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Hanford Federal Facility Agreement and Consent Order
(Tri-Party Agreement)

Engineering Evaluation/Cost Analysis for General Hanford Site Decommissioning Activities

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Public Comment Period
February 17 – March19, 2010

Tri-Party Agreement
U. S. Department of Energy
U.S. Environmental Protection Agency
Washington State Department of Ecology

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)
Reference Documents for

Engineering Evaluation/Cost Analysis for General Hanford Site Decommissioning Activities

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Engineering Evaluation/Cost Analysis for General Hanford Site Decommissioning Activities, DOE/RL-2010-14 Revision 0

DOE/RL-2010-14
Revision 0

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

U.S. DEPARTMENT OF ENERGY | Richland Operations Office

P.O. Box 550
Richland, Washington 99352

Approved for Public Release;
Further Dissemination Unlimited

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Executive Summary

This Engineering Evaluation/Cost Analysis (EE/CA) has been prepared for public comment and evaluates approaches to perform decommissioning of Hanford excess industrial buildings and structures and cleanup of miscellaneous debris at various Hanford locations. The evaluation assists the U.S. Department of Energy (DOE), Richland Operations Office (RL) in identifying the most effective means to decommission excess buildings and structures for which the specific missions have been completed. The evaluation also assists RL in cleanup of miscellaneous debris (e.g., solid wastes) identified during the cleanup process. The scope of the EE/CA encompasses excess industrial buildings and structures that were never used for radiological or chemical processing and debris. However, these buildings, structures, and debris may be potentially contaminated with hazardous substances as a result of their proximity to Hanford Site contamination and based on the building/debris components and contents (e.g., asbestos, paints, coatings, and so forth). A listing of the buildings and structures planned for decommissioning by DOE and included in the evaluation is provided in Section 2.1 of this EE/CA. The regulatory process to accomplish this decommissioning and cleanup of debris is to perform a non-time-critical removal action (NTCRA). The approach satisfies environmental review requirements and provides for stakeholder involvement, while providing a framework for selecting the decommissioning alternative. An Administrative Record has been established to record information used to support the EE/CA and provide documentation of decisions and the progress of the removal action.

Although the decommissioning of excess industrial buildings and structures and cleanup of debris by DOE is not specifically addressed in previous records of decision at Hanford, this removal action is consistent with the remedial action objectives of previous RODs and supports the overall cleanup objectives established through the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989). Completion of the removal action would place the identified buildings and structures and debris in a condition protective of human health and the environment. The potential contaminants of concern that may be encountered during implementation of the NTCRA include, but are not limited to, radionuclides, asbestos, heavy metals, and chemicals.

Development of this EE/CA has been performed in accordance with the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), as amended by

the "Superfund Amendments and Reauthorization Act of 1986" (Public Law 99-499), and in accordance with the "National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR 300). Preparation of this EE/CA is consistent with the joint DOE and Environmental Protection Agency (EPA) *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act* (DOE and EPA 1995), which establishes the CERCLA NTCRA process as an approach for decommissioning. The removal action alternatives presented are compared against the criteria of effectiveness, implementability, and cost.

Three alternatives are under consideration for the decommissioning and debris cleanup activities to be performed: Alternative 1: No Action; Alternative 2: Continued Surveillance and Maintenance; with future Decontamination, Deactivation, Decommissioning, and Demolition of Buildings/Structures and Cleanup of Debris and Alternative 3: Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures and Cleanup of Debris.

Alternative 1 assumes all short-term and long-term maintenance of the buildings/ structures is terminated. Alternative 2 includes a period of buildings/structures surveillance and maintenance and periodic inspection of debris followed by D4 and cleanup of debris. Alternative 3 consists of near-term decontamination and demolition of the buildings/structures and cleanup of debris and associated waste disposal.

Present-worth cost estimates for the three alternatives are shown in Table ES-1. The costs are based on present-day (2010) dollars. The information in the cost estimate is based on the best available information regarding the anticipated scope of the removal action alternatives.

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

Alternative	Present-Worth Cost
Alternative 1: No Action	No cost
Alternative 2: Continued Surveillance and Maintenance; with future Decontamination, Deactivation, Decommissioning, and Demolition of Buildings/Structures and Cleanup of Debris	$143,000,000
Alternative 3: Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures and Cleanup of Debris	$96,000,000

Accuracy range of the cost estimate is -30% to +50%

Alternative 1 (No Action) would not eliminate, reduce, or control risks to human health and the environment. RL is required by federal orders and state and federal laws to protect workers and the public from unacceptable exposures, and Hanford currently has administrative and physical controls in place to prevent unacceptable exposures to ionizing radiation and other chemical hazards from contaminated materials. RL cannot implement a no action alternative (e.g., no controls) for these buildings/structures and debris because it would put workers and the public at risk and would not meet the requirements of federal orders and state and federal laws. Therefore, the No Action alternative cannot be considered a viable alternative.

Alternative 2 (Continued Surveillance and Maintenance; with future Decontamination, Deactivation, Decommissioning, and Demolition of Buildings/Structures and Cleanup of Debris) would merely result in a delay for the start of decommissioning and cleanup and would require expenditures for the continued maintenance and monitoring over the interim.

The recommended removal action alternative is Alternative 3 Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures and Cleanup of Debris. The scope of Alternative 3 addresses decommissioning of Hanford excess industrial buildings and structures. The scope would include further cleanup of miscellaneous debris identified for removal. Work under this NTCRA will contribute to the efficient performance of long-term remedial actions at Hanford and will support protection of habitat and restoration of the natural environment. Building contents include, but are not limited to, structural materials, pumps, pipes, tanks, boilers, compressors, ductwork, electrical components, and other equipment. The types of wastes and debris likely to require disposal include, but are not limited to, solid waste, low-level radioactive waste, asbestos and radioactively contaminated asbestos waste, and polychlorinated biphenyl (PCB) remediation and/or bulk product contaminated waste.

The preferred disposal location for wastes generated during the implementation of the NTCRA is the Hanford Environmental Restoration Disposal Facility (ERDF). Additionally, DOE might identify certain wastes generated from activities under the scope of the NTCRA for use in other remedial actions, such as backfill, under the barrier associated with the 221-U Facility remedy, if such wastes meet applicable criteria of the decision document. DOE would consult with Washington State Department of Ecology (Ecology) and EPA for candidate wastes prior to decisions regarding such use.

Demolition of building and structures would include removal of abovegrade structures. Belowgrade structures would be removed and disposed of using the same process as abovegrade buildings and structures. However, if belowgrade structures (including pipes and utility systems) are not contaminated or may be decontaminated, they would optionally be left in place, backfilled, and brought to grade. Backfill would consist of clean fill materials. If evidence of contamination to surrounding soils is encountered, those soils would be excavated and disposed or the site may be identified by RL as a new site under the Tri-Party Agreement., with concurrence by the Ecology and EPA.

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Terms

ACHP	Advisory Council on Historic Preservation
ACM	asbestos containing material
ARAR	applicable or relevant and appropriate requirement
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CFR	Code of Federal Regulations
COC	contaminant of concern
CRMP	Cultural Resources Management Plan
CRR	cultural resource review
D4	decontamination, deactivation, decommissioning, and demolition
DOE	Department of Energy
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
EPA	Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ESA	*Endangered Species Act*
HWMA	*Hazardous Waste Management Act*
NEPA	*National Environmental Policy Act of 1969*
NHPA	*National Historic Preservation Act*
NTCRA	non-time-critical removal action
OU	operable unit
PCB	polychlorinated biphenyl
RAO	removal action objective
RCRA	*Resource Conservation and Recovery Act*
RL	U.S. Department of Energy, Richland Operations Office
ROD	Record of Decision
RSE	removal site evaluation
S&M	surveillance and maintenance
SHPO	State Historic Preservation Officer
TEDE	total effective dose equivalent

Treatment Plan	DOE/RL-97-56, *Manhattan Project and Cold War Era Historic District Treatment Plan*
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
USC	United States Code
WAC	*Washington Administrative Code*

1 Introduction

This Engineering Evaluation/Cost Analysis (EE/CA) has been prepared in accordance with Section 300.415(b)(4)(i) of the "National Oil and Hazardous Substances Pollution Contingency Plan" (40 [*Code of Federal Regulations* [CFR] 300) and assists the U.S. Department of Energy (DOE), Richland Operations Office (RL) in identifying the most effective alternative for performing the decommissioning of Hanford excess industrial buildings and structures whose mission is now completed. The excess industrial buildings and structures are identified in Table 2-1. The evaluation also assists DOE in cleanup of miscellaneous debris. The process to accomplish this action and to determine how the work will be conducted is to perform a non-time-critical removal action (NTCRA), which is intended to satisfy environmental review requirements, while providing a framework for selecting the decommissioning end states and satisfying Administrative Record requirements for documentation of the removal action. This EE/CA identifies the objectives of the removal action and analyzes the effectiveness, implementability, and estimated cost of the proposed action to satisfy these objectives. Following consideration of comments received during the public review period, an Action Memorandum documenting the selected alternative will be issued to the Administrative Record by DOE with concurrence from the Washington State Department of Ecology (Ecology) and U.S. Environmental Protection Agency (EPA).

