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2904ZA AND 2904ZB Demolition Report

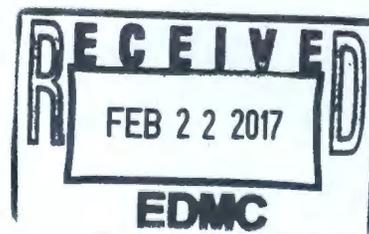
As Left Characterization

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



Approved for Public Release;
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Contents

1	Introduction	1
2	Building Descriptions	3
2.1	2904Z Building.....	3
2.2	2904ZB Building.....	3
3	Demolition Preparation	4
3.1	Characterization.....	4
3.2	Cold and Dark Process.....	5
3.3	Slab-on-Slab Installation.....	6
3.4	Demolition and Document Review.....	7
3.5	Post Demolition Walkdown.....	7
4	As-Left Condition	8
4.1	As-Left Description.....	8
4.1.1	Key Documentation and Drawings.....	8
4.1.2	Radiological and Hazardous Material Characterization.....	8
4.1.3	Industrial Safety Hazards.....	9
4.1.4	Surveillance and Maintenance Considerations.....	9
4.1.5	Regulatory Information.....	10
4.2	Endpoint Objectives.....	10
4.3	Administrative Endpoints.....	11
4.4	Endpoint Documentation.....	13
5	References	14

Figures

Figure 1.	2904ZA Building Before Demolition.....	2
Figure 2.	2904ZB Building Before Demolition.....	2
Figure 3.	2904ZA Building Monitoring Pipe.....	3
Figure 4.	2904ZB Building Sample Pipes.....	4
Figure 5.	2904ZA Slab Prior to Slab on Slab Installation.....	5
Figure 6.	2904ZA Slab May 2016 Conduits Cut and Sealed.....	6
Figure 7.	2904ZB Slab Prior to Slab on Slab Installation.....	6
Figure 8.	2904ZA Slab after Slab on Slab Installation and Conduit Removed.....	7
Figure 9.	2904ZB Slab after Slab on Slab Installation.....	7
Figure 10.	Manholes Z7 and Z9.....	10

Tables

Table 1.	Clean Slab on Grade Measureable Objectives.....	10
Table 2.	Administrative Endpoints.....	11

Terms

ACM	asbestos-containing material
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
DOE	U.S. Department of Energy
FHA	fire hazards analysis
LLW	low-level waste
PFP	Plutonium Finishing Plant
S&M	surveillance and maintenance
TEDF	Treated Effluent Disposal Facility

1 Introduction

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

- Documentation that the applicable actions required by HNF-22401, *Plutonium Finishing Plant (PFP) Complex Endpoint Criteria* (also referred to by document number NMS-16404), have been met
- Preparation of 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)
- Development of a removal action report for the PFP *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)* removal action
- Providing reference information for follow on activities associated with the site.

The 2904ZA Liquid Effluent Monitoring Station (hereafter referred to as 2904ZA) and 2904ZB Monitoring Building (hereafter referred to as 2904ZB) were demolished in 2005. The buildings were used to monitor effluent liquids from PFP prior to discharge to the soil column. The purpose of this document is to provide the as-left condition of the 2904ZA and 2904ZB sites and to evaluate and compile information relating to endpoint compliance consistent with preparation for transfer to S&M. These were the first structures removed that utilized the slab-on-slab endpoint approach of HNF-22401.

This report provides the as-left condition of the 2904ZA and 2904ZB Buildings and summary information relating to endpoint compliance consistent with the overall objectives of HNF-22401, which also requires that relevant information about the remaining slab be part of the final turn over package for transition to S&M.

The 2904ZA and 2904ZB Buildings were part of the PFP Complex located in the 200 West Area of the Hanford Site in Washington State. The structures were removed under U.S. Department of Energy (DOE) authority of the *National Environmental Policy Act of 1969*. The environmental impacts were evaluated in DOE/EA-1469, *Deactivation of the Plutonium Finishing Plant, Hanford Site, Richland, Washington*.

Demolition of the 2904ZA and 2904ZB Buildings was conducted in compliance with applicable regulatory requirements in place at the time. A radioactive air license (NOC ID 518) for demolition of ancillary buildings was issued by the Washington State Department of Health in response to DOE/RL-2002-32, *Radioactive Air Emissions Notice of Construction for Stabilization/Deactivation/Demolition of the Plutonium Finishing Plant Ancillary Buildings and Structures*.

