0063331

DOE/RL-2004-67
Revision 0

# Action Memorandum for the Non-Time-Critical Removal Action for the U Plant Ancillary Facilities



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

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

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Date Published
November 2004

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Release Approval Date

Printed in the United States of America

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# ACRONYMS

| | |
|---|---|
| ACM | asbestos-containing material |
| ARAR | applicable or relevant and appropriate requirement |
| CERCLA | *Comprehensive Environmental Response, Compensation and Liability Act of 1980* |
| CFR | Code of Federal Regulations |
| CWC | Central Waste Complex |
| D&D | decontamination and demolition |
| DOE | U.S. Department of Energy |
| DOE-RL | U.S. Department of Energy, Richland Operations Office |
| EE/CA | engineering evaluation/cost analysis |
| EPA | U.S. Environmental Protection Agency |
| ERDF | Environmental Restoration Disposal Facility |
| ESD | Explanation of Significant Differences |
| ETF | 200 Areas Effluent Treatment Facility |
| LLW | low-level waste |
| mrem/yr | millirem per year |
| NCP | National Contingency Plan |
| OMB | U.S. Office of Management and Budget |
| PCB | polychlorinated biphenyl |
| ppm | parts per million |
| RCRA | *Resource Conservation and Recovery Act of 1976* |
| RCW | Revised Code of Washington |
| ROD | record of decision |
| SAP | Sampling and Analysis Plan |
| S&M | surveillance and maintenance |
| TBC | to be considered |
| TSCA | *Toxic Substances Control Act of 1976* |
| UNH | uranyl nitrate hexahydrate |
| $UO_3$ | uranium trioxide |
| USC | United States Code |
| WAC | Washington Administrative Code |
| WIPP | Waste Isolation Pilot Plant |

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# ACTION MEMORANDUM FOR THE NON-TIME-CRITICAL REMOVAL ACTION FOR THE U PLANT ANCILLARY FACILITIES

## 1.0 PURPOSE

This Action Memorandum documents approval of the proposed non-time-critical removal action described herein for the U Plant Ancillary Facilities, located on the Hanford Site, Richland, Washington. The U Plant Ancillary Facilities are located within the U Plant Complex in the 200 West Area of the Hanford Site. Highway 240 is to the southwest of the U Plant Complex, and the Columbia River is north-northwest. The U Plant Ancillary Facilities consist of processing, support and administrative buildings located within the U Plant Complex.

This removal action minimizes the potential for a release of hazardous substances from the U Plant Ancillary Facilities that could adversely impact human health and the environment, is protective of site personnel and the environment, and contributes to the efficient performance of any anticipated long-term remedial actions, including any future subsurface soil remediation.

A 30-day public comment and review period was held from August 23, 2004 through September 23, 2004 on the engineering evaluation/cost analysis (EE/CA) (DOE/RL-2004-40) prepared to evaluate removal action alternatives for the U Plant Ancillary Facilities. All comments received generally supported implementation of this action. Revisions to the preferred alternative to strengthen post-removal sampling and verification activities resulted in part from public comments. The comments and responses are contained in the administrative record.

## 2.0 SITE CONDITIONS AND BACKGROUND

The U Plant Ancillary Facilities contain CERCLA hazardous substances, predominantly residual radionuclides, and residual quantities of hazardous chemicals. Following the deactivation of the U Plant Ancillary Facilities in 1993, the integrity of the structures and internal systems have degraded, resulting in an increased potential for releases of these hazardous substances to the environment. The U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) have determined that a non-time-critical removal action, pursuant to authority delegated under EO 12580, is warranted to mitigate this threat for the U Plant Ancillary Facilities. In addition, one of the U Plant Ancillary Facilities, the Uranium Trioxide ($UO_3$) Plant Concentration Building ($UO_3$ Facility) is designated as a key facility in Section 8 of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1994) and may be subject to additional Tri-Party Agreement requirements.

The U Plant Ancillary Facilities currently are designated as inactive, surplus facilities, awaiting disposition. The complete list of structures associated with this action memorandum are:

U Plant Ancillary Facilities.

| Structure Identifier | Structure Name/Aliases |
|---|---|
| 203-U | Uranium Storage Tank Enclosure |
| 203-UX | Concentrated Uranium Storage Tank Enclosure |
| 211-U | 211-U: Bulk Storage Aqueous Chemical Make-Up Tanks |

U Plant Ancillary Facilities.

| Structure Identifier | Structure Name/Aliases |
|---|---|
| 211-UA | 211-UA: Tank Farm |
| 222-U | Office Administration Building |
| 224-U | Uranium Trioxide ($UO_3$) Plant Concentration Building |
| 224-UA | $UO_3$ Calcination and Loadout Building |
| 272-U | Hot Shop/ Cold Shop |
| 2709-A | Change House |
| 2714-U | Warehouse |
| 2715-U | Oil Storage Shed |
| 2715-UA | Insulation Shop/Adjacent Waste Shed |
| 2716-U | Valve Station Shed |
| 2726-U | Propane Gas Storage Area |
| 275-UR | Metal Storage Building |
| 2712-U | Instrument Building |
| Yard | $UO_3$ Plant Yard |

## 2.1 BACKGROUND

The main building associated with the U Plant Ancillary Facilities is the $UO_3$ Facility (224-U, further described in Section 2.2) which was used to convert uranyl nitrate hexahydrate (UNH) solution from the Plutonium-Uranium Extraction (PUREX) Plant into a solid $UO_3$ powder. The $UO_3$ Facility's processing schedule was determined by the PUREX uranium product inventory buildup. The last operating campaign was completed in June 1993. The $UO_3$ Facility is designated as a key facility in Section 8 of the Hanford Federal Facility Agreement and Consent Order. The majority of the other buildings and structures listed below were used in support of the $UO_3$ process. Deactivation of the facility began shortly thereafter.

A removal action at the U Plant Ancillary Facilities supports overall Hanford cleanup priorities. This removal action is one part of the overall cleanup of the entire U Plant zone, which is being used as a prototype for resolution of issues and demonstration of cleanup methods that can be applied at other Hanford Site locations.