This NTCRA is consistent with the joint DOE and EPA Policy on *Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act* (DOE and EPA 1995), which establishes the CERCLA NTCRA process as the preferred approach for decommissioning surplus DOE facilities. Under this policy, an NTCRA may be taken when DOE determines that the action will prevent, minimize, stabilize, or eliminate a risk to human health and/or the environment. When DOE determines that a CERCLA NTCRA is necessary, 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. This policy states in part:

> *Although the full range of CERCLA response actions may be applicable to decommissioning activities, NTCRAs 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 will place the buildings/structures and debris in a configuration that is protective of human health and the environment. Without decommissioning these buildings/structures and cleaning up debris, a potential threat of release of hazardous substances exists, and, without action, adverse threats to human health and the environment eventually could occur. As the lead agency, DOE has determined that a removal action is an appropriate means to accomplish the final end state and achieve environmental review requirements. Both Ecology and EPA concur that a NTCRA is warranted to place these excess buildings/structures and debris in a configuration that is protective of human health and the environment. This NTCRA will, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action, as required by 40 CFR 300.415(d).

Under DOE's *National Environmental Policy Act of 1969* (NEPA) compliance program (DOE Order 451.1B, 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 5.4.1 of this document.

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

The Action Memorandum for this removal action will serve as the decision point to proceed with the disposition phase.

1.1 Purpose and Scope

The scope of the EE/CA is intended to encompass decommissioning of Hanford excess industrial buildings/structures and cleanup of debris. A listing of buildings/structures subject to the scope of this evaluation is included in Section 2.1.

Some buildings/structures slated for decommissioning may be found to be unsuitable for inclusion within the NTCRA or DOE may find unforeseen future uses prior to performing the decommissioning. If this occurs and eliminating the buildings/structures from the list identified in Section 2.1 is appropriate, documentation would be placed in the Administrative Record for this NTCRA identifying the buildings/structures and explaining why it is not being addressed under the scope of the NTCRA. Furthermore, DOE may need to decommission other Hanford buildings/structures with similar characteristics, contaminants, and complexity to those specifically identified in Section 2.1. This evaluation intends to allow the potential future inclusion of such buildings and structures under the scope of this NTCRA, as appropriate. If additional buildings and structures are added to the list in Section 2.1, concurrence from Ecology and EPA 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 sufficiently similar to the buildings/structures specifically identified in this EE/CA and appropriate for inclusion under the scope of the NTCRA. This NTCRA is intended to obtain input from the public regarding how to best implement decommissioning of excess buildings/structures and debris cleanup activities at Hanford, while simplifying administrative processes for management of wastes generated during decommissioning and cleanup. The types of wastes potentially generated during decommissioning of excess industrial buildings/structures include, but are not limited to, structural materials, pumps, pipes, tanks, boilers, compressors, ductwork, electrical components, and other equipment. The wastes and debris likely to require disposal potentially include, but are not limited to, solid waste, low-level radioactive waste, asbestos and radioactively contaminated asbestos waste, and polychlorinated biphenyl (PCB) -contaminated waste. The debris would include various solid wastes that have been identified as needing cleanup to protect habitat and restore the environment. The removal activities under the scope of this NTCRA will, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action, as required by 40 CFR 300.415(d).

For potentially contaminated wastes generated during the decommissioning, the Tri-Parties agree that to facilitate cost-effective, environmentally protective, and efficient disposal, the Environmental Restoration Disposal Facility (ERDF) would be the preferred disposal location for wastes meeting the ERDF waste acceptance criteria. Additionally, DOE might identify certain wastes generated from activities under the scope of this NTCRA for use in other remedial actions, such as backfill under the barrier associated with

the 221-U Facility remedy, if such wastes meet applicable criteria of the decision document. DOE would consult with Ecology and EPA for candidate wastes prior to decisions regarding such use. When the decommissioning involves management and/or generation of wastes subject to regulation under the Washington State Hazardous Waste Management Act/Resource Conservation and Recovery Act (HWMA/RCRA), these wastes would be addressed pursuant to substantive requirements of those regulations. If evidence of contamination to surrounding soils is encountered, those soils would be excavated and disposed or the site may be identified by DOE as a new site under the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989), with concurrence by Ecology and EPA.

The actions taken under this NTCRA are consistent with the overall Hanford cleanup initiative. Currently, several activities are in progress that support and complement future actions. Future EE/CAs will be prepared to address the decommissioning of excess buildings and structures on the Hanford Site (not covered by the scope of this removal action or other Records of Decisions [ROD]) that are contaminated with radiological and/or chemical constituents from past radiological or chemical processing activities.

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2 Site Characterization

This section provides summary background information and a description of the areas at Hanford where decommissioning activities would occur, and identifies a general description of the buildings/structures and debris that are addressed in this EE/CA and additional information relevant to the scope of this EE/CA. This section also provides a summary of the radiological and nonradiological contaminants of concern (COCs) that would potentially be encountered while conducting the decommissioning and cleanup activities.

2.1 Site Description and Background

Public access to the Hanford Site currently is restricted and controlled at the Wye Barricade on Route 4 and the Yakima and Rattlesnake Barricades on State Highway 240 (Figure 2-1).

The Hanford Site includes nearly 1,000 buildings/structures that are or have been used to support site activities. Many of these buildings/structures were not used for radiological or chemical processing, but may have some incidental contamination from proximity to other buildings/structures. The debris is located throughout the Hanford Site and includes miscellaneous aboveground utility structures and components that are no longer in use, abandoned fencing, concrete and rubble, scrap metal, and general solid wastes that may include some radiological or chemical components. Hanford excess industrial buildings/ structures are potentially contaminated with radioactive and chemical hazardous substances and are generally small, wood-framed, metal, cinder block, or concrete structures used for offices, change rooms, material storage buildings, or effluent monitoring buildings. To qualify under this NTCRA, the buildings/structures must meet the following criteria:

- The buildings/structures are suitable for routine decommissioning and/or demolition methods.
- The buildings/structures have not been addressed by another approved CERCLA decision document or RCRA closure plan for which the implementation would eliminate the release or threat of release of hazardous substances to the environment.

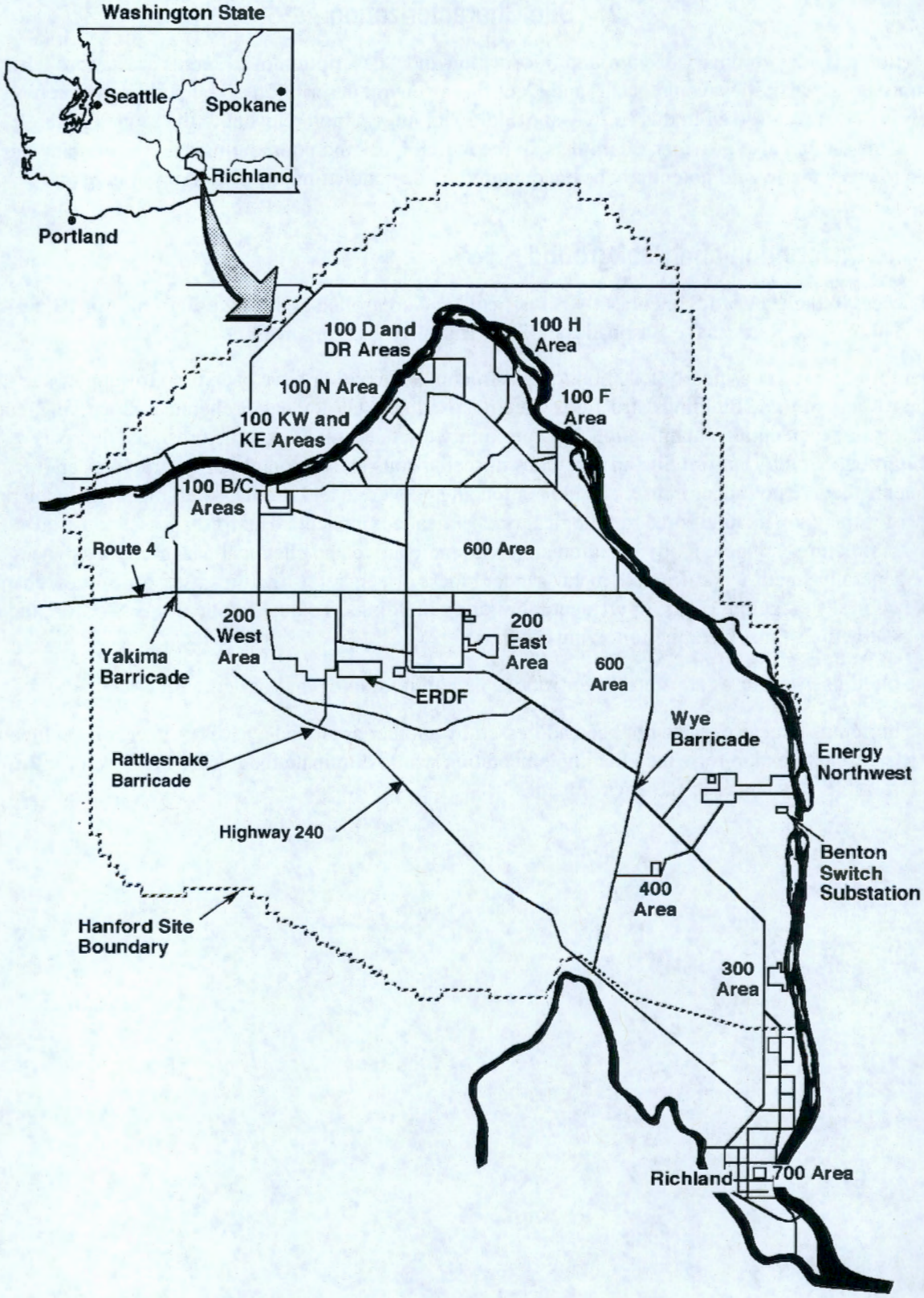

Figure 2-1. Hanford Site

Table 2-1 provides a list of the building/structures that may undergo decommissioning through this removal action.