The two buildings located outside the PFP protected area had been inactive for several years and were deactivated extensively prior to 2005. The actions taken to complete deactivation, decontamination, decommissioning, and demolition and comply with the endpoint criteria defined in the HNF-22401 were documented in the associated work packages, but the sites were never formally transferred to the S&M organization. Additionally, HNF-22401 requires that pertinent information about the remaining slab be part of the final turn over 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 CWR-PFP-00002-ADD1, *2904ZA and 2904ZB Endpoint Documentation*.

Three work packages were used to complete demolition and stabilization. The 2904ZA and 2904ZB Buildings were demolished under work packages 2Z-04-05401 and 2Z-04-05703.

Work package 2Z-05-02448 installed contamination control caps on each slab. The completion cover sheets are provided in CWR-PFP-00002-ADD1.

The buildings were located south and southeast of the PFP outer fence. Both were small pre-engineered steel fabricated buildings with a ribbed steel roof and steel walls. Figures 1 and 2 show pictures of the buildings before demolition. The buildings were located above the liquid discharge lines and constructed to sample water being discharged to the various cribs, located to the south of PFP.



Figure 1. 2904ZA Building Before Demolition



Figure 2. 2904ZB Building Before Demolition

2 Building Descriptions

The 2904ZA and 2904ZB Buildings are described in this chapter.

2.1 2904Z Building

The 2904ZA Building, constructed in 1973, was approximately 144 ft². The building was located at 119.63175/46.54898 (longitude/latitude) above pipeline 200W-207-PL-A. The 2904ZA Building was used to monitor PFP wastewater discharged through the pipeline beneath the building; access was through a large pipe, as shown in the post demolition photograph (Figure 3). Details of the slab can be found on drawing H-2-27509, *Relocated Monitoring Facility Low Level Liquid Waste Z Plant*.



Figure 3. 2904ZA Building Monitoring Pipe

2.2 2904ZB Building

The 2904ZB Building, constructed in the late 1980s, was approximately 288 ft² (14 by 20 ft). The building was located outside the PFP fenced area, at 119.63027/46.54852 (longitude/latitude), at the inlet to the 216-Z-20 Crib. The 2904ZB Building was used to monitor and sample PFP wastewater discharged through the pipeline beneath the building to the 216-Z-20 Crib. Sampling was accomplished through a series of pipes shown in Figure 4. Details can be found on drawing H-2-76851, *Strl Foundation Plan Elevations & Details*. Project W049 installed piping to the Treated Effluent Disposal Facility (TEDF), isolated the discharge to the 216-Z-20 Crib just before manhole 8, and installed a new manhole (C-1), which diverted the waste from PFP to the new TEDF line and 225WC Wastewater Sampling Facility.

