

PFP Project Site Specific Health and Safety Plan (HASP)

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

CH2MHILL
Plateau Remediation Company

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1.0 PURPOSE

The primary purpose of this document is to identify how the Plutonium Finishing Plant (PFP) Closure Project meets the required elements of a Site Specific Health and Safety Plan (HASP) as required by 29 CFR 1910.120(b)(4)(ii). This document also identifies significant security requirements for the protection of Special Nuclear (Fissile) Material as required by MSC-PLN-SAFE-5477, *Materials Control and Accountability Plan*.

A HASP is a component of the Written Safety and Health Program that is required by OSHA under 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response (HAZWOPER)*. Written Safety and Health Program requirements are met by CHPRC's Company Level Health and Safety Program as described in PRC-MP-SH-32219, *10 CFR 851 CHPRC Worker Safety and Health Program Description*.

The intent of this document (hereafter referred to as the HASP) is to implement a compliant and responsive health and safety program during Deactivation, Decontamination, Decommissioning, and Demolition (D4) activities associated with the removal of facilities and structures within the PFP Complex. This HASP outlines the process that is utilized to minimize health and safety risks to workers and other onsite personnel.

This HASP contains significant **Security and Safety and Health** information that is important for all workers and visitors at PFP. This important information has been placed in shaded boxes.

This HASP was developed as an upper-tiered document with the following intent:

- It implements the programmatic elements of the CHPRC health and safety program for the PFP Closure Project.
- It will be used in conjunction with procedures and PFP work planning documents.

1.1 Regulatory Basis for the HASP

29 CFR 1910.120 requires the development and implementation of a written Safety and Health Program for employees involved in hazardous waste operations (29 CFR 1910.120(b)). The Price Anderson Amendments Act (PAAA) at 42 USC 2282c directed the US Department of Energy (DOE) to promulgate the regulation at 10 CFR 851 to protect the health and safety of workers employed by DOE contractor companies, and 10 CFR 851.23(a)(3) incorporates by reference the 29 CFR Part 1910 requirements. These requirements are met through CHPRC's Company Level Health and Safety Program, which includes all procedures for Occupational Safety and Industrial Hygiene and aligns with PRC-MP-SH-32219, *10 CFR 851 CHPRC Worker Safety and Health Program Description*.

29 CFR 1910.120 is also incorporated by reference in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Contingency Plan at 40 CFR 300.150, which governs the safety of workers conducting CERCLA response actions.

The required elements of a HASP (per 29 CFR 1910.120(b)(4)(ii)) are:

- A safety and health hazard analysis identifying hazards and their mitigations;
- Employee training assignments;
- Personal protective equipment to be used by employees for tasks and operations;
- Medical Surveillance requirements;
- Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques;
- Site control measures;
- Decontamination procedures;
- Emergency response plan, including necessary PPE and other equipment;
- Confined space entry procedures; and
- Spill containment measures.

Additional required elements are imposed from one of PFP's primary CERCLA documents: DOE/RL-2011-03, *Removal Action Work Plan (RAWP) for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex*. Some of the elements from the RAWP overlap with the list from OSHA (29 CFR 1910.120(b)(4)(ii)) with the remainder being unique to the RAWP. These unique elements will be added to the HASP with the intent of complying with both sources of requirements.

The elements from the RAWP are as follows:

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

- Confined space requirement
- Environmental protection and response
- Hazard Communication

2.0 FACILITY DESCRIPTION/PROJECT MISSION

The PFP Complex is located in the 200 West Area of the Hanford Site. Operations began at the PFP Complex in 1949. Until 1991, PFP's primary mission was processing plutonium metal into cylindrical ingots for defense purposes. Plutonium was separated and recovered from liquid and solid process streams. In 1991, the mission changed to plutonium-bearing material stabilization, cleanup, deactivation and decommissioning (D&D), and environmental restoration. Material stabilization campaigns and the mission for storage of stabilized plutonium materials were completed in December 2009 when the final containers of stored material were shipped off-site. The 2736-Z Complex facilities that had supported that mission were demolished in 2012. Final demolition activities at the PFP Complex includes the demolition of buildings 234-5Z, 236-Z, 242-Z, 291-Z, and the 291-Z Stack. These facilities will be demolished to slab on grade with exposed basement areas filled.

As of Revision 8 of this HASP, 242-Z, 291-Z, and the 291-Z stack have been demolished. Demolition of 234-5Z and 236-Z is ongoing.

Building 234-5Z is the principal structure of PFP and contained plutonium processing equipment and laboratories. The floor levels of Building 234-5Z are designated as the basement, first floor, duct level, second floor, and roof level. The first floor contained the plutonium processing equipment, the duct level contained the transfer piping and ventilation system, and the basement contained the process drain piping and other utilities.

236-Z was used to recover plutonium by material dissolution, purification, and stabilization processes. 236-Z housed the majority of the plutonium recovery process equipment used to convert various plutonium-bearing materials and aqueous feeds to a purified plutonium nitrate product suitable for conversion to plutonium oxide or metal.

2.1 Facility Demolition Assumptions and Enhanced Controls

After an unexpected spread of contamination in December 2017, work was stopped at PFP while the contamination spread was studied. New air and ground dispersion models were completed by Pacific Northwest National Laboratory and Lawrence Livermore National Laboratory. Control boundaries were expanded. Additional Continuous Air Monitors were put in place. Additional dust collection cookie sheets were added and are surveyed regularly. The application of fixatives was studied and appropriate changes were made. Formal training in the application and use of foggers to suppress ambient dust during demolition was developed and implemented.

