alternative is included for comparative purposes in the cost analysis. Section 5.5, provides a comparative analysis of the removal action alternatives.

5.1 Effectiveness of Removal Action Alternatives

The effectiveness criterion refers to the ability to meet the RAOs (as referred to in Section 3) within the scope of the removal action and in terms of overall protection of human health and the environment.

5.1.1 Overall Protection of Human Health and the Environment

This criterion evaluates whether the alternative achieves adequate overall elimination, reduction, or control of risks to human health and the environment posed by the likely exposure pathways. This criterion draws on the assessment of the other evaluation criteria identified previously. Reducing the potential threat to acceptable levels is a threshold requirement and is the primary objective of the removal action. The evaluation of this criterion was based on qualitative analysis and assumptions regarding the radioactive inventory.

- Alternative 2 would delay D4 to be performed at a later date. As the railcars continue to age, the threat of substantial release of radiological and hazardous substances and/or animal intrusion increases with time, and confining these materials from the environment becomes more difficult. The S&M and periodic inspection activities would be required to confine the hazardous substances to minimize the risk of exposure from deterioration. This alternative would be protective of human health, though less so than alternate 3 because the hazard is eliminated at a later time, after a period of continued S&M. This delayed D4 would allow potential additional exposures to occur during that

1 interim period of continued S&M. Alternative 2 is considered to be protective of the environment, but
 2 again less so than Alternative 3 because of the threat of a release to the environment from railcars
 3 continuing to age during the period of S&M.

4 Alternative 2 achieves RAOs through prevention of unacceptable exposures through administrative
 5 and physical controls during the S&M period, followed by future D4 to mitigate hazards.

- 6 • Alternative 3 would permanently mitigate the hazards in the near term. This alternate is considered
 7 the most protective of human health as it would eliminate the hazards and preclude the threat of
 8 release due to aging.

9 Alternative 3 achieves the RAOs by removing and disposing of materials contaminated with
 10 hazardous substances.

11 **5.1.2 Compliance with Applicable or Relevant and Appropriate Requirements** 12 **and Other Standards**

13 The removal actions are required to comply with the substantive aspects of ARARs, not with
 14 corresponding administrative requirements. That is, permit applications and other administrative
 15 procedures, such as administrative reviews, and reporting and recordkeeping requirements, are considered
 16 administrative for actions conducted entirely onsite [40 CFR 300.400(e)] and therefore not required.

17 Implementation of Alternatives 2 or 3, will comply with the ARARs approved in DOE/RL-2008-80, and
 18 provided in Section 3 of this addendum, to the extent practicable.

19 **5.1.3 Long-Term Effectiveness and Permanence**

20 The long-term effectiveness and permanence criterion addresses the risk after the removal action is
 21 completed. This criterion also refers to the ability of the removal action to maintain long-term reliable
 22 protection of human health and the environment after RAOs have been met.

23 Under Alternative 2, surveillance and maintenance would be conducted for a period of 25 years followed
 24 by D4 of the railcars. The alternative would be effective at protecting human health and the environment
 25 during the period of S&M, although the efforts to maintain the level of protection necessary would
 26 become increasingly aggressive as the railcars age. Because contamination and hazardous substances
 27 would be left in place throughout the period of S&M, the risk of release to the environment would remain.
 28 Elimination of hazards would be postponed until D4 activities are completed.

29 Alternative 3 would provide immediate protection of human health and the environment and would
 30 immediately meet the RAOs as compared to Alternative 2. The railcars, including the radiological and
 31 hazardous substances associated with each railcar, would be removed from the 200 North Area and
 32 disposed, thereby creating an effective and permanent remedy for the railcars by reducing the potential
 33 exposure threat and contributing to the long-term protection of human health and the environment.

34 **5.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment**

35 This criterion refers to an evaluation of the anticipated performance of the treatment technologies that
 36 might be employed during performance of this removal action. This criterion assesses whether the
 37 alternative permanently and significantly reduces the hazard posed through application of a treatment
 38 technology. This could be accomplished by destroying the contaminants, reducing the quantity of
 39 contaminants, or irreversibly reducing the mobility of contaminants. Reduction of toxicity, mobility,
 40 and/or volume contributes toward overall protectiveness.

1 Based on process knowledge of waste generation from past railcar disposition activities, treatment would
 2 not be a significant component of the removal action for Alternative 2 during the period of S&M.
 3 However, because Alternative 3 would generate waste through the immediate disposition of the
 4 16 railcars (11 of which contain significant amounts of lead), Alternative 3 could be considered more
 5 effective at meeting this criterion for the near-term. The major treatment method anticipated (i.e.,
 6 macroencapsulation for the lead-lined casks) would act to reduce the mobility of contaminants.

