DOE/RL-2011-03
Revision 1

Removal Action Work Plan for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex

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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Signature Sheet

Title *Removal Action Work Plan for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex*

2/24/16

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Signature Sheet

Title *Removal Action Work Plan for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex*

Stephanie Schleif
Nuclear Waste Program
Washington State Department of Ecology

2/25/16
Date

Having considered the extent to which the Removal Action Work Plan, DOE/RL-2011-03, *Removal Action Work Plan for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex*, could be inconsistent with *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* processes, or could alter schedules set forth in Appendix D of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement), the State of Washington Department of Ecology approves pursuant to Section 7.2.4 of the Tri-Party Agreement Action Plan.

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Executive Summary

This Removal Action Work Plan (RAWP) is an all-inclusive work plan that describes the activities required to complete the deactivation, decontamination, decommissioning, and demolition (D4) phases of the non-time-critical removal action selected alternative for the Plutonium Finishing Plant (PFP) Complex above-grade structures listed in Table 1-1. These structures were evaluated in DOE/RL-2004-05[1] and documented in DOE/RL-2005-13[2]. This RAWP supersedes the previous RAWPs for the PFP Complex DOE/RL-2005-14[3] and DOE/RL-2005-15[4]. The remaining processes used to deactivate, decontaminate, decommission, and demolish all structures identified as part of the PFP Complex removal action are described herein.

A separate Surveillance and Maintenance Plan addressing post-demolition activities for the PFP Complex will be implemented near the end of this removal action to meet the requirements and expectations of the applicable *Hanford Federal Facility Agreement and Consent Order*[5] (Tri-Party Agreement) Milestone M-083-00A (M-83-01-03)[6].

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[1] DOE/RL-2004-05, 2004, *Engineering Evaluation/Cost Analysis for the Plutonium Finishing Plant Above-Grade Structures*, Rev. 1, Re-Issue, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: Department of Energy Tri-Party Agreement Administrative Record (AR) and Public Information Repository (PIR).

[2] DOE/RL-2005-13, 2005, *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: Department of Energy Tri-Party Agreement Administrative Record (AR) and Public Information Repository (PIR).

[3] DOE/RL-2005-14, 2005, *Removal Action Work Plan For The Plutonium Finishing Plant Above-Grade Structures: Facility Deactivation*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: Department of Energy Tri-Party Agreement Administrative Record (AR) and Public Information Repository (PIR).

[4] DOE/RL-2005-15, 2005, *Removal Action Work Plan For The Plutonium Finishing Plant Above-Grade Structures: Ancillary Facility Demolition*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: Department of Energy Tri-Party Agreement Administrative Record (AR) and Public Information Repository (PIR).

[5] Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: http://www.hanford.gov/?page=81.

[6] M-83-01-03, 2002, *Federal Facility Agreement and Consent Order Change Control Form: Establish Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestones and a Target Date for the Plutonium Finishing Plant (PFP) Transition and Selected Disposition Activities*, Milestones M-083-00A, and M-083-20 through M-083-44, dated May 30, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Richland Washington. Available at: http://www.hanford.gov/files.cfm/PFP_CR_M-83-01-03.pdf.

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Terms

ACM	asbestos containing material
ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
BMP	best management practice
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CWC	Central Waste Complex
D4	deactivation, decontamination, decommissioning, and demolition
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DQO	data quality objective
EE/CA	engineering evaluation/cost analysis
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ETF	Effluent Treatment Facility
HASP	health and safety plan
HEPA	high efficiency particulate air
HEPA-type	nonstandard high efficiency particulate air
HHE	human health and the environment
LIGO	Laser Interferometer Gravitational Wave Observatory
LLW	low-level waste
MEI	maximally exposed individual
NESHAP	“National Emission Standards for Hazardous Air Pollutants” (40 CFR 61)
NHPA	*National Historic Preservation Act of 1966*
OSHA	Occupational Safety and Health Act
PCB	polychlorinated biphenyl
PFP	Plutonium Finishing Plant
PPSL	Plutonium Process Support Laboratories

PRF	Plutonium Reclamation Facility
PTE	potential-to-emit
QA	quality assurance
RAWP	Removal Action Work Plan
RCRA	*Resource Conservation and Recovery Act of 1976*
RECUPLEX	Recovery of Uranium and Plutonium by Extraction
RMA	Remote Mechanical “A”
RMC	Remote Mechanical “C”
ROD	record of decision
RWP	radiological work permit
SAP	sampling and analysis plan
S&M	surveillance and maintenance
SHPO	State Historic Preservation Office
TBC	to be considered
TEDF	Treated Effluent Disposal Facility
TPA	Tri-Party Agreement
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TRU	transuranic
TSCA	*Toxic Substances Control Act of 1976*
TSD	treatment, storage, and disposal
WAC	*Washington Administrative Code*
WIPP	Waste Isolation Pilot Project

1 Introduction

This Removal Action Work Plan (RAWP) describes the activities required to complete the deactivation, decontamination, decommissioning, and demolition (D4) activities of the non-time critical removal action. This RAWP supersedes the scope of the previous RAWPs (DOE/RL-2005-14, *Removal Action Work Plan For The Plutonium Finishing Plant Above-Grade Structures: Facility Deactivation* [Deactivation RAWP], and DOE/RL-2005-15, *Removal Action Work Plan For The Plutonium Finishing Plant Above-Grade Structures: Ancillary Facility Demolition* [Ancillary Facility Demolition RAWP]). It also includes demolition scope for the Plutonium Finishing Plant (PFP) above-grade structures listed in Table 1-1. The structures included in this scope were evaluated in DOE/RL-2004-05, *Engineering Evaluation/Cost Analysis for the Plutonium Finishing Plant Above-Grade Structures* (henceforth referred to as the EE/CA). These D4 activities are authorized in DOE/RL-2005-13, *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action* (henceforth referred to as the Action Memorandum).

The U.S. Department of Energy (DOE) was delegated authority to conduct removal actions under Section 104 of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) by Executive Order 12580, *Superfund Implementation*. This removal action will be performed in a manner that is consistent with the planned final remedial action under authority of CERCLA and the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989), also known as the Tri-Party Agreement (TPA), which designates the Washington State Department of Ecology (Ecology) as the lead regulatory agency. The US Environmental Protection Agency (EPA) is also a signatory of the Tri-Party Agreement. As stated in the action memorandum for this removal action (DOE/RL-2005-13), DOE will submit this RAWP to Ecology for approval.

This RAWP supports completion of Tri-Party Agreement, Milestone M-083-00A, due September 30, 2016:

> *Complete PFP Facility Transition and Selected Disposition Activities. Completion of this major milestone includes the following key elements: 1) completion of all activities necessary to achieve end point criteria established through milestone M-83-20 for placing the PFP Facility in a safe and stable S&M mode, 2) completion of all activities described in the approved M-83 series interim milestones and target date; and 3) completion of the balance of PFP selected disposition activities pursuant to the final Action Memoranda and work plans.*

To meet element 3 of the milestone, "PFP selected disposition activities" are defined as the following activities described in the selected alternative in DOE/RL-2005-13: PFP above-grade structures listed in Table 1-1 will be removed to a condition of slab-on-grade[1] where the above-grade portion of the structures are removed, but the slabs and foundations are left in place. If the structures listed in Table 1-1 have basements, vaults, and/or tunnels, then the associated below-grade slab, foundation, and walls will be left in place. Equipment, piping, or ducts in accessible below-grade areas will be characterized and decontaminated or removed as required. Items requiring removal may be deferred for removal (special handling) during demolition or during post-demolition activities and may require treatment and/or disposal at an approved offsite facility. Below-grade areas of listed structures may be filled and covered

[1] Slab-on-grade is defined in the Action Memorandum as "Each PFP above-grade structure would be demolished until only the slab and foundation remained. For structures with basements, tunnels, vaults, etc., the below-grade walls would be left standing as well as the below-grade slab and foundation. These remaining surface portions of a structure are referred to in this document collectively as the structure's 'slab'."

(after completion of any necessary below-grade activities) with a suitable material to prevent collapse during demolition and/or to prevent water accumulation, but not preclude any future remedial activity.

Following completion of the PFP selected disposition activities described above, the PFP complex will be transitioned to surveillance and maintenance (S&M) mode. Placement of PFP into S&M mode is the last of three elements required to complete Milestone M-083-00A. After transition, the 236-Z and 242-Z slabs, along with the soil necessary to complete slab removal (approximately one meter below the slab), will be removed to reduce the overall radiological inventory of the PFP complex. The results of pre-slab removal characterization may indicate that the level of contamination in or below either slab would require controls more rigorous than the open-air demolition controls utilized for slab-on-grade demolition activities. In that event, DOE in consultation with the lead regulatory agency, may choose to leave the slab(s) in place for future remediation. Appropriate controls for safe removal and disposal of the slabs will be applied as discussed in Section 2.1.4. Characterization will be performed as needed to support proper slab disposal and to ensure the remaining footprint will be left in a protective state that would not preclude future remediation. Following completion of slab removal, the excavations will be backfilled as needed, and the PFP complex area will be stabilized consistent with long-term S&M needs.

Activities performed according to this RAWP will comply with the substantive portions of the applicable or relevant and appropriate requirements (ARARs) specified in the Action Memorandum (DOE/RL-2005-13) to the extent practicable, and approved under CERCLA.

1.1 Purpose of the Removal Action Work Plan

This RAWP describes activities to be taken for D4 of the structures to a slab-on-grade condition, waste and debris disposal, and stabilization and/or removal of the slabs and any systems or structures that may remain below-grade for contamination control.

The intent of this RAWP is to identify the basis and to provide the criteria for the preparation of work packages and subcontract task orders for the project tasks.

Unfinished D4 removal activities described in the previous Deactivation RAWP (DOE/RL-2005-14) and the Ancillary Facility Demolition RAWP (DOE/RL-2005-15) are included by this RAWP.

The removal action will contribute to the efficient performance of any anticipated long-term remedial action, to the extent practicable, as required by 40 CFR 300.415(d), “National Oil and Hazardous Substances Pollution Contingency Plan,” “Removal Action.”

1.2 Scope and Objectives of the Removal Action

The structures listed in Table 1-1 are within the scope of this removal action, as defined by the Action Memorandum (DOE/RL-2005-13). Since the removal action is ongoing and was started prior to preparation of this RAWP, Table 1-1 includes the status of the structures. The status of the structures in Table 1-1 will be updated only as the RAWP is modified for other changes. Below-grade spaces associated with structures listed in Table 1-1 also are within the scope of this removal action.

When discussing the activities that are to be performed, the terms above-grade, below-grade, and sub-grade are used:

Above-grade - refers to items that are above or on the elevation of the surrounding ground (e.g., a building or concrete slab). Those above-grade items listed in Table 1-1 are within the scope of this removal action.

Below-grade - means below the elevation of the surrounding ground but not completely covered by soil. For example, the basement of a building would be below-grade. Below-grade rooms (basements, tunnels, vaults, etc.) of above-grade structures listed in Table 1-1 also are within the removal action scope.

Sub-grade - refers to an item that is completely covered by soil or other covering that is not readily removed (e.g., a floor slab). For example, piping that is buried under a building is considered sub-grade. Unless specifically noted, sub-grade items are outside the scope of the removal action and, therefore, will remain after the removal/demolition of the items addressed by this removal action.

The in scope above-grade structures would be demolished until only the slab and foundation remained. In addition, miscellaneous debris in the surrounding area, like fencing, telephone poles, etc., will be removed and disposed of during demolition. For in scope structures with basements, tunnels, vaults, etc., the below-grade walls would be left standing as well as the below-grade slab and foundation. These remaining surface portions of a structure are referred to in this document collectively as the structure's 'slab'.

In general, piping and vessels would be removed from a structure as required or needed, either before or as part of that structure demolition. Piping entering or exiting a structure below-grade would be plugged or grouted to prevent potential pathways to the environment.

Each PFP above-grade structure footprint would be stabilized to prevent migration of any residual contamination to the environment, if needed.

Following removal of the 236-Z and 242-Z slabs, the excavations would be backfilled and activities would be conducted as needed to stabilize the surface in the PFP complex area to minimize contaminant migration in the environment until final disposition of the PFP complex area. This could include placement of a cover of compacted fill, gravel, asphalt or other appropriate material with sloping as needed to control run-on/run-off and erosion.

No sub-grade (e.g., buried structures, buried pipelines, soil, groundwater, or unplanned releases) source terms would be removed or treated (except for slab removal as described in this RAWP).

1.2.1 Addition and Removal from the Scope

Two structures are proposed to be added to the scope of this RAWP as allowed under Section 1.0 of the Action Memorandum (DOE/RL-2005-13); the 242-ZA Monitoring Building (see end of Section 1.3.4) and the 232-Z Duct in 291-Z (not the sub-grade duct between 232-Z and 291-Z). The 242-ZA structure was not considered separately from 242-Z in the EE/CA and is not listed in the Action Memorandum (DOE/RL-2005-13). It is sufficiently similar to other PFP structures in material and contamination to meet the intent of the Action Memorandum (DOE/RL-2005-13) for addition. The 232-Z Duct in 291-Z was included in the 232-Z CERCLA removal action but was agreed to be deferred to removal under this action. This duct is also sufficiently similar to other PFP structures in material and contamination to meet the intent of the Action Memorandum (DOE/RL-2005-13).

One structure is proposed for removal from the scope of this CERCLA removal action: 2702-Z Microwave Tower and Communications Support Building. This structure originally served for Hanford Patrol communications. It has been converted for use as a cell tower and is needed to support cell phone use in the 200 West Area.

Approval of this RAWP will constitute authorization to add and/or remove the three specific structures as proposed above.

Other additions or removals from the scope of this removal action will be documented under the TPA (Ecology et al., 1989a) change process or by Project Manager Meeting notes as decided between the Lead

Agency (DOE) and the Lead Regulatory Agency (Ecology). All documentation of such changes will be submitted to the Administrative Record. If characterization results indicate structures in the scope of this RAWP do not contain CERCLA hazardous substances, those structures may be removed from this CERCLA action and handled under separate DOE authority. The 236-Z and 242-Z slabs will be removed as discussed in Section 1.

1.2.2 Removal Action Objectives

The overall objective of this removal action is to demolish the above-grade portion of the PFP Complex to slab-on-grade and place the area in a safe and stable condition consistent with the endpoints defined in HNF-22401, *Plutonium Finishing Plant (PFP) Complex End Point Criteria*. This RAWP implements the selected alternative from the Action Memorandum (DOE/RL-2005-13) by including all D4 activities necessary to achieve the following objectives documented by the EE/CA:

1. Reduce the inventory of hazardous substances contained within the PFP Complex.
2. Reduce or eliminate the potential for exposure to hazardous substances above levels that are a danger to personnel, public, and/or environment.
3. Reduce or eliminate the potential for a release of hazardous substances.
4. Safely manage (treat and/or dispose) waste streams generated by the removal action.
5. Reduce or eliminate the need for future surveillance and maintenance (S&M) activities.
6. Facilitate and not preclude future remediation at the PFP Complex, including remediation of sub-grade portions of the PFP Complex and sub-grade waste sites.

This will ensure a site suitable for turnover to S&M, pending final remediation. Because this removal action is not a final remedial action, the endpoints are not driven by closure criteria. Instead, they are driven by the requirement to prepare the site for eventual final remedial action.

Thus, this RAWP provides consistency and flexibility through project completion for the entire list of structures included in Table 1-1.

Table 1-1. PFP Above-Grade Structures in the Removal Action Work Planning Scope and Status

Structure from Action Memorandum[a] (DOE/RL-2005-13)	Name/Description	Status
216-Z-9	Crib and support structures: 216-Z-9A, Contaminated Soil Removal Building 216-Z-9B, Operator's Cubicle 216-Z-9C, Mining Apparatus Enclosure	Inactive - Crib activities include only addition of gravel or other fill material and/or soil stabilizers inside the crib and stabilizers or structural reinforcement outside the crib if required Support structures deferred to the 200-PW-1/3/6 record of decision by Tri-Party Agreement change M-83-08-01
225-WC	Wastewater Sampling Facility	Active - supports discharges to TEDF
234-5Z	Plutonium Fabrication Facility	Undergoing deactivation
234-5ZA	Change Room Addition	Active – used to support deactivation of 234-5Z
236-Z[d]	Plutonium Reclamation Facility	Undergoing deactivation
241-Z	Tank Farm Waste Disposal Building (296-Z-3 Stack)	Demolished (Above-grade portion including stack)
241-ZA	Sample Building	Demolished
241-ZB	Sodium Hydroxide Tank	Demolished
241-ZG	Change Facility	Demolished
241-Z-RB	Retention Basin	Demolished
242-Z[d]	Waste Treatment Facility	Undergoing deactivation
243-Z	Low-Level Waste Treatment Facility (296-Z-15 Stack)	Active – used to treat potentially contaminated water
243-ZA	Low-Level Waste Storage Facility	Active – used to treat potentially contaminated water
243-ZB	Cooling Towers and Concrete Pad	Undergoing deactivation
2503-Z	Electrical Switchyard	Active
252-Z-1	Electrical Substation	Active – outside North side of 234-5Z
252-Z-2	Electrical Substation	Active – in room 500 of 291-Z

Table 1-1. PFP Above-Grade Structures in the Removal Action Work Planning Scope and Status

Structure from Action Memorandum[a] (DOE/RL-2005-13)	Name/Description	Status
267-Z	Fire Riser Valve House	Active - Attached to North side of 234-5Z (included in description of 234-5Z)
270-Z	Operations and Support Facility	Undergoing deactivation
2701-ZA	Central Alarm Station Facility	Demolished
2701-ZD	Badge House	Demolished
2702-Z	Microwave Tower and Communications Support Building	Active - converted for use as cell tower (remove from action)
2704-Z	Safeguards and Security Building	Undergoing deactivation
2705-Z	Operations Control Facility	Demolished
2712-Z	Stack Monitoring Station	Active – used to sample stack emissions (Attached to 291-Z-001 Stack)
2721-Z	Emergency Generator Building	Demolished
2727-Z	Supply Storage Building	Active – used to support entries into 242-Z
2729-Z	Maintenance Storage Building	Active
2731-Z	Plutonium Drum Storage Building	Demolished
2731-ZA	Container Storage Building	Demolished
2734-ZA, -ZC, -ZK	Gas Bottle Storage	Inactive (except for 2734-ZK)
2734-ZB, -ZD, -ZF, and –ZG	Gas Bottle Storage	Inactive (2734-ZF and 2734-ZG demolished)
2734-ZJ	Liquid Nitrogen Storage and Supply	Demolished
2734-ZL	Hydrogen Fluoride Building	Inactive
2735-Z	Bulk Chemical Storage Tanks	Inactive
2736-Z	Plutonium Storage Building	Demolished, added to ancillary by TPA-CN-254 and TPA-CN-255[b]

Table 1-1. PFP Above-Grade Structures in the Removal Action Work Planning Scope and Status

Structure from Action Memorandum[a] (DOE/RL-2005-13)	Name/Description	Status
2736-ZA	Plutonium Storage Ventilation Structure (296-Z-6 Stack)	Demolished, added to ancillary by TPA-CN-254 and TPA-CN-255[b]
2736-ZB	Plutonium Storage Support Facility (296-Z-5 and 296-Z-7 Stacks)	Demolished, added to ancillary by TPA-CN-254 and TPA-CN-255[b]
2736-ZC	Cargo Restraint Transport Dock	Demolished
2736-ZD	Vault-Experimental Breeder Reactor II Casks	Removed from complex
2902-Z	Elevated Water Storage Tower and Tank	Demolished
291-Z	Exhaust Air Filter Stack Building	Active – Includes sub-grade duct between the building and the stack
291-Z-001	Exhaust Stack	Active – Exhausts air from 234-5Z, 236-Z, and 242-Z
PFP Complex Area	PFP Complex Yards and Grounds[c]	Active

a. Not all structures in and around the PFP Complex were included in the action. One such structure, the 241-Z-361 Tank, is being addressed under the 200-PW-1/3/6 record of decision (EPA et al., 2011, *Record of Decision Hanford 200 Area Superfund Site 200-CW-5 and 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units*). Waste sites such as 216-Z-8, 216-Z-9, 216-Z-13, 216-Z-14, and 216-Z-15, which have~~s~~ piping leaving below-grade areas of the PFP structures, will be verified isolated only as part of the action.

b. DOE/RL-2005-14, *Removal Action Work Plan For The Plutonium Finishing Plant Above-Grade Structures: Facility Deactivation*, and DOE/RL-2005-15, *Removal Action Work Plan for the Plutonium Finishing Plant Above-Grade Structures: Ancillary Facility Demolition*, were modified by TPA-CN-254, *Change Notice for Modifying Approved Documents/Workplans in Accordance with the Tri-Party Agreement Action Plan Section 9.0 Documentation and Records: DOE/RL-2005-14, Revision 0, Removal Action Work Plan For The Plutonium Finishing Plant Above-Grade Structures: Facility Deactivation*, and TPA-CN-255, *Change Notice for Modifying Approved Documents/Workplans In Accordance with the Tri-Party Agreement Action Plan, Section 9.0, Documentation and Records: DOE/RL-2005-15, Revision 0, Removal Action Work Plan for the Plutonium Finishing Plant Above-Grade Structures: Ancillary Facility Demolition*, to add structures to the RAWP scope.

c. Includes mobile offices (e.g., MO XXX), hazardous waste storage units and hazardous substance storage cabinets (e.g., HS XX), interim storage vaults, and other miscellaneous items such as the 212-Z Laydown Yard. Areas not included are described in note a.

d. Slab removal planned.