While these and other administrative controls would have been considered “enhanced controls” for PFP prior to December 2017, these controls are the current “normal” controls for PFP today and going forward. More information on these controls and the background is available in Computer Based Training (CBT) Course Number 200018, *PFP Enhanced Controls*.

3.0 ROLES AND RESPONSIBILITIES

Organizational roles, responsibilities, and interfaces as described in charters and program plans can be found at the PFP Closure Project Website in the PFP Closure Project Organization Chart with key roles and responsibilities rolled into PFP-PRO-MS-50370 (FSP-PFP-5-8, 13.3), *Safety Basis Requirements Compliance*. The organizational roles/chart do not reflect a Site Safety and Health Officer by title. As defined by 29 CFR 1910.120, the Site Safety and Health Officer is the individual at the Project that is responsible to the employer and has the authority and knowledge necessary to implement the HASP and verify compliance with applicable safety and health requirements. At PFP this individual is the Health and Safety Manager. Individual Subject Matter Experts (SME) for industrial safety, industrial hygiene, environmental engineering, radiological engineering, fire protection, and emergency preparedness will provide technical support to the project.

It should be noted that 29 CFR 1910.120(b)(2), *Organizational Structure Part of the Site Program*, does not require a listing of key personnel in a HASP and is general in its discussions on the personnel to be identified as part of a HASP. Specifically, 1910.120(b)(2) states that the chain of command and responsibilities of personnel should be identified as part of the Written Safety and Health Program (i.e., CHPRC’s Company Level Health and Safety Program).

4.0 HAZWOPER APPLICABILITY TO PFP

This HASP discusses the general health and safety requirements that are associated with D&D activities to be performed within the PFP Complex. The purpose of the HASP is to establish safety and health standards that are applicable for all aspects of planned CERCLA closure of the PFP Complex. Because of the diverse nature of activities associated with the D&D activities that are to be performed under removal actions at PFP, it is expected that additional and/or enhanced controls will be needed during certain D&D activities.

In general, this HASP encompasses the D&D scope as defined in the DOE/RL-2005-13, Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action and HNF 22401, Plutonium Finishing Plant Complex End Point Criteria, which is to transition the PFP Complex to a low risk, low cost surveillance, and maintenance condition pending final remediation. The mission requires deactivating and dismantling PFP Complex systems and structures to the degree determined appropriate via the CERCLA process, thus eliminating significant hazards to workers, the public, the environment, and minimizing long-term surveillance and maintenance risks and costs.

HAZWOPER activities at PFP are those D&D and maintenance work activities that have the potential of exposing personnel (via contact and/or inhalation) to the radiological and chemical contaminants stemming from the PFP process system(s).

Non-HAZWOPER work activities would be those activities that do not expose personnel (via contact and/or inhalation) to the contaminants of the process system(s). Thus, those activities that are conducted in offices, warehouses, and shops are not considered HAZWOPER.

PFP does not consider the following activities as HAZWOPER work:

- Shipment of materials (supplies, chemicals, etc.) that are delivered to project sites or facilities where there is no access made into radiological and/or chemical contamination areas.
- Construction activities that involve excavating through areas void of radiological and/or chemical contaminants.
- Construction/remodeling activities that do not expose personnel to the radiological and/or chemical contaminants of the process system(s).
- Maintenance activities conducted on systems (e.g., HVAC, ventilation, etc.) that do not expose personnel to the radiological and/or chemical contaminants of the process system(s).
- Demolition of buildings or structures that are void of radiological and/or chemical contaminants from the process system(s).

5.0 SAFETY & HEALTH HAZARD ANALYSIS

All PFP field activities are conducted via either a work package, a procedure, or a statement of work (SOW). Work package documents are developed in accordance with PRC-PRO-WKM-12115, *Work Management*. Procedures are developed in accordance with PRC-PRO-MS-589, *CH2M HILL Plateau Remediation Company Procedures*. SOWs are developed in accordance with PRC-PRO-AC-40480, *Acquisition Planning*, and PRC-PRO-SH-40078, *Contractor Safety Process*. Each of these processes requires a hazard analysis.

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 that the Project utilizes include General Industrial Hazard Analyses (GHAs); Craft Specific Hazard Analyses (CHAs); Automated Job Hazard Analyses (AJHAs); and Job Hazard Analyses (JHAs/JSAs).

PFP documents their hazard assessment of industrial hygiene hazards via Industrial Hygiene Exposure Assessments. These hazard assessments are generated following the process outlined in PRC-PRO-SH-17916, *Industrial Hygiene Exposure Assessments*. Controls from these exposure assessments are incorporated into AJHAs/JHAs, work packages, and procedures as appropriate.

PPF documents their radiological hazard assessments on Radiological Hazard Screening Forms (RHSF). This process is outlined in various procedures; PRC-PRO-RP-40109, *Radiological Work Planning*, and PRC-PRO-RP-40021, *Radiological Work Permits*. Controls for these identified exposures are incorporated into procedures/work documents and Radiological Work Permits (RWPs).

Appendix A contains a list of general hazards and their mitigations that can be encountered at PFP. These hazards have been evaluated by Health & Safety and are considered "General" in nature meaning they are easily recognizable and mitigated by employee's fundamental knowledge and training. General hazards are not typically included in work packages or procedures unless particular emphasis is needed.

6.0 EMPLOYEE TRAINING

The CHPRC training program 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 Integrated Safety Management System and Environmental Management System (ISMS/EMS) Guiding Principle of Competence Commensurate with Responsibility. The CHPRC training program is described in PRC-MP-TQ-011, *CH2M HILL Plateau Remediation Company Qualification and Training Plan*. All employees exposed to hazardous substances, health hazards, or safety hazards and the site responsible managers receive the requisite training before they are permitted to engage in HAZWOPER activities.