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
337	300	5,860
337B	300	14,150
MO061	300	2,250
MO073	300	420
MO074	300	200
MO075	300	300
MO161	300	130
MO245	300	2,320
MO443	300	690
MO767	300	840
MO827	300	1,800
MO-246	300	290
MO-984	300	230
MO-985	300	230
MO-986	300	50
MO-987	300	50
4220	400	10
4221	400	130
4701B	400	210
4701C	400	510
4702	400	3,530
4704N	400	1,500
4704S	400	1,490
4706	400	3,070
4707	400	430
4719	400	340
4722B	400	760
4722C	400	810
4726	400	100
4727	400	40
4732A	400	2,340
4732B	400	3,630
4732C	400	3,200
4734B	400	1,660
4734C	400	1,340

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
4734D	400	1,290
4760	400	790
4790	400	680
4790A	400	250
4791TC	400	250
4802	400	240
4814	400	850
4831	400	300
4843	400	850
CC40168	400	20
HS 0079	400	20
613	600	70
614	600	10
616	600	1,240
620	600	10
622	600	10
626	600	10
6265	600	290
6267	600	140
6268	600	210
6270	600	380
6290	600	700
6291	600	20
6292	600	30
6293	600	150
6653	600	20
251W	600	980
2901W	600	10
506B	600	140
506BA	600	380
609A	600	3,240
609D	600	250
609G	600	240
609H	600	310
622A	600	30

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
622B	600	20
622C	600	90
622F	600	260
622R	600	1,480
6265A	600	60
6266A	600	60
6266B	600	20
6653A	600	10
MO246	600	2,320
MO280	600	740
MO292	600	740
MO315	600	50
MO667	600	20
MO812	600	4,510
MO898	600	50
MO984	600	1,800
MO985	600	1,800
MO986	600	380
MO987	600	380
119B	100B	10
151B	100B	940
1608B	100B	340
MO474	100B	400
MO875	100B	230
MO876	100B	230
MO877	100B	50
MO878	100B	60
MO879	100B	60
MO899	100B	110
Connex #1	100B	40
Connex #2	100B	40
120DR	100D	30
118D	100D	30
151D	100D	940
183D	100D	11,930
635	100D	20
MO084	100D	50

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
MO785	100D	30
MO786	100D	280
MO787	100D	180
MO788	100D	30
MO789	100D	280
MO790	100D	230
MO791	100D	50
MO793	100D	50
MO794	100D	30
MO870	100D	40
MO874	100D	20
MO889	100D	30
MO980	100D	290
MO929	100D	20
MO989/H0-64-4267	100D	30
CC0643	100D	40
CC60538	100D	40
CC1D0545	100D	40
CC1D0546	100D	40
MO417	100F	1,750
634	100H	20
635	100H	120
MO229	100H	580
MO796	100H	280
MO797	100H	180
MO798	100H	280
MO799	100H	60
MO848	100H	40
HO-64-04265	100H	30
HO-64-4263	100H	30
HO-64-6383	100H	30
HO-64-6387	100H	30
HO-64-06067	100H	50
CT0023	100H	20
CT0025	100H	40
CT0024	100H	30
1902N81	100N	150

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
612A	100K	120
612B	100K	120
6140	100K	30
MO751	100K	2,220
MO755	100K	2,220
MO883	100K	1,800
MO884	100K	600
MO885	100K	2,710
MO886	100K	460
HO-64-3548	100N	60
HO-64-6337	100N	60
CC0676	100N	40
CC0683	100N	40
120N	100N	20
CC0576	100N	40
CC0577	100N	40
CC0578	100N	40
CC0579	100N	40
CC0580	100N	40
CC0581	100N	40
CC0582	100N	40
CC0583	100N	40
CC0584	100N	40
CC0585	100N	40
CC0586	100N	40
CC0677	100N	40
CC1N0253	100N	40
CC1N0410	100N	40
CC1N0543	100N	40
CC1N0544	100N	40
MO-403	100N	430
MO085	100N	380
MO088	100N	20
MO769	100N	60
M0801	100N	1,160
M0802	100N	1,160
M0803/MO769	100N	500

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
M0804	100N	200
MO809	100N	1,800
MO811	100N	380
MO865	100N	300
MO866	100N	300
MO868	100N	30
HO-64-5865	100N	60
2025EC71	200E	10
207BA	200E	10
209EA	200E	410
2101HV	200E	1,200
2101M	200E	12,900
2103HV	200E	30
2105HV	200E	200
210A	200E	70
210E	200E	10
211A	200E	940
211B	200E	380
211BA	200E	80
211BA151	200E	10
211BB	200E	10
2125E	200E	100
214A	200E	80
217B	200E	40
218B	200E	10
219B	200E	10
221A	200E	70
221BA	200E	10
221BG	200E	10
2220E	200E	170
2230E	200E	120
2237E	200E	60
2258E	200E	10
225B-BA	200E	50
225BC	200E	80
225BD	200E	20
225BE	200E	260

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
225BG	200E	120
225EC	200E	10
2400E	200E	60
2402EC	200E	10
2402EG	200E	40
2403E	200E	90
2403EA	200E	20
2404E	200E	20
241A201	200E	230
241AN273	200E	20
241AN274	200E	10
241AN801	200E	10
241AP273	200E	20
241AP801	200E	10
241AW273	200E	20
241AW801	200E	10
241AZ156	200E	80
241AZ271	200E	90
241B701	200E	10
241C73	200E	10
241C90	200E	20
242A81	200E	50
242A-BA	200E	190
242AC	200E	60
242AL11	200E	100
242AL71	200E	10
243G1	200E	100
243G1A	200E	30
243G2	200E	90
243G3	200E	40
243G4	200E	50
243G6	200E	30
243G81	200E	10
243G82	200E	10
243G9	200E	20
244AR701	200E	20
244AR715	200E	40

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
2451E	200E	10
246S	200E	100
2506E1	200E	40
2506E2	200E	40
252E	200E	70
2701AB	200E	220
2701EC	200E	30
2701HV	200E	170
2701M	200E	20
2703E	200E	310
2704HV	200E	20,270
2711B	200E	20
2711E	200E	570
2711E66	200E	100
2711E66A	200E	10
2711EA	200E	360
2711EB	200E	360
2711EC	200E	10
2712A	200E	30
2712B	200E	10
2714A	200E	170
2715B	200E	40
2715EC	200E	80
2715ED	200E	60
2716E	200E	60
2718E	200E	140
2719EA	200E	150
271AB	200E	660
271BA	200E	30
2721E	200E	1,320
2721EA	200E	600
2727E	200E	790
272AW	200E	2,020
272B	200E	140
272BA	200E	80
272BB	200E	70
272E	200E	1,500

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
272HV	200E	290
2734EA	200E	30
273E	200E	480
274AW	200E	740
274E	200E	310
2750E	200E	8,030
2751E	200E	1,200
2752E	200E	1,200
2753E	200E	1,200
275E	200E	470
275EA	200E	3,280
275E-BA	200E	40
276B	200E	110
277A	200E	260
278AW	200E	150
281A	200E	10
282B	200E	20
282BA	200E	20
282E	200E	110
282EA	200E	30
282EB	200E	50
282EC	200E	220
282ED	200E	30
283E	200E	3,070
283EA	200E	230
283E-BA	200E	50
284E	200E	4,810
284EB	200E	1,270
2901A	200E	130
2902B	200E	210
2902E	200E	70
2902HV80	200E	160
2902HV82	200E	140
2902HV83	200E	40
291AG	200E	10
291AJ	200E	10
292B	200E	50

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
294B	200E	30
295AE	200E	30
C8S49	200E	20
C8S77	200E	10
MO029	200E	220
MO041	200E	150
MO104	200E	110
MO110	200E	10
MO112	200E	80
MO211	200E	50
MO232	200E	150
MO234	200E	740
MO247	200E	150
MO248	200E	150
MO251	200E	150
MO252	200E	150
MO253	200E	150
MO254	200E	150
MO256	200E	150
MO257	200E	150
MO266	200E	150
MO267	200E	150
MO268	200E	150
MO269	200E	150
MO272	200E	130
MO276	200E	1,180
MO277	200E	1,180
MO282	200E	150
MO283	200E	150
MO284	200E	150
MO285	200E	890
MO286	200E	890
MO294	200E	1,180
MO312	200E	20
MO354	200E	100
MO370	200E	10
MO377	200E	40

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
MO386	200E	148
MO388	200E	150
MO398	200E	20
MO399	200E	30
MO400	200E	370
MO405	200E	1,110
MO407	200E	370
MO408	200E	220
MO410	200E	220
MO413	200E	590
MO414	200E	890
MO421	200E	20
MO434	200E	150
MO439	200E	60
MO493	200E	230
MO497	200E	60
MO501	200E	20
MO503	200E	10
MO511	200E	140
MO546	200E	20
MO571	200E	60
MO722	200E	150
MO723	200E	150
MO724	200E	150
MO725	200E	150
MO727	200E	30
MO730	200E	50
MO732	200E	150
MO733	200E	120
MO734	200E	150
MO742	200E	20
MO816	200E	30
MO840	200E	60
MO844	200E	60
MO850	200E	230
MO890	200E	10
MO919	200E	110

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
MO974	200E	40
MO979	200E	150
MO996	200E	110
MO997	200E	110
MO998	200E	20
TC272HV	200E	70
200CC-BA	200W	40
201W	200W	30
211T	200W	200
211T52	200W	10
212S	200W	70
216ZP1A	200W	30
218W5-252	200W	10
218W5-252A	200W	10
2220W	200W	170
222SA	200W	380
222S-BA	200W	70
222SD	200W	90
222SF	200W	60
222SH	200W	60
222T	200W	1,200
2259W	200W	30
225WA	200W	20
225WB	200W	10
2262W	200W	50
2263W	200W	40
2265W	200W	30
2300W	200W	110
2304W	200W	60
2306W	200W	70
2307W	200W	70
2308W	200W	70
2309W	200W	290
2310W	200W	120
2314W	200W	40
2315W	200W	20
2318W	200W	80