7 Both Alternatives 2 and 3 would consider recycling (e.g., retain one of the locomotives, identify any
 8 reusable components, products, and/or contents associated with the railcars) to reduce the volume of
 9 material disposed.

10 **5.1.5 Short-Term Effectiveness**

11 The short-term effectiveness criterion refers to any potential adverse effects on human health
 12 (e.g., personnel or the surrounding public) and the environment during the removal action implementation
 13 phases. The criterion also refers to an evaluation of the speed with which the removal action
 14 achieves protection.

15 Under Alternative 2, short term risks could be minimized through surveillance and maintenance.
 16 However, there would be increased risk of potential for exposure to human health and the environment
 17 during the 25 year S&M period because personnel would be required to monitor, inspect, and maintain
 18 the railcars. Exposure to personnel, the environment, and/or the public would increase as the railcars
 19 continue to deteriorate with age, increasing the potential for animal intrusion and exposure to
 20 environmental elements. Although Alternative 2 could be implemented in a manner that would minimize
 21 the potential for short-term risks, full protection would not be achieved until completion of future
 22 identified D4 activities.

23 Under Alternative 3, short term risks to personnel and the environment during implementation would
 24 have an immediate increased potential exposure relative to Alternative 2 because personnel would be
 25 handling more contaminated materials from the railcars in the near term. Like Alternative 2, the work
 26 under Alternative 3 could be implemented in a manner that would minimize the potential for short term
 27 risks.

28 **5.2 Implementability of the Removal Action Alternatives**

29 Implementability refers to the technical and administrative feasibility of a removal action, including the
 30 availability of materials and services needed to implement the selected solution.

31 From a technical standpoint, Alternative 2 can be implemented easily, as demonstrated by the success of
 32 the S&M program currently ongoing for the railcars. S&M techniques are widely used throughout the
 33 Hanford Site, and no specialized materials or services would be required except when major repairs are
 34 needed. As time goes by, the primary implementation deterrent would be the increasing potential
 35 contamination exposure as railcar deterioration increases. Normal precautions for managing
 36 contamination would be applied.

37 Alternative 3 also can be implemented with relative ease. The specialized skills that would be required to
 38 work with contaminated materials and equipment would be available within the existing workforce on the
 39 Hanford Site.

1 Waste from the removal action will be sent to the ERDF⁴ or other EPA-approved location. The ERDF is
 2 the preferred disposal location because the ERDF is an engineered facility that provides a high degree of
 3 protection to human health and the environment, and previous EE/CAs for other Hanford Site work have
 4 shown that this disposal option is more cost effective than disposal at other disposal sites.

5 Alternatives 2 and 3 are both technically feasible. However, alternative 2 would defer decommissioning
 6 of the railcars by 25 years as compared to near-term decommissioning under Alternative 3.
 7 Decommissioning of the railcars after 25 years could result in increased hazards to human health and the
 8 environment from railcar degradation and the work could be more costly in 25 years as compared to the
 9 near-term. The methods for performing these activities can be planned and engineered using existing
 10 available knowledge and procedures that have been performed at the Hanford Site or elsewhere. The
 11 ERDF is anticipated to be available for onsite disposal for most or all of the waste to be generated by the
 12 activities. Use of the NTCRA process is an appropriate means to facilitate implementation, document the
 13 work, provide for public involvement, and obtain requisite approvals to perform the work.

14 **5.3 Cost of the Removal Action Alternatives**

15 Consistent with guidance established by the U.S. Office of Management and Budget (OMB),
 16 present-worth analysis is used as the basis for comparing costs of cleanup alternatives under the CERCLA
 17 program (OMB, 2010, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*).

18 For purposes of this evaluation, present-worth (discounted) cost values were calculated using a discount
 19 rate of 2.7 percent (OMB, 2010). Because of the time-dependent value of money, future expenditures
 20 were not considered directly equivalent to current expenditures. The present-worth cost method shows the
 21 amount required at the initial point in time (e.g., in the current year) to fund activities occurring over the
 22 life of the alternative. Present-worth analysis assumes that the funding set aside at the initial point in time
 23 increases in value as time goes on, similar to how money placed in a savings account gains in value as a
 24 result of interest paid on the account. Although the federal government typically does not set aside funds
 25 in this manner, the present-worth analysis is specified under CERCLA as the approach for establishing a
 26 common baseline to evaluate and compare alternatives that have costs occurring at different times,
 27 although actual costs could vary. While the funds might not actually be set aside, the present-worth costs
 28 were considered directly comparable for the purpose of evaluating the costs of the alternative.