CHPRC's training process requires the development of Individual Training Plans for all employees. These Individual Training Plans contain all initial and refresher training that is required for each employee to perform his or her job safely and effectively. The Integrated Training Electronic Matrix (ITEM) provides management a method to track required training to ensure personnel remain current.

7.0 HAZWOPER TRAINING REQUIREMENTS FOR PFP

40-Hour Training and 3 days of documented field experience are required for activities where workers and supervisors regularly engage in the activity of hazardous substance removal, or other hazardous waste related activities that may expose personnel to hazardous substances or health hazards. Health and safety professionals with on-site responsibilities for health and safety guidance also need this training. Work activities conducted at PFP that require personnel to wear respiratory protection for the radiological and/or chemical contaminants of the process system, require 40-Hour HAZWOPER training.

24-Hour HAZWOPER Training and 1 day of documented field experience is required for workers who occasionally enter the hazardous waste activity area for a specific limited task and are unlikely to be exposed to hazardous substances greater than occupational exposure limits. The areas where these workers will work must be characterized/evaluated to ensure no health hazards exist, no respiratory protection is required due to the radiological/chemical contaminants of the process system(s), and no possibility exists for an emergency arising that would require them to don respiratory protection in response to the emergency event.

It is also required for onsite managers and supervisors who are responsible for directing workers that are 40- or 24-Hour HAZWOPER trained to complete the 8-Hour Manager/Supervisor HAZWOPER training.

PPF does not consider the following activities HAZWOPER (no HAZWOPER Training is required):

- Shipment of materials (supplies, chemicals, etc.) that are delivered to project sites or facilities where there is no access made into radiological and/or chemical contamination areas.
- Construction activities that involve excavating through areas void of radiological and/or chemical contaminants.
- Construction/remodeling activities that do not expose personnel to the radiological and/or chemical contaminants of the process system(s).
- Maintenance activities conducted on systems (e.g., HVAC, ventilation, etc.) that do not expose personnel to the radiological and/or chemical contaminants of the process system(s).
- Demolition of buildings or structures that are void of radiological and/or chemical contaminants from the process system(s).

Visitors are not required to have HAZWOPER Training. PPF requires that visitors must be escorted by PPF personnel while on site. Visitors may be escorted into areas where anti-contamination clothing is required. Visitors without 40-Hour HAZWOPER training may not be escorted into areas where respiratory protection is required. Visitors shall be briefed on the general hazards listed in Appendix A.

HAZWOPER Training needs are based on potential exposures to hazardous waste. Industrial Hygiene is responsible for evaluating work activities and determining HAZWOPER training needs.

8.0 PERSONAL PROTECTIVE EQUIPMENT

As mentioned above, PFP evaluates safety and health hazards via the Job Hazard Analysis Process dictated in PRC-PRO-WKM-079, *Job Hazard Analysis*. This includes the determination of required PPE to safely perform work activities. PPE requirements are incorporated in hazard analyses (GHAs, CHAs, AJHAs, and JHAs), work packages, and procedures as appropriate.

General personal protective equipment requirements are outlined in PRC-STD-SH-40518, *Personal Protection*, and in program specific procedures such as those relating to respiratory protection, fall protection, hearing protection, radioactive contamination, and electrical safety. Minimum PPE requirements for PFP work activities are identified in PFP's general hazards (see Appendix A).

9.0 MEDICAL SURVEILLANCE

PFP uses the Employee Job Task Analysis (EJTA) system to identify medical surveillance requirements for employees based on the job requirements, hazards, exposures, and overall risk associated with their assigned work scope. This process is detailed in PRC-PRO-SH-52755, *Employee Job Task Analysis*.

The EJTA includes medical surveillance requirements for specific work activities identified by Industrial Hygiene in their Industrial Hygiene Exposure Assessments as required by PRC-PRO-SH-17916, *Industrial Hygiene Exposure Assessments*.

Dosimetry and Bioassay Requirements for PFP

Work activities conducted under an RWP within an RBA, RMA, CA, HCA, and/or ARA at PFP will require a Hanford Standard Dosimeter (HSD) and a PFP Bioassay Examination. A Hanford Combination Neutron Dosimeter (HCND) and/or a PNAD is no longer required at PFP. Personnel are required to electronically check in via the RAC (Radiological Access Control) system prior to conducting work or accessing an area that requires a RWP.

10.0 MONITORING/SAMPLING

The frequency and types of air monitoring and sampling that is completed for PFP is detailed in Industrial Hygiene Exposure Assessments and Industrial Hygiene Sampling Plans. Industrial Hygiene Monitoring, Reporting, and Records Management are dictated by PRC-PRO-SH-409, *Industrial Hygiene Monitoring, Reporting and Records Management*.

Radiological monitoring performed by PFP is identified in Radiation Protection Technical Evaluations and includes contamination, dose rates, and air sampling surveys. The performance of radiological monitoring/sampling is conducted in accordance with instrument-specific implementing procedures. Records generated from the radiological monitoring program are managed in accordance with PRC-PRO-IRM-10588, *Records Management Processes*.

11.0 SITE CONTROL

All personnel that enter the PFP Complex are required to read and sign the current revision of the HASP. Visitors to the PFP Complex are required to sign in and out on the Visitor Log Sheet (see Attachment 1). PFP evaluates safety and health hazards via the Job Hazard Analysis Process dictated in PRC-PRO-WKM-079, *Job Hazard Analysis*. This includes the determination of required site control tactics, which limits access to potential exposures. Site control requirements (e.g., use of postings and boundaries) are incorporated in the Project's Hazard Analysis (AJHAs, JHAs, GHAs, CHAs) work packages, and procedures as appropriate.