The U Plant Area initiative coordinates the cleanup of the major facilities, waste sites, contaminated ancillary facilities, and contaminated pipelines within the geographic area. The U Plant Ancillary facilities are adjacent to the 221-U Plant canyon structure and must be removed to allow placement of a barrier over the demolished canyon structure which is the current preferred alternative being considered in the Canyon Disposition Initiative Feasibility Study/Proposed Plan. The U Plant Area waste sites and pipelines are near and some are directly beneath the U Plant Ancillary Facilities.

## 2.2 FACILITY DESCRIPTION

This section describes the U Plant Ancillary Facilities structures, which are within the scope of this removal action and summarizes the chemical and radiological processes that occurred at these locations and their hazards. While some cleaning, flushing, and material removal was conducted as part of deactivation, the U Plant Ancillary Facilities contain some level of radioactive or other hazardous substances. In general process wastes generated during operation or deactivation were discharged to tanks, cribs, or other waste disposition areas that are not included in the scope of this removal action and are being addressed in other response actions.

### 2.2.1 Processing Facilities

#### 224-U $UO_3$ Plant Concentration Building

The 224-U Building is a 12,000 $ft^2$ multi-storied concrete structure. The building is approximately 200 ft long, 60 ft wide, and 60 ft tall with approximately 20 ft belowgrade. The building is divided along its length by a concrete shield wall into a gallery side and a canyon side. The gallery side is a three-story, reinforced-concrete, frame structure with a concrete floor and roof slab. Exterior and interior infill walls are non-reinforced concrete blocks. The roof, which is supported by concrete beams, is a flat, reinforced-concrete slab.

The canyon side of the 224-U Building is constructed of reinforced-concrete walls that are three-stories high. The canyon is divided into six cells, with each cell separated by a concrete wall that extends toward the ceiling.

During $UO_3$ deactivation (WHC-SD-WM-TPP-052), efforts performed for this facility involved flushing process equipment, with the exception of the E-D-6 concentrator in D cell. The outlet from this concentrator was plugged with solidified UNH, which prevented cleaning this piece of equipment. Equipment oil was drained from the machinery. In the pipe gallery on the second floor, the sulfuric acid tank and phosphoric acid tank were flushed. Electrical power, steam, and water supplies were disconnected. Computers and consoles were removed, the instrumentation was deactivated and the instrumentation faces were covered with black paper. Removable furniture, storage fixtures, supplies, breathing bottles, and cooking appliances were removed and excessed. Connections to the sanitary sewer were plugged, and toilets were removed from the building. The heating, ventilation and air conditioning (HVAC) portals were covered to prevent animal and insect intrusion. Power to motor control centers and the X-14 blower was disconnected. Finally, the 296-U-4 stack was capped and the sampling equipment was isolated.

Industrial contaminants remaining within the facility include asbestos insulation, polychlorinated biphenyl (PCB) light ballasts, lead containing items, and mercury switches.

#### 224-UA Calcination and Loadout Building

The 224-UA Building is approximately 75 ft long and 67 ft wide. The floor slab and footing are reinforced concrete. Equipment footing and supports are reinforced-concrete pier columns with steel "I"-beam framing. The outside walls consist of insulated metallic-coated steel panels. The ground floor consists of six cells that contain calciners. The continuous calciners are located on the second floor of the calciner cells. The five-floor-high section of the building located over the loadout room was used to handle the $UO_3$ powder. The tower contained two primary bag filters, two cyclones, and a storage bin. The 224-UA Building roof consists of steel panels covered with insulation and built-up roofing material. Numerous pieces of process equipment, including the 296-U-2 and 296-U-14 exhausters, were located on the roof. Industrial contaminants remaining within the facility may include asbestos insulation, PCB light ballasts, lead containing items, and mercury switches.

During $UO_3$ deactivation (WHC-SD-WM-TPP-052), removable furniture, storage fixtures, and supplies were removed and excessed. The power to 224-UA Building was isolated after installation of a new surveillance lighting system. Powder-handling equipment was vacuumed to remove loose powder, and the wet scrubber systems were acid flushed to remove powder residues. Storage bin X-26 was drained of available powder, and the HVAC portals were covered to prevent animal and insect intrusion. The water and steam supplies were isolated and the oil was drained from the agitator gearboxes. The hammermills

were isolated and dismantled before the final operating campaign. During deactivation, the bagfilters were air-blown as one of the final steps in vacuuming the powder from the equipment and were then sealed, along with the high-efficiency particulate air filters. The tower exhaust was capped to prevent animal and insect intrusion. The 296-U-2 and 296-U-13 stacks were then capped.

### 2.2.2 Support Facilities

#### 203-U Uranium Storage Tank Enclosure

The 203-U structure is a concrete basin approximately 80-ft by 45-ft by 6-ft-high that contains two UNH storage tanks (tanks X-1 and X-2). Each tank has a volume of 100,000 gallons and was used to store UNH feed. The tanks are constructed of stainless steel and are insulated. During plant operations, the UNH heel from tanks X-1 and X-2 (potentially containing organics) was stored in tank X-36. X-36 is a 4,200 gallon stainless steel, insulated tank. Recycled UNH destined for purification at PUREX was stored in tank X-38. Tank X-37 was used in the process condensate neutralization system. X-38 is a 6,500 gallon stainless steel, insulated tank. X-37 is a 12,000 gallon, stainless steel, insulated tank. These tanks are no longer used to store chemicals, and tanks have been flushed, and outside surfaces were cleaned as part of the $UO_3$ deactivation (WHC-SD-WM-TPP-052). Pipe trenches were vacuumed and cleaned. The area is still considered a surface contaminated zone.

