Plutonium Finishing Plant Work Resumption Plan

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

CH2M HILL
Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352

Approved for Public Release;
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Plutonium Finishing Plant Work Resumption Plan

Program/Project: PFP

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Executive Summary

This plan summarizes CH2M HILL Plateau Remediation Company (CHPRC) actions to resume demolition activities at the Plutonium Finishing Plant (PFP) Complex. The remaining work is divided into four phases. The first two phases encompass low-risk activities to include the 234-5Z Building debris, and the remaining 234-5Z Building, vault and associated tunnels outside of the A and C lines footprint. Resuming demolition activities at facilities that involve relatively small amounts of plutonium will enable the verification of the model and established controls to be implemented and understood by the demolition teams. The third and fourth phases encompass high-risk work 234-5Z A and C lines and tunnels associated with the A and C lines, and the Plutonium Reclamation Facility (PRF) rubble pile. Corrective actions from the root cause evaluation, independent assessment of radiological control and Integrated Safety Management System review were screened to identify pre-start actions that will be completed prior to resuming demolition activities. Two independent management assessments will be conducted: one prior to the low-risk work and one prior to the high-risk work.

CHPRC will ensure that a field work supervisor at PFP is responsible for conducting demolition in accordance with the established work documents. Strictly following the work documents, the supervisor will ensure that demolition activities remain within the bounds of the air dispersion model by monitoring radiological control activities, wind conditions, and demolition progress for the proper control of work. At the end of each shift, the supervisor will ensure that appropriate contamination controls are established prior to departing the site and that contamination monitoring has been completed. While the intention is to minimize debris pile accumulation at the end of the shift, it is acceptable that debris piles be left over from the previous shift as long as fixative has been applied prior to leaving and thereafter in accordance with current procedures. There is no time restriction regarding how long a debris pile may be left, but the debris piles must be size reduced and staged for waste loadout prior to resuming building demolition. All work activities will be performed under the control, release, and acceptance of the PFP operations office. The PFP operations team is responsible for all work evolutions that are released and performed on the PFP Project. These activities will be overseen by the senior supervisory watches (SSWs) to ensure adherence to established controls.
The resumption of work plan details the phased approach to completing demolition of PFP and PRF and outlines the enhanced controls to be implemented to ensure safe completion of the project.
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Terms

AERMOD  American Meteorological Society/Environmental Protection Agency Regulatory Model
ARA     Airborne Radioactivity Area
CA      contamination area
CHA     craft-specific hazard analyses
CHPRC  CH2M HILL Plateau Remediation Company
CSZ     core stabilization zone
CTA     container transfer area
D&D     deactivation and decommissioning
DAC     derived air concentration
DOE     U.S. Department of Energy
EMS     Environmental Management System
EOC     Emergency Operations Center
ERDF    Environmental Restoration Disposal Facility
FHA     fire hazards analysis
GHA     general industrial hazard analysis
HASP    health and safety plan
HCA     high contamination area
HRB     Hazard Review Board
ISMS    Integrated Safety Management System
Jacobs  Jacobs Engineering Group, Inc.
JHA     job hazard analysis
LLW     low-level waste
MAR     material at risk
NDA     nondestructive analysis
OEP     Option Evaluation Process
PBS     polymeric barrier system
PFP     Plutonium Finishing Plant
PNNL    Pacific Northwest National Laboratory
PPE     personal protective equipment
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRF</td>
<td>Plutonium Reclamation Facility</td>
</tr>
<tr>
<td>RAWP</td>
<td>Removal Action Work Plan</td>
</tr>
<tr>
<td>RCT</td>
<td>Radiological control technician</td>
</tr>
<tr>
<td>RMA</td>
<td>Remote mechanical A line</td>
</tr>
<tr>
<td>RMC</td>
<td>Remote mechanical C line</td>
</tr>
<tr>
<td>SME</td>
<td>Subject matter expert</td>
</tr>
<tr>
<td>SOI</td>
<td>Standard operating instruction</td>
</tr>
<tr>
<td>SSW</td>
<td>Senior Supervisory Watch</td>
</tr>
<tr>
<td>UCL(_{95})</td>
<td>Upper 95 percent confidence level</td>
</tr>
</tbody>
</table>
1 Introduction

The Plutonium Finishing Plant (PFP) Complex is currently undergoing deactivation and decommissioning (D&D) activities at the U.S. Department of Energy (DOE) Hanford Site in Richland, Washington. This plan describes the resumption of demolition activities after the spread of airborne radioactive contamination outside of the established control boundaries that caused a subsequent work stoppage.

1.1 Purpose

This plan summarizes CH2M HILL Plateau Remediation Company (CHPRC) actions to resume demolition activities at the PFP Complex safely and efficiently. This document also provides the demolition resumption strategy and associated enhanced controls to the PFP Deactivation and Decommissioning (D&D) project. Additionally, this document provides a crosswalk from the root cause evaluation (RCE) corrective actions and expert panel comments on the RCE to the plan (Appendix A).

1.2 Background

Under its contract with the DOE, Richland Operations Office, CHPRC is demolishing the highly contaminated PFP. The PFP produced approximately 60 percent of the plutonium for the United States and has been de-inventorying, decommissioning, and decontaminating for the last 20 years.

Located in the 200 West Area of the Hanford Site, PFP commenced operations in 1949. PFP’s primary mission was processing plutonium metal, which was separated and recovered from liquid and solid process streams, into hockey puck-sized “buttons” for defense purposes. In 1991, the mission changed to plutonium-bearing material stabilization, cleanup, D&D, and environmental restoration. Material stabilization campaigns and the mission for storing stabilized plutonium materials were completed in December 2009 when the final containers of material were shipped offsite. The 2736-Z Complex facilities that had supported that mission were demolished in 2012. PFP facilities in 2012 are shown in Figure 1.

Figure 1. Plutonium Finishing Plant Facilities
Consistent with CHPRC-02582, Plutonium Finishing Plant Demo Plan, D&D of the remaining PFP facilities commenced in 2016. By that year’s end, many of PFP’s 90 buildings were demolished, and much of the processing equipment and gloveboxes were safely size-reduced and removed from the facilities. Open-air demolition on the first of PFP’s four main process buildings began with the 236-Z Plutonium Reclamation Facility (PRF) in November 2016.

In June 2017, PFP demolition activities resulted in the spread of airborne radioactive contamination outside of established control boundaries, causing exposure to nearby workers and a subsequent stop work order. As a result, CHPRC completed a causal analysis and developed several corrective actions to prevent recurrence. In early September 2017, demolition resumed until December 14, 2017, when another spread of airborne contamination occurred outside of established radiological zones. On December 15, contamination was found outside of the established radiological boundaries. On December 18, follow-up radiological surveys found additional contamination present in the administrative office area, and work was stopped. CHPRC conducted a root cause analysis, identified corrective actions, and worked with DOE and the regulators to develop recovery plans to enable demolition activities to resume.

1.3 Scope

The scope of this plan includes the resumption of PFP demolition activities following the work stoppage in December 2017. Demolition activities include demolition of remaining portions of Building 234-5Z and removal of associated debris and 236-Z rubble pile and remaining stem wall disposition. The scope of work is to remove the structures to slab-on-grade and fill any basement/tunnel areas exposed during demolition using an approach that consists of four phases: two lower risk and two higher risk.

Installation of the 20-year cover cap, compilation of data to validate HNF-22401, Plutonium Finishing Plant (PFP) Complex End Point Criteria, and turnover of the remaining slabs and subterranean structures to long-term surveillance to meet the Hanford Federal Facility Agreement and Consent Order Milestone M-083-00A (Ecology, et al., 1989) are outside the scope of this document. The activities to accomplish these items will be included within the field execution schedule and performed under separate work control documents.

2 Facility Description

This chapter describes the demolition zone areas, including remaining structures and rubble piles that constitute the current conditions.

2.1 236-Z Building and Remaining Rubble Pile

The 236-Z structure was a roughly rectangular reinforced concrete building oriented in a north-south direction along its major axis. The building footprint measured approximately 70 ft wide in the east-west direction and 75 ft long along the north-south. The original building was composed of four-story levels with a small, two-story extended penthouse segment located in the southwest quadrant. The penthouse provided exterior stair access to all building floor levels and two working floor levels. The first floor of the main building was located at ground level (ref. elev. 0.0), with floors 2, 3 and 4 located approximately at elevations of 12, 24, and 34 ft, respectively. The two penthouse levels comprised a smaller footprint measuring 20.5 by 29 ft, with penthouse levels 5 and 6 located at elevations of 56 and 66.5 ft, respectively. The main roof system sloped from west to east and was generally located at 49.5 ft elevation, and the upper penthouse roof was approximately 66.5 ft. Attached to the main building on the south side was a single-story, metal-framed airlock chamber that provided access to the main cell area. This chamber was removed by conventional demolition means before the 236-Z Building was demolished.
The main structural building was composed of a bearing system in which the interior and exterior supporting walls were used to resist both vertical and horizontal loadings. The floor and lightweight concrete roof system comprised a rigid diaphragm floor system that transfers lateral loads from each level to the supporting shear walls and base-level foundation system.

As of December 2017, approximately 95 percent of the PRF has been demolished. The remaining structure includes small portions of the east and west stem walls and rubble piles consisting of concrete and metal from final demolition activities. The walls and rubble piles are covered with at least 18 in. of clean overburden and fixative (Figures 2 and 3).

Figure 2. PRF Structure at 4:00 p.m. on 12/15/2017

Figure 3. PRF Rubble Pile Under Soil and Gravel – 5/14/2018
2.2 234-5Z Debris Pile and Remaining Structure

The original 234-5Z Building consisted of 440 ft running in an east-west direction. The length was composed of 22 equal length bays of 20 ft each (Figure 4) oriented from the east to the west end of the building (reference labeled gridlines 1 through 23). The building contained eight bays located at the east end of the structure, six bays in the middle, and seven bays at the west. The transverse bay layout is at the east end of the building. The widest portion of the structure (east) had an overall width of approximately 180 ft, the middle segment was the most narrow at 138 ft, and the west end of the building was 148 ft between column centerlines. The structure was split in the middle with an expansion joint occurring at gridline 12, exactly one-half the length of the original.

The original building was composed of three floors and a roof. Floor 1 was located at ground level. The duct level on floor 2 varied in height between 12.67 and 17.67 ft. Floor 3 was located approximately 31.5 ft above the base level. The roof level also varied in height, with the northernmost elevation at approximately 43.25 ft above ground level and the southernmost at approximately 47.25 ft above ground level.

The primary structure consisted of a combined shear wall and steel frame on concrete drilled shaft foundations to provide vertical and lateral support of the wall, floor, and roof systems. The floors were conventionally reinforced concrete slabs on metal pan deck. The exterior was metal wall panels, and the interior was concrete and plaster/metal partition walls.

Demolition of the 234-5Z Building was achieved via shearing and pulverizing with high reach-type demolition equipment by individual bays and zones, which enabled removal in mass while maintaining the structural integrity of the remaining building segments.

As of December 2017, approximately 60 percent of 234-5Z Building demolition was complete. The structure has been removed along the entire north wall to column line C, the east end to approximately column line 3, and the west portion to between column lines 18 and 19. Key structural references associated with facility column lines include the remnants of stairwells 1 and 2 (N-S column lines 4 and 13, respectively), the exposure of filter room 316 (N-S column line 19), and the PRF exhaust trunk spanning the roof (E-W column line E, which demarks the southern boundary of the RMC line; Figure 4). A residual portion of Plutonium Process Support Laboratory roof extends to the south of column line E; there are no remnants of filter boxes 9, 10, 11, 12, 13, 15, and 26 stubs or the 42 in.-diameter filtered process exhaust header. Near column line 6 to 10 and E, the southern end of the structure has also been removed, which facilitated access to support the removal of the HC227S glovebox in room 227. This clearance affected removal of filter rooms 309 and 310, which had received filter process system (E-4) exhaust and were areas of higher surface contamination. The vault annex structure on the northwest side of the facility remains, along with debris piles to the north and south. Figure 5 depicts the remaining facility structures as of February 2018. The radiological source term associated with these remnants is discussed in Section 5.4.
Note: Figure shows core stabilization zones remaining for 234-5Z.

Figure 4. Original 234-5Z Building Configuration
Note: Blue highlighted areas depict the current approximate physical condition of 234-5Z; non-blue areas represent demolished parts of the building. Graphic highlights approximate location; exact building configuration is briefed daily.

**Figure 5. Current 234-5Z Building Configuration**
3 Event Actions and Subsequent Assessments

Between December 14 and 18, 2017, contamination was detected outside of the radiological boundary at the PFP demolition zone, including around PFP offices and on multiple vehicles located outside the boundary. The consequences of this event were personnel exposure and potential radiological contamination leaving the Hanford Site. The project team immediately stopped all work at PFP and began compensatory recovery measures.

3.1 Root Cause Analysis

Following the event, CHPRC chartered a causal analysis team consisting of facility subject matter experts (SMEs), program representatives, independent mentors, and Hanford Atomic Metal Trades Council Safety Representatives. Based on documentation review and expert knowledge, the team used Barrier Analysis and Why Staircase analysis techniques to determine causal factors. The analysis identified two root causes, two contributing causes, and two extraneous conditions adverse to quality. Compensatory actions for these themes focused on preventing recurrence for the rest of PFP demolition, and long-term corrective actions are being implemented for the remaining CHPRC in-progress cleanup work. Corrective actions include enhancements in radiological control technician (RCT) training, controls for protecting workers, field implementation expectations, and processes to control contamination. Appendix A provides a crosswalk of the pre- and post-start corrective actions and the applicable section within the work resumption plan.

3.2 Independent Radiological Control Assessment

Corporate CHPRC parent company, Jacobs Engineering Group, Inc. (Jacobs) chartered an independent assessment team in response to events that culminated in the December 2017 detection of radiological contamination outside the contamination area (CA) at the PFP demolition zone. The team was assembled to evaluate the extent to which the causes of the PFP contamination events might be pervasive across CHPRC and to ensure that necessary actions were taken to prevent additional events at other CHPRC projects or ongoing operations (Phase 1). In addition, the team performed a detailed “vertical slice” through the PFP Radiological Control (RadCon) Program (Phase 2). Phase 2 of the assessment identified one concern, one finding, and seven opportunities for improvement in the PFP RadCon Program. Corrective actions from these assessments have been reviewed for applicability as pre-start corrective actions and included in actions to be completed prior to resuming demolition.

3.3 Management Assessment Report for Implementation of Integrated Safety Management System (ISMS)

The purpose of the assessment was to evaluate implementation of ISMS for early lessons learned from the spread of contamination at PFP. The assessment challenged the status quo and focused on the effectiveness of implementation in the field. The review of select safety culture processes was included. In addition, the assessment scope included the following elements: implementation of ISMS, conduct of operations, activity level of work planning and control, surveillance and maintenance, and contractor assurance system (including event investigations and follow up). Corrective actions from these assessments have been reviewed for applicability as pre-start corrective actions and included in actions to be completed prior to resuming demolition.
4 Demolition Resumption Approach

This chapter details the demolition resumption approach that consists of four phases with pauses between each stage to review the previous work activity and incorporate lessons learned into the next phase. The overall plan for the demolition resumption approach detailed in this section will be refined in the specific work package for each phase. Field conditions, engineering evaluations, post-job reviews, and other work planning elements may drive adjustments to the demolition approach and sequencing necessary to convert this overall plan into achievable work steps for the work team. Any adjustments to the demolition approach will be evaluated through the change management process to ensure it will not adversely alter the preferred demolition options, enhanced controls, and conduct of operations expectations specified in subsequent sections of this document.

4.1 Stabilization and Current Site Condition

Stabilization activities included actions taken before demolition re-initiation to mitigate contamination migration from project-approved boundaries to the environment. The activities required for stabilization include application of fixatives to control the spread of contamination, a plan for ongoing maintenance activities associated with fixatives, packaged waste shipments, up posting boundaries (radiological buffer area, high contamination area [HCA], CA, and airborne radioactivity area) for control with associated monitoring and radiological surveys to ensure that fixatives are functioning adequately.

In addition to stabilization activities, car and home surveys were completed, along with generating and implementing a biological vector plan. Fixative application to the areas of known or suspected contamination was completed at least every three days and will continue to be applied per the Contamination Control Fixative Plan. Areas with this known or suspected contamination has been fixed with at least one of the following (Figure 6): polymeric barrier system (PBS), Envirotac II® (Rhino Snot), Soil-Sement®, or granular/native soil. Refer to Section 5.7 for detailed information about these fixative applications.

® Envirotac II is a registered trademark of EP&A Envirotac, Inc., La Quinta, California.
® Soil-Sement is a registered trademark of Midwest Industrial Supply, Inc., Canton, Ohio.
Figure 6. Fixative Application Areas

The radiological boundary expansion and the controlled area expansions were established by a conservative evaluation of the ground deposition model, the air dispersion model, and experience gained through investigating the contamination events. Although there is no certainty that all particles can be fully contained to an area due to unforeseen environmental conditions and biological vectors, the evaluation shows the proposed boundaries (Figure 7). The project conservatively established contamination control boundaries, active monitoring for the potential of airborne dispersion, along with regular and active assessment for migration of contamination. Radiological practices are coupled with work management controls, such as the application of fixatives and overburden, to reduce the potential for future unanticipated releases.
Waste packaged prior to the event is being removed as part of stabilization to reduce the overall potential risk. The pre-event packaged waste containers make up 90 percent of the remaining material at risk (MAR) for the project (Figure 8). The remaining demolition scope is divided between the lower and higher risk based on the remaining MAR in the facility. These stabilization activities are being completed prior to moving to the demolition activities described below to prevent further spread of contamination. It should be recognized that some legacy and newly generated waste may be present during the start of demolition. Contamination is validated through isotopic finger printing as necessary to distinguish between potential spread of contamination and other Hanford activities.
4.2 Demolition Readiness and Management Assessment

An evaluation was performed against PRC-PRO-OP-055, Startup Readiness, to determine the applicability of the procedure to the remaining PFP work scope. The procedure was considered not applicable, and the process was exited per procedure Section 3.1 step 2. As a result, an independent management assessment will be performed using the process specified in PRC-PRO-QA-246, Management Assessment. The assessment team will consist of individuals with varying expertise, such as radiological protection, operations, engineering, and safety and health. Because it will be used to determine resumption of PFP demolition activities, the assessment plan will incorporate four attributes of the process used for start-up reviews per PRC-PRO-OP-055:

1. The qualification and independence of each assessment team member will be documented in the assessment plan.

2. The performance objectives (POs) will be documented on an assessment appraisal form that identifies the approach to be taken in assessing the PO. For each PO, the lines of inquiry are defined in one or more of the following categories:
   - Records review – documents identified will be reviewed for completeness, evidence of closure, proper approvals, and effectiveness in addressing the PO.
   - Interviews – personnel will be interviewed to determine the effectiveness of corrective actions that were intended to improve personnel knowledge of existing or new practices and procedures associated with the PFP demolition activities.
   - Observations – field observations of selected activities will be conducted to verify that actions defined in procedures associated with PFP demolition can be performed as specified in the procedure.

3. Issues identified during the independent management assessment will be documented on an assessment issue form. Issues will be screened and designated as pre-start or post-start and will be tracked to closure in the CHPRC Issues Management system.
4. The assignment of “pre-start” designation will be performed using criteria documented in the assessment plan.

The assessment scope will include the following general topical areas:

- Demolition controls
- Radiological controls
- Work planning and performance
- Conduct of operations
- Off-normal incident response
- Management oversight
- Review of pre-start corrective actions

An independent management assessment will be conducted prior to the start of both low and higher risk demolition work scopes. DOE-RL will perform oversight of the independent management assessment.

After each phase of demolition, a formal post-job review will be conducted per PRC-PRO-WKM-14047, Pre-Job Briefings and Post-Job Reviews. The work team will identify the significant positive or negative lessons learned that could be gained and incorporated into the next demolition phase of work. As an example, the lessons learned may include revisions to the work documents. Figure 9 identifies independent management assessments prior to low-hazard and high-hazard work resumption. The project schedule has built-in reviews for lessons learned to be incorporated prior to initiating additional phases.

