DOE/RL-2010-54
Revision 0

Engineering Evaluation/Cost Analysis for 200 East Area Tier 2 Buildings/Structures

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

DOE/RL-2010-54
Revision 0

Engineering Evaluation/Cost Analysis for 200 East Area Tier 2 Buildings/Structures

Date Published
November 2010

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

U.S. DEPARTMENT OF
ENERGY
Richland Operations Office

P.O. Box 550
Richland, Washington 99352

J. D. Aardal 11/17/2010
Release Approval Date

Approved for Public Release;
Further Dissemination Unlimited

TRADEMARK DISCLAIMER

Printed in the United States of America

Executive Summary

This engineering evaluation/cost analysis (EE/CA) evaluates approaches to perform decontamination, deactivation, decommissioning, and demolition (D4) of Hanford Site buildings/structures identified as Tier 2 pursuant to the *Hanford Federal Facility Agreement and Consent Order Action Plan* (TPA Action Plan) (Ecology et al., 1989b)[1] Section 8.1.3 and is prepared for public comment. The scope of the EE/CA encompasses Tier 2 buildings/structures present in the 200 East Area on the Central Plateau of the Hanford Site. The evaluation assists the U.S. Department of Energy (DOE), Richland Operations Office (RL) in identifying the most effective means to disposition buildings/ structures that contain chemical and/or radiological contamination as a result of their missions. Appendix A lists the buildings/structures planned for D4 by DOE.

The method used to accomplish D4 activities is to perform a non-time-critical removal action (NTCRA) as authorized within the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA).[2] The evaluation and comparison of removal action alternatives are described in this EE/CA, with one alternative presented as the recommended alternative. This approach satisfies environmental review requirements, provides stakeholder involvement, and offers a framework for selecting the preferred alternative. In addition to the D4 of buildings/structures, this NTCRA provides a mechanism to dispose related waste in the Environmental Restoration Disposal Facility, or other appropriate disposal facility.

This NTCRA is consistent with the overall cleanup objectives established through *Hanford Federal Facility Agreement and Consent Order* (TPA) (Ecology et al., 1989a).[3] Completion of the NTCRA would place the identified buildings/structures in a condition protective of human health and the environment. Building/structure contents include, but are not limited to, structural materials, pumps, pipes, tanks, boilers, compressors, ductwork, electrical components, and other equipment. The types of waste that would

[1] 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=82.

[2] *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq. Available at: http://uscode.house.gov/download/pls/42C103.txt.

[3] 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=81.

require disposal include, but are not limited to, solid waste, low-level or transuranic (TRU) radioactive waste, beryllium, asbestos, radioactively-contaminated asbestos waste, heavy metals, and polychlorinated biphenyl waste.

Preparation of this EE/CA is consistent with the joint DOE and Environmental Protection Agency's *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)* (DOE and EPA, 1995),[4] which establishes the CERCLA NTCRA process as an approach for D4 of buildings/structures. This NTCRA serves to achieve progress toward completion of interim TPA Milestone M-085-60, "Complete Engineering Evaluation/ Cost Analysis report(s) for all Tier 2 facilities listed in Appendix J"[5] (Ecology et al., 1989a). Appendix J of the TPA Action Plan (Ecology et al., 1989b) contains the list of buildings/structures subject to Milestone M-085-60. The removal action alternatives presented are compared against the CERCLA criteria of effectiveness, implementability, and cost.

Three alternatives are under consideration for the disposition of buildings/structures:

- **Alternative 1: No Action.** This alternative assumes all short-term and long-term maintenance of the buildings/structures is terminated.
- **Alternative 2: Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures.** This alternative includes a 10-year period of surveillance and maintenance for all buildings/structures. After 10 years, a 5-year period of D4 and associated waste disposal activities would commence; surveillance and maintenance (S&M) activities would continue for those buildings/structures for which D4 has not yet begun.
- **Alternative 3: Near-Term Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures.** This alternative consists of near-term D4 of the buildings/structures and associated waste disposal. This assumes a 5-year

[4] DOE and EPA, 1995, *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, U.S. Environmental Protection Agency, and U.S. Department of Energy, Washington, D.C. Available at: http://www.epa.gov/fedfac/pdf/decommissioning_doe.pdf.
[5] Appendix J, *Central Plateau Facilities*, is the list of Central Plateau facilities that are anticipated to require a *Comprehensive Environmental Response, Compensation, and Liability Act* response action for cleanup.

period of D4 during which S&M activities would continue for those buildings/ structures for which D4 has not yet commenced.

Table ES-1 identifies the non-discounted and net present worth cost estimates for the three alternatives based on present-day (2010) dollars (estimates are based on the best available information on anticipated scope).

Table ES-1. Summary of Cost Estimates for the Alternatives

Alternative	Non-Discounted Cost	Net Present Worth Cost
Alternative 1: No Action	N/A*	N/A*
Alternative 2: Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures	$63,983,000	$50,040,000
Alternative 3: Near-Term Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures	$62,273,000	$61,730,000

Notes: Accuracy range of the cost estimate is expected to be -30 percent to +50 percent. No sensitivity analyses were performed and the following factors could impact the costs: (1) levels of contamination; (2) amount and type of equipment in the buildings; and (3) differing structural design.

*Alternative 1 is not consistent with DOE obligations under federal law to protect human health and the environment; therefore, this alternative cannot be considered viable and is not considered further in this EE/CA, but is included for comparative purposes only in the cost analysis. Although Alternative 1 would not have an associated implementation cost under this analysis, it is understood that taking no action would ultimately result in cost to DOE.

Buildings/structures would be demolished to slab-on-grade in order to minimize infiltration of rainwater to underlying soils. Below-grade structures or portions thereof may be left in place and backfilled using clean fill material. If contamination is encountered on remaining slabs or underground structures, RL would consult with the lead regulatory agency and determine whether to address the residual contamination within the scope of this NTCRA, or implement temporary measures as part of this action, and/or defer final action to the remedial investigation and remedy selection process by adding the site to the TPA Action Plan, Appendix C (Ecology et al., 1989b), in accordance with TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)" (RL-TPA-90-0001).[6]

[6] RL-TPA-90-0001, 2007, *Tri-Party Agreement Handbook Management Procedures*, Guideline Number TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)," Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/files.cfm/TPA-MP14.pdf.

Contents

Appendices

Figure

Tables

Terms

ACM	asbestos containing material
ARAR	applicable or relevant and appropriate requirement
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CWC	Central Waste Complex
D4	decontamination, deactivation, decommissioning, and demolition
DOE	United States Department of Energy
ECHOS	Environmental Cost Handling Options Solution
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ETF	Effluent Treatment Facility
LRA	lead regulatory agency
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
N/A	not applicable
NEPA	*National Environmental Policy Act of 1969*
NHPA	*National Historic Preservation Act of 1966*
NPL	National Priorities List
NTCRA	non-time-critical removal action
OMB	Office of Management and Budget
PCB	polychlorinated biphenyl
RAO	removal action objective
RCRA	*Resource Conservation and Recovery Act of 1976*
RL	U.S. Department of Energy, Richland Operations Office
ROD	record of decision
RTD	removal, treatment, and disposal
S&M	surveillance and maintenance
TPA	*Hanford Federal Facility Agreement and Consent Order*
TRU	transuranic
TSCA	*Toxic Substances Control Act of 1976*
WIDS	Waste Information Data System

1 Introduction

This engineering evaluation/cost analysis (EE/CA) has been prepared in accordance with the "National Oil and Hazardous Substances Pollution Contingency Plan" (NCP) (300.415[b][4][i], "Removal Action") and associated guidance. This EE/CA assists the U.S. Department of Energy (DOE) Richland Operations Office (RL) in identifying the most effective alternative for addressing the potential risk posed by the release or threat of release of hazardous substances from buildings/structures located within the 200 East Area of the Central Plateau on the Hanford Site.

The *Hanford Federal Facility Agreement and Consent Order Action Plan*, Section 8.1.3 (TPA Action Plan) (Ecology et al., 1989b), establishes a process for determining which buildings/structures on the Central Plateau should be dispositioned using the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). Buildings/structures identified for disposition pursuant to Section 8.1.3 of the TPA are categorized as either Tier 1 or Tier 2. The buildings/structures addressed by the scope of this EE/CA include those that are chemically and/or radiologically contaminated, but are not designated as Tier 1. Tier 2 buildings/structures (e.g., 209-East Criticality Mass Laboratory) are addressed in the TPA Action Plan and are defined as chemically and/or radiologically contaminated buildings/structures that require a CERCLA response action because of their potential for substantial threat of release of hazardous substances. Tier 1 buildings/structures (e.g., PUREX or B Plant Canyon) are generally large heavily shielded metal and concrete structures containing tanks, heavily shielded gloveboxes or hot cells, underground vaults, piping, etc, that are integral to the building structure which pose a threat of release of hazardous substances to the environment during disposition. Appendix A lists the buildings/structures evaluated in this EE/CA.

The non-time-critical removal action (NTCRA) proposed in this EE/CA is consistent with the joint DOE and the U.S. Environmental Protection Agency's (EPA) *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)* (DOE and EPA, 1995), which establishes the CERCLA NTCRA process as the preferred approach for disposition of surplus DOE facilities. Under the joint policy, a NTCRA may be taken when DOE determines that the action would prevent, minimize, stabilize, or eliminate a risk to human health and the environment. DOE is authorized to evaluate, select, and implement the removal action that DOE determines is most appropriate to address the potential risk posed by the release or threat of release of hazardous substances. This policy states in part:

> "*Although the full range of CERCLA response actions may be applicable to decommissioning activities, NTCRAs (non time critical removal actions) should be used for decommissioning, consistent with this Policy. The alternative approaches available to conduct decommissioning projects typically are clear and very limited. This often will eliminate the need for the more thorough analysis of alternatives required for remedial actions. NTCRA requirements provide greater flexibility to develop decommissioning plans that are appropriate for the circumstances presented. Statutory time and dollar limits on removal actions do not apply to removal actions conducted by DOE, which increases the scope of projects that may be addressed by DOE removal action. Most importantly, NTCRAs usually will provide benefits to worker safety, public health, and the environment more rapidly and cost effectively than remedial actions. For these reasons, DOE may exercise removal action authority to conduct decommissioning whenever such action is authorized by CERCLA, the NCP, and Executive Order 12580.*"

Performance of this removal action would place the buildings/structures in a configuration that is protective of human health and the environment. Without action, these buildings/structures pose a threat of release of hazardous substances to the environment. As the lead agency, DOE has determined that a removal action is an appropriate means to mitigate and/or eliminate the threat of release of hazardous substances from the Tier 2 buildings/structures. The Washington State Department of Ecology (Ecology) and EPA concur that a NTCRA is warranted to place these buildings/structures in a configuration that is protective of human health and the environment. This NTCRA would, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action, as required by the NCP (40 CFR 300.415[d], "Removal Action").

Under DOE's *National Environmental Policy Act of 1969* (NEPA) compliance program (DOE O451.1B, *National Environmental Policy Act Compliance Program*, Section 5.a.[13]), DOE will "…incorporate NEPA values, such as analysis of cumulative, offsite, ecological, and socioeconomic impacts, to the extent practicable, in DOE documents prepared under CERCLA." A discussion of NEPA values is included in Section 5.5 of this document.

Removal actions taken pursuant to this EE/CA would be conducted in accordance with the *Hanford Site Tri-Party Agreement Public Involvement Community Relations Plan* (Ecology et al., 2002), public participation requirements established in the NCP (40 CFR 300.415[n], "Removal Action"), and any applicable DOE policies. After the 30-day public comment period, a written response to significant comments will be provided in accordance with the NCP (40 CFR 300.820[a], "Administrative Record File for a Removal Action").

Following consideration of comments received during the public review period, an Action Memorandum(s) documenting the selected alternative will be issued by DOE, with concurrence from the lead regulatory agency (LRA), and issued to the Administrative Record. The Action Memorandum(s) for this removal action will address public comments, publish the selected alternative, and serve as the authorization to proceed with decontamination, deactivation, decommissioning, and demolition (D4) activities. Following approval of the Action Memorandum(s), a Removal Action Work Plan(s) (RAWP) will be developed, including a Waste Management Plan(s) and Air Monitoring Plan(s), which will support D4 activities and associated waste disposal. To support characterization of the building/structures D4 rubble, a Sampling and Analysis Plan(s) (SAP) also will be prepared in conjunction with the RAWP(s). As the lead regulator for this action, Ecology will approve the RAWP(s) and SAP(s). The SAP(s) will also be submitted to EPA for approval.

1.1 Purpose and Scope

The purpose of this document is to present the results of an evaluation of alternatives for D4 of buildings/structures identified as Tier 2 pursuant to the TPA Action Plan, Sections 8.1.3 and 8.1.4 (Ecology et al., 1989b). This NTCRA serves to achieve progress toward completion of TPA Milestone M-085-60, "*Complete Engineering Evaluation/Cost Analysis report(s) for all Tier 2 facilities listed in Appendix J*"[1] (Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent Order* [TPA]).

[1] Appendix J, *Central Plateau Facilities*, is the list of Central Plateau facilities that are anticipated to require a *Comprehensive Environmental Response, Compensation, and Liability Act* response action for cleanup.

The list of buildings/structures addressed by this NTCRA is provided in Appendix A. Each building/structure identified was evaluated using a graded approach to establish its designation as Tier 2, based on the presence of hazardous substances that could be released to the environment. The buildings/structures addressed by this NTCRA are not generally heavily shielded metal and concrete structures containing tanks, heavily shielded glove boxes or hot cells, underground vaults, piping and so forth, that are integral to the structure, which pose a threat of release of hazardous substances during disposition (such buildings/structures will be dispositioned as Tier 1 facilities). This document constitutes the "Facility Evaluation," as required by TPA Action Plan Section 8.1.4, "Disposition Documentation" (Ecology et al., 1989b), for the buildings/structures addressed by this NTCRA.

DOE may need to disposition other Hanford Site buildings/structures with similar characteristics, contaminants, and complexity to those identified in Appendix A. Any future Tier 2 candidate buildings/structures in the 200 East Area will be evaluated in accordance with TPA Section 8.1.4 for potential addition to the scope of this NTCRA. Buildings/structures determined to qualify as Tier 2 will be added to Appendix J of the TPA Action Plan (Ecology et al., 1989b) and the Action Memorandum(s) issued as a result of this EE/CA. If buildings/structures are removed from the scope of this NTCRA, concurrence from the LRA would first be obtained, and documentation would be placed in the Administrative Record for this NTCRA identifying the building or structure and explaining why it is being added to or deleted from the NTCRA; Appendix J would be revised to address the change.

Waste materials generated during D4 activities include, but are not limited to: radiologically and/or chemically contaminated structural and construction materials such as wood, metal, roofing, siding, gypsum, and concrete block and equipment such as pumps, pipes, tanks, containers, boilers, compressors, ductwork, and electrical components. The preferred location for disposal of waste is the Environmental Restoration Disposal Facility (ERDF). However, waste treatment and/or disposal may take place at other facilities that are on the Hanford Site or that are offsite and have been authorized by their own EPA regional offices in accordance with the NCP (40 CFR 300.440, "Procedures for Planning and Implementing Off-Site Response Actions") as suitable to receive waste from CERCLA sites.

Buildings/structures would be demolished to slab-on-grade in order to minimize infiltration of rainwater to underlying soils. Below-grade structures or portions thereof may be left in place and backfilled using clean fill material. If evidence of contamination to surrounding soils is encountered during D4 activities, those soils would be excavated and disposed at an appropriate Hanford Site or offsite disposal facility in accordance with the waste acceptance criteria of the facility. Alternatively, if the soil contamination is extensive, or unusually complex, or if contamination is encountered on remaining slabs or underground structures, DOE would consult with the LRA and determine whether to address the residual contamination within the scope of this NTCRA, or implement temporary measures as part of this action and defer final action to the remedial investigation and remedy selection process by adding the site to the TPA Action Plan, Appendix C (Ecology et al., 1989b) in accordance with TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)" (RL-TPA-90-0001).

