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[0078320H]

Meeting Minutes
Plutonium Finishing Plant (PFP)
Project Managers Meeting
825 Jadwin/641
December 3, 2015

Deem R. Konzek

Date: 1/20/16

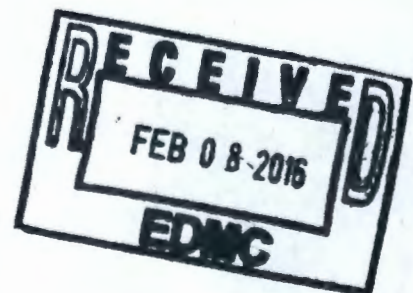
Project Manager Representative, DOE-RL

Allen Schleif

Date: 1/20/16

Project Manager Representative, Ecology

Administrative Record	H6-08
JB Borghese, CHPRC	H8-43
TE Bratvold, CHPRC	T5-60
BJ Dixon, CHPRC	T5-60
GR Konzek, RL	A6-38
E Laija, EPA	A3-46
SM Mortensen, Ecology	H0-57
SN Schleif, Ecology	H0-57
TK Teynor, RL	A6-38



The Minutes from the October 29, 2015 meeting were approved and were signed by the RL Project Manager. Since the Ecology Project Manager was participating via phone, that signature will be obtained later followed by placement of the minutes in the Administrative Record. The attendance roster is attached. Actions from previous meetings were reviewed with status as follows:

Action	Actionee	Status
Parties to meet informally to discuss what constitutes completion of M-083-00A.	RL	The action was completed with approval of TPA Change Notices to modify the PFP Removal Action Work Plan and the PFP End Point Criteria. The Parties agreed to close the action and open a new action to track development of the Sampling and Analysis Plan for slab removal.
RL to share information on the air dispersion model and discuss relocation of near facility monitors with WDOH.	RL	The draft air dispersion model will be available for internal review December 7 with the final report expected to be completed by the end of December. A briefing to Ecology and WDOH will be provided in mid-January. Ecology requested that a date be set as soon as possible to ensure that key personnel will be available.

The PFP Milestone Status (Tom Teynor, RL).

- M-083-24-T01, *Submit Revision 0 of the PFP Complex Surveillance and Maintenance (S&M) Plan to Ecology.* 06/30/2016 (On Schedule)

Development of the S&M Plan is proceeding and is expected to be available for Ecology review in February. It was agreed that the parties would work collaboratively to reach consensus on the conceptual approach and content of the plan prior to the formal review by Ecology.

- M-083-00A, *Complete PFP Facility transition & 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. Also see "description/justification" contained in change form M-83-01-03.* 9/30/2016 (At Risk)

TPA Change Notice 681 was signed on November 5, 2015, to modify DOE/RL-2011-03, *Removal Action Work Plan for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex*. TPA Change Notice 682 was also signed on November 5, to modify NMS-16404, *Plutonium Finishing Plant Endpoint Criteria*. As noted in the description of change, the modifications clarify selected activities required by the *Hanford Federal Facility Agreement and Consent Order* Milestone M-083-00a and incorporate removal of selected slabs and underlying soil following removal of above grade structures. The change notices have been placed in the Administrative Record and are attached to these minutes. Approval of the change notices satisfy the action to clarify what constitutes completion of the milestone. A Sampling and Analysis Plan (SAP) will be required for the implementation of slab removal and progress on SAP development will be tracked via the Project Managers Meeting.

The milestone remains at risk but efforts are underway to have the 236-Z building (Plutonium Reclamation Facility) ready for demolition in February.

Project Progress, Issues, Concerns, and Challenges (Tom Teynor, RL)

Activities to confirm readiness to demolish 236-Z, 242-Z, and 234-5Z include an emergency preparedness exercise the week of January 25th and a Readiness Assessment in February.

234-5Z Plutonium Finishing Plant. In-situ size reduction of glovebox HA-9A is about 2/3 complete with work on the mid-level section expected to be completed the week of December 7th. Subsequent work will be size reduction of the floor level section and removal of Lexan components to allow implementation of DSA revision 12. Work in the duct level continues with high holdup filter box 3P expected to be done the week of December 7th and the remaining filter boxes to be finished in January 2016. Removal of filter box 3P is important to reduce material-at-risk within the facility and allow more efficient removal of equipment. Stop work issues related to chemical lines, air regulators, and small amounts of liquid in ducts have been resolved.

236-Z Plutonium Reclamation Facility. 236-Z canyon cleanout is going well and is expected to be completed the week of December 7th. A presentation on the Pan J debris reaction and path forward was provided by Tom Bratvold (CHPRC) and is attached to these minutes. Preparations are being made to grout the canyon floor on December 22nd to reduce dose and allow further characterization and decontamination of the canyon walls to be done.

242-Z Americium Facility. Work in 242-Z is focusing on isolating the tanks and removing hazardous materials. Decontamination and equipment removal efforts are expected to allow workers to transition from air supplied respirators to powered air purifying respirators or PAPRs in January 2016. Revision 13 to the DSA will allow storage tanks to be removed whole as part of the demolition process vice size reduced beforehand.

Ecology Topics (Stephanie Schleif, Ecology).

It was requested that a new action be established to track progress in completing the SAP for slab removal and that a date be established as soon as possible for the presentation on the air dispersion model. Ecology would also like to have a presentation on the Readiness Assessment.

Meeting Summary

- There were no approved changes signed off in accordance with section 12.2 of the TPA action plan.
- New Action: Track progress in development of a SAP for slab removal by providing a status update during PFP Project Manager Meetings. A briefing to Ecology will be provided prior to their review of the document.

Next Meeting Date and Location

- The next Project Managers Meeting is scheduled for January 20, 2016 at 3:30 p.m. in the Federal Building.

**PFP Project Managers Meeting
825 Jadwin/641**

**December 3, 2015
ATTENDANCE LIST**

Name	Organization	Phone Number
1. Brian Dixon	CHPRC	376-7053
2. Stephanie Schleif	Ecology	(via telecon)
3. Bill Cox	CHPRC	972-9345
4. Jane Borghese	CHPRC	373-3808
5. Tom Bratvold	CHPRC	373-2306
6. Tom Teyner	DOE-RL	376-6363
7. Glenn R. Konzak	DOE-RL	376-8399
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TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 681	TPA CHANGE NOTICE FORM	Date: 11/5/2015
Document Number, Title, and Revision: DOE/RL-2011-03, Removal Action Work Plan for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex, Rev 0		Date Document Last Issued: August 2014
Originator: T. K. Teynor		Phone: 509-376-6363

Description of Change:

Modification of the document to clarify selected activities required by *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) Milestone M-083-00A and to incorporate removal of selected slabs and underlying soil following removal of above grade structures at the Plutonium Finishing Plant (PFP) Complex.