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**Figure 9. Proposed Demolition Schedule with Management Assessments and Lessons Learned**
4.3 Options Evaluation Process

To prepare for resumption of the PFP demolition, work teams performed options engineering evaluations that included the Option Evaluation Process (OEP) as described in CHPRC-03673, *Plutonium Finishing Plant Demolition Option Evaluation Report*. The OEP served as a problem analysis tool that evaluated options according to their strengths and weaknesses to determine preferred choices. This OEP considered and reviewed the entire lifecycle of each of the options generated.

The OEP applied to all aspects of demolition activities remaining for 236Z and 234-5Z, including waste generation and disposal. The four main identified areas (Figure 10) from the OEP are (A) 234-5Z Building debris, (B) remaining demolition of 234-5Z, vault and associated tunnels, (C) A and C lines and associated tunnels in 234-5Z, and (D) remaining PRF demolition and rubble pile. The OEP provides confidence that any PFP activity (demolition, processing, conditioning, packaging, and disposal) is done with due diligence from having considered different approaches and solutions.

![Figure 10. Remaining Four Demolition Scope Areas](image)

The OEP delivery team uses a multi-attribute analysis iterative process where options perceived to provide issue resolution are evaluated against a select group of attributes or performance measures. The options’ performance against the attributes is graded, measured by the OEP delivery team, and performs a standard process flow for each of the four identified areas (Figure 10). From each of the four identified resumption areas, a preferred method was scored against selected attributes and respective weighted factors applied (Figures 11 through 16).
Figure 11. Option Evaluation Process

- Identify Problem
  - Problem statement
  - Graded approach to determine level of analysis

- Define Scope
  - Boundaries
  - Constraints
  - Assumptions

- Identify Attributes
  - Cost, logistics, health, safety, etc.
  - Assign weighting factors

- Adjust Weighting Factors
  - Iterative approach to finalize Weighting Factors
  - Sensitivity analysis

Score Options Against Attributes

- Quantitative/qualitative scoring

Identify Options

- Characterize options
- Viability screening
- Proportionality screening

Results – OEP Identified

Implementation, Documenting, and Monitoring/Feedback

Figure 12. Option Evaluation Weighted Factors

<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>WEIGHT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH AND SAFETY</td>
<td>35</td>
</tr>
<tr>
<td>ENVIRONMENTAL IMPACTS</td>
<td>25</td>
</tr>
<tr>
<td>TECHNICAL PERFORMANCE</td>
<td>10</td>
</tr>
<tr>
<td>SOCIO-ECONOMIC</td>
<td>10</td>
</tr>
<tr>
<td>ENVIRONMENTAL OBJECTIVES</td>
<td>10</td>
</tr>
<tr>
<td>FINANCIAL COST</td>
<td>5</td>
</tr>
<tr>
<td>DURATION OBJECTIVES</td>
<td>5</td>
</tr>
</tbody>
</table>
Preferred option selected: Enhanced controls for current debris stockpiles
Short description: Use enhanced controls identified from the Root Cause Evaluation and a Jacobs corporate independent assessment of CHPRC’s radiological program to disposition debris created during pre-December 2017 demolition of lower-risk areas of 234-5Z.

<table>
<thead>
<tr>
<th>Options</th>
<th>Descriptions</th>
<th>Health and safety</th>
<th>Environmental impacts</th>
<th>Technical performance</th>
<th>Socio-economic</th>
<th>Environmental objectives</th>
<th>Duration objectives</th>
<th>Financial cost</th>
<th>Raw</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tent full coverage</td>
<td>Construct fully enclosed facility to cover the entire PFP footprint.</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>1.9</td>
<td>2.4</td>
</tr>
<tr>
<td>2</td>
<td>Entomb</td>
<td>Construct engineered berm and place engineered cap over debris.</td>
<td>Red</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>2.4</td>
<td>2.9</td>
</tr>
<tr>
<td>3</td>
<td>Shroud Large</td>
<td>Construct hard or soft sided large tent cover with dimension approximately 100x70 feet.</td>
<td>Green</td>
<td>Red</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>4</td>
<td>Enhanced Controls for Current Debris Stockpiles</td>
<td>Use enhanced controls identified from the Root Cause Evaluation and Jacobs’ radiological assessment to disposition debris created during pre-December 2017 demolition of lower-risk areas of 234-5Z.</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>3.3</td>
<td>3.7</td>
</tr>
<tr>
<td>5</td>
<td>Do nothing, place in S&amp;M</td>
<td>Leave PFP rubble pile as is with monitoring and fixative application ongoing.</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>1.8</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Figure 13. Option Scoring – Area A

Preferred option selected: Segmented modular demolition
Short description: Implement current zone-by-zone demolition strategy with additional controls developed from the pre-start corrective actions and a Jacobs’s independent assessment of CHPRC’s radiological program.

<table>
<thead>
<tr>
<th>Options</th>
<th>Descriptions</th>
<th>Health and safety</th>
<th>Environmental impacts</th>
<th>Technical performance</th>
<th>Socio-economic</th>
<th>Environmental objectives</th>
<th>Duration objectives</th>
<th>Financial cost</th>
<th>Raw</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tent full coverage</td>
<td>Construct fully enclosed facility to cover the entire PFP footprint.</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>2.0</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>Shroud Large</td>
<td>Construct hard or soft sided large tent cover with dimension approximately 100x70 foot</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>2.1</td>
<td>2.5</td>
</tr>
<tr>
<td>3</td>
<td>Segmented Modular Demo</td>
<td>Implement current zone-by-zone demolition strategy with additional controls developed from the pre-start corrective actions and radiological assessment report.</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>2.8</td>
<td>3.2</td>
</tr>
<tr>
<td>4</td>
<td>Do nothing, place in S&amp;M</td>
<td>Leave PFP rubble pile as is with monitoring and fixative application ongoing.</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>1.7</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Figure 14. Option Scoring – Area B
Preferred option selected: Ventilated modular demolition
Short description: Current zone-by-zone demolition strategy (supported with a structural engineering analysis) with additional controls, including ventilation on the A and C process lines and tunnel corridor to enhance particulate control during demolition.

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
<th>Health and safety</th>
<th>Environmental impacts</th>
<th>Technical performance</th>
<th>Socio-economic</th>
<th>Environmental objectives</th>
<th>Duration objectives</th>
<th>Financial cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tent full coverage</td>
<td>Construct fully enclosed facility to cover the entire PFP footprint.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.1</td>
</tr>
<tr>
<td>2 Intomb</td>
<td>Construct engineered berm and place engineered cap over debris.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.9</td>
</tr>
<tr>
<td>3 Shroud small open-ended</td>
<td>Construct hard or soft sided small tent cover with dimension approximately 20x30 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.4</td>
</tr>
<tr>
<td>4 Shroud large</td>
<td>Construct hard or soft sided large tent cover with dimension approximately 100x70 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.1</td>
</tr>
<tr>
<td>5 Grout Injection</td>
<td>Inject grout or like boning agents into debris pile and agitate; after curing time remove in larger portions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.1</td>
</tr>
<tr>
<td>6 Ventilated Modular Demolition</td>
<td>Current zone-by-zone demolition strategy (supported with a structural engineering analysis) with additional controls, including ventilation on A&amp;C process lines and tunnel corridor, to enhance particulate control during demolition.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>7 Do nothing, place in S&amp;M</td>
<td>Leave PFP rubble pile as is with monitoring and fixative application ongoing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.9</td>
</tr>
</tbody>
</table>

**Figure 15. Option Scoring – Area C**
Preferred option selected: Saturated soil entrainment  
Short description: By adding water to the contamination-free soil that currently covers the PRF rubble pile, the soil will become saturated and better able to prevent contamination migration.

<table>
<thead>
<tr>
<th>Options</th>
<th>Descriptions</th>
<th>Health and safety</th>
<th>Environmental impacts</th>
<th>Technical performance</th>
<th>Socio-economic</th>
<th>Environmental objectives</th>
<th>Duration objectives</th>
<th>Financial cost</th>
<th>Raw</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tent full coverage</td>
<td>Construct fully enclosed facility to cover the entire PFP footprint.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Entomb</td>
<td>Construct engineered berm and place engineered cap over debris.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Water Bath</td>
<td>Construct engineered berm and flood area approximately 1-3 foot with water and remove debris from submerged surface.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Shroud Small open ended</td>
<td>Construct hard or soft sided small tent cover with dimension approximately 20x10 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Shroud Large</td>
<td>Construct hard or soft sided large tent cover with dimension approximately 100x70 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Grout Processing</td>
<td>Place debris in grout mixing containers and saturate prior to loading in waste containers. Similar to Burial ground method.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Grout Injection</td>
<td>Inject grout or like boning agents into debris pile and agitation; after curing time remove in larger portions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Saturated Soil Entainment</td>
<td>By adding water to the contamination-free soil that currently covers the PFP rubble pile, the soil will become saturated and better able to prevent contamination migration. Heavy equipment will remove the wet soil and rubble and place it in a container for shipment to ERDF.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Do nothing, place in S&amp;M</td>
<td>Leave PFP rubble pile as is with monitoring and fixative application on going.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key: Low (0-3), MED (3.1-6.0), High (6.1-9)  

Figure 16. Option Scoring – Area D

4.3.1 Enhanced Control Sets  
A standard control set was developed for resumption of work during lower and higher hazard work scope. During lower risk activities, enhanced controls will adequately protect human health and the environment (Figure 17).
### Enhanced Controls for Lower and Higher Risk Scope

<table>
<thead>
<tr>
<th>Control Set</th>
<th>Pre–December 18</th>
<th>Enhanced Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boundaries</td>
<td>• Established from predicted air dispersion and surface deposition models to encompass levels requiring posting and control</td>
<td>• Significantly enlarged to ensure contamination, even below posting limits, is controlled inside of boundaries</td>
</tr>
<tr>
<td>Survey Plan</td>
<td>• 45 cookie sheets surveyed once per working day</td>
<td>• 77 cookie sheets; surveys twice per working day and during demolition activities</td>
</tr>
<tr>
<td></td>
<td>• Worker-performed personal surveys</td>
<td>• Automated personal contamination monitors</td>
</tr>
<tr>
<td></td>
<td>• No access restriction for wind events</td>
<td>• Access restricted until post-wind event surveys are complete</td>
</tr>
<tr>
<td>Monitoring</td>
<td>• 14 continuous air monitors</td>
<td>• 14 continuous air monitors</td>
</tr>
<tr>
<td></td>
<td>• 22 air samplers; 3-day air sample turnaround time</td>
<td>• 35 air samplers (three elevated at 20 ft); can achieve 1-day air sample turnaround time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Evaluating additional air samplers at radiological boundaries</td>
</tr>
<tr>
<td>Demolition Sequence</td>
<td>• Parallel building demolitions</td>
<td>• Sequential demolition from lower- to higher-risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Opportunity for worker involvement and incorporation of lessons learned between tasks</td>
</tr>
<tr>
<td>Fixatives</td>
<td>• 3 main fixatives</td>
<td>• Fixatives used per manufacturers’ specifications with technical evaluations to support; incorporated into work planning documents</td>
</tr>
<tr>
<td></td>
<td>• 50% Polymeric Barrier System (PBS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Soil-Sement®</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Envirotac II® (“Rhino Snot”)</td>
<td></td>
</tr>
<tr>
<td>Waste Packaging</td>
<td>• Large piles accumulated during demolition</td>
<td>• Minimize pile accumulation; ensure fixative application</td>
</tr>
<tr>
<td></td>
<td>• Environmental Restoration Disposal Facility (ERDF) dozer operator using respiratory protection</td>
<td>• Wider use of respiratory protection at ERDF, based on waste profile; multiple air samples and surveys taken near waste and downwind</td>
</tr>
<tr>
<td>Worker Engagement</td>
<td>• Inconsistent face-to-face communication and worker involvement</td>
<td>• Pauses incorporated into demolition sequence for worker involvement and review of lessons learned</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Employee involvement in Root Cause Evaluation, corrective action development, and option evaluation team for demolition resumption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Weekly employee roundtables scheduled with project management</td>
</tr>
<tr>
<td>Work Package</td>
<td>Large work package with tasks</td>
<td>• Smaller work packages with limited tasks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rigorous documented change management process (protects control set)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Independent Hazard Review Board</td>
</tr>
<tr>
<td>Oversight</td>
<td>Hazard Review Board</td>
<td>• Hazard Review Board, Senior Supervisory Watch and senior project mentors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Roles, responsibilities, and participation criteria defined</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Process implemented to track observations, necessary actions, and trending</td>
</tr>
</tbody>
</table>

Note: Surveying plan and monitoring numbers may change due to final air and surface models, development of work control documents, and lessons learned.

**Figure 17. Enhanced Controls for Lower and Higher Risk Scope**
In addition to a standard control set, additional enhanced controls for ventilated modular demolition were developed to ensure the protection of human health and the environment (Figure 18).

<table>
<thead>
<tr>
<th>Enhanced Controls for Ventilated Modular Demolition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre–December 18</td>
</tr>
</tbody>
</table>
| No ventilation | • Ventilation  
                 • Ventilation placement  
                 • Work sequence  
                               • East to west  
                               • Bay-by-bay  
                               • Tunnel Removal | • Captures particulate inside RMA and RMC and tunnels that may come loose during demolition  
                          • Sweeps particulate away from open working surface  
                          • Features one-time placement in current floor plan  
                          • Only one working face exposed  
                          • Allows for planned stopping and starting points  
                          • Allows for easier debris pile management  
                          • Opens tunnels/removes pipes for backfilling  
                          • Adds protection to the area prior to opening structure |

Figure 18. Enhanced Controls for Ventilated Modular Demolition

In addition to a standard control set, additional enhanced controls for saturated soil entrainment were developed to ensure the protection of human health and the environment (Figure 19).

<table>
<thead>
<tr>
<th>Enhanced Controls for Saturated Soil Entrainment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre–December 18</td>
</tr>
</tbody>
</table>
| Open air demolition/ no soil cover | • Soil coverage (18 in.) on pile  
                                    • Wetting area prior (15 minutes)  
                                    • Spray patterns and set back distances  
                                    • Equipment placement  
                                    • Single removal location  
                                    • Observations of dust  
                                    • Bucket load reduction  
                                    • Removal of foundation wall at new exposed soil level  
                                    • Soil coverage (18 in.) and fixative application at end of the day | • Ensures co-located areas will not become disturbed during setup and removal activities  
                                                                                     • Allows for soil to develop “mud layer” that will flow downward once equipment breaks the surface  
                                                                                     • Provides best coverage of effected areas prior and during rubble removal activities  
                                                                                     • Allows equipment to work beyond the arch of the spray device as per engineering direction  
                                                                                     • Ensures waste container availability is consistent with work activity so no accumulation of uncovered waste can occur  
                                                                                     • Allows constant monitoring of removal activity to ensure no visual emissions are migrating from the work area  
                                                                                     • Reduces spillage, minimizing spread of contamination  
                                                                                     • Decreases exposed debris and permits for simple cover during activities (e.g., reach high winds or at end of shift)  
                                                                                     • Covers all newly exposed areas with soil and fixative to leave in a safe state when not actively working and allows for the cycle to stop and start in the same condition |

Figure 19. Enhanced Controls for Saturated Soil Entrainment

4.3.2 Phase A – 234-5Z Building Debris Dispositioning

The strategy for removing and dispositioning pre-December 2017 debris uses controls (identified from the root cause analysis and the Jacobs Engineering Group, Inc. (Jacobs) independent assessment of CHPRC’s radiological program and described in Chapter 5) for lower risk areas of 234-5Z. This method is considered low risk from an MAR standpoint and uses current established processing techniques and
requirements with proven industrial hazard mitigation. The air dispersion model allows for multiple
locations (up to four) to be worked simultaneously without exceeding assumptions or limits built into the
model during this phase.
The green highlighted areas in Figures 20 and 21 show previously size-reduced building debris from
234-5Z currently located at one of the loadout areas. Loadout areas can be located anywhere within the
HCA to help facilitate waste packaging and movement. For these areas, minimal waste size reducing is
required, and waste will be packaged.

Figure 20. Demolition Area A – Removal of 234-5Z Debris and Rubble
Figure 21. Previously Size-Reduced Building Debris from 234-5Z

The blue areas shown in Figures 20 and 22 identify previously removed mobile office debris co-located to 234-5Z and comingled building debris from demolition activities from 234-5Z. These areas of waste will require size reduction, transfer to the loadout area, and packaging.

Figure 22. 234-5Z Building and Mobile Office Debris
Physical Work Activity

For previously size-reduced building debris, heavy equipment will be used from the outward ends of the pile toward the center, removing waste and placing into Environmental Restoration Disposal Facility (ERDF) approved containers. This process will minimize disturbing large portions of building debris not being actively removed. After waste has been loaded, the waste containers will be sealed and relocated to an assigned CTA.

For debris co-located to 234-5Z, heavy equipment will be used from the outward ends of the pile toward the center. Large components will be size-reduced and prepared for transfer to the loadout area. Size-reduced waste material will be placed into approved waste containers and the waste containers will be sealed. As described in the work control document, water or approved fixatives will be applied to debris using approved application systems and techniques during waste loadout activities.

For previously size-reduced building debris and debris co-located next to 234-5Z, fixative will be applied to distributed debris, the rubble pile, and all newly exposed surfaces at the end of each shift as a minimum or prior to the demolition work area is unmanned.

4.3.3 Phase B – Demolition of 234-5Z, Vault, and Associated Tunnels

Using additional controls from the pre-start corrective actions and the corporate independent assessment of CHPRC’s radiological program, current zone-by-zone demolition strategy can be implemented for the majority of 234-5Z, vault, and associated tunnels (Figure 23), excluding RMA and RMC lines and their associated tunnels. Under this low-risk MAR demolition activity, the current industrial hazard controls and structural engineering would not be altered as they address the analysis since the beginning of the demolition process. All zones and core stabilization zones (CSZs) have multiple bays located within them. The associated tunnels include portions of Tunnels 3, 4, and 6 that are partially under the 234-5Z demolition low risk work scope. Demolition of the associated tunnels includes the tunnel roofs, and isolation or removal of selected drain piping, and backfilling the tunnels with soil. Each bay is an approximately 10 by 14 ft compartmentalized section supported with columns and trusses. Bays will be removed one at a time, starting at the second floor demolishing downward through the duct level to the floor level (Figure 24). The bay-by-bay removal method will enable the project to demolish to described stopping points and remove debris and rubble before starting a new segment under radiological and fixative controls. While the intention is to minimize debris pile accumulation at the end of the shift, it is acceptable that debris piles be left over from the previous shift as long as fixative has been applied prior to leaving and thereafter in accordance with current procedures. There is no time restriction regarding how long a debris pile may be left, but the debris pile must be size reduced and staged for waste loadout prior to resuming building demolition. A residual amount of debris and/or waste loadout material may be present during building demolition. The air dispersion model allows for multiple (up to four) locations to be worked simultaneously without exceeding assumptions or limits built into the model during this phase. During this evolution, rubble and debris piles, residual debris, and waste loadout material from 234-5Z will receive fixatives once physical demolition activities cease.
Figure 23. Demolition Area B – Remaining Demolition of 234-5Z and Vault

Figure 24. Depictions of Bay-by-Bay Removal of Second Floor and Duct Level
### Zone and Core Stabilization Zone Descriptions

Zones and core stabilizations are depicted in Figure 4 for original configuration and Figure 5 for current configuration. Below are current descriptions of zones and CSZs in their current configuration.

**Zone 2** – Most of Zone 2 has been removed using the bay-by-bay demolition technique minus the staircase adjacent to CSZ 2.5. The stairwell and staircase bays will be removed as a singular demolition in conjunction with the removal of CSZ 2.5. Zone 2 will be completed prior to Zone 5 and A and C lines and tunnels demolition.

**CSZ 2.1** – The remaining vault structure can be demolished as a standalone if demolition occurs before A and C lines and tunnels demolition.

**CSZ 2.3** – Currently under demolition surgically removing it from CSZ 6.1. CSZ 2.3 also contains a stairwell and staircase bays that will be removed as a singular demolition after separation from CSZ 6.1.