1.3 PFP Complex History

The PFP Complex, located in the Hanford Site 200 West Area (Figures 1-1, 1-2, and 1-3), was used to conduct plutonium processing and storage for the production of nuclear weapons and reactor fuel, including the following activities:

- Special nuclear material handling and storage
- Plutonium and americium separation and purification
- Plutonium conversion from plutonium nitrate to other forms, such as plutonium oxide and metal
- Plutonium reclamation and recycling
- Development of plutonium aqueous separations technology at the Plutonium Process Support Laboratories (PPSL)
- Waste handling
- Shutdown and operational surveillances

The structures associated with the PFP Complex, identified in Table 1-1, are described in the EE/CA (DOE/RL-2004-05). The following sections provide a summary description for the main process structures addressed by this RAWP.

1.3.1 234-5Z Plutonium Finishing Plant

Within the 234-5Z Structure, floor levels are designated as the basement, first floor, duct level, second floor, and roof level. The frame is of structural steel with an outer sheathing of aluminum panels over rock wool insulation and 16-gauge sheet steel. The basement is poured concrete. The first floor is a concrete slab. The duct level is sheet metal roof decking. The second floor is a concrete slab. The roof is insulated metal decking. Interior walls are reinforced concrete with metal studs, metal lath, and plaster. The reinforced concrete walls stop at the second floor. The vault and process area doors are constructed of steel. The structure has two box-type reinforced concrete stairwells that extend to the roof. The basement primarily consists of pipe tunnels containing drain piping to sumps.

The first floor housed primary plutonium processing operations occurring in gloveboxes and/or hoods. The first floor also housed support areas such as instrument maintenance shops, maintenance shops, locker rooms with change rooms and restrooms, and office spaces. The process operations included manual plutonium bearing material stabilization and conversion initially in the rubber glove line and, later, remote operations in Remote Mechanical “A” (RMA) (oxide line) and Remote Mechanical “C” (RMC) line (metal line) gloveboxes. By May 1976, some of the gloveboxes used for plutonium processing operations and most of the plutonium processing equipment were removed from the RMA and RMC lines and placed in 61 containers in retrievable transuranic (TRU) waste burial grounds in the 200 West Area. The 234-5Z structure housed plutonium process laboratory functions in the PPSL, standards laboratory, and PFP Analytical Laboratory. It also housed the Recovery of Uranium and Plutonium by Extraction (RECUPLEX) process. In 1978, the Radioactive Acid Digestion Test Unit was emplaced to upgrade waste disposal practices. In this unit, combustible material was shredded and fed into a digester. The material was mixed with nitric and sulfuric acids, residual solids were separated, the solution was dried and then packaged for disposal. Well over half of the gloveboxes and hoods have been removed from the PFP Complex from ongoing work under the Deactivation RAWP (DOE/RL-2005-14).

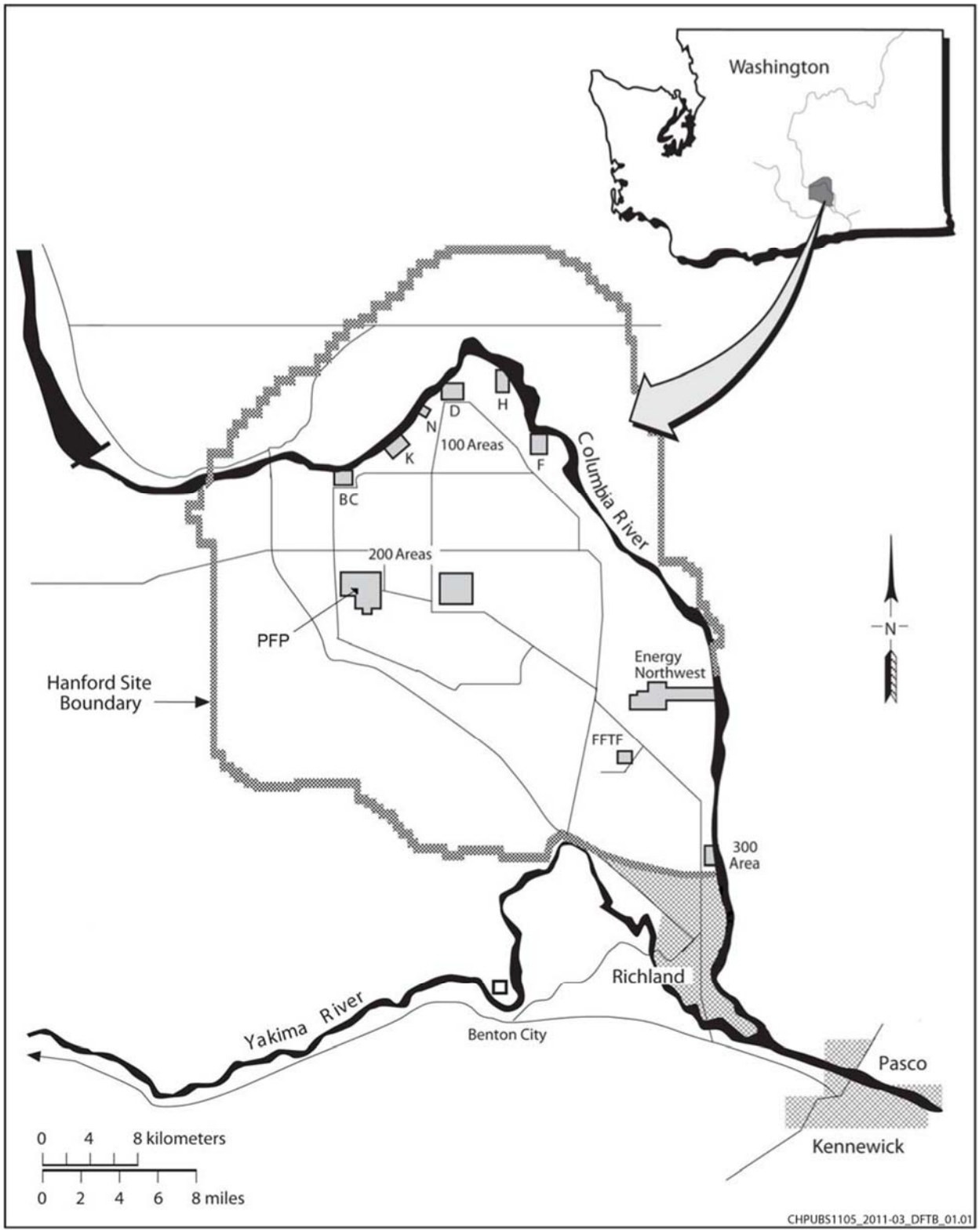


Figure 1-1. Hanford Site Map

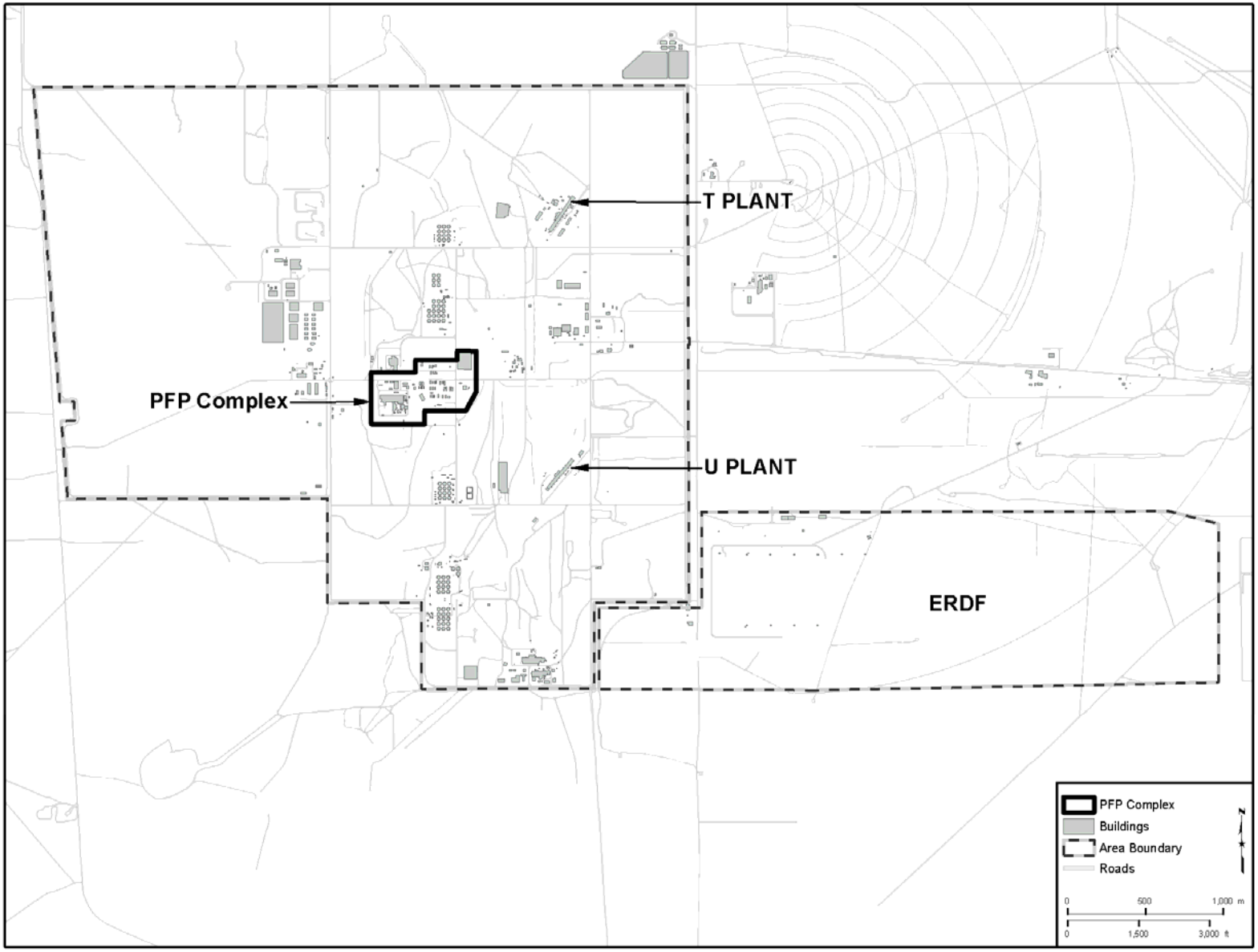


Figure 1-2. 200 West Area Map

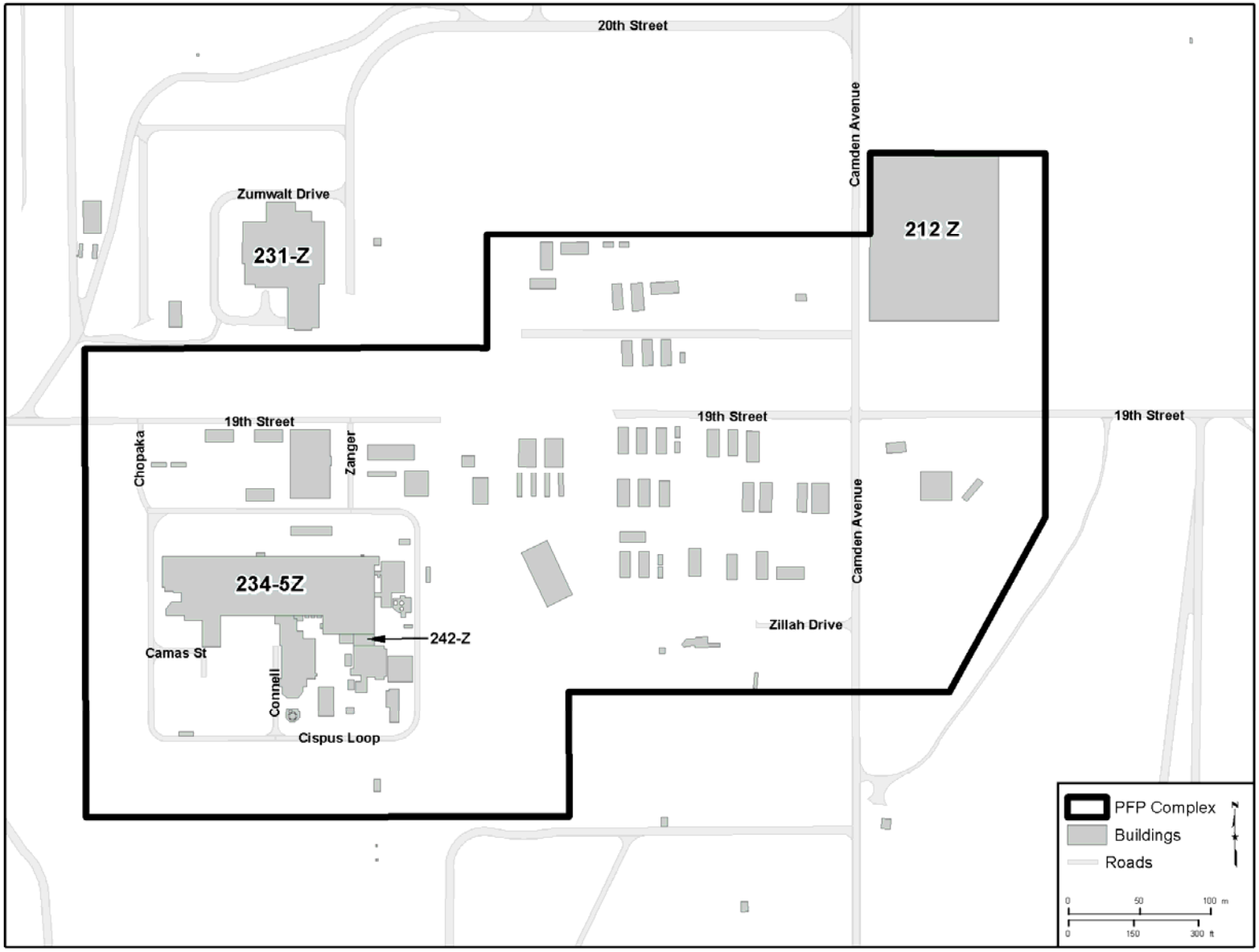


Figure 1-3. PFP Complex Map

Plant closure has been the focus of the last two decades, beginning with the disposition of plutonium-bearing material accumulated during the 50-year production and storage mission.

The duct level contains service piping, ventilation ducts, and some filter boxes. The second floor contained the lunchroom, a plastics shop, conference room, materials storage room, chemical feed preparation and aqueous makeup rooms, locker rooms with change rooms and restrooms, and office spaces. The second floor also contains exhaust air ductwork including filter boxes, filter rooms, and the fan room. The fan room houses the ventilation supply fans, the steam inlet and distribution system, air dryers, the distilled water still, air chilling units, process vacuum pumps, and the vent and balance control room.

The roof level contains air supply ducts and exhaust outlets. The primary supply duct is the 1.4 m (54 in.) diameter supply to the 236-Z structure. The 267-Z fire riser valve house is a sheet steel and structural steel structure located immediately north of, and attached to, the northeast corner of the 234-5Z structure. It was not part of the original 234-5Z construction. The structure houses the control valves for the 234-5Z fire water supply but is an integral part of the 234-5Z structure.

1.3.2 236-Z Plutonium Reclamation Facility (PRF)

The 236-Z structure, constructed in 1963, is essentially a four-story structure built of reinforced concrete and concrete block. The 236-Z structure is connected to the 242-Z structure located at the southeastern corner of the 234-5Z structure.

The 236-Z structure was built to replace the RECUPLEX process in 234-5Z and was completed in December of 1963, with hot feed operations beginning on May 6, 1964. The 236-Z structure received process liquids from 234-5Z as well as scrap from other plutonium facilities in the DOE Complex. The 236-Z structure houses plutonium recovery process equipment that was used to convert various plutonium bearing materials and aqueous feeds to a purified plutonium nitrate product suitable for conversion to plutonium metal or plutonium oxide. The 236-Z processes included plutonium material and scrap stabilization (miscellaneous treatment) (hydrolysis, clarification, and calcinations), plutonium purification (feed preparation, solvent extraction, stripping, and organic cleanup), and concentration and clarification of the aqueous product and waste streams. Except for residue stabilization or cleanout type operations, the 236-Z did not operate after 1989. The principal 236-Z internal feature is a single process equipment cell (PRF Canyon). The cell is a three-story room in the center of the structure. The equipment in the process cell includes many long, narrow, upright metal tanks or columns that vary in length.

An airlock is located against the large double door at the south end of the structure to facilitate equipment transfer into and out of the canyon. The east side of the structure was primarily the service side. The ground floor housed the maintenance shop areas. The second floor housed the maintenance glovebox and ventilation exhaust filter. The third floor housed service equipment and electrical switchgear. The fourth floor housed the chemical preparation, miscellaneous treatment, operating control room, dissolver charging room, and a column room. The first through the fourth floors are serviced by a service elevator on the east side of the structure.

1.3.3 241-Z Tank Farm Waste Disposal Building

The 241-Z structure, also known as the Waste Storage and Treatment Facility, was located south of the 234-5Z structure. 241-Z consisted of a corrugated metal enclosure, that has been removed, and a below-grade concrete vault structure containing remaining tanks D-4, D-5, D-6, D-7, and D-8. The vault structure has been decommissioned, and the *Resource Conservation and Recovery Act of 1976* (RCRA) tank unit has been clean closed. End Point Criteria have been met, including installation of the 20-year cover.

The below-grade vault structure is constructed of reinforced concrete, and the approximate dimensions are 6 m (20 ft) wide, 28 m (92 ft) long, and 7 m (22 ft) deep. The vault structure consists of five separate cells, each with its own sump and each containing a tank.

The 296-Z-3 Stack was on a concrete pad, located just outside the southwest corner of the structure, and was 36 cm (14 in.) in diameter.

1.3.4 242-Z Waste Treatment Facility

The 242-Z structure was constructed in 1963. It is connected to the southeast corner of the 234-5Z structure and to PRF. The 242-Z structure is constructed, in part, of reinforced concrete with portions of the structure having a structural steel frame covered with metal lath and plaster internally, and insulating material wall panels externally. The slightly peaked roof is constructed of metal decking, covered by insulation and built-up asphalt and gravel.

A corridor along the east side interconnects the 234-5Z, 242-Z, and 236-Z structures. The south portion of 242-Z, designated as the tank room, houses large, empty process vessels, and cation and solvent exchange columns, with pipe connecting to the process gloveboxes in the control room. The north portion, designated the control room, has a mezzanine over its west half for chemical addition tanks. The 242-Z structure shares its ventilation system with the 234-5Z structure.

The 242-Z structure was used to treat 234-5Z and 236-Z waste and extract americium from the liquid using special ion exchange resins. 242-Z originally provided chemical additions to 241-Z, and the chemical addition lines remain. An americium recovery system was placed in a glovebox in 242-Z in 1964 and became operational in May 1965. The system received acidic aqueous waste from the 242-Z solvent extraction column, neutralized the solution with sodium hydroxide, and co-extracted plutonium and americium-241. The process was modified in 1970, with the addition of a second cation exchange column. In 1976, an accident caused high levels of contamination (americium, plutonium, resin, and nitric acid) to be deposited in the rooms of the process area, necessitating the isolation of the structure, installation of a high efficiency particulate air (HEPA) filter to the exhaust system, and application of a strippable organic coating to contaminated surfaces.

The 242-ZA structure is a corrugated metal Kelly enclosure that was built specifically for making entries to clean up the 242-Z Control Room. The 242-ZA structure surrounds the west and south sides of the 242-Z Airlock.

1.3.5 291-Z Exhaust Air Filter Stack Building

The 291-Z structure is located south of the 234-5Z structure. The 291-Z structure was constructed in 1949 of reinforced concrete.

This structure houses the exhaust fans and plenums that provide ventilation exhaust for 236-Z, 234-5Z, 242-Z, and formerly for 232-Z. The 232-Z structure was removed previously under a separate CERCLA action (04-AMCP-0486, “Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Non-Time Critical Removal Action Memorandum for Removal of 232-Z Contaminated Waste Recovery Process Facility at the Plutonium Finishing Plant”). The ductwork from the 232-Z structure was isolated from 232-Z in 2005, but it remains physically located in the 291-Z Ventilation structure and is isolated from the 291-Z system. The 291-Z structure also houses an electrical switchgear room called the 252-Z-2 Electrical Substation that is located on the structure’s east side. South of the switchgear room is a mechanical room containing two air compressors and two air sample vacuum pumps. There is a plutonium-contaminated sump located in the mechanical equipment room that

discharges to the 243-Z structure. The contamination in the sumps originates from the process vacuum pumps, which were removed previously. Contaminated process vacuum piping remains.

The ventilation fans and the inlet and exhaust plenums are the primary contents of the 291-Z structure. The structure contains electric motor-driven fans and steam turbine driven fans. The fan rooms are on each side of the inlet plenum and each fan room has a discharge plenum below. The two exhaust plenums discharge to a common discharge plenum to the 291-Z-001 Stack. The structure also has a compressor and pumps room, two cross passageways, and an air supply room. Although subgrade, the ductwork from the 291-Z structure to the 291-Z-001 Stack is within the scope of the Action Memorandum (DOE/RL-2005-13).

1.3.6 291-Z-001 Stack

The 291-Z-001 Stack, also constructed in 1949, is adjacent to the 291-Z structure, and provides the outlet for exhaust air from the 234-5Z, 236-Z, and 242-Z structures. This stack is 61 m (200 ft) tall and is constructed of reinforced concrete.

1.4 Source, Nature, and Extent of Contamination

The structures within this RAWP contain plutonium chemical process equipment and/or process waste handling equipment. These process structures and equipment are contaminated with radiological and chemical substances used or generated during plutonium processing and process waste management operations. Potential radiological and chemical substances have been identified from characterization data, historical operating data, process knowledge, and knowledge of hazardous substances contained in construction materials (e.g., asbestos, lead, polychlorinated biphenyls [PCBs]) and are listed in the EE/CA (DOE/RL-2004-05).

The primary hazardous substances of concern for personnel safety are radioactive materials. Key radionuclide contaminants are the plutonium isotopes (Pu-238 through Pu-242) and their decay products (primarily americium-241), uranium isotopes U-234 through U-238, neptunium-237, and lesser amounts of mixed fission products, primarily strontium-90 and cesium-137.