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
234-5Z-BA	200W	150
2402W	200W	10
2402WB	200W	320
2402WC	200W	320
2402WD	200W	320
2402WE	200W	320
2402WF	200W	320
2402WG	200W	320
2402WH	200W	320
2402WI	200W	320
2402WJ	200W	320
2402WK	200W	320
2402WL	200W	320
241SX281	200W	30
241SX701	200W	40
241SY272	200W	20
241SY276	200W	10
241T701	200W	10
241TX701	200W	10
242T271	200W	10
242T601	200W	80
242TC	200W	10
2506W1	200W	40
252S	200W	60
2620W	200W	330
267Z	200W	10
2704S	200W	650
2707SX	200W	110
2708S	200W	10
2710S	200W	30
2710W	200W	10
2711S	200W	10
2712T	200W	10
2713WC	200W	140
2715S	200W	20
2715T	200W	50
2715WA	200W	190

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
2716S	200W	140
2719WB	200W	370
2722W	200W	110
2727W	200W	190
2727WA	200W	190
272S	200W	690
272WA	200W	1,240
272W-BA	200W	50
2734S	200W	40
273W	200W	480
2740W	200W	890
2754W	200W	370
275W	200W	320
277T	200W	100
278WA	200W	150
282W	200W	110
282WA	200W	30
282WB	200W	10
282WC	200W	220
282WD	200W	30
283W	200W	3,370
283WA	200W	230
283WB	200W	20
283W-BA	200W	50
283WC	200W	60
283WD	200W	30
283WE	200W	80
283WF	200W	30
284W	200W	4,110
284WB	200W	140
285W	200W	10
286W	200W	10
2902W	200W	70
2904SA	200W	10
HS0001	200W	20
HS0002	200W	20
MO011	200W	130

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
MO014	200W	70
MO015	200W	50
MO016	200W	50
MO017	200W	50
MO027	200W	150
MO028	200W	220
MO031	200W	220
MO032	200W	220
MO037	200W	440
MO039	200W	220
MO107	200W	130
MO223	200W	50
MO235	200W	150
MO240	200W	150
MO244	200W	220
MO249	200W	150
MO250	200W	150
MO264	200W	150
MO273	200W	740
MO278	200W	740
MO279	200W	740
MO281	200W	1,180
MO287	200W	890
MO288	200W	30
MO289	200W	30
MO290	200W	150
MO291	200W	740
MO295	200W	20
MO406	200W	220
MO409	200W	300
MO412	200W	440

Table 2-1. Building / Structure List and Locations

Building/Structure Designation	Area	ERDF Approximate Waste Quantity (ton)
MO428	200W	150
MO429	200W	150
MO432	200W	150
MO433	200W	150
MO437	200W	150
MO438	200W	150
MO444	200W	50
MO446	200W	50
MO450	200W	10
MO459	200W	70
MO556	200W	100
MO563	200W	50
MO573	200W	20
MO710	200W	10
MO720	200W	1,180
MO721	200W	300
MO739	200W	40
MO743	200W	440
MO760	200W	120
MO837	200W	50
MO841	200W	100
MO847	200W	20
MO892	200W	110
MO906	200W	110
MO939	200W	50
MO956	200W	120
MO970	200W	270
MO971	200W	270
X8	200W	10

2.1.1 Land Use Access

Proposed alternatives for future land use have been described in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (HCP EIS, DOE/EIS-0222-F). Land use designations, including Industrial, Industrial-Exclusive, and Preservation, were adopted in the 1999 DOEROD for the HCP EIS (64 Federal Register 61615). A Supplement Analysis (DOE/EIS-0222-SA-01) and an amended

ROD issued in 2008 (73 Federal Register 55824) supported the conclusions and clarified the decisions published in the 1999 ROD. The Future Site Uses Working Group (Drummond, 1992) and the Exposure Scenario Task Force also are sources for additional guidance on land use.

2.1.2 Cultural Resources

The Hanford Site contains an extensive record of human occupation documenting a series of overlapping cultural landscapes stretching back thousands of years, each layer of which tells the story of how people have used the landscape. Three distinct landscapes are defined; the Native American Cultural Landscape, the Early Settlers and Farming Landscape, and the Manhattan Project and Cold War Era Cultural Landscape. A detailed description of how each of these landscapes is generally represented is derived from the NEPA Characterization Report (PNNL 6415) and from the DOE/RL-98-10, *Hanford Cultural Resources Management Plan* (CRMP).

A National Historic Preservation Act Section 106 cultural resource review (CRR) will be conducted to address the demolition of the miscellaneous buildings and structures on the Hanford Site. All of the buildings/structures are located in areas that have been extensively disturbed by past construction activities. Hanford Site buildings/structures have been evaluated for their National Register of Historic Places (NRHP) eligibility as part of DOE/RL-97-56, *Manhattan Project and Cold War Era Historic District Treatment Plan* (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. The Treatment Plan also requires that walkthroughs be completed of these buildings/structures to identify artifacts that are of educational and interpretive value. Before field activity begins, each building/structure requiring documentation will be evaluated for: (1) the type of documentation required for each building/structure (Historic Property Inventory Form or Expanded Historic Property Inventory Form) and (2) status of that documentation. In addition, as appropriate, walkthroughs of the buildings/structures will be conducted before demolition to finalize all mitigation requirements. CRR documentation for any specific building/structure would be finalized before demolition activities would begin.

Appropriate CRR(s) would be conducted to address the cleanup of debris. A graded CRR could be developed to address cleanup of the debris that has been identified to date, as well as those that may be identified in the future, to ensure that adverse effects on potential archaeological sites are avoided. CRR documentation, including any necessary site-specific field evaluations, would be finalized before debris cleanup would begin.

2.1.3 Ecological Resources

Because most of the proposed actions would occur in areas that have been previously disturbed, the potential for effects on sensitive ecological resources is expected to be minimal. Ecological reviews would be carried out before work begins in 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*).

All of the buildings/structures have the potential to support nesting by migratory birds, and building/structure-specific surveys must be conducted at each building/structure prior to decommissioning. Project engineers should consult with the ecological compliance staff well in advance of planned decommissioning activities to allow for sufficient surveys. If nesting migratory birds are observed, decommissioning should 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 must be performed at each

building/structure prior to decommissioning, and appropriate mitigation should be developed in consultation with qualified bat biologists, if any are found. 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* (ESA), or candidates for such protection, are known to be affected by the buildings/structures decommissioning. Very little native or natural habitat is present in the vicinity of the buildings/structures slated for decommissioning. However, care will be taken to avoid or minimize damage to any vegetation, especially shrubs or trees that are in the vicinity of the buildings/structures. Workers should also avoid all wildlife that may be found in and around the buildings/structures.

Appropriate ecological surveys of debris cleanup sites would be conducted before field activities would begin. Procedures to avoid or mitigate damage to sensitive areas identified during the reviews would be established before work begins, including activities occurring on the Hanford Reach National Monument environs. For example, it is expected that many of the sites would have relatively small collections of material that could be removed without undue disturbance of the surrounding areas. However, debris cleanup that would require travel of vehicles off maintained roadways or the use of other heavy equipment and/or excavation would require site-specific evaluation and review of the biological resources at the time the work is scheduled. If off-road travel is necessary during cleanup, additional disturbance would be minimized to the extent possible and planned to avoid any sensitive ecological resources identified within the area. Impacts on ecological resources in the vicinity of the removal actions would continue to be mitigated in accordance with DOE/RL-96-32, *Hanford Site Biological Resources Management Plan* and DOE/RL-96-88, *Biological Resources Mitigation Strategy*.

2.2 Previous Closure/Cleanup Activities at the Hanford Site

Although the decommissioning of excess industrial buildings/structures, and cleanup of debris by DOE is not specifically addressed in previous CERCLA RODs at Hanford, this removal action is consistent with the remedial action objectives (RAOs) of previous RODs and supports the overall cleanup objectives established through the Tri-Party Agreement.

2.3 Source, Nature, and Extent of Contamination

Contaminant sources addressed by this EE/CA include both radioactive and chemical hazardous substances. The Hanford excess industrial buildings/structures are potentially contaminated with hazardous substances used or generated during Hanford Site operations and waste management activities. Various resources were used to help identify the hazardous substances and the nature and extent of contamination in the buildings/structures. These resources included historical operations information, process knowledge, radiological survey reports, radiation occurrence reports, buildings/structures assessment reports, personnel interviews, buildings/structures characterization reports, vulnerability assessments, inspections, walkdowns, and knowledge of construction and other materials.

The debris is located throughout the Hanford Site and includes miscellaneous aboveground utility structures and components that are no longer in use, abandoned fencing, concrete and rubble, scrap metal, and general solid wastes. The miscellaneous aboveground utility structures and components consist primarily of discarded wooden telephone poles and railroad ties; utility service lines and railroad systems are not covered under this action. The debris is not anticipated to include dangerous or mixed wastes, but would include various materials that potentially contain hazardous substances (e.g., appliances, scrap metal, and nonliquid PCBs).

To the extent practicable, hazardous substances, including bulk chemicals that are no longer in use, have been, or will be, removed from the buildings/structures during routine surveillance and maintenance (S&M) activities. Although some asbestos was previously removed from Hanford excess industrial

buildings/structures, a number of the buildings/structures still contain friable and nonfriable asbestos insulation, siding, and ductwork. In addition, the Hanford excess industrial buildings/structures potentially contain one or more of the following materials that contain hazardous substances.