**CSZ 2.4** – This area is fully segregated from CSZs 2.3 and 6.2, and demolition is complete.

**CSZ 2.5** – This area and associated tunnels has not started bay-by-bay demolition but will be removed prior to Zone 6 and A and C lines and tunnels demolition.

**Zone 3** – Zone 3 is fully segregated from CSZ 3, and demolition is complete.

**CSZ 3** – Demolition is approximately two-thirds complete and is being isolated from Zones 4 and 5 and CSZ 2.5 and associated tunnels.

**Zone 4** – Demolition is approximately one-third complete and will be worked in three separate areas adjacent to CSZs 4.1, 4.2, 4.3, and portions of CSZ 3. Zone 4 will be removed prior to Zone 5 and A and C lines and tunnels demolition.

**CSZ 4.1** – Demolition is approximately one-half complete and is isolated from the remaining Zone 4 in conjunction with the removal of CSZ 7.

**CSZ 4.2** – This area has not started bay-by-bay demolition and will be removed once the connecting Zone 4 has been removed, isolating it from Zone 5.

**CSZ 4.3** – This area has not started bay-by-bay demolition and will be removed once the connecting Zone 4 has been removed, isolating it from Zone 5.

**Zone 5** – Zone 5 does not contain any CSZs in its entirety. Zone 5 will be the last demolished and can be removed from all sides using the bay-by-bay technique, including removal of the second floor and duct level to expose the A and C lines and tunnels area.

**Zone 6** – This zone has not started bay-by-bay demolition and will be removed prior to Zone 5 and A and C lines and tunnels demolition. Zone 6 can be performed in two separate areas adjacent to CSZs 6.1 and 6.2, including the removal of the second floor and duct level to expose the A and C lines and tunnels area.

**CSZ 6.1** – This area has not started bay-by-bay demolition and will be removed once the connecting Zone 6 has been removed, isolating it from Zone 5, including the removal of the second floor and duct level to expose the A and C lines and tunnels area.

**CSZ 6.2** – This area has not started bay-by-bay demolition and will be removed once the connecting Zone 6 has been removed, isolating it from Zone 5, including the removal of the 2nd floor and duct level to expose the A and C lines and tunnels area.
Zone 7 – This Zone is fully segregated from CSZ 7, and demolition is complete.

CSZ 7 – Demolition is approximately two-thirds complete and is isolated from Zones 5 and 6 while working in conjunction with the removal of CSZ 4.1.

4.3.4.1 Preferred Demolition Sequence

The preferred sequence for demolishing the remaining 234-5Z structure is listed below using the approved bay-by-bay demolition method. Any changes to the preferred method will follow the project’s change management process.

- CSZ-3 and associated tunnels
- CSZ 4.1 and 7 concurrently
- CSZ 2.3, plus stairwells and staircases
- CSZ 2.5, plus stairwell and staircases and associated tunnels
- CSZ 2.1

Remaining Zone 4

- CSZ 4.2 (Figure 25)
- CSZ 4.3

Zone 5 – Remove only the second floor and duct level to expose A and C lines and tunnels in portions of this zone. Note: The removal of Zone 5 second and duct level can be demolished concurrently with Zone 6.

Zone 6 – Remove only the second floor and duct level to expose A and C lines and tunnels in portions of this zone.

- CSZ- 6.1 – removal of only the second floor and duct level to expose A and C lines and tunnels in portions of CSZ 6.1
- CSZ 6.2 – removal of only the second floor and duct level to expose A and C lines and tunnels in portions of CSZ 6.2

Figure 25. Removal (blue) of CSZ 4.2, Second Floor and Duct Level Connected to Zone 5 and Remaining (red) A and C Lines and Tunnels
4.3.4.2  **Physical Work Activity**

Zones and CSZs will be removed following the preferred bay-by-bay demolition sequence. This method will help minimize debris pile accumulation at the end of the shift, however it is acceptable that the debris pile be left over from the previous shift as long as fixative has been applied prior to leaving and thereafter in accordance with current procedures. There is no time restriction regarding how long a debris pile may be left, but the debris pile must be size reduced and staged for waste loadout prior to resuming building demolition. A residual amount of debris and/or waste loadout material may be present during building demolition. The air dispersion model allows for multiple (up to four) locations to be worked simultaneously without exceeding assumptions or limits built into the model during this phase. During this evolution, rubble and debris piles, residual debris, and waste loadout material from 234 5Z will receive fixatives once physical demolition activities cease.

4.3.5  **Phase C – Demolition of A and C Line and Tunnels**

Current zone-by-zone demolition strategy with additional controls, including ventilation on A and C lines and tunnel corridors, will enhance particulate control during demolition. Ventilation on existing A and C lines and tunnel corridors enhances particulate control during demolition.

A and C lines and their associated tunnels is a generic description (also referred to as remote mechanical A line [RMA] and remote mechanical C line [RMC] areas and Tunnels 4 and 5) for a constellation of labs situated in Zones 5 and 6 located on the first floor of 234-5Z. RMA consists of four individual lab areas, whereas RMC consists of seven; these individual labs in the RMA and RMC lines are interconnected with doorways and penetrations. These single bay high areas have already had fixative applied to their interior and the outer concrete rooms will be exposed after the demolition of Zones 5 and 6, second floor, and duct levels, leaving only the A and C line areas (Figures 26 through 31). Tunnels 4 and 5 (Figures 31 and 32) are sub-level passages containing epoxy-filled process lines and drains to be mechanically removed during RMA and RMC demolition activities, which will expose the tunnels and enable heavy equipment to remove previously identified process piping and backfill the tunnel area during demolition activities.
Figure 26. Demolition Area C – A and C Lines and Tunnels in 234-5Z

Figure 27. RMA and RMC Location in Zones 5 and 6 with CSZs

Figure 28. First Floor RMA and RMC Location in Zones 5 and 6
Figure 29. Preparing RMA for Demolition
Figure 30. RMC Location Prepped for Demolition

Figure 31. Tunnel 4 and 5 Location Under RMA and RMC
4.3.6 Ventilation Controls and Placement

An air mover ventilation unit may be attached to the A or C line corridors. Two air movers will be available for use and are the IONEX exhausters already approved for use in the Removal Action Work Plan (RAWP, DOE/RL 2011-03, Removal Action Work Plan for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex), with the preferred location located at room 227 in Zone 6 or Room 232 in Zone 5 to achieve a sweeping air flow through corridors while actively demolishing from the opposite area working toward the ventilation inlet (Figure 33). Should the preferred placement location options be unavailable, any of the alternate locations identified in Figure 33 may be used. The application of the exhausters as described in this section is consistent with, and used in accordance with, the RAWP, and will not result in emissions outside the RAWP requirements. The ventilation unit will consist of an air mover, flexible duct hosing, and a pre-made shroud assembly constructed outside the demolition zone (Figure 34). The shroud and flexible ducting will be placed, funneling airflow into the HEPA filters in the ventilation unit, allowing capture of particulate that may come loose to be swept toward the ventilation until the tunnel or lines can be breached to allow appropriate fixative application (i.e., fogging with water dogs or direct spray with water truck or directional devices). Ventilation will aid with particulate control while opening the tunnels and removing previous epoxy-filled process lines that will be removed in segments during demolition. Using the bay-by-bay method will enable demolition to planned stopping points and remove debris and rubble prior to starting a new segment under both ventilation and fixative controls. While the intention is to minimize debris pile accumulation at the end of the shift, it is acceptable that debris piles be left over from the previous shift as long as fixative has been applied prior to leaving and thereafter in accordance with current procedures. There is no time restriction regarding how long a debris pile may be left, but the debris pile must be size reduced and staged for waste loadout prior to resuming building demolition. A residual amount of debris and/or waste loadout material may be present during building demolition. The air dispersion model allows for multiple (up to four) locations to be worked simultaneously without exceeding assumptions or limits built into the model during this phase. During this evolution, rubble and debris piles, residual debris, and waste loadout material from 234 5Z will receive fixatives once physical demolition activities cease.
Note: Blue stars identify preferred locations; red circles identify alternate locations.

**Figure 33. Identified Locations for Ventilation Attachments for A and C Lines**

**Figure 34. Ventilation Shroud**

The preferred placement of the ventilation shroud is at the opening of room 232 for the RMA and at the opening of Room 227 for the RMC. These locations can draw air from both A and C lines and tunnels simultaneously. Note: Even though there are preferred placement options, any doorway or opening identified in Figure 33 can be selected to achieve ventilated demolition using sweeping air flow as long as the demolition activities work toward the air mover inlet.

The field work supervisors will brief the controls for ventilation and ensure operational prior to the start of demolition activities when required. Ventilation will be observed from the heavy equipment operator during the removal of individual bays to ensure that airflow and water overspray are sweeping inward. All members of the workforce will be briefed on air flow expectations and can contact the FWS to stop the demolition process if air flow is not being achieved. If air does not indicate inward flow by visibility of water overspray, the FWS will stop demolition and contact the director of demolition to begin the work control change process to allow for additional ventilation to be installed at other locations. The change
process will included the needed disciplines to confirm additional location(s) and hazards prior to commencing work activities.

**Physical Work Activity**

Heavy equipment shall be used for removing RMA and RMC. The air mover shall be in place at either preferred location on the east end of the RMA and RMC, and energized. The bay-by-bay removal process will work from west to east, with debris not exceeding more than can be removed in the subsequent shift. Once a single bay is removed, the tunnel piping will be exposed for removal and voids would be backfilled immediately with soil. As described in the work control document, water or approved fixatives will be applied to debris using approved application systems and techniques during demolition activities.

Heavy equipment will size-reduce large components to prepare the material for transfer to the waste loadout area. Size-reduced waste material will be transferred to the identified waste loading area, placed into approved waste containers, and the waste containers sealed. Water or approved fixatives will be applied at the work location during waste material size reduction and loadout activities.

At the end of each shift as a minimum (or when the demolition work area is unmanned), fixative will be applied to all remaining debris piles and all newly exposed surfaces in RMA, RMC, or the associated tunnels as described in the detailed work control document.

**4.3.7 Phase D – Remaining PRF Demolition and Rubble Pile**

By adding water to the overburden soil that currently covers the 236-Z Building rubble pile, the soil will become saturated and better able to prevent contamination migration. Heavy equipment will remove the wet soil and rubble and place it in an approved container for shipment to ERDF. Properly distributed (approximately 18 in. or greater), the overburden would reduce dose rates from radiological sources, stabilize the components, and reduce hazard and particulate migration in the affected areas.

The PRF rubble pile is an approximately 115 by 80 ft area covered with a minimum of 18 in. of relatively clean soil over building debris and partially erect (4 to 8 ft tall) portions of concrete foundation wall (Figures 35 through 37). The comingling of this rubble with fixative application is considered to be stabilized (Section 4.1).
Figure 35. Demolition Area D – Remaining 236-Z Demolition and Rubble Pile

Figure 36. PRF Rubble Pile – 04/08/2018
Adequate saturation means sufficiently mixing or penetrating with liquid to prevent the release of particulates contained in the soil. The use of foggers in conjunction with the conceptual spray pattern for a minimum of 15 minutes prior to the start of removal of the rubble will provide the saturation levels needed by this option. Other fixative application devices may be used to supplement foggers including but not limited to hand pumps, adjustable water cannons, sprinkler systems, etc. If particulate releases are observed coming from the PRF rubble pile, then that material has not been saturated and the additional application of water or fixatives is required. This particulate release does not include condensed uncombined water vapor.

The rubble should be retrieved only from beyond the crest of the spray arch as shown in Figures 38 through 40. Water or approved fixative delivery devices, as illustrated in Figures 38 and 39, should be used in conjunction with the conceptual spray pattern for a minimum of 15 minutes prior to the start of removal of the rubble (Figure 40). The 15-minute pre-soak time provides approximately 1,500 gal per each waterdog trailer at full speed. Two water or fixative delivery systems provides approximately 3,000 gal of liquid, to saturate the working face. Continuous monitoring for dust during the physical demolition activities will be performed to minimize the spread of contamination and ensure that the rubble is adequately saturated. The air dispersion model only supports working at one location at a time during the remaining PRF demolition and removal of rubble piles.
Physical Work Activity

For the PRF rubble pile and debris, water or fixative application delivery systems must cover the area adequately. Prior to the start of removal, a minimum 15-minute spray time shall be completed using a minimum of two water or fixative application delivery systems. Heavy equipment shall be positioned to remove rubble only beyond the arch of the application device’s spray pattern. While performing the 15-minute pre-soak, heavy equipment will gently disturb the fixative-hardened planned work area to allow for water infiltration (represented by yellow circle in Figure 40). Working from north to south, equipment shall remove no more than an approximately three-fourths filled exactor “bucket load” for transfer to a pre-staged approved waste container. Single removal locations shall be used to ensure that
physical material removal does not exceed the available containers. Note that the controls for water and fixative identified here will be used for removal of the foundation walls. Sequencing of demolition of the debris pile and foundation walls will be defined in the work control document.

Again, working from north to south, equipment shall remove foundation walls. Once exposed, the walls shall be removed in manageable pieces using excavator attachments and close to the soil level at all times. Once pieces are freed, the rubble and debris shall be transferred to an approved waste container. During demolition activities per the work control document, including rubble disposition and foundation wall removal, fixatives shall be applied continuously to the affected area.

As described in the work control document, water or fixatives shall be applied at work locations when performing size reduction and waste loadout activities. For transfer to the waste loadout area, large components shall be size reduced beyond the spray arch and placed in approved waste containers with co-mingled wetted soil and the waste container sealed. Water or approved fixatives will be applied to debris using approved application systems and techniques during size reduction and waste loadout activities. RCTs will perform dust monitoring to examine dust generated in the demolition area. Field work supervisors, heavy equipment, and water application system operators will monitor for dust at the working interface while actively removing and packaging material at the job site. If dust generation is observed, the demolition process will pause while additional water is applied. If dust suppression cannot be achieved, the field work supervisor will adjust the location of the water/fixative application system per engineering guidance to attain adequate water delivery for dust control.

Wetted soil and fixative will be applied to newly exposed rubble or foundation walls at the end of each shift as a minimum or when the demolition work area is unmanned.

5 Demolition Controls

The controls described in this chapter and in Chapter 6 will be implemented prior to resuming demolition activities and represent lessons learned and corrective actions developed during the PFP recovery period since December 2017.

5.1 Safety Basis

Resumption of demolition activities at PFP will be governed by the accident analyses and controls in HNF-15500, Plutonium Finishing Plant Deactivation and Decommissioning Documented Safety Analysis, and HNF-15502, Plutonium Finishing Plant Deactivation and Decommissioning Technical Safety Requirements, as applicable to the Documented Safety Analysis Demolition Phase. All new work documents developed for resumption of demolition activities (see Section 6.2) will receive unreviewed safety question review to ensure that the proposed activity is consistent with the D&D safety basis.

5.2 Criticality Controls

Prior to demolition, Criticality Safety Evaluation Report (CSER) 15-002, Criticality Safety Incredibility Evaluation Report for the Final Demolition of Buildings 234-5Z, 236-Z, and 242-Z, was developed (and published as CHPRC-02512) to identify fissile material limits and controls that had to be met to ensure that a criticality accident would not be credible during the demolition of each of the buildings. Criticality Prevention Specification (CPS)-Z-165-80200, PFP Complex Demolition, was developed to implement the CSER. Included in the CPS was a PFP Complex Criticality Incredibility Checklist to document completion of prerequisites that had to be met to declare criticality incredibility. PFP facilities were deemed criticality incredible through characterization, process knowledge, visual inspection, downsizing, removal of any components and equipment that exceed nuclear criticality safety mass criteria, and
application of encapsulation or void filling of process equipment and piping, which fixes any residual
radionuclides and precludes water entry. The CPS checklist was completed for each building. While
criticality incredibility has been declared for these facilities, waste management and demolition activities
are still subject to criticality safety work limits and process controls that maintain criticality incredibility.
This is accomplished through use of CPSs that are integrated into the work documents developed for
demolition activities, waste packaging activities, staging, storage, and shipment of wastes in containers.
No additional action is required to support demolition resumption.

5.3 Facility Characterization

Characterization activities are limited to those structures and below-grade areas in the scope of the RAWP
and are expected to occur through the balance of the D&D process. Sampling requirements are described
in DOE/RL-2004-29, Sampling and Analysis Plan for the Plutonium Finishing Plant Above-Grade
Structures. Characterization data will be collected to document end-state criteria that have been met, as
stated in HNF-22401.

Initial characterization was conducted in conjunction with D&D activities for PFP Complex structures.
Prior characterization data, process knowledge, and historical information was used to identify potential
data gaps for inclusion into initial characterization activities for above- and below-grade areas. Subgrade
ductwork and drain lines (not in the current scope of work for CHPRC) are characterized at the point
where they connect to the slab or below-grade space of structures. In addition to prior data, process
knowledge, and historical information, data obtained by this characterization iteration are used for air
dispersion modeling, monitoring modeling, identification of waste disposition pathways, items requiring
special handling (i.e., cannot be rubblized during demolition) or packaging, and appropriate
demolition/dismantlement methods. The data will be compiled and documented in a report that addresses
each facility or group of facilities.

5.4 Air Dispersion Model

Pacific Northwest National Laboratory (PNNL) performed air dispersion modeling in support of
CHPRC’s demolition planning effort by making engineering estimates of potential releases during
demolition of PFP structures. The results of this modeling are intended to serve as guidance in
establishing boundaries and an air monitoring regime.

Atmospheric dispersion modeling using estimated release rates provided information on the location and
levels of radioactive contamination anticipated from demolition activities. The size of the original 234-5Z
facility had the potential to affect dispersion patterns through various meteorological phenomena,
including building wake effects. As the structures have been demolished, impacts on dispersion from
wake effects have diminished. Hourly meteorological data collected over six years (2004–2009) were
used to examine the effects of wind speed, direction, and stability on projected concentrations of
contaminants in air and deposited on nearby surfaces.

The radioactive contamination of concern for the PFP Complex is primarily transuranic contamination
from past operations. Cleanout operations have removed a large fraction of this contamination. Source
terms modeled in this report are based on the residual transuranic contamination levels anticipated for the
various sections of the structure at the time of demolition.

The radiological consequences have been established using the five-factor formula from
DOE-HDBK-3010-94, Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor
Nuclear Facilities, considering MAR, damage ratio, airborne release fraction, respirable fraction, and leak
path factor. Radioactive contamination emissions have been calculated by release mechanism and
demolition area for on-shift and off-shift activities. The emissions from the applicable sources have been combined to provide emissions estimates for each day from each demolition area.

The U.S. Environmental Protection Agency’s American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) computer code is used to estimate atmospheric dispersion and deposition of the released radioactive materials near the demolition activities. Modeling is fully representative of the range of possible weather conditions (i.e., uses multiple full annual cycles of meteorological data) and representative of the expected demolition period (i.e., models the hours of the day that demolition activities will occur). The modeling also includes the effects of local building structures on the near-field atmospheric dispersion rates due to wake effects.

Both airborne and surface concentrations are modeled with AERMOD. Hourly derived air concentrations (DAC) are also modeled for an array of receptors covering the demolition site and surrounding area. Peak (95th and 99th percentiles) values of time-integrated air concentrations at these receptor points are derived from these hourly values, with modeling results reported as total incremental air concentrations in the integrated value DAC-hours occurring over the selected time period. Air concentrations are expected to fluctuate during the demolition processes with transient periods of higher and lower airborne concentrations. However, because computed doses are based on integrated intake, instantaneous airborne concentrations are not necessary in this analysis. Total accumulated deposition amounts are also evaluated with AERMOD using the same array of receptors, with results reported as dpm per 100 cm².

Each building in the PFP Complex is considered in terms of its construction and suggested target contamination levels. The modeling effort is based on the planned sequence of demolition phases, and the results are based on CHPRC-proposed demolition rates, schedules, and methods. The various building zones are assumed to be demolished using hydraulic shears or mechanical hammer. Certain ductwork and piping may remain in the building until demolition. The entire demolition process for the remaining portions of 234-5Z is assumed to require 20 days (about four work weeks). The modeling of demolition activities incorporates some realistic assumptions based on input from CHPRC about release mitigation; use of fixatives and misting/spraying is included in all release estimates. Work is assumed to be performed during a 10-hour day shift only, with concurrent demolition and rubble removal. Additional air dispersion modeling will be performed to understand the impacts of possible backshift activities. Including concurrent demolition and rubble removal in analysis produces a bounding result. Demolition plans call for completion of demolition debris loadout prior to resuming activities that generate additional debris during the current day.