Supplemental Survey Areas

To provide for early detection of transferable contamination within the PFP High Contamination Area (HCA), supplementary contamination control practices are applied at certain areas within the HCA. The supplementary contamination control practices (i.e., hand and foot survey or removal of outer gloves and shoe covers) are best management practices and should be performed unless their performance would result in a non-compliance (i.e., PPE out of compliance with the RWP). These areas are demarcated by signs listing the following actions: ***“STOP, prior to leaving this area, Remove Outer Gloves and Shoe Covers OR Contact RCT to Perform Hand and Foot Survey, If unable to comply, proceed directly to an RCT to perform survey.”***

Exiting an RBA

When exiting an RBA established for contamination control, personnel must have a hand and foot survey. Hand-carried items must be surveyed by an RCT.

12.0 PROTECTION OF SPECIAL NUCLEAR (FISSILE) MATERIAL

PFM Material Balance Area (MBA)

A Material Balance Area (MBA), approved by Safeguards, is currently maintained at PFM. An MBA is a controlled access area used to control and protect Special Nuclear (Fissile) Material. Movement of this material is done through the observation of trained and qualified material handlers.

Material Surveillance is the process that detects (through tamper-indicating devices and/or personnel observation) unauthorized movement of nuclear material, tampering with containments, falsification of information related to location and quantities of nuclear material, and tampering with safeguards devices.

All personnel with Unescorted Access to the PFM MBA are responsible for Material Surveillance. The following is what is required by these individuals:

- Recognize that material surveillance is initiated when entry into an MBA occurs. Material surveillance ends when you exit the MBA.
- Recognize that material surveillance is initiated when nuclear material (NM) is outside its authorized MBA storage location.
- Recognize unauthorized activities/movements of NM within an MBA.
- Identify authorized personnel that are allowed access to the NM.
- Recognize tampering with NM containment and safeguards devices.
- Report falsification of information related to location and quantities of NM.
- Report unauthorized activities or anomalous conditions to the Shift Operations Manager (SOM) or Building Emergency Director (BED) immediately.

Access into the MBA is controlled by a lock with a key issued by the PFM Shift Office. Unescorted access into this area requires you to have a Hanford-issued picture badge and be trained to this HASP. Access to the MBA is granted by the Shift Office upon acknowledgment of having read and understood this HASP.

All gates associated with the MBA must be locked/latched or chained with an approved lock when not attended.

Personnel who are not granted access to the MBA are required to be escorted by a PFM Authorized Person while in the MBA. Escorts shall keep visitor under constant surveillance until they exit the PFM MBA. The escort is responsible for Material Surveillance to ensure no Special Nuclear Material is compromised by the visitor.

Additional information concerning PFM's MBA requirements can be found in FPS-PFM-5-8, 4.6, *Plutonium Finishing Plant Security Requirements*.

13.0 DECONTAMINATION

PFP evaluates safety and health hazards via the Job Hazard Analysis Process dictated in PRC-PRO-WKM-079, *Job Hazard Analysis*. This includes the determination of decontamination requirements. Decontamination requirements are incorporated into the Project's Hazard Analysis (AJHAs, JHAs, GHAs, CHAs), work packages, and procedures as appropriate.

14.0 EMERGENCY RESPONSE/SPILL RESPONSE

General purpose trailers/facilities at PFP utilize Facility Emergency Response Information Boards (FERIBs) to communicate emergency response information to facility occupants. FERIBs are maintained per PRC-PRO-EM-7647, *Emergency Preparedness Program Requirements*.

Hazardous facilities at PFP, as listed in FSP-PFP-0263, use the Building Emergency Plans prescribed in this document.

All work teams are required to have a viable means of communication with them at all times. This can be accomplished via telephone (cell/hardline) or radio.

To report upset events that exhibit an emergency condition (e.g. fire, spills, life-threatening injuries), it is recommended that personnel notify the Shift Operations Manager (SOM) first. The SOM can initiate facility protective actions, request facility medical responders, and will make the 911 call if necessary. The SOM can be contacted at 373-2337 or Channel 1 (Emergency Ops) via radio. If contacting the Hanford Fire Department (Emergency Medical Services), call 911 from a hard line or (509)373-0911 from a cell phone.

The SOM monitors all PFP radio channels. During an emergency situation, the SOM will contact employees via radio. There are two staging areas at PFP. One is in the North West Corner of the PFP fence line. The other is in the PFP North Parking Lot. The staging area utilized during an upset event will be directed by the SOM and dictated by site conditions.

It should be noted that the PFP Shift Office is not staffed 24 hours a day, 7 days a week. It is staffed Monday through Friday during normal work hours at a minimum and will be staffed whenever demolition activities are occurring.

Radiological/chemical hazard event response is governed by PRC-PRO-EM-40325, *Radiological/Chemical Hazard Event Response*.

Reporting, investigating, and managing health, safety and property/vehicle events are governed by PRC-PRO-SH-077, *Reporting, Investigating, and Managing Health, Safety and Property/Vehicle Events*.

15.0 CONFINED SPACES

All confined space work that is completed at PFP is done in accordance with DOE-0360, *Hanford Site Confined Space Procedure (HSCSP)*. Industrial Hygiene maintains an inventory of PFP's confined spaces. Confined space controls that are needed to perform work safely are incorporated into the Project's Hazard Analysis (AJHAs, JHAs, GHAs, CHAs), work packages, and procedures as appropriate.

16.0 WASTE MATERIALS

There are many restrictions on the waste materials generated at PFP. Radioactive, hazardous, mixed, and TRU waste must all be properly segregated, packaged, labeled, and shipped according to stringent regulatory requirements. Discarding waste materials in an unapproved manner may result in a violation of environmental regulations, which may have a severe impact on the facility, as well as the contractor and the individual.