The majority of the contaminants are found in the form of adherent films and residues in deactivated process vessels, piping, equipment, filters, and ventilation system ductwork. These contaminants also might be found in walls, cracks, and crevices in the processing structures walls and floors. The presence of these materials in nonprocess areas is due to process upsets or releases that occurred throughout the decades of PFP operations. These releases could have affected the immediate release area (e.g., spills of liquid or heavy materials) or could have affected a wider area (e.g., rooms and hallways) downstream of the upset/release (e.g., releases of plutonium oxide or fluoride powders) that is serviced by the affected ventilation system. Thus, mobile forms of plutonium could be found in any process area of the primary plutonium processing structures; areas containing process pipes, such as drains, transfer lines, and vacuum systems; or areas containing the ventilation systems. In most instances, the contamination will be fixed (painted over), but loose powder (plutonium oxides and fluorides) could exist in areas not generally accessed (e.g., panels, electric junction boxes, lighting fixtures, false ceilings, walls, and ventilation ductwork).

Nonradiological hazardous substances identified as having a potential to be present in removal action waste originate from construction materials, process chemicals, and decontamination solutions. The nonradiological contaminants generally considered to provide the most significant personnel health risks through ingestion, contact, and/or inhalation include the following: PCBs, asbestos, beryllium, heavy metals, acids/caustics, and other hazardous process chemicals (e.g., carbon tetrachloride, tributyl phosphate, dibutyl butyl phosphonate). To the extent practicable, bulk quantities of containerized hazardous chemicals are being removed from the PFP Complex in preparation for demolition. Residual

quantities of hazardous chemicals could be encountered as drips, leaks, or dry residue during deactivation activities inside the buildings. As encountered, these drips, leaks, dry residue, etc. will be cleaned up as necessary to support ongoing deactivation activities and protect human health and the environment.

Although most tanks and vessels have been drained, there is little documentation indicating that these systems have been flushed. Therefore, residues containing these hazardous materials are anticipated to be present at some locations. Because all PFP plutonium processes were radioactive, chemical contamination in these systems likely will include radionuclides.

1.5 Hazards

The PFP Complex contains significant quantities of radiological materials, as well as process chemicals specifically used in the various plutonium process operations. In addition, the PFP Complex contains all the normal hazardous materials associated with industrial structures (such as asbestos insulation, lead in paint, or PCBs in electrical equipment). Biological hazards may also be present. Demolition of the structures has the potential for additional industrial related hazards (e.g., cuts, falls, strains, and falling equipment).

Some of the structures within the scope of this RAWP (Table 1-1 and any subsequent additions) are nonprocess support structures that are considered potentially contaminated with radionuclides and/or hazardous materials. Potential radiological and chemical substances in these structures will be identified from characterization data, historical operating data, process knowledge, and knowledge of hazardous substances in construction materials (e.g., asbestos or PCBs).

1.5.1 Radiological Materials

The PFP Complex is posted as a radiologically controlled area. The following radioactive materials are contained within the structures and equipment in the PFP Complex:

- Uranium-233, -234, -235, -236, -237, and -238
- Plutonium-238, -239, -240, -241, and -242
- Americium-241
- Neptunium-237
- Fission products (e.g., cesium-137 and strontium-90)
- Tritium sealed sources in exit signs

1.5.2 Lead

Lead could exist in surface coatings (i.e., lead-based paint) and as shielding or components of plumbing inside the PFP Complex.

1.5.3 Asbestos

Asbestos containing material (ACM) is found in and around the PFP Complex. Disturbance of vessel or piping insulation, loose floor tiles, wall coverings or panels, sheetrock, electrical wire insulation, ducting, or other suspect ACM must be avoided.

1.5.4 Biological Hazards

Biological hazards are present in the form of insect and snakebites and exposure to contaminated bird and rodent feces.

1.5.5 Chemicals

Bulk chemical inventories will have been disposed or recycled during deactivation of the PFP Complex. The potential exists for the discovery of old containers of residual chemical contaminants (e.g., solvents, greases, hydraulic fluids and fuel oils, and aerosols). If such containers are found, they will be managed in accordance with applicable ARARs. Process chemical liquids and residuals remaining in components and piping (e.g., acids, mercury, hydraulic fluids, and oils) will be addressed as part of deactivation and removal of equipment.

PCBs may be found on the painted surfaces of the PFP Complex, in light ballasts, hydraulic equipment components, electrical equipment, stained soils, and waste oils generated during D4. Material that is coated with paint containing PCBs will be managed as PCB bulk product waste.

1.5.6 Beryllium

Beryllium was used in PFP laboratory activities and was associated with radioactive sources used at the PFP Complex. Additionally, low concentration beryllium contamination is expected to be found in areas of structures where Rocky Flats plutonium oxide scrap was processed.

1.5.7 Industrial Hazards

Industrial hazards will be typical of shutdown/inactive structures and demolition areas. Examples include tripping, falling, sharp edges, and lifting (ergonomic) hazards. In addition, demolition with heavy equipment introduces other industrial hazards different from those typical of an operating plant, such as uneven walking surfaces, noise from cranes, excavators, flying debris, waste processing, pinch points on moving equipment, or Environmental Restoration Disposal Facility (ERDF) waste container loading and movements.

1.6 Relationship to Other Documents, CERCLA Work Plans and Actions

1.6.1 End Point Criteria

The PFP Complex End Point Criteria (HNF-22401) defines endpoint criteria (in the form of checklists) for transition of the PFP Complex to slab-on-grade. However, the End Point Criteria document (HNF-22401) included structures and waste sites that are not in the scope of this removal action as defined by the Action Memorandum (DOE/RL-2005-13). For the purposes of this interim CERCLA action, endpoint checklists from the End Point Criteria document will be applied only to those structures in the scope of this removal action.

To document completion of the endpoints, checklists will be completed for the PFP Complex structures in the scope of this CERCLA response action. These checklists document the objective evidence for completion of each endpoint determined to be applicable to specific structures. Endpoint checklists include actions to prepare structures for demolition, demolition completion, and preparation of the site for turnover to S&M. The completed endpoint checklists will be used to support documenting completion of activities under this interim CERCLA removal action, preparing the S&M Plan, transition to S&M and future remedial actions.

1.6.2 CERCLA Work Plans

In 2005, two separate RAWPs were developed to initiate the D4 process at PFP to implement the actions identified in the Action Memorandum (DOE/RL-2005-13).

The Deactivation RAWP (DOE/RL-2005-14) provided the basis and guidance for the preparation of work packages and subcontract task orders for the PFP deactivation project tasks. It also described the activities taken to complete structure characterization, stabilization, decontamination, and deactivation necessary to

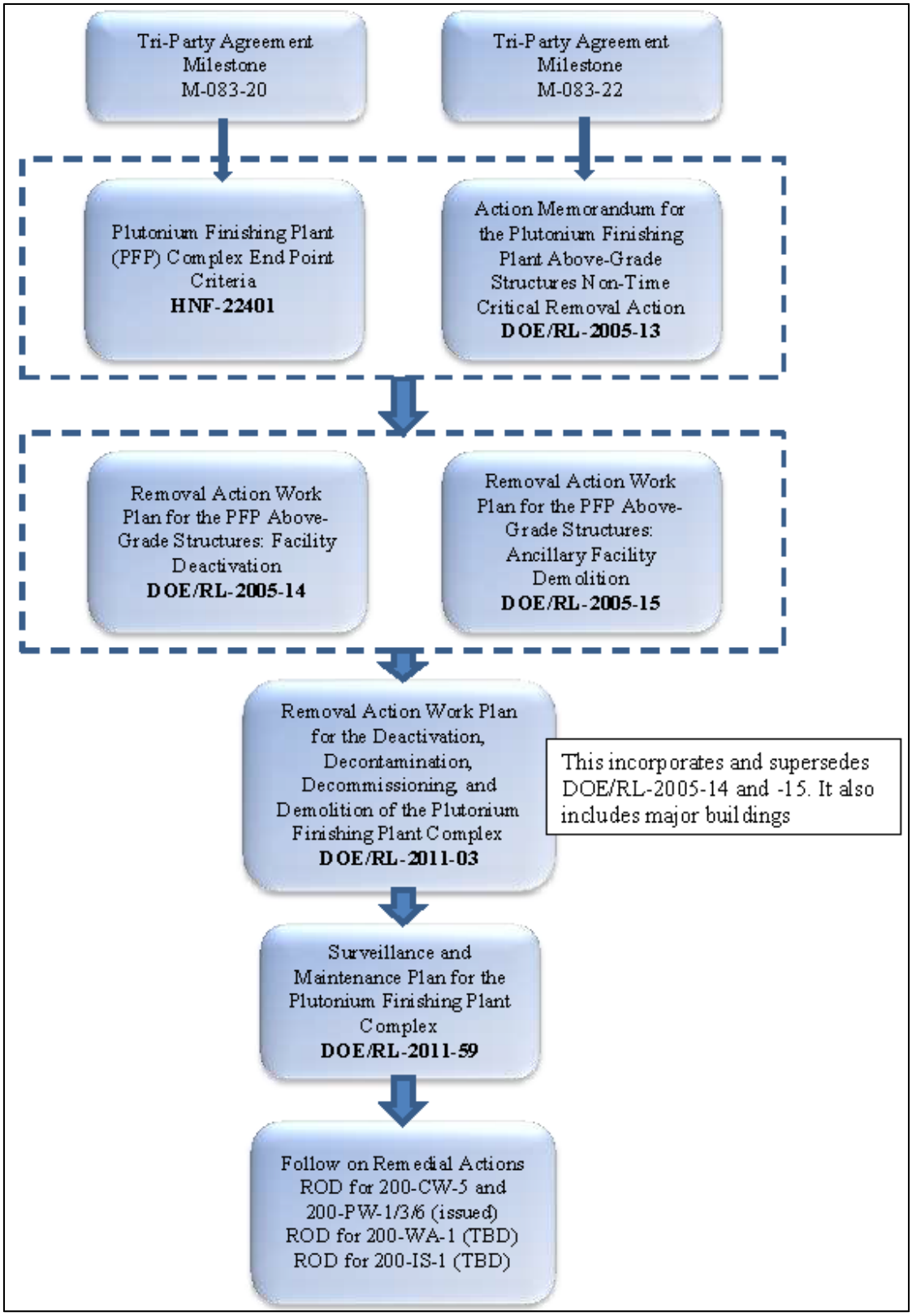
prepare the structures for demolition. The term “deactivation” included all activities required to place a structure in a condition where demolition may be implemented. The Deactivation RAWP does not address those activities associated with structure demolition and disposal.

The Ancillary Facility Demolition RAWP (DOE/RL-2005-15) described the demolition activities of the ancillary structures to a slab-on-grade condition, and the waste and debris disposal. It also described activities for stabilization of the slabs and any remaining systems/structures that may remain below-grade for contamination control. The scope of the Ancillary Facility Demolition RAWP (DOE/RL-2005-15) included only ancillary structures at the PFP Complex that represent a relatively low risk of contamination release during demolition.

This consolidated RAWP was developed to be an updated standalone RAWP for the PFP project. It incorporates and replaces the two previous RAWPs by addressing both ongoing deactivation and demolition (herein referred to as D4) of all structures, including 243-Z, 234-5Z, 236-Z, 242-Z, and 291-Z-001 Stack. This RAWP will be the work plan that the project follows to complete the remaining work at PFP.

1.6.3 Follow-on Actions

The removal action represented by this RAWP is an interim step in the CERCLA process defined by the TPA (Ecology et al., 1989a) and DOE/RL-2009-10, *Hanford Site Cleanup Completion Framework*. This removal action includes periodic S&M activities. S&M will continue until records of decision (RODs) implement the final remedial actions. The Z-1A Crib, Z-3 Crib, Z-9 Crib, and 241-Z-361 Tank are included in the 200-PW-1/3/6 ROD (EPA et al., 2011, *Record of Decision Hanford 200 Area Superfund Site 200-CW-5 and 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units*). Two other RODs (i.e., RODs for the 200-WA-1 and the 200-IS-1 Operable Units) are anticipated to address the disposition of the PFP slabs and below-grade areas that remain after completion of work under this RAWP. Remaining slabs and below-grade areas will be identified by DOE for placement in the Waste Information Data System for evaluation as a new site under the TPA Management Procedure MP-14. Figure 1-4 shows a flow diagram of the document and actions relationships.



Note: Complete reference citations are provided in Chapter 6.

Figure 1-4. Relationship of Documents and Actions Flowchart

2 Demolition Removal Action

The removal action addressed in this RAWP will involve a number of different activities, depending upon the specific scope of work being performed. For the purposes of this RAWP, these activities are addressed in general terms in Section 2.1. These activities will be performed in discrete work phases that are identified as characterization (including sampling and analysis, surveys, and inspections needed to support demolition and/or waste disposal), utility termination, demolition, verification, and turnover to S&M.

2.1 Removal Action Work Activities

The following list includes (but is not limited to) the general activities to implement this removal action. These activities will be applied to those structures and slabs included in the scope of this action. The subsections that follow this list provide some additional detail of these work activities. These described activities are applicable to the above-grade structures, below-grade rooms (basement, tunnels, vaults, etc.), remaining slabs, and, as appropriate, to slabs identified for removal that are within the scope of this removal action.

- Initial characterization
- Remove remaining hazardous substances (chemical, radiological, and biological)
- Decontaminate or remove equipment, ducting, and piping as necessary to support demolition methods
- Stabilize equipment and structures for S&M while they await demolition
- Demolish structures to slab on grade
- Site stabilization
- Turnover to S&M mode after completion of PFP selected disposition activities
- Demolish selected slabs to reduce radiological inventory
- Final characterization
- Post-slab removal stabilization and demobilization

Some activities will be ongoing throughout the entire removal evolution, such as the following:

- Emissions and work activity monitoring
- Waste management and disposal

2.1.1 Characterization Activities

Characterization activities are limited to those structures, below-grade areas, and slabs in the scope of this interim removal action (see Table 1-1) and are expected to occur throughout the deactivation, decontamination, and decommissioning process. Once the demolition activities are complete, final characterization will take place prior to any required stabilization activities.

All characterization activities will be conducted in accordance with the approved sampling and analysis plan (SAP) (DOE/RL-2004-29, *Sampling and Analysis Plan for the Plutonium Finishing Plant Above-Grade Structures*), which was developed following the U.S. Environmental Protection Agency's (EPA) data quality objective (DQO) process for data collection, sampling and analysis rationale, strategy, and requirements (EPA/600/R-96/055, *Guidance for the Data Quality Objectives Process*). The results of the DQO process are documented in the SAP (DOE/RL-2004-29). Characterization for the safe management and disposal of the slabs and soil that may be removed will be addressed in a DQO/SAP to provide additional information on potential soil contamination under those slabs, and to provide information in the waste site discovery process.

2.1.1.1 Initial Characterization

Initial characterization will be conducted in conjunction with deactivation, decontamination, and decommissioning activities for the PFP Complex structures in the scope of this removal action. Prior characterization data, process knowledge, and historical information will be used to identify potential data gaps for inclusion into initial characterization activities for above-grade and below-grade areas. Sub-grade ductwork and drain lines (not in the scope of this removal action) will be characterized at the point where they connect to the slab or below-grade space of structures in the scope of this interim removal action.

The data obtained by this characterization iteration along with prior data, process knowledge, and historical information will be used for air dispersion modelling; monitoring modelling; and identification of waste disposition pathways, items requiring special handling (i.e., cannot be rubblized during demolition) or treatment, and appropriate demolition/dismantlement methods.

2.1.1.2 Final Characterization

The final characterization data collection, survey, sampling, and analysis will be used to document the condition of the remaining slabs, below-grade areas, and surrounding soils at the completion of the D4 activities. The primary purpose of this activity is to document any remaining contamination (e.g., contaminants of concern, concentrations, and locations) for follow on activities such as S&M, slab removal, input to the waste site discovery process, and future remedial actions.

This final characterization will take place after demolition activities prior to final stabilization activities and will continue through slab removal activities. In the case of below-grade areas in the scope of this removal action, this characterization may take place prior to the start of demolition.

2.1.2 Remove Hazardous Substances

This work includes the removal of such items as asbestos containing material, chemical feed tanks and piping, equipment oils, control panels, and materials or liquids in drain traps. Radiological hazardous substance removal includes, but is not limited to, process hoods, gloveboxes, filter boxes, piping, and ducting. Equipment or items, shown by characterization data to meet the ERDF waste acceptance criteria without treatment, may be left in place to be rubblized during demolition. For below-grade equipment left in place, characterization data will be documented for future remediation.

2.1.3 Decontaminate or Remove Equipment

This activity is accomplished through the deactivation, decontamination, and decommissioning process. Any deactivation, decontamination, and decommissioning activities started under the Deactivation RAWP (DOE/RL-2005-14) will continue under this RAWP, once approved. This RAWP supersedes the Deactivation RAWP (DOE/RL-2005-14). Once deactivation, decontamination, and decommissioning activities are documented to be complete, the structure is considered ready for demolition.

All equipment, piping, and items left to be rubblized with the structures must meet the ERDF waste acceptance criteria.

These activities may also encompass maintenance on select operational systems. Systems deemed necessary to support the deactivation, decontamination, and decommissioning activities will be maintained until work has progressed to the point they are no longer necessary. Examples include maintenance of roofs, exterior walls, heating, cooling, lighting, radiation monitoring, electrical systems, and ventilation systems (including fans, belts, and ductwork).

2.1.3.1 Above-Grade Deactivation

Deactivation activities to stage structures for final demolition will encompass all work performed to place the structure in a state where release of contaminants and risk to employees and the environment have been minimized to the extent practical, and will enable structure demolition and disposal. This work will be performed to ensure personnel and structure safety and may include isolating systems (i.e., electrical, mechanical, and chemical). Final demolition preparation will include removing final items previously required to support habitability (e.g., remaining instrumentation containing hazardous constituents, and asbestos containing doors), and applying fixatives and sealing penetrations through the floor. All equipment and piping penetrating the floor will be cut or dismantled as close to the floor as possible and plugged. Operations involving radiological contaminants will be performed with personnel protection measures commensurate with the hazards anticipated. If work area monitoring shows the work environment is not as anticipated, work will be stopped to ensure adequate personnel protection. During the performance of activities where unknown radiological or other hazardous conditions exist, appropriate measures will be implemented to protect personnel and to reduce the risk of generating airborne contamination. Items identified as requiring special handling (cannot be rubblized) either will be removed during this phase of work or may be clearly color coded for intact removal after demolition has begun.

While deactivation activities are ongoing, systems and equipment may be left in an operational state to support S&M activities prior to the structure being demolished. These systems include electrical power, lighting, ventilation, and radiation monitoring. These items may be deactivated prior to demolition or deferred to structure demolition, as appropriate and needed. Each of the uncertainties known to exist for this removal action will be managed with pre-work surveys, physical/chemical/radiological characterization of the structure, walk-throughs, preventive control measures, analytical data, and in-depth planning (such as work packages and hazard reviews).

2.1.3.2 Below-Grade Deactivation

Below-grade areas of structures in the scope of this removal action will remain after completion of the removal action, but also will undergo deactivation to minimize potential release of contaminants, risk to employees, and the environment. Equipment, piping, or ducts in accessible below-grade areas will be characterized and removed or decontaminated as required. Items requiring removal (special handling) may be deferred for removal during demolition or during post-demolition activities and may require treatment and/or disposal at an approved offsite facility. For waste slated to go to the Waste Isolation Pilot Project (WIPP), the disposal pathway may entail storage at the Central Waste Complex (CWC) and/or shipment to another facility for treatment; then ultimately, shipment to WIPP in accordance with the schedule established for completing remedial actions on the Hanford Site. Any remaining plutonium in the below-grade areas must be verified not to pose a security risk or potential for criticality.

Piping that exits or enters a below-grade portion of structures will either be flushed or drained, cut or dismantled as close to the wall as possible, and plugged or capped.

After below-grade activities are complete, including final characterization, and as necessary to support planned demolition activities, below-grade voids may be filled to provide structural support.

Removal of the below-grade structures is not in the scope of this removal action and will be addressed in future CERCLA response actions.

2.1.3.3 Decontamination

After an area (i.e., some part of a structure) has been surveyed and the radiological conditions established, cleanup and general housekeeping will commence, as necessary. Cleanup and general housekeeping will involve removing loose materials and rubble/debris, as well as loose radiological contamination as needed

to facilitate demolition. If it is advantageous, these materials may be staged for removal during the demolition phase of the project.

The initial decontamination work scope is focused on removing the remaining internal equipment and debris from gloveboxes, hoods, operating areas, and ductwork; decontaminating the interior surfaces of gloveboxes; and packaging the internal equipment and debris for disposal. If the equipment/debris can be decontaminated to the extent it can meet the ERDF waste acceptance criteria, the equipment/debris will be disposed at ERDF or it may be left for disposal with the structure debris during demolition. Gloveboxes, hoods, and other contaminated equipment (pipes such as transfer lines, vacuum lines and drains, ducts and filter boxes, and other components) that cannot be cleaned, decontaminated, or otherwise treated to meet ERDF waste acceptance criteria will require disposal at WIPP. The WIPP disposal pathway may entail storage at the CWC and/or shipment to another facility for treatment; then ultimately, shipment to WIPP in accordance with the schedule established for completing remedial actions on the Hanford Site.

If during excavations (e.g., to access utilities) the excavated soil is determined to be contaminated, the contaminated soil will be disposed at ERDF. Clean fill will be used to backfill the excavation.