The exposure results from structure demolition are presented as local-area maps of potential exposures from demolition activities. The results are expressed as total DAC-hours for demolition activities during the work week generating the highest source terms coupled with the bounding (95th and 99th percentiles) meteorological conditions based on six years of hourly local climatology data. The results are based on the highest projected emission rates related to the demolition of the RMA and RMC lines. The results present a composite of the maximums of 95th percentile exposure values on the area surrounding the demolition activity based on all the modeled total work-week exposures based on total exposures for all the contiguous five-day periods from six years of meteorological observations. All other demolition activities for this building will have equal or lower levels of predicted weekly peak exposures.

The air dispersion modeling performed indicates that some releases of radioactive material are to be anticipated during the demolition of the PFP structures. The results indicate that the radiological exposures from the planned demolition efforts will be well below the designated limits for air and soil exposures. However, demolition of the 234-5Z structures is expected to release some alpha-emitting radionuclides. Concentrations at the PFP facilities fence line should remain well below 12 DAC-hr/week.
given the 95th and 99th percentile results based on six years of hourly climatological data, a representative demolition period, realistic mitigating actions, and a bounding source term indicate.

The total source term in PFP facilities was determined by summing plutonium content attributed to the types of residual contamination that in the air dispersion model were assigned separate emission factors. For the air dispersion model to capture the project sequence and the rate at which sources would be encountered, the following source types were further indexed by facility demolition:

- Structural externally fixed contamination on floors and walls. The residual quantity of plutonium was determined by statistical analysis of radiological survey contamination data. Data collection was guided by the application of Visual Sample Plan protocols.

- Internal contamination in room exhaust (E-3) or process exhaust (E-4) ductwork. For E-3, the residual quantity of plutonium was determined by statistical analysis. Judgmental analysis of coupon contamination data determined holdup in E-4 ducting. As the maximum coupon contamination level measured over a given span of ductwork characterized the surface activity over the whole span, the judgmental analysis was conservatively biased.

- Residual discrete sources derived from in situ nondestructive analysis (NDA) per safeguards protocols. Such sources consisted of floor-wall ventilation stubs and segments distributed throughout the facility and incorporated in the low-level waste (LLW) debris. NDA was also used to quantify wall and void area residual in the recovery of uranium and plutonium by extraction area, room 221A. A surface-contaminated object characterization and engineering analysis quantified the HA-46 glovebox and associated bank tanks in room 232.

- NDA quantified special handled items earmarked for surgical removal and packaging as transuranic waste during demolition. For 234-5Z these consisted of epoxied process vacuum system segments (removed), internally fixed E-4 segments, and gloveboxes (also removed).

With respect to source term results, an upper 95 percent confidence level (UCL95) of the mean value was used to quantify the air dispersion model input for PFP recovery. A summary is provided in Table 1.

### Table 1. 234-5Z Recovery Air Model Input Summary

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<th>Total Pu (g)</th>
<th>Rel $\sigma/\mu$ (%)</th>
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Table 1. 234-5Z Recovery Air Model Input Summary

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</tr>
<tr>
<td></td>
<td>E-4 TRU removal (12 and 22 ft)</td>
<td>22.5</td>
<td>9.09</td>
<td>40</td>
<td>37.5</td>
</tr>
<tr>
<td>Z-7</td>
<td>Vault annex</td>
<td>0.00</td>
<td>0.00</td>
<td>46</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Tunnels 4 and 5 with Z-5, 6</td>
<td>247</td>
<td>55.32</td>
<td>22</td>
<td>339</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3</td>
<td>0.64</td>
<td>189</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Tunnels 1, 2, and 3, last removals</td>
<td>128</td>
<td>48.33</td>
<td>38</td>
<td>208</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>1.90</td>
<td>126</td>
<td>5</td>
</tr>
</tbody>
</table>

Nominal quantified total: 410.58
Conservative input: 632.43

*The notation of ground floor assumes that demolition has occurred.

GB = glovebox
LLW = low-level waste
TRU = transuranic
UCL95 = upper 95% confidence level
RECUPLEX = recovery of uranium and plutonium by extraction

Previous dispersion model inputs used UCL95 values only for internally and externally contaminated structural floors/walls and ductwork. For sources quantified by NDA methods, the nominally measured plutonium source was previously used as input. This convention was adopted to align with waste management practices and recognize the capabilities of in situ NDA. Most in situ measurements were completed using the sodium-iodide detector, which was more readily deployed in areas of limited accessibility but delivers high uncertainty in settings with low plutonium holdup. For sources quantified by NDA methods, nominal inputs were considered appropriate through recognition of added conservatisms incorporated by the dispersion model.

In addition, Lawrence National has conducted additional modeling of air dispersion and particle deposition. This model is under final review and results will be incorporated into the work planning.

5.5 Health and Safety Plan (HASP)

The PFP Health and Safety Plan, CHPRC-00328, PFP Project Site Specific Health and Safety Plan (HASP), addresses the health and safety requirements for demolition of buildings within the PFP Complex. Response to upset conditions and emergency response reactions will be within the HASP. As part of demolition preparation, a drill program as outlined PRC-PRO-EM-40317, Operational Drill Program, will be established and initiated to demonstrate the response to upset conditions and response readiness of personnel and equipment.
The HASP outlines controls designed to minimize health and safety risks to workers and other onsite personnel. The HASP also establishes requirements, provides general guidelines, and conveys facility-specific hazard communication information to PFP personnel performing work within the PFP demolition area.

The primary purpose of PFP’s HASP is to identify how the project meets the required elements of a HASP under 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response.” These required elements are met by the implementation of company-level procedures such as those that dictate work planning, training, and emergency response. Project hazards are identified and evaluated per the job hazard analysis process dictated in PRC-PRO-WKM-079, Job Hazard Analysis. Typical job hazard analyses (JHAs) that the project uses include general industrial hazard analyses (GHAs); craft-specific hazard analyses (CHAs); and JHAs. Mitigative controls are incorporated in hazard analyses (GHAs, CHAs, and JHAs), work packages, and procedures, as appropriate.

The HASP describes the CHPRC training program, which ensures personnel are trained to safely, competently, and effectively perform their job function while protecting themselves, fellow workers, the public, and the environment. Personnel are trained to perform assigned tasks in accordance with federal, state, and local regulations; DOE directives; agreements; and management-directed training. The CHPRC training programs provide personnel with the training to meet the ISMS and Environmental Management System (EMS) Guiding Principle of Competence Commensurate with Responsibility. In some cases (e.g., radiological control technicians), training includes core examinations that must be passed per criteria in order to perform duties.

All employees exposed to hazardous substances, health hazards, or safety hazards and the site Responsible Managers (RMs) receive the requisite training before they are permitted to engage in Hazardous Waste Operations and Emergency Response (known as HAZWOPER) activities. CHPRC’s training process requires the development of Individual Training Plans for all employees. These plans contain all initial and refresher training that is required for employees to perform their jobs safely and effectively.

5.6 Radiological Monitoring and Control

To ensure the safety of workers, the public, and the environment, CHPRC is incorporating several enhancements to radiological controls as a result of the December 2017 contamination spread at PFP. Increased radiological area boundaries, established from predicted air dispersion and surface deposition models discussed above, will encompass levels requiring posting and control and will ensure contamination remains within posted boundaries. Radiological monitoring, near-field radiation monitoring, and personnel radiological monitoring parameters will be specified in the As Low As Reasonably Achievable management worksheets within the specific activity work packages and radiological work permits. Radiological personnel, air, and surface monitoring is discussed below.

5.6.1 Personnel Monitoring

Personnel monitoring improvements include the use of hand and foot monitors at egress locations at the radiological buffer area boundaries to minimize errors in monitoring personnel for contamination.

5.6.2 Air Monitoring

Increased use of fixed air samplers along with the continuous air monitors, during both demolition and nondemolition activities, will provide more confidence that contamination controls are effective. One radiological control technician will be assigned to monitor CAMs remotely per shift, during demolition activities. Field work supervisors will be notified via radio of any rate of rise that exceeds 50 percent of
the CAM chronic alarm set point and the crew directed to stop demolition and apply additional water/fixative. In the event of a continuous air monitor alarm (not including spurious or radon related alarms), stored continuous air monitoring data will be retrieved by the project for trending and analysis. As entry into or near the radiological control areas will be necessary to access the continuous air monitor data, worker safety will be a factor in retrieving this information and therefore the process of deploying employees will be in line with current worker protection and ALARA considerations. The number, location, monitoring frequency, turnaround times, and action levels are shown in Table 2.
Table 2. Monitoring and Response

<table>
<thead>
<tr>
<th>Continuous Air Monitors</th>
<th>Cookie Sheets</th>
<th>Fixed Air Samplers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Demolition</strong></td>
<td><strong>During Demolition</strong></td>
<td><strong>Non-Demolition</strong></td>
</tr>
<tr>
<td><strong>Number/ location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 total</td>
<td>77 total</td>
<td>35 total</td>
</tr>
<tr>
<td>4 inner CAMs (closer to demolition)</td>
<td>47 inside HCA and CA</td>
<td>15 inside HCA and CA</td>
</tr>
<tr>
<td>(24 DAC-hr)</td>
<td>18 inside RBA</td>
<td>8 inside RBA</td>
</tr>
<tr>
<td>10 outer CAMs (further from demolition)</td>
<td>12 outside work control zone</td>
<td>3 inside work control zone</td>
</tr>
<tr>
<td>(8 DAC-hr)</td>
<td>Additional deployed in prominent downwind location from job site, based on wind direction</td>
<td>9 outside work control zone</td>
</tr>
</tbody>
</table>

**Monitoring frequency**

- Visual once per shift
- Filter paper changed daily or for cause (rate of rise noted)
- Continuously observed by RCTs
- Filter paper changed daily or for cause (rate of rise noted)
- Surveyed twice per day
- Surveyed after wind events
- Near real-time surveys of cookie sheets in prominent downwind location of demolition and within the demolition HCA, boundary of the HCA and CA
- Filter paper changed daily or for cause
- Filter paper changed daily or for cause

**Turnaround time**

- Filter papers take 24 hr to analyze
- Results every 15 minutes; can differentiate between alpha and background
- Filter papers take 24 hr to analyze
- Results real time
- Filter papers take 24 hr to analyze
- Filter papers take 24 hr to analyze

**Action level**

- Upon alarm
- 50% of the chronic alarm set point
- >1,600 dpm/100cm² inside HCA and CA
- >20 dpm/100 cm² outside the CA
- Any contamination above action levels assumed to be alpha; further analysis may determine it is radon
- >1,600 dpm/100cm² inside HCA and CA
- >20 dpm/100 cm² outside the CA
- Any contamination above action levels assumed to be alpha; further analysis may determine it is radon
- 20,000 dpm
- 20,000 dpm

**Response**

- Exit area/notify management
- Notify FWS
- Stop demolition
- Apply additional water/fixative
- Obtain/analyze data history trend
- Notify Operations/RadCon Management
- Perform sample analysis
- Evaluate need for additional water/fixative
- Evaluate need to revise posting
- Notify Operations/RadCon Management
- Perform sample analysis
- Evaluate need for additional water/fixative
- Evaluate need to revise posting
- Notify RadCon Management
- Evaluate need for timely sample analysis
- Notify RadCon Management
- Evaluate need for timely sample analysis

---

a. Numbers and location may change based on further analysis.
b. Filter paper on CAMs and air samplers at ARA boundaries and downwind are counted every 24 hr, which is required for filter paper analysis for additional CAMs and air samplers as needed due to equipment and employee resources.

ARA = airborne radioactivity area
CA = contamination area
CAM = continuous air monitor
RCT = radiological control technician
5.6.3 Surface Contamination

Cookie sheets deployed as shown in Table 2 will provide monitoring and smear locations to validate controls are effective. Wind survey protocols remove employees from affected work areas and assess changes to contamination levels (if any):

- Work stop at 15 miles per hour (mph)
- Access restricted at >30 mph average or 40 mph gusts, followed by response surveys of cookie sheets and boundaries. The expanded monitoring locations for demolition resumption are shown in Figure 41.

![CURRENT RADIOLOGICAL BUFFER AREA AND ACCESS CONTROL BOUNDARY (UPDATED 6/5/18)](image)

**Figure 41. Monitoring Locations After December 2017**

Based on analysis of the potential emissions and evaluation of available control technologies, the following techniques are examples of those that will be used to control air emissions during demolition.

- Water or fixative will be applied for suppressing dust during any demolition and waste loadout activity, as defined in work packages.
- Fixative use and application will comply with manufacturer recommendations and documented engineering evaluations.
• Radiological surveys (e.g., smears) will be taken on equipment, tools, and materials in areas where there is the potential for removable contamination.

• Demolition equipment, tools, and materials, with removable contamination above 2,000 dpm/100 cm² alpha will be decontaminated, wrapped, or fixed in place.

• Appropriate controls such as water, fixatives, covers, containment tents, or windscreens will be applied as defined in project work packages and procedures.

• Fixatives or cover material (e.g., soil, gravel, and plastic) will be applied to disturbed contaminated soils and demolition debris associated with the PFP Complex when field activities cease for the day.

The waste packages will remain closed, except during packaging and waste inspection activities once they are staged onsite.

5.7 Contamination Control Fixative Plan

To evaluate effective contamination control techniques and products, CHPRC investigated alpha contamination fixatives for use in resuming demolition of PFP and loadout of the demolition debris. CHPRC-03653, *Fixative Application Recommendation for PFP Demolition*, documents the comparisons and recommendations to control the spread of radioactive alpha contamination during demolition and is summarized below.

The demolition operations had been applying a diluted (25 percent to 75 percent solution) PBS liquid adhesive fixative at the time of the airborne contamination event. PBS was applied using water cannons on waste piles being transferred into waste boxes. To facilitate application of PBS using water cannons, the fixative was diluted beyond the manufacturer’s recommendations, likely reducing the effectiveness of PBS in controlling the spread of contamination. Following the event, other fixatives including Soil-Sement and Envirotac II were applied to limit the spread of contamination and have been effective to date. Additionally, PBS has been used but in full strength per the manufacturer’s recommendation.

The fixatives listed in Table 3 are approved for use at PFP, provided that they are applied per the manufacturer’s recommendations and with the limitations previously noted. The fixatives were evaluated and are proprietary formulations of synthetic and natural polymers with varying amounts of water content that bind or adhere to radioactive contamination. The manufacturer’s recommendations regarding the type of matrix the product can be used on and dilution are also summarized. Reapplication frequency is based on the manufacturer’s recommendation and Hanford Site experience.

<table>
<thead>
<tr>
<th>Fixative (Product)</th>
<th>Contamination Matrix</th>
<th>Dilution Ratio</th>
<th>Reapplication Frequency</th>
</tr>
</thead>
</table>
| Polymeric Barrier System | • Waste piles  
• Vertical structures | Do not dilute | When loosened or cracked |
| Envirotac II® | • Soil  
• Waste piles  
• Vertical structures | 225 gal product to 1,000 gal of water (~1 to 4) | Every 30 days or when disturbed |
| InstaCote® CC Demo 100 | • Soil  
• Waste piles | Do not dilute | Every 6 months or when disturbed or cracked |
Table 3. Fixatives, Matrix, Dilution, and Reapplication Frequency

<table>
<thead>
<tr>
<th>Fixative (Product)</th>
<th>Contamination Matrix</th>
<th>Dilution Ratio</th>
<th>Reapplication Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ames® Blue Max®</td>
<td>Waste piles</td>
<td>1 part product to 7 parts water</td>
<td>When yellowed</td>
</tr>
<tr>
<td>Soil-Sement®</td>
<td>• Soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Waste piles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Vertical structures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Ames and Blue Max are registered trademarks of Ames Research Laboratories, Inc., Salem, Oregon. Envirotac II is a registered trademark of EP&A Envirotac, Inc., La Quinta, California. InstaCote is a registered trademark of InstaCote, Inc., Erie Township, Michigan. Soil-Sement is a registered trademark of Midwest Industrial Supply, Inc., Canton, Ohio.

Table 4 summarizes the approved applications for fixatives as applied over other foundation layer 1 fixatives, considering the allowed condition of the foundation layer fixative (dry, damp, or wet) to ensure fixative effectiveness and adhesion. A summary of the approved fixatives for a proposed application and contamination matrix is shown in Table 5.

Table 4. Approved Fixative Applications

<table>
<thead>
<tr>
<th>Product to Apply</th>
<th>Envirotac II® (Rhino Snot)</th>
<th>Soil-Sement®</th>
<th>InstaCote® CC Demo 100</th>
<th>Ames® Blue Max®</th>
<th>Polymeric Barrier System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymeric Barrier System</td>
<td>Damp*</td>
<td>Damp*</td>
<td>N/A</td>
<td>N/A</td>
<td>Wet</td>
</tr>
<tr>
<td></td>
<td>Dry</td>
<td>Dry</td>
<td>Dry</td>
<td>Dry</td>
<td>Dry</td>
</tr>
<tr>
<td>Envirotac II® (Rhino Snot)</td>
<td>Wet</td>
<td>Damp</td>
<td>Damp*</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Dry</td>
<td>Damp</td>
<td>Damp</td>
<td>Dry</td>
<td>Dry</td>
</tr>
<tr>
<td>InstaCote® CC Demo 100</td>
<td>Damp*</td>
<td>Damp*</td>
<td>Wet</td>
<td>N/A</td>
<td>Damp*</td>
</tr>
<tr>
<td></td>
<td>Dry</td>
<td>Damp</td>
<td>Damp</td>
<td>Dry</td>
<td>Dry</td>
</tr>
<tr>
<td>Ames® Blue Max®</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Soil-Sement®</td>
<td>Damp*</td>
<td>Wet</td>
<td>Damp*</td>
<td>N/A</td>
<td>Damp*</td>
</tr>
<tr>
<td></td>
<td>Dry</td>
<td>Damp*</td>
<td>Damp*</td>
<td>Dry</td>
<td>Dry</td>
</tr>
</tbody>
</table>

Notes: Ames and Blue Max are registered trademarks of Ames Research Laboratories, Inc., Salem, Oregon. Envirotac II is a registered trademark of EP&A Envirotac, Inc., La Quinta, California. InstaCote is a registered trademark of InstaCote, Inc., Erie Township, Michigan. Soil-Sement is a registered trademark of Midwest Industrial Supply, Inc., Canton, Ohio.

*May be applied after a 24-hour cure time.

N/A = not applicable
### Table 5. Approved Fixative by Application/Matrix

<table>
<thead>
<tr>
<th>Application/Matrix</th>
<th>Fixative (Recommended Product)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contaminated soil</td>
<td>Soil-Sement®</td>
</tr>
<tr>
<td></td>
<td>Envirotac II®</td>
</tr>
<tr>
<td></td>
<td>InstaCote® CC Demo 100</td>
</tr>
<tr>
<td>Structures (stable and building demolition)</td>
<td>Soil-Sement®</td>
</tr>
<tr>
<td></td>
<td>Envirotac II®</td>
</tr>
<tr>
<td></td>
<td>Polymeric Barrier System</td>
</tr>
<tr>
<td>Waste (debris) piles</td>
<td>Soil-Sement®</td>
</tr>
<tr>
<td></td>
<td>Envirotac II®</td>
</tr>
<tr>
<td></td>
<td>InstaCote® CC Demo 100</td>
</tr>
<tr>
<td></td>
<td>Polymeric Barrier System</td>
</tr>
<tr>
<td></td>
<td>Ames® Blue Max®</td>
</tr>
</tbody>
</table>

Notes: Ames and Blue Max are registered trademarks of Ames Research Laboratories, Inc., Salem, Oregon. Envirotac II is a registered trademark of EP&A Envirotac, Inc., La Quinta, California. InstaCote is a registered trademark of InstaCote, Inc., Erie Township, Michigan. Soil-Sement is a registered trademark of Midwest Industrial Supply, Inc., Canton, Ohio.