2 Site Characterization

This section provides summary background information and a description of the area where D4 activities would occur, and additional information relevant to the scope of this NTCRA. This section also provides a summary of the hazardous substances that could be encountered while conducting D4 activities.

2.1 Site Description and Background

The buildings/structures in the scope of this NTRCA are located in an industrial area of the Hanford Site. The 200 East Area of the Central Plateau on the Hanford Site, depicted in Figure 2-1, contains the buildings/structures addressed by this NTRCA. Appendix A presents a list and brief descriptions of the buildings/structures.

2.1.1 Physical Setting

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, which is located between the 200 East and 200 West Areas, and other locations throughout the Hanford Site. The range of average daily maximum temperatures vary from an average winter high of 2°C (35°F) in late December and early January to 35°C (95°F) in late July (PNNL-6415, *Hanford Site National Environmental Policy Act (NEPA) Characterization*). Most precipitation occurs during late autumn and winter, with more than half of the annual amount occurring from November through February.

2.1.2 Anticipated Future Land Use

Proposed alternatives for future land use have been described in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (HPC EIS, DOE/EIS-0222-F). Land use designations, including Industrial, Industrial-Exclusive, and Preservation, were adopted in the 1999 DOE record of decision (ROD) (64 Federal Register 61615, “Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement”). A *Supplement Analysis: Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE/EIS-0222-SA-01) and an amended ROD issued in 2008 (73 Federal Register 55824, “Amended Record of Decision for the Hanford Comprehensive Land-Use Plan Environmental Impact Statement”) supported the conclusions and clarified the decisions published in the 1999 ROD. The Future Site Uses Working Group (Drummond, 1992, *The Future for Hanford: Uses and Cleanup: The Final Report of the Hanford Future Site Uses Working Group*) and the Exposure Scenario Task Force also are sources for additional guidance on land use.

2.1.3 Ecological Resources

The land area around the buildings/structures addressed by this NTCRA has been disturbed from building and parking lot construction activities. Because most of the proposed action would occur in previously disturbed areas, the potential for effects on sensitive ecological resources is expected to be minimal. Ecological reviews would be conducted before work begins to identify areas where there is a potential for adverse impacts to sensitive or rare biological resources, consistent with existing routine procedures (DOE/RL-95-11, *Ecological Compliance Assessment Management Plan*).

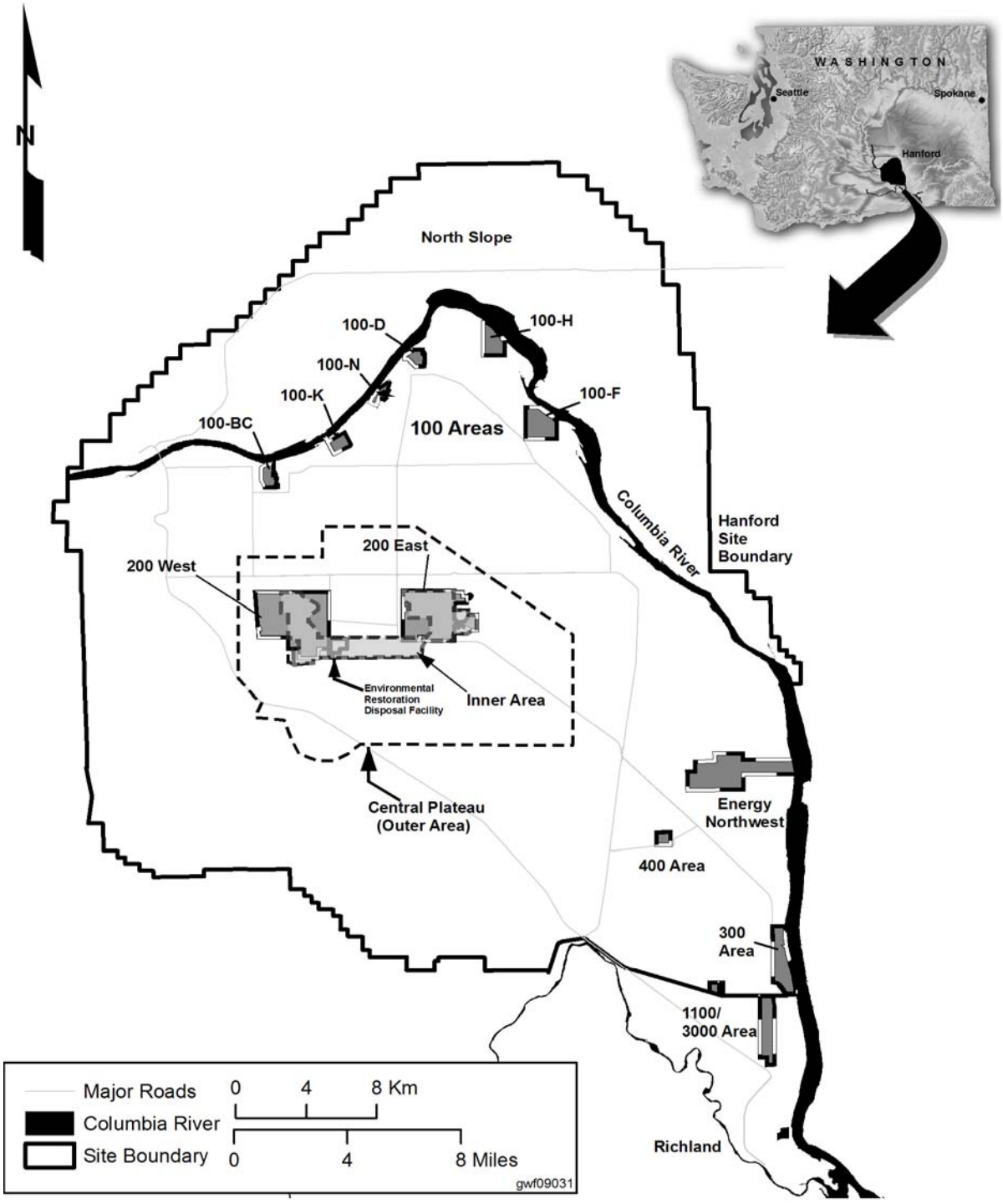

Figure 2-1. Hanford Site and the Central Plateau

The buildings/structures have the potential to support nesting by migratory birds; therefore, building-specific surveys must be conducted at each building/structure prior to commencement of D4 activities. Project engineers would consult with the ecological compliance staff well in advance of planned D4 activities to allow for sufficient surveys. If nesting migratory birds are observed, D4 activities would be delayed until after the end of the nesting season. Many of the buildings/structures also have the potential to provide roosting habitat for various species of bats. Communal roost sites for many bat species are considered a high conservation priority for the Washington Department of Fish and Wildlife. Surveys for bats (if any are found) would be performed at each building/structure prior to commencement of D4 activities, and appropriate mitigation would be developed in consultation with qualified bat biologists. Spring and summer are the preferred seasons to survey for bats. No plant or animal species listed as threatened or endangered under the federal *Endangered Species Act of 1973*, or candidates for such protection, are known to be in the vicinity of the buildings/structures slated to undergo D4. Very little native or natural habitat is present in the vicinity of the buildings/structures slated to undergo D4. However, care will be taken to avoid or minimize damage to any native vegetation, especially shrubs that are in the vicinity of the buildings/structures. Workers would also be directed to avoid all wildlife that may be found in and around the buildings/structures.

Impacts on ecological resources would 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*.

2.1.4 Cultural Resources

A *National Historic Preservation Act of 1966* (NHPA) Section 106 cultural resource review would be conducted to address D4 activities. The D4 activities would be performed in areas that have been extensively disturbed by past construction activities. Before field activity begins, each building/structure requiring documentation would be evaluated for: (1) the type of documentation required for each building and structure (Historic Property Inventory Form or Expanded Historic Property Inventory Form); and (2) the status of that documentation. In addition, as appropriate, walkthroughs of the buildings/structures would be conducted before demolition to finalize all mitigation requirements. Cultural resource review documentation for any specific building/structure would be finalized before D4 activities begin. Tagged artifacts, if identified, would be removed for long-term curation prior to the start of D4 activities. At the time of removal, assessments would be made regarding options and feasibility of long-term curation of tagged artifacts.

Hanford Site buildings/structures have been evaluated for their National Register of Historic Places eligibility as part of DOE/RL-97-56, *Manhattan Project and Cold War Era Historic District Treatment Plan*. Some buildings/structures have been determined to be contributing properties to the Manhattan Project/Cold War Era Historic District with mitigation in the form of documentation required. DOE/RL-97-56 also requires that walkthroughs be completed of these buildings/structures to identify artifacts that are of educational and interpretive value.

2.2 Previous Investigations and Removal Actions

Various soil and groundwater investigations have been conducted within the 200 East Area on the Central Plateau of the Hanford Site. None of these investigations, however, were related to the buildings/structures addressed by this NTCRA. No previous removal actions have been performed on the buildings/structures addressed by this NTRCA.

2.3 Source, Nature, and Extent of Contamination

The buildings/structures are, to different degrees, contaminated with both radioactive and chemical substances used or generated during facility operations and waste management activities. Some hazardous substances have been, or will be, removed from the buildings/structures as part of routine surveillance and maintenance (S&M) activities. Resources such as historical information, process knowledge, radiological survey reports, occurrence reports, assessment reports, personnel interviews, characterization reports, vulnerability assessments, inspections, walkdowns, and knowledge of construction and other materials will be used to characterize the nature and extent of remaining hazardous substances (for example, within equipment, piping/drains, and so forth) to facilitate D4 and associated waste disposal, as well as to document post-demolition conditions for future decision-making. Sampling will be performed as part of this NTCRA in accordance with a SAP. As the lead regulator for this action, Ecology will approve the SAP. The SAP will also be submitted to EPA for approval.

2.3.1 Radiological Hazards

The primary hazardous substances associated with the buildings/structures are radioactive materials. Key radionuclide contaminants include, but are not limited to, uranium-234, uranium-235, uranium-238, plutonium-239/240, americium-241, and mixed fission products such as strontium-90, cesium-137, cobalt-60, europium-152, europium-154, and europium-155. The majority of contaminants are found in the form of adherent films and residues within the buildings/structures.

2.3.2 Chemical Hazards

The buildings/structures will contain some friable and/or nonfriable asbestos in the form of insulation and ductwork, which will be confirmed through process knowledge and/or sampling and analysis. In addition, the buildings/structures may include, but are not limited to, one or more of the following materials.

- Polychlorinated biphenyls (PCBs)
- Beryllium
- Lead paint and lead shielding
- Mercury switches, gauges, and thermometers
- Mercury or sodium vapor lights
- Incandescent light bulbs
- Used oil from motors and pumps
- Chemicals
- Emergency light batteries
- Refrigerants
- Other heavy metals (for example, arsenic, cadmium, uranium, etc.)

2.4 Risk Evaluation and Site Conditions Justifying a Removal Action

The buildings/structures addressed by this NTCRA are contaminated with hazardous substances including radiological contaminants, heavy metals, PCBs, beryllium, and asbestos. The buildings/structures were used for radiological and chemical processing activities and some contain significant inventories of hazardous substances that would present an increased threat to human health and the environment if not addressed.

Contaminants could be released directly to the environment through a fire, breach in a utility pipe, containment wall, roof, or building collapse as the buildings/structures age and deteriorate. Contaminants could also be released to the environment indirectly through animal and human intrusion. Historically, intrusion and spread of contamination by rodents, insects, birds, and other organisms has and continues to be a factor.

In general, the risk of an accidental release (for example, from a structural failure) increases the longer the buildings/structures remain in the S&M Program awaiting D4. The risk from the buildings/structures would increase with time because of the potential for inventory releases from structure degradation.

The radiological contamination and the large quantity of ACM present a sufficient threat of release to the environment under a continued S&M scenario to justify a NTCRA.

3 Identification of Removal Action Objectives

The RAOs for this NTCRA are to perform D4 in a manner that would, to the extent practicable, support the long-term and final cleanup goals for the 200 Area National Priorities List (NPL) site. The following RAOs were developed to complete this scope:

- RAO 1: Protect human and ecological receptors from exposure to contaminants above acceptable exposure levels.
- RAO 2: Reduce/eliminate the inventory of hazardous/radioactive substances.
- RAO 3: Facilitate and, to the extent practicable, be consistent with anticipated remedial actions at the Hanford Site, while expediting actions to reduce the Hanford Site footprint.
- RAO 4: Prevent adverse impacts to cultural resources or threatened or endangered species, and minimize wildlife habitat disruption.
- RAO 5: Safely treat, as appropriate, and dispose of waste streams generated.
- RAO 6: Reduce or eliminate the need for future S&M activities.

It should be noted that the numbering of these RAOs does not signify ranking or prioritization.

4 Identification of Removal Action Alternatives

The removal action alternatives must be protective of human health and the environment and otherwise meet the RAOs. Three removal action alternatives were identified for evaluation:

- Alternative 1: No Action
- Alternative 2: Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures
- Alternative 3: Near-Term Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures

4.1 Alternative 1: No Action

Under Alternative 1, it is assumed that the buildings/structures would be abandoned without any further action. S&M activities would be discontinued and degradation would continue indefinitely. Alternative 1 is not consistent with DOE obligations under federal law to protect human health and the environment; therefore, this alternative cannot be considered viable and is not considered further in this EE/CA, but is included for comparative purposes only in the cost analysis. Although Alternative 1 would not have an associated implementation cost under this analysis, it is understood that taking no action would ultimately result in cost to DOE. Under Alternative 1, access is assumed to be unrestricted. Potential radiological hazards would continue to exist because controls to prevent access would not be maintained. Initial risks of Alternative 1 are minimal to the environment, provided there are no significant weather or fire events. Risks over time are expected to increase, as deterioration progresses and structural integrity is compromised. The potential for adverse consequences would increase as hazardous substance exposure increases. This alternative is used as a baseline for comparison only.

4.2 Alternative 2: Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures

Under Alternative 2, S&M activities would continue for the next 10 years. After 10 years, a 5-year period of D4 and associated waste disposal activities would commence; S&M activities would continue as needed. S&M activities would include access control, periodic monitoring for potential radiological contamination and other hazards, maintenance, and general visual inspections. Additionally, limited decontamination and application of fixatives would occur to control the spread of contamination. Alternative 2 would merely result in a delay of the start of D4 activities and would require expenditures for the continued S&M, and periodic inspections over the interim period.

4.3 Alternative 3: Near-Term Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures

Alternative 3 consists of near-term D4 of the buildings/structures and associated waste disposal. This assumes a 5-year period (for cost estimate comparison purposes) of D4 during which S&M activities would be ongoing. Alternative 3 would ensure that any hazardous substances are placed in a protective and safe condition for the foreseeable future, without the need for ongoing S&M activities. This alternative would include the following primary D4 elements:

- Deactivate buildings/structures, as appropriate, by removing hazardous substances, as necessary from within and around the buildings/structures.
- Plug or grout piping and/or drains entering or exiting buildings/structures below grade, as needed, to prevent potential pathways to the environment.
- Decontaminate, fix contamination, and isolate systems, as needed.
- Remove equipment.
- Demolish each building/structure to grade or below, as appropriate.
- Deactivate remaining below-grade structures (for example, basements, utilities), remove and/or fill void spaces.
- Backfill sub-grade structures with uncontaminated controlled density fill or other suitable material.
- Package and ship waste to ERDF (or other approved Hanford Site or offsite disposal facility) for treatment (as needed) and disposal.
- Characterize the nature and extent of remaining hazardous substances (for example, within areas including, but not limited to, equipment, piping/drains, and so forth) to facilitate D4 and associated waste disposal, as well as to document post-demolition conditions for future decision-making.
- Stabilize the area (for example, backfill, contour, revegetate, and so forth) as needed.
- Initiate the waste site evaluation process for components such as slabs or soil contamination areas that may potentially require further work under a separate response action.

