

2736Z Complex Demolitions Report

As Left Characterization

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

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788



P.O. Box 1600
Richland, Washington 99352

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Change Control Record		
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Revision	Description of Change – Replace, Add, and Delete Pages	Month/Year
0	Initial release of document describing demolition of the 2736Z, 2736ZA, 2736ZB, 2736ZC, 2721Z, and 2731ZA, including stacks 296Z005, 296Z006, and 296Z007. Also addresses room 637A attached to 2736ZB.	November 2017

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Terms

ACM	asbestos-containing material
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
PFP	Plutonium Finishing Plant
S&M	surveillance and maintenance

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1 Introduction

The purpose of this report and addendum is to provide information that will support the following activities:

- Document that the applicable actions required by HNF-22401, *Plutonium Finishing Plant (PFP) Complex End Point Criteria* (also referred to by document number NMS-16404), have been met.
- Prepare an overall turnover package documenting the as-left condition of the Plutonium Finishing Plant (PFP) site that will be transitioned to surveillance and maintenance (S&M).
- Develop a removal action report for the PFP *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)* removal action.
- Provide reference information for follow-on activities associated with the site.

This report provides the as-left condition of the 2736Z Complex and compiles information relating to endpoint compliance consistent with HNF-22401.

Located in the 200 West Area of the Hanford Site in southeastern Washington State, the 2736Z Complex was part of the PFP Complex, consisted of six structures, and was designed to store and package special nuclear material. The 2736Z Complex was deactivated under DOE/RL-2005-14, *Removal Action Work Plan for the Plutonium Finishing Plant Above-Grade Structures: Facility Deactivation*. Demolition work was implemented according to DOE/RL-2005-13, *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action*, and DOE/RL-2005-15, *Removal Action Work Plan for Plutonium Finishing Plant Above Grade Structures Ancillary Facility Demolition*, as modified by TPA-CN-255, *Tri Party Agreement TPA Change Notice Form TPA-CN-255 DOE/RL-2005-15, Revision 0, Removal Action Work Plan for the Plutonium Finishing Plant Above-Grade Structures: Ancillary Facility Demolition*.

Demolition of the 2736Z Complex was initiated in 2011 and completed in 2012. The actions taken to complete deactivation, decontamination, decommissioning, and demolition and comply with the endpoint criteria defined in HNF-22401 were documented in the associated work packages, but the sites were never formally transferred to the S&M organization. HNF-22401 requires that pertinent information about the remaining slab be part of the final turnover package for transition to S&M. The purpose of this document is to compile that information in preparation for transfer to S&M. Endpoint compliance with HNF-22401 is documented in the addendum to this report.

2 Building Descriptions

The 2736Z Complex (Figure 1) was located at the southwest area of the PFP Complex and consisted of the Plutonium Storage Building (2736Z), the Plutonium Storage Ventilation Structure (2736ZA), the Plutonium Storage Support Building (2736ZB), the Cargo Restraint Transport Dock (2736ZC), the Emergency Generator Building (2721Z), and the Container Storage Building (2731ZA). Ventilation stack 296Z006 was located in the 2736ZA Building, and the 2736ZB Building had two ventilation stacks, 296Z005 and 296Z007.