1. Given the current facility configuration in mid-demolition with large nonhomogeneous debris piles, Soil-Sement is the preferred application for PFP demolition. Envirotac II is equivalent to Soil-Sement but is a less preferred alternative due to mixing ratios and cost. Both products can be applied to soil, waste piles, and buildings, and both products use the same equipment for application. In addition, both products can be applied over the existing debris previously sprayed with the other fixatives listed in Table 4.

2. Fixative will be applied during demolition to those newly exposed surfaces at the end of a work shift or due to inclement weather regardless of whether the previous fixative application has cured for 24 hours. The 24-hour cure time is applicable for meeting the undisturbed aspect of the fixative for reapplication frequency (Table 3).

3. The selection of the fixative is only one consideration in implementing the broader contamination control strategy during demolition of contaminated structures. Additional factors to be considered during application are the manner of application (hosing, misting, and trawling) by Engineering Evaluation (PFP-TE-18-0004, Technical Evaluation for PFP Floggers, and PFP-TE-18-0005, Technical Evaluation for PFP Water Cannons), and ambient conditions (wind speed, wind direction, air temperature, and humidity) by field optimization.

### 5.8 Electrical and Mechanical Isolation

To minimize the risk from hazardous energy sources during demolition, CHPRC developed and implemented the requirements of PRC-PRO-DD-40013, Electrical and Mechanical Isolation of Facilities to Support D&D Work, for each building. Electrical and mechanical (including utilities) isolations were completed for each building for each service prior to initiation of demolition activities and no additional action is required to support demolition resumption.
5.9 Combustible Controls

During the remaining demolition, the basic tenet of combustible controls is introducing material necessary to accomplish the task. Unneeded materials will be removed as soon as practicable. When noncombustible materials are available to perform a task, incorporating the material substitution will be considered.

Control of combustible materials and flammable liquids will include prohibitions, quantity limits, spatial separation, segregation, storage in approved containers/cabinets, ventilation, and provision of secondary containment (e.g., berms or catch pans). Periodic inspection of active areas will be performed to ensure a high degree of compliance. The safety function of this approach is to minimize the potential for fire propagation, limiting the size of a fire, and preventing a potentially explosive atmosphere. The functional intent of the combustible material control from HNF-15500 is summarized as follows:

- Fuel packages will be limited in size and spaced apart to reduce the likelihood of radiant fire propagation and flashover conditions. Fuel packages that are properly contained within a noncombustible container, or are smaller in size than a defined de minimis value, can be excluded from size and spacing requirements. Fuel packages are defined in the fire hazards analysis (FHA) and its implementing documents.

- Fuel-fired equipment and vehicle/equipment refueling will be controlled by Hanford Fire Marshal permits and in accordance with PRC-STD-FP-40404, *Fire Protection Program*.

- Combustible and flammable liquids will be properly containerized and limited in quantity in any given room when outside a flammable liquids cabinet.

As specified in the FHA, combustible controls, Hanford Fire Marshall permits, and PRC-STD-FP-40404 will be implemented during demolition activities as a result of removal of combustible material.

5.10 Waste Management, Handling, and Packaging

Waste characterization is in accordance with DOE/RL-2005-13, *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action*, and the RAWP (DOE/RL-2011-03). The waste management and handling practices will be performed in accordance with PFP waste handling procedures as well as federal and state requirements specified in the action memorandum (DOE/RL-2005-13). Waste will be characterized and containerized to meet the waste acceptance criteria identified in the regulatory documents. The waste acceptance criteria limit for shipment is 325 g of plutonium in a Standard Large Box 2 or Standard Waste Box container. The acceptance criterion is 200 g of plutonium for drums and items designated for Perma-Fix.

Characterization and handling of waste designated for disposal at ERDF are covered under separate Waste Planning Checklists (Site Form A-6004-590) and are included within the work authorization documentation. Separate from the work authorization documents, multiple ERDF waste profiles have been generated for disposition of waste from the PFP Complex that has been determined to be acceptable for ERDF disposal.

The process to remove waste containers from the PFP demolition area to ERDF ensures contamination is controlled (Figure 42). Contamination surveys and monitoring will be conducted as the waste is moved from CAs to the radiological buffer area, and then to the container transfer area (CTA).
ERDF and PFP staff worked together to develop and review controls for transferring waste from PFP to ERDF. Thorough reviews will ensure packaged waste meets ERDF waste disposal criteria. Extensive surveys will be conducted before containers are transferred between areas. Prior to transferring shipping containers from the CTA onto the roadways, surveys will ensure external contamination on the containers is less than detectable. Transfer of the containers from PFP to ERDF occurs at the CTA immediately prior to transport to ERDF.

At ERDF, enhanced controls will be instituted for disposal of PFP waste. The potential to exceed 20 percent DAC (CHPRC ARA posting criteria) was documented in ALARA Management Worksheet AMW-18-ERDF-001. The need for respiratory protection and associated controls to be deployed at ERDF were developed based on lessons learned from PFP and applying the hierarchy of controls with input from the work team and SMEs as part of the job hazard analysis process. The enhanced controls include the following:

- PFP waste shall not use general purpose ramps
- PFP waste will have dedicated waste placement Airborne Radioactivity Area (ARA) ramps
- All waste generated from PFP will be placed only by the ARA ramp or Place-and-Cover methods
- Ramp depth increased from 8 to 15 ft to increase the distance between workers and the waste
- Fixative applied during waste disposal on ARA ramp
- No PFP waste will be placed if wind exceeds 15 mph
- Air sample data from PFP corresponding to that waste shipment must be analyzed to ensure that it is within ERDF’s control set
- Enhanced controls to protect workers as shown in Table 6.

**Figure 42. Waste Transfer from PFP to ERDF**
### Table 6. ERDF Enhanced Controls for Worker Protection During Disposal of PFP Waste

<table>
<thead>
<tr>
<th>Control Set</th>
<th>ERDF Enhanced Controls at ARA Ramp</th>
<th>ERDF Enhanced Controls for Place-and-Cover Method</th>
</tr>
</thead>
</table>
| **PPE**     | • PAPR and single set of anti-contamination clothing for dozer and compactor operators  
               • Lapel air samplers worn by all individuals in ARA  
               • PAPR and single set of anti-contamination clothing for personnel in ARA/CA on dump ramp | • PAPR and single set of anti-contamination clothing for dozer operator, RCTs and workers  
               • Lapel air samplers worn by all individuals in ARA |
| **Air Sampling** | • Two air samplers at the dump ramp  
               • One air sampler on the bulldozer (in cell)  
               • One air sampler on the compactor (in cell)  
               • One air sample at RBA/CA boundary  
               • Three air samplers at the downwind boundary | • Air samplers at the rear of the truck  
               • One air sampler on the bulldozer  
               • One air sampler on the upwind boundary  
               • Three air samplers at the downwind boundary |
| **Contamination Surveys** | • Technical smears taken at the dump ramp  
               • Direct and transferable surveys on ground adjacent to ramp  
               • Direct and transferable surveys on ground downwind on a daily basis  
               • Inside cab and egress path of dozer and compactor | • Direct and transferable on ground adjacent to the ARA/CA boundary  
               • Direct and transferable on ground downwind  
               • Inside cab and egress path of dozer and shuttle truck  
               • Technical smears taken at various locations during placement |
| **Work Area Restoration** | • Water applied to waste being placed  
               • Fixative applied to placed waste  
               • 12 in. of clean dirt cover placed at the end of the day | • Water applied to waste being placed  
               • 12 in. of clean dirt cover placed immediately after waste is placed |

ARA = Airborne Radioactivity Area  
CA = contamination area  
ERDF = Environmental Restoration Disposal Facility  
PFP = Plutonium finishing Plant  
PPE = personal protective equipment  
RBA = radiological buffer area  
RCT = radiological control technician

### 5.11 Site Control Plan

Following the December event, PFP expanded its work control zone. The PFP Shift Office controls the work zone and implements access control to prevent interference with or by surrounding work. This controlled work control zone will remain throughout the resumption of PFP demolition activities.

Inside the work control zone will be the demolition zone access boundary fence, ERDF roll-on and roll-off loading and container transport areas, and radiological areas (Figure 43). Boundaries and traffic pathways will be delineated by physical traffic barriers such as signage, jersey barriers, trenches, berms, ditches, elevated locations, embankments, or spatial separation from passing traffic.
Other Hanford Site contractors requiring access to their work areas inside the work control zone coordinate with the PFP shift office for access authorization and understanding the nature of each other’s work and protective requirements. If the other contractor must enter a PFP radiological area to access their equipment or systems, personnel would be required to gain authorization from PFP operations, follow PFP access qualifications and personal protective equipment requirements. If the other contractor experiences an emergency or abnormal condition in their work areas within the PFP work control zone, they would notify the PFP operations shift office, which would then instruct PFP personnel to take the appropriate action based on the condition. A site-level emergency within the work control zone would be communicated to all Hanford Site employees along with required site-wide actions (e.g., evacuation, take cover).

As the project progresses, the configuration of the site is subject to change. In addition to the work control boundary, specific areas are described as follows:

- Radiological areas – encompass the PFP footprint as well as the remaining structures and debris piles consistent with the updated air dispersion model and are subject to radiological controls for personal protective equipment (PPE) and monitoring.
• Demolition zone – based on the location of the demolition activity, minimum boundary from the facility being demolished will be controlled.

• Waste queues – waste container queues are provided within the perimeter fence to facilitate management of waste containers including loadout and transport.

• Ingress/egress and travel paths – personnel access routes for ERDF trucks, fuel trucks, maintenance vehicles, and emergency vehicles will be established.

5.12 Tunnels, Trenches, and Subterranean Structures

The location and nature of all subterranean structures will be shown in the structural analysis to provide coordinated protection, removal, or shoring of all subterranean structures associated with the demolition project limits. Structures identified as “remaining” will be properly protected by use of barricades or blockage, or by use of shoring, plating, or berm protection to ensure protection and integrity of the remaining underground structures.

Where underground structures must be crossed or loaded for demolition purposes, these structures will be analyzed for both vertical and horizontal soil surcharge loading to assure proper protection and integrity of the remaining structure. Shoring, plating, or use of soil protection berms may be used to supplement or provide structural protection of the remaining underground structures.

Where possible, crossing or loading of underground structures will be avoided, and passage over or around these structures will be restricted by use of barricades, markers, or restricted access zones to ensure that these structures are not loaded.

5.13 Water Management

Water from this project will be generated from several of the following sources: dust suppression, decontamination, and normal site precipitation runoff. Requirements for managing these water sources are provided in the RAWP (DOE/RL-2011-03). Specifically, water will be maintained within the footprint of the berm (Figure 43) to allow for evaporation. The primary methods for protecting runoff will be installing a berm within the perimeter of the demolition area and plugging the ground penetrations and drain lines. In addition to the berm, asphalt or concrete around the buildings will be broken and/or removed to minimize water runoff. Requirements to monitor the water level within the berm will be contained within the building demolition work packages. To assist with water control, a lined ditch may be placed inside the berm to allow placement of water removal equipment as a response to upset conditions involving water volume accumulation. Water collection containers (i.e., Frac or Baker Tanks) will be staged and available to respond to localized water accumulation and excess water volume mitigation.

Any buried piping systems, drain lines, culverts, storm drains, and other similar utilities that exit, or have the potential to exit, the berm will be plugged or sealed to prevent water intrusion and migration offsite. During demolition, radiological monitoring of the soil will be in accordance with controls described in Section 5.6 and posted accordingly.

6 Conduct of Operations

The CHPRC organization structure is a traditional matrix organization, with project organizations assigned responsibility for execution of work and functional organizations being assigned to perform required support and overhead tasks to successfully execute scope. The mission of the PFP Project is the
safe and compliant demolition of the facility that will eliminate major hazards on the Hanford Site and reduce the costs of safe and secure surveillance.

6.1 Roles, Responsibilities, Authorities, and Accountabilities

CHPRC uses an integrated project team at PFP to enhance the delegation of work responsibility, authority, and accountability to individual team members. The project manager retains overall responsibility and authority for project actions and activities while delegating work to team members. Each work element assignee has the responsibility, authority, and accountability for managing the work element from inception to turnover with established scope, schedule, and cost baselines. The project team will typically evolve in skill mix and size as the project evolves through the project phases. The project manager is responsible for the identification of staffing needs and required changes through the project life. Specialized support staffing will come from the CHPRC support organizations. The PFP senior management organization chart is shown in Figure 44.

![Figure 44. PFP Senior Management Team](image)

6.1.1 Project Manager

The project manager has overall responsibility for ensuring implementation and execution of the PFP Project to include the following:

- Identify the project team’s staffing requirements, including required support from the core functional organizations and subcontracting
- Ensure adequate and timely project communications to the project team and external stakeholders
- Ensure ISMS/EMS requirements and principles are integrated into all project execution activities
- Manage developing and accepting project cost estimate, schedule, and performance measurement baseline
• Ensure that CHPRC’s Nuclear Safety Program is complied with, as applicable to the project
• Ensure that applicable environmental regulatory requirements and documents are complied with during project execution
• Ensure that Hanford Site safeguards and security requirements are adhered to or integrated into the design if the project involves work in a protected area, or involves the modification of a security system or boundary
• Monitor and report project cost and schedule performance, report against designated performance indicators, and prepare or contribute to monthly and project reporting
• Ensure that project fields are adhered to during project execution
• Ensure that worker safety requirements are adhered to during project execution
• Engage with DOE-RL oversight to understand their field observations and take necessary actions to address the issue

6.1.2 Deputy Project Managers

Deputy project managers represent the project manager in internal and external interactions and have specific delegations to act with project manager authority in specific project scopes (e.g., demolition, project execution, compliance).

6.1.3 Demolition Director

The demolition director serves as the responsible manager for demolition activities and the implementation of work management for the project or a specific body of work from inception to completion by providing continuity of purpose and understanding throughout the work planning and implementation process. The demolition director runs the plan of the day and week and ensures that teams have necessary equipment, resources, work documents, and time to perform demolition safely and compliantly.

6.1.4 Field Work Supervisors

The demolition field work supervisors report to the demolition director and are individuals trained and qualified to supervise work teams to ensure the safe and compliant performance of field work within the parameters of the work documents. Field work supervisors are given the authority for controlling work in the field, possess the authority flow-down in multi-discipline teams, and during casualty situations.

6.1.5 Facility Min-Safe, Maintenance, and Operations Director

The facility min-safe, maintenance, and operations director is responsible for both operational control of the facility and maintenance, emergency preparedness, conduct of work, hazardous energy control, safeguards and security, training, and quality assurance. The shift office is under the purview of this director and is the project work release authority and is responsible for formal notifications and reporting.

6.1.6 Safety, Health, and Radiological Protection Director

The safety, health, and radiological protection director is responsible for ensuring all aspects of occupational safety, industrial hygiene, and radiological control.
6.1.7 Engineering, Waste, and NDA Director
The engineering, waste, and NDA director provides technical guidance and resources to the project, including nuclear safety and fire protection, and is responsible for waste management and shipping.

6.1.8 Environmental Director
The environmental director performs project environmental compliance and permitting, environmental strategy and planning, regulatory strategy and integration, regulatory liaison, environmental risk assessment, and environmental monitoring and reporting.

6.1.9 Project Controls Director
The project controls director performs scheduling, cost estimating, earned value management, and project performance reporting.

6.2 Work Package Development
Prior to resuming demolition, work instructions for future PFP demolition will be written in new work documents to incorporate lessons learned from the December event and to provide concise steps for the work team. All phases of work package development will involve the work team, including mock-up of activities prior to starting work. SMEs will be involved to evaluate lessons learned and help incorporate new ideas of completing the demolition of PRF and 234-5Z.

A thorough review of the work documents and supporting attachments will be performed prior to providing the work package to the Hazard Review Board (HRB) team comprised of a senior manager chairperson and SMEs who provide a seasoned level of oversight to work package completion. To ensure that the appropriate controls are captured and flowed down to the work packages, documents that support each major workscope will undergo HRB review and approval. A HRB team has been selected from outside of PFP to evaluate the work documents for hazard controls while ensuring that the work team understands the scope of the work and controls to safely and compliantly execute the work. Their perspective will provide a different look at the documents and work activities to ensure the work package is ready for use. By charter and based on initial review, the HRB chairperson determines whether the work package will undergo full HRB or HRB chairperson review. PFP work packages intended for development for demolition resumption-related work have been identified and reviewed, and those work packages designated for HRB or HRB chair review are shown in Appendix B. All changes, modifications, and revisions to HRB-reviewed work packages must be approved by the HRB or HRB chairperson, ensuring that hazard controls are maintained through document updates and revisions. Changes to HRB-reviewed work packages are further evaluated by the PFP change management process described below in section 6.6.

Following completion of each remaining work scope, the PFP project team will conduct a formal post-job review per PRC-PRO-WKM-14047, Pre-Job Briefings and Post-Job Reviews, to review the completed work evolution. Lessons learned will be discussed and documented. Opportunities for improvement will be incorporated into the next work package prior to starting a new work scope.

The work planning process overview is shown in the chart in Appendix C and is as follows:

- Identify work: All requests to perform work are reviewed by the release authority to identify impacts to the facility for equipment/system deficiencies.
- Plan work: Activities are packaged, scheduled, and released in accordance with PRC-PRO-WKM-12115, Work Management. Early SME involvement from initiation of hazard analysis through work document approval will promote work performed safely and efficiently. The effort involved in
determining the scope of work will vary. Some tasks will have a limited scope, and others are complex and involve numerous actions and work groups. Determining the scope of work may be an iterative process. There are two forms for work documents: the short form is for low risk, low complexity work activities and the long form is for all other work.

- Schedule work: Scheduling and coordination of work activities avoids unnecessary removal of equipment and systems from service and uses manpower effectively. Ideally, all activities that involve critical resources should be scheduled

- Pre-work review: The purpose of the pre-work review is to ensure the work package, as planned, and including supporting documents can still be performed safely and compliantly and that the current facility/work location conditions are valid for the assumptions used during planning

- Release of work: The permission to perform work is done in two steps: release of the work package and the authorization to perform the released work in the field. All no-release-required work must be included on the Daily Release Sheet whenever it is to be worked

- Perform work: All work steps will be followed as written, in the proper alpha-numeric sequence, using only the flexibility built into the work document. Work instructions will be identified as continuous or reference use and will be followed as such. All work shall be performed according to work instructions, not per the hazard analysis or other supplemental documents. If the work cannot be performed as written, then a stop work will be called and supervision notified

- Work package closure/Post-work review: Closeout activities should be completed no more than 30 days after the work has been accepted

- Work suspension or cancellation: Work documents may be suspended or cancelled by the project manager or responsible manager. Circumstances warranting cancellation or suspension include a package that cannot be performed safely or compliantly as written, when there is uncertainty of path forward, or when the work will not proceed for greater than two work weeks

- Work package change process: Two methods are available to change work instructions: editorial change, which will be executed via pen-and-ink, and technical changes, which may be executed via pen-and-ink change or via a work change notice. All technical changes must be reviewed for any impacts on hazards or controls and approved by the responsible manager. Changes made using the work package change process are further evaluated by the PFP change management process described below in section 6.6

- Transfer of responsible manager and field work supervisor responsibilities: Responsible manager responsibilities should be transferred to another qualified responsible manager when the responsible manager is unavailable to fulfill the position’s duties

The process of planning a resolution for a work document can be relatively straightforward for simple, routine, low-hazard work or more demanding for complex, high-hazard work. These areas are presented in a pattern (i.e., logic tree as shown in Appendix D). An example showing portions of a PFP work document is shown in Appendix E.

### 6.3 Employee Engagement

Workers are integral to safe, successful work planning and execution, and their input is integral to every phase of the demolition process. The CHPRC ISMS/EMS expectations for all employees include Stop Work authority, speaking up when things don’t seem right, providing recommendations for safer and
more efficient work ideas, and demonstrating a questioning attitude. In addition, employees are encouraged to provide feedback via frequent discussions with management. With 14 SMEs from 12 different work disciplines (including nine craft personnel), the engineering review team examined and ranked the options and provided input prior to selection. These experienced workers helped develop and rank achievable demolition options described in Chapter 4.