Waste is always disposed of per a Waste Planning Checklist (WPC) as per PRC-PRO-WM-52692, *Waste Planning, Packaging and Labeling*. The WPC is completed as part of the work planning process and is incorporated into work packages and procedures as appropriate.

17.0 COMBUSTIBLE CONTROLS

PFP evaluates potential fire hazards via the Job Hazard Analysis Process dictated in PRC-PRO-WKM-079, *Job Hazard Analysis*. This includes the determination of combustible control requirements. Combustible control requirements are incorporated into the Project's Hazard Analysis (AJHAs, JHAs, GHAs, CHAs), work packages, and procedures as appropriate.

18.0 REFERENCES

- 10 CFR 851.23, *Nuclear Worker Health and Safety*
- 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*
- 40 CFR 300.150, *National Contingency Plan*
- 42 USC 2282c, *Price Anderson Amendments Act*
- DOE-0359, *Hanford Site Electrical Safety Program*
- DOE-0360, *Hanford Site Confined Space Procedure (HSCSP)*
- DOE/RL-2011-03, *Removal Action Work Plan (RAWP) for the Deactivation, Decontamination, Decommissioning, and Demolition of the Plutonium Finishing Plant Complex*
- FPS-PFP-5-8, 4.6, *Plutonium Finishing Plant Security Requirements*
- MSC-PLN-SAFE-5477, *Materials Control and Accountability Plan*
- PRC-MP-SH-32219, *10 CFR 851 CHPRC Worker Safety and Health Program Description*
- PRC-MP-TQ-011, *CH2M HILL Plateau Remediation Company Qualification and Training Plan*
- PRC-PRO-AC-40480, *Acquisition Planning*
- PRC-PRO-EM-7647, *Emergency Preparedness Program Requirements*
- PRC-PRO-EM-40325, *Radiological/Chemical Hazard Event Response*
- PRC-PRO-IRM-10588, *Records Management Processes*
- PRC-PRO-MS-589, *CH2M HILL Plateau Remediation Company Procedures*
- PRC-PRO-RP-40021, *Radiological Work Permits*
- PRC-PRO-RP-40109, *Radiological Work Planning*
- PRC-PRO-SH-077, *Reporting, Investigating, and Managing Health, Safety and Property/Vehicle Events*
- PRC-PRO-SH-409, *Industrial Hygiene Monitoring, Reporting and Records Management*
- PRC-PRO-SH-17916, *Industrial Hygiene Exposure Assessment*
- PRC-PRO-SH-28034, *Adverse Weather*
- PRC-PRO-SH-40078, *Contractor Safety Process*
- PRC-PRO-SH-52755, *Employee Job Task Analysis*
- PRC-PRO-WKM-079, *Job Hazard Analysis*
- PRC-PRO-WKM-12115, *Work Management*
- PRC-STD-SH-40518, *Personal Protection*

19.0 APPENDIX A: PFP's GENERAL HAZARDS

Hazard	Mitigation/Control/Action	Discussion
General Work Areas Including the PFP RBA Area(s)	PPE	<p>Minimum PPE that is required in General Work Areas including the PFP RBA Area(s) include:</p> <ul style="list-style-type: none"> • High-Visibility Shirt or Vest • Safety Glasses with Side Protection when performing work (<i>See Eye Injury Section Below</i>) • Long Pants • Shirts with sleeves that cover the shoulders • Substantial Footwear (Sturdy construction that fully encloses the foot, has semi-rigid non-slip sole, and a defined heel)
Designated Demolition Area.	PPE	<p>Minimum PPE that is required in the Demolition Area shall include:</p> <ul style="list-style-type: none"> • Long Pants • Shirts with sleeves that cover the shoulder • Protective footwear (that has a protective steel or composite toe, ankle support and defined heel) • Safety Glasses with side protection • High Visibility shirt, vest or jacket (Anti-Contamination clothing is considered equivalent)

Hazard	Mitigation/Control/Action	Discussion
Transitioning to and from radiological work areas	Allowance for wearing modesty shorts and shirts without sleeves	<p>Personnel are allowed to wear modesty shorts and shirts without sleeves when transitioning to and from radiological work areas that require anti-contamination clothing.</p> <p>This allowance does not preclude personnel from wearing a highly visible shirt or vest.</p> <p>Personnel are not allowed to perform work activities unless they are in the required PPE (see PPE for General Work Areas) which includes long pants and shirts with sleeves that cover the shoulder.</p>
Eye Injury	Safety Glasses	<p>Safety Glasses with side protection are required when performing any/all work excluding administrative office work, or any documented exclusion areas by the OS/IH organization.</p> <p>Safety glasses worn indoors must have clear lenses or lenses rated for indoor/outdoor use. Dark tinted safety lenses designed to provide brightness and UV protection from the Sun are not allowed for indoor use or low light conditions.</p>
Dust from Windy Conditions (≥ 20 mph)	Dust goggles	Dust goggles are required for all outdoor activities whenever winds are sustained at 20 mph or greater.
Heat Stress	<ul style="list-style-type: none"> • Work/Rest regimens • Buddy System • Provide fluids/water 	<p>Field Work Supervision is responsible for establishing work/rest regimens in accordance with PRC-PRO-SH-121, <i>Heat Stress Control</i>.</p> <p>Heat stress conditions should be considered whenever personnel are wearing level D PPE and ambient temperatures are $\geq 85^{\circ}\text{F}$ outdoors and $\geq 90^{\circ}\text{F}$ indoors; when</p>