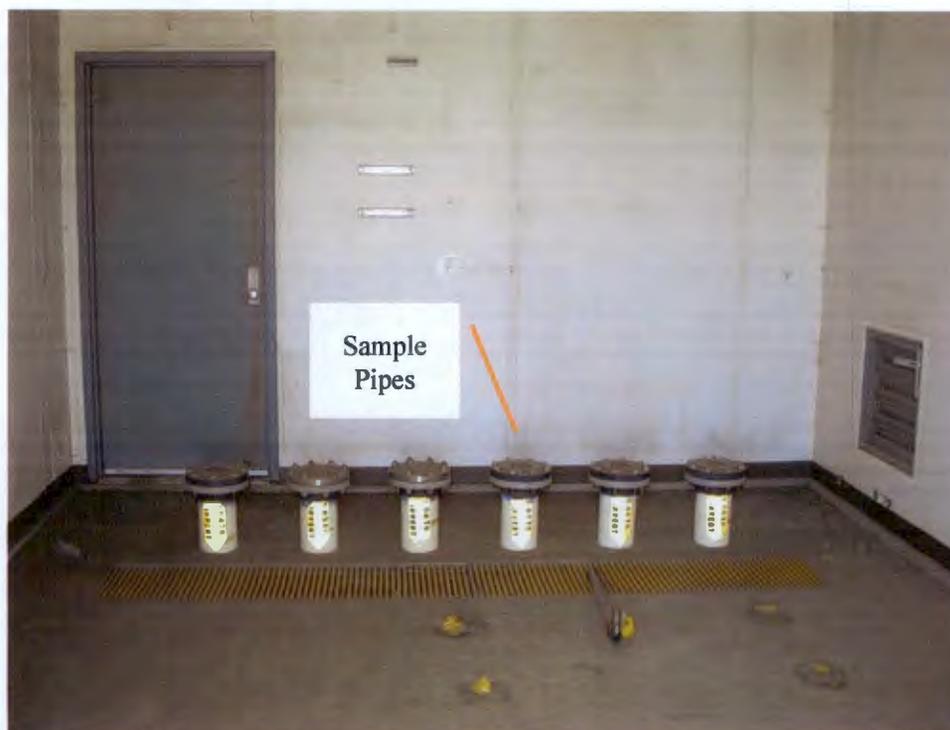


Figure 4. 2904ZB Building Sample Pipes

3 Demolition Preparation

Demolition preparation and demolition of the buildings were performed under work packages 2Z-04-05401 for 2904ZA and 2Z-04-05703 for 2904ZB. A final contamination control cap was installed on both slabs by work package 2Z-05-02448. As part of the preparation for demolition, the building was characterized, electrically isolated, and cleaned out of hazardous materials.

3.1 Characterization

As part of the preparation for demolition, the buildings were characterized for asbestos, waste disposal, and radiological contamination.

Asbestos characterization was accomplished by a walkdown (good faith survey) of the building by an *Asbestos Hazard Emergency Response Act of 1986* trained individual to identify any asbestos-containing material (ACM) that would need to be removed. No ACM was identified in either structure.

In preparation for demolition, a revised form (*Notification of Intent to Remove Asbestos Containing Materials, or to Demolish*) was filed with the Benton Clean Air Agency. The original form had covered a number of structures planned to be demolished, and the notification form was revised to add 2904ZB to the previous form. Copies of this document is included in CWR-PFP-00002-ADD1 (Appendix B).

Radiological characterization of the two buildings was based on both process knowledge and predemolition radiological surveys. While the surveys reflect no detectable removable contamination at the time of demolition, the narrative in the 2904ZA work package (2Z-04-05401) reflected that removable contamination was encountered in the southeast corner of the building, in the area around the 12 in. monitoring pipe and on the floor that was fixed with paint prior to dismantling the building. After demolition, the 12 in. monitoring pipe in 2904ZA (Figure 3) was brought down to slab level.

The package narrative noted that no contamination was detected during size reduction of the monitoring pipe. Subsequently, both slabs were covered with a new concrete slab. Copies of the predemolition radiological surveys are included in CWR-PFP-00002-ADD1.

Initial chemical characterization of the two buildings was based on limited field sampling for lead paint and process knowledge of the construction material. Lead-based paint was identified on the exterior of Building 2904ZA, and lead-based controls were implemented for size reducing the panels. Subsequent to demolition of 2904ZB, field paint samples were taken and analyzed to confirm process knowledge.

Beryllium characterization at the time of the demolitions (2005) was based only on process knowledge, and the buildings were not designated as beryllium buildings.

3.2 Cold and Dark Process

As part of the cold and dark process in preparation for demolition of the buildings, electrical feeds to both buildings were verified isolated and air gapped. For the 2904ZA Building, the electrical isolation was performed as part of the work package. All electrical circuits were isolated from the building. A portion of the building conduits was left to provide for a communication circuit associated with the 225WC Building, which had to remain active (Figure 5). 2904ZB had been decommissioned in 1995 and 1996, when the new sampling building (225WC) was brought on line, and the respective building demolition work package for the structure only confirmed the electrical isolation.



Figure 5. 2904ZA Slab Prior to Slab-on-Slab Installation

Demolition of 225WC completed the electrical isolation and sealing of the remaining circuits at the 2904ZA slab under work package 2Z-16-0091, *Isolate and Demolish Building 225WC* (Figure 6).



Figure 6. 2904ZA Slab May 2016 Conduits Cut and Sealed

Mechanical isolation of the two structures was performed under the respective work packages. In the case of 2904ZA, the floor drain was noted in the work package as being previously sealed with grout. The 12 in. monitoring pipe (Figure 3) was cut down to slab level and capped after demolition (Figure 5). In the 2904ZB Building, the remaining sample port risers were cutoff near floor level expandable plugs installed in sample pipes and floor drain, and the drain trench was filled (Figure 7).



Figure 7. 2904ZB Slab Prior to Slab-on-Slab Installation

3.3 Slab-on-Slab Installation

After removal of the building and plugging all drain holes, a concrete control cap was installed on both slabs per drawing H-2-831931, *Civil Contamination Control Cap Details*. The control cap extended out (approximately 12 in.) from the original slab, effectively sealing the conduits to the building, with the exception of the active conduits on the 2904ZA slab, which were subsequently cut and sealed in 2016. The as-left condition is shown in Figures 8 and 9.