- Employees provide perspectives in work planning by helping to identify and mitigate hazards and performing walkdowns to validate that the work scope can be completed as written. As part of work planning, worker representatives attend the HRB, during which the chairperson relies on face-to-face feedback about whether the work package can be followed the way it is written.

- After each phase of PFP demolition, management and employees will perform a review of readiness for the next phase. Feedback from the previous work activities will be incorporated into lessons learned before starting the next phase.

- The plan of the day and plan of the week offer structure to planning discussions by displaying various status boards to keep the work force informed about project deliverables. These boards will provide real-time information to employees, including project priorities, active work activities, key equipment availability and functionality, waste shipment inventories and locations, technical safety requirement compliance, radiological survey status, and meteorology updates. These communication tools facilitate identification of critical-path activities so employees better understand project work status and their involvement.

- Employee input will be sought as part of change management reviews, ensuring that any potential change does not adversely affect safety or base assumptions and documents.

The PFP project or deputy manager meets with each work group on a rotating weekly basis in roundtable discussions. With their commitment to communication prior to PFP demolition resumption, the PFP management team provides sitewide employee briefings about recovery and stabilization actions that provide an opportunity for individual interaction with workers to address questions and concerns. Additionally, PFP has conducted briefings with PFP employees on the enhanced controls developed for resumption of demolition activities. During these communication meetings, questions, answers, and employee feedback are documented and tracked for follow-up.

### 6.4 Emergency Preparedness and Abnormal Conditions

Emergency response procedures shall identify the responsible individuals and the specific response actions to be carried out by those individuals during an emergency drill, exercise, or in response to an actual event.

#### 6.4.1 Emergency Preparedness

Fully established and mature, the PFP emergency preparedness program is implemented through the use of approved procedures and qualified personnel. Several documents flow down from DOE-0223, *Emergency Plan Implementing Procedures*, including PRC-PRO-EM-060, *Reporting Occurrences and Processing Operations Information*, to PFP emergency response procedures listed in Table 7.
Table 7. PFP Emergency Preparedness Program-Related Guidance

<table>
<thead>
<tr>
<th>Procedure Number</th>
<th>Title</th>
<th>Effective Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFP-PRO-ER-50466, ZCR-001</td>
<td>Continuous Air Monitor Alarm</td>
<td>04/04/2018</td>
</tr>
<tr>
<td>PFP-PRO-ER-50467, ZCR-002</td>
<td>Unplanned Material Release</td>
<td>02/14/2018</td>
</tr>
<tr>
<td>PFP-PRO-ER-50468, ZCR-003</td>
<td>Personnel Contamination</td>
<td>06/07/2017</td>
</tr>
<tr>
<td>PFP-PRO-ER-50470, ZCR-005</td>
<td>Fire/Explosion</td>
<td>02/14/2018</td>
</tr>
<tr>
<td>PFP-PRO-ER-50473, ZCR-009</td>
<td>Evacuation</td>
<td>03/29/2018</td>
</tr>
<tr>
<td>PFP-PRO-ER-50474, ZCR-010</td>
<td>Take Cover</td>
<td>02/14/2018</td>
</tr>
<tr>
<td>PFP-PRO-ER-50477, ZCR-017</td>
<td>Bomb Threat/Bomb/Suspicious Object</td>
<td>03/06/2017</td>
</tr>
</tbody>
</table>

The PFP emergency response procedures include response actions for radiological incidents including the audible/visual alarm received from a continuous air monitor, an unplanned material release, and personnel contamination. The procedures delineate immediate actions to be taken, including those necessary to protect workers; follow-up actions, including evaluation of the situation and development of restoration plans; and roles and responsibilities of affected employees, radiological control personnel, and the building emergency director.

At the site level, emergencies are classified and protective actions taken through implementing DOE-0223 and activating site resources and infrastructure. Credible accidents are analyzed and included in procedures and guidance documents. With the start of demolition, the remaining emergency action level is listed in RLEP 1.0 Appendix 1-2.Z, “Outside Releases (PFP Complex)” and covers the areas listed in Table 8.

Table 8. DOE-RL Emergency Action Levels

<table>
<thead>
<tr>
<th>Facility Emergency Events</th>
<th>Natural Emergency Events</th>
<th>Security Contingencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1A</td>
<td>Table 2A</td>
<td>Table 3A</td>
</tr>
<tr>
<td>Generic Emergency Classification Criteria</td>
<td>Seismic Event</td>
<td>Explosive Device</td>
</tr>
<tr>
<td>Table 1B</td>
<td>Table 2B</td>
<td></td>
</tr>
<tr>
<td>Fire Involving TRU Waste Container(s)</td>
<td>High Winds/Tornado</td>
<td></td>
</tr>
<tr>
<td>Table 1C</td>
<td>Table 2C</td>
<td></td>
</tr>
<tr>
<td>Explosion Involving TRU Contaminated Equipment</td>
<td>Aircraft Crash</td>
<td></td>
</tr>
<tr>
<td>Table 1D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosion Involving TRU Waste Container(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table 1E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spill Involving TRU Waste Container(s)/Equipment</td>
<td></td>
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</tr>
</tbody>
</table>
The severity of the MAR and the event will determine the emergency classification level and the associated protective actions, all of which are ultimately driven through a building emergency director with a staffed initial command post.

6.4.2 Abnormal Events
An abnormal event is has the potential to escalate and result in a classified emergency or where local residents or the media would expect offsite organizations to be aware of the event. As noted in PRC-PRO-EM-060, Reporting Occurrences and Processing Operations Information, four categories of abnormal events are classified by the emergency operations center (EOC) Shift Office after notification by the shift manager. Following notification of an event, EOC Shift Office personnel will gather information and immediately evaluate and perform final abnormal event categorization of reported events/conditions using specific criteria negotiated with offsite agencies and contained in EOC Shift Office procedures. Upon declaration of an abnormal event, EOC Shift Office personnel will notify offsite agencies of the event/condition.

Five categories of abnormal events are noted in Appendix B of PRC-PRO-EM-060: site and/or facility condition, environmental, personnel safety, safeguards and security, and cross-category items. Each of these categories has associated facility or sitewide emergency response procedures (e.g., fire, explosion, spills, personnel injury, security) that will be followed to mitigate the event and protect personnel.

6.4.3 Abnormal Operations
Non-emergency but off-normal incidents and expected response actions are identified in PFP work documents based upon CHPRC procedures PRC-PRO-EM-40325, Radiological/Chemical Hazard Event Response, PRC-PRO-SH-077, Reporting, Investigating, and Managing Health, Safety and Property/Vehicle Events, and PRC-PRO-SH-28034, Adverse Weather. Conditions such as power loss, equipment failure, or introduction of an unexpected hazard would result in a work stoppage followed by protecting personnel, placing the work area in a safe configuration, and performing normal exit procedures.

For abnormal radiological incidents, each work package identifies radiological indicators and actions to be taken to protect the worker and curtail activities so radiological conditions are stabilized. Examples of radiological indicators include reaching radiological work limits, monitoring continuous air monitors for rate of rise, and detection of contamination during in-process surveys.

PFP workers will conduct operational drills prior to demolition resumption to demonstrate that contamination control is correctly managed by the field work supervisors and crew, that RCTs properly respond to contamination events and promptly notify results, and to familiarize emergency responders with the new work and radiological boundaries. The senior supervisory watch (SSW) will observe the drills (Section 6.5) and include measurable performance objectives.

6.4.4 Notifications
Timely notifications are an expectation at PFP to ensure that operations management receives information on incidents, emergencies, and abnormal events to protect workers, facilitate timely decision-making, and follow-on notification to personnel on and off the project. This expectation is a reflection of CHPRC’s tenets for conduct of work. In a safety pause message in January 2018, the CHPRC president reiterated the expectation to believe in indicators, make notifications to Operations, and to ensure the senior manager has been notified of events and issues. In March 2018, CHPRC’s Chief Operating Officer issued an all-employee message regarding notifications to facility operations. The message provided clear direction that the need to notify goes well beyond emergencies and includes notifications when work activities do not go as expected, whenever a worker identifies a problem on a job or off-normal. PFP issued standing operating instruction (SOI) 18-001 on shift office notifications as a supplemental
document to FSP-PFP-5-8, 5.4 (PFP-PRO-MS-50357), On-Call and Notifications Program, which has requirements for primary and secondary notifications. The SOI emphasizes the shift office is the first point in the work control and emergency preparedness processes and promotes the tenet that fast notification results in fast response. Further, the SOI highlighted benefits of timely notification, such as allowing decisions to be made for Occurrence Reporting and Processing System reportability, notifications to senior management, and the potential calling in of additional resources. Notifications are made from the PFP Shift Office to CHPRC executive management and Hanford site emergency operations for additional site level actions and notifications to external agencies as required.

6.5 Management Oversight

PFP management oversight will have more rigor in the form of SSWs as the project works to enhance oversight and mentoring. The deputy project manager issued interoffice memorandum CHPRC-1801076, Updated Plutonium Finishing Plant Senior Supervisory Watch, to provide a clear set of expectations for SSW oversight, feedback to the project, and documentation. The PFP project manager identified 26 senior managers and SMEs to serve as SSWs, including 17 from outside of the PFP project.

Stationing of the SSW is at the discretion of the PFP project manager or deputy. Work activities requiring SSW are assigned by the PFP project manager during the work planning process to identify specific tasks such as movement and disposition of waste containers, debris/rubble size reduction and loadout, demolition, first-time evolutions, and work conducted outside regular working hours. Assigning SSW requires special consideration, particularly the assigned individual’s prior experiences and knowledge, evaluating the assigned task effectively, and becoming familiar with associated standards and procedures. The assigned SSWs and the project manager will sign an expectation of understanding on SSW duties. A PFP-specific SSW checklist facilitates consistency and documentation of SSW observations for review and submission to the Management Observation Process. The memorandum issued by PFP to designate SSW members as well as the SSW expectation of understanding and checklist are attached in Appendix F.

PFP management oversight also includes quarterly assessments of the implemented corrective actions. The objective of the assessments is to ensure compliance with work documents and that work performance has been conducted safely and without incident.

6.6 Change Management Process

CHPRC established a process at PFP to manage planned and emergent changes. The change management process was instituted via written direction from the PFP deputy project manager to PFP senior management and designed to rigorously manage change so that proposed changes are evaluated, deliberate and controlled, to ensure the following:

- Changes are implemented safely, efficiently, and effectively
- Nuclear safety aspects are identified and addressed
- Gaps are diagnosed and corrective actions are developed and implemented
- Enhanced processes are effectively implemented
- Effective organizational performance is achieved
- Work performance errors are reduced

During the execution phase of work, a recommended change needs to be reviewed against base assumptions and documents developed during the planning phase. The PFP project manager’s and deputy project manager’s roles will include having approval authority for the scope of the change and to ensure
the change has one owner with decision-making authority. The change owner will need to provide
background information and facts about what the change is, what the reasons for the change are, who the
change affects, how the change affects the scope of work, and when the change needs to be made. The
change owner will also recommend the nature of the change (i.e., whether the change can be made
immediately or require a phased approach).

Changes will be implemented formally using existing processes. Examples include the following:

- Proposed changes to complex, high-hazard work activities previously approved by the HRB will go
back to the HRB for review, utilizing a HRB chairperson review or full HRB membership at the
discretion of the HRB chairperson per the HRB charter.

- Changes resulting in significant corrective actions may require review and concurrence by the
Corrective Action Review Board, Radiological Control Change Management Program, HRB, or
Executive Safety Review Board.

- Changes related to issues that potentially interact with safety, quality, or environmental significance
and/or have programmatic implications may require Executive Safety Review Board approval in
accordance with the Board’s charter.

- Changes associated with radiological control personnel, processes, and performance at the Program
level may use the Radiological Control Change Management process.

- Changes made to the work instructions (statement of scope through restoration/end state) must follow
the change process outlined in PRC-PRO-WKM-12115, Work Management. Such changes or changes
editorial or technical in nature are implemented using a phased approach via pen and ink or work
change notice, and require responsible manager approval.

- Changes need to be communicated and promoted to the workforce, the customer, and as applicable,
other CHPRC projects and Hanford Site contractors.

On April 23, 2018, the PFP deputy project manager performed a stand-up presentation on the thresholds
relative to change management to PFP management and supervision. The presentation consisted of
distributing the internal memorandum CHPRC-1801336, Plutonium Finishing Plant Change
Management Expectations, to each supervisor/manager discussing in detail the change management
process at PFP.

7 References

29 CFR 1910.120, “Occupational Safety and Health Standards,” “Hazardous Waste Operations and
at: http://www.gpo.gov/fdsys/pkg/CFR-2010-title29-vol5/xml/CFR-2010-title29-vol5-
sec1910-120.xml.

CHPRC-00328, 2017, PFP Project Site Specific Health and Safety Plan (HASP), Rev. 7, CH2M HILL

CHPRC-02582, 2016, Plutonium Finishing Plant Demo Plan, Rev. 1, CH2M HILL Plateau Remediation
Company, Richland, Washington.

CHPRC-03653, 2018, Fixative Application Recommendation for PFP Demolition, Rev. 0,


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Appendix A

Integrated Corrective Actions to Support Work Resumption Plan and Crosswalk of Expert Panel Comments
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Contents

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A2  Crosswalk of Expert Panel Comments.......................................................................................... A-11
A1 Integrated Corrective Actions to Support Work Resumption Plan
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### Table A-1. Integrated Corrective Actions to Support Work Resumption Plan

<table>
<thead>
<tr>
<th>#</th>
<th>Action No.</th>
<th>Action</th>
<th>Cross-Reference to the Work Resumption Plan</th>
<th>Pre- or Post-Start</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CA-01</td>
<td>Obtain analysis of samples of the contamination to support the development</td>
<td>Interim Measure Enabling other Actions</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of improved controls.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CA-02</td>
<td>NTS - Based on engineering evaluation of fog/mist velocities and spatial</td>
<td>4, Demolition Resumption Approach</td>
<td>Pre</td>
<td>Closed</td>
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<tr>
<td></td>
<td></td>
<td>distribution, develop dust destroyer placement to include set-back</td>
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<tr>
<td></td>
<td></td>
<td>distance and approach angles to ensure engulfing fog without providing</td>
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<tr>
<td></td>
<td></td>
<td>a motive force for contamination transport. Include fogger placement</td>
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<td></td>
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<td>deployment criteria in work packages.</td>
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<td>3</td>
<td>CA-03</td>
<td>NTS - Based on engineering evaluation of the application of water or</td>
<td>4, Demolition Resumption Approach</td>
<td>Pre</td>
<td>Closed</td>
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<td></td>
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<td>fixative through a water cannon, determine appropriate nozzle and</td>
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<td>setting to include set-back distance and approach angles to ensure</td>
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<td></td>
<td></td>
<td>water/fixative application without providing a motive force for</td>
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<td></td>
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<td>transport of contamination and complete coverage of all newly exposed</td>
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<td></td>
<td></td>
<td>surfaces resulting from demolition. Include cannon placement deployment</td>
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<td></td>
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<td>criteria into associated demolition work packages.</td>
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<td>4</td>
<td>CA-04</td>
<td>NTS - Revise work package 2Z-18-00196, Apply Fixative to PFP Components,</td>
<td>6, Conduct of Operations</td>
<td>Pre</td>
<td>Open</td>
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<td></td>
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<td>2Z-17-01699, Demolition of 234-5Z Building, and 2Z-15-06342, Demolition</td>
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<td></td>
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<td>of 236-Z Building to cease dilution of PBS (polymeric barrier system)</td>
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<td></td>
<td></td>
<td>fixative.</td>
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<tr>
<td>5</td>
<td>CA-05</td>
<td>NTS - Obtain a documented evaluation of the appropriate use of fixative</td>
<td>5, Demolition Controls</td>
<td>Pre</td>
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<tr>
<td></td>
<td></td>
<td>(i.e., type, concentration levels, and adherence properties to materials)</td>
<td>5.7, Contamination Control Fixative Plan</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>for PFP demolition activities.</td>
<td>Table 3. Fixatives, Matrix, Dilution, and</td>
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<td></td>
<td></td>
<td></td>
<td>Reapplication Frequency</td>
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<td>Table 4. Approved Fixative Applications</td>
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<td>Table 5. Approved Fixative by Application/Matrix</td>
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<td>6</td>
<td>CA-06</td>
<td>NTS - Develop the training on new techniques and methods for control</td>
<td>5, Demolition Controls</td>
<td>Pre</td>
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<tr>
<td></td>
<td></td>
<td>of airborne radioactivity and contamination.</td>
<td>5.5, Health and Safety Plan (HASP)</td>
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<td>7</td>
<td>CA-07</td>
<td>NTS - Provide training to applicable PFP personnel on improved</td>
<td>5, Demolition Controls</td>
<td>Pre</td>
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<tr>
<td></td>
<td></td>
<td>techniques and methods for control of airborne radioactivity and</td>
<td>5.5, Health and Safety Plan (HASP)</td>
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<td></td>
<td></td>
<td>contamination.</td>
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<tr>
<td>8</td>
<td>CA-08</td>
<td>NTS - Define the new radiological boundary for stabilization to include</td>
<td>4, Demolition Resumption Approach</td>
<td>Pre</td>
<td>Open</td>
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<tr>
<td></td>
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<td>criteria for expanding that boundary.</td>
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<td>Action No.</td>
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<td>Pre- or Post-Start Status</td>
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<td>9</td>
<td>CA-09</td>
<td>Implement the new radiological boundary for stabilization.</td>
<td>5, Demolition Controls</td>
<td>Pre Open</td>
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<td>Figure 40. Monitoring Locations After December 29, 2017</td>
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<td>10</td>
<td>CA-10</td>
<td>NTS - Verify the new radiological boundary based on the revised ADM.</td>
<td>4, Demolition Resumption Approach</td>
<td>Pre Open</td>
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<tr>
<td></td>
<td></td>
<td>Refine and adjust as required.</td>
<td>Figure 7. Boundaries Being Evaluated</td>
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<td>Figure 17. Enhanced Controls for Lower and Higher Risk Scope</td>
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<td>5, Demolition Controls</td>
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<td></td>
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<td></td>
<td>5.4, Air Dispersion Model</td>
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<td></td>
<td>Table 1. 234-5Z Recovery Air Model Input Summary</td>
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<tr>
<td>11</td>
<td>CA-11</td>
<td>NTS - Revise ADM for remaining material at risk and facility configuration for the remaining scope to complete slab on grade, taking into account larger particles being swept in wind-driven events.</td>
<td>5, Demolition Controls</td>
<td>Pre Open</td>
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<td>5.4, Air Dispersion Model</td>
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<td>Table 1. 234-5Z Recovery Air Model Input Summary</td>
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<td>12</td>
<td>CA-12</td>
<td>NTS - Evaluate and implement alternate models that take into account larger particles being swept in wind-driven events.</td>
<td>5, Demolition Controls</td>
<td>Pre Closed</td>
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<td></td>
<td>5.4, Air Dispersion Model</td>
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<td></td>
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<tr>
<td>13</td>
<td>CA-13</td>
<td>NTS - Re-define the PFP HRB membership.</td>
<td>6, Conduction of Operations</td>
<td>Pre Closed</td>
<td></td>
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<td></td>
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<td></td>
<td>6.2, Work Package Development</td>
<td></td>
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</tr>
<tr>
<td>14</td>
<td>CA-14</td>
<td>NTS - Issue the expectations for implementation of HRB program at PFP.</td>
<td>6, Conduction of Operations</td>
<td>Pre Closed</td>
<td></td>
</tr>
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<td></td>
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<td>6.2, Work Package Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>CA-15</td>
<td>NTS - Develop and provide training to PFP radiological control personnel/regarding to reliance on CAMs and indicators showed potential for contamination without warning from air samplers.</td>
<td>5, Demolition Controls</td>
<td>Pre Closed</td>
<td></td>
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<td></td>
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<td>5.5, Health and Safety Plan (HASP)</td>
<td></td>
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<tr>
<td>16</td>
<td>CA-16</td>
<td>NTS - Revise bi-annual re-qualification training for CHPRC RCTs and Radiological Control First Line Supervisors to include lessons learned from this event with regard to reliance on CAMs and the indicators showed potential for contamination without warning from air samplers.</td>
<td>5, Demolition Controls</td>
<td>Post Open</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>5.5, Health and Safety Plan (HASP)</td>
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</table>
# Table A-1. Integrated Corrective Actions to Support Work Resumption Plan