The decontamination and stabilization activities include the following uncertainties:

- Personnel exposure to unexpected hazardous substances
- Inadvertent generation of high airborne contamination concentrations
- Unknown structural integrity of the structure and systems that could cause industrial accidents
- Depth of contaminant penetration into structure surfaces
- Common industrial risks associated with working in industrial areas and around heavy equipment
- Unknown conditions

Asbestos. Removal and disposal of asbestos and ACM will be performed in accordance with the substantive provisions of the *Clean Air Act of 1977* (40 CFR 61, “National Emission Standards for Hazardous Air Pollutants,” hereinafter called NESHAP, Subpart M, “National Emission Standard for Asbestos”) as identified in the Action Memorandum (DOE/RL-2005-13), which require special precautions to control airborne emissions of asbestos fibers during asbestos removal activities. Asbestos abatement activities will be performed in full compliance with all substantive NESHAP standards that are ARAR for the work. Prior to the commencement of the demolition, a thorough inspection of the affected structure will be performed and documented for the presence of asbestos, including Category I and Category II nonfriable ACM. All Category II nonfriable ACM will generally be presumed to be potentially friable and will be removed prior to the start of actual demolition activities. If DOE identifies any Category II ACM that should be allowed to remain in place during demolition based on the knowledge that the demolition will not render it friable, information identifying the planned demolition approach and describing how the Category II ACM will not become crumbled, pulverized, or reduced to powder by the forces expected to act on it during the demolition or otherwise friable, will be provided in advance to EPA for approval. Category I nonfriable ACM will also be removed prior to the start of actual demolition activities, except in situations where demolition practices will be used that can be or have been demonstrated to the satisfaction of EPA to not render the Category I ACM friable, consistent with NESHAP (40 CFR 61) standards. Demonstration can be performed using existing EPA or Washington State guidance regarding asbestos abatement under NESHAP (40 CFR 61). Such Category I nonfriable ACM must not be in poor condition and planned demolition activities must not subject the ACM to sanding, grinding, cutting, or abrading. In all cases, ACM that is either friable or cannot be demonstrated

to remain nonfriable during demolition will be removed prior to such demolition, as required by NESHAP (40 CFR 61).

Other Hazardous Material. Unattached, not-in-use, and accessible lead bricks and sheeting, PCBs (e.g., motor oils and light ballasts), mercury (in process equipment, lighting components, and switches), fire extinguishers, radioactive sources (e.g., exit signs and smoke detectors), emergency light batteries and other hazardous materials should be removed. Such materials should either reused/recycled in accordance with guidelines discussed in Section 4.2.3 (where practicable), or disposed. Any items not removed will be documented if the final waste matrices meet the ERDF waste acceptance criteria.

Radiological Controls. It is anticipated that temporary contamination control structures (such as temporary containments, glovebags, and/or temporary ventilation systems) may be used to limit airborne releases. Waste package assay station(s) for drums, standard waste boxes, and other waste containers will be used to characterize radiological material contents of waste packages prior to disposal. Decontamination processes and solutions will be used to reduce the concentrations of radiological contaminants on surfaces in gloveboxes, hoods, filter boxes, ductwork, floors, walls, and other surfaces.

Current Unknowns. Other activities and/or processes, yet to be identified, to improve processes may be procured and implemented during decontamination. If size reduction of material is required and/or beneficial prior to waste disposal, this activity may be implemented by onsite personnel as appropriate. Throughout all of these activities, occupational monitoring capabilities will be used, as needed, to ensure personnel and environmental safety.

Each method or process involves uncertain or unknown conditions that must be addressed to support the implementation of structure deactivation and stabilization. As the structure undergoes deactivation, structural features, airflow conditions, background radiation levels, and airborne contamination concentrations are likely to change and are some of the uncertainties. These uncertainties will be managed with pre-work surveys, and in-depth planning (work packages and hazard reviews).

All waste generated for disposal will be characterized in accordance with the SAP (DOE/RL-2004-29).

Specialized Equipment for Deactivation, Stabilization, and Decontamination. Specialized project equipment may be needed during deactivation and decontamination operations. Equipment for concrete cutting, decontamination, dismantling, and system/equipment isolation will be evaluated, as needed, to ensure that personnel training and equipment are adequate for safe integration into the work activities. In most cases, personnel training will be derived from the equipment operational manuals and methods. Equipment that is more complex might require specialized training by vendor representatives. Modifications to equipment that will limit the exposure to contamination will be incorporated when possible. These modifications generally would involve alterations that allow only the working components to be used in contamination areas, with the power/collection/process units maintained in clean areas (i.e., outside of the contaminated area).

Process Equipment. Contaminated process equipment will be characterized, decontaminated, stabilized, and/or removed as needed to support open-air or limited-containment demolition. The equipment will be fixed or stabilized, as necessary, for the disposal or other waste management path chosen. TRU waste being loaded into a container may not require stabilization, but fixatives may be required for the waste prior to removal to ensure environmental and personnel exposures are as low as reasonably achievable (ALARA).

Decontaminating or stabilizing process equipment may involve the use of simple brush, spray, foams, or fixative procedures, or it may require more extensive preparations, including special glovebags, vacuum systems, crawlers, chemicals, and/or other special equipment.

Gloveboxes, hoods, filter boxes, and process cell may require more aggressive decontamination and may use the following processes to remove, fix, or stabilize contaminated surfaces:

- Aggressive chemicals (such as etching, solvents, degreasers, peels, or strip coats) and a wide variety of other chemical cleaners
- Mechanical means (such as scraping, grinding, cutting, scabbling, explosive scabbling, sand blasting, laser ablation systems, robotics, or pressurized gas systems)
- Brushing the surfaces to remove contamination followed by use of fixatives (e.g., paint and foam)

Special equipment may be procured or developed to enhance this work as experience is gained, and unique challenges are identified during the life of the project.

Decontamination chemicals identified at this time include water, other specialized commercially available alternatives, and compressed nitrogen gasses. It is anticipated that other chemicals, compounds, and methods will be used as needed, based on experience gained.

In some cases, decontamination will be followed by removal and disposal of portions or all of the gloveboxes and hoods. Prior to leaving process equipment to be rubblized with the structure, it will be verified they will not cause the final waste matrix to exceed the ERDF Waste Acceptance Criteria. Items that will not meet ERDF Waste Acceptance Criteria and/or requiring special handling (cannot be rubblized) during demolition will be characterized, stabilized, identified, and clearly marked using a color coding system for segregation to prevent rubblization.

Ductwork. Contaminated ventilation ductwork will be characterized, decontaminated, stabilized, and/or removed as needed to support open-air or limited-containment demolition. The ducts will be fixed or stabilized, as necessary, for the disposal or other waste management path chosen. TRU waste being loaded into a container may not require stabilization, but fixatives may be required for the waste prior to removal to ensure environmental and personnel exposures are ALARA.

Decontaminating or stabilizing ductwork may involve the use of simple brush, spray, foams, or fixative procedures, or it may require more extensive preparations, including special glovebags, vacuum systems, crawlers, chemicals, and/or other special equipment.

Prior to leaving ductwork to be rubblized with the structure, it will be verified they will not cause the final waste matrix to exceed the ERDF Waste Acceptance Criteria. Items that do not meet ERDF Waste Acceptance Criteria and/or requiring special handling (cannot be rubblized) during demolition will be characterized, stabilized, identified, and clearly marked using a color coding system for segregation to prevent rubblization.

Contaminated Piping Systems. This section is applicable to piping systems internal to structures or above grade piping external to structures. It does not apply to sub-grade piping once it exits a structure. A contaminated piping system may include transfer lines, vacuum lines, drain lines and, in some places, the outsides of clean chemical feed lines. These pipes will first be drained of liquids. The liquids will be disposed to the Effluent Treatment Facility (ETF) or other approved facility, or absorbed or solidified and disposed as solid waste. Pipes and drain lines (including floor drains) that exit structures through the foundation/slab/grade will be isolated/sealed at the structure boundaries.

Additional decontamination steps may include chemical or mechanical treatments, followed by stabilization (paints, epoxies, foams, or other methods) as required for removal of the piping to ensure personnel and environmental safety.

As with the ductwork, decontamination of these lines may use crawlers, "slugs," simple flushing procedures, acids, foaming, or other technologies to clean or stabilize the contamination associated with the piping.

In general, with strategic exceptions, prior to leaving piping in the structure for rubblization, it will be verified they will not cause the final waste matrix to exceed the ERDF Waste Acceptance Criteria. Items requiring special handling (cannot be rubblized) during demolition will be identified and clearly marked using a color coding system for segregation to prevent rubblization.

236-Z Plutonium Reclamation Facility and Other Highly Contaminated Structures, Areas, or Equipment. Most of the loose, accessible radiological contamination will either be removed or fixed in place, depending on the levels, accessibility, complex shapes (e.g., grating), and type of contamination found. Some of the equipment/piping will be removed, and loose contamination will be wiped or vacuumed with a HEPA filter-equipped vacuum. If loose contamination remains after the initial decontamination effort (unless the area will be inaccessible after completion of the removal project, or if the structure configuration or conditions make removal of loose contamination impractical), the contamination will be fixed in place, as required.

Removal of residual contamination (radiological or chemical) will be performed as necessary to ensure endpoint and final disposal requirements are met using nonaggressive (e.g., wiping or using decontamination solutions) or aggressive means (e.g., scabbling, grinding, or other abrasive/mechanical means). Aggressive means of decontamination will be planned based on ALARA principles. The activities chosen will strive to reduce contamination to ALARA compatible with planned demolition methods. A controlled density fill material such as grout or other similar material may be installed to stabilize the material and/or provide shielding, to facilitate demolition and/or future removal or remedial actions for below-grade structures not authorized for removal by this removal action.

The Action Memorandum (DOE/RL-2005-13), in choosing Alternative 4 as the preferred alternative, stated in Section 5.1.4:

> *Plutonium holdup disposition activities would be completed. Significantly less than 1 kg of residual contamination may remain after completion of the slab-on-grade activities. The remaining residual contamination would be trapped in the building foundation slabs and sub-grade structures (including buried piping and ductwork).*

Because of uncertainty in the radiological inventory of the above- and below-grade structures at PFP, a final remaining plutonium inventory value cannot be determined until characterization is completed during this above-grade removal action.

If a change arises that results in a fundamental change to the selected response action that is not within the scope of work, another EE/CA or proposed plan and supporting documentation will be prepared to allow DOE and Ecology to select a revised response action.

In some cases, contaminated equipment, piping, or contaminated materials that are not practical to be removed prior to demolition and that cannot be decontaminated such that segregation from other structure debris for disposal is required will be stabilized and/or shielding material installed. The equipment, piping, or material will be marked (i.e., painted) such that the item may be segregated from rubblization to be retrieved and segregated during structure demolition and debris cleanup.

2.1.3.4 Decommissioning

The decommission process will proceed on a priority-based path that results in an expedient and cost effective transition of structures to a safe and stable condition that presents no significant threat of release

of hazardous substance into the environment and no significant risk to human health and the environment (HHE). In the typical decommissioning process, the structure undergoes transition requiring active management to mitigate risks to an S&M phase, followed by final disposition. Due to the nature of the structures in the PFP Complex, decommissioning may not be complete until most activities conducted under this RAWP are complete culminating in the complex left at slab-on-grade, releasing the complex from active management.

2.1.4 Demolish Structures

Demolition encompasses activities such as mobilization and preparation, demolition, and equipment decontamination. Each PFP structure in the scope of this removal action would be demolished until only the slabs and foundations (including below-grade areas) remain. The slabs associated with 236-Z and 242-Z will be demolished and removed to reduce radiological inventory of the PFP complex area, unless pre-removal characterization results indicate that the level of contamination in or below the slab(s) would require controls more rigorous than the open-air demolition controls utilized for slab-on-grade demolition activities. In that event, DOE in consultation with the lead regulatory agency, may choose to leave the slab(s) in place for future remediation.

2.1.4.1 Site Mobilization and Preparation Work

Upon initiation of demolition activities and deactivation of plant systems to move to a cold and dark state, personnel will be mobilized and consumables and required equipment will be procured. The first activities to be performed will include mobilizing personnel and any needed trailers or temporary systems or structures to support project activities. Field personnel will perform an assessment of project readiness to start demolition work by verifying pre-demolition endpoints are complete, deactivation status, and physical isolation of the services and utilities.

Concurrent with these activities, waste staging areas will be established to facilitate transportation of the material for recycling or disposal in accordance with the environmental management and controls described in Chapter 4. The PFP onsite area may be expanded to areas near the PFP site to accommodate the waste management function.

Electricity will be connected from an outside line or generator, and temporary power and lighting will be installed as needed. Electrical systems that will be used throughout the D4 activities are discussed in further detail in Section 2.3. Water sources (both potable and dust suppression) and sanitary facilities will be identified and established, as needed, to support the planned work. Occupational Safety and Health Act (OSHA) concerns (e.g., fall protection and electrical) will be managed as the concerns are identified during the work planning.

2.1.4.2 Demolition Activities

In general, the PFP Complex will be demolished using standard demolition techniques (e.g., excavator with a hoe-ram; a hydraulic shear with steel shear jaws, concrete pulverizer jaws, or breaker jaws). Other industry standard practices for demolition also could be used (e.g., mechanical saws, cutting torches, and controlled explosives). For the most part, open-air demolition will be used and conformance with emissions controls outlined in Section 4.3.1.2 will be monitored throughout the process. Controls such as fogs and sprays, encapsulation, and tenting will be used as needed to control release of any contaminants.

As part of the pre-demolition preparation, items requiring special handling (e.g., stabilized ducting, gloveboxes, or HEPA filters) will be identified, clearly marked using a color coding system, and prepared for removal before beginning structure demolition. Demolition planning will ensure these marked items will not be subjected to demolition techniques, as they require special handling. Some items may not meet

ERDF Waste Acceptance Criteria and require disposition as TRU waste or may require treatment prior to transport to ERDF.

Each PFP above-grade structure will be demolished to within 15 cm (6 in.) of the slab and foundation. For structures with basements, tunnels, vaults, etc., the below-grade walls, as well as the below-grade slab and foundation will be left in place. These remaining portions of a structure are referred to in this document collectively as the slab. Equipment, piping, and ducts remaining in below-grade areas at the completion of the removal action would be characterized and documented to support future final remediation. Below-grade voids left by this work may be backfilled as needed, after any required sampling or surveys. In addition, miscellaneous debris in the surrounding area, such as fencing or telephone poles, will be removed and disposed of during demolition.

Demolition will result in piles of bulk demolition waste. This waste will be processed and loaded concurrently with demolition activities. These piles will be on or near the associated structure footprint and positioned to allow equipment access to the structure undergoing demolition and equipment access to the bulk waste.

During removal and demolition activities, if there are parts (areas, sections, etc.) of the slab that sustain damage that could allow contamination to enter into the environment, repairs of the slab are allowed. Repair work may include the use of concrete or other materials that would provide enough permanency to survive through the S&M period. Slabs associated with 236-Z and 242-Z will be removed and disposed (or staged at CWC or other appropriate 200 Area facility in WIPP-certifiable containers while awaiting final disposition) subsequent to completion of PFP selected disposition activities and after transition to S&M mode.

Underground Injection Control Devices (French drains) will be formally closed or stabilized prior to demolition activities to prevent demolition water intrusion. Removal of the top three feet of the French drain and backfill is required to meet formal closure. Removal may be accomplished prior to or during demolition activities. Formal closure may be deferred to final site remediation.

Wells may be located near or within the footprint of the structures undergoing demolition activities. The wells may or may not be affected by the demolition activities, but discussions with the affected groundwater groups or project must occur to ensure either proper well protection or decommissioning is performed. If required, the well or wells may be decommissioned prior to or as part of the demolition work.

2.1.4.3 Equipment Decontamination

Decontamination that is necessary to allow removal of demolition equipment from contamination areas, and waste truck decontamination, will be accomplished using standard industry practices and best management practices (BMPs).

Gross equipment decontamination methods will be employed to remove loose contamination within the contamination area. Gross cleaning and/or decontamination of heavy equipment and vehicles may consist of using wipes and nonhazardous materials to remove loose contamination. Water may be used to clean equipment in the decontamination area; however, the use of large volumes of water will be minimized. Soaps, detergents, or other nonhazardous cleaning agents may be added to the water used in the high-pressure washer. Pressure washing, if required, will normally be performed using cold water. However, hot water may be used to avoid icing. Wet grit blasting, grinding, or steam cleaning will be used only after other decontamination methods prove to be ineffective.

Additional or final decontamination may take place in the contamination reduction zone using the same or similar methods. Location and characterization of all decontamination areas will be documented after use.

2.1.4.4 Water Management

Water from this project will be generated from several of the following sources:

- Decontamination water
- Dust suppression water
- Normal site precipitation runoff
- Sanitary waste water

Decontamination fluids that meet the substantive provisions of existing Hanford state waste discharge permits may be discharged accordingly. Alternatively, decontamination fluids (water and/or nondangerous cleaning solutions) generated from cleaning equipment and tools may need to be contained, sampled, and as necessary transported to ETF, other approved facility, or solidified for disposal at ERDF. Verification sampling of the decontamination area will be performed in accordance with the approved SAP (DOE/RL-2004-29) before close out of the project. The decontamination methods used will be documented. Personnel responsible for equipment decontamination will be knowledgeable of the applicable requirements of this RAWP.

Dust suppression water applied during demolition will be used as necessary. All attempts will be made to prevent water from ponding or puddling. If a quantity of water running off the site presents safety or environmental issues, the water will be collected and managed. If the water cannot be evaporated, then it will be characterized and disposed to an appropriate facility such as the Treated Effluent Disposal Facility (TEDF), ETF, or other approved facility.

Current site runoff is being managed by the TEDF system. Care will be taken to prevent water generated from D4 activities from combining with current site runoff and overwhelming the TEDF system. Therefore, typical site runoff should continue to be managed as part of normal operation. Further discussion of wastewater management is contained in Section 4.5.

2.1.5 Site Stabilization and Demobilization

The following activities will be completed after demolition of above-grade structures and removal of TRU waste from below-grade spaces:

- Post-demolition survey
- Sealing of below-grade accesses
- Removal of deferred items
- Document any remaining tubing, piping, ducting, drain lines that contain contamination
- Stabilization of contaminated slabs
- Pre-transition area cleanup, surveys and postings
- Transition to S&M
- Removal of 236-Z and 242-Z slabs to reduce radiological inventory
- Characterization as needed
- Final cleanup/site stabilization
- Final surveys
- Final posting and access control measures

Post-demolition surveys will be conducted to determine if additional cleanup is necessary. Surveys will include radiation, confirmation sampling (if hazardous waste is suspected), and physical hazard surveys.

Appropriate steps will be taken to correct any issues found from the post-demolition surveys. Access to below-grade areas will be appropriately closed to minimize any liquid intrusion. Following transition to S&M, the 236-Z and 242-Z slabs, along with soil necessary to complete slab removal (approximately one meter below the slab) will be removed to reduce radiological inventory. After removal of slabs, remaining excavations will be backfilled and stabilized to prevent contaminant migration using an appropriate cover or other stabilization method for S&M prior to final disposition.

Once these activities are complete, potentially contaminated areas will be evaluated to determine if a contamination control cap is required. Some areas will likely require contamination control cap installation; however, many ancillary structures can be cleared from hazards and not require a cap or other barrier. If any contamination remains on a slab, the contamination must be fixed and a contamination control cap suitable for exposure to the weather for 20 years installed.

Items deferred to post-demolition removal from below-grade areas will be removed using appropriate methods and controls. This may require removal of portions of the existing slab and implementing additional radiological controls.

Final cleanup will be conducted as demolition activities are completed. This also includes such things as sealing/eliminating confined spaces and manholes to prevent water intrusion and personnel access. Waste will be screened and segregated. The site will be graded to original site contours where necessary. Waste will be removed and disposed once it has been characterized.

Final site surveys will be completed once the site has been graded or once the cap or slab has been constructed. Surveys will include radiation, confirmation sampling (if hazardous waste is suspected), and physical hazard surveys. These surveys will be documented and placed in the site data repository so that the information will be available for the final remediation team.

Using the data from the final survey, a site access control plan will be developed. This will define areas where access must be controlled such as below grade void areas. These sites will be posted and, if necessary, fenced or other barriers will be built to prevent access to the area. The site will be turned over to S&M for the PFP Complex.

2.1.6 Emissions Monitoring

Emissions and work activity monitoring will be accomplished through a combination of real time monitoring, sampling and surveys at work locations, stack sampling, near facility monitors, and the Hanford Site perimeter monitors. Most of the deactivation, decontamination, and decommissioning work will be conducted under the existing structure ventilation system. Those emissions are continuously sampled at the 291-Z-001 Stack. As structures are prepared for demolition, they will be separated from the ventilation system such that the other structures will remain under active ventilation. Once all structures have been prepared for demolition or the decision has been made that the ventilation system is no longer necessary, the system will be shut down and the stack sampling discontinued.

The primary method of monitoring after disconnection from the ventilation system or once the ventilation system is completely shut down will be work activity monitoring consisting of real time monitoring using ambient air monitors with alarms, sampling and surveys. In addition, the near facility monitoring data will be used for indication of conditions throughout the D4 process. Additional information is provided in Section 4.3.

2.1.7 Waste Management and Disposal

A variety of waste streams will be generated under the selected removal action alternative. It is anticipated that most of the waste will be characterized as low-level waste (LLW) or dangerous waste.

However, quantities of TRU waste or mixed waste, PCB-bulk product waste, and ACM may be generated. The majority of the waste will be in a solid form; however, some aqueous solutions might be generated. Wastes resulting from structure preparations, sampling and analysis, and decontamination (i.e., decommissioning activities) will be managed and disposed of in accordance with the pertinent ARARs specified by the Action Memorandum (DOE/RL-2005-13) and reproduced in Section 4.2 of this RAWP. Waste will be packaged to meet the applicable waste acceptance criteria of the receiving facilities.