T.K. Teynor and S.N. Schleif agree that the proposed change
DOE **Lead Regulatory Agency**
modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

The document is modified throughout to incorporate revisions and clarifications as shown on the attached pages. -

Modifications are denoted by using strikeout to indicate deletions and double underline to indicate text additions. For clarity, the attached pages incorporate the changes from the previously approved TPA-CN-661 on page 5-1.

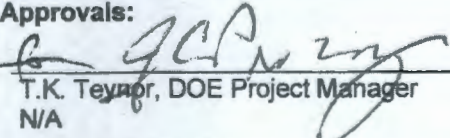
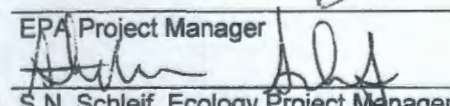
Affected page numbers are from the original document, 1-1, 1-2, 1-3, 1-4, 1-6, 1-15, 1-16, 2-1, 2-2, 2-8, 2-9, 2-10, 2-11, 2-12, 4-7, 4-18, 4-23, 5-1, and 5-3

Justification and Impacts of Change:

The Tri-Party Agreement Milestone M-083-00A requires the U.S. Department of Energy – Richland Operations (DOE-RL) to: "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." This change incorporates text to clarify the scope of work required to meet element 3 of the milestone.

In addition, DOE-RL and the Washington State Department of Ecology have proposed to remove the 236Z and 242Z slabs following removal of the above-grade structures. Slab removal will reduce radiological inventory during the S&M period pending final disposition of the area in a future remedial action. This change notice incorporates the text in the work plan describing the actions needed for slab removal and the schedule for these actions with respect to milestone completion.

Approvals:

 T.K. Teynor, DOE Project Manager N/A	<u>11.5.15</u> Date	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved
EPA Project Manager	Date	<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved
 S.N. Schleif, Ecology Project Manager	<u>11/5/15</u> Date	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved

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 Under 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-grade¹ 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.

~~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. As stated in the Action Memorandum for this Removal Action (DOE/RL-2005-13), DOE will submit this RAWP to Ecology for approval.~~

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. ~~This migration prevention could include adding a cover (of compacted fill, gravel, asphalt or other appropriate material with an engineered slope), if needed, to the slab to prevent run-on/run-off.~~

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

1 action. This duct is also sufficiently similar to other PFP structures in material and contamination to meet
2 the intent of the Action Memorandum (DOE/RL-2005-13).

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

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

9 Other additions or removals from the scope of this removal action will be documented under the TPA
10 (Ecology et al., 1989a) change process or by Project Manager Meeting notes as decided between the Lead
11 Agency (DOE) and the Lead Regulatory Agency (Ecology). All documentation of such changes will be
12 submitted to the Administrative Record. If characterization results indicate structures in the scope of this
13 RAWP do not contain CERCLA hazardous substances, those structures may be removed from this
14 CERCLA action and handled under separate DOE authority. The 236-Z and 242-Z slabs will be removed
15 as discussed in Section 1.

16 1.2.2 Removal Action Objectives

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

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

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

33 Thus, this RAWP provides consistency and flexibility through project completion for the entire list of
34 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
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 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.

1.5.5 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

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

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

10 This consolidated RAWP was developed to be an updated standalone RAWP for the PFP project.
 11 It incorporates and replaces the two previous RAWPs by addressing both ongoing deactivation and
 12 demolition (herein referred to as D4) of all structures, including 243-Z, 234-5Z, 236-Z, 242-Z, and
 13 291-Z-001 Stack. This RAWP will be the work plan that the project follows to complete the remaining
 14 work at PFP.

15 1.6.3 Follow-on Actions

16 The removal action represented by this RAWP is an interim step in the CERCLA process defined by the
 17 TPA (Ecology et al., 1989a) and DOE/RL-2009-10, *Hanford Site Cleanup Completion Framework*.
 18 This removal action includes periodicis to be followed by S&M activities. S&M will continue until
 19 records of decision (RODs) implement the final remedial actions. The Z-1A Crib, Z-3 Crib, Z-9 Crib, and
 20 241-Z-361 Tank are included in the 200-PW-1/3/6 ROD (EPA et al., 2011, *Record of Decision Hanford*
 21 *200 Area Superfund Site 200-CW-5 and 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units*). Two
 22 other RODs (i.e., RODs for the 200-WA-1 and the 200-IS-1 Operable Units) are anticipated to address
 23 the disposition of the PFP slabs and below-grade areas that remain after completion of work under this
 24 RAWP. Remaining slabs and below-grade areas will be identified by DOE for placement in the Waste
 25 Information Data System for evaluation as a new site under the TPA Management Procedure MP-14.
 26 Figure 1-4 shows a flow diagram of the document and actions relationships.

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, and 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
- ~~Final characterization~~
- Site stabilization ~~and demobilization~~
- Turnover to ~~post-removal action~~ 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, and 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 ~~immediately~~ after demolition activities prior to any 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).

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 Contamination control cap installation 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 surveys are complete, the 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 this removal action 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

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 ~~structure preparations, sampling and analysis, decontamination waste packaging and storage, and demolition activities for the PFP above-grade structures~~ 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

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 cm² alpha following any demolition action. During deactivation activities, equipment, tools, and materials with removable contamination above 100,000 dpm/100 cm² beta/gamma or 2,000 dpm/100 cm² 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]).

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 it 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.

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.

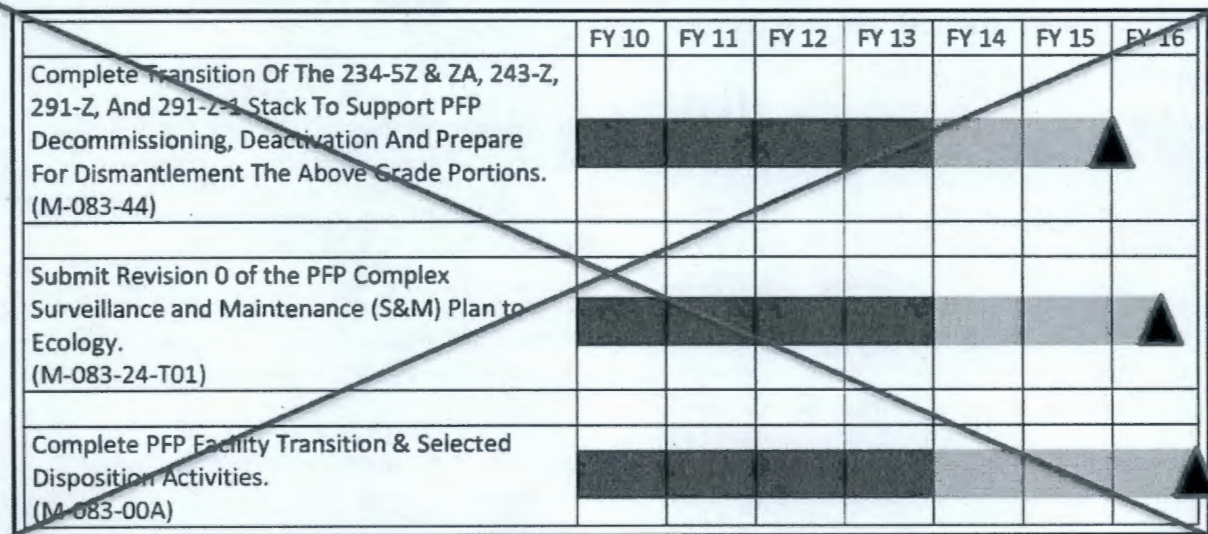
The DOE Project Manager is responsible for monitoring the technical/scope, cost, and schedule baselines through all phases of this removal action.