#### 203-UX Concentrated Uranium Storage Tank Enclosure

The 203-UX Facility is composed of two small concrete enclosures. One enclosure contains two filters and tank X-30 (the 100% UNH feed storage tank). X-30 is a 3,600 gallon, insulated (originally), stainless steel tank. The other enclosure contains tank X-19 (backup for tank X-30) and tank X-20 (which received filter backflush from tank X-30 filters F-1 and F-2, and from Luckey pots used for filterbag cleaning). X-20 is a 400 gallon, stainless steel, insulated tank. X-19 is a 3,600 gallon stainless steel, insulated tank. During $UO_3$ Facility decontamination efforts (WHC-SD-WM-TPP-052), tanks X-20 and X-30 and filters F1 and F2 were flushed. Legacy tank X-19 was not cleaned but was visually verified as empty as part of the deactivation. Contaminated piping insulation was removed.

#### 211-U Bulk Storage Aqueous Chemical Make-Up Tanks and 211-UA Tank Farm

The 211-UA tank farm (ten tanks) and the 211-U tank farm (five tanks) were a part of the chemical processing facility that used chemical solutions to extract uranium from Hanford Site waste streams. The tanks are located aboveground and were used to receive process feed chemicals, including nitric acid and sodium hydroxide. Based on the deactivation end point criteria document (WHC-SD-WM-TPP-052), the original facility deactivation consisted of completely removing bulk materials, flushing the systems, and installing blind flanges on piping. However, residual heel materials may remain in the tanks and piping systems.

The 211-UA tank farm, consisting of ten 100,000 gallon tanks, received recovered nitric acid, which was stored in tanks Tk-306, Tk-307 and Tk-308. In addition, tanks Tk-302 and Tk-303 were historically used for storage of nitric acid. Tk-301 was kept in standby condition for use as a spare. During deactivation, the six nitric acid tanks were emptied and flushed. The sodium hydroxide was received and stored in four 100,000 gallon, asbestos-insulated carbon steel tanks, designated Tk-321 through Tk-324. These four tanks were not part of the $UO_3$ deactivation and may potentially contain some residual material that will be dispositioned as part of this removal action (WHC-SD-WM-TPP-052).

The 211-U tank farm received and stored nitric acid, sodium hydroxide, and other process feed chemicals. The tank farm consists of four 14,000 gallon horizontal, uninsulated, carbon steel tanks. The fifth tank in

the 211-U tank farm is a steel, insulated, vertical tank of unknown volume. The 211-U tanks were not part of the $UO_3$ deactivation and may potentially contain some residual material that will be dispositioned as part of this removal action (WHC-SD-WM-TPP-052).

The 211-U and 211-UA tank farms have neither electrical power nor active monitoring systems. The 211-U tanks and transfer piping have been subject to an asbestos removal program; however, some asbestos insulating materials remain, primarily on the four tanks and the deactivated steam lines. An affixing agent has been applied to the pipeline to contain small asbestos fragments that remain from the asbestos abatement effort. The 211-UA tanks have not had insulation removed.

**222-U Office Administration Building**

The 222-U Building was initially used to provide laboratory support and then modified for use as office space for U Plant Complex workers. The building has areas that are posted as radiologically contaminated. In addition, the building may contain asbestos and other industrial contaminants such as PCB ballasts and mercury switches. The 222-U Building is a single story, concrete cinder block structure, approximately 7,400 square feet. This building was not part of the $UO_3$ deactivation (WHC-SD-WM-TPP-052) and continues to have electrical utilities.

**272-U Hot Shop/Cold Shop**

This 272-U Building served as the service and repair shop for plant equipment. The 272-U Building was divided into a "hot", radiologically controlled, shop area, with access only through the regulated area, and a cold shop area for nonradioactive maintenance. The 272-U Building is approximately 4,500 square feet. The building is a metal sided structure on a concrete slab. Removable furniture, fixtures, and supplies were removed during $UO_3$ deactivation (WHC-SD-WM-TPP-052). Industrial contaminants remaining within the facility may include asbestos insulation, PCB light ballasts, lead containing items, and mercury switches.

**2709-A Change House**

The 2709-A Building was the change house associated with the 2714-U Building. The building is approximately 160 square feet and is wood framed with sheet metal siding construction. Workers changed into and later removed radiological work clothing at this location. It is unknown whether the building contains any traces of radiological contamination; however, there are industrial contaminants present, including asbestos insulation and ceiling tiles.

**2714-U Warehouse**

The 2714-U Building is a frame structure on a concrete pad. The building siding consists largely of asbestos siding and roofing. The building is approximately 2,900 square feet. The $UO_3$ powder from calciners was stored in the building and yard area before it was shipped offsite by railcars. The building is currently posted as a contamination area and contains radiologically contaminated equipment. Industrial contaminants remaining within the facility may include asbestos insulation, PCB light ballasts, lead containing items, and mercury switches.

**2715-U Oil Storage Shed**

The 2715-U Building is approximately 192 square feet, constructed of steel frame with sheet metal siding on a concrete slab. Solvent and oil were stored in 55-gal drums on the cold side. Piping provided access to the drums on the hot and cold sides. Both sides contained grease and lubrication guns. Removable

furniture, fixtures, and supplies were removed during $UO_3$ deactivation (WHC-SD-WM-TPP-052). A small amount of potential asbestos insulation on piping remains in this building.

**2715-UA Insulator Shop/Adjacent Waste Shed**

The 2715-UA Building was commonly known as the "insulation shop." The building is an insulated sheet metal structure on a concrete slab. The building was previously used for storage by painters and laggers. The building is likely to contain asbestos.

**2716-U Valve Station Shed**

The 2716-U Building is a framed construction with sheet metal siding that houses a fire sprinkler riser. The building is approximately 45 square feet. During $UO_3$ deactivation (WHC-SD-WM-TPP-052), the sprinkler riser was deactivated. There are no known industrial hazards present, but there may be some radiological contamination due to localized radiological contamination spread from nearby facilities.

**2726-U Propane Gas Storage Area**

The 2726-U Area was a framed construction that previously was used to store propane gas tanks. The building structure and tanks have been removed. All that remains are the four concrete tank saddles and some piping risers. The concrete tank saddles are approximately 6 feet across and 18 inches thick. There are no known industrial hazards present, but there may be some radiological contamination due to localized radiological contamination spread from nearby facilities.