Waste management will include both S&M activities conducted prior to and after D4, as well as wastes generated during D4 (DOE/RL-2005-13). Certain materials may be eligible for salvage and recycling, which is encouraged if the appropriate regulatory and project requirements are met and it is economically feasible for the project to do so. ERDF is onsite under CERCLA (Section 121, “Cleanup Standards”) for management and/or disposal of waste from this removal action. The suitability of the receiving TSD facility to manage CERCLA waste that must be sent off the PFP CERCLA Site will be determined by the EPA regional office overseeing the receiving TSD facility in accordance with 40 CFR 300.440, “Procedures for Planning and Implementing Off-Site Response Actions.” Treatment of waste (onsite or offsite) may be necessary prior to disposal at ERDF, and containerized waste may be returned from offsite segregation or treatment for disposal at ERDF. Liquid waste will be sent to an approved facility, and any treatment residues that meet the waste acceptance criteria may be disposed at ERDF.

2.1.8 Surveillance and Maintenance

The goal of S&M is to sustain a structure or area in a safe condition and reduce the potential release or migration of hazardous materials to the environment. Prior to turnover to S&M, any remaining plutonium in below-grade systems must be verified not to pose a security risk or potential for criticality. Some S&M activities may be applicable to structures prior to demolition (in the case where there is a waiting period between being demo-ready and the start of demolition). Turnover to S&M will follow completion of the portion of the removal action that includes above-grade structure demolition, removal of TRU waste in below-grade spaces, and stabilization of the contaminated areas. After turnover, slab removal and final site stabilization would be performed as necessary. Subsequently, the S&M measures will include routine radiological and hazard monitoring of the area, safety inspections, and maintenance activities necessary to keep the area in a safe condition and any remaining hazards contained. The S&M activities are tailored to the specific conditions of the area. Waste generated during this period will be evaluated for disposal at ERDF. Most waste generated during S&M activities is expected to meet the ERDF Waste Acceptance Criteria. However, some waste generated during the S&M period does not contain hazardous substances and, therefore, does not require disposal at ERDF. Examples include, but are not limited to, “replacement in kind” items, such as light bulbs or trash that do not contain CERCLA hazardous substances. This waste will be disposed in the appropriate nonhazardous waste disposal facility.

A separate S&M Plan addressing post-demolition activity for the PFP Complex will be completed per the TPA (Ecology et al., 1989) Target Date M-083-24-T01. Turnover to S&M will be implemented near the end of this removal action.

2.2 Project Site Closeout

A site closeout characterization package will be generated for all of the PFP Complex at some point in the future. The characterization package may include several areas, as opposed to an individual package for each area. The packages will summarize demolition activities and describe the final disposition of each structure. The Waste Information Data System will be updated to reflect the status and conditions of affected waste sites, as appropriate. Verification will be conducted to ensure the waste accumulation/management areas have been cleaned up. A turnover package will be developed to provide as left information and document compliance with project endpoints.

2.3 Utility Systems

Removal of utility systems is typically the last isolation activity performed because power and other utilities will be needed to support any remaining characterization for demolition and pre-demolition activities. However, if the existing electrical systems pose a threat to workers (e.g., conduit interfering with ductwork decontamination), the electrical system could be removed first and alternative power supplies used (e.g., generators and/or temporary power distribution).

The other required utility services to support demolition are generally limited to a source of water for dust suppression. This can be supplied from truck mounted pumps or a fire hydrant, depending on the needs and proximity to a fire hydrant. The site supervisor and radiological controls supervisor will dictate the daily dust suppression needs during the demolition work.

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3 Safety and Health Management and Controls

Emergency planning and preparedness activities for this removal action will be consistent with planning and preparedness actions taken by other Hanford Site contractors and similar projects. Activities will be conducted in a manner that ensures the health and safety of workers and the public, and the protection of the environment in the event of an abnormal incident during characterization, decontamination, and demolition of the PFP Complex.

3.1 Emergency Management

The Emergency Management Program establishes a coordinated emergency response organization capable of planning for, responding to, and recovering from industrial, security, and hazardous material incidents. Emergency action plans identify the capabilities necessary to respond to emergency conditions, provide guidance and instruction for initiating emergency response actions, and serve as a basis for training personnel in emergency actions. The emergency response actions within the emergency action plan are provided for recognizing incidents and/or abnormal conditions, initiating protective actions, and making the proper notifications.

The emergency action plans are consistent with Hanford Site emergency processes and meet the requirements of state and federal regulations (e.g., 29 CFR 1910, “Occupational Safety and Health Standards,” and WAC 173-303, “Dangerous Waste Regulations”).

3.2 Health and Safety Program

The Health and Safety Plan (HASP) prepared for this action will address chemical, radiological, and physical hazards and will specify the controls and requirements for work activities. The HASP will address the health and safety hazards of each phase of site operation and include the requirements for hazardous waste operations and/or construction activities, as specified in 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response.” Depending on the specific hazards present, one or more HASPs could be written for this removal action.

In addition to the HASP, radiological work permits (RWP) will be prepared, as needed, for work in areas with potential radiological hazards. The RWP extends the Radiological Protection Program to the specific work site or operation. All personnel assigned to the project and all work site visitors will strictly adhere to the provisions identified in the HASP and RWP.

3.2.1 Personnel Safety Program

The Hazardous Waste Operations Safety and Health Program was developed for employees involved in hazardous waste site activities. The program was developed to comply with the requirements of 29 CFR 1910.120 and 10 CFR 835, “Occupational Radiation Protection,” to ensure the safety and health of workers during hazardous waste operations. The Integrated Safety Management System will be incorporated into all work activities. The program includes the following elements:

- Organizational structure that specifies the official chain of command and the overall responsibilities of supervisors and employees
- Comprehensive work plan developed before work begins at a site to identify operations and objectives and to address the logistics and resources required to accomplish project goals
- Development of a site-specific HASP when workers may be exposed to hazardous substances
- Worker training commensurate with individual job duties and work assignments

- Medical surveillance program administered to comply with the OSHA requirements (29 CFR 1910.120)
- Contractor's processes and project/task-specific implementing plans and processes
- Voluntary Protection Plan

3.2.2 HASP and Activity Hazards Analysis

The HASP defines the chemical, radiological, and physical hazards and specifies the controls and requirements for work activities. Structure access and work activities are controlled in accordance with approved work packages, as required by established contractor procedures. The HASPs address the health and safety hazards of each phase of site operation and include the requirements for hazardous waste operations and/or construction activities, as specified in 29 CFR 1910.120. Depending on the specific hazards present, one or more site-specific HASP will be written as an appendix to the HASP during the project planning process for D4 of the specific structure. As part of work package development, a hazards analysis will be written to identify the hazards associated with specific tasks not already covered under a HASP. The elements included in the HASP are as follows:

- Activities to be conducted within the PFP
- Regulatory or programmatic basis for this HASP
- Roles and responsibilities of site personnel
- Site characterization process
- Hazard evaluation process
- Training requirements for D4
- Personal protective equipment requirements
- Medical surveillance program
- Monitoring to be performed during the execution of the D4
- Decontamination procedures
- Site control requirements
- Emergency response plan
- Confined space requirement
- Environmental protection and response
- Hazard communication

3.2.3 Radiological Controls and Protection

The radiological controls and protection program is defined in DOE-approved programs, work requirements, and processes. The radiological controls and protection program reduces the risks to personnel safety and/or health to ALARA and ensures adequate protection of workers. The radiological protection program meets the requirements of 10 CFR 835. Appropriate dosimetry, RWPs, personal protective equipment, ALARA planning, periodic surveys, and radiological control technical support also will be provided.

The standard controls for work in radiological areas will govern project activities. The RWPs will provide for radiological control(s) planning to identify the site-specific conditions. The controls identify the specific requirements for an activity, periodic radiation and contamination surveys of the work area, real time monitoring, and periodic or continuous observation of the work by the radiological controls organization. The RWPs also contain action levels and void limits specific to the work being performed. Monitoring and surveys are used to evaluate compliance with the action levels and void limits and work is

adjusted or stopped when the values established in the RWP are approached. The ALARA planning process will be used to identify shielding requirements, contamination control requirements (including local ventilation controls), radiation monitoring requirements, and other radiological control requirements for the individual tasks conducted during the projects.

Measures also will be taken to minimize the possibility of releases to the environment. Chapter 4 of this RAWP addresses the controls that may be used during project activities to prevent the potential release of contamination. Radiological monitoring of personnel and the immediate environment will be completed as described in this section. Personnel monitoring will be conducted using approved occupational radiological protection methods.

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4 Environmental Management and Controls

This chapter addresses the controls that may be used during project activities to prevent the potential release of contamination. Radiological monitoring of personnel and the immediate environment will be completed as described in this chapter. The Action Memorandum (DOE/RL-2005-13) identifies the ARARs for this removal action, which are summarized in Section 4.1. The following sections discuss how the demolition activities will comply with these ARARs.

4.1 Applicable or Relevant and Appropriate Requirements

To the extent practicable, a removal action must meet the substantive portions of ARARs as defined in the following subsections.

Applicable. Requirements are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

Relevant and Appropriate. Requirements, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

To Be Considered. To be considered (TBC) information includes advisories or guidance issued by federal or state governments; these materials are not legally binding and do not have the status of ARARs. However, as appropriate, TBCs should be referenced with ARARs when determining the removal activities necessary for protection of HHE.

Removal actions are exempt from obtaining federal, state, and local permits for activities performed onsite, per CERCLA, Section 121(e)(1), "Cleanup Standards," "Permits and Enforcement."

Because the PFP demolition activities will result primarily in waste generation and have the potential for air emissions, the key ARARs include waste management standards and standards controlling emissions to the environment. Preliminary ARARs were identified in the EE/CA (DOE/RL-2004-05), and final ARARs are listed in the Action Memorandum (DOE/RL-2005-13). Table 4-1 lists the ARARs for the removal action.

4.2 Waste Management

This RAWP outlines the waste management practices that will be performed during project activities to implement federal and state requirements. Although not an ARAR for shipments occurring on the Hanford Site, the U.S. Department of Transportation (DOT) requirements specified in 49 CFR 171, "General Information, Regulations, and Definitions," through 49 CFR 179, "Specifications for Tank Cars," or an equivalent level of compliance to these regulations are used as guidance for describing waste packaging, marking, and labeling.

Table 4-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for the PFP Above-Grade Structures

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
Waste Management Standards **Regulations Pursuant to the *Resource Conservation and Recovery Act of 1976*;** **Implemented through RCW 70.105, "Hazardous Waste Management;"** **"Dangerous Waste Regulations" (WAC 173-303)**			
Solid Waste Identification Specific subsections: WAC 173-303-016 WAC 173-303-017	ARAR	These regulations define how to identify when materials are and are not solid waste.	Substantive requirements of these regulations are applicable because these define how to determine which materials are subject to the designation regulations. Specifically, materials that are generated for removal from the CERCLA site during the removal action would be subject to the procedures for identification of solid waste to ensure proper management.
Dangerous/Mixed Waste Designation WAC 173-303-070(3)	ARAR	This regulation establishes the procedures to be used to determine if solid waste requires management as dangerous waste. These procedures are used to identify which waste codes are appropriate for application to the waste.	Substantive requirements of these regulations are applicable to materials encountered during the removal action. Specifically, solid waste that is generated for removal from the CERCLA site during this removal action would be subject to the dangerous waste designation procedures to ensure proper management.
Dangerous/Mixed Waste Management Specific subsections: WAC 173-303-073 WAC 173-303-077 WAC 173-303-170(3)	ARAR	These regulations establish the management standards for solid waste designated as dangerous or mixed waste. Special waste is addressed in WAC 173-303-073. Universal waste is addressed in WAC 173-303-077. Generator standards are identified through WAC 173-303-170(3).	Substantive requirements of these regulations are applicable to materials encountered during the removal action. Specifically, the substantive standards for management of special waste and universal waste and the substantive standards for management of dangerous/mixed waste are applicable to the interim management of certain waste that will be generated during the removal action. For purposes of this removal action, WAC 173-303-170(3) includes the substantive provisions of WAC 173-303-200 by reference. WAC 173-303-200 further includes certain substantive standards from WAC 173-303-630 and -640 by reference.

Table 4-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for the PFP Above-Grade Structures

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
Dangerous/Mixed Waste Disposal Specific subsection: WAC 173-303-140(4)	ARAR	This regulation establishes state standards for land disposal of dangerous waste and incorporates by reference federal land disposal restrictions of 40 CFR 268, that are applicable to solid waste that designates as dangerous or mixed waste in accordance with WAC 173-303-070(3).	The substantive requirements of this regulation are applicable to materials encountered during the removal action. Specifically, dangerous/mixed waste that is generated and removed from the CERCLA site during the removal action for offsite (as defined by CERCLA) land disposal would be subject to the identification of applicable land disposal restrictions at the point of generation of the waste. The actual offsite treatment of such waste would not be ARAR to this removal action, but would instead be subject to all applicable laws and regulations.
Recycling Requirements Specific subsections: WAC 173-303-120(3) WAC 173-303-120(5)	ARAR	These regulations define the requirements for the recycling of materials that are solid and dangerous waste. Specifically, WAC 173-303-120(3) provides for management of certain recyclable materials, including spent refrigerants, antifreeze, and lead-acid batteries. WAC 173-303-120 (5) provides for the recycling of used oil.	Substantive requirements of these regulations are applicable to certain materials that might be encountered during the removal action. Recyclable materials that are exempt from regulation as dangerous waste and that are not otherwise subject to CERCLA as hazardous substances can be recycled and/or conditionally excluded from certain dangerous waste requirements.
Final TSD Unit Requirements Specific subsection: WAC 173-303-610(2)	ARAR	This regulation establishes requirements applicable to final status TSD units undergoing closure.	Substantive requirements of this regulation are applicable to any RCRA final status TSD unit within the CERCLA site and undergoing closure activities in conjunction with the removal action. Substantive requirements of this regulation are relevant and appropriate to any interim status TSD unit undergoing closure in conjunction with the removal action.

Table 4-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for the PFP Above-Grade Structures

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
Regulations Pursuant to the *Toxic Substances Control Act of 1976* (TSCA); "Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions" (40 CFR 761)			
PCB Waste Management and Disposal Specific subsections: 40 CFR 761.50(b)(1) 40 CFR 761.50(b)(2) 40 CFR 761.50(b)(3) 40 CFR 761.50(b)(4) 40 CFR 761.50(b)(7) 40 CFR 761.50(c)	ARAR	These regulations establish standards for storage and disposal of PCB wastes.	Substantive requirements of these regulations are applicable to the storage and disposal of PCB liquids, items, remediation waste, and bulk product waste at ≥50 ppm. The specific identified subsections from 40 CFR 761.50(b) reference the requirements for management of each PCB waste type. Radioactive PCB waste can be disposed in accordance with 40 CFR 761.50(b)(7).
Regulations pursuant to RCW 70.95, "Solid Waste Management—Reduction and Recycling," "Minimum Functional Standards for Solid Waste Handling" (WAC 173-304)			
Nondangerous, Nonradioactive Solid Waste Management Specific subsection: WAC 173-304-200(2)	ARAR	This regulation establishes requirements for the onsite storage of solid waste that is not dangerous or radioactive waste.	Substantive requirements of these regulations are applicable to materials encountered during the removal action. Specifically, nondangerous, nonradioactive solid wastes (i.e., hazardous substances that are only regulated as solid waste) that will be containerized for removal from the CERCLA site would be managed onsite according to the substantive requirements of this standard.
To Be Considered Pursuant to Relevant Facility Acceptance Criteria			
Environmental Restoration Disposal Facility Waste Acceptance Criteria	TBC	This document establishes waste acceptance criteria for the Environmental Restoration Disposal Facility.	Waste destined for management at ERDF must meet acceptance criteria to ensure proper disposal.

Table 4-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for the PFP Above-Grade Structures

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
Standards Controlling Releases to the Environment Regulations pursuant to the *Clean Air Act of 1977*; "National Emission Standards for Hazardous Air Pollutants" (NESHAP) (40 CFR 61)			
40 CFR 61.92	ARAR	Emissions of radionuclides to the ambient air shall not exceed amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.	Substantive requirements of this standard are applicable because this removal action may include activities such as open-air demolition of contaminated structures, excavation of contaminated soils, and operation of exhausters and vacuums, each of which may provide airborne emissions of radioactive particulates to unrestricted areas. As a result, requirements limiting emissions potentially apply. This is a risk-based standard for the purposes of protecting human health and the environment.
40 CFR 61.93	ARAR	Emissions from point sources of airborne radioactive material shall be measured. Measurement techniques may include, but are not limited to, sampling, calculation, smears, or other reasonable methods for identifying emissions as determined by the lead agency.	Substantive requirements of this standard are applicable because point source emissions of radionuclides to the ambient air may result from activities performed during the removal action, such as open-air demolition of contaminated structures, excavation of contaminated soils, and operation of exhauster and vacuums. This standard exists to ensure compliance with emission standards.
40 CFR 61.145(a) 40 CFR 61.145(c) 40 CFR 61.150	ARAR	Regulated asbestos-containing materials shall be removed in accordance with specific handling, packaging, and disposal requirements where the potential-to-emit asbestos exists.	Substantive requirements of this standard are applicable because this removal action includes abatement of asbestos and asbestos-containing materials in the form of pipe and tank insulation, transite siding, and ductwork. As a result, there is potential-to-emit asbestos to unrestricted areas and the requirements for the removal, handling, and packaging of asbestos potentially apply.
Regulations pursuant to RCW 70.94, "Washington Clean Air Act;" RCW 43.21A, "Department of Ecology;" "Radioactive Protection – Air Emissions"(WAC 246-247)			
WAC 246-247-040(3) WAC 246-247-040(4)	ARAR	Emissions shall be controlled to assure emission standards are not exceeded.	Substantive requirements of this standard are applicable because fugitive, diffuse, and point source emissions of radionuclides to the ambient air may result from activities performed during the removal action, such as open-air demolition of contaminated structures, excavation of contaminated soils, and operation of exhauster and vacuums. This

Table 4-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for the PFP Above-Grade Structures

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
			standard exists to assure compliance with emission standards.
WAC 246-247-075		Emissions from nonpoint and fugitive sources of airborne radioactive material shall be measured. Measurement techniques may include, but are not limited to sampling, calculation, smears, or other reasonable method for identifying emissions as determined by the lead agency.	Substantive requirements of this standard are applicable because fugitive and non-point source emissions of radionuclides to the ambient air may result from activities performed during the removal action such as open-air demolition of contaminated structures and excavation of contaminated soils. This standard exists to assure compliance with emission standards.
"General Regulations for Air Pollution Sources" (WAC 173-400)			
Air Contaminant Emission Standards Specific subsections: WAC 173-400-040 WAC 173-400–113	ARAR	Methods of control shall be employed to minimize the release of air contaminants associated with fugitive emissions resulting from materials handling, construction, demolition, or other operations. Emissions are to be minimized through application of best available control technology.	Substantive requirements of these standards are relevant and appropriate to this removal action because there may be visible, particulate, fugitive, and hazardous air emissions and odors resulting from decontamination, demolition, and excavation activities. As a result, standards established for the control and prevention of air pollution may be relevant and appropriate.
"Controls for New Sources of Toxic Air Pollutants" (WAC 173-460)			
WAC 173-460-030 WAC 173-460-060 WAC 173-460-070	ARAR	Emissions of toxic air contaminants shall be quantified and ambient impacts evaluated. Best available control technology for toxics shall be used as determined by the lead agency to protect human health and the environment.	Substantive requirements of these standards are relevant and appropriate to this removal action because there is the potential for toxic air pollutants to become airborne as a result of decontamination, demolition, and excavation activities. As a result, standards established for the control of toxic air contaminants may be relevant and appropriate.

Sources:

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

40 CFR 61.92, "Standard."

40 CFR 61.93, "Emission Monitoring and Test Procedures."

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions."

Clean Air Act of 1977.

RCW 43.21A, "Department of Ecology."

RCW 70.105, "Hazardous Waste Management."

RCW 70.94, "Washington Clean Air Act."

RCW 70.95, "Solid Waste Management—Reduction and Recycling."

Resource Conservation and Recovery Act of 1976.

Toxic Substances Control Act of 1976.

Table 4-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for the PFP Above-Grade Structures

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
WAC 173-303-016, "Identifying Solid Waste."			
WAC 173-303-017, "Recycling Processes Involving Solid Waste."			
WAC 173-303-070, "Designation of Dangerous Waste."			
WAC 173-303-073, "Conditional Exclusion of Special Wastes."			
WAC 173-303-077, "Requirements for Universal Waste."			
WAC 173-303-120, "Recycled, Reclaimed, and Recovered Wastes."			
WAC 173-303-140, "Land Disposal Restrictions."			
WAC 173-303-170, "Requirements for Generators of Dangerous Waste."			
WAC 173-303-200, "Accumulating Dangerous Waste On-Site."			
WAC 173-303-610, "Closure and Post-Closure."			
WAC 173-303-630, "Use and Management of Containers."			
WAC 173-303-640, "Tank Systems."			
WAC 173-304, "Minimum Functional Standards for Solid Waste Handling."			
WAC 173-304-200, "On-Site Containerized Storage, Collection and Transportation Standards for Solid Waste."			
WAC 173-400, "General Regulations for Air Pollution Sources."			
WAC 173-400-040, "General Standards for Maximum Emissions."			
WAC 173-400-113, "Requirements for New Sources in Attainment or Unclassifiable Areas."			
WAC 173-460-030, "Applicability."			
WAC 173-460-060, "Control Technology Requirements."			
WAC 173-460-070, "Ambient Impact Requirement."			
WAC 246-247, "Radioactive Protection-Air Emissions."			
WAC 246-247-040, "General Standards."			
WAC 246-247-075, "Monitoring, Testing and Quality Assurance."			

Management and disposal of wastes resulting from implementation of this RAWP will be performed in accordance with the ARARs specified in the Action Memorandum (DOE/RL-2005-13) in accordance with CERCLA. Waste will be packaged to meet the applicable waste acceptance criteria.