- ACM
- Cadmium
- Beryllium
- Lead paint and shielding
- PCB light ballasts and surface coatings
- Mercury switches, gauges, and thermometers
- Refrigerants
- Lubricants
- Unspecified chemical containers
- Corrosives (including both acids and caustics)
- Sodium vapor and mercury vapor lighting.
- Creosote
- Arsenic.

Radionuclide contaminants on the Hanford Site are uranium-234, uranium-235, and uranium-238, plutonium-239/240, americium-241, and mixed fission products such as strontium-90, cesium-137, cobalt-60, europium-152, -154, and -155. Tritium may also be found within building exit signs.

Additional characterizations may be conducted as part of the removal action activities in accordance with an EPA-approved sampling and analysis plan. The additional sampling and characterization will be used to support waste designation, as needed, and to determine if the removal action objectives (RAOs) have been met where necessary.

2.4 Risk Evaluation and Site Conditions Justifying a Removal Action

The buildings/structures, and debris addressed in this EE/CA may be potentially contaminated with hazardous substances, primarily metals and/or asbestos, and radionuclides. The risks associated with the radioactive and/or nonradioactive contaminants have not been quantified in detail. Consequently, the following discussion provides a qualitative discussion of the risks.

Access to the Hanford Site is controlled to limit unauthorized access. In addition, institutional controls may prevent direct contact with and exposure to hazardous materials. However, institutional controls will not prevent deterioration of the Hanford excess industrial buildings/structures and potential release of contaminants to the environment. 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 and debris age and deteriorate. Contaminants could also be released to the environment indirectly through animal and human intrusion into the buildings/structures and debris. Historically, intrusion and spread of contamination by rodents, insects, birds, and other organisms has been difficult to control and prevent.

The inhalation and ingestion pathways are of concern if the material within the equipment and piping is disturbed. Hazardous substance removal includes D4 activities. Even though personal protective equipment will be worn, external hazardous substance exposure and inhalation still will pose a risk. During initial D4 activities, the potential for a release will increase. As the inventory is stabilized and disposed appropriately, the source term (hence, the risk) will decrease.

In general, the risk of an accidental release (e.g., from a structural failure) increases the longer the buildings/structures remain in the S&M Program awaiting decommissioning. The risk from the Hanford excess industrial buildings/structures will increase with time because of the potential for inventory releases from structure degradation. The residual contamination and the large quantity of asbestos containing materials (ACM) present a sufficient threat of release to the environment under a continued S&M scenario to justify a NTCRA.

A removal action for the Hanford excess industrial buildings/structures and debris supports overall Hanford cleanup priorities.

3 Identification of Removal Objectives and Scope

The potential COCs that may be encountered during the decommissioning consist of asbestos, heavy metals, chemicals, and, potentially, radionuclides. This section identifies the RAOs and goals for the activities associated with this NTCRA.

3.1 Removal Action Objectives

The RAOs for this NTCRA are to perform the decommissioning of excess industrial buildings/structures and cleanup of debris in a manner that will, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action at Hanford. The RAOs include the following.

1. Protect human and ecological receptors from exposure to contaminants above acceptable exposure levels buildings/structures
2. Control the migration of contaminants from the buildings/structures and debris into the environment
3. Facilitate and, to the extent practicable, be consistent with anticipated remedial actions at Hanford, while expediting actions to reduce the Hanford footprint
4. Achieve applicable or relevant and appropriate requirements (ARARs) to the extent practicable
5. Safely treat, as appropriate, and dispose of waste streams generated by the removal action
6. Prevent adverse impacts to cultural and natural resources
7. Reduce or eliminate the need for future surveillance, maintenance or periodic inspection activities

Note: The numbering of the above RAOs is not intended to be a ranking or a prioritization.

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4 Identification of Removal Action Alternatives

The removal action alternative for the Hanford excess industrial buildings/structures and debris must be protective of human health and the environment, and otherwise meet the RAOs. Based on these considerations, the following three removal action alternatives were identified for assessment:

- Alternative 1: No Action
- Alternative 2: Continued Surveillance and Maintenance; with future Decontamination, Deactivation, Decommissioning, and Demolition of Buildings/Structures and Cleanup of Debris
- Alternative 3: Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures and Cleanup of Debris.

Under Alternative 1, it is assumed that the buildings/structures and debris would be abandoned without any further actions. Surveillance, maintenance, and periodic inspection activities would be discontinued and degradation would continue indefinitely. Ultimately, under Alternative 1, access to the Hanford excess industrial buildings/structures and debris is assumed to be unrestricted. Industrial and 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 buildings/structures deterioration progresses and structural integrity is compromised. Alternative 1 would do nothing to address the potential for release and/or spread of contamination in the environment or minimize access to hazardous substances and is used as a baseline for comparison only.

4.1 Alternative 2: Continued Surveillance and Maintenance; with future Decontamination, Deactivation, Decommissioning, and Demolition of Buildings/Structures and Cleanup of Debris

Under Alternative 2, the Hanford excess industrial buildings/structures and debris would remain in the S&M program for 10 years followed by D4. The Hanford excess industrial buildings/structures would be maintained in a quiescent state for a considerable duration while ongoing preventive measures are implemented. These measures would include periodic monitoring for potential radiological and industrial hazards, preventive maintenance, and general visual inspections. Periodic visual inspections would be performed for debris. Additionally, limited decontamination and application of fixatives would occur to control the spread of contamination for the Hanford excess industrial buildings/structures. Initially, minimal waste would be generated with little or no need for waste treatment prior to disposal. Over time, buildings/structures and debris degradation and other factors could result in an increased need for maintenance and possibly increased waste generation. Alternative 2 would merely result in a delay for the start of decommissioning and cleanup and would require expenditures for the continued surveillance, maintenance, and periodic inspections over the interim period. The cost analysis includes the period of S&M, followed by D4 and cleanup of debris. For the alternative of a continued S&M program, data evaluation from surveys, inspection/observations, and future plans were factored into planning and implementing the continued S&M. The prime goal of this alternative is to prevent environmental releases and to avoid industrial accidents.

4.2 Alternative 3: Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures and Cleanup of Debris

This alternative consists of performing D4 of the excess buildings/structures, cleanup of debris, and packaging and shipping to the associated waste to ERDF or other approved onsite or offsite disposal facility for treatment, as needed, and disposal. Alternative 3 would ensure that any hazardous substances potentially within or on the Hanford excess industrial buildings/structures and debris are placed in a protective and safe condition for the foreseeable future, without the need for ongoing preventative measures and inspections. This alternative would include the following primary elements:

- Remove the nonradiological and radiological hazardous substances from within and around the buildings/structures, as appropriate
- Decontaminate, fix contamination, and isolate systems, as needed
- Remove equipment
- Demolish each building/structure to grade or below, as appropriate
- Deactivate remaining belowgrade structures (e.g., basements, utilities) and fill void spaces
- Cleanup miscellaneous debris
- Dispose of wastes generated during D4 or debris cleanup activities
- Stabilize the area, as needed.

Piping and drains entering or exiting each building/structure belowgrade would be plugged or grouted to prevent potential pathways to the environment.

The majority of the demolition would require the use of heavy equipment (e.g., excavator with various attachments) to demolish the structures. Other standard industry practices for demolition also might be used (e.g., mechanical saws, cutting torches). Belowgrade structures would be removed and disposed of in the same fashion as abovegrade buildings and structures. However, if belowgrade structures (including pipes and utility systems) are not contaminated or may be decontaminated, they would optionally be left in place, backfilled, and brought to grade. Backfill would consist of clean fill materials. If evidence of contamination to surrounding soil is encountered, those soils would be excavated and disposed of onsite at the ERDF in accordance with ERDF waste acceptance criteria or sent to an offsite disposal facility in accordance with applicable laws and regulations. The ERDF is the preferred disposal location because the ERDF is an engineered facility that provides a high degree of protection to human health and the environment, and 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 the ERDF was authorized using a separate CERCLA ROD (EPA 1995). The ERDF is designed to meet minimum technological requirements for RCRA landfills, including standards for double liner, a leachate collection system, leak detection, monitoring, and a final cover. Alternatively, if soil contamination is extensive, or unusually complex, the site may be identified by DOE as a new site for investigation under the Tri-Party Agreement.

When the decommissioning involves the generation and management of wastes subject to regulation under the Washington State Hazardous Waste Management Act, the substantive provisions of *Washington Administrative Code* (WAC) 173-303 would be implemented. Treatment would be performed as

necessary to meet the ERDF acceptance criteria or the waste would be sent to a permitted treatment, storage, and/or disposal (TSD) building/structure in accordance with applicable laws and regulations.

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5 Alternative Analysis

In accordance with the *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (EPA 1993), EE/CAs for NTCRA alternatives will be evaluated with respect to three criteria: (1) effectiveness, (2) implementability, and (3) cost. Public acceptance of the preferred alternative will be considered after the public has had an opportunity to review and comment on the EE/CA.

Effectiveness includes two sub-criteria: protectiveness and the ability to meet the RAOs. Protectiveness was evaluated based on (1) protectiveness of the alternative for public health and the community, (2) protectiveness of workers during implementation, (3) protectiveness of the environment, and (4) compliance with ARARs and other requirements. Implementability is evaluated based on technical feasibility; availability of equipment, personnel, services, and disposal facilities; and administrative feasibility. Costs are estimated, including capital costs, operations and maintenance costs, and present net worth costs.