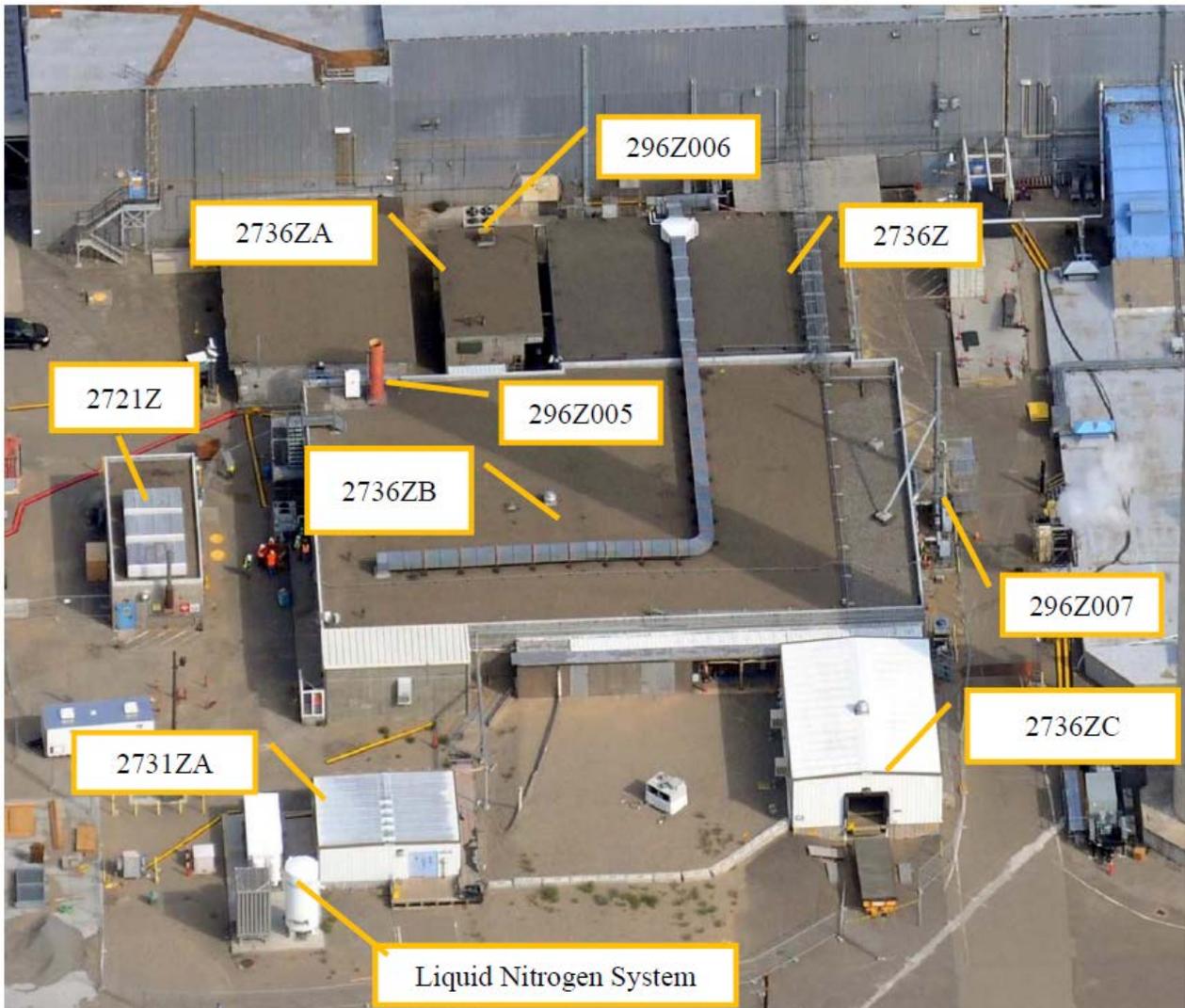


Figure 1. 2736Z Complex

2.1 2736Z, Plutonium Storage Building

The 2736Z Building (Figure 2) was the primary PFP plutonium storage building and was located on the south side of the 234-5Z Building. The 2736Z Building also abutted the 2736ZB Building. Constructed in 1971, the 2736Z Building was a 65 by 56 ft one-story structure constructed of reinforced concrete. It contained four vaults for storing plutonium product and scrap.



Figure 2. 2736Z Building Entrance

2.2 2736ZA, Plutonium Storage Ventilation Structure

Constructed in 1971, the 2736ZA Building (Figure 3) housed the ventilation equipment for the 2736Z Building and was a one-story facility ~40 by 22 ft. Ventilation stack 296Z006 was an integral part of the structure (Figure 1).



Figure 3. 2736ZA Building Entrance

2.3 2736ZB, Plutonium Storage Support Facility

The 2736ZB Building was constructed in 1982 to support 2736Z Building storage vault operations and was connected to the south side of the 2736Z Building. 2736ZB was a one-story building ~132 by 90 ft, primarily constructed of reinforced concrete. Ventilation stack 296Z005 was an integral part of the structure (Figure 4). The building underwent extensive modification in 2001, including the addition of a new ventilation stack (296Z007; Figure 9), to support processing and package fissile residue materials for offsite shipment.



Figure 4. 2736ZB Building

An annex (Figure 5) on the north wall of room 637 of the 2736ZB Building that housed supporting electrical equipment was referred to as 637A.