> *The ARARs are standards, requirements, criteria, or limitations promulgated under Federal or state environmental laws that must be met or waived for actions conducted under CERCLA. Only the substantive provisions of requirements that are ARARs must be met (or waived) for actions conducted entirely onsite (CERCLA, Sec. 121 [d] [3]). These onsite waste management and disposal actions are exempted from obtaining Federal, state, and local permits (CERCLA, Sec. 121 [e] [1]).*

A variety of waste streams will be generated under this removal action. It is anticipated that much of the waste will be characterized as LLW. However, quantities of TRU waste, dangerous or mixed waste, PCB-contaminated waste, and asbestos and ACM may be generated. The great majority of the waste would be in a solid form. However, some aqueous solutions might be generated.

Waste generated through implementation of this removal action will be dispositioned at appropriate Hanford Site or offsite waste disposal facilities, in accordance with the waste acceptance criteria of those facilities. ERDF would be the preferred disposal location for waste meeting ERDF waste acceptance

criteria and would be considered "onsite"[1] for management and/or disposal of waste from activities addressed in this document.

The identification, storage, treatment, and disposal of hazardous waste and the hazardous component of mixed waste are governed by RCRA. Authority to implement most of the RCRA was delegated to the State of Washington, which implements RCRA requirements under WAC 173-303. The dangerous waste standards for generation and storage will apply to the management of any dangerous or mixed waste generated under this removal action. Treatment standards for dangerous or mixed waste subject to RCRA land disposal restrictions are specified in WAC 173-303-140, “Land Disposal Restrictions,” which incorporates 40 CFR 268, “Land Disposal Restrictions,” by reference.

The management and disposal of PCB wastes are governed by the *Toxic Substances Control Act of 1976* (TSCA), which is implemented by 40 CFR 761, “Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.” The TSCA regulations contain specific provisions for PCB waste, including PCB waste that contains a radioactive component. PCBs are also considered underlying hazardous constituents under RCRA and, thus, may be subject to WAC 173-303-140 and 40 CFR 268 requirements.

LLW that meets ERDF acceptance criteria will be disposed at ERDF, which is engineered to meet appropriate performance standards under 10 CFR 61, “Licensing Requirements for Land Disposal of Radioactive Waste.” Waste that is characterized as either contact-handled or remote-handled TRU waste or TRU mixed waste will be staged at PFP or CWC and will be shipped to WIPP in accordance with the schedule established for completing remedial actions at the Hanford Site. WIPP meets 40 CFR 191, “Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes,” requirements for TRU waste disposal and is a RCRA-permitted disposal facility. ERDF is considered onsite for the purpose of CERCLA for management and/or disposal of waste from this removal action. The suitability of the receiving TSD facility to manage CERCLA waste that must be sent off the PFP CERCLA Site will be determined by the EPA regional office overseeing the receiving TSD facility in accordance with 40 CFR 300.440. Treatment of waste (onsite or offsite) may be necessary prior to disposal at ERDF, and containerized waste may be returned from offsite segregation or treatment for disposal at ERDF.

Waste designated as dangerous or mixed waste will be treated, to the extent practical, as appropriate to meet land disposal restrictions and ERDF acceptance criteria, and disposed at ERDF. ERDF is also engineered to meet landfill design standards under WAC 173-303-665, “Landfills.” All applicable packaging and pre-transportation requirements for dangerous or mixed waste generated during this removal action will be identified and implemented prior to movement of any wastes.

Some of the aqueous waste that is characterized as LLW, dangerous, or mixed waste may be transported to ETF or other approved facility for treatment and disposal that is authorized to treat aqueous waste streams generated at the Hanford Site and dispose of them at an approved facility in accordance with all applicable requirements.

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[1] CERCLA Section 104(d)(4) states that where two or more noncontiguous facilities are reasonably related on the basis of geography, or on the basis of the threat or potential threat to the public health or welfare or the environment, the facilities can be treated as one for purposes of CERCLA response actions. Consistent with this, the Hanford buildings/structures and ERDF would be considered to be "onsite" for purposes of Section 104 of CERCLA, and waste may be transferred between the facilities without requiring a permit. This determination will be made upon issuance of the Action Memorandum(s).

Waste characterized as PCB waste will likely be disposed at ERDF or WIPP, depending on whether it is a LLW or a TRU waste, respectively. ERDF is authorized to accept solid PCB waste for disposal. All TRU waste suspected to contain PCBs will be evaluated to determine whether the waste meets waste acceptance criteria. Asbestos and ACM will be removed, packaged as appropriate, and disposed in ERDF.

It is anticipated that all alternatives will be performed in compliance with waste management ARARs. All waste streams will be evaluated, designated, and managed in compliance with the appropriate requirements.

4.2.1 Project Waste Streams

The PFP above-grade structures removal action may generate solid, dangerous, LLW, PCB, and/or mixed wastes, as well as TRU and TRU mixed wastes during decommissioning activities. All wastes will be evaluated and managed to comply with the waste management ARARs.

ERDF is considered onsite for the purposes of CERCLA for management and/or disposal of waste from this removal action. There is no requirement to obtain a permit to manage or dispose of CERCLA waste at the PFP Complex.

The suitability of the receiving TSD facility to manage CERCLA waste that must be sent off the PFP CERCLA Site will be determined by the EPA regional office overseeing the receiving TSD facility in accordance with 40 CFR 300.440.

The majority of the LLW will be disposed at ERDF in accordance with the ERDF Waste Acceptance Criteria. Waste will be shipped either in containers or in plastic-wrapped bulk shipments, depending on the characteristics of the waste matrix. Waste shipped offsite will have prior EPA approval.

Low-Level Waste. It will be assumed that any regulated waste not determined to be mixed waste, TRU, greater-than-Class C, or TRU mixed waste will be LLW. The LLW will include step-off pad waste, soft waste, material used in decontamination activities, process items that have been decontaminated below TRU levels, structure rubble, and waste packages characterized as LLW. This LLW will be mainly solid in form, although some liquid and sludge waste may be generated during the decommissioning activities. LLW will be shipped to ERDF (Figure 4-1) and will be packaged and placed in storage within the PFP Onsite Area (Figure 4-2) prior to shipment.

Dangerous Waste. The major source of nonradioactive dangerous waste is expected to be from the use of acids and cleaning solutions in specific nonradiological, surface decontamination efforts, as well as mercury switches and lead-based paints. With a viable waste minimization program and the substitution of nonregulated material, the portion of this waste stream that has not become radioactively contaminated should be a minor source of dangerous waste. This regulated dangerous waste may be in either liquid or solid form.

Mixed Waste. Another waste stream that can be expected is mixed waste. Any hazardous substances that will be disposed of will be classified as dangerous waste or mixed waste (if radioactive). The source of this waste stream will likely be remaining contaminant residues (e.g., lead) on radioactively contaminated equipment and surfaces and the chemicals/materials used for decontamination.

Transuranic Waste. These wastes contain TRU nuclides with a half-life greater than 20 years that exist in a concentration greater than 3.7 KBq/g (100 nCi/g). The process system, exhaust duct and filters and, possibly, drains are all potential sources of TRU waste. Some of the structure surface materials removed during decontamination may also be TRU waste, most likely in solid form. Liquids and sludges in the process system and drains may also be encountered.

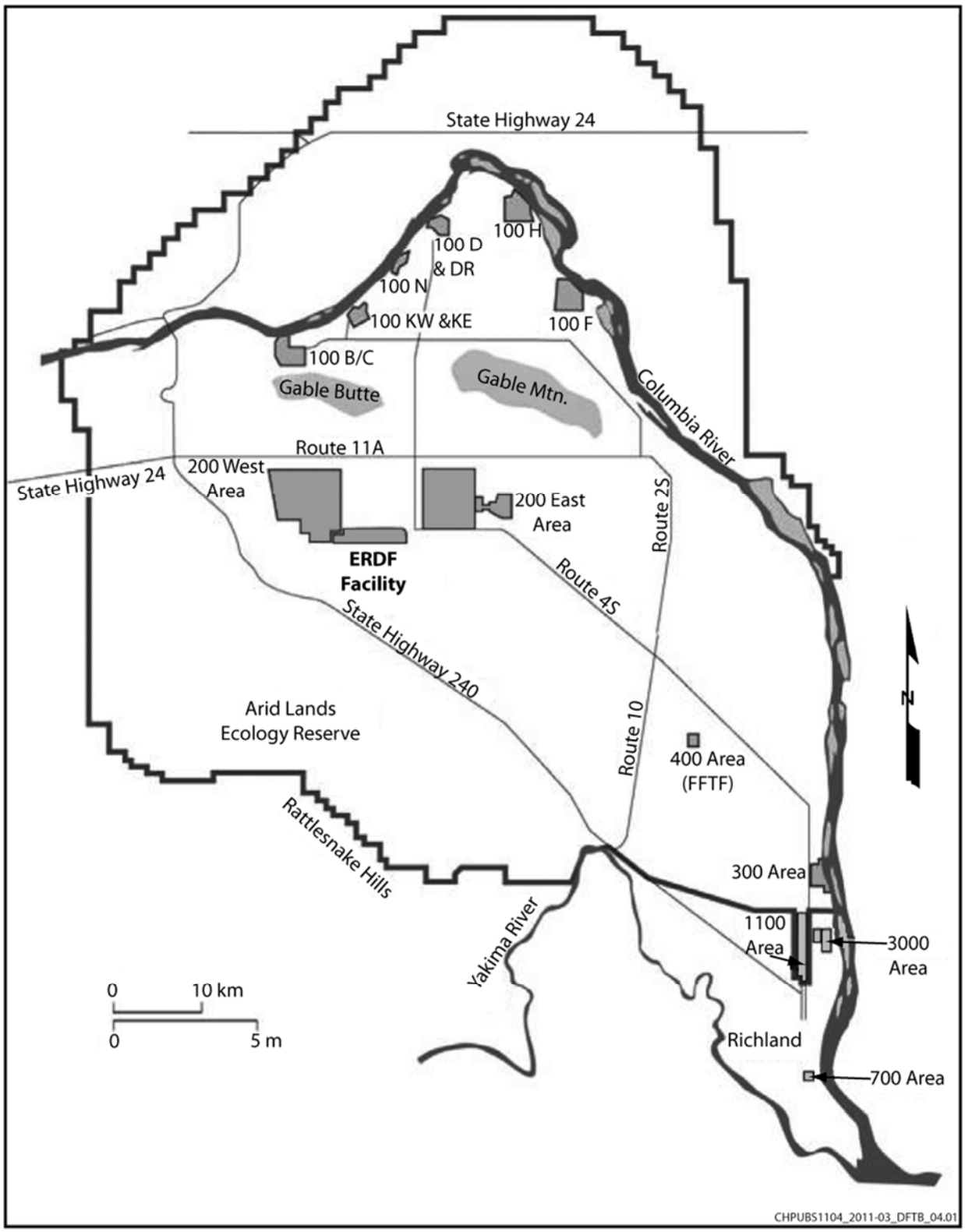

Figure 4-1. Environmental Restoration Disposal Facility

Transuranic Mixed Waste. TRU mixed waste may exist in the form of lead shielding and equipment. This waste, in all probability, will be solid; however, there could be residual liquid from decontamination activities or process-related systems.

PCB Waste. The paint used to coat many of the structure interior surfaces (e.g., walls and ceilings) may contain elevated levels of PCBs. Light ballasts and other hydraulic and electrical equipment may contain some level of PCBs. Consequently, some of the waste streams discussed previously may also be contaminated with PCBs.

Nonregulated Bulk Waste. Some nonregulated waste (e.g., structure rubble and radiologically released metal and concrete) is expected to result from demolition.

4.2.2 Waste Characterization and Designation

The waste characterization requirements to support this removal action were developed as part of the DQO process. Waste generated will be characterized in accordance with the approved SAP (DOE/RL-2004-29) and the requirements of the receiving facility. Characterization may be accomplished through process knowledge, sampling/analysis, radiological surveys, etc.

The characterization criteria identified in the approved SAP (DOE/RL-2004-29) provide the rationale and strategy for conducting sampling and analysis activities in support of waste designation. They contain sampling, analysis, and radiological survey requirements to support waste designation and disposal decisions during all phases of the removal action project. The characterization data will be used to prepare waste profile summaries for evaluations against waste acceptance criteria to determine appropriate disposal options.

4.2.3 Waste Minimization and Recycling

By using waste separation and segregation, waste generation can be kept to a minimum. Waste will be segregated for the removal action as it is generated, which will minimize the volume of regulated waste. Waste will be separated into the following categories: LLW, mixed, dangerous, TRU, TRU mixed, and nonregulated bulk.

Decontaminating agents and solutions will be selected to minimize quantities of hazardous substances for disposal and the volume of waste generated. Waste materials will be recycled, reused, or reclaimed whenever practicable and economically feasible.

4.2.4 Waste Handling, Storage, and Packaging

All waste packaged for shipment from this removal action will be staged in waste storage areas pending further action or shipment and identified by signs reading “CERCLA WASTE MANAGEMENT AREA.” Incompatible waste will be separated within the waste storage areas to prevent commingling of the waste.

All packaged waste staged will meet the ARARs identified in the Action Memorandum (DOE/RL-2005-13). Appropriate areas will be established in which waste is staged prior to shipment, if necessary. These waste staging and storage areas either reside within the area of contamination or in the onsite area, as identified in Figure 4-2, including the area adjacent to the west of the outer PFP fence line. To facilitate PFP project logistics, waste staging and storage areas may be relocated, as needed, within the onsite area. A means of tracking waste staging and storage areas will be maintained at PFP. These waste staging and storage areas are onsite and are necessary for implementation of the removal action.

Demolition will result in piles of bulk demolition waste. This waste will be processed and loaded concurrently with demolition activities. These piles of bulk demolition waste will be on or near the

associated structure footprint and positioned to allow equipment access to the structure undergoing demolition and equipment access to the bulk waste.

The CERCLA hazardous waste areas will be inspected weekly, and the universal waste and recyclables management areas will be inspected quarterly at a minimum to verify container integrity, legibility of markings and labels, and proper placement of signs. An inventory of the waste generated will be maintained. Before shipment to ERDF or an offsite location, the containers must be properly sealed and checked for leaks or other damage. At that time, a final inspection will be performed. Regulated waste from the removal action activities will be packaged per 49 CFR 100-185 regulations (or equivalent approved packaging guidelines for Hanford Site shipments). Samples and associated sample waste may be returned to PFP for disposition or sent to ERDF for disposal, if it meets the waste acceptance criteria.

Most contaminated soil and other remediation waste (e.g., structure rubble) that can be characterized as LLW and meeting ERDF Waste Acceptance Criteria will be shipped in bulk to ERDF using roll-off/roll-on containers that will have liners. Additionally, the trailer units will be equipped with tarps. If needed, other approved packages (e.g., burial boxes and/or sea-land containers) may be used for surface contaminated objects, bulk, and low specific activity shipments.

Waste not appropriate for bulk shipment (e.g., piping, transfer columns, or other processing equipment) will be cut to size, packaged, and shipped in non-bulk containers to meet the appropriate facility's waste acceptance criteria. The containers must also be weighed and visually inspected for leaks or other damage before the waste is transported.

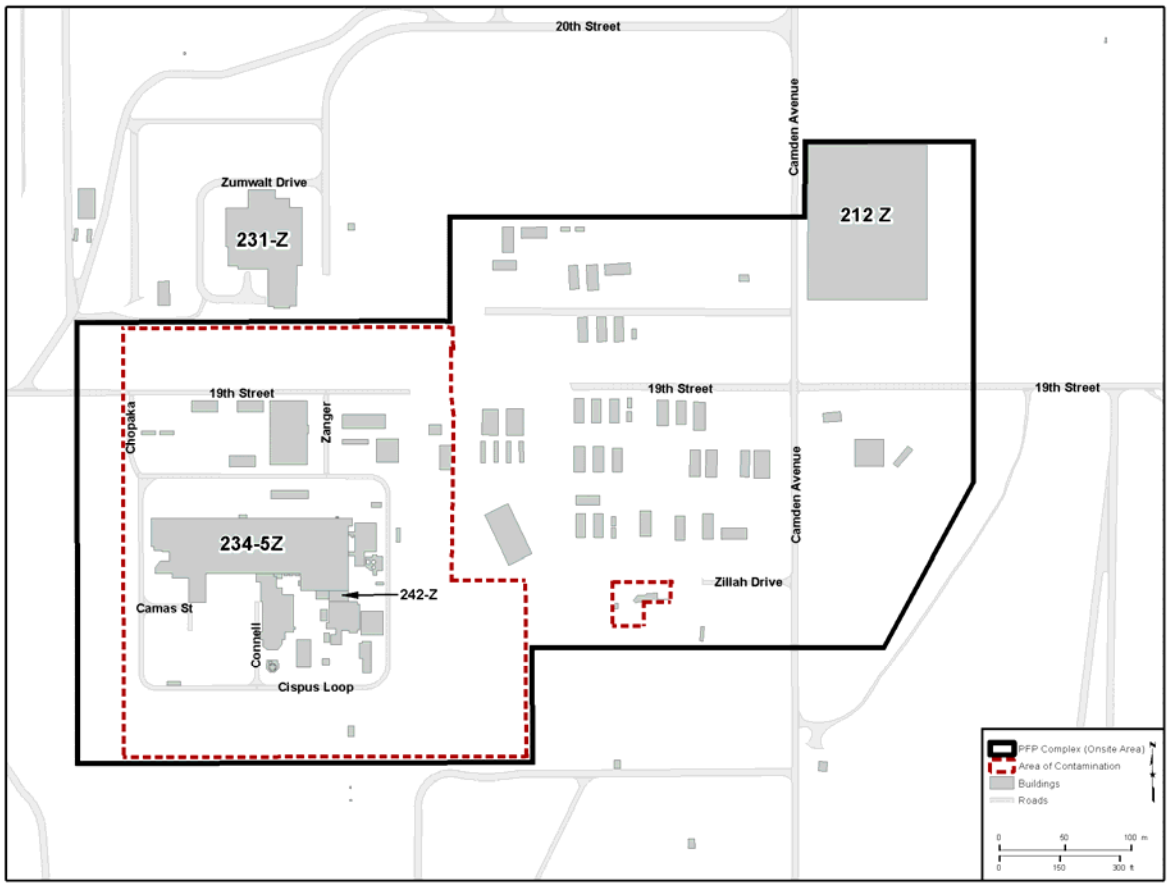

Figure 4-2. PFP Removal Action Onsite Area and Area of Contamination

4.2.5 Waste Treatment

Treatment of waste streams may be necessary to provide for safe transport or effective disposal. The waste treatment may occur onsite at the PFP or ERDF, as practical, in accordance with the substantive requirements of WAC 173-303 and the applicable disposal site waste acceptance criteria. Onsite waste treatments may include, but not be limited to, solidification, separation, elementary neutralization, filtration, evaporation, amalgamation, size reduction, or repackaging. In the event waste cannot be treated onsite, an offsite search will be conducted to determine whether the waste can be treated effectively at an offsite treatment, storage, and disposal (TSD) facility. Once a TSD facility is found, an offsite determination will be requested from EPA.

ERDF is considered onsite. The suitability of the receiving TSD facility to manage CERCLA waste that must be sent off the PFP CERCLA Site will be determined by the EPA regional office overseeing the receiving TSD facility in accordance with 40 CFR 300.440.

4.2.6 Waste Transportation and Shipping

Although not an ARAR for shipments occurring on the Hanford Site, DOT requirements specified in 49 CFR 171, “General Information, Regulations, and Definitions,” through 49 CFR 179, “Specifications for Tank Cars,” or an equivalent level of compliance to these regulations are used as guidance for describing waste packaging, marking, and labeling.

Before transport to ERDF or another disposal site, all waste containers must be properly packaged, marked, labeled, and in proper condition for disposal. The LLW may be shipped in either non-bulk or bulk mode. Dangerous and mixed waste must be shipped in specific containers for either storage or disposal, and TRU and TRU mixed waste must be shipped in specific containers for storage or disposal, as appropriate. The applicable shipping paperwork will be prepared for each waste shipment. A tracking form will be completed for each waste shipment destined for ERDF. The completed tracking form is used as the basic shipping document and must accompany the shipment when the waste is sent to ERDF. Emergency response information must be attached to the tracking form. All markings and labeling will be completed under the direction of the properly trained personnel.

4.2.7 Solid Waste Disposal

ERDF is considered onsite for the purposes of CERCLA for management and/or disposal of waste from this removal action. There is no requirement to obtain a permit to manage or dispose of CERCLA waste at this facility. The suitability of the receiving TSD facility to manage CERCLA waste that must be sent off the PFP CERCLA Site will be determined by the EPA regional office overseeing the receiving TSD facility in accordance with 40 CFR 300.440.

It is anticipated that most of the LLW and mixed LLW and debris from the removal action will be disposed at ERDF, which is designed to meet RCRA minimum technical requirements for land disposal. ERDF can also accept some asbestos and PCB waste. Aqueous waste that is characterized as LLW, dangerous, or mixed waste may be transported to ETF or other approved facility for treatment and disposal.

Any PCB waste that does not meet the ERDF Waste Acceptance Criteria, as well as TRU and TRU mixed waste, will be staged at PFP or CWC awaiting final disposal. Dangerous waste that does not meet the ERDF Waste Acceptance Criteria will be disposed at a permitted offsite facility, with approval from EPA. In the event that TRU waste is generated, it will be shipped offsite to WIPP in accordance with the schedule established for completing remedial actions.

4.2.8 Waste Management Strategy

Any TRU waste that is generated will ultimately require disposal at WIPP, and may entail storage and/or shipment to other facilities for treatment. All other regulated waste will be shipped to ERDF for disposal. Each waste stream will require management to achieve specific packaging and disposal criteria.

4.2.9 Release of Property

All property released for offsite disposal and/or reuse and recycle is nonreal property. The release of nonreal property will take into consideration radiological and beryllium contamination.

4.3 Air Monitoring Plan

The removal action has the potential to release a variety of radioactive and chemical contaminants to the ambient air. The following section describes the management of these emissions to ensure that the emissions are ALARA and appropriately monitored.