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.



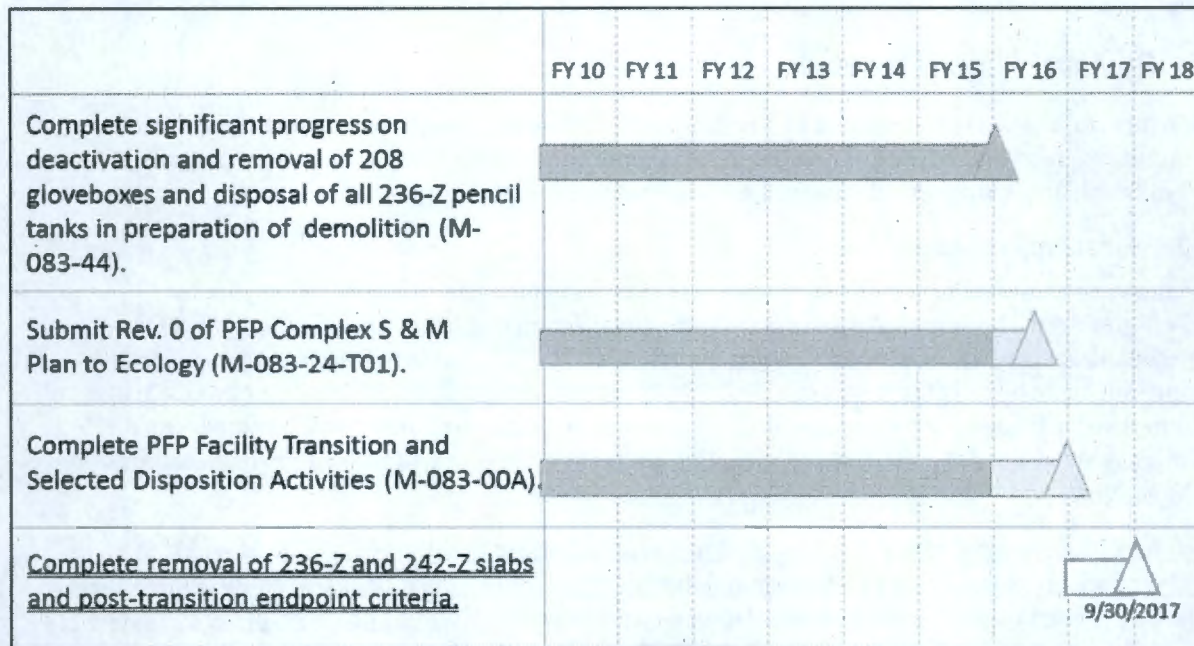


Figure 5-1. Project Schedule

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

SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update IV-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 Documents supporting endpoint criteria completion will be included in a 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*).

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 682	TPA CHANGE NOTICE FORM	Date: 11/5/2015
Document Number, Title, and Revision: NMS-16404, Plutonium Finishing Plant (PFP) Complex Endpoint Criteria, Rev 0 <i>[also identified as HNF-22401, Rev 0]</i>		Date Document Last Issued: August 2004
Originator: T.K. Teynor		Phone: 509-376-6363

Description of Change:

Insertion of a preamble to the beginning of the document to clarify applicability of the endpoint criteria required to place the PFP Facility in a safe and stable surveillance and maintenance (S&M) mode.

T.K. Teynor and S.N. Schleif agree that the proposed change
DOE **Lead Regulatory Agency**
 modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

A new preamble is added prior to the Cover and Executive Summary. A new Page P-1, followed by Table P-1 (starting on Page P-2) is being added prior to the existing Page 1 of the document.

Note: Because the entire text of the preamble is new, no underlining is used.

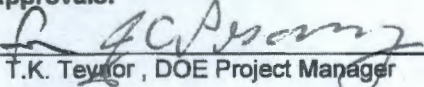
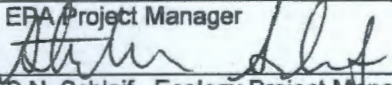
New pages P-1 through P-14 are added before the cover page (page 1).

Justification and Impacts of Change:

The Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Milestone M-083-00A requires the U.S. Department of Energy-Richland Operations Office (DOE-RL) to: "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 [surveillance and maintenance] 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."

DOE-RL and the Washington State Department of Ecology (Ecology) have proposed to remove the 236Z and 242Z slabs following removal of the above-grade structures. Slab removal will reduce radiological inventory during the S&M period pending final disposition of the area in a future remedial action. The preamble clarifies the applicability of the endpoint criteria required to place the PFP Facility in a safe and stable S&M mode as required in the milestone M-083-00A in light of the potential for removal of selected slabs.

Approvals:

<u></u> T.K. Teynor, DOE Project Manager	<u>11-5-15</u> Date	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved
N/A EPA Project Manager	Date	<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved
<u></u> S.N. Schleif, Ecology Project Manager	<u>11/5/15</u> Date	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved

Plutonium Finishing Plant (PFP) Complex Endpoint Criteria
NMS-16404, Rev 0

PREAMBLE

The *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) Milestone M-083-00A requires the U.S. Department of Energy-Richland Operations Office (DOE-RL) to:

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 [surveillance and maintenance] 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.

The Plutonium Finishing Plant (PFP) Complex Endpoint Criteria document was originally developed to establish a set of transition endpoint criteria to be applied to completion of the deactivation, decontamination, decommissioning, and demolition (D4) of above-grade structures and other components within the PFP Complex. The criteria have been utilized for detailed planning and execution of the project during and after development of DOE/RL-2004-05, *Engineering Evaluation/Cost Analysis for the Plutonium Finishing Plant Above-Grade Structures*, and associated DOE/RL-2005-13, *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action*.