Figure 5. Room 637A Annex to 2736ZB

2.4 2736ZC, Cargo Restraint Transport Dock

The 2736ZC Cargo Restraint Transport Dock (Figure 6) was constructed in the late 1970s and was an enclosed loading and unloading dock and corridor to the shipping and receiving areas of the 2736ZB Building. The dock was a concrete pad enclosed in a metal building ~48 ft, 6 in. by 32 ft. The 2736ZC provided temporary storage for shipping containers associated with offsite shipping and receiving.



Figure 6. 2736ZC Building

2.5 2721Z, Emergency Generator Building

The 2721Z Building (Figure 7) was constructed in 1979 to house backup emergency diesel electric generators. 2721Z was located immediately west of the 2736ZB Building. 2721Z was 46 by 19 ft and was constructed of poured reinforced concrete walls and floor. 2721Z housed three diesel-driven generators that were used as backup power for the PFP facilities. Fuel to the 2721Z generators was provided by an underground storage tank (2721Z-2) located south of 2736ZB. Removal of the tank was addressed in CWR-PFP-00013, *Miscellaneous Pre-2014 CERCLA Demolitions and Removals*.



Figure 7. 2721Z Building

2.6 2731ZA, Container Storage Building

Also known as the Clean Laundry Building (Figure 8), the 2731ZA provided storage for laundry and equipment. The building was an ~93 by 16 ft steel structure erected on a concrete slab located south of the 2736ZB Building. A liquid nitrogen system (Figure 1) located immediately west of the 2731Z Building provided nitrogen to the 2736ZB Building.



Figure 8. 2731ZA Building

2.7 Emission Stacks

Three emission stacks (296Z005, 296Z006, and 296Z007) were associated with the 2736Z Complex. Stack 296Z005 provided ventilation for the 2736Z Vault and was an integral part of the 2736ZA Building (Figure 1). Stack 296Z006 provided ventilation to and was an integral part of 2736ZB (Figure 1). The 296Z007 stack adjacent to 2736ZB (Figure 9) provided ventilation for the 2736ZB glovebox areas.



Figure 9. 2731ZA Building

3 Preparation and Demolition

Demolition of the 2736Z Complex occurred in two phases. Following decommissioning of the 2736ZB Building, the underground fuel tank (2721Z-2) was removed (Figure 10) in preparation for the demolition of 2721Z. The first phase removed the low-hazard facilities (2721Z, 2731ZA, and 2736ZC), and the final phase addressed the high-hazard facility (2736ZB) and the remainder of the complex (2736Z and 2736ZA, along with stacks 296Z005, 296Z006, and 296Z007).



Figure 10. Underground Fuel Tank Removal

3.1 Decommissioning and Pre-Demolition Characterization

After facility decommissioning, the individual buildings were characterized to prepare for demolition. The following aspects were subject to evaluation for the facility (asbestos, beryllium, and radiological contamination):

- After asbestos removal and abatement, a good faith inspection was performed. At the time of the inspection, the only asbestos-containing material (ACM) remaining was limited to ACM mastic associated with some of the doors in the facilities.
- Only the 2736ZB structure contained radiological contamination of concern. A detailed radiological characterization of 2736ZB prior to final decommissioning and demolition was documented in CHPRC-00921, *Radiological Characterization of the Plutonium Finishing Plant 2736-ZB Building*.
- Potential beryllium contamination associated with the material processed through the 2736ZB gloveboxes was addressed in the issuance of beryllium work permits associated with the demolition work packages CP-10-07668, CP-10-07669, CP-11-0429, and CP-11-0430.
- The structures were evaluated for hazardous constituents using a waste identification process that involved room-to-room walkdowns and identification of items to be addressed. A final evaluation of the overall facility, including reports for the facilities, was documented in internal letter CHPRC-11004430.1, “2736Z Complex and Ancillary Buildings Report for Waste Disposal.”

3.2 Cold and Dark Process

The facility was isolated both electrically and mechanically by work packages CP-11-0429 and CP-11-0430. Remaining hazardous materials and special-handled items were addressed by work package CP-10-07668.

3.3 Demolition and Document Review

Other than a minor issue of a broken pipe that ran to the Treated Effluent Disposal Facility within the demolition boundary, the demolition was uneventful. Some residual contamination remained on the 2736ZB and 2736ZC slabs.

4 As-Left Condition

This chapter summarizes the overall status of and provides pertinent information associated with the site.