**275-UR Metal Storage Building**

The 275-UR Building was a warehouse used in support of the U Plant Complex and also included office space. The building is approximately 3,000 square feet and is situated on a concrete slab. This building was not deactivated and currently has electrical utilities. Industrial contaminants remaining within the facility may include asbestos insulation, PCB light ballasts, lead containing items, and mercury switches.

**2712-U Instrument Building**

The 2712-U building is a metal structure approximately 150 square feet placed on a concrete slab. This building was not deactivated and currently houses monitoring instrumentation used for the diversion box. Industrial contaminants remaining within the facility may include asbestos insulation, PCB light ballasts, and mercury switches.

**$UO_3$ Plant Yard**

The yard within the $UO_3$ Plant contains a variety of aboveground structures that will be demolished as part of this CERCLA removal action. These miscellaneous structures include items such as trailers, electrical transformers, power and utility poles, aboveground piping and the associated supports, fencing, barrier poles, and miscellaneous debris. Industrial contaminants remaining within the yard may include asbestos insulation, PCBs, and lead containing paints. Two contaminated trailers (MO-321 and MO-107) will be used during D&D activities and will be demolished as part of this CERCLA removal action if they can no longer be used at the end of the removal action project.

## 2.3 RELEASES OR THREATENED RELEASE INTO THE ENVIRONMENT OF A HAZARDOUS SUBSTANCE OR POLLUTANT OR CONTAMINANT

The U Plant Ancillary Facilities are contaminated with hazardous substances used or generated during uranium conversion operations. To help identify hazardous substances, several sources of information were used, including characterization data, historical operations records, process knowledge, and knowledge of the construction materials. Key radionuclide contaminants are uranium-234, uranium-235, and uranium-238, and mixed fission products such as strontium-90 and cesium-137. Tritium may also be found as a sealed source within building exit signs. The majority of contaminants are found in the form of adherent films and residues encrusted in deactivated process vessels, piping, and ventilation system ductwork.

The primary hazardous materials of concern are radioactive materials, including $UO_3$ and UNH. To the extent possible, concentrated hazardous chemicals were removed from the facility during deactivation and/or S&M operations. The solidified UNH contained in process equipment in the $UO_3$ facility and residual quantities of hazardous substances remain as hold up or heels in process lines, tanks, and vessels. Although some asbestos was removed from the U Plant Ancillary Facilities during deactivation activities, the facilities as a group still contain an estimated 10,000 linear feet of friable and nonfriable asbestos in the form of insulation, siding, and ductwork. In addition, the U Plant Ancillary Facilities are anticipated to contain one or more of the following materials found in most Hanford Site facilities that contain hazardous substances:

- PCB light ballasts
- Lead paint
- Lead for shielding
- Mercury switches, gauges, thermometers
- Mercury or sodium vapor lights
- Used oil from motors and pumps
- Acids such as nitric, phosphoric and sulfuric
- Caustic chemicals such as sodium hydroxide
- Unspecified chemical containers.

Additional characterization will be conducted as part of the removal action activities in accordance with an approved sampling and analysis plan. The additional sampling and characterization will be used to support waste designation and to determine if the removal action objectives and stabilization requirements have been met.

## 2.4 DISCUSSION OF RELEASE THREAT

The U Plant Ancillary Facilities are contaminated with hazardous substances, primarily radionuclides and asbestos.

The risks to the environment associated with routine S&M activities at the U Plant Ancillary Facilities have not been quantified. However, radiological conditions require special precautions for entry.

The inhalation and ingestion pathways also are of concern if the material within the cell processing equipment and piping is disturbed. D&D activities include process cell equipment dismantling (cutting process piping and other components) and other hazardous substance removal. Even though personal protective equipment will be worn, external radionuclide exposure and inhalation of hazardous substances

still will pose a risk. During initial D&D activities, the potential for a radionuclide release will increase. As the inventory is stabilized and disposed appropriately, the source term (hence, the risk) will decrease.

In general, the risk of an accidental radiological release (e.g., from a structural failure resulting from seismic event) increases the longer the facilities remain in the S&M Program awaiting disposition. The risk from the U Plant Ancillary Facilities will increase with time because of the potential for inventory releases from structure degradation. The residual $UNH/UO_3$ and the large quantity of asbestos containing materials (ACM) present sufficient threat of release to the environment under a continued S&M scenario to justify a non-time-critical removal action.

## 2.5 OTHER ACTIONS TO DATE

Much of the U Plant Ancillary Facilities were deactivated within a few years after operations ended in 1993. Deactivation included removing bulk process and waste streams and stabilizing the facilities. Additional selective decontamination activities might be performed before initiating work covered by this removal action scope. If implemented, these activities would focus on removing additional radioactive material and/or asbestos waste to reduce the risk to personnel and the environment during D&D. Any waste generated will be managed appropriately. The facility is currently in the surveillance and maintenance mode.

# 3.0 THREATS TO HUMAN HEALTH OR THE ENVIRONMENT

Conditions persist wherein threats to the public health or the environment exist.

The National Contingency Plan (NCP), 40 CFR, Section 300.415(b)(2), establishes factors to be considered in determining the appropriateness of a removal action. Those factors include:

- *Hazardous substances or pollutants or contamination in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.* Hazardous substances, including radioactive substances are contained within the U Plant Ancillary Facilities' pipes and process vessels. These substances pose a threat of accidental release that may result from equipment failure resulting from a fire or seismic event.

- *Other situations or factors are present that may pose threats to public health or the environment.* Hazardous substances are present as fixed contamination within the cells, equipment and additional structures. These substances pose a threat of release as fixed contamination becomes exposed and as structural integrity is compromised, resulting in a potential direct exposure of nearby personnel and the environment, and exposure to the public through airborne radioactive contaminants. Degradation may not be fully addressed by S&M activities and the risk of release of hazardous substances will increase as degradation continues or goes undetected.