The current scope of the removal action, as described in DOE/RL-2011-03, *Removal Action Work Plan [RAWP] for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex* includes the following activities for above-grade structures and other components:

- (1) Removal of above-grade structures and equipment to slab-on-grade
- (2) Removal of equipment and components in below-grade structures that could not be dispositioned as low-level waste during final disposition activities
- (3) Isolation of potential sources of contamination to the environment, such as underground transfer lines and drains
- (4) Identification of areas where radioactive and chemical contamination will remain for final disposition
- (5) Stabilization of the remaining slabs and surface to mitigate the potential for radioactive and hazardous material migration
- (6) Transition to surveillance and maintenance (S&M) until final disposition decisions are made and implemented

During implementation of the D4 process, the U.S. Department of Energy-Richland Operations Office (DOE-RL) and the Washington State Department of Ecology (Ecology) have determined that because of potential residual transuranic contamination in some of the process building slabs, removal of selected slabs while D4 equipment and personnel are mobilized may be an effective means of reducing onsite radionuclide inventory pending final remediation. Because removal of building slabs was not envisioned during development of the original endpoint criteria, and because the Parties agree that timely transition to the S&M is the most efficient use of resources, revisions are made to the applicability of the endpoint criteria that will allow the PFP Facility to be placed in a safe and stable S&M mode, as required in Tri-Party Agreement milestone M-083-00A following removal of the above-grade structures.

The endpoint criteria have been evaluated to identify those criteria that are applicable and necessary to achieve safe and stable S&M. This has been determined to include criteria that achieve the following: (1) removal of the above grade structures; (2) removal of the required below-grade equipment and components; and (3) isolation of potential sources of contamination to the environment.

Completion of these criteria will meet the intent of Tri-Party Agreement milestone M-083-00A where it requires "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".

Plutonium Finishing Plant (PFP) Complex Endpoint Criteria
NMS-16404, Rev 0

Following transition to S&M, 236Z and 242Z building slabs will be removed, along with soil necessary to allow complete slab removal (approximately one meter below the slab). This will be followed by necessary actions to achieve transition from the removal action to a remedial action.

Table P-1 documents the criteria that must be met to enable transition of the PFP Complex to S&M (stated in the Applicability column as Pre-transition). The criteria identified as part of S&M, such as final stabilization of the surface and documentation of conditions in support of final disposition decisions, will be completed as part of S&M activities on a schedule that will be approved by the Parties in DOE/RL-2011-03, *RAWP for the D4 of the PFP Complex*.

Table P-1. PFP Endpoint Criteria Applicability Before and After Transition to S&M

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Facility-specific criteria 1-21 generally apply to individual structures. Most facility-specific endpoints will be achieved as part of the D4 process for removal of each of the above-grade structures and below-grade components and are designated as pre-transition activities. Those criteria that the set of facilities or where the endpoint requires a report or other documentation that could change significantly as a result of slab removal are designated as applicable during S&M activities.				
Facility-specific	1. Remove Special Nuclear Material (SNM) inventory from buildings. <u>Description:</u> PFP currently stores significant quantities of SNM in the PFP vaults. All of this material must be transferred to alternate approved storage location(s) prior to completion of the PFP transition. A walk down around the structure will be performed to verify the stored SNM has been removed.	X		
Facility-specific	2. Remove structures, equipment, piping, ducting etc. above the foundation/slab. <u>Description:</u> This end point includes activities to complete the structures' dismantlement to the slab/foundation. A walk down will be conducted to verify removal of the structure and internal equipment (building and equipment is gone, equipment connecting building to building is gone).	X		
Facility-specific	3. Cleanout or remove equipment, piping, ducting etc. from accessible below-grade spaces such that the remaining equipment, piping, ducting etc. could be dispositioned as low-level waste as part of the building rubble during the final remediation of the PFP Zone. And, if needed, satisfy the end state criteria for the Central Plateau. This criteria applies to 234-5Z Tunnels, 241-Z Cells, 241-Z-RB Valve Room, 291-Z, 216-Z-9 Control Room, and 243-ZA Tank Pit. <u>Description:</u> This end point includes activities to complete the removal of transuranic waste (TRU) (or decontaminate to low-level waste criteria) of plutonium-contaminated equipment, piping, ducting, etc. A walk down combined with work package and radiological survey data reviews will be conducted to verify removal or decontamination to low-level waste criteria of the plutonium contaminated equipment, piping, ducting, etc. prior to sealing the space (refer to criteria 17).	X		
Facility-specific	4. Isolate/seal ventilation ducting at building boundaries (foundation/slab/grade). <u>Description:</u> Ventilation ducting exiting the structures' boundaries will be plugged/capped or otherwise isolated to prevent material from both entering and exiting the remaining items. A walk down of the structure will be performed to verify ducting isolation.	X		Additional isolation may be required if ductwork is exposed after slab removal.

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Facility-specific	<p>5. Buried piping that enters/exits a building will be flushed or allowed to drain to minimize hazardous constituents prior to capping/ isolating. All recovered liquids will be dispositioned through approved methods.</p> <p><u>Description:</u></p> <ul style="list-style-type: none"> Underground drain lines and piping associated with sanitary services (water, storm drains, and sewer) will be drained. No flushing will be performed. Abandoned underground drain lines and pipes to cribs, ditches, retention basins, and underground tanks (e.g. 241-Z-361 Tank, 216-Z-8 Tank, etc.) will be checked for liquids and drained, if needed, at the lowest point accessible from within buildings (e.g. lines will be checked/drained from inside 234-5Z Tunnels, 241-Z Cells, 241-Z-RB Valve Room, etc). No flushing of these lines will be performed due to prohibitions associated with provisions of the State Waste Discharge Permit No. 4508. Drain lines and pipes from process facilities to 241-Z, not associated with the 241-Z TSD permit, will be flushed to minimize hazardous constituents. However, flushing will not be performed if the line is a failed line or it is determined that flushing creates a greater hazard to worker safety or the environment than would leaving the line as-is for action during the final remediation of the PFP Zone. Lines that are not flushed will be checked for liquids and drained, if needed, at the lowest point accessible from within 241- Z. Drain lines that are part of the 241-Z TSD will be dispositioned as part of the RCRA closure plan's required actions. Lines will be flushed to minimize hazardous constituents. However, flushing will not be performed if the line is a failed line or it is determined that flushing creates a greater hazard to worker safety or the environment than would leaving the line as-is for action during follow-on remediation of the PFP Zone. Lines that are not flushed will be checked for liquids and drained, if needed, at the lowest point accessible from within 241-Z. Drain lines and pipes from process and process support facilities to 243-Z/ZA will be flushed to minimize hazardous be constituents. All other underground drain lines and pipes will be drained at the facility boundary prior to capping. 	X		<p>Additional isolation may be required if piping is exposed after slab removal.</p> <p><i>[Note: State Waste Discharge Permit ST-4508 has been superseded by ST-4511. The prohibition on flushing remains.]</i></p>