Hazard	Mitigation/Control/Action	Discussion
		<p>personnel will be wearing additional layers of clothing (e.g., Quantumwear, Tyvek, or OREX) and ambient temperatures are $\geq 70^{\circ}\text{F}$; and when personnel are wearing impermeable clothing (e.g., Quantumwear-C) at any temperature.</p> <p>Industrial Hygiene should be contacted if assistance is needed in determining work/rest requirements.</p> <p>The Buddy System shall be used and fluids/water provided whenever heat stress conditions exist.</p> <p>Rest breaks can be taken in the work area while personnel are wearing anti-contamination clothing provided they are removed from heat stress conditions while they are resting.</p> <p>It is realized that hydration is not easily facilitated when personnel are working within a HCA/ARA. Because of this, personnel will not be allowed to work more than two work cycles without taking a break in a cool down area where they are allowed to drink.</p> <p>Industrial Hygiene input is required whenever protective clothing is utilized to ensure that adequate controls are in place for heat stress.</p>

Hazard	Mitigation/Control/Action	Discussion
Cold Stress	Appropriate cold weather clothing.	Personnel shall dress appropriately for working in cold conditions to avoid cold related illnesses or injury.
Abrasion, laceration, cut, or puncture hazards to the hands	Cut/Puncture Resistant Gloves	Cut/Puncture Resistant Gloves are required whenever abrasion, laceration, cut, or puncture hazards are associated with the task such as when using sharp knives and tools. ANSI/ISEA-105 or BS EN388 criteria shall be used when assessing cut resistant qualities of a glove. Cut resistant gloves shall have a rating of 4 unless otherwise evaluated and approved/prescribed by OS/IH.
Scrapes to the hands	Work Gloves	Work gloves are required when there is a potential for scrapes to the hands. Cut or puncture resistant gloves are required whenever abrasion, laceration, cut, or puncture hazards are associated with the task. Work gloves as a minimum are required for material handling activities such as handling piping/conduit/wood/etc., moving furniture/boxes/etc., and delivering supplies/equipment/etc.
Foot injury when arriving to work and transitioning between PFP trailers	Appropriate Footwear	The minimum requirement for footwear when arriving at work is substantial footwear without a defined heel. Substantial footwear is made of sturdy construction that fully encloses the foot and has a semi-rigid non-slip sole (i.e., gripping traction pattern). Most tennis shoes meet this requirement. Footwear that DOES NOT meet this requirement includes moccasins, flip-flops, slippers, sandals, high-heeled shoes and open-toed shoes. Transitioning between trailers and

Hazard	Mitigation/Control/Action	Discussion
		<p>administrative activities conducted in and around Trailer Village I and MO287 requires substantial footwear but does not require a defined heel.</p> <p>Substantial footwear with a defined heel (most tennis shoes DO NOT meet this requirement) is required in general work areas including the PFP RBA, Trailer Village II at Bridgeport, and 2754W.</p>
Foot injury due to falling or rolling objects	Safety Rated Footwear	<p>Safety toed boots are required when dressed in Anti-Contamination Clothing, when there is a potential danger of foot injury due to the hazards of falling or rolling objects. During the routine handling of hard-edged/solid objects near or above waist level that weigh more than 15 pounds and have the potential for falling onto the feet. Or as prescribed in the work document.</p>
High Noise	Personnel shall wear hearing protection (earplugs or muffs) with a NRR equal to or greater than 25 dBs.	<p>Personnel shall wear hearing protection when working in high noise work areas. Hearing protection is required for all workers within 25 feet of activities involving pneumatic tool operations, power equipment operations, drills, hammer drills, saws, grinders, etc. (unless IH has evaluated and set a new distance per your work activity/location)</p> <p>A good "rule of thumb" for determining if your work area or activity requires hearing protection is if you have difficulty hearing or understanding a "normal" tone of voice at a distance of about three feet, noise levels are probably exceeding safe levels.</p>

Hazard	Mitigation/Control/Action	Discussion
		<p>Personnel are required to wear hearing protection when noise levels are suspected of being high.</p> <p>Personnel should request evaluation by Industrial Hygiene when unevaluated noisy conditions are encountered.</p>
Biological Hazards	Personnel will stay aware of their environment and watch out for critters (snakes, insects, rodents, etc.) that might impact their safety	Evaluation and the safe decontamination and/or cleanup of biological material (excreta, carcasses, nests, etc.) will be performed under Work Package 2Z-16-03854, <i>PFP Biological Hazard Decontamination</i> .
Chemical Hazards associated with Chemical Product Use	Safe use of chemical products	<ul style="list-style-type: none"> • Chemical products will be used in well-ventilated areas. • IH will be contacted prior to using chemical products in a confined/enclosed work area. • Chemical products shall be used in such a way that skin and eye contact is avoided. <ul style="list-style-type: none"> ○ Minimum PPE for chemical product use is latex/nitrile gloves and safety glasses with side protection. ○ Chemical goggles with a face shield are required if a spray/splash hazard exists (not required when respiratory protection is utilized). • Chemical products shall be sprayed in a controlled manner and personnel shall avoid overspray. • Chemicals shall not be sprayed in the direction of respirator inlets.