# 4.0 ENDANGERMENT DETERMINATION

DOE will utilize CERCLA response authority whenever a hazardous substance is released, or there is a substantial threat of release, into the environment, and response is necessary to protect public health, welfare, or the environment. DOE Order 5400.4 requires DOE to respond to any release or substantial threat of a release of a hazardous substance into the environment in a manner consistent with CERCLA

and the National Oil and Hazardous Substances Pollution Contingency Plan, regardless of whether or not the release or threatened release is from a site listed on the National Priorities List.

The response action proposed is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances, including radioactive substances, from the U Plant Ancillary Facilities into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health, welfare, or the environment.

# 5.0 PROPOSED ACTIONS AND ESTIMATED COSTS

Proposed actions and estimated costs are presented in the following sections.

## 5.1 PROPOSED ACTION

An EE/CA was prepared to develop removal action alternatives for the U Plant Ancillary Facilities. The removal action alternatives evaluated for the U Plant Ancillary Facilities must meet the removal action objectives. The specific removal action objectives for this response action are as follows:

- Reduce or eliminate the potential for exposure to hazardous substances above levels that are protective of the public and environment
- Reduce or eliminate the potential for a release of hazardous substances
- Safely manage (treat and/or dispose) waste streams generated by the removal action
- To the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerns and ensure an orderly transition from removal to remedial response actions, including any future subsurface soil remediation.

Based on these considerations, the following four removal action alternatives are identified:

- Alternative One: No Action
- Alternative Two: Continued S&M
- Alternative Three: D&D (to grade, excluding building foundation and underlying soils/structures)
- Alternative Four: D&D (including building foundation and underlying soils/structures to 1 meter below foundation). NOTE: The foundation includes the footings of the structure.

### 5.1.1 Alternative One: No Action

Under the No Action alternative, access to the U Plant Ancillary Facilities is assumed to be unrestricted. Industrial and radiological hazards continue to exist because controls to prevent access are not maintained. Initial risks of the No Action alternative are minimal to the environment provided there are no significant seismic, weather, or fire events. Risks over time are expected to increase as deterioration of the U Plant Ancillary Facilities progresses and structural integrity is compromised. The No Action

alternative does not address the hazards posed by the U Plant Ancillary Facilities as they continue to deteriorate. Eventually, decay is expected to result in radiological or other hazardous substance releases to the environment and potential exposure to personnel and the public. Physical hazards associated with partial structural collapses also would be anticipated.

### 5.1.2 Alternative Two: Continued S&M

Under this alternative, the U Plant Ancillary Facilities would remain in the S&M program until decommissioning occurs. The U Plant Ancillary Facilities would be maintained in a quiescent state for a considerable duration while ongoing preventive measures are implemented. These measures would include periodic radiological and industrial hazard monitoring (both inside and outside of the U Plant Ancillary Facilities), cold weather protection, preventive maintenance, annual roof inspections, identification and minor repair of friable asbestos, and general visual inspections. Major maintenance operations, such as roof maintenance, would be performed to ensure the structures remain in a safe condition and that the ongoing deterioration process is minimized to control the potential for release of radioactive materials and hazardous substances. Additionally, limited decontamination and fixative application would occur to control the spread of radiological contamination.

The primary goal of this alternative is to prevent radiological releases to the environment and to avoid industrial accidents. Adoption of the S&M alternative extends the life of the U Plant Ancillary Facilities for approximately the next 25 years, during which time deterioration progresses and unusual events (e.g., seismic) might occur. Severe weather conditions could create conditions amenable to radiological releases, and long-term aging of structures could lead to eventual failure. These conditions, accompanied by the minimum surveillance efforts conducted under S&M, could result in an unplanned radiological release.

Because minimal surveillance would not readily detect U Plant Ancillary Facilities decay (e.g., systems corrosion or structural breakdowns), preventive maintenance might not occur in time, and response actions could be required. This approach could result in the spread of contamination. An ongoing S&M program would have to become increasingly more labor intensive and incorporate periodic characterization efforts to counter these conditions. Such conditions ultimately would lead to increased risk of exposure of radioactive material and contamination to personnel, the public, and the environment.

### 5.1.3 Alternative Three: D&D (to grade, excluding building foundation and underlying soils/structures)

This alternative consists of removing the nonradiological and radiological hazardous substances from the U Plant Ancillary Facilities, removing equipment and associated piping, decontaminating the structures and/or stabilizing the contamination, demolishing the structures to slab, disposing of the waste generated, and stabilizing the area.

Hazardous substances in the U Plant Ancillary Facilities, would be removed, including asbestos-containing material, the chemical feed tanks and piping, equipment oil, mercury, control panels, and, if any, materials/liquids in the floor drains. Radiological hazardous substances removal would include removal of the contaminated tanks and piping and hoods. Because most of the radioactive inventory exists within the process cell equipment and piping, these would be removed completely and disposed as appropriate, either before or as part of the U Plant Ancillary Facilities demolition. Equipment, vessels, and piping might need to be cut to facilitate removal and/or disposal. Remote handling equipment and cranes and hoists may be used to facilitate removal of cell equipment and piping.

In general, piping and vessels would be removed, either before or as part of the U Plant Ancillary Facilities demolition. Piping and drains entering or exiting the U Plant Ancillary Facilities below-grade would be plugged or grouted to prevent potential pathways to the environment.

The majority of the demolition would require the use of heavy equipment (e.g., excavator with various attachments) to demolish the structures. Other industry standard practices for demolition also might be used (e.g., mechanical saws, cutting torches). The U Plant Ancillary Facilities would be demolished to grade, with only a slab remaining. Areas such as the pipe tunnel area in 224-U Building C cell that exist below-grade would be filled with grout, gravel, or other suitable material to grade level and the entire footprint of the U Plant Ancillary Facilities would be stabilized to prevent migration of any residual contamination to the environment.

The scope of this removal action alternative does not include soil, groundwater, or waste site remediation. Further soil or waste site remediation would be conducted in coordination with future remedial actions.