4.1 As-Left Description

The facility was left in a clean slab-on-grade condition with all penetrations sealed. Post-demolition, no contamination was identified on the slabs associated with 2721Z, 2731ZA, 2736Z, or 2736ZA. Fixative was applied to areas of contamination on the 2736ZB and 2736ZC slabs, and metal plates were sealed to the slab over the fixed contamination. Figure 11 shows the slabs and location of fixed contamination. Figure 12 shows the as-left condition of the 2721Z and 2736ZB slabs, which were covered with gravel to address walking surface issues.

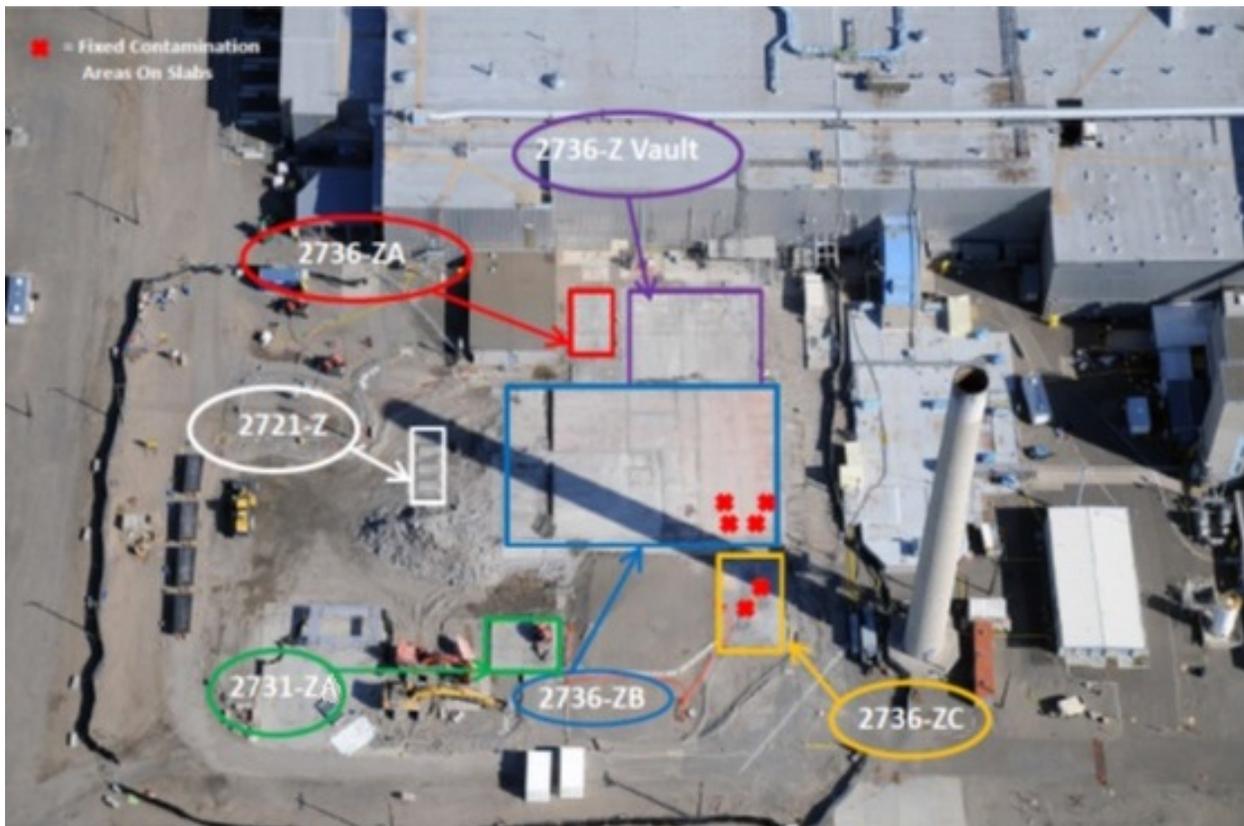


Figure 11. 2736Z Complex Slabs

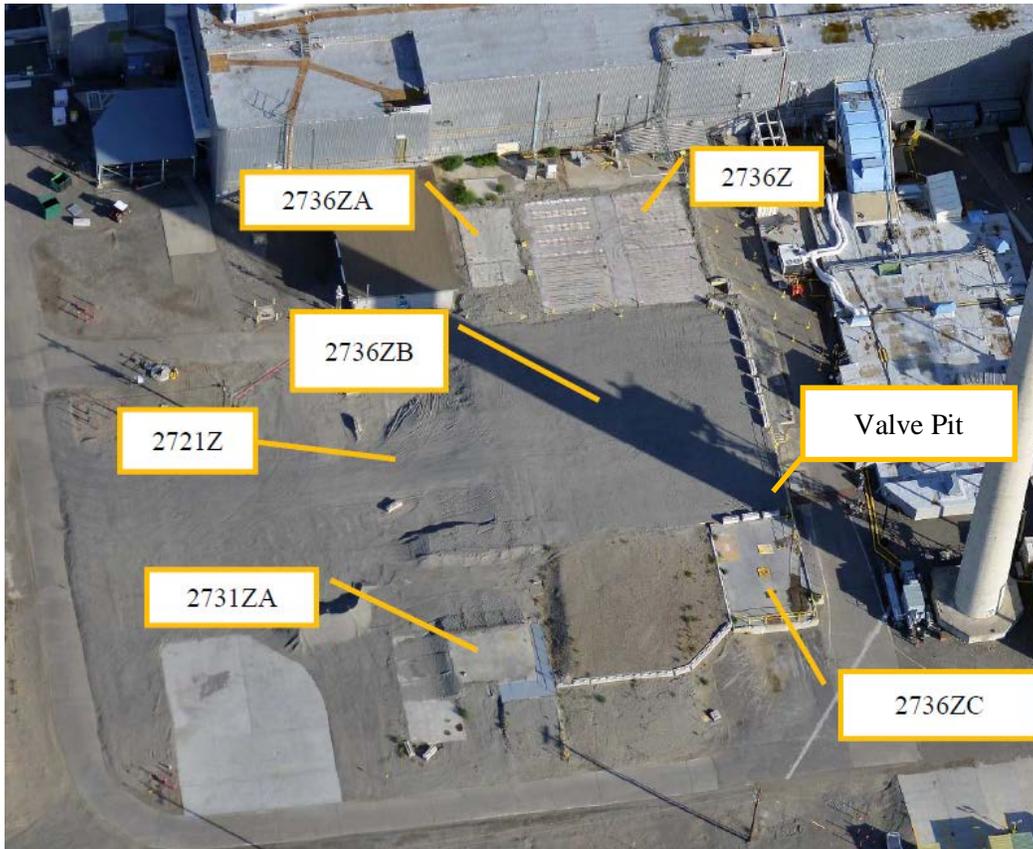


Figure 12. 2736Z Complex As-Left Conditions

4.1.1 Key Documentation and Drawings

No drawings associated with the 2736Z Complex would be deemed “essential” or “support” per current engineering configuration management requirements. The following drawings would be considered useful for any future site remediation activities:

H-2-26650, *Structural Concrete Foundation Plan and Details*, shows the 2736Z slab.

H-2-27966, *Structural Concrete Floor Plan Section & Details*, shows the 2736ZA slab.

H-2-80116, *Structural Foundation Plan and Details*, and H-2-80181, *Piping Plan and Sections*, show the 2721Z and the 2736ZB slabs with the below-grade process line discussed in Section 4.1.3.

H-2-80191, *Piping Plan and Detail*, shows the continuation of the process drain line from 2736ZB to near 241Z.

H-2-80111, *Civil Site Preparation Plan and Details*, shows details of the various below-grade drain piping surrounding the 2736Z Complex that was left in place.

4.1.2 Industrial Safety Hazards

One below-grade void space associated with the 2736Z Complex remains: the valve pit on the walkway on the north side of 2736ZB between the 2736ZB and 2736ZC slabs (Figure 12). Details of the void space are shown on drawing H-2-80116. Figure 13 shows the valve pit under construction in the early 1980s. This confined space, CS28, has been eliminated by restricting access with the placement of gravel fill placed over the manhole cover.



Figure 13. Construction Photograph of the 2736ZB Valve Pit

Electrical vault, confined space CS36, next to 2721Z was filled with gravel and the void space totally eliminated.

South of 2736ZB, confined space CS38 had been erroneously identified as an electrical vault but was actually a drainage cleanout manhole shown on drawing H-2-80111. Access to this space has been eliminated with the placement of gravel fill placed over the manhole cover, eliminating the confined space.