29 In contrast to the present-worth costs, the total nondiscounted costs do not take into account the value of
 30 money over time. The nondiscounted cost method displays the total costs occurring over the entire
 31 duration of an alternative, with no adjustment (or discounting) to reflect current year or set aside cost
 32 based on an assumed interest rate. Because nondiscounted costs do not reflect the changing value of funds
 33 over time, presentation of this information under CERCLA is for information purposes only, not for
 34 response action alternative selection purposes.

35 Table 5-1 presents the total estimated costs for each alternative as described in Sections 4.1 through 4.3.

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⁴ CERCLA Section 104(d)(4) states that 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 facilities can be treated as one for purposes of CERCLA response actions. Consistent with this, the railcars and ERDF would be considered to be onsite for purposes of Section 104 of CERCLA, and waste may be transferred between the facilities without requiring a permit.

Table 5-1. Comparison of Total Cost of Removal Action Alternatives

Description	Alternative 1	Alternative 2	Alternative 3
	No Action	Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Disposal of the Railcars	Near Term Decontamination, Deactivation, Decommissioning, and Disposal of the Railcars
Total Project Duration (years)	Not Applicable	25	1
Capital Cost	\$0	\$9,133,000	\$8,734,000
Total O&M Cost	\$0	\$192,000	\$0
Total Periodic Cost	\$0	\$513,000	\$0
Total Nondiscounted	\$0	\$7,685,000	\$6,422,000
Total Present Value of Alternative (Discounted)	\$0	\$4,339,000	\$6,422,000

Note: The accuracy range of the cost estimate is -30% to +50%.

1 5.4 Other Considerations

2 This section identifies other considerations associated with the proposed removal action alternatives such
3 as *National Environmental Policy Act of 1969* (NEPA) values.

4 5.4.1 NEPA Values

5 In accordance with DOE Order 451.1B Chg 1, DOE CERCLA documents are required to incorporate
6 NEPA values (e.g., analysis of cumulative, offsite, ecological, and socioeconomic impacts) to the extent
7 practicable.

8 Table 5-2 describes the NEPA values (i.e., resource area and relevant NEPA considerations) most
9 relevant to and potentially affected by the actions taken under this removal action.

10

Table 5-2. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
Transportation	Considers impacts of the proposed action on local traffic (i.e., traffic at the Hanford Site) and traffic in the surrounding region.	<p>Alternative 1 would have no impacts on local traffic, since no action would be taken and Alternative 2 would have very little impact on local traffic from the continuation of S&M activities.</p> <p>Implementation of Alternative 3 would be expected to produce short-term impacts on local traffic. A majority of the impact is associated with increased truck traffic, when transporting each railcar to the ERDF. Transportation impacts were considered in DOE/RL-93-99, <i>Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility</i>, as part of the evaluation of short-term effectiveness and implementability. NEPA values in the planning for the ERDF operation were explained in detail in DOE/RL-94-41, <i>NEPA Roadmap for the Environmental Restoration Disposal Facility Regulatory Package</i>. See the discussion of cumulative impacts for a perspective of transportation to the ERDF.</p>
Air Quality	Considers potential air quality concerns associated with emissions generated during the proposed action.	<p>Under Alternative 1, the fixatives and water used for emission controls would not be used and the railcars would eventually degrade, which would increase air emissions and reduce localized air quality.</p> <p>Airborne releases associated with Alternatives Two and Three are expected to be minor with the use of appropriate work controls (e.g., use of water within the well-housing of the railcars, sampling during favorable wind conditions, and use of fixatives).</p> <p>Any potential of airborne release of contaminants during these removal actions will be controlled in accordance with DOE radiation control and air pollution control standards, to minimize emissions of air pollutants at the Hanford Site, and protect all communities outside the Site boundaries.</p> <p>Operation of trucks and other diesel-powered equipment for these alternatives would be expected, in the short-term, to introduce quantities of sulfur dioxide, nitrogen dioxide, particulates, and other pollutants to the atmosphere, typical of similar-sized construction projects. These releases would not be expected to cause any air quality standards to be exceeded and (as needed) dust generated during removal activities would be minimized by watering or other dust-control measures. Vehicular and equipment emissions will be controlled and mitigated in compliance with the substantive standards for air quality protection that apply to the Hanford Site.</p>
Natural, Cultural, and Historical Resources	Considers impacts of the proposed action on wildlife, wildlife habitat, archeological sites and artifacts, and historically significant properties.	<p>Impacts on ecological resources in the vicinity of the removal actions will continue to be mitigated in accordance with DOE/RL-96-32, <i>Hanford Site Biological Resources Management Plan</i> and DOE/RL-96-88, <i>Biological Resources Mitigation Strategy</i>, and with the applicable standards of all relevant biological species protection regulations.</p> <p>Because this area has already been disturbed, and no soil excavation is expected to occur, it is not anticipated that any artifacts could be encountered during project activities under any of the alternatives. If the possibility of finding isolated artifacts occurs, the project will implement DOE/RL-98-10, <i>Hanford Cultural Resources Management Plan</i>, and consult with area Tribes to help ensure appropriate mitigation to avoid or minimize any adverse cultural or historical resource effects and address any relevant concerns.</p> <p>Potential impacts to cultural and historical resources that may be encountered during the short-term activities associated with implementing Alternative 3 of the removal action will be mitigated through compliance with the appropriate substantive requirements of the <i>National Historic Preservation Act of 1966</i> and other ARARs related to cultural preservation.</p>
Socioeconomic Impacts	Considers impacts pertaining to employment, income, other services (e.g., water and power utilities), and the effect of implementation of the proposed action on the availability of services and materials.	<p>The proposed action is within the scope of current DOE, Richland Operations Office (RL) environmental restoration activities and will have minimal impact on the current availability of services and materials. This work is expected to be accomplished largely using employees from the existing contractor workforce. Even if the removal activities create additional service sector jobs, the total expected increase in employment would be expected to be less than 1 percent of the current employment levels. The socioeconomic impact of the project will contribute to the continuing overall positive employment and economic impacts on eastern Washington communities from Hanford Site cleanup operations.</p>
Environmental Justice	Considers whether the proposed response actions would have inappropriately or disproportionately high and adverse human health or environmental effects on minority or low-income populations.	<p>Per Executive Order 12898, <i>Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations</i>, DOE seeks to ensure that no group of individuals bears a disproportionate share of negative environmental consequences resulting from proposed federal actions. No impacts are associated with proposed activities associated with the railcars that could reasonably be determined to affect any member of the public; therefore, they would not have the potential for high and disproportional adverse impacts on minority or low-income groups.</p>