Demolition would require the use of heavy equipment (for example, excavator with various attachments). Other standard industry practices for demolition would also be used (for example, mechanical saws, cutting torches, or explosives). Below-grade structural components such as basements would preferentially be left intact (with penetrations secured or blanked), and backfilled with inert material, as appropriate. If warranted, below-grade structures and/or related equipment may be removed to facilitate other D4 activities surrounding the area or as deemed necessary by DOE to support overall cleanup goals and priorities.

If evidence of contamination to surrounding soil is encountered that is directly associated with the structure being removed or that resulted directly from the demolition activity, those soils would be excavated and disposed at ERDF in accordance with ERDF waste acceptance criteria. ERDF is the preferred disposal location because ERDF is an engineered facility that provides a high degree of protection to human health and the environment. Historically it has been shown that this disposal option is more cost effective than disposal at other waste disposal sites. Construction of ERDF was authorized using a separate CERCLA ROD (EPA, 1995, *Record of Decision U.S. DOE Hanford Environmental Restoration Disposal Facility, Hanford Site, Benton County, Washington*). ERDF is designed to meet technological requirements for *Resource Conservation and Recovery Act of 1976* (RCRA) landfills, including standards for a double liner, a leachate collection system, leak detection, monitoring, and a final cover. However, waste treatment and/or disposal may take place at other facilities that are on the Hanford Site or that are offsite and have been authorized by their own EPA regional offices in accordance with the

NCP (40 CFR 300.440, “Procedures for Planning and Implementing Off-Site Response Actions”) as suitable to receive waste from CERCLA sites.

Alternatively, if soil contamination is extensive, or unusually complex, the site may be identified as a potential new waste site and evaluated in accordance with approved practices and procedures for inclusion and management/cleanup in accordance with RL-TPA-90-0001.

5 Alternative Analysis

Alternatives have been evaluated with respect to three primary criteria: effectiveness, implementability, and cost. Sub-criteria are also used in the following evaluation process.

Primary Criteria for Evaluating Alternatives

	Sub Criteria
Effectiveness	a. Protectiveness: i. Protectiveness of the alternative for public health and the community ii. Protectiveness of workers during implementation iii. Protectiveness of the environment iv. Compliance with applicable or relevant and appropriate requirements (ARARs) b. Ability to meet the RAOs
Implementability	a. Technical feasibility b. Availability of equipment c. Personnel, services, and disposal facilities d. Administrative feasibility
Cost	No Sub-Criteria. Costs are estimated and include: • Capital costs • Operational and maintenance costs

Public acceptance of the recommended alternative will be considered after the public has had an opportunity to review and comment on the EE/CA.

Sections 5.1 through 5.3 provide an analysis of the alternatives being considered for this NTCRA. Section 5.4 provides a summary of the comparative analysis of the alternatives, indicating relative rankings. This analysis provides the rationale for identifying the recommended removal action alternative. As discussed in Section 4.1, the No Action Alternative (Alternative 1) is not consistent with DOE obligations under federal law to protect human health and the environment; therefore, this alternative cannot be considered viable and is not considered further in this EE/CA, but is included for comparative purposes only in the cost analysis. Although Alternative 1 would not have an associated implementation cost under this analysis, it is understood that taking no action would ultimately result in cost to DOE. Section 5.5 provides an evaluation of the NEPA values considered for the removal action alternatives.

5.1 Effectiveness of the Alternatives

The two sub-criteria for evaluating effectiveness are protectiveness and the ability to meet the RAOs.

5.1.1 Protectiveness

Protectiveness is the primary objective of a removal action and is a threshold criteria that must be met to consider an alternative. As discussed in Section 2.4, as the buildings/structures continue to age, the threat of substantial release of hazardous substances increases with time, and confining these materials from release to the environment becomes more difficult. The S&M and periodic inspection activities required to confine the hazardous substances may increase the risk of potential exposure to personnel. Alternative 3 would permanently mitigate the hazards. Alternative 2 would delay D4 activities. Although both Alternatives 2 and 3 are protective of human health and the environment, Alternative 3 is considered the most protective, as it would eliminate the hazards and preclude the threat of a release during the period of continued S&M.

Alternatives 2 and 3 would meet the ARARs identified in Appendix B.

5.1.2 Ability to Achieve RAOs

Alternatives 2 and 3 are both considered to achieve the RAOs. Alternative 3 would achieve the RAOs by removing and disposing of materials contaminated with hazardous substances. Alternative 2 would prevent unacceptable exposures through administrative and physical controls, followed by future D4 to mitigate the hazards.

5.2 Implementability of the Alternatives

Implementability is evaluated based on technical and administrative feasibility and availability of equipment, personnel, services, and disposal facilities.

5.2.1 Technical and Administrative Feasibility

Alternatives 2 and 3 are both technically feasible. However, Alternative 2 would defer D4 activities by 10 years as compared to near-term D4 under Alternative 3. After 10 years, D4 could result in increased hazards from degradation and the work could be more complex, as buildings/structures continue to age and deteriorate.

Alternatives 2 and 3 are both administratively feasible. The methods for performing these activities can be planned and engineered using existing available knowledge and procedures that have been performed at the Hanford Site or elsewhere. ERDF is anticipated to be available for “onsite” disposal of most or all of the waste to be generated by the activities. Use of the NTCRA process is an appropriate means to document the work, provide for public involvement, and obtain requisite approvals to perform the work.

5.2.2 Availability of Equipment, Personnel, and Services

Equipment to support both Alternatives 2 and 3 is either available at the Hanford Site or commercially available. Front-end loaders and trackhoes with processor end-effectors are available at the Hanford Site, as are transport trucks. Cranes capable of heavy lifts are also available or are commercially available. Advanced cutting methods are available for cutting contaminated equipment. Trained personnel are available to perform both Alternatives 2 and 3. Disposal and recycling services are available for the types of waste expected to be generated under Alternative 3 on or off the Hanford Site.

5.3 Cost of the Alternatives

Cost estimates have been prepared for the alternatives evaluated in this EE/CA. The estimates were prepared in accordance with *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (EPA/540-R-00-002), along with DOE's *Cost Estimating Guide* (DOE G 430.1-1).

Table 5-1 shows the cost estimate for the three alternatives, starting from a present-day, non-discounted cost, also called constant dollars. Alternative 1 is not consistent with DOE obligations under federal law to protect human health and the environment; therefore, this alternative is not considered viable. Although Alternative 1 is not considered further in this EE/CA, it is included for comparative purposes in this cost analysis. Non-discounted costs are not affected by general price inflation (i.e., they represent "units of stable purchasing power"); thus, the cost of a particular product or service would be the same in Year 0, Year 1, Year 2, and so forth. The non-discounted cost essentially assumes that the work is performed today. Because non-discounted costs do not reflect the changing value of money over time, presentation of this information under CERCLA is for information purposes only, not for response action alternative selection purposes.

Table 5-1. Summary of Cost Estimates for the Alternatives

Alternative	Non-Discounted Cost	Net Present Worth Cost
Alternative 1: No Action	N/A*	N/A*
Alternative 2: Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures	$63,983,000	$50,040,000
Alternative 3: Near-Term Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures	$62,273,000	$61,730,000

Notes: Accuracy range of the cost estimate is expected to be -30 percent to +50 percent. No sensitivity analyses were performed and the following factors could impact the costs: (1) levels of contamination; (2) amount and type of equipment in the buildings; and (3) differing structural design.

*Alternative 1 is not consistent with DOE obligations under federal law to protect human health and the environment; therefore, this alternative cannot be considered viable and is not considered further in this EE/CA, but is included for comparative purposes only in the cost analysis. Although Alternative 1 would not have an associated implementation cost under this analysis, it is understood that taking no action would ultimately result in cost to DOE.

Consistent with guidance from EPA and the U.S. Office of Management and Budget (OMB), present-worth analysis is used as the basis for comparing costs of cleanup alternatives under the CERCLA program (OMB Circular No. A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs"). A discount rate (OMB Circular No. A-94) is applied for cost estimates that span multiple years, making it possible to evaluate expenditures associated with alternatives that occur during different periods (EPA/540-R-00-002). Because of the time-dependent value of money, future expenditures are not considered directly equivalent to current expenditures. The present-worth cost method shows the amount required at the initial point in time (e.g., in the current year) to fund activities occurring over the life of the alternative. Present-worth analysis assumes that the funding set aside at the initial point in time

increases in value as time goes on, similar to how money placed in a savings account gains in value because of interest paid on the account. Although the federal government typically does not set aside funds in this manner, the present-worth analysis is specified under CERCLA as the approach for establishing a common baseline to evaluate and compare alternatives that have costs occurring at different times, although actual costs could vary. While the funds might not actually be set aside, the present-worth costs were considered directly comparable for evaluating the costs of the alternative.

The information in the cost estimate is based on the best available information regarding the anticipated scope of the removal action alternatives. Changes in the cost elements are likely to occur because of new information and data collected during preparation and performance of the removal action. Consistent with EPA guidance, this is an order of magnitude engineering cost estimate that was developed to be within -30 percent to +50 percent of actual project cost.

The reported estimates are based on costs derived using Remedial Action Cost Estimate Requirement (RACER)™ 2010, Version 10.3 and actual pricing information obtained from historical experience, vendor quotes, CHPRC estimates, and standard commercial databases, such as RS Means (*Building Construction Cost Data* [Means, 2010a]), Environmental Cost Handling Options Solution (ECHOS) *Facilities Construction Cost Data* (Means, 2001), and *Heavy Construction Cost Data* (Means, 2010b).

5.3.1 Cost Estimate Rationale

Alternative 1 is presented with “no cost” solely in the context of no action being taken with respect to the potential threat posed by the buildings/structures. In reality, if no action were taken, cost would nevertheless ultimately be incurred in terms of adverse impacts to human health and the environment, and possibly more costly actions in the future.

For Alternative 2, 10 years of S&M are expected, followed by D4 of buildings/structures. It is expected that D4 of the 57 structures would take approximately 5 years. The cost estimate assumes $3,000/year per building/structure, for each of the 10 years of S&M. Because the actual D4 schedule has not been created to date, for estimating purposes, an additional 2.5 years of S&M was assumed for each of the buildings/ structures in addition to the capital cost during D4.

For Alternative 3, it was assumed that the D4 activities will start immediately. The D4 activities are assumed to take approximately 5 years. Because an actual D4 schedule has not been created to date for the buildings/structures, for estimating purposes, an additional 2.5 years worth of S&M was assumed for each of the buildings/structures in addition to the capital cost during D4.

Table 5-2 presents cost estimate (discounted and non-discounted) and waste disposal quantity information by building/structure for Alternatives 2 and 3, respectively.

™ Remedial Action cost Estimate Requirement (RACER)™ is a trademark of AECOM.

5.4 Comparative Analysis of Alternatives

Table 5-3 presents a comparative analysis summary of the three removal action alternatives based on the criteria presented in Sections 5.1, 5.2, and 5.3. Table 5-3 indicates “no cost” for Alternative 1 solely in the context of literally taking no action with respect to the threat. In reality, if no action were taken, cost would nevertheless ultimately be incurred in terms of adverse impacts to human health and the environment, and possibly more costly actions in the future.

5.5 NEPA Values

In accordance with DOE O 451.1B, DOE CERCLA decision documents are required to incorporate NEPA values (for example, analysis of cumulative, offsite, ecological, cultural, and socioeconomic impacts) to the extent practicable.

Table 5-4 describes the NEPA values (that is, resource area and relevant NEPA considerations) most pertinent to and potentially affected by the removal action alternatives identified in this NTCRA, except the No Action Alternative (Alternative 1). As noted in Section 4.1 and Chapter 5, Alternative 1 is included in the EE/CA for cost comparison only, and is not a viable alternative. Therefore, NEPA values are not considered for Alternative 1.

Table 5-2. Detailed Cost and Waste Quantity Summary Information by Building/Structure

Building/Structure Number and Title		Estimated Cost and Waste Quantity				
		Alternative 2		Alternative 3		Estimated Waste Quantity
		Discounted	Non-Discounted	Discounted	Non-Discounted	Tons
203A	Acid Pump House	$3,440,000	$4,412,000	$4,340,000	$4,382,000	9,778
206A	Vacuum Acid Fractionator Building	$1,640,000	$2,105,000	$2,060,000	$2,075,000	4,148
209E	Critical Mass Laboratory (including the 296P031 Stack)	$8,200,000	$10,522,000	$10,400,000	$10,492,000	12,581
212A	Fission Product Loadout Station	$780,000	$1,001,000	$960,000	$971,000	2,918
212B	Fission Product Loadout, Cask Transfer Building	$3,630,000	$4,651,000	$4,580,000	$4,621,000	25,244
213A	Fission Product Load-in Station	$140,000	$170,000	$140,000	$140,000	1,792
216A	Valve Control Facility	$90,000	$109,000	$80,000	$79,000	18
221BB	Process Steam and Condensate Building	$140,000	$171,000	$140,000	$141,000	878
221BC	SWP Change House	$230,000	$291,000	$260,000	$261,000	464
221BD	Laundry Storage Building	$150,000	$192,000	$160,000	$162,000	1,365
221BF	Condensate Effluent Discharge Facility at B Plant	$320,000	$404,000	$370,000	$374,000	144
221BK	B Plant Canyon Exhaust Instrumentation Building	$280,000	$350,000	$320,000	$320,000	2,988
222B	Office Building/Laboratory	$1,990,000	$2,547,000	$2,490,000	$2,517,000	4,929
225BA	K1 Filter Pit Encapsulation Facility	$200,000	$251,000	$220,000	$221,000	386
225BB	K3 Filter Pit Encapsulation Facility	$230,000	$287,000	$250,000	$257,000	39

Table 5-2. Detailed Cost and Waste Quantity Summary Information by Building/Structure

Building/Structure Number and Title		Estimated Cost and Waste Quantity				
		Alternative 2		Alternative 3		Estimated Waste Quantity
		Discounted	Non-Discounted	Discounted	Non-Discounted	Tons
225BF	WESF Tanker Loadout Station	$150,000	$188,000	$160,000	$158,000	331
225E	TEDF Pump Station 2	$350,000	$439,000	$410,000	$409,000	1,583
241C801	Cesium Load-Out Facility	$960,000	$1,224,000	$1,180,000	$1,194,000	3,478
241CR271	Cold Chemical Makeup Building	$2,010,000	$2,579,000	$2,530,000	$2,549,000	2,986
241CX40	Grout Removal Building	$260,000	$335,000	$300,000	$305,000	413
242B	Radioactive Particle Research Laboratory	$2,910,000	$3,730,000	$3,670,000	$3,700,000	3,708
242BL	Cask Loading Building	$660,000	$841,000	$800,000	$811,000	1,400
252AB	Electrical Substation	$320,000	$407,000	$370,000	$377,000	3,425
252AC	Electrical Substation	$40,000	$51,000	$20,000	$21,000	126
2707AR	Sludge Vault Change House	$160,000	$205,000	$170,000	$175,000	1,551
2711A	Air Compressor Building	$120,000	$148,000	$120,000	$118,000	987
2716B	RM Checkout Station, RR Tunnel	$80,000	$104,000	$70,000	$74,000	646
271B	B Plant Support Building	$7,060,000	$9,066,000	$8,960,000	$9,036,000	76,482
271CR	Control Building	$1,790,000	$2,296,000	$2,250,000	$2,266,000	416
276A	Cold Solvent Storage Building, R Cell	$1,510,000	$1,929,000	$1,880,000	$1,899,000	294
276C	Solvent Handling Building	$530,000	$670,000	$630,000	$640,000	27,368
291AB	Exhaust Air Sampler House	$40,000	$51,000	$20,000	$21,000	10