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

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 previously discussed in Section 2.4, as the buildings/structures and debris continue to age, the threat of substantial release of radiological and hazardous substances increases with time, and confining these materials from 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 decommissioning and cleanup to be performed at a later date. Although both Alternative 2 and Alternative 3 would be protective of human health, Alternative 3 is considered the most protective, as it would eliminate the hazards and preclude the threat of a release due to aging buildings/structures during the period of continued S&M. In addition, Alternative 3 would reduce exposures to workers, since the delayed decommissioning and cleanup would allow potential additional worker exposures to occur during the interim period of S&M. Although both Alternative 2 and Alternative 3 are considered to be protective of the environment, Alternative 3 would be the most protective, as it would preclude the threat of a release to the environment from buildings/structures and debris continuing to age.

5.1.2 Ability to Achieve Removal Action Objectives

Alternatives 2 and 3 are both considered to achieve the RAOs. Alternative 3 achieves 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 decommissioning and cleanup 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 decommissioning of buildings/structures and cleanup of debris by 10 years as compared to near-term decommissioning and cleanup under Alternative 3. Decommissioning of the buildings/structures and debris cleanup after 10 years could result in increased hazards to workers from buildings/structures and debris degradation and the work could be more costly in 10 years as compared to the near-term. 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. The 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. End-loaders and trackhoes with processor end-effectors are available onsite, as are transport trucks. Cranes capable of heavy lifts are also available onsite or are commercially available. Advanced cutting methods are available for cutting contaminated equipment. Trained personnel are available to perform both Alternatives 2 and 3. Onsite or offsite disposal or recycling services are available for the types of wastes expected to be generated under Alternative 2 and 3.

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 2000). Table 5-1 shows the present worth cost estimate for the three alternatives. The estimate is calculated using present-day (2010) dollars, also called constant dollars. Constant dollars are not affected by general price inflation (i.e., they represent "units of stable purchasing power"). Thus, the cost of a particular good or service would be the same in Year 0, Year 1, Year 2, and so forth. Consistent with EPA guidance, constant dollars are used in cost estimates to make it possible to evaluate expenditures associated with alternatives that occur during different time periods (EPA 2000). This method allows the cost of the alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the CERCLA action over its planned life. Since present-worth costs are used, the actual costs that will occur during the years of implementation will be greater than the present worth 2010 costs due to inflation.

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 as a result 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 is developed to be within -30% to +50% of actual project cost.

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

Alternative	Present-Worth Cost
Alternative 1: No Action	No cost
Alternative 2: Continued Surveillance and Maintenance; with future Decontamination, Deactivation, Decommissioning, and Demolition of Buildings/Structures and Cleanup of Debris	$143,000,000
Alternative 3: Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures and Cleanup of Debris	$96,000,000

Accuracy range of the cost estimate is -30% to +50%.

5.4 Other Considerations

This section identifies other considerations associated with the proposed removal action alternatives such as NEPA values.

5.4.1 NEPA Values

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

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

Table 5-2. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
Transportation	Considers impacts of the proposed action on local traffic (i.e., traffic at the Hanford Site) and traffic in the surrounding region.	Implementation of Alternative 3 would be expected to produce short-term impacts on local traffic. A majority of the impact would be associated with increased truck traffic associated with Alternative 3, when transporting wastes and debris to the ERDF. 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 the 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 the ERDF.
Air Quality	Considers potential air quality concerns associated with emissions generated during the proposed action.	Airborne releases associated with Alternatives 2 and 3 would be expected to be minor with the use of appropriate work controls (e.g., use of water within the well-housing of the Hanford excess industrial buildings/ structures, sampling during favorable wind conditions, and use of fixatives). Any potential of airborne release of contaminants during these removal actions would be controlled in accordance

Table 5-2. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
		with DOE radiation control and air pollution control standards, to minimize emissions of air pollutants at the Hanford Site, and protect all communities outside the Hanford Site boundaries. Operation of trucks and other diesel-powered equipment for these alternatives would be expected, in the short-term, to introduce quantities of sulfur dioxide, nitrogen dioxide, particulates, and other pollutants to the atmosphere, typical of similar-sized construction projects. These releases would not be expected to cause any air quality standards to be exceeded and (as needed) dust generated during removal activities would be minimized by watering or other dust-control measures. Vehicular and equipment emissions will be controlled and mitigated in compliance with the substantive standards for air quality protection that apply to the Hanford Site.
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 in the vicinity of the removal actions would continue to be mitigated in accordance with DOE/RL-96-32, *Hanford Site Biological Resources Management Plan* and DOE/RL-96-88, *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 (see Section 2.1.3). Because most of these sites (buildings/structures and debris) either have already been disturbed or minimal soil disturbance would be expected, it is anticipated that only isolated artifacts could be encountered during project activities under any of the alternatives. Implementation of CRMP and consultation with area Tribes would 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 Alternative 3 of the removal action 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, cultural resource reviews would be conducted before implementing field activities (see Section 6.2).
Socioeconomic Impacts	Considers impacts pertaining to employment, income, other services (e.g., water and power utilities), and the effect of implementation of the proposed action on the availability of services and materials.	The proposed action is within the scope of current RL environmental restoration activities and would have minimal impact on the current availability of services and materials. This work would be expected to be accomplished largely using employees from the existing contractor workforce. Even if the removal activities create additional service sector jobs, the total expected increase in employment would be expected to be less than 1 percent of the current employment levels. The socioeconomic impact of the project would contribute to the continuing overall positive employment and economic impacts on eastern Washington

Table 5-2. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
		communities from Hanford Site cleanup operations.
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. No impacts would be associated with proposed activities associated with the Hanford excess industrial buildings/structures and debris that could reasonably be determined to affect any member of the public; therefore, they would not have the potential for high and disproportional adverse impacts on minority or low-income groups.
Cumulative Impacts (Direct and Indirect)	Considers whether the proposed action could have cumulative impacts on human health or the environment when considered together with other activities locally, at the Hanford Site, or in the region.	The concern is associated directly with the targeted area. Because of the temporary nature of the activities and their remote location, cumulative impacts on air quality or noise with other Hanford Site or regional construction and cleanup projects would be minimal. When equipment such as the Hanford excess industrial buildings/structures and debris at a site in this area are found to be contaminated with hazardous substances in concentrations presenting a material threat to human health and the environment, that threat would be mitigated. The net anticipated effect could be a positive contribution to cumulative environmental effects at the Hanford Site through removal, treatment, and disposal of such hazardous substances and contaminants of concern into a building/structure such as the ERDF that has been designed and legally authorized to safely contain such contaminants. The Hanford excess industrial buildings/ structures and debris removed under Alternatives 2 and 3 would meet the ERDF waste acceptable criteria as described in WCH-191, *Environmental Restoration Disposal Waste Acceptance Criteria*. Wastes generated during the proposed activities would be manageable within the capacities of existing facilities. For perspective, the ERDF received more than 700,000 tons of waste in calendar year 2008 and more than 430,000 tons in calendar year 2007. Radiological contamination is expected to be within the acceptance criteria levels for ERDF disposal. The ERDF received approximately 22,500 Ci of radioisotopes in calendar year 2008 and approximately 13,000 Ci in calendar year 2007. It is expected that the total amount of waste that could be generated for disposal in the ERDF for this removal action is ~250,000 tons. Over the 5-year expected duration of this removal action, an average of ~50,000 tons/year would be disposed of at the ERDF. This volume is still small when compared with the 700,000 tons disposed in the ERDF in calendar year 2008.

Table 5-2. NEPA Values Evaluation

NEPA Values	Description	Evaluation (Includes the Evaluation for Each Alternative)
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 would 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 site contractors, would mitigate risks to workers from the removal activities.
Irreversible and Irretrievable Commitment of Resources	Considers the use of nonrenewable resources for the proposed response actions and the effects that resource consumption would have on future generations. (When a resource [e.g., energy minerals, water, wetland] is used or destroyed and cannot be replaced within a reasonable amount of time, its use is considered irreversible.)	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

The recommended removal action alternative is Alternative 3: Decontamination, Deactivation, Decommissioning, and Demolition (D4) of Buildings/Structures and Cleanup of Debris. The scope of Alternative 3 is intended to decommission Hanford excess industrial buildings/structures and perform cleanup of debris. Building contents include, but are not limited to, structural materials, pumps, pipes, tanks, boilers, compressors, ductwork, electrical components, and other equipment. The types of wastes and debris likely to require disposal include, but are not limited to, solid waste, low-level radioactive waste, asbestos and radioactively contaminated asbestos waste, and PCB-contaminated waste.

For contaminated wastes generated during the decommissioning of excess industrial buildings/structures and cleanup of debris, the ERDF would be the preferred disposal location for wastes meeting the ERDF waste acceptance criteria. Waste that does not meet the ERDF WAC would be dispositioned at appropriate onsite or offsite waste disposal facilities, in accordance with the waste acceptance criteria of those facilities. Demolition of buildings and structures would include removal of abovegrade structures. Belowgrade structures would be removed and disposed of in the same fashion as abovegrade buildings and structures. However, if belowgrade structures (including pipes and utility systems) are not contaminated or may be decontaminated, they would optionally be left in place, backfilled, and brought to grade. Backfill would consist of clean fill materials. If evidence of contamination to surrounding soils is encountered, those soils would be excavated and disposed or the site may be identified by RL as a new site under the Tri-Party Agreement, with concurrence by Ecology and EPA. The recommended alternative meets the proposed RAOs regarding long-term risk, minimizes short-term worker risk and radiation exposure, is cost effective, meets ARARs, and provides a safe and stable configuration that is environmentally sound. RL also considers Alternative 3 to contribute to the efficient performance of Hanford long-term remedial actions and promotes protection of habitat and restoration of the environment consistent with Tri-Party goals.