Table 5-2. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
Cumulative Impacts (Direct and Indirect)	Considers whether the proposed action could have cumulative impacts on human health or the environment when considered together with other activities locally, at the Hanford Site, or in the region.	<p>The cumulative impacts concern is associated directly with the targeted area. Because of the temporary nature of the activities and their remote location, cumulative impacts on air quality or noise with other Hanford Site or regional construction and cleanup projects would be minimal. When equipment such as the railcars at a site in this area are found to be contaminated with hazardous substances in concentrations presenting a material threat to human health and the environment, that threat will be mitigated. The net anticipated effect could be a positive contribution to cumulative environmental effects at the Hanford Site through removal, treatment, and disposal of such hazardous substances and contaminants of concern into a facility such as the ERDF that has been designed and legally authorized to safely contain such contaminants. The railcars removed under Alternative 3, with treatment such as macroencapsulation (of the lead-lined casks), will meet the ERDF waste acceptable criteria as described in WCH-191.</p> <p>The amount of waste that could be generated for disposal from Alternative 3 during this removal action period could be approximately 2,000 tons over the expected duration of this removal action (the removal action is scheduled for completion in 2011). All activities should take place within 1 year.</p> <p>Wastes generated during the proposed activities would be manageable within the capacities of existing facilities. For perspective, the ERDF received more than 700,000 tons of waste in calendar year 2008 and more than 430,000 tons in calendar year 2007 (ERDF waste database). Radiological contamination is expected to be within the acceptance criteria levels for ERDF disposal. The ERDF received approximately 22,500 Curies (Ci) in calendar year 2008 and approximately 13,000 Ci in calendar year 2007 (ERDF waste database).</p> <p>The activities addressed in this addendum represent an incremental increase in potential impacts previously identified in Section 5 of DOE/RL-2008-07, Revision 1. However, the cumulative impacts continue to be small when considered with those identified in the aforementioned DOE/RL-2008-07. Specifically, the waste generated from the buildings in the 212-N, -P and -R removal action represented approximately 24,000 tons (ERDF waste database) according to ERDF records. The added scope of rail car disposition (Alternative 2 and 3) represents an estimated 2,000 tons of waste. For Alternative 3, the cumulative 26,000 tons, is still small when compared with the 700,000 tons disposed in ERDF in calendar year 2008. Assuming no increase in ERDF disposal rates, the incremental increase would be 2,000 tons compared with 700,000 tons in a calendar year in 2035 or later.</p>
Mitigation	Considers whether, if adverse impacts cannot be avoided, response action planning should minimize them to the extent practicable. This value identifies required mitigation activities.	Compliance with the substantive requirements of the ARARs will mitigate potential environmental impacts on the natural environment, including migratory birds and endangered species. DOE has also established policies and procedures for the management of ecological and cultural resources when actions might affect such resources (DOE/RL-96-32; DOE/RL-96-88; DOE/RL-98-10). Cultural resource and biological species reviews/surveys are undertaken that also provide suggested migration activities to ensure adverse effects associated with implementing the actions are minimized or avoided. Health and safety procedures, documented in a Health and Safety Plan established by site contractors, would mitigate risks to workers from the removal activities.
Irreversible and Irrecoverable Commitment of Resources	<p>Considers the use of nonrenewable resources for the proposed response actions and the effects that resource consumption would have on future generations.</p> <p>(When a resource [e.g., energy minerals, water, wetland] is used or destroyed and cannot be replaced within a reasonable amount of time, its use is considered irreversible.)</p>	Alternative 1 will result in no usage of resources. For both Alternatives Two and Three, normal usage of resources during S&M and D4 activities, such as fuel and water, will be irreversibly used.