4.3.1 Radiological Air Emissions

Federal regulations found in 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities," require that emissions of radionuclides to the ambient air shall not exceed amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem/year. The same regulation requires continuous monitoring of point sources (i.e., stacks or vents) with a major potential for radioactive airborne emissions and periodic confirmatory measurement of minor source emissions sufficient to verify low emissions. The substantive requirements for monitoring of fugitive or nonpoint sources emitting radioactive airborne emissions (WAC 246-247-075(8), "Monitoring, Testing and Quality Assurance") will be addressed by sampling the effluent streams and/or ambient air as appropriate using reasonable and effective methods. The state implementing regulations require added ALARA-based controls of radioactive airborne emissions to the extent economically and technologically feasible (WAC 246-247-040(3) and (4), "General Standards," and associated definitions) that could be reasonably expected to reduce emissions. In order to address the substantive aspect of these requirements, best available controls consistent with ARAR requirements (WAC 246-247-040(3)) will be used when economically and technologically feasible based on the methodology of evaluation of process variables, applicable technologies, feasibility, and effectiveness and practicality from an environmental, energy, and economic impact consideration.

4.3.1.1 Airborne Source Information

Handling radiological contaminated materials during PFP Complex D4 activities has the potential to generate particulate and gaseous emissions from point sources and diffuse or fugitive sources. The annual unabated potential-to-emit (PTE) and resultant effective dose calculations for the maximally exposed individual (MEI) are based on estimated holdup in the structures and the dose-per-unit-release factors from DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*, which designates the assigned MEI for Hanford emissions zones; for PFP in the 200 West Area, the assigned onsite MEI is at the Laser Interferometer Gravitational Wave Observatory (LIGO). LIGO is on the Hanford Site and requires use of the onsite MEI dose-per-unit-release factors.

The primary radionuclides of concern are americium-241 and plutonium-238, -239, -240, -241, and -242. Other radioisotopes may be present due to activation products, fission products, decay products, sources, and standards.

The calculation parameters summarized previously and the assumptions used to arrive at the PTE provided in this RAWP are presented and discussed in ECF-200NPL-14-0012, *Development and Basis for Plutonium Finishing Plant Potential to Emit Calculation*.

Point source emissions are primarily associated with the main PFP stack (291-Z-001), but also include emissions associated with portable or temporary radioactive air emission units as well as minor stacks (e.g., 296-Z-15). Aggressive decontamination activities, such as scabbling, may be employed during the decontamination phase to reduce residual contamination remaining during the demolition phase. Emissions associated with aggressive decontamination will be discharged via the structure ventilation after process related abatement.

The use of temporary exhausters to supplement ventilation in areas currently ventilated by the 291-Z-001 Stack, such as the 236-Z Canyon, may be necessary to facilitate structure decontamination and deactivation. Temporary exhausters also may be used to ventilate individual process structures rather than using the existing ventilation system. Unlike the 291-Z-001 Stack, which exceeds 40 m (131 ft) in height, these temporary units would discharge at elevations below 40 m (131 ft). Although these temporary exhausters would meet or exceed the abatement capability of the current system, the lower elevation of release would slightly increase the estimated effective dose equivalent in terms of dose per unit released. Descriptions of any temporary emissions units (including proposed monitoring methods) used to exhaust directly to the atmosphere will be included as addendums to this RAWP, as information becomes available. Approval of addendums will be accomplished through the TPA (Ecology et al., 1989a) change process or by Project Manager Meeting notes as decided between the Lead Agency (DOE) and the Lead Regulatory Agency (Ecology).

The activities described in this RAWP will be conducted over several years. However, the PTE estimates conservatively assume the activities are all conducted within one year. Actual emissions will be less than the PTE estimates because the radiological inventory will be reduced as the removal action activities progress.

Minor emission units, such as 296-Z-15 and minor portable or temporary radioactive air emission units, are anticipated to have an unabated PTE of less than 0.1 mrem/yr based on the quantity of material managed in the ventilated area or actual challenge to the abatement system.

Potential-to-Emit tables (Tables 4-2, 4-3, and 4-4) are presented for each of the major process structures (234-5Z, 236-Z, and 242-Z). The 291-Z PTE is included with the 234-5Z PTE (Table 4-2). These separate PTEs will provide flexibility and allow the use of temporary exhaust systems as necessary. The process structures may be provided separate HEPA filtered ventilation paths or temporary HEPA filtered exhaust units. This will allow for the start of demolition of one or more structures while others are still completing deactivation activities. The combination of these tables and the minor emissions discussed previously provide a bounding PTE for all D4 activities.

Table 4-2. Potential Releases and Maximally Exposed Individual Doses Associated with 234-5Z and 291-Z Structures during PFP D4

Isotopes[a]	Ci	Release Fraction[b]	Unabated Release (Ci)	Dose-per-Unit Release Factor[c] (mrem/yr per Ci)	Unabated Dose to MEI (mrem/yr)
Pu-238	3.5E+02	1 E-03	3.5E-01	5.23	1.8E+00
Pu-239	2.0E+03	1 E-03	2.0E+00	5.68	11.3E+00
Pu-240	7.1E+02	1 E-03	7.1E-01	5.68	4.0E+00
Pu-241	1.2E+04	1 E-03	1.2E+01	0.102	1.2E+00

Table 4-2. Potential Releases and Maximally Exposed Individual Doses Associated with 234-5Z and 291-Z Structures during PFP D4

Isotopes[a]	Ci	Release Fraction[b]	Unabated Release (Ci)	Dose-per-Unit Release Factor[c] (mrem/yr per Ci)	Unabated Dose to MEI (mrem/yr)
Pu-242	2.9E-01	1 E-03	2.9E-04	5.39	1.5E-03
Am-241	1.1E+03	1 E-03	1.1E+00	4.73	5.3E+00
Total			**16**		**23.6**

a. Activity associated with uranium and neptunium isotopes represent less than 0.00185% of the overall activity within the waste matrix being handled and are not included in the table. Isotopes present in even lower concentrations, such as cesium, strontium, and tritium, are similarly omitted due to their low concentrations and lower dose consequence than the primary isotopes listed.

b. From 40 CFR 61, Appendix D, for liquids or particulate solids

c. From DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses* (Table 4.8), Onsite MEI, release height < 40 m (131 ft).

Table 4-3. Potential Releases and Maximally Exposed Individual Doses Associated with the 236-Z Structure during PFP D4

Isotopes	Ci	Release Fraction	Unabated Release (Ci)	Dose-per-Unit Release Factor (mrem/yr per Ci)	Unabated Dose to MEI (mrem/yr)
Pu-238	3.4E+02	1 E-03	3.4E-01	5.23	1.8E+00
Pu-239	1.9E+03	1 E-03	1.9E+00	5.68	11.0E+00
Pu-240	6.9E+02	1 E-03	6.9E-01	5.68	3.9E+00
Pu-241	1.2E+04	1 E-03	1.2E+01	0.102	1.2E+00
Pu-242	2.8E-01	1 E-03	2.8E-04	5.39	1.5E-03
Am-241	1.1E+03	1 E-03	1.1E+00	4.73	5.1E+00
Total			**15**		**22.9**

Table 4-4. Potential Releases and Maximally Exposed Individual Doses Associated with the 242-Z Structure during PFP D4

Isotopes	Ci	Release Fraction	Unabated Release (Ci)	Dose-per-Unit Release Factor (mrem/yr per Ci)	Unabated Dose to MEI (mrem/yr)
Pu-238	2.1E+01	1 E-03	2.1E-02	5.23	0.1E+00

Table 4-4. Potential Releases and Maximally Exposed Individual Doses Associated with the 242-Z Structure during PFP D4

Isotopes	Ci	Release Fraction	Unabated Release (Ci)	Dose-per-Unit Release Factor (mrem/yr per Ci)	Unabated Dose to MEI (mrem/yr)
Pu-239	3.0E+01	1 E-03	3.0E-02	5.68	0.2E+00
Pu-240	2.2E+01	1 E-03	2.2E-02	5.68	0.1E+00
Pu-241	8.3E+02	1 E-03	8.3E-01	0.102	0.1E+00
Pu-242	1.5E-02	1 E-03	1.5E-05	5.39	8.3E-05
Am-241	4.9E+01	1 E-03	4.9E-02	4.73	0.2E+00
Total			**9.5E-01**		**0.7**
Am-241*	1.0E+03	1 E-03	1.0E+00	4.73	4.8E+00
242-Z TOTAL			**1.95E+00**		**5.5E+00**

* Americium is from the exchange column.

The total conservative calculated potential (unabated) effective dose equivalent to the maximally exposed individual resulting from all D4 activities is 52 mrem/yr.

Open-air demolition activities and the resulting potential for emissions are included in the above estimate. Although not taken into account for the above conservative estimates of potential impacts, the majority of the source term will not be exposed to demolition (rubblized). Special handling (cannot be rubblized) of contaminated equipment will be employed, with use of full or partial containment with or without portable exhausters, to maintain overall worker exposure ALARA. As such, both potential and actual emissions associated with demolition methods would represent only a small portion of what has been estimated. Aggressive decontamination activities, such as scabbling, may be employed in the post-demolition phase to reduce residual contamination on the slabs and would be subject to process-related, HEPA-filtered abatement.

The standard from 40 CFR 61.92 requires exposure to any member of the public to be less than 10 mrem/yr. As previously stated, maintaining worker and environmental exposure ALARA will require that most items handled outside of the ventilated space will have been internally and externally stabilized and handled in a manner to minimize any actual release. Activities will be conducted in conjunction with sound radiological practices to avoid unacceptable onsite consequences for the collocated worker and keep emissions ALARA. The work is controlled by RWPs that direct worksite monitoring and prescribe action levels as well as void limits specific to the work being performed. The action levels and void limits are established to maintain contamination spread, airborne radioactivity generation, and individual doses from radiological hazards ALARA or within regulatory or contractual limits. Real time monitoring and surveys are used to evaluate compliance with the action levels and void limits and work is stopped, evaluated, and adjusted when the values established in the RWP are approached. This also ensures PFP's emissions will not cause the Hanford Site emissions to exceed the 40 CFR 61.92 standard of 10 mrem/year to any member of the public (maximally exposed individual). As progress is made on PFP Complex demolition, potential diffuse and fugitive emissions will be evaluated to ensure that emission

control techniques are being used effectively. It is recognized that demolition methods such as use of sheers have a greater potential to disrupt pre-demolition application of fixatives. Items requiring special handling during demolition such as stabilized, highly contaminated items will be uniquely identified for special handling during the demolition phase.

4.3.1.2 Airborne Emission Controls

While the existing ventilation systems for the structures are active, the abatement controls that are part of those systems will continue to be utilized. As previously described, temporary exhausters that provide equivalent or better abatement capability as that of the current systems may be used to supplement or replace the existing systems. As the amount of "hold-up" material is reduced through removal of process equipment, gloveboxes, and hoods from the structure, the full capabilities of the ventilation system will not be necessary. The airflow and filtration required to support the work is also reduced and redundancy in the system becomes unnecessary. When required to support ongoing decontamination work, the project may reroute ducting to bypass areas, including filter rooms, of the systems no longer needed. There is also the possibility of installing in-line HEPA filters for localized contamination control upstream of the final filters. This incremental reduction in ventilation will enable the project to isolate and discontinue maintenance of equipment and sections of the ventilation system that are no longer necessary to support the deactivation work. The emission control system and associated stack will be less critical for contamination control, and eventually will be shut down and removed from service. When the emission control system and associated stack is removed from service, the remaining radioactive inventory would be considered the source for potential diffuse and fugitive emissions unless remaining under alternate powered exhaust.

Based on analysis of the potential emissions and evaluation of available control technologies, the following active controls of diffuse and fugitive emissions have been selected for use when practicable during the removal action. The radiological control and environmental organizations are responsible for selecting and ensuring appropriate controls are implemented to maintain both worker exposure and environmental releases ALARA.

- Items to be handled outside of the ventilated space may be internally and externally stabilized and handled in a manner to minimize any potential release prior to being removed from ventilated space or securing ventilation.

- Water in mists or fine sprays will be applied, as practicable, for suppression of fugitive emissions and dust during any excavation (including any slab removal), backfilling, and demolition activities when contamination is present.

- Radiological surveys (e.g., swipes/smears) will be taken of demolition equipment leaving any areas where there is the potential for removable contamination above 2,000 dpm/100 cm^2 alpha following any demolition action. During deactivation activities, equipment, tools, and materials with removable contamination above 100,000 dpm/100 cm^2 beta/gamma or 2,000 dpm/100 cm^2 alpha will be decontaminated, wrapped, or the contamination otherwise fixed by an appropriate means before being removed from a structure.

- Appropriate controls such as water, fixatives, covers, containment tents, windscreens, or other controls during cessation of work activities will be applied, to the extent practicable based on conditions in the work environment (i.e., weather conditions and predicted wind speeds greater than 32 km/hr [20 mi/hr]).

- Fixatives or cover material (e.g., soil, gravel, and plastic) will be applied to disturbed contaminated soils and debris associated with the PFP Complex demolition activities at any time field activities will be inactive for more than 24 hours. Additionally, if the sustained wind speed is predicted to be greater than 32 km/hr (20 mi/hr) overnight, based on the Hanford Meteorological Station forecast, fixative or cover material will be applied, as practicable.

- Before starting intrusive activities (such as isolating utilities and piping, or dismantling an exhaust system), removable contamination in the affected area(s) will be fixed, or reduced to ALARA. Measures such as decontamination solutions, expandable foam, encasement in grout, fixatives, or glove bags also will be used to the extent practicable to help minimize the spread of contamination.

- During open-air demolition, stabilized items identified as requiring special handling would be managed in a manner to minimize disturbance of the contamination. Methods of stabilization will be implemented prior to demolition to address void space issues and eliminate the need for excessive crushing, size reduction, or other actions that could lead to potential airborne releases.

- TRU waste containers will remain closed, except during packaging and waste inspection activities.

- Any vacuum cleaners and portable exhausters used for demolition activities will be equipped with appropriately tested nonstandard (HEPA-type) filters.

The following additional controls have been selected and could be implemented as practicable to minimize diffuse and fugitive emissions further:

- Planning for the special handling of stabilized items while minimizing risk of damage during handling

- Vacuum cleaners and/or portable exhausters used for demolition activities equipped with HEPA-type filters to provide point source or down draft contamination control

- Temporary exhausters with HEPA filters to provide alternate exhaust as practicable during decommissioning and preparation for final demolition

Temporary contamination control structures may be used as practicable with or without active portable HEPA-type filtered exhauster(s) during portions of the demolition preparation activities to minimize worker exposure. HEPA-type is intended to reflect nonstandard application of HEPA abatement not meeting engineered specifications of the applicable standards. No abatement credit is taken for "HEPA-type" devices.

4.3.1.3 Airborne Emission Monitoring

The quantification of radioactive air emissions and air monitoring has been identified as requirements for D4 activities. There are two components associated with airborne emissions monitoring at PFP. Point source monitoring (e.g., stacks, HEPA-filtered vacuums, portable HEPA-filtered exhausters, temporary exhausters) and diffuse and fugitive monitoring (temporary ambient air monitors, near facility monitors, radiological surveys). During the D4 activities at the PFP Complex, both components (point sources and diffuse and fugitive sources) will be monitored at the same time. Monitoring activities may include:

- Real time and periodic radiological monitoring using temporary ambient air monitors as prescribed by the Radiological Control organization (primary method for evaluating compliance with the action levels and void limits), with concurrence from the Environmental organization.

- Radiological smear surveys (Indicator – effluent air emission estimated rates are based on gross residual contamination levels).

- Near facility ambient air monitoring (currently being performed at several locations around the PFP complex).

- While the existing ventilation systems for the structures remain active, the existing sampling systems for the associated stacks will continue to be used.

- 291-Z-001 Ventilation System. This system provides ventilation for the 234-5Z, 234-5ZA, 236-Z, and 242-Z structures and exhausts through the 291-Z-001 Stack. The 291-Z-001 stack is a major emissions source and requires continuous sampling whenever the ventilation system is operating per 40 CFR 61.93(b)(2). All radionuclides that could contribute greater than 10 percent of the potential effective dose equivalent are measured as required by 40 CFR 61.93(b)(4). Stack flow rates are not measured; instead, an alternate method of using max fan capacity of four electric fans was approved per 40 CFR 61.93(b)(3). The sampling system is located in the 2712-Z structure at the 50-foot level of the stack and consists of a single shrouded probe and record sampler. This sampling system will be maintained operational in accordance with the substantive requirements of 40 CFR 61, Subpart H as long as the stack operates. Sample results from the 291-Z-001 sampling system are reported annually.

- 296-Z-15 Ventilation System. This system provides ventilation for the 243-Z structure and exhausts through the 296-Z-15 stack. This stack is a minor emissions source and is required to have periodic confirmatory measurements. This requirement is met by taking a four-week sample each year using a shrouded probe and a record sampler. The sample system is located inside the 243-Z structure. Sample results are reported annually. Annual sampling will continue until the stack is shut down. Sample results from the 296-Z-15 sampling system are reported annually.

- At some point in the D4 process, these stacks will be shut down. When the stacks are no longer needed, their sampling will also be discontinued. Approval of this RAWP constitutes approval to shut down the stacks when it is determined they are no longer needed. Stack operating records are maintained and will be made available upon request.

- Interim localized filtration systems for alternate ventilation will be monitored as necessary. Use of temporary exhausters may be necessary to provide alternate exhaust to facilitate preparation for final demolition. The monitoring of these exhausters will be conducted consistent with requirements in a manner proportionate with the potential risk. If these alternatives are used, descriptions of any temporary emissions units (including proposed monitoring methods) used to exhaust directly to the atmosphere will be included as addendums to this RAWP, as information becomes available. Approval of addendums will be accomplished through the TPA (Ecology et al., 1989a) change process or by Project Manager Meeting notes as decided between the Lead Agency (DOE) and the Lead Regulatory Agency (Ecology).

- HEPA-filtered vacuums intended for use will vary in size and primarily will be small, portable units of the type similar to those in use on the Hanford Site, with flow capacities between 1.4 and 8.5 m^3/min (50 and 300 ft^3/min). Larger capacity units with flow rates of 56.6 m^3/min (2,000 ft^3/min) or higher could be used. These units will be used to manage localized airborne contamination as well as the removal of contaminated soil and debris from outdoor areas, including soil generated from excavations associated with PFP Complex activities. To verify low emissions periodically, a contamination survey of the outlet of the vacuum will be performed at the completion of use. Vacuuming using one of these devices has no specific contamination limit, but will be controlled based on the specifics of the situation to ensure that the PTE from each unit does not exceed the

minor source criterion. If contamination levels over 2,000 dpm alpha/100 cm^2 (i.e., high surface contamination area) are inadvertently exceeded, a separate evaluation regarding emissions measurement will be conducted.

Portable HEPA-type filtered vacuums, portable HEPA-type filtered exhausters, and various types of containments will be used, as needed. A distinction between portable HEPA-type filtered exhausters and temporary HEPA filtered exhausters is intended. Portable exhausters are minor emission units that are easily set up for use and readily portable, being either hand carried or wheel mounted. Due to the nature of the activities involving use of the HEPA-type filtered air movers, measurable abated releases associated with these devices are not anticipated, and the near facility monitoring stations described below will be used to assess air emissions for the activities associated with these portable point sources.

Once demolition activities begin, worksite air monitoring will be the primary indicator of effectiveness of abatement and ALARA control methods during demolition activities. Worksite monitoring includes using temporary ambient air monitors (real time continuous air monitors with alarms, personnel samplers, ambient air samplers) and surveys. The worksite monitoring network will be established as directed by the Radiological Control organization, with concurrence from the Environmental organization, and will be focused around and in the established demolition zones. This monitoring network provides the primary emissions data used to ensure the limits set in the RWP are not exceeded. At a minimum, three (one upwind and two downwind) real time alpha continuous air monitors with alarms will be located at each demolition zone boundary.

In addition to point source monitoring and worksite monitoring, the 200 West Area Near Facility Ambient Air Program stations nearest the PFP Complex (shown in Figure 4-3) provide a secondary layer of monitoring. These six stations (N433, N554, N975, N165, N155, and N555) do not provide real time data so their data will be used as indicators along with the worksite monitoring data for overall trending of potential diffuse and fugitive emissions. During periods of demolition and debris removal, no more than one of these six monitors will be allowed to be inoperative for more than 24 hours.

The Hanford Site perimeter monitoring provides the last layer of monitoring and is used to measure the diffuse and fugitive emissions from the Hanford Site.

The well-established Hanford Site protocol for emission monitoring will be followed, including Hanford Site perimeter ambient air data collection, sampling frequencies, sample analysis, and data reporting (DOE/RL-91-50, *Hanford Site Environmental Monitoring Plan*). This method will address the substantive requirements of WAC 246-247-75.

Demonstration of compliance with the 40 CFR 61.92 effective dose equivalent of 10 mrem/year limit is provided by the Radioactive Air Emissions Report for the Hanford Site.