<table>
<thead>
<tr>
<th>#</th>
<th>Action No.</th>
<th>Action</th>
<th>Cross-Reference to the Work Resumption Plan</th>
<th>Pre- or Post-Start</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>CA-17</td>
<td>NTS - Revise Courses 022801, Initial Radiological Work Planning and 022830, Radiological Work Planning Refresher to include lessons learned from this event with regard to reliance on CAMs and indicators showed potential for contamination without warning from air samplers.</td>
<td>5, Demolition Controls 5.5, Health and Safety Plan (HASp)</td>
<td>Post</td>
<td>Open</td>
</tr>
<tr>
<td>18</td>
<td>CA-18</td>
<td>NTS - Incorporate newly developed methods and controls into the applicable work packages to address CA-02 and CA-03. Provide specificity to controls to allow consistent field implementation.</td>
<td>6, Conduct of Operations 6.2, Work Package Development</td>
<td>Pre</td>
<td>Open</td>
</tr>
<tr>
<td>19</td>
<td>CA-19</td>
<td>NTS - Establish external review and concurrence outside of PFP (e.g., HRB chair) for changes related to demolition work packages. Document the process.</td>
<td>6, Conduct of Operations 6.2, Work Package Development</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>20</td>
<td>CA-20</td>
<td>NTS - Document PFP expectations to utilize CHPRC change management processes (e.g., HRB, IPAR, informal and formal post jobs). Deviation from change management processes are not acceptable to PFP activities.</td>
<td>6, Conduct of Operations 6.6, Change Management Process</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>21</td>
<td>CA-21</td>
<td>NTS - Perform a stand-up presentation on the thresholds described in CA-20 to PFP Management and supervision.</td>
<td>6, Conduct of Operations 6.6, Change Management Process</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>22</td>
<td>CA-22</td>
<td>NTS - Establish a formalized radiological contamination tracking and trending process that allows for making educated decisions during demolition of the remainder of the PFP work scope.</td>
<td>5, Demolition Controls 5.6, Radiological Monitoring and Control 6, Conduct of Operations 6.5, Management Oversight</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>23</td>
<td>CA-23</td>
<td>NTS - Establish near real-time protocols for surveying for contamination spread outside of the immediate demolition area.</td>
<td>6, Conduct of Operations 6.2, Work Package Development</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>24</td>
<td>CA-24</td>
<td>Provide direction for notification to the shift office for abnormal conditions as they occur.</td>
<td>This is a remedial action 6, Conduct of Operations 6.4, Work Execution: Emergency Preparedness and Abnormal Operations</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>25</td>
<td>CA-25</td>
<td>Communication expectations on notifications to Operations shift office in PFP all hands briefing.</td>
<td>This is a remedial action 6, Conduct of Operations 6.4, Work Execution: Emergency Preparedness and Abnormal Operations</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>#</td>
<td>Action No.</td>
<td>Action</td>
<td>Cross-Reference to the Work Resumption Plan</td>
<td>Pre- or Post-Start</td>
<td>Status</td>
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</tr>
<tr>
<td>26</td>
<td>CA-26</td>
<td>Issue expectations on notifications to Operations shift office to functional organizations.</td>
<td>This is a remedial action 6, Conduct of Operations 6.4, Work Execution: Emergency Preparedness and Abnormal Operations</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>27</td>
<td>CA-27</td>
<td>Provide gap training to PFP personnel regarding this event to include notification process, response to upset conditions, new boundaries, etc.</td>
<td>6, Conduct of Operations 6.4.4, Notifications</td>
<td>Pre</td>
<td>Open</td>
</tr>
<tr>
<td>28</td>
<td>CA-28</td>
<td>Revise CHPRC General Employee Training to incorporate information on notifications to Operations Management and voice-to-voice communication during notification.</td>
<td>This is a remedial action 6, Conduct of Operations 6.4, Work Execution: Emergency Preparedness and Abnormal Operations</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>29</td>
<td>CA-29</td>
<td>Provide direction to the shift office to utilize PRCNS for notification of abnormal events to off-project POCs.</td>
<td>This is a remedial action 6, Conduct of Operations 6.4, Work Execution: Emergency Preparedness and Abnormal Operations</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>31</td>
<td>CA-31</td>
<td>Re-establish routine Labor/Management meetings with the Bargaining Unit to solicit feedback and provide updates on priorities and path forward.</td>
<td>This is a remedial action 6, Conduct of Operations 6.3, Employee Engagement</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>37</td>
<td>CA-37</td>
<td>Provide clear set of expectations for Senior Supervisory Watch oversight, feedback to the operations project and documentation.</td>
<td>This is a remedial action 6, Conduct of Operations 6.5, Management Oversight</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>44</td>
<td>CA-44</td>
<td>NTS - Develop and provide training to the remaining PFP Radiological Control personnel who were not available at the time the training was provided for CA-15, regarding reliance on CAMs and the indicators showing potential for contamination without warning from air samplers.</td>
<td>5, Demolition Controls 5.5, Health and Safety Plan (HASP)</td>
<td>Pre</td>
<td>Closed</td>
</tr>
<tr>
<td>#</td>
<td>Action No.</td>
<td>Issue</td>
<td>Action</td>
<td>Cross-Reference to the Work Resumption Plan</td>
<td>Pre- or Post-Start</td>
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<tr>
<td>58</td>
<td>CA-101</td>
<td>The PFP Team did not demonstrate the willingness and commitment to administer certain radiological processes, fix problems, and establish adequate project-specific radiological controls.</td>
<td>Develop a briefing to address the updated control set; Rad practices; Risk expectations, e.g., contamination controls; and procedure and work package compliance.</td>
<td>6, Conduct of Operations 6.6, Change Management Process</td>
<td>Pre</td>
</tr>
<tr>
<td>59</td>
<td>CA-102</td>
<td>The PFP Team did not demonstrate the willingness and commitment to administer certain radiological processes, fix problems, and establish adequate project-specific radiological controls.</td>
<td>Establish a process to ensure timely reviews of RSRs and develop a metric for monitoring performance.</td>
<td>6, Conduct of Operations 6.2, Work Package Development</td>
<td>Pre</td>
</tr>
<tr>
<td>60</td>
<td>CA-01</td>
<td>Contrary to PRC-PRO-RP-40021, PFP Job-Specific RWPs do not meet procedural intent for job-specific work or RWP void limits.</td>
<td>Review all active RWPs and AMWs to ensure controls are clear, technical bases are provided (for action and void limits).</td>
<td>6, Conduct of Operations 6.2, Work Package Development</td>
<td>Pre</td>
</tr>
<tr>
<td>61</td>
<td>CA-02</td>
<td>Contrary to PRC-PRO-RP-40021, PFP Job-Specific RWPs do not meet procedural intent for job-specific work or RWP void limits.</td>
<td>Review PFP demolition related repetitive work packages to ensure the packages meet the hazard analysis standards.</td>
<td>6, Conduct of Operations 6.2, Work Package Development</td>
<td>Pre</td>
</tr>
<tr>
<td>62</td>
<td>CA-01</td>
<td>Management and staff turnover is adversely affecting compliance with standards and enforcement of requirements.</td>
<td>Update HASP to ensure all controls are in place.</td>
<td>5, Demolition Controls 5.5, Health and Safety Plan (HASP)</td>
<td>Pre</td>
</tr>
<tr>
<td>69</td>
<td>CA-02</td>
<td>Continued improvement in the clarity of RWPs is warranted.</td>
<td>Review all in-use PFP technical procedure and ensure they are properly classified as either skill-based or beyond skill-based, then verify JHA exists for each beyond skill-based technical procedure.</td>
<td>6, Conduct of Operations 6.2, Work Package Development</td>
<td>Pre</td>
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</table>
Table A-1. Integrated Corrective Actions to Support Work Resumption Plan

<table>
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<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>ADM</td>
<td>air dispersion model</td>
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<td>ALARA</td>
<td>As Low As Reasonably Achievable</td>
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<tr>
<td>AMW</td>
<td>ALARA management worksheet</td>
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<tr>
<td>CAM</td>
<td>continuous air monitor</td>
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<tr>
<td>CHPRC</td>
<td>CH2M HILL Plateau Remediation Company</td>
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<tr>
<td>HRB</td>
<td>Hazard Review Board</td>
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<td>IPAR</td>
<td>in-process ALARA review</td>
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<tr>
<td>NTS</td>
<td>noncompliance tracking system</td>
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<td>PFP</td>
<td>Plutonium Finishing Plant</td>
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<tr>
<td>POC</td>
<td>point of contact</td>
</tr>
<tr>
<td>PR CNS</td>
<td>Plateau Remediation Company Notification System</td>
</tr>
<tr>
<td>RCT</td>
<td>radiological control technician</td>
</tr>
<tr>
<td>RSR</td>
<td>radiological survey record</td>
</tr>
<tr>
<td>RWP</td>
<td>radiation work permit</td>
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a. Cross references are to the main text of this document.
A2 Crosswalk of Expert Panel Comments
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## DOE Expert Panel Comments Crosswalk to PFP Work Resumption Plan

<table>
<thead>
<tr>
<th>DOE Expert Panel Comments</th>
<th>Corrective Actions</th>
<th>Section of the Demo Work Resumption Plan</th>
</tr>
</thead>
</table>
| Evaluations for water/liquid use aren’t included in work package controls | CA-02, CA-03, CA-04, CA-16 | 6. Conduct of Operations  
6.2, Work Package Development |
| New airborne dispersion modeling for the transport of larger particles of contamination is not included | CA-11, CA-12 | 5. Demolition Controls  
5.4, Air Dispersion Model  
6, Conduct of Operations  
6.2, Work Package Development |
| Hazard Review Board (HRB) role and responsibility are not clear | CA-13, CA-14 | 6. Conduct of Operations  
6.2, Work Package Development |
| Unclear criteria for entering the change management process | CA-20 | 6. Conduct of Operations  
6.6, Change Management Process |
| New real-time survey protocols during demolition are undefined | CA-23, CA-98 | 5. Demolition Controls  
5.6, Radiological Monitoring and Control  
Table 2, Monitoring and Response  
Figure 40, Monitoring Location After December 2017 |
| Unclear how employee feedback is being tracked to resolution | CA-31 | 6. Conduct of Operations  
6.3, Employee Engagement |
| Senior Supervisor Watch roles and responsibilities unclear | CA-37 | 6. Conduct of Operations  
6.5, Management Oversight |
| Unclear how As Low As Reasonably Achievable (ALARA) reviews are incorporated | RP/IP CA-03  
CR-2016-0540 | 5. Demolition Controls  
5.8, Radiological Monitoring and Control |
| Insufficient formality in decision making and examples of employees not following processes and procedures | CA-14, CA-20  
6.2, Work Package Development  
6.6, Change Management Process  
5. Demolition Controls  
5.6, Radiological Monitoring and Control |
| Recommendation for PFP management assessments to include whether work performed complied with work documents | CA-33, CA-34, CA-35 | 6.5, Management Oversight |
| Recommendation for further analysis of the implementation of the Integrated Safety Management System (ISMS) at PFP | CA-101, CA-102, CA-103, CA-104, CA-105, CA-106, CA-107 | The actions identified to support ISMS are embedded throughout:  
5, Demolition Controls  
6, Conduct of Operations  
The primary areas are:  
5.5, Health and Safety Plan (HASP)  
5.8, Radiological Monitoring and Control  
6.2, Work Package Development  
6.3, Employee Engagement |
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Appendix B

Work Packages
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## B Work Packages

### PFP Packages in Progress

<table>
<thead>
<tr>
<th>Work Package</th>
<th>Description</th>
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<tbody>
<tr>
<td>1 2Z-18-01396</td>
<td>NDA Super Sacks and Relocation PRF Waste Packages (HRB)</td>
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<tr>
<td>2 2Z-18-02076</td>
<td>Load Super Sacks (HRB)</td>
</tr>
<tr>
<td>3 2Z-18-01395</td>
<td>Remove Tumble weeds at PFP</td>
</tr>
<tr>
<td>4 2Z-18-01532</td>
<td>Install PFP Recovery Material Storage Fencing and Gates</td>
</tr>
<tr>
<td>5 2Z-18-01972</td>
<td>Installing T-Posts for Expanded RBA/CA Boundaries</td>
</tr>
<tr>
<td>6 2Z-18-02702</td>
<td>Equipment Repair or Maintenance for PFP Complex (HRB-C)</td>
</tr>
<tr>
<td>7 2Z-18-00975</td>
<td>Cover Exposed Pactec Bags that Contain Waste (HRB-C)</td>
</tr>
<tr>
<td>8 2Z-18-00819</td>
<td>Apply Fixative or Add Clean Fill Material to Control Contamination (HRB)</td>
</tr>
<tr>
<td>9 2Z-18-02265</td>
<td>Deactivation of Waste Drums (HRB)</td>
</tr>
<tr>
<td>10 2Z-18-02264</td>
<td>Repackage Waste Containers (HRB)</td>
</tr>
<tr>
<td>11 2Z-18-01979</td>
<td>234-5Z Debris Load Out (HRB)</td>
</tr>
<tr>
<td>12 2Z-18-02480</td>
<td>Perform Inspection of ERDF RO/RO Containers in HCA (HRB-C)</td>
</tr>
<tr>
<td>13 2Z-18-08490</td>
<td>Characterization inside the 233S Exhauster (HRB-C)</td>
</tr>
<tr>
<td>14 2Z-18-02453</td>
<td>MINOR ELECTRICAL, INTRUSIVE ELECTRICAL, INVESTIGATIONS, INSTALL TEMP LIGHTING LOAD CENTERS, SPIDER BOXES</td>
</tr>
<tr>
<td>15 2Z-18-02352</td>
<td>REMOVE OR REPAIR OR REPLACE T/S FITTINGS AND COMPONENTS</td>
</tr>
<tr>
<td>16 2Z-18-01392</td>
<td>CAM INSTALLATION, RELOCATION, AND REMOVAL</td>
</tr>
<tr>
<td>17 2Z-18-08487</td>
<td>Remove Steam Line North of 234-5Z (HRB-C)</td>
</tr>
<tr>
<td>18 2Z-18-XXXXX</td>
<td>234-5Z Demolition (Phase 3A) (HRB)</td>
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<td>19 2Z-18-XXXXX</td>
<td>234-5Z Demolition (Phase 3B) (HRB)</td>
</tr>
<tr>
<td>20 2Z-18-XXXXX</td>
<td>236-Z Debris Load Out (HRB)</td>
</tr>
<tr>
<td>21 2Z-18-XXXXX</td>
<td>Soil Removal 234-5Z / 236 / 242 (HRB)</td>
</tr>
<tr>
<td>22 2Z-18-XXXXX</td>
<td>Soil Cap 234-5Z / 236 / 242 (HRB)</td>
</tr>
<tr>
<td>23 2Z-18-03427</td>
<td>Soil Characterization for 236-Z / 242-Z (HRB)</td>
</tr>
<tr>
<td>24 2Z-18-XXXXX</td>
<td>PFP Isolations (French Drains, UIC, etc.) (HRB)</td>
</tr>
</tbody>
</table>
Appendix C

CHPRC Work Management Process
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# CHPRC Work Management Process

## Planning
1. **Identify/Request Work**
2. **Validate**
3. **Initiate Screens** (Rad, Env, Davis Bacon)
4. **Determine Method**
5. **Determine Long or Short Form**

## Define Scope of Work
1. **CHPRC Work Management Process**
2. **EMS ISMS**

## Identify and Analyze Hazard Controls
1. **Refine Work Instructions**
2. **HRB Screen**
3. **Draft Work Instructions**
4. **Establish Work Planning Team**
5. **OHC/Subcontractor non-PM/S Work**

## Develop and Implement Hazard Controls
1. **Hazard Analysis Concurrence**
2. **Workability Review**
3. **HRB Review**
4. **RM Approval**

## Implementation
1. **Accept Work**
2. **Perform Work**
3. **Conduct Pre-Job Briefing**
4. **Release Work**
5. **Schedule Work**

## Checking and Corrective Action
1. **Provide Feedback and Continuous Improvement**
2. **Post-Job Review**
3. **Closeout Work**
4. **Record Retention**
5. **Process Feedback**

---

*Hashed boxes not required for skill-based work*

---

**PRC-PRO-WKM-12115, rev. 4, website**

---

**08/27/2014**
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Appendix D

Logic Tree
D Logic Tree

Receive New Work Request

Understand the Desired Work Scope

Determine the Desired End State

Other Baseline Data

Prepare Resolution

Hazards Analysis (PRC-PRO-VVM-079)

Select Work Document Style (PRC-PRC-VVM-12115)

Work Instructions Format and Contents

1.0 Scope

2.0 Special Materials, Tools and Equipment

3.0 Precautions and Limitations

4.0 Prerequisites

5.0 Work Steps

6.0 Restoration, Testing, End State Summary

References (in JCS)

Identify Needed Special Materials, Equipment & Tools

Materials, Tools Available?

Yes

Verify Materials, Equipment or Tools are Staged

No

Commerially Available?

Yes

D/ATA Prepare eDOM, Verify Materials are Ordered

No

D/ATA Determine Fabrication Path Forward

Assist with Obtaining Approvals and Confirming Receipt

After Planning has been completed:

Review and Approval

Work Package Assembly and Self-Checking

Workability Review for HRB Work Documents

When changes are needed after RM approval:

Planner Actions for Work Package Changes

Permits and Other Special Documents

Estimate Personnel & Equipment Resource Requirements

Identify Needed Special Materials, Equipment & Tools

No

DMA Determine Fabrication Path Forward

 DMA/DA Prepare eDOM, Verify Materials are Ordered

Prepare, Gather Supporting Documents

Verify Materials, Equipment or Tools are Staged

Notify SME of Permits Needed
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Appendix E

Example Work Document
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Load PRF/PFP TRU Waste Bags into Shipping Containers

1.0 SCOPE

This work instruction provides direction to load demolition debris TRU/TRUM waste previously packaged inside a PacTec “super sack” into either a top loaded SLB2 or 1800-TL Waste Container. This work document will be used for mockup / dry-run activities to ensure equipment and materials function as anticipated and to provide involved workers with hands on experience outside HCA/ARA.

Super sack(s) will be loaded into a waste container using a Special Lift Plan and a single crane.

The work instructions have been divided into the following tasks as listed below.

Task 1. WORK AREA SETUP and RECURRING ACTIVITIES
Task 2. PRE-START REQUIREMENTS
Task 3. RE-LOCATING WASTE PACKAGES TO SUPER SACK LOADING AREA
Task 4. LIFTING AND LOADING SUPER SACK INTO 1800-TL CONTAINER
Task 5. LIFTING AND LOADING SUPER SACK INTO SLB2 CONTAINER

2.0 SPECIAL MATERIAL, TOOLS AND EQUIPMENT

- Hoisting and rigging equipment specified on the Special Lift Plan.
- Forklift.
- HexArmor 2085 or 2090 work gloves....

3.0 PRECAUTIONS AND LIMITATIONS

3.1 WORKER SAFETY

3.1.1 FWS will work with Industrial Hygiene (IH) to establish work/rest requirements in accordance with procedure PRC-PRO-SH-121, “Heat Stress Control”...

3.1.2 The area behind the engine of the crane is a high noise area. This area shall be roped and posted as a Hearing Protection Required area. The roped and posted area shall encompass the area behind the engine of the crane to within 25 feet as a minimum unless otherwise directed by IH based on sampling results.

3.1.3 Gloves with a cut resistance rating of 4 or greater to the front and back (i.e., 360°) are required when using tools (manual or power) with a sharp edge, handling sharp objects, or associated work that poses a cut hazard.
3.1.4 HexArmor 2085 or the HexArmor 2090 shall be utilized when coming in contact with the soft sided waste packages (these gloves have a cut resistance rating of 4 and a puncture resistant rating of 3)....