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Facility-specific	6. Isolate/seal drain lines (including floor drains) at building boundaries (foundation/slab/grade). <u>Description:</u> Process piping and drains exiting the structures' boundaries will be plugged/capped or otherwise isolated to prevent material from both entering and exiting the remaining pipe. A walk down of the structure will be performed to verify piping isolation.	X		
Facility-specific	7. Isolate/seal vents and penetrations to the environment. <u>Description:</u> In addition to ventilation ducting and piping, items may exit the facility boundary and require isolation. These items will be plugged/capped or otherwise isolated to prevent material from both entering and exiting the remaining items. A walk down of the structure will be performed to verify isolation.	X		
Facility-specific	8. Identify/label remaining tubing/piping/ ducting/drain lines containing radiation/contamination. <u>Description:</u> Tubing/piping/ducting remaining after transition & dismantlement will be documented and provided to the oncoming project/contractor. Labeling will be done in accordance with approved site procedures.		X	Information about contamination will be collected throughout the D4 process. This endpoint will be completed after slab removal, as removal of embedded or buried piping, tubing, ducting, drain lines, and ventilation ducting may be completed during slab removal.
Facility-specific	9. Obtain characterization data for remaining tubing/piping/ducting/drain lines and ventilation ducting. <u>Description:</u> Characterization data will compiled utilizing process knowledge in cases where that knowledge is likely to bound the remaining condition. When process knowledge will not bound the remaining condition, samples will be obtained with the analysis included in the data package placed in the completion package files. Process knowledge will be used to identify analytical analyses to be performed on the samples obtained.		X	Characterization data will be developed throughout D4 process. Final characterization reporting for items remaining after demolition will be developed after slab removal.
Facility-specific	10. Verify remaining plutonium in the below grade/buried systems (e.g. ducts, drain lines, etc.) does not pose a significant security risk nor does it pose a potential for criticality. <u>Description:</u> This end point addresses two concerns. The first is the need to eliminate significant security risks with the second being to eliminate any potential of a criticality. To complete this end point, material will be removed or remediated as required to preclude the potential of criticality or significant security risk. Any remaining material shall be designated as waste or contamination.	X		

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Facility-specific	11. Conduct housekeeping activities, remove and excess/dispose unattached materials and equipment. <u>Description:</u> A walk down of the structures will be conducted prior to the seal/cover/fill being installed to verify loose materials have been removed. This end point applies to both above grade and below grade spaces.	X		
Facility-specific	12. Remove portable and loose equipment/ piping within the structures boundary (inside the building structure but below grade). <u>Description:</u> This end point includes activities to complete the interior stabilization and demolition (if required) of below grade spaces (e.g. 234-5Z Tunnels, and 291-Z). A walk down will be conducted to verify removal of the portable and loose internal equipment (equipment is gone, building shell and fixed equipment remains).	X		
Facility-specific	13. Fire extinguishers, radioactive sources from exit signs and smoke detectors, and emergency lantern batteries are removed from inside the below grade structures and reused/disposed in accordance with site procedures. <u>Description:</u> Radioactive sources from exit signs and smoke detectors, fire extinguishers, and emergency lantern batteries contain hazardous materials and therefore are removed. A walk down is conducted to verify the removal of the previously identified items.	X		
Facility-specific	14. Remove/reuse/excess/dispose unused chemicals. <u>Description:</u> This end point ensures the removal and disposition of stored chemicals. A walk down of the structure will be performed to verify stored chemicals have been removed.	X		
Facility-specific	15. Stabilize below grade spaces in buildings to preclude release of contamination and structural collapse thereby eliminating the need for surveillance and maintenance entries. <u>Description:</u> This may include application of a fixative to the walls, ceiling, floors, equipment, piping, ducting, etc. as well as of any exposed soil. Additionally, a structural assessment will be performed on the cover slab. If structural integrity is questionable, then the space may be backfilled and/or the existing cover slab reinforced.	X		
Facility-specific	16. Remove/fix/contain radioactive contamination. <u>Description:</u> This end point ensures the project has mitigated the potential for contamination migration. A review of the structures' final radiological survey report and map will be conducted to verify mitigation of contamination areas has been complete.		X	Contamination control will be conducted throughout the D4 process; final radiological surveys and activities to remove/fix/contain contamination will be conducted after all demolition and final stabilization are complete.

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Facility-specific	17. Seal structure foundation/slab (or roof in the case of 291-Z) with material having a minimum twenty year life with minimal maintenance. <u>Description:</u> It is expected the remaining foundation/slab will remain for several years. A contamination control cap may be installed to inhibit the potential for radiological or hazardous material migration. In the case of 291-Z, 234-SZ, and 216-Z-9 this includes sealing below-grade access doors and backfilling the stairwells and applying a contamination control cap over the stairwells at grade level. When finished, entry to below-grade spaces will be impossible.		X	Stabilization will be conducted after above grade structures are removed; final stabilization for the site will be established following slab removal.
Facility-specific	18. Verify that the portions of the remaining slab exposed to the weather are free of radiological contamination (contamination may be fixed and below a contamination control cap) to ensure contamination will not migrate to the environment during the surveillance and maintenance phase. <u>Description:</u> A final radiological survey will be conducted and the results reviewed. Any identified exposed radiological contamination will be removed or fixed and covered with a contamination control cap.		X	Radiological surveys and application of contamination control measures will occur throughout the D4 process. Final radiological surveys on remaining exposed slabs and stabilization of the area will occur following slab removal.
Facility-specific	19. Perform radiological survey and post radiological conditions in accordance with site radiological requirements. <u>Description:</u> A walk down will be conducted with the final radiological survey to verify postings are in compliance with site procedures.		X	Radiological surveys and posting will occur throughout the D4 process. Final radiological surveys and postings will occur following slab removal.
Facility-specific	20. Remove/dispose of non-hazardous, radioactive, hazardous, and mixed waste in accordance with approved waste handling procedures and regulatory requirements. <u>Description:</u> A final review of waste handling and disposal paperwork will be conducted to validate compliance.		X	Waste generated as a result of above-grade structure removal will be removed pre-transition. Additional waste will be generated/removed during and after slab removal.
Facility-specific	21. Slab is labeled/posted for radiological conditions (dose/contamination) and industrial hazards in accordance with approved site procedures. <u>Description:</u> After the structures' end point condition is met, cognizant personnel will perform an audit to verify site required postings are in place. This audit may be conducted to verify there are not any postings if none are required.		X	Areas may be re-posted following slab removal if conditions change. Final PFP Complex conditions will be evaluated in Complex-wide criteria 42 & 43.