Hazard	Mitigation/Control/Action	Discussion
		<ul style="list-style-type: none"> Workers may upgrade to OV/CL/CD/HC/HS/SD/HE/HF cartridges to preclude odors when respirators are worn.
Head injury due to falling or flying objects, or electrical shock or burns	Protective head gear (hard hat)	Personnel shall wear hard hats when working in areas where there is a potential for head injury due to falling or flying objects, or electrical shock or burns.
Fall Hazards	Work from protected work platforms. A Fall Protection Work Permit (FPWP) when required.	A Fall Protection Work Permit (FPWP) is required when conducting work where employees are exposed to an unprotected fall hazard of 6 feet or more. Work from approved scaffolds or rolling ladders do NOT require an FPWP. Contact Industrial Safety to initiate FPWP when required.
Potential crush hazard associated with Material Handling Activities	Personnel will watch their position in association with their work so they do not position themselves where they can be caught between and/or pinched.	<p>The FWS will ensure that work 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.</p> <p>Personnel will not enter areas where they could be caught between a moving object and a stationary barrier. Equipment will be placed in a safe configuration when personnel need to access equipment work areas.</p> <p>Personnel are not allowed under a suspended load.</p> <p>Equipment operator will walk-down travel paths and work area to identify impacts and obstructions.</p> <p>Clear travel paths will be established prior to placing equipment in motion.</p>

Hazard	Mitigation/Control/Action	Discussion
Overhead Electrical Hazard	Implement overhead electrical controls when working near overhead power lines.	Work activities conducted in proximity of overhead power lines shall implement controls in accordance with procedure DOE-0359, <i>Hanford Site Electrical Safety Program</i> .
Ergonomic/Lifting Hazards	Proper Lifting/Breaks/Job Rotation	<p>Personnel are restricted to a lifting limit of 55 pounds. Mechanical lifting devices shall be used as much as possible to prevent injury to personnel. Mechanical lifting devices or multiple person lifts are required for loads greater than 55 pounds or awkward loads.</p> <p>Personnel shall take breaks as needed and rotate tasks to prevent fatigue and strain injuries.</p> <p>Knee pads or kneeling pad will be used for work activities requiring prolonged kneeling.</p>
Vehicle/Heavy Equipment	Controlled Work Areas/High Visibility Clothing	<p>The FWS will ensure that areas are controlled using boundaries as needed to ensure personnel are kept away from material handling activities and the swing/travel pathways of equipment. Equipment will be placed in a safe configuration when personnel need to access equipment work areas.</p> <p>High Visibility shirt, vest, or jacket (Anti-Contamination clothing is considered equivalent) is required when working in areas with vehicle and/or heavy equipment traffic.</p>

Hazard	Mitigation/Control/Action	Discussion
Adverse Weather	Suspension of work activities during Adverse Weather Conditions	<p>Field Work Supervisor (FWS) will monitor the weather conditions throughout the performance of work in accordance with procedure PRC-PRO-SH-28034, <i>Adverse Weather</i>.</p> <ul style="list-style-type: none"> • OS&IH shall evaluate work activities for the safe continuation of work when sustained winds exceed 15 mph. • Work on roofs and elevated surfaces (e.g., scaffolds, ladders) will be suspended at wind speeds of 25 mph and/or gusts to 35 mph. • Crane and other material lifting/hoisting equipment activities will be suspended at wind speeds of 25 mph and/or gusts to 35 mph. • If winds are anticipated to be greater than those identified in 18-004-SOI as dictated by the PFP shift office, work will be placed in a safe configuration and personnel will leave the PFP Controlled Boundary. • Elevated outdoor work will be suspended when lightning is detected within a 50-mile radius. • All outdoor work will be suspended when lightning is detected within a 10-mile radius.

Hazard	Mitigation/Control/Action	Discussion
Bomb Threat/Suspicious Object/Written Threat Letter	Notify the Building Emergency Director (BED) and Hanford Patrol	Bomb Threat/Suspicious Object/Written Threat Letter are to report immediately to the BED and Hanford Patrol by calling 911. For reporting a bomb threat/explosive device ensure you are beyond 300 feet from the suspect object before using a cell phone, (509)373-0911. A Written Threat Letter is to be handled as little as possible.
Hostage Situation/Armed Intruder	Notify the BED and Hanford Patrol	Hostage Situation/Armed Intruder is to be reported immediately to the BED and to Hanford Patrol by calling 911 or (509)373-0911 (if using a cell phone).
Range Fire	Immediately leave the area and contact your Supervisor. Notify the BED and Hanford Fire Department.	In the event of a wild land/range fire, employees shall immediately contact their appropriate Supervisor to report accountability and receive further direction. Follow the direction provided by the BED or IC.

20.0 APPENDIX B: CONTAMINANTS OF POTENTIAL CONCERN**Contaminants of Potential Concern (Construction Materials and Process/Facility Chemicals^c)**

Identified Waste Stream	COPC and Waste Characteristics
Wall, ceiling, and floor construction material	Chemical residues, asbestos
Floor drain sediment	Corrosive, lead, PCBs, mercury
Painted surfaces ^a	Lead, PCBs, chromium
Equipment	Barium, cadmium, chromium, lead, mercury, silver, PCBs
Glovebox Materials (debris only)	Asbestos fibers, barium, beryllium, cadmium, chromium, lead, mercury, silver
Fluorescent light ballast/tubes, transformers, and capacitors	PCBs, mercury
Filters and Filter Boxes	Asbestos, barium, beryllium, cadmium, chromium, lead, mercury, silver
Incandescent light bulbs	Lead
Asbestos insulation and gaskets	Asbestos
Lead packing	Lead, PCBs
Residual liquids	Corrosives, barium, cadmium, chromium, lead, mercury, silver
Mercury	Mercury
Built-up roofing materials ^b	Asbestos

a. Paint is assumed to be oil based. If paint is latex, add mercury as COC.

b. Polycyclic aromatic hydrocarbon (PAH) sampling for roofing materials is excluded under WAC 173-303-071.

c. Chemicals are not listed separately from the same materials in building construction (e.g., corrosive, or mercury).