The major risk associated with this alternative is the potential release of radioactive material or other hazardous substances to the environment during process system removals and decontamination and the industrial aspects of structural demolition/dismantlement. Risks associated with credible natural phenomenon events (e.g., seismic actions and high-velocity wind) would continue to exist until the radioactive material inventory is removed. These risks would diminish as the U Plant Ancillary Facilities removal activities progress and the radiological inventory is removed.

The disposal of the radioactive material inventory in the U Plant Ancillary Facilities and the immediate removal of the U Plant Ancillary Facilities and systems are the most direct resolution of impending radiological and physical hazards. By backfilling over potential below-grade areas of the U Plant Ancillary Facilities and stabilizing the slabs, the mobility of residual contaminants to the environment in and under the foundations would be significantly reduced. In time, however, contaminants could still pose a risk through groundwater transport exposure pathways or by inadvertent intrusion. Therefore, further action, including a possible remedial action might be required. While concerns for operational methods and technology used would be encountered and resolved during removal actions, no major issues exist that might compromise this alternative.

### 5.1.4 Alternative Four: D&D (including building foundation and underlying soils/structures to 1 meter below foundation)

This alternative consists of D&D as described in Alternative Three plus the removal of the building foundations to a depth of 1 meter below each foundation and footings. In this alternative, potentially contaminated facility foundations, piping, drains, and surrounding soil would be removed to 1 meter below each foundation and 1 meter out from each building footprint. The resulting void space would be backfilled with clean fill.

The demolition would use heavy equipment (e.g., excavator with various attachments) to demolish the structures. Other industry standard practices for demolition also could be used (e.g., mechanical saws). Removal would include the U Plant Ancillary Facilities aboveground structures and subsurface structures and systems to a depth of 1 meter below each foundation.

Underground piping and trenches extending away from the U Plant Ancillary Facilities are only included in the scope to a distance of 1 meter from the walls of the structures, although additional piping or trenches might be removed and disposed, as necessary, to accommodate the removal action for the structures. Contaminated and uncontaminated soil located a distance of more than 1 meter from the walls and floors of each structure might be moved or removed as necessary to implement the removal of the

structures; however, the scope of this removal action does not include any additional soil or waste site remediation beyond that described above.

The major risk associated with this alternative is the safety of D&D personnel. They may be exposed to radioactive or other hazardous substances during process system removals and decontamination and will face industrial hazards associated with facility demolition and dismantlement, including soil excavation. These risks are related to the potential release of contamination and the hazards associated with construction activities. Risks associated with credible natural phenomenon events (e.g., seismic actions and high-velocity wind) would continue to exist until the radioactive material and other hazardous substances inventory was removed. These risks would diminish as the U Plant Ancillary Facilities removal progresses and the radioactive inventory was removed.

The disposal of the radioactive material inventory in the U Plant Ancillary Facilities and the immediate removal of each building and its systems would be the most direct resolution to impending radiological and physical hazards. Because the foundation of the structures, as well as underlying and adjacent soils, would be removed to the extent described, this alternative would potentially result in the removal of the greatest amount of contamination of the four removal action alternatives. In time, however, potential contaminants remaining in the soil, piping, or trenches could still pose a risk through the groundwater transport exposure pathway or by inadvertent intrusion, and may need to be remediated as part of future remedial actions. While concerns for operational methods and technology utilization would be encountered and resolved during removal actions, no major issues exist that might compromise this alternative.

## 5.2 COMMON ELEMENTS

With the exception of the No Action alternative, each of the alternatives would result in generation of waste (S&M to a lesser extent). The majority of the contaminated debris likely would be designated as low-level waste (LLW); however, quantities of mixed waste, dangerous waste, and solid waste not contaminated with hazardous substances may be generated. Waste management applicable or relevant and appropriate requirements (ARARs) are discussed in Section 5.3.1.

Waste generated under removal action Alternatives Two, Three, and Four would be disposed at an appropriate disposal site. Waste management would be a common element among these alternatives. For each alternative, recycling and/or reuse options would be evaluated and implemented where possible to reduce the volume of material disposed.

Contaminated waste for which no reuse, recycle, or decontamination option is identified would be assigned an appropriate waste designation (e.g., solid, asbestos, PCB, radioactive, dangerous, or mixed) and disposed of at an approved disposal location. For the purposes of the cost analysis performed in this document, most of the contaminated waste generated during implementation of these alternatives is assumed to be disposed onsite at the Environmental Restoration Disposal Facility (ERDF) in the 200 West Area. Alternate potential disposal locations may be considered when the removal action is performed if a suitable and cost effective location is identified. Alternate potential disposal locations will be evaluated pursuant to an EPA-approved waste management plan.

ERDF is an engineered facility that provides a high degree of protection to human health and the environment and meets *Resource Conservation and Recovery Act* (RCRA) minimum technical requirements for landfills, including standards for a double liner, a leachate collection system, leak detection, and monitoring. Construction and operation of ERDF was authorized using a separate CERCLA ROD (EPA et al. 1995). The *U.S. Department of Energy Hanford Environmental Restoration Disposal Facility, Hanford Site, Benton County, Washington, Explanation of Significant Differences*

(ESD) (EPA et al. 1996) modified the ERDF ROD (EPA et al. 1995 and 2002) to clarify the eligibility of waste generated during cleanup of the Hanford Site. Per the ESD, ERDF is eligible for disposal of any LLW, mixed waste, and hazardous/dangerous waste generated as a result of cleanup actions (e.g., D&D waste and investigation-derived waste), provided that the waste meets ERDF waste acceptance criteria and that appropriate CERCLA decision documents are in place.

The waste that would be generated under these alternative CERCLA removal actions would fall within the definition of waste eligible for disposal at ERDF established in the ERDF ROD and subsequent ESD. Some waste may require treatment to meet ERDF waste acceptance criteria or RCRA land disposal restrictions. The type and location of treatment would be documented in treatment plans developed and submitted to EPA for approval as part of the work plan needed for each waste stream requiring treatment. Solidification, encapsulation, neutralization, and size reduction/compaction could be employed to treat various waste types.