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Complex-wide criteria 22-45 apply to the general PFP yard/grounds or to the PFP Complex as a whole. Some of the endpoints that relate to specific physical structures can be achieved as part of above-grade structure and below-grade component removal and are designated as applicable to pre-transition activities. Many of the complex-wide criteria involve components that will continue to be used through slab removal, require a final complex-wide walkdown that will be conducted after slab removal and final site stabilization, or require reports or documentation that will become part of the final site turnover package that will be completed after final site stabilization activities have been completed. These are designated as applicable during S&M.				
Complex-wide	22. Remove miscellaneous above-grade structures/materials (e.g. camera towers, security monitoring systems, con ex boxes, lay down yards, guard pill boxes, staging area shelter, dumpsters, etc.). <u>Description:</u> To meet the project objective, above grade structures/ materials will be removed. Removal of these miscellaneous structures and materials will be verified by a PFP Complex walk down.		X	Inactive fixed structures will be removed as part of the above-grade structure removal. Active fixed structures (such as fire hydrants) and equipment (such as storage containers, dumpsters, and waste boxes) used to support slab removal and site stabilization activities will remain until they are no longer needed.
Complex-wide	23. Remove the inner fence to alleviate the collection of tumbleweeds. <u>Description:</u> The exclusion area fence is a known tumbleweed accumulation point. One fence will be removed to limit the need to remove the collected tumbleweeds.	X		
Complex-wide	24. Post and isolate below grade systems and building foundations/slabs with subsurface void areas to prohibit vehicle traffic. <u>Description:</u> Signs will be posted over below grade voids unable to support vehicle traffic. A review of post demolition drawings will identify the locations requiring postings. A walk down will be conducted to verify proper postings are in place.		X	While areas will be posted, as needed, throughout the D4 process, final postings, review of post-demolition drawings, and final walkdown will occur following completion of slab removal as part of final site stabilization.
Complex-wide	25. Isolate/seal manhole covers to prevent rain water/run off entering liquid and inhibiting personnel access to eliminate the confined space. <u>Description:</u> Manhole covers will be sealed to inhibit water intrusion. The manhole covers will be secured in place to prevent personnel access and allow removal from confined space listings.	X		
Complex-wide	26. Document compliance with confined space program for inclusion in the transition & dismantlement completion package. <u>Description:</u> A qualified representative will walk down the PFP Complex and document compliance with site confined space requirements.		X	While individual confined spaces may be closed throughout the D4 process, documentation for the final turnover package will occur following completion of slab removal as part of final site stabilization.
Complex-wide	27. Document compliance with the site asbestos program for inclusion in the transition & dismantlement completion package. <u>Description:</u> A qualified representative will walk down the PFP Complex and document compliance with site asbestos requirements.		X	While asbestos inspections and assessments will occur for individual facilities throughout the D4 process, the final assessment to document compliance for the turnover package will occur following completion of slab removal as part of final site stabilization.

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Complex-wide	28. Verify waste accumulation areas are eliminated. <u>Description:</u> Document that waste accumulation areas have had stored waste removed and that documentation has been submitted to reflect that waste is no longer being stored/staged in the identified areas. A copy of the paperwork reflecting the cessation of active use will be placed into the completion package files.		X	Waste accumulation areas will continue to be in use until after slab removal is complete.
Complex-wide	29. Isolate the PFP Complex electrical supply at a point minimizing electrical dead legs. <u>Description:</u> Electricity will be isolated from the PFP Complex. Electrical system modifications may be required to continue to provide power to non-PFP systems located within the complex (e.g. lift station). Isolation will be done to limit the isolation points and electrical dead legs. Drawings will be updated and work packages and essential drawings will be reviewed to verify they reflect the electrical isolation.	X		Temporary power supplies will be used, as needed, throughout the D4 process after isolation of the normal electrical supply has occurred.
Complex-wide	30. Isolate the PFP Complex water supply, at a point minimizing dead legs, and drain to the extent possible utilizing existing configuration. <u>Description:</u> Water will be isolated from the PFP Complex. Water system modifications may be required to continue to provide water to non-PFP systems located within the complex. Isolation will be done to minimize the number of isolation points and dead legs. Drawings will be updated and work package(s) and essential drawings will be reviewed to verify they reflect the water isolation.		X	Water supply will be needed throughout the D4 process and slab removal. Isolation of the water supply will occur after slab removal is complete.
Complex-wide	31. Backfill the PFP Complex specific septic tanks. <u>Description:</u> Septic tanks associated with the PFP Complex will be backfilled prohibiting further use. Identified septic tanks are 2607-Z, 2607-Z1, and 2607-WA. Ownership of 2607-WB will be transferred to the landlord organization since it is associated with the mobile office trailers located outside the PFP fences and are not within the scope of this project.	X		Note that 2607-WA is outside the outer security fence and will continue to be actively used after completion of the PFP Closure Project.
Complex-wide	32. Remove the PFP Complex specific above grade steam lines. <u>Description:</u> Steam lines will be removed were they run above grade inside the outer PFP fence to prevent the potential insulation degradation. All loose ends of the steam line will be properly encapsulated to protect any remaining asbestos insulation. Steam lines will be properly supported to eliminate industrial hazards.	X		
Complex-wide	33. Remove the PFP Complex specific utility poles. <u>Description:</u> Unused/unneeded utility poles associated with only the PFP Complex will be removed and disposed.	X		

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Complex-wide	34. Remove vegetation from radiologically contaminated areas. <u>Description:</u> Vegetation will be removed from contaminated areas and the area will be sprayed to inhibit new vegetation growth.		X	While individual areas with vegetation may be removed throughout the D4 process, the final sweep for vegetation and spraying will occur following completion of slab removal as part of final site stabilization.
Complex-wide	35. Grade soil to promote drainage away from remaining below-grade structures. <u>Description:</u> The soil shall be graded to promote drainage away from below grade structures utilizing good management practices. The distance away from the structure and slope angle will be evaluated for each below grade structure with underground ducting and other below grade structures taken into consideration.		X	While some soil grading may be conducted throughout the D4 process, final soil grading will occur following completion of slab removal as part of final site stabilization.
Complex-wide	36. Complete soil stabilization to mitigate dust/erosion. <u>Description:</u> Where structure removal or grading leaves newly exposed soil, the area will be stabilized. Review of work packages and site walk downs will be completed to verify the completion of this end point.		X	While some soil stabilization to mitigate dust/erosion may be conducted throughout the D4 process, final soil stabilization activities will occur following completion of slab removal as part of final site stabilization.
Complex-wide	37. Post locations of below grade equipment (e.g. buried ducting). <u>Description:</u> Below grade equipment remaining after transition and dismantlement will be posted/documented and provided to the oncoming project/contractor.		X	While below-grade equipment posting will occur throughout the D4 process where needed, final documentation for the turnover package will occur following completion of slab removal as part of final site stabilization.
Complex-wide	38. Transfer ownership of PFP WIDS Sites to the Central Plateau S&M organization. <u>Description:</u> Waste Information Data Systems (WIDS) sites associated with the PFP Complex will be transferred to the oncoming project/contractor. The WIDS sites database will be updated to reflect the condition as of transfer to the S&M phase.	X		Existing WIDS sites will be transferred to S&M during transition of the complex to S&M. The discovery site process will continue following slab removal in accordance with TPA procedure MP-14. This may result in identification of new WIDS sites.
Complex-wide	39. Develop and issue an EE/CA to evaluate remediation alternatives for follow on PFP site disposition and follow-on remedial action. <u>Description:</u> Develop and issue an EE/CA to evaluate remediation alternatives for subsequent PFP site disposition and closure. An Action Memorandum will be issued by RL.	X		