6.1 Compliance with Environmental Regulations, Including Those That Are Applicable or Relevant and Appropriate Requirements

Section 121 of CERCLA (42 USC § 9621) requires the responsible CERCLA implementing agency to ensure that the substantive standards of HWMA/RCRA and other applicable laws will be incorporated into the federal agency's design and operation of its long-term remedial actions and into its more immediate removal actions. RL is the implementing agency for this NTCRA. Both Ecology and EPA concur that an NTCRA is warranted to protect human health and the environment. Through the NTCRA process, the risks presented in this document will be mitigated in a timely manner.

Appendix A lists the proposed ARARs that have been identified for this removal action. These ARARs are consistent with ARARs for long-term remedial actions at the Hanford Site. The ARARs list is based on several key assumptions:

- When the decommissioning of buildings/structures or cleanup of debris involves management and/or generation of wastes subject to regulation under the Washington State HWMA/RCRA, these wastes would be addressed pursuant to substantive requirements of those regulations.
- Actions have been taken at the buildings/structures subject to this EE/CA prior to initiation of the NTCRA through other regulatory activities intended to place the buildings/structures in an environmentally safe condition. However, some lead may remain following these activities, which may require management under the scope of the NTCRA. Removed lead that constitutes hazardous waste and cannot be recycled or reclaimed shall be declared a hazardous waste or mixed low-level

waste and will be disposed of at the ERDF in accordance with waste acceptance criteria or at an offsite disposal facility in accordance with applicable laws and regulations. Some mercury located in mercury fluorescent lamps and mercury-containing electrical switches and lights are planned for removal prior to this NTCRA under other regulatory activities intended to place the building/structure in an environmentally safe condition.

- Miscellaneous debris from cleanup activities and debris generated during decommissioning of the buildings and structures may contain paint that contains PCBs. PCB-containing light ballasts will be disposed of at 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 the *Toxic Substances Control Act* (TSCA). Lead-contaminated paint also may be removed, which would be subject to the substantive requirements of WAC 173-303.

- Asbestos-containing material, which is both friable and nonfriable, would be encountered incidental to performance of the NTCRA. Friable or regulated ACM is subject to specific asbestos regulations and would be acceptable for disposal at the ERDF. Regulated asbestos will be removed and disposed of as required by 40 CFR 61.150, "Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations."

6.2 Cultural Resources

Section 106 of the *National Historic Preservation Act of 1966* (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 (SHPO) and other interested parties when impacts are likely. It also requires federal agencies to invite the Advisory Council on Historic Preservation (ACHP) 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 NRHP, including previously unidentified historic properties that may be discovered during the implementation of a project (36 CFR 800). 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 the CRMP. The CRMP is implemented through a Programmatic Agreement among DOE, the SHPO, and the ACHP.

DOE is required to review as guidance the most current U.S. Fish and Wildlife Service (USFWS) list for threatened and endangered plant and animal species. DOE determined that none of the alternatives would USFWS is not required for this action.

6.3 Compliance with Disposal Facility Waste Acceptance Criteria

Wastes generated through implementation of Alternative 3 would be dispositioned at appropriate onsite or offsite waste disposal facilities, in accordance with the waste acceptance criteria of those facilities. The ERDF would be the preferred disposal location for wastes meeting the ERDF waste acceptance criteria.

The ERDF is engineered to meet minimum technological requirements for landfills under WAC 173-303-665. Applicable packaging and pre-transportation requirements for dangerous or mixed wastes generated during implementation of the removal action would be identified and implemented before movement of any waste. The ERDF is an onsite disposal facility that accepts CERCLA waste generated at the Hanford Site. Hazardous, mixed, low-level, asbestos, and TSCA waste can be accepted

for disposal at the ERDF (WCH-191). Although the decommissioning and cleanup to be performed under this NTCRA is not expected to generate any waste packages exceeding the Class C criteria established for wastes regulated by the Nuclear Regulatory Commission. If a waste package with activated metals does exceed the Class C criteria, a special performance assessment must be performed and reviewed by the regulatory agencies to ensure that there are no unacceptable risks associated with disposal at the ERDF.

6.4 Achieving Removal Action Goals

The recommended Alternative 3 would meet the RAOs through removal and shipment of potentially contaminated wastes and debris to an approved disposal facility. Demolition of buildings and structures would include removal of abovegrade structures. Belowgrade structures would be removed and disposed of in the same fashion as abovegrade buildings and structures. However, if belowgrade structures (including pipes and utility systems) are not contaminated or may be decontaminated, they would optionally be left in place, backfilled, and brought to grade. Backfill would consist of clean fill materials. If evidence of contamination to surrounding soils is encountered, those soils would be excavated and disposed, or the site may be identified by DOE as a new site under the Tri-Party Agreement, with concurrence by Ecology and EPA. These actions would be consistent with the RAOs identified in Section 3.1.

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

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Appendix A

Applicable or Relevant and Appropriate Requirements

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Applicable or Relevant and Appropriate Requirements

For the removal action being considered in this document, implementation of any selected alternative will 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), 42 U.S.C.9621(e)).

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 health and safety standards.[1]

Waste Management Standards

A variety of waste streams would be generated under the proposed removal action alternatives. It is anticipated that some of the waste will potentially be determined to be low-level waste (LLW). However, quantities of dangerous or mixed waste, PCB waste, and asbestos and asbestos-containing material also could be generated. The majority of the waste will be in a solid form. However, some liquid wastes 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, 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 the decommissioning activities at the Hanford excess industrial buildings/ structures and as a result of debris cleanup activities. Treatment standards for dangerous or mixed waste subject to RCRA land disposal restrictions are specified in WAC 173-303-140, which incorporates 40 CFR 268 by reference.

The management and disposal of PCB wastes are governed by TSCA and regulations at 40 CFR 761. 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.

Removal and disposal of asbestos and ACM are regulated under the Clean Air Act (40 CFR 61, Subpart M). These regulations provide for special precautions to prevent environmental releases or exposure to personnel of airborne emissions of asbestos fibers during removal actions.

[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, a discussion of the safety and health requirements is included in this appendix, as a result of the nature and importance of these standards.

Waste that is determined to be LLW that meets ERDF[2] acceptance criteria would preferentially be disposed at the ERDF, because the ERDF is an engineered facility that provides a high degree of protection to human health and the environment, and 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 the ERDF was authorized using a CERCLA ROD (EPA 1995). The ERDF is designed to meet minimum technological requirements for landfill, including standards for double liner, a leachate collection system, leak detection, monitoring, and a final cover. Alternate potential disposal locations may be considered when the removal action occurs, if a suitable and cost-effective location is identified. Any potential alternate disposal location will be evaluated for appropriate performance standards to ensure that it is adequately protective of human health and the environment.

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 removal action 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 PCB remediation 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 the ERDF.

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

Standards Controlling Emissions to the Environment

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

Radiological Air Emissions

The federal *Clean Air Act* (42 United States Code 7401 et seq.) and the "Washington Clean Air Act," (Revised Code of Washington [RCW] 70.94), require regulation of radioactive air pollutants. Implementing regulations found in 40 CFR 61.92 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. This requirement would be applicable to any aspects of the removal action 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. Radioactive air emissions are to be

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 excess industrial buildings/structures and the 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.

controlled through the use of best available radionuclide control technology (BARCT) or as low as reasonably achievable control technology (ALARACT) 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 (i.e., 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 will be administered as appropriate using the best methods from among those that are reasonable and effective.

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 that establish limits on emissions of criteria/toxic air pollutants. The primary source of emissions resulting from this removal action will be fugitive particulate matter. In accordance with WAC 173-400-040(3) and (8), 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 removal action.

Treatment of some waste encountered during the removal action may be required to meet ERDF waste acceptance criteria. In most cases, the type of treatment anticipated would consist of solidification/ stabilization techniques such as macroencapsulation or grouting, and WAC 173-460 would not be considered an ARAR 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, the substantive requirements of WAC 173-400-113(2) and WAC 173-460-060 would be evaluated to determine applicability and satisfied if determined to be ARAR.

Emissions to the air will be minimized during implementation of the removal action through use of standard industry practices such as the application of water sprays and fixatives. These techniques are considered to be reasonable precautions to control fugitive emissions as required by the regulatory standards of WAC 173-400-040(3) and (8).

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

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

	ARAR or TBC	Requirement	Rationale for Use
Clean Air Act of 1977, 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants"			
40 CFR 61.92, "Standard"	ARAR	This regulation set limits for radionuclide emissions, which cannot exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem/yr or greater.	Some excess industrial buildings/structures and debris to be addressed under this NTCRA could potentially 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) and (2) 40 CFR 61.145(c) 40 CFR 61.150, "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) and (2) are used to determine when the requirements of 40 CFR 61.145(c) apply to demolition activities. The standards of 40 CFR 61.150 are used to control asbestos emissions during collection, processing, packaging, and transport of any asbestos-containing waste material.	Some excess industrial buildings and structures addressed under the NTCRA could contain asbestos. The substantive provisions of 40 CFR 61.145(c) would be in compliance with 40 CFR 61.145(a)(1) and (2) for the demolition of excess industrial buildings and structures that contain RACM under this removal action. The substantive provisions of 40 CFR 61.150 would be met during activities that involve collection, processing, packaging, and transport of asbestos-containing waste material under the NTCRA.
Archaeological and Historic Preservation Act			
National Archaeological and Historic Preservation Act of 1976 16 USC 469aa-mm 40 CFR 6.301(c), "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 in compliance with for actions under the NTCRA that might disturb these sites. This requirement is location-specific.