Table 5-2. Detailed Cost and Waste Quantity Summary Information by Building/Structure

Building/Structure Number and Title		Estimated Cost and Waste Quantity				
		Alternative 2		Alternative 3		Estimated Waste Quantity
		Discounted	Non-Discounted	Discounted	Non-Discounted	Tons
291AC	Exhaust Air Sampler House	$40,000	$51,000	$20,000	$21,000	10
291AD	Filter Pit and Stack	$210,000	$260,000	$230,000	$230,000	415
291AE	Filter Cell #4	$1,680,000	$2,156,000	$2,110,000	$2,126,000	4,463
291AH	AOG Sample Station	$100,000	$119,000	$90,000	$89,000	144
291AK	Tunnel Spray Enclosure and Caissons	$110,000	$131,000	$100,000	$101,000	47
291AR	Exhaust Air Filter Stack Building	$370,000	$476,000	$440,000	$446,000	79
291B	Exhaust Fan Control House and Sand Filter	$1,380,000	$1,762,000	$1,720,000	$1,732,000	212
291BA	Exhaust Air Sample House	$40,000	$52,000	$20,000	$22,000	8
291BB	Instrument Bldg—A and B Filters	$60,000	$77,000	$50,000	$47,000	283
291BC	A and B Filters	$1,200,000	$1,541,000	$1,500,000	$1,511,000	3,217
291BD	C Filter and Instrument Building	$500,000	$632,000	$600,000	$602,000	268
291BF	D Filter	$430,000	$553,000	$520,000	$523,000	115
291BG	D Filter Instrument Building	$430,000	$541,000	$510,000	$511,000	283
291BH	Instrument Building—E Filter	$40,000	$46,000	$20,000	$16,000	20
291BJ	B Plant Instrument Building—F Filter	$790,000	$1,008,000	$970,000	$978,000	272
291BK	Instrument Building—E and F Filters	$50,000	$65,000	$30,000	$35,000	223
292AA	PR Stack Sample House	$60,000	$70,000	$40,000	$40,000	274

Table 5-2. Detailed Cost and Waste Quantity Summary Information by Building/Structure

Building/Structure Number and Title		Estimated Cost and Waste Quantity				
		Alternative 2		Alternative 3		Estimated Waste Quantity
		Discounted	Non-Discounted	Discounted	Non-Discounted	Tons
292AB	PUREX Gases Effluent Monitoring Building	$340,000	$427,000	$390,000	$397,000	8,296
293A	Off Gas Treatment Facility	$1,120,000	$1,439,000	$1,400,000	$1,409,000	1,383
294A	Off Gas Treatment and Monitoring Station	$220,000	$281,000	$250,000	$251,000	194
295A	ASD Sample Station	$130,000	$161,000	$130,000	$131,000	219
295AA	SCD Sample and Pumpout Station	$120,000	$146,000	$110,000	$116,000	157
295AB	PDD Sample Station	$100,000	$122,000	$90,000	$92,000	442
295AC	CSL Sample Station	$50,000	$64,000	$30,000	$34,000	223
295AD	SWL Sample Station	$60,000	$77,000	$50,000	$47,000	366
Totals		**$50,040,000**	**$63,983,000**	**$61,730,000**	**$62,273,000**	**214,489**

AOG = ammonia off gas
ASD = ammonia scrubber discharge
CSL = chemical sewer line
PDD = process distillate discharge
PR = plutonium recovery
PUREX = Plutonium-Uranium Extraction (Plant)
RM = radiation monitor
RR = railroad
SCD = steam condensate discharge
SWL = sanitary water line
SWP = special work permit
WESF = Waste Encapsulation and Storage Facility
TEDF = Treated Effluent Disposal Facility

Table 5-3. Comparative Analysis Summary

Removal Action Alternative	Effectiveness	Implementability	Cost
Alternative 1: No Action	●	◐	●[a]
Alternative 2: Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures	◐	○	●
Alternative 3: Near-Term Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures	○	○	○

a. Alternative 1 is not consistent with DOE obligations under federal law to protect human health and the environment; therefore, this alternative cannot be considered viable and is not considered further in this EE/CA, but is included for comparative purposes only in the cost analysis. Although Alternative 1 would not have an associated implementation cost under this analysis, it is understood that taking no action would ultimately result in cost to DOE.

● = Performs less well against the criterion relative to the other alternatives with significant disadvantages or uncertainty

◐ = Performs moderately well against the criterion relative to the other alternatives with some disadvantages or uncertainty

○ = Performs very well against the criterion relative to the other alternatives with minor disadvantages or uncertainty

Table 5-4. NEPA Values Evaluation

NEPA Values	Description	Evaluation
Transportation	Considers impacts of the proposed action on local traffic and traffic in the surrounding region.	Implementation of Alternatives 2 or 3 is expected to produce short-term impacts on local traffic. A majority of the impacts would be associated with increased truck traffic associated with Alternative 3, when transporting waste to ERDF. In addition, Alternative 2 would include continued transportation during the 10-year S&M period. Transportation impacts associated with transport of contaminated material to ERDF were considered in DOE/RL-93-99, *Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility*, as part of the evaluation of short-term effectiveness and implementability. NEPA values specifically associated with ERDF were addressed in DOE/RL-94-41, *NEPA Roadmap for the Environmental Restoration Disposal Facility Regulatory Package.* See the discussion of cumulative impacts for a perspective of transportation to ERDF.

Table 5-4. NEPA Values Evaluation

NEPA Values	Description	Evaluation
Air Quality	Considers potential air quality concerns associated with emissions generated during the proposed action.	Airborne releases associated with Alternatives 2 and 3 are expected to be minor with the use of appropriate work controls (for example, filtered ventilation, containment, and dust suppression including use of fixatives). Any potential for airborne release of contaminants during the NTCRA would be controlled in accordance with DOE radiation control and air pollution control ARARs, to minimize emissions of air pollutants, and protect the public and the environment. 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 are not expected to cause any air quality standards to be exceeded and dust generated during removal activities would be minimized by watering or other dust-control measures (as needed). 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.
Natural, Cultural, and Historical Resources	Considers impacts of the proposed action on wildlife, wildlife habitat, archeological sites and artifacts, and historically significant properties.	Impacts on ecological resources 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. Appropriate ecological reviews would be conducted before implementing field activities. Because most of the buildings/structures either have already been disturbed or minimal soil disturbance is expected, it is anticipated that only isolated artifacts could be encountered during project activities under any of the alternatives. Implementation of DOE/RL-98-10, *Hanford Cultural Resources Management Plan* and consultation with area Tribes will help ensure appropriate mitigation to avoid or minimize any adverse cultural or historical resource effects and address any relevant concerns. Potential impacts to cultural and historical resources that may be encountered during the short-term activities associated with implementing Alternatives 2 or 3 of the NTCRA would be mitigated through compliance with the appropriate substantive requirements of the *National Historic Preservation Act of 1966* and other ARARs related to cultural preservation. As appropriate, a cultural resource review will be conducted before implementing field activities.

Table 5-4. NEPA Values Evaluation

NEPA Values	Description	Evaluation
Socioeconomic Impacts	Considers impacts pertaining to employment, income, other services (for example, water and power utilities), and the effect of implementation of the proposed action on the availability of services and materials.	The proposed action is within the scope of current DOE 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 is 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.
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.	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. The proposed activities associated with buildings/structures will not disproportionately affect any member of the public; therefore, the actions do not have the potential for high and disproportional adverse impacts on minority or low-income groups.
Cumulative Impacts (Direct and Indirect)	Considers whether the proposed action could have cumulative impacts on human health or the environment when considered together with other activities locally, at the Hanford Site, or in the region.	The concern is associated directly with the targeted area. Because of the temporary nature of the activities and their remote location, cumulative impacts on air quality or noise with other Hanford Site or regional construction and cleanup projects will be minimal. When equipment at a site is found to be contaminated with hazardous substances in concentrations presenting a material threat to human health and the environment, that threat would be mitigated. The net anticipated effect could be a positive contribution to cumulative environmental effects at the Hanford Site through disposal of hazardous substances into a facility, such as ERDF, that has been designed and legally authorized to safely contain such contaminants. The buildings/structures removed under Alternatives 2 or 3 would meet ERDF waste acceptable criteria as described in WCH-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*. Waste generated during the proposed activities would be manageable within the capacities of existing facilities. For perspective, ERDF received more than 700,000 tons of waste in calendar year 2008 and more than 430,000 tons in calendar year 2007. Radiological contamination is expected to be within the acceptance criteria levels for ERDF disposal. ERDF received approximately 22,500 curies (Ci) in calendar year 2008 and approximately 13,000 Ci in calendar year 2007.

Table 5-4. NEPA Values Evaluation

NEPA Values	Description	Evaluation
		It is expected that the total amount of waste that could be generated for disposal in ERDF for this NTCRA is approximately 214,489 tons. Over the 5-year expected duration of this NTCRA, an average of approximately 43,000 tons/year will be disposed of at ERDF. This volume is still small when compared with the 700,000 tons disposed in ERDF in calendar year 2008.
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 mitigation 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 Hanford Site contractors, will mitigate risks to workers from the NTCRA.
Irreversible and Irretrievable Commitment of Resources	Considers the use of nonrenewable resources for the proposed response actions and the effects or resource consumption on future generations. (When a resource [for example, minerals, water, wetland] is used or destroyed and cannot be replaced within a reasonable amount of time, its use is considered irreversible.)	Alternative 1 would result in no usage of resources. For both Alternatives 2 and 3, normal usage of resources during S&M and D4 activities, such as fuel and water, would be irreversibly used.

6 Recommended Removal Action Alternative

This NTCRA evaluated the following three removal action alternatives.

- Alternative 1: No Action
- Alternative 2: Continued Surveillance and Maintenance with Future Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures
- Alternative 3: Near-Term Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures

Alternative 3 is the recommended alternative for this NTCRA and it provides long-term protectiveness. Alternative 3 contains provisions for submitting components such as contaminated building slabs and soil, to a separate cleanup action as described in the TPA (Ecology et al., 1989a) and RL-TPA-90-0001, if conditions warrant.

The recommended alternative meets the RAOs, meets ARARs, provides for early risk reduction, utilizes current availability of the existing contractor workforce, and provides a safe and stable configuration that is environmentally sound. Alternative 3 contributes to the efficient performance of future long-term remedial actions. Alternative 3 is assumed to be comparable to Alternative 2 from a cost standpoint when considering that the accuracy range of the cost estimate is expected to be -30 percent to +50 percent. However, significant benefits to protection of human health and the environment will be realized with Alternative 3 by addressing hazards in the near-term.

6.1 Compliance with Environmental Regulations, Including Those that are Applicable or Relevant and Appropriate Requirements

Section 121 of CERCLA requires the CERCLA federal lead agency to ensure that substantive applicable or relevant and appropriate requirements from federal and state laws and regulations are incorporated into the agency's design and operation of its removal and remedial actions. DOE is the CERCLA lead agency for this NTCRA. Under the Tri-Party Agreement, the lead regulatory agency must concur that the NTCRA decision documented in the Action Memorandum(s) will be protective of human health and the environment when the removal action has been completed. Through this process, the risks described in this document will be mitigated in a timely manner.

Appendix B delineates ARARs that have been identified for this NTCRA. These ARARs are consistent with ARARs for long-term remedial actions for the Hanford Site. The selection of ARARs is based on the following key assumptions:

- D4 may involve removal activities that have the potential to emit radionuclide and/or criteria/toxic contaminants. The federal *Clean Air Act of 1990* and amendments and the "Washington Clean Air Act," (RCW 70.94), require regulation of radioactive air pollutants. Implementing regulations found in "National Emission Standards for Hazardous Air Pollutants" (40 CFR 61.92, "Standard") 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 due to emissions from the Hanford Site. Methods will be employed, as prescribed under state and federal regulations, to maintain the impact of these air emissions to ALARA levels. Methods would be employed, as prescribed under state and federal regulations, to reduce the impact of these air emissions.

- Waste generated during D4 may contain paint that contains PCBs. PCB-containing light ballasts would be disposed in an appropriate disposal facility. Other PCB contamination, if encountered, would also be disposed at an appropriate disposal facility, unless decontamination is determined appropriate and feasible. If encountered, such waste may trigger substantive requirements of "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions" (40 CFR 761), *Toxic Substances Control Act of 1976* (TSCA). Lead-contaminated paint also may be removed, which would be subject to the substantive requirements of WAC 173-303, "Dangerous Waste Regulations."

- Asbestos containing material (ACM), which is both friable and non-friable, would be encountered during performance of the NTCRA. Friable or regulated ACM is subject to specific asbestos regulations and is acceptable for disposal at ERDF. Regulated asbestos would be removed and disposed of as required by "National Emission Standards for Hazardous Air Pollutants" (40 CFR 61.150, "Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations").

- Beryllium may be encountered during performance of the NTCRA. If encountered, beryllium may be subject to the substantive requirements of "National Emission Standards for Hazardous Air Pollutants" (40 CFR 61.32, "Emission Standard") or WAC 173-460, "Controls for New Sources of Toxic Air Pollutants."

- Section 106 of the NHPA, as amended, requires agencies to consider the impact of undertakings on properties listed or eligible for listing in the National Register of Historic Places and to consult with the State Historic Preservation Officer and other interested parties when impacts are likely. It also requires federal agencies to invite the Advisory Council on Historic Preservation to participate in consultation when impacts may be adverse. The NHPA Section 106 process has been tailored to meet the unique needs of the Hanford Site. Section 110 of the NHPA directs federal agencies to establish programs to find, evaluate, and nominate eligible properties to the National Register of Historic Places, including previously unidentified historic properties that may be discovered during the implementation of a project (36 CFR 800, "Protection of Historic Properties"). In addition, the *Archaeological Resources Protection Act of 1979*, as amended, provides for the protection and management of archaeological resources on federal lands. Procedures and strategies to tailor these requirements to the unique needs of the Hanford Site are described in DOE/RL-98-10, *Hanford Cultural Resources Management Plan*. DOE/RL-98-10 is implemented through a Programmatic Agreement among DOE, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation. Alternative 3 complies with DOE/RL-98-10 and the Programmatic Agreement.

- DOE is required to review, as guidance, the most current U.S. Fish and Wildlife Service list for threatened and endangered plant and animal species. DOE determined that none of the alternatives would impact any threatened and endangered species and also determined that formal consultation with the U.S. Fish and Wildlife Service is not required for this action.

6.2 Compliance with Disposal Facility Waste Acceptance Criteria

Waste generated through implementation of Alternative 3 would be dispositioned at appropriate Hanford Site or offsite waste disposal facilities, in accordance with the waste acceptance criteria of those facilities. ERDF would be the preferred disposal location for waste meeting ERDF waste acceptance criteria and would be considered to be "onsite"[1] for management and/or disposal of waste from activities addressed in this document.

ERDF is engineered to meet appropriate RCRA technological requirements for landfills. Hazardous, mixed, low-level, asbestos, and *Toxic Substances Control Act of 1976* waste can be accepted for disposal at ERDF (WCH-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*). It is expected that most of the waste generated during D4 activities would be disposed onsite at ERDF. In the event that TRU waste is generated during D4 activities, this waste would be stored at the Central Waste Complex (CWC) pending shipment to the Waste Isolation Pilot Plant.