4.1.3 Site Characterization

As shown in Figure 11, small areas of fixed alpha contamination remained on the 2736ZB and 2736ZC slabs. The maximum contamination measured using portable instruments prior to fixing was 4,500 dpm/100 cm² alpha direct and 200 dpm/100 cm² alpha removable (survey BP-1200105).

These areas of fixed contamination were stabilized by painting and were then covered with a steel plate according to work package 2Z-12-05372.

The painted surface areas of the slabs associated with 2736Z and 2736ZA are assumed to contain heavy metal contaminants (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) associated with lead-based paint because they were constructed before 1978. The 2721Z, 2731ZA, 2736ZB, and 2736ZC Buildings were constructed after 1978.

One process waste line (200-W-229-PL) was associated with the 2736ZB facility. Shown on drawing H-2-80181, this line was originally installed to support the decontamination of room 130 in 2736ZB. As part of project W460 in 2001, the decontamination shower was removed from room 130 and the floor drain sealed per engineering change notice 669828.

With the exception of a contamination event in the late 1980s, it is not known if the 2736ZB drain line was ever used for decontamination purposes. Additionally, due to inaccessibility, it is not known if the drain line contains liquid. As shown on drawing H-2-80191, the 200-W-229-PL line originally drained to the 241Z tank system via a tie-in to the 200-W-228-PL drain from the 232Z scrubber cell drain described in CWR-PFP-00011, *232Z Demolitions Report*. This line to 241Z downstream of the two isolation valves shown on drawing H-2-80191 was severed and capped by project C-031H when new drain piping was installed between 234-5Z and 241Z. As described in the 232Z report, water was found in the 232Z drain; from the connection between the two lines near 241Z, it is possible that 200-W-229-PL contains liquid. Based on the nature of activities in room 130 of 2736Z and samples taken in 232Z prior to removing liquid to the extent practical from the line, any liquid in the pipe would be of neutral pH and slightly alpha contaminated (0.1 $\mu\text{Ci/L}$ order of magnitude). It should be noted that polychlorinated biphenyl contamination was detected in the 232Z sample as well.

4.2 Endpoint Objectives

Table 1 discusses 10 measurable objectives (also outlined in Section VI of HNF-22401) that define the goal of clean slab-on-grade as part of the post-demolition document review and walkdown of the site.

Table 1. Clean Slab-on-Grade Objectives

Objective	Status	Comment
1. Above-grade structures are removed.	Met	No comment.
2. Below-grade portions of buildings will be emptied and stabilized.	Met	There was no below-grade portion of the 2736Z Complex. The subgrade void space discussed in Section 4.1.2 was not in the scope of the removal.
3. Buried pipes and ducts will be drained and sealed.	Met	All accessible piping was drained and sealed. As discussed in Section 4.1.3, the decontamination room drain was not accessible.
4. The portion of concrete slab that is exposed to the weather shall be free of dispersible radiological contamination.	Met (subject to change)	Post-demolition, all contamination on the slabs was fixed and stabilized; because slabs are in the 234-5Z and 236Z demolition zone, they will need further evaluation.
5. The exposed surface of the slab shall be free of tripping and puncture hazards.	Met	Post-demolition, most of the area was covered with gravel, eliminating any potential hazards.

Table 1. Clean Slab-on-Grade Objectives

Objective	Status	Comment
6. The exposed surface of the slab shall be suitable for exposure to the weather for at least 20 years.	Met (subject to change)	Post-demolition, all contamination on the slabs was fixed and stabilized; because slabs are in the 234-5Z and 236Z demolition zone, they will need further evaluation.
7. Subsurface radiological areas will be posted per regulations.	Met	Posted as part of the PFP fenced area.
8. All penetrations through the slab (e.g., piping, conduits) shall be sealed with grout or equivalent suitable for exposure to the weather for 20 years.	Met	No comment.
9. All wastes are removed.	Met	No comment.
10. No exposed surface soil contamination areas are allowed.	Met (subject to change)	Post-demolition, all contamination on the slabs was fixed and stabilized; because slabs are in the 234-5Z and 236Z demolition zone, they will need further evaluation.

4.3 Administrative Endpoints

Because the 2736Z Complex is located inside the PFP inner fence in what could be considered a pre-final condition, the applicable administrative endpoints specified in HNF-22401 were evaluated in Table 2 and documented in the following section. This evaluation is intended to support the final overall PFP endpoint administrative requirement evaluation, which will be documented at a later date.