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Complex-wide	<p>40. Transfer ownership of Tank 241-Z-361 to the Central Plateau S&M organization.</p> <p><u>Description:</u> Tank 241-Z-361 will be treated like other underground waste sites at PFP. To support the S&M of the tank the following information actions will be provided to the S&M organization:</p> <ul style="list-style-type: none"> • An EE/CA will be performed to evaluate remediation options and an Action Memorandum will be issued. • The structural integrity of the tank will be verified. • The HEPA filter(s) will be tested and shown to be compliant 	X		
Complex-wide	<p>41. Provide administrative/physical controls to prevent unauthorized access to unauthorized storage of hazardous/radioactive materials.</p> <p><u>Description:</u> The intent of this end point is to prevent post transition and dismantlement accumulation of materials. A single fence will remain around the PFP Complex with access gates locked. The keys will be controlled by PFP Complex personnel and subsequently transferred to the S&M organization to prevent unauthorized access.</p>		X	Activation of final site controls will occur following slab removal and completion of final radiological and industrial hazards surveys and postings associated with endpoints 42 and 43.
Complex-wide	<p>42. Document radiological conditions in final survey report for inclusion in the transition & dismantlement completion package.</p> <p><u>Description:</u> A final radiological survey will be conducted and documented in accordance with a survey plan.</p>		X	This is a compilation for the turnover package of facility-specific radiological surveys to be conducted for individual facilities in accordance with facility-specific endpoint 19.
Complex-wide	<p>43. Document remaining industrial hazards and compliance with site industrial safety requirements for inclusion in the project turnover package.</p> <p><u>Description:</u> A safety representative will walk down the remaining structure and document compliance with site requirements and remaining hazards.</p>		X	This is a compilation for the turnover package of facility-specific industrial hazards evaluations to be conducted for individual facilities in accordance with facility-specific endpoint 21.
Complex-wide	<p>44. Utilizing current process knowledge and historic information, document amount and location of remaining radiological issues/hazardous substances/dangerous wastes for inclusion in the project turnover package.</p> <p><u>Description:</u> Remaining hazardous substances/dangerous wastes will be documented and placed into the completion files. Utilization of historic knowledge of spills and process upsets will be used to develop the document.</p>		X	The final report on the location of remaining radiological issues, hazardous substances, and dangerous wastes will be developed when the site configuration is established after slab removal as part of final site stabilization.
Complex-wide	<p>45. Project turnover package items are provided: Final radiological surveys, work plans/packages, description/photos, modified configuration management documents, historical information, compliance documents that define the condition at completion of the project.</p> <p><u>Description:</u> The items identified in the end point will be compiled and placed in the completion package files.</p>		X	Identified items will be gathered throughout the D4 process; the final turnover package will be completed after slab removal and final site stabilization are completed.

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Administrative criteria 1-17 generally involve documentation of conditions or compliance with the PFP Complex as a whole. Many involve reports or documentation that will be part of the final turnover package after structures are removed, and slab removal and final site stabilization are completed. These criteria are designated as applicable during the S&M period. A few involve documentation of specific items that are already completed or can be completed as part of the above-grade structure removal and are designated as applicable to pre-transition activities.				
Admin	1. Complete/close outstanding audit findings and occurrence reports. <u>Description:</u> A review of facility and site action tracking systems and open occurrence reports will be conducted and items will be addressed and closed.		X	Audits will continue throughout the slab removal period which may result in findings to be closed. The potential for occurrence reports exists as long as D4 activities are being conducted.
Admin	2. Document configuration management performed in accordance with site standards. <u>Description:</u> The final configuration of the PFP Complex will be reviewed against controlled drawings to verify proper incorporation of structure and utility modifications/isolations.		X	The final review of site configuration against controlled drawings will be conducted in support of the turnover package development following slab removal and final site stabilization.
Admin	3. Provide essential drawings and a list of all facility drawings necessary for S&M. <u>Description:</u> This end point will be done in conjunction with the development of the draft S&M Plan. The essential drawing list will be updated to reflect the condition of the PFP Complex area at the end of the project. A separate list containing both the essential drawing and those required to support S&M.		X	The final documentation of essential and facility drawings will occur following slab removal and final site stabilization.
Admin	4. Document remaining industrial hazards and compliance with industrial safety requirements. <u>Description:</u> This end point compiles the individual end points into one report reflecting the remaining industrial hazards.		X	The final documentation of industrial hazards will be developed in conjunction with complex-wide criterion 43.
Admin	5. Document compliance with confined space program. <u>Description:</u> This end point compiles the individual end points into one report reflecting the remaining confined spaces.		X	Documentation of the final list of confined spaces and disposition of closed confined spaces will be developed in conjunction with complex-wide criterion 26 for the final turnover package following slab removal and final site stabilization.
Admin	6. Document compliance with the asbestos program. <u>Description:</u> The post demolition condition of the PFP Complex will be assessed for compliance with the site asbestos program.		X	Documentation of the final assessment of the PFP asbestos conditions will be developed in conjunction with complex-wide criterion 27 for the final turnover package following slab removal and final site stabilization.