If aqueous waste is generated and determined to be LLW or designated as dangerous or mixed waste, it may be transported to the 200 Area Effluent Treatment Facility (ETF) for treatment, followed by discharge under the Washington State waste discharge program. The ETF is a RCRA-permitted unit authorized to treat aqueous waste streams generated on the Hanford Site and dispose of these streams at a designated state-approved land disposal site in accordance with applicable requirements.

Residuals from treatment of waste originating from activities addressed in this NTCRA can be disposed at ERDF, providing the treatment residuals meet ERDF waste acceptance criteria. The D4 activities to be performed under this NTCRA may generate waste packages exceeding the Class C criteria established for waste regulated by the Nuclear Regulatory Commission. If a waste package does exceed the Class C criteria, a special performance assessment would be performed and reviewed by the regulatory agencies to ensure that there are no unacceptable risks associated with disposal at ERDF. Alternately, Class C waste may be evaluated for disposal at another disposal facility on the Hanford Site.

6.3 Achieving RAOs

Alternative 3 would meet the RAOs through removal and transfer of contaminated waste to an approved disposal facility. D4 would include removal of above-grade structures. Structures that are partially or completely below grade would be either removed or left intact (with penetrations secured or blanked), and backfilled with inert material, as appropriate. Equipment, material, piping, and appurtenances may be removed prior to demolition. Backfill would consist of clean fill materials or grout.

If evidence of contamination to surrounding soils is encountered during D4 activities, those soils would be excavated and disposed in an appropriate Hanford Site or offsite disposal facility in accordance with the waste acceptance criteria of the facility. Alternatively, if the soil contamination is extensive, or unusually complex, or if contamination is encountered on remaining slabs or underground structures,

[1] 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 Hanford buildings/structures 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. This determination will be made upon issuance of the Action Memorandum(s).

DOE would consult with the LRA and determine whether to address the residual contamination within the scope of this NTCRA, or implement temporary measures as part of this action and defer final action to the remedial investigation and remedy selection process by adding the site to the TPA Action Plan, Appendix C (Ecology et al., 1989b) in accordance with RL-TPA-90-0001.

Completion of the NTCRA would be accomplished with the development of completion reports. The completion reports would provide summary-level information for the NTCRA, including building/structure number or location, completion date, building/structure footprint area, waste generation and disposal information, and end state.

7 References

36 CFR 800, "Protection of Historic Properties," Code of Federal Regulations. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_08/36cfr800_08.html.

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Code of Federal Regulations. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr61_09.html.

61.32, "Emission Standard."

61.92, "Standard."

61.150, "Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations."

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_10/40cfr300_10.html.

300.415, "Removal Action."

300.440, "Procedures for Planning and Implementing Off-Site Response Actions."

300.820, "Administrative Record File for a Removal Action."

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr761_09.html.

64 FR 61615, "Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)," *Federal Register*, Vol. 64, No. 218, pp. 61615-61625, November 12, 1999. Available at: http://gc.energy.gov/NEPA/nepa_documents/rods/1999/61615.pdf.

73 FR 55824, "Amended Record of Decision for the Hanford Comprehensive Land-Use Plan Environmental Impact Statement," *Federal Register*, Vol. 73, No. 188, pp. 55824-55826, September 26, 2008. Available at: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2008_register&docid=55825.pdf.

Archaeological Resources Protection Act of 1979, 16 USC 470aa-mm. Available at: http://www.nps.gov/history/local-law/fhpl_ArchRsrcsProt.pdf.

Clean Air Act of 1977, 42 USC 7401, et seq. Available at: http://www.epa.gov/air/caa/.

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://uscode.house.gov/download/pls/42C103.txt.

DOE and EPA, 1995, *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)*, U.S. Environmental Protection Agency, and U.S. Department of Energy, Washington, D.C. Available at: http://www.epa.gov/fedfac/pdf/decommissioning_doe.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: http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158842. http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158843. http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158844. http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158845. http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158846. http://www5.hanford.gov/arpir/?content=findpage&AKey=D199158847.

DOE/EIS-0222-SA-01, 2008, *Supplement Analysis: Hanford Comprehensive Land-Use Plan Environmental Impact Statement*, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/files.cfm/SAwith_signed-R1.pdf.

DOE G 430.1-1, 1997, *Cost Estimating Guide*, U.S. Department of Energy, Washington, D.C.

DOE O 451.1B Chg 1, 2001, *National Environmental Policy Act Compliance Program*, U.S. Department of Energy, Washington, D.C. Available at: https://www.directives.doe.gov/directives/current-directives/451.1-BOrder-bc1/view.

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://www2.hanford.gov/arpir/?content=findpage&AKey=D196061256.

DOE/RL-94-41, 1994, *NEPA Roadmap for the Environmental Restoration Disposal Facility Regulatory Package*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www2.hanford.gov/arpir/?content=findpage&AKey=D196074918.

DOE/RL-95-11, 1995, *Ecological Compliance Assessment Management Plan*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www2.hanford.gov/arpir/?content=findpage&AKey=D196015539.

DOE/RL-96-32, 2001, *Hanford Site Biological Resources Management Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.pnl.gov/ecomon/docs/brmap/BRMaP.pdf.

DOE/RL-96-88, 2003, *Hanford Site Biological Resources Mitigation Strategy*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.pnl.gov/ecomon/docs/BRMiS.pdf.

DOE/RL-97-56, 1998, *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-98-10, 2003, *Hanford Cultural Resources Management Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Drummond, Marshall E., 1992, *The Future for Hanford: Uses and Cleanup: The Final Report of the Hanford Future Site Uses Working Group*, prepared by the Hanford Future Site Uses Working Group for the U.S. Environmental Protection Agency, Washington State Department of Ecology, and U.S. Department of Energy, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=D196123428.

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=81.

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=82.

Ecology, EPA, and DOE, 2002, *Hanford Site Tri-Party Agreement Public Involvement Community Relations 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/files.cfm/crp.pdf.

Endangered Species Act of 1973, 16 USC 1531, et seq. Available at: http://www.nmfs.noaa.gov/pr/pdfs/laws/esa.pdf.

EPA, 1995, *Record of Decision U.S. DOE Hanford Environmental Restoration Disposal Facility, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, U.S. Department of Energy, and Washington State Department of Ecology. Available at: http://www2.hanford.gov/arpir/?content=findpage&AKey=D196041064.

EPA 540-R-00-002, 2000, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, OSWER 9355.0-75, Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. Available at: http://epa.gov/superfund/policy/remedy/sfremedy/rifs/costest.htm.

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

Means, R.S., 2001, *Facilities Construction Cost Data*, R.S. Means, Company Inc., Kingston, Massachusetts.

Means, R.S., 2010a, *Building Construction Cost Data*, 68th Annual Edition, R.S. Means, Company Inc., Kingston, Massachusetts.

Means, R.S., 2010b, *Heavy Construction Cost Data*, 24th Annual Edition, R.S. Means, Company Inc., Kingston, Massachusetts.

National Environmental Policy Act of 1969, 42 USC 4321, et seq. Available at: http://www.fhwa.dot.gov/environment/nepatxt.htm.

National Historic Preservation Act of 1966, 16 USC 470, et seq. Available at: http://www.achp.gov/docs/nhpa%202008-final.pdf.

OMB Circular No. A-94, 2010, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (memorandum for Heads of Executive Departments and Establishments), Appendix C, "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses," as revised, Office of Management and Budget, Washington, D.C.

PNNL-6415, 2007, *Hanford Site National Environmental Policy Act (NEPA) Characterization*, Rev. 18, Pacific Northwest National Laboratory, Richland, Washington. Available at: http://www.pnl.gov/main/publications/external/technical_reports/PNNL-6415Rev18.pdf.

RCW 70.94, "Public Health and Safety," "Washington Clean Air Act," *Revised Code of Washington*, Washington State, Olympia, Washington. Available at: http://apps.leg.wa.gov/RCW/default.aspx?cite=70.94.

RCW 70.105, "Hazardous Waste Management," *Revised Code of Washington*, Olympia, Washington. Available at: http://apps.leg.wa.gov/RCW/default.aspx?cite=70.105.

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq. Available at: http://www4.law.cornell.edu/uscode/42/6901.html.

RL-TPA-90-0001, 2007, *Tri-Party Agreement Handbook Management Procedures*, Guideline Number TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)," Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/files.cfm/TPA-MP14.pdf.

Toxic Substances Control Act of 1976, 15 USC 2601, et seq. Available at: http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=BROWSE&TITLE=15USCC53.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-303.

WAC 173-460, "Controls for New Sources of Toxic Air Pollutants," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-460.

WCH-191, 2009, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, Rev. 1, Washington Closure Hanford, LLC, Richland, Washington.

Appendix A

Central Plateau 200 East Area Tier 2 Buildings/Structures Descriptions

A Building/Structure List

Table A-1 lists those Tier 2 buildings/structures in the scope of this NTCRA.

Table A-1. Central Plateau 200 East Area Tier 2 Building/Structure List

Building/Structure ID	Building/Structure Title
203A	Acid Pump House
206A	Vacuum Acid Fractionator Building
209E*	Critical Mass Laboratory (including the 296P031 Stack)
212A	Fission Product Loadout Station
212B*	Fission Product Loadout, Cask Transfer Building
213A	Fission Product Load-in Station
216A*	Valve Control Facility
221BB*	Process Steam and Condensate Building
221BC	SWP Change House
221BD*	Laundry Storage Building
221BF	Condensate Effluent Discharge Facility at B Plant
221BK	B Plant Canyon Exhaust Instrumentation Building
222B*	Office Building/Laboratory
225BA*	K1 Filter Pit Encapsulation Facility
225BB*	K3 Filter Pit Encapsulation Facility
225BF*	WESF Tanker Loadout Station
225E*	TEDF Pump Station 2
241C801*	Cesium Load-Out Facility
241CR271*	Cold Chemical Makeup Building
241CX40*	Grout Removal Building
242B	Radioactive Particle Research Laboratory
242BL*	Cask Loading Building
252AB	Electrical Substation
252AC	Electrical Substation
2707AR*	Sludge Vault Change House
2711A	Air Compressor Building
2716B	RM Checkout Station, RR Tunnel
271B*	B Plant Support Building
271CR*	Control Building

Table A-1. Central Plateau 200 East Area Tier 2 Building/Structure List

Building/Structure ID	Building/Structure Title
276A	Cold Solvent Storage Building, R Cell
276C*	Solvent Handling Building
291AB	Exhaust Air Sampler House
291AC	Exhaust Air Sampler House
291AD	Filter Pit and Stack
291AE	Filter Cell #4
291AH	AOG Sample Station
291AK	Tunnel Spray Enclosure and Caissons
291AR*	Exhaust Air Filter Stack Building
291B	Exhaust Fan Control House and Sand Filter
291BA	Exhaust Air Sample House
291BB	Instrument Bldg – A and B Filters
291BC	A and B Filters
291BD	C Filter and Instrument Building
291BF	D Filter
291BG	D Filter Instrument Building
291BH	Instrument Building – E Filter
291BJ*	B Plant Instrument Building – F Filter
291BK	Instrument Building – E and F Filters
292AA	PR Stack Sample House
292AB	PUREX Gases Effluent Monitoring Building
293A	Off Gas Treatment Facility
294A	Off Gas Treatment and Monitoring Station
295A	ASD Sample Station
295AA	SCD Sample and Pumpout Station
295AB	PDD Sample Station
295AC	CSL Sample Station
295AD	SWL Sample Station

* Denotes those buildings/structures that are *not* currently included in Appendix J of the TPA.

A1.1 Building/Structure Descriptions

This section provides a brief description and history, if available, for each of the buildings/structures listed in Table A-1.

203A Acid Pump House. The 203A storage area is a 37.5 m (123 ft) by 31.4 m (103 ft) by 1.8 m (6 ft) high, reinforced-concrete, diked area surrounding storage tanks used for uranyl nitrate hexahydrate and other acidic solutions. The area is located to the north of the 202A Building and the 211A liquid chemical tank farm. The area is isolated from utilities and other structures that remained at the end of deactivation. Adjacent to this diked area is the 203A Building, which is a 14.3 m (47 ft) by 4.9 m (16 ft) by 3.7 m (12 ft) high, reinforced-concrete structure used to house pumps and the control room for the 203A storage tanks. A rail car and truck loading/unloading station is located on the west side of this area. To the east of the 203-A area is a 11.0 m (36 ft) by 7.6 m (25 ft) by 6.1 m (20 ft) high metal building used to store empty metal drums. The building is constructed of concrete and is approximately 1,342 m^2 (14,448 ft^2).

206A Vacuum Acid Fractionator Building. The 206A Vacuum Acid Fractionator Building houses the vacuum fractionators and associated equipment used for concentrating nitric acid from the PUREX and UO_3 Plants. The 206A Building is a reinforced-concrete structure located at the northwest corner of U Cell. The outside dimensions are 8 m (28 ft) by 11 m (35 ft) by 14 m (46.5 ft) above grade at its maximum height. Inside the building, a pit containing the condensate tank extends 3 m (10 ft) below grade.

209E Critical Mass Laboratory and 296P031 Stack. The 209 E Critical Mass Laboratory is located west of the 201C Process Building. The Critical Mass Laboratory is an L-shaped concrete block structure. One wing houses offices, control room shops, and common facilities. The other wing houses an equipment room, change room, mixing laboratory, and a two-story reactor hall. The reactor hall is heavily shielded.

Criticality experiments were conducted in the Critical Mass Room from 1960 to 1983 using plutonium nitrate and enriched uranium solutions. Criticality research was also conducted with solid special nuclear materials and fuels such as plutonium blocks, uranium blocks and slabs, and fuel assemblies from the Fast Flux Test Facility and other reactors. This building is approximately 834 m^2 (8,979 ft^2) and includes the 296P031 Stack.

212A Fission Product Loadout Station. The 212A Fission Product Loadout Station was used for delivering or withdrawing liquid radioactive waste to or from the PUREX Plant. The 212A Building is located along the south wall of the 202A Building and is constructed of metal. A roll-up door for entry of trucks transporting casks or tank trailers is located in the west end of the building. This metal building is approximately 59 m^2 (640 ft^2).

212B Fission Product Loadout, Cask Transfer Building. The 212B Fission Product Loadout, Cask Transfer Building was used for loading and unloading fission products from shielded transfer casks. The building is a sheet-metal-covered, steel-frame structure, 23 m (76 ft) long by 15 m (49 ft) wide, and 11 m (35 ft) at the highest point. The building includes a truck lock, a cask handling and surveillance room, and an underground operating gallery and cell, and attached laundry storage and change rooms. This building is approximately 512 m^2 (5,221 ft^2).

213A Fission Product Load-In Station. The 213A Fission Product Load-In Station is a corrugated steel building that was used for loading liquid waste for transport from shipping casks to the PUREX Plant. The 213A Building was also used for temporary storage of contaminated dry waste. This building is 48 m^2 (521 ft^2).

216A Valve Control Facility. The 216A Valve Control Facility is located near the 202A Building and includes an above-ground reinforced-concrete stair access and underground reinforced-concrete sample and valving pit. Two underground steel tanks are also associated with this facility. The calculation includes the volumes of the two steel tanks. The bottom of the lowest tank is 8 m (26 ft) below grade. This building is approximately 41 m^2 (440 ft^2).

221BB Process and Steam Condensate Building. The 221BB Process and Steam Condensate Building is located on the south side of the 221B Building between the R-13 and R-15 stairwells. The 221BB Building consists of a below-grade concrete vault (referred to as the condensate pit) and an above-grade metal building.