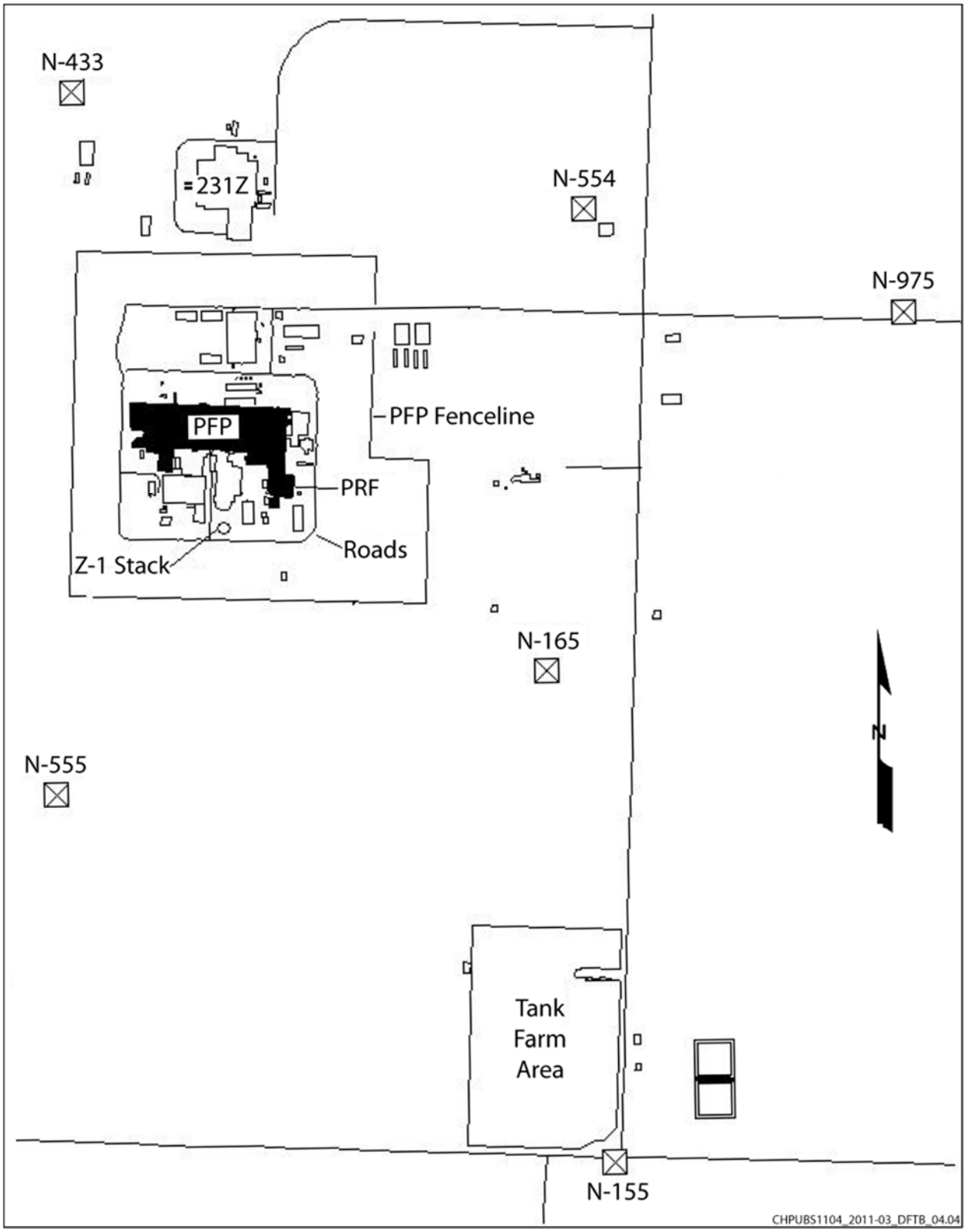

Figure 4-3. Ambient Air Monitoring nearest the PFP Complex

4.3.2 Air Contaminant and Toxic Air Pollution Emissions

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 will be taken to prevent the release of air contaminants associated with fugitive emissions resulting from demolition, materials handling, or other operations and prevent fugitive dust from becoming airborne from fugitive sources of emissions.

4.3.2.1 Criteria Pollutants

Operation of trucks and other diesel-powered equipment during these removal activities 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. Dust generated during removal activities would be minimized by watering or other dust control measures (e.g., use of fixatives). 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. These techniques are considered reasonable precautions to control fugitive emissions as required by the substantive requirements.

4.3.2.2 Asbestos

The federal implementing regulations also contain requirements for managing asbestos material associated with demolition and waste disposal (40 CFR 61, Subpart M, “National Emission Standard for Asbestos”). At the state level, the substantive requirements for control of a criteria and toxic emissions will be administered in accordance with the substantive requirements identified in Table 4-1 (i.e., WAC 173-400 and WAC 173-460).

4.3.2.3 Control Methods

Based on analysis of the potential emissions and analysis of available control technologies, the following controls have been selected for use during the removal action:

- Water will be applied, as needed, during any excavation (including any slab removal), backfilling, or recontouring activities to spray for suppression of fugitive emissions including dust.
- Fixatives will be applied to structural materials, debris and equipment, and/or contaminated soil, as needed, to minimize airborne contamination during the removal action activities for fugitive emissions and dust. Fixative application techniques may include spraying, fogging, brushing on, pouring, or some other method, as necessary.
- Fixatives or cover material (e.g., soil and gravel) will be applied to disturbed contaminated soils, when field activities will be inactive more than 24 hours, except as noted:
- If a fixative has already been applied and the fixed contaminated items will remain undisturbed, further use of fixatives will not be needed. The fixatives or other controls will not be applied when the contaminated items are frozen, or if is raining, snowing, or other freezing precipitation is falling.
- Field activities will be temporarily ceased and the area placed in a safe configuration if airborne contamination control measures are not expected to be adequate, based onsite conditions (e.g., excessive wind). Additionally, a fixative will be applied to the demolition site and debris piles as needed to help control dust and radiological and nonradiological contaminants.

If unanticipated new sources of airborne pollutants are encountered, the potential for emissions will be reviewed, and appropriate controls will be implemented, if required.

4.3.3 Reporting Requirements for Nonroutine Releases

The reporting requirements described in the following subsections apply for hazardous substances and PCBs that could be released during characterization and stabilization activities.

Federal Hazardous Substance. 40 CFR 302, "Designation, Reportable Quantities, and Notification," requires immediate notification to the National Response Center on discovery of a release of a hazardous substance into the environment in excess of a reportable quantity.

40 CFR 355, "Emergency Planning and Notification," requires immediate notification to the community emergency coordinator for the local emergency planning committee and to the State Emergency Response Commission for a release of a reportable quantity of an extremely hazardous substance, a comprehensive release of a reportable quantity of an extremely hazardous substance, or a CERCLA hazardous substance.

These requirements only apply to hazardous substances discovered or released at PFP that are not subject to this CERCLA action. Hazardous substances that are subject to this CERCLA action are not subject to this reporting requirement because such substances are already subject to CERCLA cleanup authority. Any releases of such hazardous substances to the environment that pose a threat to human health or the environment will be addressed as appropriate under this removal action. Spills or releases within buildings or to containment will be addressed as needed to minimize the potential for release to the environment.

Radiological Release Reporting. Existing occurrence reporting requirements trigger timely notifications to the lead agency (i.e., DOE) of events of significance.

4.4 Ecological, Historical, and Cultural Resources Protection

The *National Historic Preservation Act of 1966* (NHPA) requires federal agencies to survey the lands under their control, evaluate all historic properties for eligibility for the National Register of Historic Places, and consider the effects of actions on properties eligible for or listed in the National Register.

The PFP Complex structures are located in a highly disturbed, low-sensitivity area due to past construction and infrastructure installations. Workers will be directed to watch for cultural materials (e.g., bones and artifacts) during all work activities. If any are encountered, work near the discovery must stop until the find is assessed for significance and potential mitigation of impacts are addressed.

DOE/RL-97-56, *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (Treatment Plan), was developed to satisfy the NHPA, Section 106 (as implemented through 36 CFR 800, "Protection of Historic Properties") requirements for the identification, evaluation, and treatment necessary for all undertakings, up to and including demolition, which may affect Manhattan Project and Cold War Era properties (from 1943 through 1990). Implementation of the Treatment Plan (DOE/RL-97-56) resulted in 11 structures at PFP being designated as eligible for listing in the National Register of Historic Places. Table 4-5 provides the list of 11 eligible PFP structures along with the level of documentation determined to be appropriate for each structure from Table A.5, Appendix A of the Treatment Plan (DOE/RL-97-56).

Table 4-5. PFP Structures Listed in DOE/RL-97-56 for Mitigation

Number	Name	Documentation Level
232-Z	Waste Incinerator Facility	HAER
234-5Z	Plutonium Finishing Plant	ExHPIF
234-5ZA	234-5Z South Annex	ExHPIF
236-Z	Plutonium Reclamation Facility	ExHPIF
242-Z	Waste Treatment Facility	ExHPIF
291-Z	Air Filter and Exhaust Stack	HPIF
2701-ZA	Central Alarm Station	HPIF
2704-Z	Office Building	HPIF
2736-Z	Primary Plutonium Storage Facility	HPIF
2736-ZA	Primary Plutonium Storage Annex	HPIF
2736-ZB	Primary Plutonium Storage Support	HPIF

HAER = Historic American Engineering Record
HPIF = Historic Property Inventory Form
ExHPIF = Expanded Historic Property Inventory Form

The documentation (HAER) for 232-Z has been completed as indicated in DOE/RL-97-56. The documentation (HPIF/ExHPIF) for the remaining 10 PFP structures also have been completed as stated in CCN 0205441, *REVISED Cultural Resources Review for the Plutonium Finishing Plant (PFP) Decommissioning Project – Demolition of 10 Buildings that are eligible for listing on the National Register of Historic Places (HCRC# 2002-200-021)*. Discussion of the PFP complex structures was included in DOE/RL-97-1047, *History of the Plutonium Production Facilities at the Hanford Site Historic District, 1943-1990*.

In January 2003, the State Historic Preservation Office (SHPO) agreed that because of public health and safety concerns posed by high radiological contamination levels, public access to these structures would be highly unlikely; therefore, deactivation activities could proceed. On September 29, 2003, further correspondence was received from SHPO, which allowed deactivation activities to extend approximately 304.8 m (1,000 ft) beyond the PFP fence line and included excavations to a depth of 6 m (20 ft) (Whitlam, 2003, “Re: D&D of the Plutonium Finishing Plant Complex HCRC #2003-200-039”).

The Treatment Plan (DOE/RL-97-56) also requires walkthroughs of the structures to be completed to identify artifacts that are of educational and interpretive value. Walkthroughs have been completed for the PFP structures, except for 242-Z and 2701-ZA, and artifacts have been identified. The 242-Z structure was excluded for safety reasons and 2701-ZA structure was excluded for security reasons. Historic artifacts that are not contaminated will be collected as part of the deactivation activities. Contaminated artifacts will be documented and photographed to serve as a permanent record and then disposed of. Efforts will be made to locate non-contaminated examples of the same or similar artifacts for retention. All artifacts and documentation will be turned over to the Department of Energy’s curating contractor.

The *Endangered Species Act of 1973*, as implemented through 50 CFR 402, "Interagency Cooperation-Endangered Species Act of 1973, as Amended," and WAC 232-12-297, "Permanent Regulations," "Endangered, Threatened, and Sensitive Wildlife Species Classification," requires the conservation of critical habitat on which endangered or threatened species depend and prohibits activities that threaten the continued existence of listed species or destruction of critical habitat. The *Migratory Bird Treaty Act of 1918* provides for the protection of specific migratory birds. Although adverse impacts to endangered or threatened species or migratory birds are not expected, activity-specific ecological reviews will be conducted to identify and mitigate any potentially adverse impacts prior to beginning fieldwork. After fieldwork commences, mitigation of impacts on migratory birds (e.g., nesting in rubble piles or within unstable portions of structures) would have to be tempered by personnel safety and environmental release considerations.

4.5 Surface and Groundwater

The Washington State Waste Discharge Program (WAC 173-216-020, "Policy Enunciated") requires the use of all known available and reasonable methods to prevent and control the discharge of wastes into state waters. Structure dismantlement will involve the use of water sprays to limit the amount of dust generated. Water volumes and runoff controls will be managed consistent with substantive provisions of site-wide discharge and surface water control plans.

Stormwater runoff from some of the structures listed in the Action Memorandum (DOE/RL-2005-13) discharges to engineered structures (e.g., injection wells). These injection wells are registered pursuant to WAC 173-218, "Underground Injection Control Program." *State Waste Discharge Permit Number ST 4511* (Ecology, 2014), issued pursuant to WAC 173-216, "State Waste Discharge Permit Program," addresses discharges of stormwater to engineered structures. Substantive provisions of the permit include the implementation of BMPs, which are intended to prevent or reduce the spread of contamination and pollution of groundwater of the state. The substantive requirement of WAC 173-218 is applicable to the decommissioning of underground injection control wells. Sampling and analysis of the stormwater discharge is not normally required as long as the proper pollution prevention and BMPs are followed, unless contamination exists. Stormwater that has become contaminated is to be sampled to verify that the groundwater quality criteria are met prior to discharge to the injection well.

The BMPs identified by Ecology (2005) and DOE/RL-97-67, *Pollution Prevention and Best Management Practices Plan for State Waste Discharge Permit ST 4511*, will be considered and implemented as appropriate after further discussions with Ecology. These BMPs include actions such as the following:

- Conducting inspections to identify and remove materials that could contaminate stormwater discharges
- Implementing good housekeeping practices to segregate and store materials and wastes in a manner to prevent the potential for contaminating stormwater
- Taking reasonable efforts to minimizing ponding
- Collecting discharges that have become contaminated
- Cleaning up spilled materials and liquids promptly
- Informing work crews of the appropriate BMPs to be implemented

The removal actions specified in the Action Memorandum (DOE/RL-2005-13) will result in a unique set of circumstances for each structure. Additional BMPs may be needed to prevent the discharge of

contaminated stormwater runoff to an injection well. These practices could include berming, rerouting stormwater discharges, or creating new discharge locations. If an existing injection well must be closed, it will be evaluated for the presence of contamination and sampled as necessary. If the well does not require further action under CERCLA, it will be decommissioned in accordance with WAC 173-218. Where additional BMPs are required to prevent contamination of stormwater runoff to the injection wells, they will be documented in structure-specific work-controlling documents (e.g., work packages). Lead regulatory agency concurrence will be obtained prior to creating a new discharge location.

The substantive requirements of WAC 173-160, “Minimum Standards for Construction and Maintenance of Wells,” are applicable when decommissioning groundwater wells that are found to require closure prior to performing demolition activities (i.e., the well is located within the structure layback boundary). While not an identified ARAR, required well decommissioning activities will be conducted in accordance with substantive requirements of WAC 173-160 and WAC 173-162, “Regulation and Licensing of Well Contractors and Operators,” under other closure documents to support this demolition work as needed.

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5 Project Management

This chapter describes overall project management elements for the PFP removal action.

5.1 Project Team

The project team includes the individuals working to accomplish the removal action. Accordingly, the project team includes a DOE Project Manager representing the Lead Agency, an Ecology Project Manager representing the Lead Regulatory Agency and a Contractor Project Manager.

The DOE Project Manager is responsible for monitoring the technical/scope, cost, and schedule baselines through all phases of this removal action.

The Ecology Project Manager is responsible for regulatory oversight.

The Contractor Project Manager has overall responsibility and accountability for the performance of all activities associated with this removal action.

5.2 Project Cost and Schedule Tracking

The demolition of structures is part of the overall TPA (Ecology et al., 1989a) milestone M-083-00A completion schedule. This overall schedule is provided as Figure 5-1. This schedule is subject to acceleration or delay due to changes in priority as determined by the TPA (Ecology et al., 1989a) signatories and consistent with the TPA change processes.

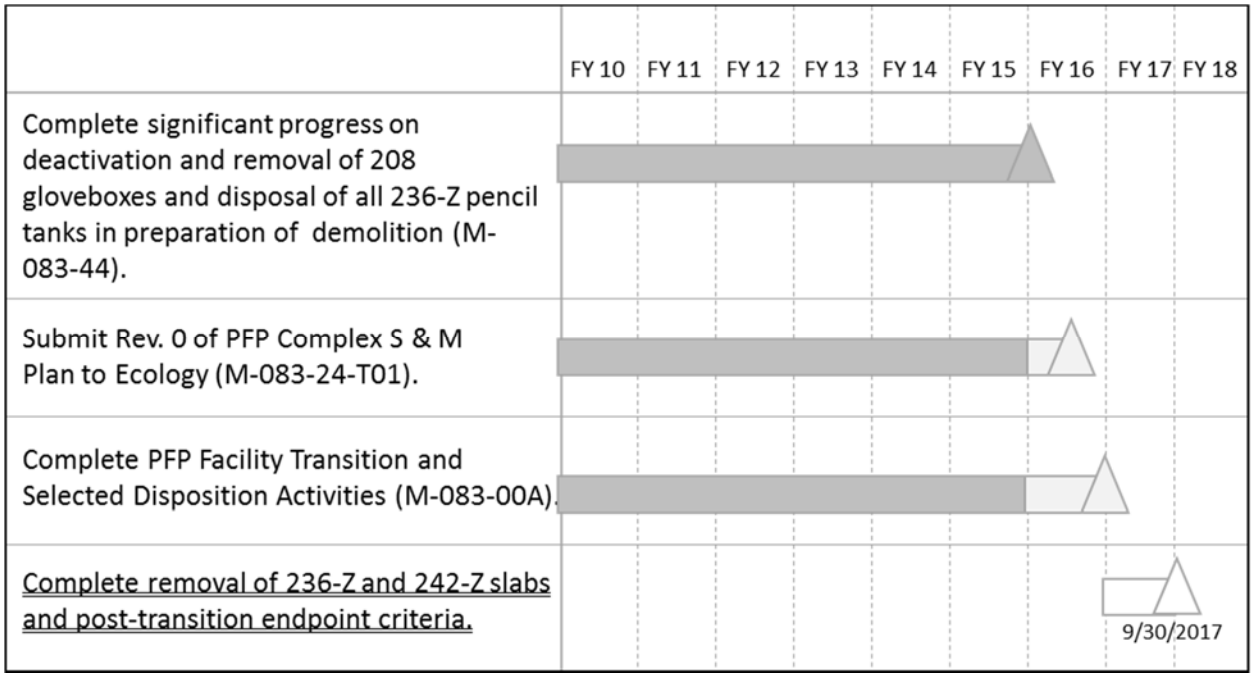

Figure 5-1. Project Schedule

Cost and schedule tracking is managed in accordance with Section 4 of the TPA (Ecology et al., 1989a).

5.3 Security Requirements

Access to the Hanford Site is controlled by fences and around the clock checkpoints on vehicle access roads. All personnel entering the Hanford Site must display a DOE issued identification badge. Personnel on the Hanford Site are also subject to random searches. Signs at the 200 West Area boundaries indicate access by authorized personnel only or similar legends.

5.4 Change Management and Configuration Control

If a change arises that results in a fundamental change to the selected response action that is not within the scope of work, another EE/CA or proposed plan and supporting documentation will be prepared to allow DOE and Ecology to select a revised response action.

5.5 Personnel Training and Qualifications

During the performance of project activities, the experience and capabilities of the operating staff will be extremely important in maintaining worker and environmental safety. Day-to-day knowledge of ongoing operations, month-to-month understanding of conditions encountered, and lessons learned will be used for continued safe operations.

Training requirements will ensure that personnel have been instructed in the technologies to work safely in and around radiological areas, and to maintain their individual radiation exposure and the radiation exposures of others ALARA. Standardized core courses and training material will be presented, and site-specific information and technologies will be added to train workers adequately. Records of required training will be maintained in accessible files.

Health physics workers will be required to have completed and be current in radiological control technician qualification training. These training courses require the successful completion of examinations to demonstrate understanding of theoretical and classroom material. Specialized training will be provided as needed to instruct workers in the use of nonstandard equipment, in the performance of abnormal operations, and in the hazards of specific activities. Specialized training could be provided by on-the-job training activities, classroom instruction and testing, or pre-job briefings. The depth of training in any discipline will be commensurate with the degree of the hazard(s) involved and the knowledge required for task performance.

Some activities will require the acquisition of expert services as opposed to project staff training.

The contractor training program will provide workers with the knowledge and skills necessary to execute assigned duties safely. A graded approach will be used to ensure that workers receive a level of training commensurate with their responsibility and that complies with applicable requirements. Specialized employee training will include pre-job safety briefings, plan-of-the-day meetings, and facility/work site orientations. Training and qualifications will be determined as required by job assignment for work activities.

The HASP, RWP, and activity hazards analysis will include specific requirements for project activities being conducted, which will include personal protective equipment and required training for project personnel.

5.6 Quality Assurance Requirements

Overall quality assurance (QA) for the RAWP will be planned and implemented in accordance with EPA/240/B-01/003, *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5), and

SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update 1V-B*. QA activities will use a graded approach based on the potential impact on the environment, safety, health, reliability, and continuity of operations. Other specific activities will include QA implementation, responsibilities and authority, document control, QA records, and audits.

5.7 Removal Action Closeout

Removal action closeout will consist of a review to determine the final action status and validation that the Action Memorandum (DOE/RL-2005-13) is completed, the S&M Plan is approved, property is turned over to S&M, and appropriate documents are incorporated into the administrative record.

5.7.1 Final Project Status

To achieve the removal action end state, endpoints for dismantlement of the PFP Complex to slab-on-grade must be achieved consistent with removal action objectives specified in the EE/CA. Project closeout consists of endpoint criteria completion. The status of the performance measures at completion of each project will be evaluated. At a minimum, a final updated schedule and cost report will be completed and added to the project file. Any in-scope work not completed will be noted. Once a structure is determined to have met pre-transition endpoint criteria, it will be ready to be transferred for S&M activities.

Documentation required to support transition to a safe and stable S&M mode will be provided in a turnover package at transition to S&M (completion of M-083-00A). The final turnover package will be provided at the completion of all post-transition endpoint criteria by September 30, 2017, as identified in Figure 5-1. The turnover package will support future surveillances, audits, and final disposition planning. It will be provided to the organization responsible for S&M of the PFP Complex following completion of the above-grade removal action and be available for the final remedial action planning. The following specific elements must be addressed in the turnover package:

- The as left condition of confined spaces (eliminated or sealed)
- Compliance with the asbestos standards
- The as left condition and location of remaining below-grade equipment
- Description of remaining industrial hazards
- The amount and locations of remaining radiological contamination/hazardous substances
- Final radiological surveys
- Work packages and plans
- Modified configuration management documents
- Photographs

5.7.2 Records Disposition and Retention

Records created during the execution of the PFP Complex removal action are managed in accordance with Section 9.4 of the TPA Action Plan (Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*).

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