COC = Contaminant of Concern

COPC = Contaminant of Potential Concern

PCB = Polychlorinated Biphenyl

WAC = Washington Administrative Code

Substances

Substance	Health Effects
Asbestos, CAS No. 1332 21 4	Causes chronic lung disease (asbestosis), inflammation of the pleura, and certain cancers of the lungs and digestive tracts.
Lead, CAS No. 7439 92 1	Prolonged absorption of lead may result in weakness, tremors, abdominal pain, encephalopathy, and anemia.
Mercury, CAS No. 7439 97 6	Absorption may produce tremors, bronchitis and pneumonitis, chest pain, coughing, and may have other respiratory and central nervous system effects.
Americium, CAS 7440-35-9	Targets bone surface.
Cadmium, CAS 7440-43-9	Targets respiratory system, kidneys, prostate, and blood. Symptoms include pulmonary edema, difficulty breathing, cough, chest tightness, sub sternal pain, headache, chills, muscle aches, nausea, diarrhea, proteinuria, loss of sense of smell, emphysema. Prostatic and lung cancer.
Potassium Hydroxide, CAS 1310-58-3	Targets eyes, skin, and respiratory system. Symptoms include eye and skin irritation. Coughing and sneezing. Eye and skin burns. Vomiting and diarrhea.
Barium, CAS 7440-39-3	Targets eyes, skin, respiratory system, heart, central nervous system. Symptoms include Irritation of eyes, skin, and upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, hypokalemia.
Carbon Tetrachloride, CAS 56-23-5	Targets central nervous system, eyes, lungs, liver, kidneys, and skin. Symptoms include irritation of eyes and skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, un-coordination; [potential occupational carcinogen]
Silver, CAS 7440-22-4	Targets nasal septum, skin, and eyes. Symptoms include blue-gray eyes, nasal septum, throat, skin; irritation and ulceration of skin; gastrointestinal disturbance
Selenium, CAS 7782-49-2	Targets eyes, skin, respiratory system, liver, kidneys, blood, and spleen. Symptoms include Irritation eyes and skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage
Diesel exhaust fumes, CAS NA	Targets eyes and respiratory system. Symptoms include eye irritation and pulmonary function changes. Lung tumors in animals.
Particulates, CAS NA	Targets eyes, skin, and respiratory system. Symptoms include irritation of eyes, skin, throat, and upper respiratory system.
PCBs, CAS Nos. 11097-69-1, 53469 21-9	Irritant of the eyes and mucous membranes, is toxic to the liver, and causes Chloracne. It is a liver carcinogen in animals; ACGIH (A3).
Plutonium, CAS 7440-07-5	Toxic and carcinogenic; targets gastro intestinal tract, kidneys, and lungs.
Silica, crystalline, CAS No. 14808 60 7	May cause impaired pulmonary function (coughing and wheezing).

Substances

Substance	Health Effects
Chromium, CAS 7440-47-3	Irritation & dermatitis. Liver, kidney, respiratory, cancer.
Manganese, CAS 7439-96-5	CNS, lung, reproductive
Nickel, CAS 7440-02-0	Dermatitis, pneumoconiosis CNS, irritation, Cancer, lung, irritation,
Nitric acid, CAS 7697-37-2	Irritation, corrosive, pulmonary edema
Sodium hydroxide, CAS 1310-73-2	Irritant, corrosive
Beryllium, CAS 7440-41-7	Chronic beryllium disease, eye irritant, dermatitis, sensitizer, cancer
Hydrofluoric Acid, CAS 7664-39-3	Targets Eyes, skin, respiratory system, bones. Symptoms include irritation eyes, skin, nose, throat; pulmonary edema; eye, skin burns; rhinitis; bronchitis; bone changes.
Tributyl Phosphate, CAS 126-73-8	Irritant, cholinergic
Hydroxylamine Nitrate, CAS 13465-08-2	Skin sensitization (MAK)
Uranium, CAS 7440-61-1	Toxic and carcinogenic.
Cerium Nitrate, CAS 10108-73-3	Corrosive to skin, eye, and mucous membranes
Ferrous Sulfate, CAS 7782-63-0	Toxic by ingestion. Eye irritant.
Ethylene Glycol Monobutyl Ether, CAS 111-76-2	Irritation to eyes, nose, throat; headache, drowsiness, lassitude (weakness, exhaustion); ataxia, tremor; anemic pallor; in animals: reproductive, teratogenic effects
Triethylamine, CAS 121-44-8	Irritation to eyes, skin, respiratory system; in animals: myocardial, kidney, liver damage
Isopropanol, CAS 67-63-0	Irritation to eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin; in animals: narcosis
Hydrochloric Acid, CAS 7647-01-0	Irritation to nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite; in animals: laryngeal spasm; pulmonary edema
Ammonium Fluoride, CAS 12125-01-8	Irritation to nose, throat, lungs; pulmonary edema. Contact may irritate or burn eyes or skin.
Citric Acid, CAS 77-92-9	Irritation to eye, skin, mucous membranes; Mildly toxic by ingestion.

Substances

Substance	Health Effects
Sodium Carbonate, CAS 497-19-8	Dilute solutions irritate eye and skin. Concentrated solutions may have significant caustic effects. Dusts or mists are moderately irritating to mucous membranes.
Aluminum nitrate Nona hydrate (ANN), CAS 13473-90-0	Contact hazard as a liquid or solid.
Acetone, CAS 67-64-1	Volatile organic compound
Phosphoric Acid, CAS 126-71-6	Corrosive, irritant
Dibutyl Butylphosphonate (DBBP), MSDS 058649	Absorption and inhalation hazard
Hydrogen, MSDS 059185	Flammable Gas
Oxalic Acid, MSDS 067949	Contact hazard