The condensate pit is constructed of poured concrete and has a length of 5.28 m (17 ft), a maximum width of 1.83 m (6 ft), and a depth of 2.59 m (8.5 ft). On top of the pit is a steel-frame construction building with metal sides and roof. The building is approximately 2.15 m from the south exterior wall of the 221B Building. The metal building is approximately 7 m (22 ft) long by 7.7 m (25 ft) wide. The 7.7 m (25 ft) wall is parallel to the south exterior wall of the 221B Building.

221BC SWP Change House. The 221BC SWP Change House is a reinforced-concrete block building associated with the B Plant Complex. The building has a one-ton monorail crane along the west side. This building is approximately 70 m^2 (756 ft^2).

221BF Process Condensate Effluent Discharge Facility. The 221BF Process Effluent Discharge Facility is located in the southwest portion of the B Plant Complex. The 221BF Process Condensate Effluent Discharge Facility is a below-grade concrete vault. The vault is divided into a sample room, a monitor room, and a tank room.

The overall dimensions of the vault are 11 m (36 ft) long by 11 m (36 ft) wide by 8.2 m (27 ft) deep. An above-grade stair building is 4.5 m (15 ft) long by 1.68 m (5.5 ft) wide and 2.4 m (7.87 ft) high. The stair building is of steel frame and sheet metal construction.

222B Laboratory. The 222B Laboratory, located directly southeast of the 222B Building, was used from 1945 until 1952 for laboratory analysis in support of the B Plant Bismuth Phosphate Fuel Processing. Various small-scale experiments were performed inside the facility. This facility disposed of liquid waste to the 216-B-6 Reverse Well and the 216-B-10A Crib. This building is approximately 694 m^2 (7,474 ft^2).

225E TEDF Pump Station 2. The 225E TEDF Pump Station 2 is a pre-engineered metal building and underground two-level reinforced-concrete pump pit. The facility pumps liquid waste to the Treated Effluent Disposal Facility (TEDF). This building is approximately 9 m^2 (96 ft^2).

241C801 Cesium Load-Out Facility. The 241C801 Cesium Load-Out Facility was built in 1962. When the facility was in operation, cesium-rich waste from tank 241C103 was pumped to an ion exchanger on a trailer. The cesium-depleted waste was returned to tank 241C102. The purpose was to provide load-out capability of cesium, which was independent of the PUREX Plant, thus freeing fission-product equipment in PUREX to be devoted to other programs. The building has a total area of approximately 77 m^2 (832 ft^2) and consists of three parts: the load-out room, the operating room, and the valve pit room. The building is reinforced-concrete, partially below grade, with a metal upper section and roof.

241CR271 Cold Chemical Makeup Building. The 241CR271 Building is located adjacent to the 271CR building. The building has an office, an electrical room, a laboratory, a cell, and a tank room. The tank room houses tank 5-1 used for adding chemicals for waste processing. The tank was removed in approximately 1968. The structure has been used as a storage shed since the late 1960s. The floor and

sink drains located in the structure drain to crib 216C8, except for a sink drain in the laboratory area that is routed to the French drain. This building is approximately 210 m^2 (2,256 ft^2).

241CX40 Grout Removal Building. The 241CX40 Grout Removal Building is a temporary wood building covering the 241CX72 tank and houses machinery for extracting grout from the 241CX72 tank. The building is associated with the 241CX72 tank and the Semi-Works Facility and is approximately 101 m^2 (1,086 ft^2).

242B Radioactive Particle Research Laboratory. The 242B Radioactive Particle Research Laboratory contains the 242B Evaporator and is located immediately south of the 241B Tank Farm. The facility consists of the evaporator reinforced-concrete building and an attached control metal building. This facility disposed of liquid waste to the 216B11A and 216B11B Reverse Wells and the 216B37 Trench. The building is approximately 285 m^2 (3,067 ft^2).

252AB Electrical Substation. The 252AB Electrical Substation is associated with the PUREX Facility and is approximately 135 m^2 (1,454 ft^2). Substation 252AB supplies 1,500 kVA of electrical power to each of two busses, which in turn provide power to the operating and standby canyon exhaust fans, the 292-AB stack monitoring building, the 291AE No. 4 Filter Building, the 291-A-1 monitoring system, and the SAMCONS I&C skid for surveillance and monitoring.

252AC Electrical Substation. The 252AC Electrical Substation is a skid-mounted modular substation associated with the PUREX Facility. The 252-AC station is powered from either of the two 1,500-kVA busses through an automatic transfer switch and supplies 750 kVA of electrical power to dedicated surveillance lighting throughout the PUREX Facility. This building is approximately 4.7 m^2 (51 ft^2).

271B B Plant Support Building. The 271B B Plant Support Building is a concrete and concrete block three-story building with basement and penthouse over the stair tower and a penthouse over the elevator. This building is approximately 2,309 m^2 (24,857 ft^2).

271CR Control Building. The 271CR Control Building consists of: (1) a mechanical equipment room that houses an air compressor, receiver vessel, air dryer and filters, and a water heater; (2) a control room that houses the electrical distribution equipment (panel boards and motor control center) and the control/alarm panels; and (3) an operator area that houses a lunch room, shower, locker room, and toilet. The operator area is no longer used by operations personnel. The equipment in this building is non-operational except for the control/alarm panel and the electrical distribution equipment. The control/alarm panels have operational instruments that monitor the tank waste temperatures and liquid levels. This building is approximately 185 m^2 (1,988 ft^2).

276A Cold Solvent Storage Building. The 276A Cold Solvent Storage Building associated with the PUREX Plant ventilation system. The 276A Building (R-cell) is a 19.8 m (65 ft) by 7 m (23 ft) by 10.7 m (35 ft) high concrete structure (vault), built below grade, with removable concrete cover blocks extending above grade to form the building roof. R-cell provided organic solvent decontamination and storage. Currently, R-cell is accessed through the 202A sample gallery (R-cell centrifuge platform) or through the PR corridor (R-cell vault floor). This building is approximately 29 m^2 (314 ft^2).

276C Solvent Handling Building. The 276C Solvent Handling Building contained equipment and tanks for the treatment and storage of process solvents used in the 201C Process Building operations. The 276C Solvent Handling Facility is a four-story structure extending approximately 14 m (46 ft) above grade with a total floor area of approximately 213 m^2 (2,300 ft^2). The building is steel framed with metal siding, concrete floors, and a concrete roof. All of the exposed steel framework is covered with 3 cm (1 in.) of heat-resistant plaster.

Equipment used for solvent treatment was located on the first level. The chemical additional tanks were located on the second-level mezzanine. Head tanks and storage tanks for clean solvents were located on the third and fourth levels. Removable panels on the top two levels allowed large equipment to be removed from the building. The head tanks delivered organic feeds by gravity to the 201C Process Building. In addition, a large heating, ventilation, and air conditioning unit was located on the second level. The power control room was attached to the south side of the building. Contamination in the 276C Building was limited to a diluent vessel on the third floor and in the filter housings.

291AE Filter Cell #4. The 291AE Filter Cell #4 is an above-ground building associated with the PUREX Plant ventilation system. The 291AE #4 filter building is a 37.5 m (123 ft) by 12.5 m (41 ft) by 5.2 m (17 ft) reinforced-concrete building, which houses 10 modular filter units, each with upstream and downstream isolation dampers. A typical modular filter unit consists of a stainless-steel housing containing an inlet damper, an in-place-filter testing assembly, a four-by-three array of HEPA filters, an in-place filter-testing assembly, and an outlet damper. During the S&M phase, three filter arrays will remain in operation, with one remaining in reserve. The remaining filter arrays are not generally ready to be placed into service.

Two reinforced-concrete air ducts are located below the 291AE Building, parallel to each other and running in the north-south direction. The west duct is an inlet air duct connected to the underground air duct from the deep-bed Filter #2. The east duct is the discharge air duct from the HEPA filter units and connects with the above-ground, reinforced-concrete exhaust air plenum. Attached to the south side of the building is a 7.3 m (24 ft) by 3.7 m (12 ft) by 2.7 m (9 ft) high metal building, which houses the mechanical and electrical equipment and is the entrance vestibule for the 291AE Building. This building is approximately 471 m^2 (5,076 ft^2).

291AK Tunnel Spray Enclosure and Caissons. The 291AK Tunnel Spray Enclosure is a small metal frame building associated with the PUREX Plant, located under the 202A stair. This building also contains two caissons for access piping to spray the 202A exhaust air plenums. This building is approximately 3 m^2 (32 ft^2).

291AR Exhaust Air Filter Stack Building. The 291AR Exhaust Air Filter Stack Building is a vault, a partially above-grade, and partially below-grade structure associated with the 244AR Building. This building is approximately 13 m^2 (143 ft^2).

291B Exhaust Fan Control House and Sand Filter. The 291B Building consists of air filter systems, ventilation equipment, and an exhaust stack. It is located east of the 222B Building and south of the 221B Building. The retired 291B HEPA filters are located in underground vaults in the 291B area, which is located approximately 46 to 61 m (150 to 200 ft) south of the east end of the 221B Canyon. The vaults are reinforced concrete, with steel filter frames inside. The vaults are covered by approximately 1 m (3.1 ft) of soil and gravel and are bermed with soil and gravel on three sides. The east end has a vacant vault (F vault) east of and adjacent to the last in-service filter (E filter). The A, B, C, D, and E filters were equipped with multiple banks of HEPA filters, and some filters were also equipped with one or more banks of pre-filters. The filters and vaults have been isolated and abandoned in place.

The equipment contained within this complex is used to collect and filter air from the 221B Building before discharging it to the exhaust stack. Radioactive contaminants were present in the exhaust air as a result of various dissolving steps during the fuel processing. This building is approximately 30 m^2 (330 ft^2).

291BH Instrument Building, E Filter. The 291BH Instrument Building is an above-ground concrete shear wall building associated with the B Plant Canyon ventilation system. This building is 2.3 m^2 (25 ft^2).

292AA PR Stack Sample House. The 292AA PR Stack Sample House is a small steel building containing instrumentation associated with the plutonium recovery stack at the PUREX Plant. This building is approximately 11 m^2 (117 ft^2).

292AB PUREX Gases Effluent Monitoring Building. The 292AB PUREX Gases Effluent Monitoring Building is a steel-braced frame building containing monitoring instrumentation associated with the PUREX Plant ventilation system. The 292AB Building is a 10.7 m (35 ft) by 6.1 m (20 ft) by 7.6 m (25 ft) two-story metal building. The second floor is constructed on metal grate, with a metal plate over approximately 80 percent of the floor area. The building is an enclosure for stack sampling equipment. This building is approximately 142 m^2 (1,531 ft^2)

293A Off Gas Treatment Facility. The 293A Off Gas Treatment Facility is a concrete building containing off gas scrubber equipment for treating PUREX Plant off gases. The building is approximately 83 m^2 (899 ft^2).

295AA Steam Condensate Discharge (SCD) Sample and Pumpout Station. The 295AA SCD Sample and Pumpout Station is a small steel building that supported PUREX Plant operations. This building was originally designated as 216Z9D in 200 West, at the Plutonium Finishing Plant. The building was salvaged in 1983 and installed as 295AA at PUREX in 1985. This building is approximately 8 m^2 (85 ft^2).

Typical Light Steel Frame Building. These buildings are pre-engineered and/or prefabricated with transverse rigid frames, and are usually one story. The roof and walls consist of insulated steel roof and wall panels. The frames are designed often with tapered beam and column sections built up of light plates. The frames are built in segments and assembled in the field with bolted or welded joints. Interior walls are usually metal studs, and gypsum wallboard partitions. Buildings that fall into this generic category include the following:

- **221BD Laundry Storage Building.** The 221BD Laundry Storage Building is part of the B Plant Complex and is approximately 56 m^2 (608 ft^2).
- **221BK B Plant Canyon Ventilation Instrument Building.** The 221BK B Plant Canyon Ventilation Instrument Building is associated with the B Plant Canyon ventilation system and is approximately 114 m^2 (1,230 ft^2). The B Plant Canyon exhaust system is monitored and controlled from a programmable logic controller (PLC) located in the 221BK Building.
- **225BF Waste Encapsulation and Storage Facility (WESF) Tanker Loadout Station.** The 225BF WESF Tanker Loadout Station associated with the WESF liquid waste system and is approximately 12 m^2 (128 ft^2).
- **242BL Cask Loading Building.** The 242BL Cask Loading Building was built in 1963 to facilitate the transfer of radioactive materials to and from the 242B Facility. The building is a typical steel light frame structure associated with the 241B Tank Farm and is approximately 45 m^2 (480 ft^2).
- **2707AR Sludge Vault Change House.** The 2707AR Sludge Vault Change House is associated with the PUREX Facility and is approximately 61 m^2 (659 ft^2).
- **2711A Air Compressor Building.** The 2711A Air Compressor Building is associated with the PUREX Facility and is approximately 37 m^2 (400 ft^2).

- **2716B Radiation Monitor (RM) Checkout Station, RR Tunnel.** The 2716B RM Checkout Station, RR Tunnel is associated with the B Plant Complex and is approximately 22 m^2 (240 ft^2).
- **291BC "A and B" Filters Building.** The 291BC "A and B" Filters Building is associated with the B Plant Canyon ventilation system and is 84 m^2 (901 ft^2).
- **291BD "C" Filter and Instrument Building.** The 291BD Filter and Instrument Building is associated with the B Plant Canyon ventilation system and is 12 m^2 (137 ft^2).
- **291BF "D" Filter.** The 291BF "D" Filter Building is a typical steel light frame structure associated with the B Plant Canyon ventilation system, and includes the fourth filter vault and supporting instrument building. This building is 6 m^2 (64 ft^2).
- **291BG "D" Filter Instrument Building.** The 291BG "D" Filter Building is a typical steel light frame structure associated with the B Plant Canyon ventilation system. This building includes the compressor building, fifth filter vault and, supporting instrument building. This building is 11 m^2 (126 ft^2).
- **291AD Filter Pit and Stack.** The 291AD Filter Pit and Stack is associated with the PUREX Facility and is approximately 16 m^2 (173 ft^2).
- **291BB Instrument Building, "A and B" Filters.** The 291BB Instrument Building is associated with the B Plant Canyon ventilation system and is approximately 13 m^2 (144 ft^2).
- **291BJ B Plant Instrument Building, "F" Filter.** The 291BJ B Plant Instrument Building is a typical steel light frame structure associated with the B Plant Canyon ventilation system and is approximately 13 m^2(144 ft^2).
- **291BK Instrument Building – "E and F" Filters.** The 291BK Instrument Building is associated with the B Plant Canyon exhaust system pressure monitoring. This building is approximately 9.29 m^2 (100 ft^2).
- **291AH Ammonia Off Gas (AOG) Sample Station.** The 291AH AOG Sample Station is associated with the PUREX Plant process ventilation system. This building is approximately 6 m^2 (64 ft^2).
- **294A Off Gas Treatment and Monitoring Station.** The 294A Off Gas Treatment and Monitoring Station is a small steel building associated with the PUREX Plant process ventilation system. This building is approximately 9 m^2 (96 ft^2).
- **295A Ammonia Scrubber Discharge (ASD) Sample Station.** The 295A ASD Sample Station contains instrumentation for monitoring of ASD effluent associated with PUREX Plant process operations. This building is approximately 9 m^2 (96 ft^2).
- **295AB Process Distillate Discharge (PDD) Sample Station.** The 295AB PDD Sample Station is a small steel building that supported PUREX Plant operations. This building is approximately 18 m^2 (192 ft^2).
- **295AC Chemical Sewer Line (CSL) Sample Station.** The 295AC CSL Sample Station is a small steel building that contains instrumentation associated with the PUREX Plant chemical sewer system. This building is approximately 9 m^2 (96 ft^2).