3.1.5 Ground personnel will adhere to the following controls when accessing/working within the demolition boundary:

- Personnel shall use established pathways as much as possible and avoid paths that have potential slip, trip, and fall hazards.
- Personnel are not allowed within approximately 50 feet of the 234-5Z building or vaults unless the work activity has been approved by the OS&IH Manager due to potential overhead hazards...

3.1.6 Field Work Supervisor (FWS) will monitor the weather conditions throughout the performance of work in accordance with procedure PRC-PRO-SH-28034, "Adverse Weather".

3.2 EQUIPMENT OPERATIONS SAFETY

3.2.1 Equipment shall be in its lowest safe position when transiting between work locations.

3.2.2 Equipment operator will walk-down travel paths and work area to identify impacts and obstructions.

3.2.3 Clear travel paths will be established prior to placing equipment in motion.

3.2.4 The FWS will ensure that areas are controlled using boundaries or spotters as needed to ensure personnel are kept away from material handling activities and the swing/travel pathways of equipment....

3.3 WASTE CONTAINER ACCESS

3.3.1 Top loaded waste containers are Non-Permit Confined Spaces.

3.3.2 Personnel are not allowed to make a whole body entry into a waste container until IH has completed Section 5 of the "Hanford Confined Space Hazard Identification Form" (A-6005-724) and the container is posted as a Non-Permit Confined Space....

3.4 ASBESTOS

3.4.1 This work activity will take place inside a regulated area for Class II Asbestos (e.g., floor tile, mastic, gaskets, packing, caulk, and roof mastic)....
Load PRF/PFP TRU Waste Bags into Shipping Containers

3.5 BERYLLIUM

3.5.1 This work activity will take place inside a Demolished Beryllium Facility Site (DBFS) boundary.

3.6 LEAD

3.6.1 Lead contamination potentially exists within the Demolition Boundary.

3.7 CHEMICAL HAZARDS

3.7.1 The following chemical products have been evaluated for use.

- Envirotac II (Rhino Snot).
- Soil-Sement.
- Super 77 Spray Adhesive.
- RTV Silicone Adhesive.
- CC Fix...
- Non-Locking Anaerobil Liquid Thread Sealant.
- OptiSorb.
- Waterworks.

3.8 FIRE SAFETY

3.8.1 Flammable products shall be stored under climate control when seasonal ambient temperatures are greater than 90°F.

DSA 3.9 DOCUMENTED SAFETY ANALYSIS/TECHNICAL SAFETY REQUIREMENT CONTROLS

3.9.1 To satisfy TSR SAC 5.24.2 b. limits, any individual waste item, package of waste items, or loaded waste container shall NOT exceed 400 g Pu (criticality value).

3.10 CRITICALITY

3.10.1 The following criticality prevention specifications apply to all tasks:

- CPS-Z-165-80010, "General Limits".
- CPS-Z-165-80100, "Out-of-Hood Fissile Material Storage, Transportation and Transition".
- CPS-Z-165-80200, "PFP Complex Demolition".
3.11 RADIOLOGICAL CONTROLS

3.11.1 Work area will be up posted to a CA / ARA prior to initiation of loading operations at a minimum distance of 33 feet from where work is being performed and ensure there is a boundary air sampler.

3.11.2 During performance of this work scope, RCT's will perform surveys of the cookie sheets and other horizontal flat surfaces in the proximity of the work.

3.11.3 All real-time continuous air monitors (CAMs) and ARA boundary air samplers (A/S-8, A/S-17, A/S-29, and A/S-40) shall be operational to monitor potential airborne radioactivity releases...

4.0 PREREQUISITES

4.1 NONE

Work INSTRUCTIONS

NOTE: Task 1 work steps may be performed in any order or repeated as necessary and worked concurrently with Tasks 2 through Task 5.

4.2 TASK 1: WORK AREA SETUP and RECURRING ACTIVITIES

4.2.1 STAGE materials, tools, and equipment.

4.2.2 ERECT, inspect, modify, and remove scaffolding.

4.2.3 ADD clean fill material to improve vehicle travel path(s) or waste package location surfaces as necessary.

4.2.4 UP post / down post CA / ARA radiological boundaries....

4.3 TASK 2: PRE-START REQUIREMENTS

4.3.1 RM ensure by signing below that the mockup / dry-run has been completed.

____________ / __________________________ / 
RM Print Signature Date

4.3.2 Field work per work package 2Z-18-01396/W, "NDA Super Sacks and Relocate PRF Waste Packages" has been completed.
Load PRF/PFP TRU Waste Bags into Shipping Containers

4.3.3 FWS will ensure the following are completed each work shift PRIOR to initiation of waste packaging activities:

- ENSURE radiological air sampling equipment is operating.
- ENSURE bulk fixative application equipment (i.e., water truck) is prepared for use each work shift.

NOTE: Task 3 may be worked independently, repeated, or concurrently with Tasks 4 and Task 5.

4.4 TASK 3: RE-LOCATE WASTE PACKAGE to DESIGNATED LOADING AREA

4.5 TASK 4: LIFTING AND LOADING SUPER SACK into 1800-TL CONTAINER

4.6 TASK 5: LIFTING AND LOADING SUPER SACK into SLB2 CONTAINER

5.0 END STATE SUMMARY

5.1 WORK COMPLETION

5.1.1 Field Work Supervisor (FWS) to ensure the following have been completed.

- Ensure waste has been packaged and disposed of in accordance with the waste planning checklist.
- Ensure Data Sheets from procedures ZO-170-043 and ZO-170-320 are completed and forwarded to waste organization representative.
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Appendix F

Senior Supervisory Watch Expectations
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Contents

F1  Attachment 1................................................................................................................................. F-1
F2  Attachment 2................................................................................................................................. F-5
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ATTACHMENT 1

CHPRC-1801076
CONTRACT NUMBER DE-AC06-08RL14788

PLUTONIUM FINISHING PLANT
SENIOR SUPERVISORY WATCH EXPECTATIONS

Consisting of 4 pages,
including this cover page
GENERAL GUIDANCE

Purpose

The new expectations for PFP SSW establishes common competency requirements and standardizes the process for all personnel assigned to the SSW at PFP.

Management Responsibility

The PFP Project Manager and/or Deputy Project Manager will interview each SSW candidate using training, qualifications, and competencies. This evaluation can be used at the discretion of the PFP Project Manager and/or Deputy Project Manager as a guide to assess the knowledge and skills of the candidate being interviewed. If the PFP Project Manager and/or Deputy Project Manager determines that other competencies need to be assessed, they will document the other competencies in the blank spaces provided below in this attachment.

Applicability

The new expectations for PFP SSW is applicable to all personnel assigned to the SSW position. The PFP Project Manager and/or Deputy Project Manager shall identify individuals who are authorized as SSW personnel.

Duties and Responsibilities

Stationing of the SSW is at the discretion of the PFP Project Manager and/or Deputy Project Manager. This action does not relieve facility management from their responsibilities for operations and safety. The SSW should:

- Fill out PFP SSW specific checklist for the evolutions observed.
- Stop any evolution in progress that causes concern
- Identify the concern to programmatic management
- Concur with resolution of the concern, and
- Allow resumption of the evolution after satisfactory resolution.

Individuals selected for SSW must have general knowledge of the activities being observed, and must also have knowledge of the safety basis documents for the facility. They must have the ability to recognize issues that need to be investigated or issues that require additional follow-up and mentoring as determined by the responsible line manager. The SSW must inform the appropriate line manager of any concerns that are not satisfactorily resolved and provide a written assessment of the assigned activities, which they observed.

Personnel assigned the PFP SSW shall be qualified to:

- Conduct job observations
- Identify deviations from management expectations
- Provide immediate intervention (mentoring) and communicate concerns and observations to management while assigned to a nuclear operations facility.
Qualification Process

The requirements contained in the new expectations for PFP SSW are derived from PRC-PRO-OP-53077, Senior Supervisory Watch. The expectation is identified individuals have a familiarity level of understanding of the aforementioned listed procedure. Familiarity level knowledge is characterized by a conversational understanding of the subject matter and its general applicability to job duties.

The PFP Project Manager and/or Deputy Project Manager will determine the applicability of the requirements to the individual being interviewed. Successful completion is achieved by passing the oral interview to the satisfaction of the PFP Project Manager and/or Deputy Project Manager conducting the interview. There are no written examination requirements for SSW qualification.

Records

The following section of this document is the expectation of understanding. The candidate will verify, by signature, that competency requirements have been discussed with the PFP Project Manager and/or Deputy Project Manager(s). Once the PFP Project Manager and/or Deputy Project Manager is assured that the candidate being considered for qualification meets their knowledge and skill expectations, then they will verify, by signature, that the candidate is qualified to perform SSW assignments. The expectation of understanding must then be turned into the M. R. Oswalt-Spry to be retained accordingly.
### Expectation of Understanding

<table>
<thead>
<tr>
<th>Other Competency requirements as deemed by the PFP Project Manager and/or Deputy Project Manager</th>
<th>Date Discussed</th>
<th>Date Completed</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

I verify that I understand the requirements of and expectations of the PFP SSW and am aware of my roles and responsibilities regarding assignment to the SSW.

Candidate Signature: ____________________________ Date: ____________________________

I verify that the requirements and expectations have been satisfactorily completed and understood for granting of this individual as a SSW on the PFP Project. I am assured that the individual is capable of safely performing the duties associated with the SSW assignment based on successfully passing an oral interview with me.

PFP Project Manager and/or Deputy Project Manager Signature: ____________________________ Date: ____________________________
ATTACHMENT 2

CHPRC-1801076
CONTRACT NUMBER DE-AC06-08RL14788

PLUTONIUM FINISHING PLANT
SENIOR SUPERVISORY WATCH CHECKLIST

Consisting of 9 pages,
including this cover page
### INSTRUCTIONS:
Complete applicable checklist for the observed activity or evolution. Discuss any negative results, opportunities for improvements (OFI), and problems identified and corrected on the spot (COTS) in the comment section of the checklist. If a checklist is not needed for the observed activity/evolution, document in the comment section of that checklist “Not used for this activity.” Complete the summary/recommendation section and document any corrective actions follow-up and tracking system number. Submit the completed form to M. R. Oswalt-Spry electronically or hard copy.

### Task Title:
Title of Work Package

### SSW Observation Date(s)

<table>
<thead>
<tr>
<th>SSW Name</th>
<th>Signature</th>
</tr>
</thead>
</table>

### Activity/Evolution Description:

### Activity Description:

### SSW Authority:
The only operational authority that can be exercised by the SSW is Stop Work in accordance with DOE-0343, “Stop Work” to identify an unsafe situation, clarify operational conditions, ensure proper operational requirements are being met, or other applicable issues. Lifting the stop work and recommencing work will follow DOE-0343. In other instances, the SSW will not interfere with critical operating activities and will adhere to operational and safety requirements and procedures.

### Task Document No:

<table>
<thead>
<tr>
<th>#</th>
<th>Pre-Job Briefing</th>
<th>Check one on whether the action was satisfied: Not satisfied (NS), identified, not observed (NOB), or not applicable (N/A) document any boxes checked “NS” in the comment section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The briefing leader controls the meeting and ensures everyone is focused on the specific job.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>2</td>
<td>Supervision makes job assignments based on the operator’s proficiency and their familiarity with the assigned task.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>3</td>
<td>All workers are engaged, familiar with the work scope/task, understand the steps and expected results.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>4</td>
<td>All tools and equipment required for the job have been located and staged.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>5</td>
<td>Prerequisites/limitations/precautions are reviewed as necessary.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>6</td>
<td>A person in charge (PIC) is identified for the job, if applicable.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>7</td>
<td>Previous lessons learned associated with this or similar tasks are discussed.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>8</td>
<td>Questions from workers and open issues are resolved prior to completion of the briefing.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>9</td>
<td>Critical steps or evolutions are discussed.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>10</td>
<td>Peer check steps were identified.</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td>11</td>
<td>Was there a “SAFE” discussion conducted for the work scope/activity?</td>
<td>Yes  No  OFI  NOB  N/A</td>
</tr>
<tr>
<td></td>
<td>• Summarize: What are the critical steps or phases of this task?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Anticipate: How could a mistake be made at those steps?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Foresee consequences: What is the worst thing that could go wrong?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Evaluate: What defenses are needed?</td>
<td></td>
</tr>
</tbody>
</table>
# PFP SSW Checklist

## Task Title:
Title of Work Package

## Pre-Job Briefing

<table>
<thead>
<tr>
<th>#</th>
<th>Check one to whether the criterion was satisfied; if not satisfied, an Opportunity For Improvement (OFI) was identified, Not Observed (NOB) or Not Applicable (N/A). Explain any boxes checked 'OFI' or 'No' in the comments section.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

## Con Ops

<table>
<thead>
<tr>
<th>#</th>
<th>Check one to whether the criterion was satisfied; if not satisfied, an Opportunity For Improvement (OFI) was identified, Not Observed (NOB) or Not Applicable (N/A). Explain any boxes checked 'OFI' or 'No' in the comments section.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>1</td>
<td>Proper authorization is received from Operations line management to perform the task (released at shift office).</td>
</tr>
<tr>
<td>2</td>
<td>Task performance demonstrates full compliance with the technical procedure or work document.</td>
</tr>
<tr>
<td>3</td>
<td>Personnel are trained and qualified to perform work assigned.</td>
</tr>
<tr>
<td>4</td>
<td>Only approved and issued procedures are used.</td>
</tr>
<tr>
<td>5</td>
<td>Revisions to technical procedures or work documents are made in full compliance with established procedures.</td>
</tr>
<tr>
<td>6</td>
<td>Tools and equipment required to perform the activity are available and function as intended.</td>
</tr>
<tr>
<td>7</td>
<td>Needed cameras are available and operable.</td>
</tr>
<tr>
<td>8</td>
<td>Equipment calibrations, surveillances, and scheduled preventative maintenance requirements are current.</td>
</tr>
<tr>
<td>9</td>
<td>Conduct of Operations activities (such as log keeping, communications protocols, and procedure compliance) are carried out in full compliance with established procedures.</td>
</tr>
<tr>
<td>10</td>
<td>Support functions required for performing activities are available and carry out their responsibilities as required.</td>
</tr>
<tr>
<td>11</td>
<td>Response to abnormal conditions (still or actual) discovered during operations is conducted in full compliance with established procedures.</td>
</tr>
<tr>
<td>12</td>
<td>Noise levels do not affect employee communications during the activity.</td>
</tr>
</tbody>
</table>

Comments:
### Safety

<table>
<thead>
<tr>
<th>#</th>
<th>Statement</th>
<th>Yes</th>
<th>No</th>
<th>OfI</th>
<th>NOB</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proper body positions are used to minimize stress and overextending the body.</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Attention is given to walking/working surfaces to prevent falls.</td>
<td></td>
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<tr>
<td>3</td>
<td>Workers stay away/stand clear from potential sources of stored energy.</td>
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<tr>
<td>4</td>
<td>Appropriate/requied PPE is worn for potentially hazardous environments.</td>
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<tr>
<td>5</td>
<td>Required personal protective equipment is utilized properly.</td>
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</tbody>
</table>

Comments: 

### General

<table>
<thead>
<tr>
<th>#</th>
<th>Statement</th>
<th>Yes</th>
<th>No</th>
<th>OfI</th>
<th>NOB</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Personnel are wearing the correct personal protective equipment (PPE).</td>
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<td>2</td>
<td>Housekeeping at job site is adequate.</td>
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<tr>
<td>3</td>
<td>Required work documents (procedures, work package, etc.) are used at job site.</td>
<td></td>
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<td>4</td>
<td>Personnel engaged in the activity are qualified to perform it.</td>
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<tr>
<td>5</td>
<td>Personnel signed in on the correct RWP.</td>
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<tr>
<td>6</td>
<td>Required dosimetry is worn correctly by workers.</td>
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<tr>
<td>7</td>
<td>Postings and controls for the work area are correct and followed.</td>
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<tr>
<td>8</td>
<td>The scope of work for the activity is understood by all the workers.</td>
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</tr>
</tbody>
</table>

Comments:
## PFP SSW Checklist

### Task Title:
Title of Work Package

<table>
<thead>
<tr>
<th>#</th>
<th>Procedure Compliance</th>
<th>Check one as to whether the criterion was satisfied: Yes, No, OBS, N/A. Explain any boxes checked &quot;OBS&quot; or &quot;N/A&quot; in the comments section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Procedure revision was verified as the most current revision along with any field changes.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>2</td>
<td>The procedure is complete. There are no missing pages or steps and it is legible.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>3</td>
<td>The person using the procedure is familiar with the task, understands the steps and expected results.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>4</td>
<td>Prerequisites/limitations/precautions are reviewed prior to procedure performance.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>5</td>
<td>Critical steps or evolutions are discussed prior to procedure performance.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>6</td>
<td>The procedure is present in the work area and in use with each step being performed as written.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>7</td>
<td>The procedure is stopped and supervision is notified if the validity or intent of a step is in doubt.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>8</td>
<td>A Stop Work is initiated for any abnormality that needs to be discussed.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>9</td>
<td>Prerequisites/limitations/precautions are reviewed prior to procedure performance.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>10</td>
<td>Critical steps or evolutions are discussed prior to procedure performance.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>11</td>
<td>If procedure is stopped, THEN when work with the procedure is authorized to resume, the right level of additional management attention and authority is present.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>12</td>
<td>Steps can be performed as written with tools, cameras, and lighting, etc. without the need to make an assumption about any required condition.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>13</td>
<td>The procedure is completed, legible and any corrections are lined out, initialed and dated.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>14</td>
<td>During the performance of the procedure observe the use of self-checks or peer checks for critical steps.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>15</td>
<td>The correct type of procedure is properly used.</td>
<td>Yes  No  OBS  N/A</td>
</tr>
<tr>
<td>16</td>
<td>Good three-way communications are used (repeat backs).</td>
<td>Yes  No  OBS  N/A</td>
</tr>
</tbody>
</table>

**Comments:**
### Control Areas

<table>
<thead>
<tr>
<th>#</th>
<th>Task Description</th>
<th>Yes</th>
<th>No</th>
<th>OFI</th>
<th>NOB</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;Control Areas and Boundaries&quot; are properly posted.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>&quot;At-The-Controls&quot; locations are properly posted.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The boundary of the &quot;At-The-Controls&quot; location is posted close to the work area but with adequate space for workers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Access into &quot;Control Areas&quot; and &quot;At-The-Controls&quot; locations is properly authorized and consistently implemented.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**

### PFP Environmental Considerations

<table>
<thead>
<tr>
<th>#</th>
<th>Task Description</th>
<th>Yes</th>
<th>No</th>
<th>OFI</th>
<th>NOB</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lighting is adequate for the performance of inspections or for working safely.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Nothing looks questionable. (If it doesn't look right it probably isn't)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Doors for access and egress are functioning properly and there are no obstructions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Wind speeds within tolerance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**
**Vehicle/Equipment usage**

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
<th>OFI</th>
<th>NOB</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The operator's daily checklist associated with each mobile crane is filled out during the preoperational inspection of the crane and the completed checklist is placed with the work control documents or left with the crane.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Heavy equipment usage is coordinated with ample spacing between equipment, effective communications between operators, and authority to proceed given by the PIC.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Government vehicles are operated safely, including the use of 360 degree walk-arounds and seat belts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td></td>
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</tr>
</tbody>
</table>
# PFP SSW Checklist

## Task Title:
Title of Work Package

### Field Observation Summary / Recommendations

<table>
<thead>
<tr>
<th>Documents Used</th>
<th>Personnel Interviews/Discussions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Good Practices/Feedback/Mentoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential actions to improve efficiency or OFI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### Observation(s)

### Concerns

#### Method for Resolution

- [ ] Submit Work Request:
- [ ] Initiate Document Revision:
- [ ] Initiate Trackwise Potential Issue Report:
- [ ] CR Issued
- [ ] Other (Describe resolution method here)

### Additional Information / Comments:

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<table>
<thead>
<tr>
<th>Task Title:</th>
<th>Title of Work Package</th>
</tr>
</thead>
</table>

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