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

	ARAR or TBC	Requirement	Rationale for Use
National Historic Preservation Act of 1966			
National Historic Preservation Act of 1966 16 USC 470, Section 106 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 Hanford, these types of sites could be encountered during the NTCRA. The substantive requirements of this act are potentially applicable to and would be in compliance 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 25 USC 3001, et seq. 43 CFR 10	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 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 removal action and will require Native American Tribal consultation in the event of discovery. This requirement is location-specific.
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 1971, as amended" 40 CFR 6.302(h), "Responsible Official Requirements" Migratory Bird Treaty Act of 1918 16 USC 703 et seq.	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 at various locations throughout Hanford, where such species could be encountered during the NTCRA. Substantive requirements of this act are potentially applicable if threatened or endangered species are identified in areas where removal actions 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.

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

	ARAR or TBC	Requirement	Rationale for Use
Protection of Stratospheric Ozone, 40 CFR 82			
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 of 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 excess industrial buildings and structures and/or debris 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.
Toxic Substances Control Act (TSCA); 40 CFR 761, "Polychorinated 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), "Applicability," "Storage for Disposal" Disposal Requirements," 40 CFR 761.60(a), "Disposal Requirements" "PCB liquids" 40 CFR 761.60 (b), "Disposal Requirements" "PCB Articles" 40 CFR 761.60 (c), "Disposal Requirements" "PCB Containers" 40 CFR 761.61, "PCB Remediation Waste" 40 CFR 761.62, "PCB Bulk Product Waste"	ARAR	These regulations apply to the storage and disposal of PCB wastes including liquid PCB wastes, PCB items, PCB remediation waste, PCB bulk product wastes, and PCB/radioactive wastes at concentrations equal to or greater than 50 ppm. These regulations also provide options for decontamination of materials contaminated with PCBs.	Some excess industrial buildings and structures and/or debris addressed under the NTCRA could include various forms of PCB wastes, including, but not limited to, PCB items, PCB liquids, and PCB articles, and/or containers that would be managed in accordance with the substantive requirements of these standards if encountered and or generated during the NTCRA.

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants"

40 CFR 82, "Protection of Stratospheric Ozone."

40 CFR 141, "National Primary Drinking Water Standards."

40 CFR 761, "Polychorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions"

ARAR = applicable or relevant and appropriate requirement.
CFR = Code of Federal Regulations.
MCL = maximum contaminant level.
NTCRA = non-time-critical removal action
ODS = ozone depleting substances
OU = operable unit.
PCB = polychlorinated biphenyl
ppm = parts per million
RACM = regulated asbestos-containing material
TBC = To Be Considered.

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

ARAR Citation	ARAR	Requirement	Rationale for Use
Regulations pursuant to the Resource Conservation and Recovery Act of 1976 and implemented through WAC 173-303, "Dangerous Waste Regulations"			
"Identifying Solid Waste," WAC 173-303-016	ARAR	This regulation applies for determining which materials are and are not solid waste. This determination is used to establish which wastes are subject to the designation procedures of WAC 173-303-070(3),	Solid wastes will be generated during the decommissioning of excess industrial buildings/structures and cleanup of debris 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 removal action would be evaluated using the procedures for identifying solid waste to ensure proper management. This requirement is action-specific.
"Designation of Dangerous Waste," WAC 173-303-070(3)	ARAR	This regulation applies for the evaluation of solid wastes to determine if such wastes are designated as dangerous or mixed waste. Solid wastes that are designated as dangerous or mixed wastes are subject to management and disposal standards of WAC 173-303.	There is potential for generating solid wastes during the decommissioning of excess industrial buildings/structures and debris cleanup that would be designated as dangerous or mixed waste. Substantive requirements of these regulations are potentially applicable to such solid wastes generated or encountered during the NTCRA. Specifically, solid waste generated for removal from the CERCLA site during this removal action would be evaluated using the dangerous waste designation procedures to ensure proper management. This requirement is action-specific.
"Excluded Categories of Waste," WAC 173-303-071	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 the decommissioning of excess industrial buildings/structures and debris cleanup 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.
"Conditional Exclusion of Special Wastes," WAC 173-303-073	ARAR	This regulation provides for management of wastes that pose a relatively low hazard to human health and the environment. The standards provide for management of special wastes with a low level of protection that is intermediate between dangerous and nondangerous solid wastes.	There is a potential for generating materials during the decommissioning of excess industrial buildings/structures and debris cleanup 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.

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

ARAR Citation	ARAR	Requirement	Rationale for Use
"Requirements for Universal Waste," WAC 173-303-077	ARAR	This regulation provides alternate reduced standards for certain solid wastes (i.e., batteries, mercury-containing equipment, and lamps) as described in WAC 173-303-573.	There is potential for generating materials during the decommissioning of excess industrial buildings/structures and debris cleanup 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.
"Land Disposal Restrictions," WAC 173-303-140(4)	ARAR	This regulation establishes State standards for land disposal of dangerous waste and incorporates by reference the federal land disposal restrictions of 40 CFR 268 that are applicable to solid waste designated as dangerous or mixed waste in accordance with WAC 173-303-070(3).	There is potential for generating solid wastes during the decommissioning of excess industrial buildings/structures and debris cleanup that would be designated as dangerous or mixed waste and require further treatment prior to land disposal. The substantive requirements of this regulation are potentially applicable to dangerous and /or mixed wastes that are generated or encountered during the removal action. Specifically, dangerous and/or mixed waste generated and removed from the CERCLA site during the NTCRA for land disposal (e.g., at the 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.
"Requirements for Generators of Dangerous Waste," WAC 173-303-170(3)	ARAR	This regulation establishes standards for the temporary management of wastes that are designated as dangerous or mixed waste.	There may be waste generated during the NTCRA that need 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 and the standards for management in containers under WAC 173-303-630 and tanks under -640. This requirement is action-specific.

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

ARAR Citation	ARAR	Requirement	Rationale for Use
General Regulations for Air Pollution Sources, WAC 173-400 and WAC 173-460			
Washington Clean Air Act of 1967, Ch. 70.94 and Ch. 43.21A RCW General Regulations for Air Pollution, WAC 173-400 Specific subsection: WAC 173-400-040(3) 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 RACT.	There is potential for fugitive emissions during decommissioning of excess industrial buildings and structures 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 that occurs during decommissioning or other activities. These requirements are action-specific.
Specific subsection: WAC 173-400-113	ARAR	This regulation applies to new and modified sources and requires controls to minimize the releases of associated criteria and toxic air emissions. Emissions are to be minimized through application of 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 removal action. This requirement is action-specific.
Controls for New Sources of Toxic Air Pollutants, WAC 173-460 Specific subsections: WAC 173-460-060 WAC 173-460-150	ARAR	These regulations 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 emissions. 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.
Radiation Protection -- Air Emissions, WAC 246-247			
"Radiation Protection -- Air Emissions," "Standards," WAC 246-247-040(3) WAC 246-247-040(4)	ARAR	These regulations require all new construction and significant modifications of emissions units to utilize best available radionuclide control technology (BARCT) and require all existing emission units and nonsignificant modifications to utilize ALARCT in controlling emissions to the environment.	There is potential for encountering radionuclide contamination during contamination during decommissioning of excess industrial buildings/structures and debris cleanup under the NTCRA. Substantive requirements of this standard are potentially applicable because fugitive, diffuse, and point source emissions of radionuclides to the ambient air may result from activities, such as demolition and excavation of contaminated soils and operation of exhausters and vacuums, performed during the removal action. This standard exists to ensure compliance with emission standards. These requirements are action-specific.

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

ARAR Citation	ARAR	Requirement	Rationale for Use
"Monitoring, testing, and quality assurance," WAC 246-247-075 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(8)	ARAR	These regulations establish the monitoring, testing, and quality assurance requirements for radioactive air emissions from major sources. These regulations also include requirements for continuous sampling and provide for periodic sampling (grab samples) in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. These regulations also provide for the waste site owner or operator to use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures, as approved by the lead agency. These regulations also establish requirements to monitor nonpoint and fugitive emissions of radioactive material.	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 soils and operation of exhausters and vacuums, performed during the removal action. These requirements are action-specific.
"General Standards for Maximum Permissible Emissions," WAC 173-480-050(1)	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, as low as reasonably achievable (ALARA). The regulation indicates that control equipment of sites operating under ALARA shall be defined as RACT and as ALARACT.	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.
"Emission Monitoring and Compliance Procedures," WAC 173-480-070-(2)	ARAR	This regulation applies for determining compliance with the radionuclide emission standard. Compliance with the public dose standard is determined by calculating exposure at the point of maximum annual air concentration in a location in which any member of the public may be located in an unrestricted area.	The potential for radionuclide emissions from some activities under the NTCRA such as fugitive and diffuse emissions during 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.

40 CFR 268, "Land Disposal Restrictions"

WAC 173-303, "Dangerous Waste Regulations"

WAC 173-400, "General Regulations for Air Pollution Sources"

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

WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides"

WAC 246-247, "Radiation Protection -- Air Emissions"

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

ARAR Citation	ARAR	Requirement	Rationale for Use

ALARA = as low as reasonably achievable

ALARACT = as low as reasonably achievable control technology

ARAR = applicable or relevant and appropriate requirement.

BACT = best available control technology

BARCT = best available radionuclide control technology

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

CFR = Code of Federal Regulations

ERDF = Environmental Restoration Disposal Facility

NTCRA = non-time-critical removal action

RACT = reasonably available control technology

T-BACT = best available control technology for regulated emissions of toxic air pollutants

TAP = toxic air pollutants

WAC = Washington Administrative Code.

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