- **295AD Sanitary Water Line (SWL) Sample Station.** The 295AD SWL Sample Station is a small steel building that contains instrumentation associated with the PUREX Plant sanitary water system. This building is approximately 13 m^2 (144 ft^2).

Typical Light Wood Frame Building. These building are generally wood, light frame structures containing repetitive framing by wood joists on wood studs. Loads are light and spans are small. Exterior walls are usually sheathed with plank siding, stucco, plywood, gypsum board, particle board, or fiberboard. Interior partitions are sheathed with plaster or gypsum board. Roofing is asphalt shingles, composition or built-up roofing system. Buildings that fall into this generic category include the following:

- **291AB Exhaust Air Sampler House.** The 291AB Exhaust Air Sampler House is associated with the PUREX Plant ventilation system and is approximately 4 m^2 (46 ft^2).
- **291AC Exhaust Air Sampler House.** The 291AC Exhaust Air Sampler House is associated with the PUREX Plant ventilation system and is approximately 4 m^2 (46 ft^2).

Typical Reinforced Structure. These structures are typically cast-in-place concrete beams or columns, and could include below-grade construction or basements. These buildings/structures normally have exterior walls that exceed 0.3048 m (12 in.) in thickness, and are heavily reinforced on minimal centerline spacing. Interior walls will vary depending on bearing and non-bearing requirements. Floor and roof framing system consists of cast-in-place concrete slabs with concrete beams, one-way joists, two-way waffle joists, or flat slabs. Buildings that fall into this generic category include the following:

- **225BA K1 Filter Pit Encapsulation Facility.** The 225BA K1 Filter Pit Encapsulation Facility is associated with the WESF ventilation system and is approximately 59 m^2 (638 ft^2).
- **225BB K3 Filter Pit Encapsulation Facility.** The 225BB K3 Filter Pit Encapsulation Facility is associated with the WESF ventilation system and is approximately 121 m^2 (1,302 ft^2).
- **291BA Exhaust Air Sample House.** The 291BA Exhaust Air Sampler House is associated with the B Plant Canyon ventilation system and is approximately 4 m^2 (48 ft^2).

Appendix B

Applicable or Relevant and Appropriate Requirements

B1 Applicable or Relevant and Appropriate Requirements

For the removal action being considered in this document, implementation of any selected alternative would be designed to comply with the ARARs cited in this section to the extent practicable. ARARs are defined to include only substantive requirements of environmental standards. ARARs do not include administrative requirements, including requirements to obtain any federal, state, or local permits (40 CFR 300.400[e], "National Oil and Hazardous Substances Pollution Contingency Plan" (NCP), "General"; 42 USC 9621[e], "Comprehensive Environmental Response, Compensation, and Liability," "Cleanup Standards").

The ARARs listed in this appendix are the ARARs that DOE proposes for implementation of the recommended alternative. These ARARs were selected based on knowledge regarding the hazardous substances within the Tier 2 buildings/structures. The final ARARs will be established within the Action Memorandum(s). Because the alternatives would result primarily in waste generation and potential for air emissions, the key ARARs identified for the alternatives considered include waste management standards, standards controlling releases to the environment, standards for protection of natural resources, and safety and health standards.[1]

B1.1 Waste Management Standards

A variety of waste streams would be generated under the proposed removal action alternatives. It is anticipated that the majority of the waste would be determined to be LLW. However, quantities of TRU, dangerous or mixed waste, PCB waste, and ACM could also be generated. The great majority of the waste would be in a solid form. However, some liquid waste might be generated.

Radioactive waste is managed by 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 by D4 activities. 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 management and disposal of PCB waste are governed by *Toxic Substances Control Act of 1976* (TSCA), and regulations at 40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions." The TSCA regulations contain specific provisions for PCB waste, including PCB waste that contains a radioactive component. PCBs also are considered underlying hazardous constituents under RCRA and thus could be subject to WAC 173-303 and 40 CFR 268 requirements.

[1] Worker safety and health standards are not environmental standards per se and therefore not potential ARARs. Instead, compliance with applicable safety and health regulations is required external to the CERCLA ARAR process. However, due to the nature and importance of these standards, a discussion of the safety and health requirements is included in this appendix.

Removal and disposal of asbestos and ACM are regulated under the Clean Air Act (40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Subpart M, "National Emission Standard 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 that is determined to be LLW that meets ERDF[2] acceptance criteria would preferentially be disposed at ERDF, because ERDF is an engineered facility that provides a high degree of protection to human health and the environment. In addition, previous EE/CAs for other Hanford Site work have shown that this disposal option is more cost effective than disposal at other disposal sites. Construction of ERDF was authorized using a CERCLA ROD (EPA, 1995, *Record of Decision U.S. DOE Hanford Environmental Restoration Disposal Facility, Hanford Site, Benton County, Washington*). ERDF is designed to meet minimum technological requirements for a hazardous waste landfill, including standards for a double liner, a leachate collection system, leak detection, monitoring, and a final cover. Alternate potential disposal locations may be considered when the NTCRA occurs if a suitable and cost-effective location is identified. Any potential alternate disposal location would be evaluated for appropriate performance standards to assure that it is adequately protective of human health and the environment. Waste treatment and/or disposal may take place at other facilities that are on the Hanford Site or that are offsite and have been authorized by their own EPA regional offices in accordance with 40 CFR 300.440 as suitable to receive waste from CERCLA sites.

Waste designated as dangerous or mixed waste would be treated as appropriate to meet land disposal restrictions and ERDF acceptance criteria, and disposed at ERDF. Applicable packaging and pre-transportation requirements for dangerous or mixed waste generated by the NTCRA would be identified and implemented before movement of any waste.

Some of the aqueous waste determined to be LLW or designated as dangerous or mixed waste would be transported to ETF for treatment and disposal. ETF is a RCRA-permitted unit 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 non-liquid PCB waste likely would be disposed at ERDF, depending on whether it meets the waste acceptance criteria. PCB waste that does not meet ERDF waste acceptance criteria would be retained at a PCB storage area meeting the requirements for TSCA storage and would be transported for future disposal at an appropriate disposal facility.

Asbestos and ACM would be removed, packaged as appropriate, and disposed in ERDF.

Alternatives 2 and 3 can be performed in compliance with the waste management ARARs. Waste streams would be evaluated, designated, and managed in compliance with the ARAR requirements. Before disposal, waste would be managed in a protective manner to prevent releases to the environment or unnecessary exposure to personnel.

[2] 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 Hanford buildings/structures 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. This determination will be made upon issuance of the Action Memorandum(s).

B1.2 Standards Controlling Emissions to the Environment

The proposed removal action alternatives have the potential to generate both radioactive and non-radioactive airborne emissions.

Radiological Air Emissions: The Federal *Clean Air Act of 1990* and the "Washington Clean Air Act," (RCW 70.94, "Public Health and Safety"), require regulation of radioactive air pollutants. Implementing regulations found in 40 CFR 61.92, "National Emission Standards for Hazardous Air Pollutants," "Standard," set limits for radionuclide emissions from the DOE Hanford Site, which cannot exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem/yr. This requirement would be applicable to any aspects of the NTCRA with the potential to emit radionuclides to unrestricted areas. Verification of compliance with this standard is required by the state- implementing regulation at WAC 173-480-070, "Ambient Air Quality Standards and Emission Limits for Radionuclides," "Emission Monitoring and Compliance Procedures." Radioactive air emissions are to be controlled through the use of best available radionuclide control technology or as low as reasonably achievable control technology where economically and technologically feasible (WAC 246-247-040[3] and -040[4], "Radiation Protection—Air Emissions," "General Standards," and associated definitions). To address the substantive aspect of these potential 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 (that is, based on cost/benefit). If it is determined that there are substantive aspects of the requirement for control of radioactive airborne emissions once ARARs are finalized, then controls would be administered as appropriate using the best methods from among those that are reasonable and effective. Several of the buildings/structures to be removed may require continuous emissions monitoring or an approved alternative monitoring method, to ensure timely response to elevated airborne emissions of radionuclides (WAC 246-247-035, "National Standards Adopted by Reference for Sources of Radionuclide Emissions").

B1.3 Criteria/Toxic Air Emissions

WAC 173-400, "General Regulations for Air Pollution Sources," and WAC 173-460, "Controls for New Sources of Toxic Air Pollutants," establish requirements emissions of criteria/toxic air pollutants. The primary source of emissions resulting from this NTCRA would be fugitive particulate matter. In accordance with WAC 173-400-040(3) and (8), "General Standards for Maximum Emission," reasonable precautions must be taken to: (1) prevent the release of air contaminants associated with fugitive emissions resulting from demolition, 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 NTCRA.

Treatment of some waste encountered during the NTCRA 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 because it would not result in the emission of toxic air pollutants. If more aggressive treatment is required that would result in the emission of regulated air pollutants above *de minimis* emission values in WAC 173-460-150, "Table of ASIL, SQER and de Minimis Emission Values," 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 and satisfied if determined to be ARAR.

Emissions to the air would be minimized during implementation of the NTCRA 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 of WAC 173-400-040(3) and (8).

The alternatives are expected to comply with the ARARs in Tables B-1 and B-2.

Table B-1. Identification of Potential Federal Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
Clean Air Act of 1990 and Amendments; 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants"			
40 CFR 61.92, "Standard"	ARAR	This regulation sets a limit for the combined radionuclide emissions from a DOE facility (site). The emissions cannot exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.	The buildings/structures to be addressed under this NTCRA will contain radioactive constituents. Potential emissions from work under the NTCRA would be performed in accordance with this standard.
40 CFR 61.145, "Standard for Demolition and Renovation" Specific subsections: 40 CFR 61.145(a)(1), (a)(2), and (a)(5), 40 CFR 61.145(c) 40 CFR 61.150(a) through (c), "Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations"	ARAR	These standards apply to demolition activities, including the removal of regulated asbestos-containing material (RACM). The standards of 40 CFR 61.145(a)(1), (a)(2), and (a)(5), are used to determine when the requirements of 40 CFR 61.145(c) apply to demolition activities. The standards of 40 CFR 61.150(a) through (c) are used to control asbestos emissions during collection, processing, packaging, and transport of any asbestos-containing waste material.	Some buildings/structures addressed under the NTCRA could contain asbestos. The substantive provisions of 40 CFR 61.145(c) would be complied in accordance with 40 CFR 61.145(a)(1), (a)(2), and (a)(5) for the D4 of that contain RACM under this NTCRA. The substantive provisions of 40 CFR 61.150(a) through (c) would be met during activities that involve collection, processing, packaging, and transport of asbestos-containing waste material under the NTCRA.

Table B-1. Identification of Potential Federal Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
Archaeological and Historic Preservation Act			
National Archaeological and Historic Preservation Act of 1976 *Archeological and Historic Preservation Act of 1974*, 16 USC 469aa –469mm 40 CFR 6.301(c), "Procedures for Implementing the National Environmental Policy Act and Assessing the Environmental Effects Abroad of EPA Actions," "Applicant Requirements"	ARAR	These laws apply to activities that could 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.	Based on past identification of archeological and historic sites at the Hanford Site, the substantive requirements of this act are potentially applicable to and would be complied with for actions under the NTCRA that might disturb these sites. This requirement is location-specific.
National Historic Preservation Act of 1966			
National Historic Preservation Act of 1966 36 CFR 800, "Protection of Historic Properties" 40 CFR 6.301(b), "Applicant Requirements" Executive Order 11593, *Protection and Enhancement of the Cultural Environment* 36 CFR 65, "National Historic Landmarks Program" 36 CFR 60, "National Register of Historic Places"	ARAR	The National Historic Preservation Act of 1966 requires that historic properties are appropriately considered in planning federal initiatives and actions. These laws also require federal agencies to consider the impacts of their undertaking on cultural properties through identification, evaluation and mitigation processes, and consultation with interested parties.	Based on past identification of cultural and historic sites at the Hanford Site, these types of sites could be encountered during NTCRA activities. The substantive requirements of this act are potentially applicable to and would be complied with for actions that might disturb these types of sites. This requirement is location-specific.
Native American Graves Protection and Repatriation of Act 1990			
Native American Graves Protection and Repatriation Act of 1990 43 CFR 10, "Native American Graves Protection and Repatriation Regulations"	ARAR	These provisions establish federal agency responsibility for discovery of human remains, associated and unassociated funerary objects, sacred objects, and items of cultural patrimony.	Based on Hanford Site history, these types of sites could be encountered during the NTCRA. Substantive requirements of this act are potentially applicable if remains and sacred objects are found during NTCRA activities and will require Native American Tribal consultation in the event of discovery. This requirement is location-specific.

Table B-1. Identification of Potential Federal Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
Endangered Species Act of 1973			
Endangered Species Act of 1973,16 USC 1531 et seq., subsection 16 USC 1536(c) 50 CFR 402, "Interagency Cooperation—Endangered Species Act of 1973, as amended" 40 CFR 6.302(h), "Responsible Official Requirements" *Migratory Bird Treaty Act of 1918*	ARAR	These laws and implementing regulations prohibit 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.	The NTCRA will be implemented where such species could be encountered. Substantive requirements of this act are potentially applicable if threatened or endangered species are identified in areas where NTCRA activities will occur. If the NTCRA is within critical habitat or buffer zones surrounding threatened or endangered species, mitigation measures must be taken to protect the resource in accordance with substantive requirements of these laws and regulations. This requirement is location-specific.
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	The provisions 40 CFR 82.156 specify standards for evacuation of refrigerant from appliances to a recovery or recycling machine prior to disposal. The procedures and processes of 40 CFR 82.158 apply to recycling and recovery of ozone depleting substances (ODS). 40 CFR 82.161 requires appropriate certification for workers who recover or recycle ODS.	Some buildings/structures addressed under the NTCRA could include appliances. Appliances identified for disposal under the NTCRA may include the recycling or recovery of ODS that would be conducted in accordance with the applicable substantive requirements and work practices. These requirements are action-specific.

Table B-1. Identification of Potential Federal Applicable or Relevant and Appropriate Requirements and to be Considered for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
Toxic Substances Control Act (TSCA); 40 CFR 761, "Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions"			
40 CFR 761.50(b)1, 2, 3, 4, and 7, "Applicability," "PCB Waste" 40 CFR 761.50(c), "Storage for Disposal" 40 CFR 761.60(a), "Disposal Requirements," "PCB Liquids" 40 CFR 761.60 (b), "PCB Articles" 40 CFR 761.60 (c), "PCB Containers" 40 CFR 761.61, "PCB Remediation Waste" 40 CFR 761.62, "Disposal of PCB Bulk Product Waste" 40 CFR 761.79, "Decontamination Standards and Procedures"	ARAR	These regulations apply to the storage and disposal of PCB waste including liquid PCB waste, PCB items, PCB remediation waste, PCB bulk product waste, and PCB/radioactive waste at concentrations equal to or greater than 50 ppm. These regulations also provide options for decontamination of materials contaminated with PCBs.	Some buildings/structures addressed under the NTCRA could include various forms of PCB waste, 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.

ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
EO = executive order
MBTA = Migratory Bird Treaty Act
MCL = maximum contaminant level
MOU = memorandum of understanding
ODS = ozone depleting substances
OU = operable unit
PCB = polychlorinated biphenyl
ppm = parts per million
RACM = regulated asbestos-containing material
TBC = to be considered

Table B-2. Identification of Potential State Applicable or Relevant and Appropriate Requirements for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
RCW 70.95, Regulations Pursuant to the Solid Waste Management Recovery and Recycling Act of 1969			
WAC 173-303-016 , "Identifying Solid Waste"	ARAR	This regulation applies for determining which materials are and are not solid waste. This determination is used to establish which waste are subject to the designation procedures of WAC 173-303-070(3).	Solid waste will be generated during the NTCRA. Substantive requirements of these regulations are potentially 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 NTCRA would be evaluated using the procedures for identifying solid waste to ensure proper management. This requirement is action-specific.
WAC 173-303-070(3), "Designation of Dangerous Waste"	ARAR	This regulation applies for the evaluation of solid waste to determine if such waste is designated as dangerous or mixed waste. Solid waste that designates as dangerous or mixed waste are subject to management and disposal standards of WAC 173-303.	There is potential for generating solid waste during D4 that would designate as dangerous or mixed waste. Substantive requirements of these regulations are potentially applicable to such solid waste if generated or encountered during the NTCRA. Specifically, solid waste generated for removal from the CERCLA site during this NTCRA would be evaluated using the dangerous waste designation procedures to ensure proper management. This requirement is action-specific.
WAC 173-303-071, "Excluded Categories of Waste"	ARAR	This regulation lists waste categories that are excluded from management in accordance with the requirements of WAC 173-303.	There is potential for generating materials during D4 that would qualify for management under the substantive provisions of these regulations, which would be used as appropriate during the NTRCA. This requirement is action-specific.

Table B-2. Identification of Potential State Applicable or Relevant and Appropriate Requirements for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
WAC 173-303-073 , "Conditional Exclusion of Special Wastes"	ARAR	This regulation provides for management of waste that pose a relatively low hazard to human health and the environment. The standards provide for management of special waste with a level of protection that is intermediate between dangerous and nondangerous solid waste.	There is potential for generating materials during D4 that would qualify for management under the substantive provisions of these regulations, which would be used as appropriate during the NTCRA. This requirement is action-specific.
WAC 173-303-077, "Requirements for Universal Waste"	ARAR	This regulation provides alternate reduced standards for certain solid waste (that is, batteries, mercury-containing equipment, and lamps) as described in WAC 173-303-573.	There is potential for generating materials during D4 that would qualify for management under the substantive provisions of these regulations, which would be used as appropriate during the NTCRA. This requirement is action-specific.
WAC 173-303-120, "Recycled, Reclaimed, and Recovered Wastes"	ARAR	This regulation describes requirements for recycling materials that are solid waste and dangerous.	There is potential for generating solid waste during D4 that will designate as dangerous that may be recycled.
WAC 173-303-140(4) , "Land Disposal Restrictions"	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).	There is potential for generating solid waste during D4 that would designate as dangerous or mixed waste and further require treatment prior to land disposal. The substantive requirements of this regulation are potentially applicable to dangerous and/or mixed waste that is generated or encountered during the NTCRA. Specifically, dangerous and/or mixed waste generated and removed from the CERCLA site during the NTCRA for land disposal (for example, at ERDF or other approved disposal facility) would be evaluated for determination of applicable land disposal restrictions at the point of waste generation. This requirement is action-specific.

Table B-2. Identification of Potential State Applicable or Relevant and Appropriate Requirements for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
WAC 173-303-170(3), "Requirements for Generators of Dangerous Waste."	ARAR	This regulation establishes standards for the temporary management of waste that designates as dangerous or mixed waste.	There may be waste generated during the NTCRA that needs to be temporarily accumulated or stored under the NTCRA. Substantive requirements of these regulations would be used for management of materials generated and/or encountered during the NTCRA. WAC 173-303-170(3) includes by reference the substantive provisions of both the satellite accumulation standards of WAC 173-303-200, "Accumulating Dangerous Waste On-Site," and the standards for management in containers under WAC 173-303-630, "Use and Management of Containers," and tanks under -640, "Tank Systems." This requirement is action-specific.
Regulations Pursuant to the Solid Waste Management Recovery and Recycling Act of 1969, RCW 70.95			
WAC 173-350-300(2), "Solid Waste Handling Standards," "On-Site Storage, Collection, and Transportation Standards"	ARAR	This regulation describes requirements for management of non-dangerous, non-radioactive solid waste.	There is potential for generating non-dangerous, non-radioactive solid waste during D4.
General Regulations for Air Pollution Sources, WAC 173-400, "General Regulations for Air Pollution Sources," and WAC 173-460, "Controls for New Sources of Toxic Air Pollutants"			
Washington Clean Air Act of 1967, RCW 70.94, "Public Health and Safety," "Washington Clean Air Act," and RCW 43.21A, "State Government—Executive," "Department of Ecology" WAC 173-400, "General Regulations for Air Pollution" Specific subsection: WAC 173-400-040(3), "General Standards for Maximum Emission" WAC 173-400-040(8)	ARAR	These laws and regulations require 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 (RACT).	There is potential for fugitive emissions during D4 under the NTCRA. Substantive requirements of the general standards for control of fugitive emissions would be applied as appropriate to minimize the generation of fugitive dust during D4 activities. These requirements are action-specific.

Table B-2. Identification of Potential State Applicable or Relevant and Appropriate Requirements for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
Specific subsection: WAC 173-400-113, "Requirements for New Sources in Attainment or Unclassifiable Areas"	ARAR	This regulation applies to new and modified sources and requires controls to minimize the release of associated criteria and toxic air emissions. Emissions are to be minimized through application of best available control technology (BACT).	It is unlikely that the substantive provisions in this regulation would be triggered during the NTCRA. However, substantive requirements of this regulation potentially would be applicable to removal actions performed at the site if a treatment technology that emits regulated air emissions were necessary during the implementation of the NTCRA. This requirement is action-specific.
WAC 173-460, "Controls for New Sources of Toxic Air Pollutants" Specific subsections: WAC 173-460-060, "Control Technology Requirements" WAC 173-460-150, "Table of ASIL, SQER and de Minimis Emission Values"	ARAR	These regulation apply for determination of *de minimis* emission values and for establishment of control technology as appropriate for new or modified toxic air pollutant sources likely to increase toxic air pollutant emission. Requires best available control technology for regulated emissions of toxic air pollutants (T-BACT) and demonstration that emissions of toxic air pollutants (TAP) will not endanger human health or safety.	It is not expected that work done under the NTCRA will trigger standards for T-BACT. However, substantive requirements of these regulations potentially 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 NTCRA. These requirements are action-specific.
WAC 246-247, "Radiation Protection—Air Emissions"			
WAC 246-247, "Radiation Protection—Air Emissions" WAC 246-247-040(3), "General Standards" 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 ALARACT in controlling emissions to the environment.	Radionuclide contamination will be encountered during D4 under the NTCRA. Substantive requirements of this standard would be potentially applicable to activities that would involve fugitive, diffuse and/or point source emissions of radionuclides to the ambient air, such as demolition and excavation of radioactively contaminated structures and/or soils and operation of exhausters and vacuums, performed during the NTCRA. These requirements are action-specific.

Table B-2. Identification of Potential State Applicable or Relevant and Appropriate Requirements for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
WAC 246-247-075, "Monitoring, Testing, and Quality Assurance" Specific subsections: WAC 246-247-075(1) WAC 246-247-075(2) WAC 246-247-075(3) WAC 246-247-075(4) WAC 246-247-075(6) WAC 246-247-075(8) WAC 246-247-075(11)	ARAR	These regulations establish the monitoring, testing, and quality assurance requirements for radioactive air emissions from radionuclide air emission sources. These regulations also include requirements for continuous sampling. Periodic sampling (grab samples) occurs 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. Emissions from non-point and fugitive sources of airborne radioactive material shall be measured. 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.	There is a potential for generating fugitive, diffuse, and/or point source emissions during the NTCRA. Substantive requirements of this standard are potentially applicable because fugitive and nonpoint source emissions of radionuclides to the ambient air may result from activities, such as demolition and excavation of radioactively contaminated structures and operation of exhausters and vacuums, performed during the NTCRA. These requirements are action-specific.
WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides"			
WAC 173-480-040, "Ambient Standard"	ARAR	Requires that emissions of radionuclides in the air shall not cause a maximum effective dose equivalent of more than 10 mrem/y to the whole body to any member of the public.	The buildings/structures to be addressed under this NTCRA will contain radioactive constituents. Potential emissions from work under the NTCRA would be performed in accordance with this standard.

Table B-2. Identification of Potential State Applicable or Relevant and Appropriate Requirements for the Removal Action

ARAR Citation	ARAR	Requirement	Rationale for Consideration
WAC 173-480-050(1), "General Standards for Maximum Permissible Emissions"	ARAR	This regulation establishes general standards for all radionuclide emission units and requires emission units to meet WAC 246-247 requiring every reasonable effort to maintain radioactive materials in effluents to unrestricted areas, ALARA. The regulation indicates that control equipment of sites operating under ALARA shall be defined as RACT and ALARA control technology.	The potential for fugitive and diffuse emissions due to demolition and excavation and related activities potentially will require efforts to minimize those emissions by meeting WAC 246-247. This requirement is action-specific and potentially applicable.
WAC 173-480-060, "Emission Standards for New and Modified Emission Units"	ARAR	Requires that construction, installation, or establishment of a new air emission unit shall utilize BARCT.	The potential for fugitive and diffuse emissions due to demolition and excavation and related activities potentially will require efforts to minimize those emissions by meeting WAC 246-247. This requirement is action-specific and potentially applicable.
WAC 173-480-070(2), "Emission Monitoring and Compliance Procedures"	ARAR	Requires that procedures specified in WAC 246-247 or approved specifically by the regulatory agency shall be used to determine compliance with the 10 mrem/yr standard for dose to any member of the public. Compliance is determined by calculating the dose to members of the public at the point of maximum annual air concentration in an unrestricted area where any member of the public may be.	The potential for radionuclide emissions from some activities under the NTCRA such as fugitive and diffuse emissions during demolition and excavation and related activities would be performed in compliance with the public dose standard during the NTCRA. This requirement is action-specific.

ALARA = as low as reasonably achievable
ALARACT= as low as reasonably achievable control technology
BACT = best available control technology
BARCT = best available radionuclide control technology
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
RACT = reasonably available control technology
TAP = toxic air pollutants
T-BACT = toxics best available control technology
WAC = Washington Administrative Code

B2 References

36 CFR 60, "National Register of Historic Places," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_10/36cfr60_10.html.

36 CFR 65, "National Historic Landmarks Program," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_10/36cfr65_10.html.

36 CFR 800, "Protection of Historic Properties," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_08/36cfr800_08.html.

40 CFR 6, "Procedures for Implementing the National Environmental Policy Act and Assessing the Environmental Effects Abroad of EPA Actions," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr6_09.html.

6.301, "Applicant Requirements."

6.302, "Responsible Official Requirements."

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr61_09.html.

61.92, "Standard."

61.145, "Standard for Demolition and Renovation."

61.150, "Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations."

Subpart M, "National Emission Standard for Asbestos."

40 CFR 82, "Protection of Stratospheric Ozone," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_10/40cfr82_10.html. 2010 Revision. Accessed 09/22/10.

82.156, "Required Practices."

82.158, "Standards for Recycling and Recovery Equipment."

82.161, "Technician Certification."

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr268_09.html.

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_10/40cfr300_10.html.

300.400, "General."

300.440, "Procedures for Planning and Implementing Off-Site Response Actions."

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr761_09.html.

761.50, "Applicability."

761.60, "Disposal Requirements."

761.61, "PCB Remediation Waste."

761.62, "Disposal of PCB Bulk Product Waste."

761.79, "Decontamination Standards and Procedures."

42 USC 9621, "Comprehensive Environmental Response, Compensation, and Liability," "Cleanup Standards," *United States Code*. Available at: http://uscode.house.gov/download/pls/42C103.txt.

43 CFR 10, "Native American Graves Protection and Repatriation Regulations," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/43cfr10_09.html.

50 CFR 402, "Interagency Cooperation—Endangered Species Act of 1973, as amended," *Code of Federal Regulations*. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/50cfr402_09.html.

Archeological and Historic Preservation Act of 1974, 16 USC 469aa-469mm. Available at: http://www.nps.gov/history/local-law/fhpl_archhistpres.pdf.

Atomic Energy Act of 1954, 42 USC 2011, et seq. Available at: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0980/ml022200075-vol1.pdf.

Clean Air Act of 1990, 42 USC 7401, et seq., Pub. L. 101-549. Available at: http://www.epa.gov/air/caa/.

Endangered Species Act of 1973, 16 USC 1531, et seq. Available at: http://www.access.gpo.gov/nara/cfr/waisidx_09/50cfr402_09.html.

EPA, 1995, *Record of Decision U.S. DOE Hanford Environmental Restoration Disposal Facility, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, U.S. Department of Energy, and Washington State Department of Ecology. Available at: http://www2.hanford.gov/arpir/?content=findpage&AKey=D196041064.

Executive Order 11593, 1971, *Protection and Enhancement of the Cultural Environment*, Richard Nixon, May 13. Available at: http://www.gsa.gov/portal/content/101025.

Migratory Bird Treaty Act of 1918, 16 USC 703, et seq. Available at: http://www.animallaw.info/statutes/stusmba.htm.

National Historic Preservation Act of 1966, 16 USC 470, et seq. Available at: http://www.achp.gov/docs/nhpa%202008-final.pdf.

Native American Graves Protection and Repatriation Act of 1990, 25 USC 3001, et seq. Available at: http://www.nps.gov/history/local-law/FHPL_NAGPRA.pdf.

RCW 43.21A, "State Government—Executive," "Department of Ecology," *Revised Code of Washington*, Washington State, Olympia, Washington. Available at: http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21A.

RCW 70.94, "Public Health and Safety," "Washington Clean Air Act," *Revised Code of Washington*, Washington State, Olympia, Washington. Available at: http://apps.leg.wa.gov/RCW/default.aspx?cite=70.94.

RCW 70.95, "Solid Waste Management—Reduction and Recycling," *Revised Code of Washington*, Olympia, Washington. Available at: http://apps.leg.wa.gov/RCW/default.aspx?cite=70.95.

Toxic Substances Control Act of 1976, 15 USC 2601, et seq. Available at: http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=BROWSE&TITLE=15USCC53.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-303.

303-016, "Identifying Solid Waste."

303-070, "Designation of Dangerous Waste."

303-071, "Excluded Categories of Waste."

303-073, "Conditional Exclusion of Special Wastes."

303-077, "Requirements for Universal Waste."

303-120, "Recycled, Reclaimed, and Recovered Wastes."

303-140, "Land Disposal Restrictions."

303-170, "Requirements for Generators of Dangerous Waste."

303-200, "Accumulating Dangerous Waste On-Site."

303-630, "Use and Management of Containers."

303-640, "Tank Systems."

WAC 173-350-300, "Solid Waste Handling Standards," "On-Site Storage, Collection and Transportation Standards," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-350-300.

WAC 173-400, "General Regulations for Air Pollution Sources," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-400.

400-040, "General Standards for Maximum Emission."

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*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-460.

460-060, "Control Technology Requirements."

460-150, "Table of ASIL, SQER and de Minimis Emission Values."

WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-480.

480-040, “Ambient Standard.”

480-050, “General Standards for Maximum Permissible Emissions.”

480-060, “Emission Standards for New and Modified Emission Units.”

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

WAC 246-247, “Radiation Protection—Air Emissions,” *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=246-247.

247-040, “General Standards.”

247-035, “National Standards Adopted by Reference for Sources of Radionuclide Emissions.”

075, “Monitoring, Testing and Quality Assurance.”

Distribution

	MS	Quantity
U.S. Department of Energy, Richland Operations Office		
D.H. Chapin	A5-11	20
DOE Public Reading Room	H2-53	1
CH2M HILL Plateau Remediation Company		
D.L. Norman	T1-41	10
Publications Technical Library	H3-21	1
Washington Closure Hanford, LLC		
J.W. Badden	S7-66	1
Administrative Record	H6-08	1
Document Clearance	H6-08	1