If other suitable locations for disposal of wastes are identified prior to the completion of implementation of the selected alternative (e.g. rubble from the demolished structures used as fill for nearby remedial actions), the alternate waste disposal location would be evaluated in accordance with the Removal Action Objectives and the selected ARARs, and the waste management plan would be modified as appropriate.

While most waste that would be generated during the proposed removal action alternatives likely would meet ERDF waste acceptance criteria, some waste might not meet or might not be able to be treated to meet ERDF acceptance criteria. Specifically, this would include low-level radioactive and nonradioactive liquid waste that might be encountered or generated. Liquid waste containing levels of radioactive and/or nonradioactive hazardous substances meeting the 200 Areas Effluent Treatment Facility (ETF) waste acceptance criteria would be transferred to ETF and treated to meet ETF waste discharge criteria. Liquids that do not meet ETF waste acceptance criteria would be solidified and either disposed at ERDF (if ERDF waste acceptance criteria are met) or stored at the Central Waste Complex (CWC) subject to final disposition. Clean water (e.g., nonradioactive and nonhazardous) could be used for dust suppression.

In the event that transuranic wastes are generated, they would be placed in interim storage at CWC and shipped offsite to the Waste Isolation Pilot Plant (WIPP) in accordance with the schedule established for completing remedial actions, no later than September 30, 2024.

ERDF is considered to be onsite for management and/or disposal of waste from removal actions proposed in this document[1]. There is no requirement to obtain a permit to manage or dispose of CERCLA waste at the ERDF. It is expected that the great majority of the waste generated during the removal action proposed in this document can be disposed onsite at ERDF. For waste that must be sent offsite, EPA would make a determination in accordance with 40 CFR 300.440 as to the acceptability of the proposed disposal site for receiving this CERCLA removal action waste. For this removal action, CWC and ETF are considered 'offsite'.

[1] CERCLA Section 104(d)(4) states that, where two or more noncontiguous facilities are reasonably related on the basis of geography, or on the basis of the threat or potential threat to the public health or welfare or the environment, the President may, at his discretion, treat these facilities as one for the purpose of this section. The preamble to the "National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR 300) clarifies the stated EPA interpretation that when noncontiguous facilities are reasonably close to one another, and wastes at these sites are compatible for a selected treatment or disposal approach, CERCLA Section 104(d)(4) allows the lead agency to treat these related facilities as one site for response purposes and, therefore, allows the lead agency to manage waste transferred between such noncontiguous facilities without having to obtain a permit. Therefore, the ERDF is considered to be onsite for response purposes under this removal action. It should be noted that the scope of work covered in this removal action is for a facility and waste contaminated with hazardous substances. Materials encountered during implementation of the selected removal action that are not contaminated with hazardous substances will be dispositioned by DOE.

## 5.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND OTHER CRITERIA, ADVISORIES, OR GUIDANCE TO BE CONSIDERED

A requirement under other environmental laws may be either "applicable" or "relevant and appropriate," but not both. Identification of ARARs must be done on a site-specific basis and involves a two-part analysis: first, a determination whether a given requirement is applicable; then, if it is not applicable, a determination whether it is nevertheless both relevant and appropriate.

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

To-Be-Considered (TBC) information consists of nonpromulgated advisories or guidance issued by federal or state governments that are not binding legally and do not have the status of ARARs. As appropriate, TBCs should be considered in determining the removal action necessary for protection of human health and the environment. Requirements drawn from TBCs may be included in the selected alternative. Because the alternatives would result primarily in waste generation and potential for air emissions, the key ARARs identified for the alternatives considered include waste management standards; standards controlling emissions to the environment; and environment, safety, and health standards. The ARARs are discussed generally in the following sections and are documented in detail in Table 5-1.

### 5.3.1 Waste Management Standards

A variety of waste streams would be generated under the proposed removal action alternatives. It is anticipated that most of the waste will designate as LLW. However, quantities of dangerous or mixed waste, PCB-contaminated waste, and asbestos and ACM also could be generated. The great majority of the waste will be in a solid form. However, some aqueous solutions might be generated.

The identification, storage, treatment, and disposal of hazardous waste and the hazardous component of mixed waste are governed by RCRA. The State of Washington, which implements RCRA requirements under *Washington Administrative Code* (WAC) 173-303, has been authorized to implement most elements of the RCRA program. The dangerous waste standards for generation, storage, and disposal would apply to the management of any dangerous or mixed waste generated at the U Plant Ancillary Facilities. Treatment standards for dangerous or mixed waste subject to RCRA land disposal restrictions are specified in WAC 173-303-140, which incorporates 40 CFR 268 by reference.

The management and disposal of PCB wastes are governed by the *Toxic Substances Control Act* (TSCA) *of 1976*, and regulations at 40 CFR 761. The TSCA regulations contain specific provisions for PCB waste, including PCB waste that contains a radioactive component. PCBs also are considered underlying hazardous constituents under RCRA and thus could be subject to WAC 173-303 and 40 CFR 268 requirements.

Removal and disposal of asbestos and ACM are regulated under the *Clean Air Act* (40 CFR 61, Subpart M) and Occupational Safety and Health Administration regulations (29 CFR 1910.1101 and WAC 296-62). These regulations provide for special precautions to prevent environmental releases or exposure to personnel of airborne emissions of asbestos fibers during removal actions. 40 CFR 61.52 identifies packaging requirements.

Waste that is designated as LLW that meets ERDF acceptance criteria is assumed to be disposed at ERDF, which is engineered to meet appropriate performance standards under 10 CFR 61. Alternate potential disposal locations may be considered when the removal action occurs if a suitable and cost effective location is identified. Any potential alternate disposal location will be evaluated and submitted for EPA approval.

Waste designated as dangerous or mixed waste would be treated as appropriate to meet land disposal restrictions and ERDF acceptance criteria, and disposed at ERDF. ERDF is engineered to meet minimum technical requirements for landfills under WAC 173-303-665. Applicable packaging and pre-transportation requirements for dangerous or mixed waste generated at the U Plant Ancillary Facilities would be identified and implemented before movement of any waste.