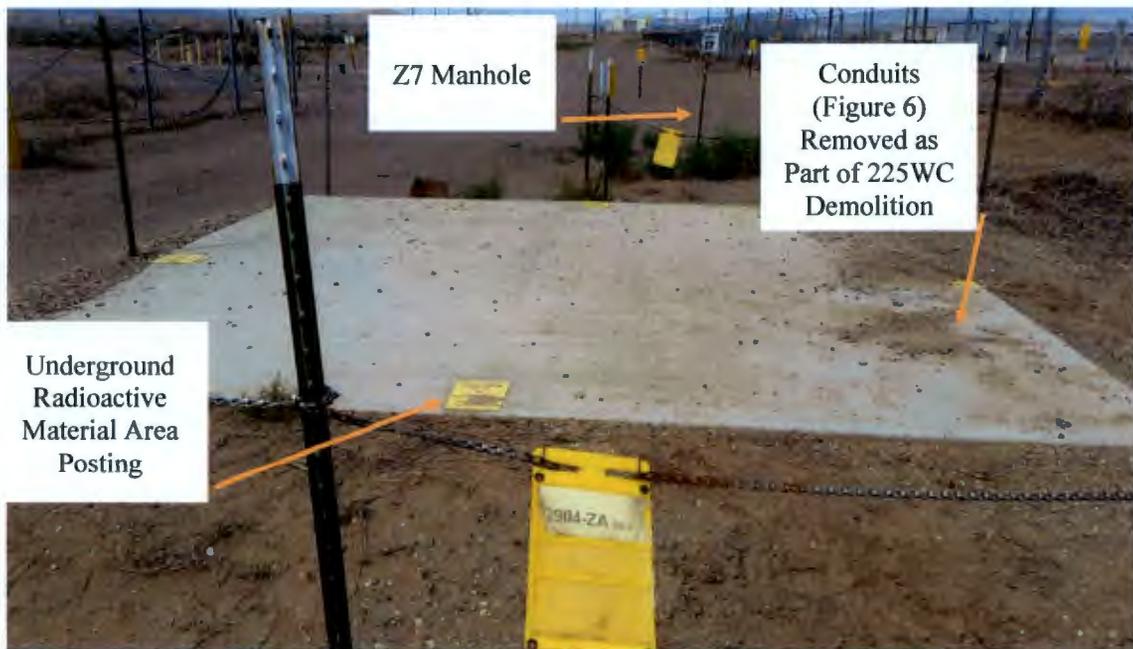


Figure 8. 2904ZA Slab after Slab-on-Slab Installation and Conduit Removed



Figure 9. 2904ZB Slab after Slab-on-Slab Installation

3.4 Demolition and Document Review

Based on a review of the documentation and discussions with onsite individuals at the time of the activity, removal of the structures was uneventful. 2904ZA was disposed as low-level waste (LLW), and 2904ZB was disposed offsite as nonradioactive waste based on process knowledge and the surveys performed.

3.5 Post Demolition Walkdown

There is no documentation of the walkdowns that occurred after the 2005 demolition. While it is known that multiple walkdowns occurred and pictures were taken, no summary of the walkdowns can be found.

At the time of demolition, there was little want or need to begin transferring the facilities from PFP control, since enhanced security efforts were being implemented around PFP at the time.

In conjunction with preparing documentation for completion of pretransition activities, a walkdown of the 2904ZA and 2904ZB slabs was conducted in 2016 (results are in Section 4.2).

4 As-Left Condition

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

4.1 As-Left Description

The 2904ZA and 2904ZB slabs (Figures 8 and 9) were left in a clean slab-on-slab at grade condition. Both 2904ZA and 2904ZB were capped with a new concrete cap slab-on-slab. Any minor in slab contamination was sealed with no contamination on the surface. Manholes adjacent to the slabs were left accessible and managed under the PFP confined space program until turnover to S&M. The Z7 manhole (PFP confined space #81) west of the 2904ZA slab (Figure 8) remains active and supports the TEDF storm drains located on the south side of PFP. The Z9 manhole (PFP confined space #84 and S&M confined space # 0382), north of the 2904ZB slab (Figure 9), is inactive and remains open to support future remedial investigation of the 216-Z-20 Crib. The area around both buildings is considered an underground radioactive area due to adjacent waste sites.