Note:

DOE/RL-93-99, *Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility*DOE-RL-94-41, *NEPA Roadmap for the Environmental Restoration Disposal Facility Regulatory Package*DOE/RL-96-32, *Hanford Site Biological Resources Management Plan*DOE/RL-96-88, *Biological Resources Mitigation Strategy*DOE/RL-98-10, *Hanford Cultural Resources Management Plan*DOE/RL-2008-07, *212-N, -P, and -R Facilities Engineering Evaluation/Cost Analysis*, Rev. 1WCH-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, Rev. 1

1 **5.5 Comparative Analysis of Alternatives**

2 Table 5-3 provides a comparative analysis of the removal action alternatives for the railcars.

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Table 5-3. Comparative Analysis of the Removal Action Alternatives for the Railcars.

EE/CA Alternative	Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost	Duration
Alternative 1: No Action	Does not protect human health and the environment	Does not comply with ARARs	Does not provide any measure of long-term effectiveness and permanence	N/A ^a	N/A ^a	N/A ^a	\$0	0 year
Alternative 2: Continued Surveillance with Future Decontamination, Deactivation, Decommissioning, and Disposal of the Railcars	Is protective of human health and the environment	Complies with ARARs	Does not provide immediate long-term effectiveness; delayed for 25 years	Does not reduce mobility during period of surveillance and maintenance (reduction of toxicity and mobility is equivalent to Alternative 3 when action is implemented)	Provides short-term effectiveness	S&M activities are ongoing at this time, so are already implemented	\$4,339,000	25 years
Alternative 3: Near Term Decontamination, Deactivation, Decommissioning, and Disposal of the Railcars	Is protective of human health and the environment	Complies with ARARs	Provides long-term effectiveness and permanence	Reduces toxicity and mobility through treatment of waste prior to disposal	Provides short-term effectiveness	Can be easily implemented	\$6,422,000	1 year

Note:

a. This alternative was not protective of human health and the environment and was not effective; therefore, it was not evaluated further.

6 Conclusions and Recommended Removal Action Alternative

The recommended removal action alternative for the railcars is Alternative 3: Near Term Decontamination, Deactivation, Decommissioning, and Demolition of the Railcars. Section 5.5, Table 5-3 provides a detailed comparative analysis of the alternatives.

Alternative 3 accomplishes the following:

- Adequately protects public health and the environment
- Complies with ARARs
- Meets the RAOs
- Is consistent with future remediation plans for the 200 North Area through the removal and permanent disposal of these sources of contamination
- Facilitates goals associated with ARRA funding
- Provides the best long-term effectiveness and reduction in toxicity and mobility of wastes, and is implementable.

The overall effectiveness is discussed in detail in Section 5 of the EE/CA and was not addressed further in this EE/CA addendum. The text includes discussion of the protection of human health and the environment (Section 5.1.1), waste management standards (Section 5.1.2.1), radiological air emissions (Section 5.1.2.2.1), and criteria/toxic air emissions (Section 5.1.2.2.2). No changes to these discussions are needed for incorporation of the action described in this addendum.

7 Project Schedule

After addressing public comments, a modification will be made to the existing DOE/RL-2008-80, and a revision will be issued. A removal action work plan (RAWP) will be developed to address in greater detail the work to disposition the railcars, which will include provisions for waste management and air monitoring for the selected alternative. A project schedule identifying key tasks will be included in the RAWP.

8 References

The following references are included as an addition to those specified in DOE/RL-2008-07, Rev.1.

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