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Admin	7. Document amount and location of remaining hazardous substances and/or dangerous wastes. <u>Description:</u> This end point compiles the individual end points into one report reflecting the remaining hazardous substances/dangerous wastes.		X	The final report documenting hazardous substances and/or dangerous wastes remaining in the PFP Complex will be included in the turnover package developed following slab removal and final site stabilization.
Admin	8. Complete and provide current Fire Hazards Analysis (FHA). <u>Description:</u> An FHA will be completed reflecting the end point condition of the PFP Complex.		X	The final FHA reflecting the endpoint condition of the PFP Complex will be included in the turnover package developed following slab removal and final site stabilization.
Admin	9. Transfer facility physical property records. <u>Description:</u> The property records for the PFP Complex will be updated as the transition & dismantlement effort removes excess and or disposes of property.		X	The final update of property records will be completed following slab removal and final site stabilization.
Admin	10. Provide a Surveillance & Maintenance Plan (S&M). <u>Description:</u> The transition & dismantlement project/contractor has the historic and current knowledge of the PFP Complex. Therefore, they will develop a S&M Plan for the Surveillance and Maintenance organization. The oncoming project/contractor has the responsibility to release the S&M Plan under their document release procedures.	X		
Admin	11. Provide a current/updated building emergency plan. <u>Description:</u> The PFP Complex building emergency plan will be updated (or cancelled) to reflect the end point condition.		X	The Building Emergency Plan will be updated or cancelled after slab removal.
Admin	12. Provide S&M procedures and files. <u>Description:</u> Procedures utilized by the transition & dismantlement project/contractor to conduct surveillance and maintenance at the end of the project will be copied and placed in the completion package files.		X	Final procedures for S&M will be included in the turnover package developed following slab removal and final site stabilization.
Admin	13. Provide identified regulatory commitments and regulatory documentation. <u>Description:</u> The transition & dismantlement project/contractor has the historic and current knowledge of the PFP Complex existing commitments and documentation. As such, the transition & dismantlement project/contractor will compile outstanding commitments and documentation to support the S&M organization to complete the commitments/documentation. These along with recently (within the last year of the project) completed commitments documentation (closure/completion letters) will be included in the completion package files.		X	The final list of regulatory commitments and documentation will be included in the turnover package developed following slab removal and final site stabilization.
Admin	14. Transfer classified documents to repository. <u>Description:</u> All classified documents will be removed from the PFP Complex and placed in a site approved repository.	X		

Type	Endpoint Criteria	Applicability		Comments
		Pre-transition	During S&M	
Admin	15. Verify transition and dismantlement completion package contents are complete. <u>Description:</u> This is a final review of the document log for the completion package files. This will ensure the intended documentation provided in the files have not been removed or checked out and not returned.		X	The final turnover package will be completed and reviewed following slab removal and final site stabilization.
Admin	16. Provide existing regulatory permitting documentation. <u>Description:</u> The remaining regulatory permits and supporting documentation will be compiled and provided to the S&M organization.		X	The final list of regulatory permits will be included in the turnover package developed following slab removal and final site stabilization.
Admin	17. Compile available historical data including chemical and plutonium spills, holdup, releases, and constituents associated with building processing to support final remediation. <u>Description:</u> This end point is designed to capture useful information on the remaining structures/systems that has been kept by facility personnel (i.e. engineers, health physics, operations, etc.) and is not available through other sources prior to their leaving the facility. This data will be compiled and placed in the completion package files. Documentation already maintained by the Hanford site document control system and/or libraries will be referenced only.	X		



Plutonium Finishing Plant Closure Project

Pan J Debris Reaction and Path Forward



ch2m.
SLM

Issue

- On September 28th, a chemical reaction was noted on PRF Canyon floor debris transferred to a collection tray the previous Friday.
 - Reaction was slow to present and continued for two additional days before receding and eventually re-hardening.
 - IH monitoring did not identify any exposure concerns or increased temperature of the expanding material.



Key Compensatory Measures

- Impounded all containerized floor debris at the facility
- Developed Recovery Plan to manage condition
- Initiated visual inspection of floor debris drums
 - Some (not all) additional J-Pan material was observed to have reacted
- Returned all J-Pan material to the canyon
- Contracted PhD Chemist and former PRF Process Engineer
- Developed sampling and analysis plan
- Administratively prohibited application of glycerin contain fixatives on bulk materials



The Reaction & Planned Analysis

- Nitrates present in the J-Pan floor debris reacted with glycerol in the selected fogging agent (ETGS)
 - Chemists have ruled out creation of shock sensitive reactionary byproducts
 - NO_x is the primary gaseous byproduct of reaction, confirmed with IH monitoring and anecdotally with plastic bag discoloration and degradation
- J-Pan has some unique properties, compared to the other 14 pans
 - Highest plutonium content by volume (chemical form of plutonium in the Canyon is $\text{Pu}(\text{NO}_3)_3$ and $\text{Pu}(\text{NO}_3)_4$)
 - Most likely location where many other nitrates would be present, including ANN, $\text{Mg}(\text{NO}_3)_2$, $\text{Ca}(\text{NO}_3)_2$, $\text{Fe}(\text{NO}_3)_3$, $\text{H}_4\text{N}_2\text{O}_4$
 - Limited “slurping” during facility operations
 - Only Pan where a hardened material was noted (it was that hardened material that reacted)
- First 8 floor debris samples shipped to 325 Building on November 19th
 - PNNL analyzing for phosphates, nitrates, chlorides, fluorides, plutonium, americium, uranium, metals, corrosivity, and organics
 - Preliminary results beginning on 12/11; Organic results starting on 01/15
 - Sample of ETGS being shipped offsite for constituent analysis
- Analytical data may allow taking some of the floor debris off the treatment path.

“Treatment” Options

- Three primary treatment options exist
 - Furnace runs
 - Blend and immobilize in grout
 - Wash/saturate in water and solidify
- PFP can perform treatment under CERCLA
 - Prefer to minimize/eliminate treatment at PFP
- Evaluating PFNW and PNNL (325) as treatment options for containerized materials
 - PFNW has the capability and has performed grout immobilization before
- Grout option preferred
 - Evaluating blend recipe to ensure H₂ generation within WIPP WAC constraints
 - PFP FPD coordinating information exchange on blend recipe and supporting calculations with WIPP prior to treatment

Path Forward – Prepare to Treat all Floor Debris

- Developed new waste packaging/handling instructions for containerizing J-Pan material
 - J-Pan load out underway
- All non J-Pan material from Canyon floor is in drums
- Move Non J-Pan containerized floor materials into outdoor Limited Area Storage
 - H Pan drum stored outside since July showed no indication of heat-driven reaction
 - Additional drum inspections to be coordinated with shipment to CWC
- Stage J-Pan drums in RADTU and PRF
- Arrange for interim storage of PRF floor debris drums in 2404-WC (climate controlled)
 - Will require a Limited Area and J-Pan drums likely require a 0063 Exemption
- Coordinate with Material Control and Accountability to obtain RL authorization to ship material to PFNW
- W&FMP to coordinate shipment of drums to PFNW for immobilization in grout
 - Treatment of all floor materials (100+ drums) will take over two years based on their license restrictions and other material queued for PFNW treatment