4.1.1 Key Documentation and Drawings

No drawings associated with either 2904ZA or 2904ZB would be deemed essential or support drawings per engineering configuration management requirements. The following drawings could be considered historical information:

- 2904ZA (H-2-27509 [sheet 2], *Relocated Monitoring Facility Low Level Liquid Waste Z Plant* as modified by FMP-02-10054-R0S)
- 2904ZB (H-2-76851 [sheet 1] and H-2-76852 [sheet 1], *Piping Plan and Details Effluent Sample*, as modified by FMP-02-10054-R0R)
- Slab-on-slab (H-2-831931)
- Redirection of piping to TEDF (H-2-140336, *Civil Line C STA 0-34.22 to STA 8+51.54*)

4.1.2 Radiological and Hazardous Material Characterization

The two slabs share a common history of sampling the process waste line (200-W-207-PL) that last carried wastewater from PFP to the 216-Z-20 drain field prior to being replaced with discharge to TEDF. The older 2904ZA was installed to support sampling of the 216-Z-19 Ditch discharge, and it sampled discharge to the 216-Z-20 drain field until it was replaced by 2904ZB in the late 1980s. A description of LLW liquid disposal sites associated with discharges from PFP, in the area southeast of PFP, can be found in BHI-00174, *U Plant Aggregate Area Management Study Technical Baseline Report*. The first site was the 216-Z-1 Ditch, which was replaced in 1959 by the 216-Z-11 Ditch, which was replaced in 1971 with the 216-Z-19 Ditch, which was replaced in 1981 with the 216-Z-20 drain field. Ultimately, this discharge was replaced with a connection to TEDF, which was sampled by the 225WC Building.

4.1.2.1 2904ZA Site Radiological and Hazardous Material Characterization

The 2904ZA slab has both fixed radiological contamination and hazardous material contamination beneath the cover slab. The below-grade portion of the monitoring pipe is likely moderately contaminated for the following reasons:

- **Slab:** As discussed in Section 2.1, removable contamination was noted on the 2904ZA slab prior to demolition that had been painted over. Figure 5 is a photograph of the 2904ZA slab after demolition that shows evidence of yellow paint, implying more extensive contamination on the building slab. It was common practice to use a coat of yellow paint as a warning indicator to fix contamination then cover it with a layer of grey. Based on the paint color palette developed as part of the PFP characterization effort, yellow and grey paint on the surface of the slab can be expected to contain heavy metals of cadmium, chromium, lead, and mercury as well as elevated levels of polychlorinated biphenyls.
- **Below-grade:** No direct survey of the below-grade portion of the monitoring pipe was conducted. While the work package indicates that no contamination was detected while size reducing the monitoring pipe, the slab contamination indicated that sampling activity in the past had resulted in contamination in the building. This is corroborated by the event described in BHI-00174, involving an estimated 30 to 60 g of alpha activity accidentally released on March 25, 1976 from the Z Plant complex into the 216-Z-19 Ditch. The release described would have been detected and sampled in the 2904ZA Building. Two additional events in BHI-00174 described that levels of the microcuries per liter order of magnitude were detected in 1984 and 1985 and discharged to the 216-Z-20 drain field.

4.1.2.2 2904ZB Site Radiological and Hazardous Material Characterization

2904ZB has no known fixed radiological contamination and hazardous material contamination beneath the cover slab. A survey of the building and slab along with process knowledge supported a free release of the structure for disposal:

- **Slab:** As discussed in Section 2.1, no fixed or removable contamination was detected on the 2904ZB slab. The 2904ZB slab interior photograph (Figure 3) shows no evidence of paint on the floor.
- **Below-grade:** No direct survey of the below-grade portion of the pipes was conducted. Based on the liquid process waste history during the period the building operated, low levels of activity may be expected in the below-grade portion of the piping.

4.1.3 Industrial Safety Hazards

As discussed in Section 4.1.4, manholes Z-7 and Z-9 (Figure 10) represent confined space hazards adjacent to the sites. These confined spaces are properly marked and currently managed within the PFP confined space program. Because of the installation of an additional slab on top of the existing slab, both slabs are elevated above-grade; to mitigate any potential tripping hazards, a chained barrier is installed around each slab. No other industrial safety hazards were identified during the walkdown.

4.1.4 Surveillance and Maintenance Considerations

At the time of this report, steam condensate and some surface drains continue to discharge to TEDF and pass through manhole Z-7. The Z-9 manhole is essentially part of the 216-Z-20 site, and it has a S&M confined space posting as well as the PFP posting. The final disposition of these and the other various manholes and turnover of the associated confined spaces will be addressed as part of the administrative endpoint requirements. Since these sites are located outside the protected area, the radiological postings at the sites must be maintained.