Table 2. Administrative Endpoint Review

Checklist Number	Item ^a	Description ^a	Applicability or Documentation
Admin-1	Complete and close outstanding audit findings and occurrence reports.	A review of facility and site action tracking systems and open occurrence reports will be conducted and items will be addressed and closed.	Not applicable ^b
Admin-2	Document configuration management performed in accordance with site standards.	The final configuration of the PFP Complex will be reviewed against controlled drawings to verify the proper incorporation of structure and utility modifications or isolations.	See Section 4.1.1
Admin-3	Provide essential drawings and a list of all facility drawings necessary for S&M.	This endpoint 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 will contain both the essential drawing and that required to support S&M.	See Section 4.1.1

Table 2. Administrative Endpoint Review

Checklist Number	Item ^a	Description ^a	Applicability or Documentation
Admin-4	Document remaining industrial hazards and compliance with industrial safety requirements.	This endpoint compiles the individual endpoints into one report, reflecting the remaining industrial hazards.	See Section 4.1.2
Admin-5	Document compliance with confined space program.	This endpoint compiles the individual endpoints into one report, reflecting the remaining confined spaces.	See Section 4.1.2
Admin-6	Document compliance with the asbestos program.	The post-demolition condition of the PFP Complex will be assessed for compliance with the site asbestos program.	See Section 4.1.1
Admin-7	Document amount and location of remaining hazardous substances and/or dangerous wastes.	This endpoint compiles the individual endpoints into one report, reflecting the remaining hazardous substances and dangerous wastes.	See Section 4.1.3
Admin-8	Complete and provide current FHA.	An FHA will be completed reflecting the endpoint condition of the PFP Complex.	Not applicable ^b
Admin-9	Transfer facility physical property records.	Property records for the PFP Complex will be updated as the transition and dismantlement effort removes excess and or disposes of property.	Not applicable ^b
Admin-10	Provide an S&M plan.	The transition and dismantlement project contractor has historic and current knowledge of the PFP Complex and will develop an S&M plan for the S&M organization. The oncoming project contractor has the responsibility to release the S&M plan under its document release procedures.	Not applicable ^b
Admin-11	Provide a current, updated building emergency plan.	The PFP Complex building emergency plan will be updated (or cancelled) to reflect the endpoint condition.	Not applicable ^b
Admin-12	Provide S&M procedures and files.	Procedures used by the transition and dismantlement project contractor to conduct S&M at the end of the project will be copied and placed in the completion package files.	Not applicable ^b

Table 2. Administrative Endpoint Review

Checklist Number	Item ^a	Description ^a	Applicability or Documentation
Admin-13	Provide identified regulatory commitments and regulatory documentation.	The transition and dismantlement project contractor has historic and current knowledge of the PFP Complex existing commitments and documentation. As such, the transition and dismantlement project contractor will compile outstanding commitments and documentation to support the S&M organization to complete the commitments documentation. Along with recently (within the last year of the project) completed commitments documentation (closure completion letters), these items will be included in the completion package files.	Not applicable ^b
Admin-14	Transfer classified documents to repository.	All classified documents will be removed from the PFP Complex and placed in a site-approved repository.	Not applicable ^b
Admin-15	Verify transition and dismantlement completion package contents are complete.	This step is a final review of the document log for the completion package files, ensuring that intended documentation in the files have not been removed or checked out and not returned.	Not applicable ^b
Admin-16	Provide existing regulatory permitting documentation.	The remaining regulatory permits and supporting documentation will be compiled and provided to the S&M organization.	Not applicable ^b
Admin-17	Compile available historical data, including chemical and plutonium spills, holdup, releases, and constituents associated with building processing to support final remediation.	This endpoint is designed to capture useful information on the remaining structures and systems that has been kept by facility personnel (i.e., engineers, health physics, and operations) and is not available through other sources prior to staff members leaving the facility. These 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.	See Section 4.1.3

a. Description is originated from HNF-22401, *Plutonium Finishing Plant (PFP) Complex End Point Criteria*.

b. These administrative criteria are not separately evaluated for 2736Z Complex. All criteria will be addressed globally in the turnover package to Central Plateau S&M, and this documents supports that evaluation.

FHA = fire hazards analysis

4.4 Endpoint Documentation

The endpoints applicable to the 2736Z Complex are addressed in Appendix A of CWR-PFP-00006-ADD1, *2736Z Complex End Point Documentation*; supporting documentation is provided in Appendix B.

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