Figure 10. Manholes Z7 and Z9

4.1.5 Regulatory Information

There are no site-specific regulatory requirements.

4.2 Endpoint Objectives

The 10 measurable objectives outlined in Section VI of HNF-22401 that define clean slab-on-grade are evaluated in Table 1 based on a review of work documentation and physical walkdown of the site by the author of this document.

Table 1. Clean Slab-on-Grade Measureable Objectives

Objective	Status	Comment
Above-grade structures are removed.	Met	225WC conduit removed as part of 225WC demolition
Below-grade portions of buildings will be emptied and stabilized.	Not Applicable	Neither structure had below-grade areas
Buried pipes and ducts will be drained and sealed.	Met	Piping to the below-grade line self drain and were sealed
The portion of concrete slab that is exposed to the weather will be free of dispersible radiological contamination.	Met	Slab-on-slab

Table 1. Clean Slab-on-Grade Measureable Objectives

Objective	Status	Comment
The exposed surface of the slab shall be free of tripping and puncture hazards.	Met	Area chained off due to elevation of slab
The exposed surface of the slab shall be suitable for exposure to the weather for at least 20 years.	Met	Slab-on-slab
Subsurface radiological areas will be posted per regulations.	Met	Posted (Figures 8 and 9)
All penetrations through the slab (e.g. piping and conduits, etc.) shall be sealed with grout or equivalent suitable for exposure to the weather for 20 years.	Met	Slab-on-slab
All wastes are removed.	Met	
No exposed surface soil contamination areas are allowed.	Met	

Note: Objectives are based on HNF-22401, *Plutonium Finishing Plant (PFP) Complex End Point Criteria*.

4.3 Administrative Endpoints

Since the 2904ZA and 2904ZB Buildings were located outside the PFP inner fence and demolition boundary, the slabs could be considered a final condition; administrative endpoints specified in HNF-22401 applicable to the 2904ZA and 2904Z Buildings are evaluated in Table 2, and applicable items are documented in Section 4.4.

Table 2. Administrative Endpoints

Checklist Number	Item ^a	Description ^a	Status
Admin-1	Complete/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 proper incorporation of structure and utility modifications/isolations.	Not applicable ^b
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 containing both the essential drawing and those required to support S&M.	Not applicable ^b
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.	Not applicable ^b

Table 2. Administrative Endpoints

Checklist Number	Item^a	Description^a	Status
Admin-5	Document compliance with confined space program.	This endpoint compiles the individual endpoints into one report reflecting the remaining confined spaces.	See Section 4.1.3 for discussion of pipeline manholes
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.	Met See Section 4.1.2
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/dangerous wastes.	Met See Section 4.1.2
Admin-8	Complete and provide current Fire Hazards Analysis (FHA).	An FHA will be completed reflecting the endpoint condition of the PFP Complex.	Not applicable ^b
Admin-9	Transfer facility physical property records.	The property records for the PFP Complex will be updated as the transition and dismantlement effort removes excess and or disposes of property.	The demolition status of the structures were documented via a Facility Status Change Form
Admin-10	Provide a Surveillance & Maintenance Plan (S&M).	The transition and 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.	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 utilized by the transition and dismantlement project/contractor to conduct surveillance and maintenance at the end of the project will be copied and placed in the completion package files.	Not applicable ^b

Table 2. Administrative Endpoints

Checklist Number	Item ^a	Description ^a	Status
Admin-13	Provide identified regulatory commitments and regulatory documentation.	The transition and dismantlement project/contractor has the 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. 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.	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 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.	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/systems that has been kept by facility personnel (i.e., engineers, health physics, and operations) 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.	See Section 4.1.2

a. Descriptions are based on HNF-22401, *Plutonium Finishing Plant (PFP) Complex End Point Criteria*.

b. These administrative criteria are not separately evaluated for 2904ZA or 2904ZB. All criteria will be addressed globally in the turnover package to Central Plateau S&M, and this document supports that evaluation.

FHA = fire hazards analysis

4.4 Endpoint Documentation

The endpoint document (HNF-22401) was utilized in performing the demolitions in 2006. Endpoints applicable to 2904ZA and 2904ZB are addressed in Appendix A of CWR-PFP-00002-ADD1, and supporting documentation is provided in Appendix B.

5 References

- Asbestos Hazard Emergency Response Act of 1986*, 15 USC 2641, et seq. Available at:
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