Some of the aqueous waste designated as LLW, dangerous, or mixed waste would be transported to ETF for treatment and disposal. ETF is a RCRA-permitted facility authorized to treat aqueous waste streams generated on the Hanford. The treated wastes are disposed of at a designated state-approved land disposal facility in accordance with applicable requirements.

Waste designated as PCB remediation waste likely would be disposed at ERDF, depending on whether it is LLW and meets the waste acceptance criteria and substantive TSCA disposal requirements. PCB waste that does not meet ERDF waste acceptance criteria would be retained at a PCB storage area meeting the requirements for TSCA storage and would be transported for future treatment and disposal at an appropriate disposal facility.

Asbestos and ACM would be removed, packaged as appropriate, and disposed in ERDF in accordance with 40 CFR 61.150.

All alternatives will be performed in compliance with the waste management ARARs. Waste streams will be evaluated, designated, and managed in compliance with the ARAR requirements. Before disposal, waste will be managed in a protective manner to prevent releases to the environment or unnecessary exposure to personnel.

### 5.3.2 Standards Controlling Emissions to the Environment

The federal Clean Air Act of 1990 and Amendments (42 United States Code 7401 et seq.), and the Washington Clean Air Act (RCW 70.94) require regulation of air pollutants. Under federal implementing regulations, the Title 40 CFR Part 61, Subpart H requires that radionuclide airborne emissions from the facility shall be controlled so as not to exceed amounts that would cause an exposure to any member of the public of greater than 10 millirem per year effective dose equivalent. The same regulation addresses point sources (i.e., stacks or vents) emitting radioactive airborne emissions, requiring monitoring of such sources with a major potential for radioactive airborne emissions, and requiring periodic confirmatory measurement sufficient to verify low emissions from such sources with a minor potential for emissions. Under state implementing regulations, the federal regulations are adopted by Washington state, which in addition, require added control of radioactive airborne emissions where economically and technologically feasible [WAC 246-247-040(3) and –040(4) and associated definitions].

In order to address the substantive aspect of these requirements, best or reasonable control technology will be met by ensuring that applicable emission control technologies (those reasonably operated in similar applications) will be utilized when economically and technologically feasible (i.e., based upon cost/benefit). Additionally, the substantive aspect of the requirements for monitoring of fugitive or non-point sources emitting radioactive airborne emissions [WAC 246-247-075(8)] will be met by sampling the effluent streams and/or ambient air as appropriate using proper methods.

The federal implementing regulations also contain requirements for managing asbestos material associated with demolition and waste disposal (Title 40 CFR Part 61, Subpart M).

The specific requirements pertaining to radioactive and nonradioactive air emissions for this action are in Table 5-1.

Table 5-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Information for the U Plant Ancillary Facilities.

| ARAR citation | ARAR or TBC | Requirement | Rationale for use |
|---|---|---|---|
| **5.1.2.1 WASTE MANAGEMENT STANDARDS** | | | |
| Regulations pursuant to the RCRA, 42 *United States Code* (USC) 6901, et seq. – Implemented through the *Hazardous Waste Management Act*, RCW 70.105 | | | |
| *Dangerous Waste Regulations*, (WAC 173-303): | | | |
| Solid Waste Identification<br><br>Specific subsections:<br>WAC 173-303-016<br>WAC 173-303-017 | ARAR | These regulations define how to identify when materials are and are not solid waste | These regulations are applicable because materials will be generated and they define how to determine which materials are subject to the designation regulations. |
| Dangerous/Mixed Waste Designation<br><br>Specific subsections:<br>WAC 173-303-070<br>WAC 173-303-071<br>WAC 173-303-080<br>WAC 713-303-081<br>WAC 173-303-082<br>WAC 173-303-090<br>WAC 173-303-100<br>WAC 173-303-110 | ARAR | These regulations define the procedures to be used to determine if solid waste requires management as dangerous waste. The regulations identify which waste codes are appropriate for application to the waste. | These regulations are applicable to solid waste that will be generated during the removal action. |
| Dangerous/Mixed Waste Management<br><br>Specific subsections:<br>WAC 173-303-073<br>WAC 173-303-077<br>WAC 173-303-170(3) | ARAR | These regulations establish the management standards for solid waste designated as dangerous or mixed waste. Special waste is addressed in WAC 173-303-073. Universal waste is addressed in WAC 173-303-077. Generator standards are addressed in -170 and -200. | These regulations are applicable to the management of materials subject to WAC 173-303. Specifically, the standards for management of special waste and universal waste and the standards for management of dangerous/mixed waste are applicable to the onsite management of certain waste that will be generated during the removal action. WAC 173-303-170(3) includes the provisions of WAC 173-303-200 by reference. WAC 173-303-200 further includes certain standards from WAC 173-303-630 and -640 by reference. |

| ARAR citation | ARAR or TBC | Requirement | Rationale for use |
|---|---|---|---|
| Dangerous/Mixed Waste Disposal<br><br>Specific subsections:<br>WAC 173-303-140 | ARAR | This regulation establishes state standards for land disposal of dangerous waste and incorporates by reference federal land disposal restrictions of 40 CFR 268 that are applicable to solid waste that designates as dangerous or mixed waste in accordance with WAC 173-303-070. | This regulation is applicable to dangerous/mixed waste generated from the removal action that will be destined for storage or land disposal |
| Recycling Requirements<br><br>Specific subsections:<br>WAC 173-303-120(3)<br>WAC 173-303-120(5) | ARAR | These regulations define the requirements for the recycling of materials that are solid and a dangerous waste. Specifically, WAC 173-303-120(3) provides for management of certain recyclable materials, including spent refrigerants, antifreeze, and lead-acid batteries.<br>WAC 173-303-120(5) provides for the recycling of used oil. | These regulations are applicable for the onsite management of materials, such as antifreeze and used oil that will be generated during removal action. Such materials can be recycled and/or conditionally excluded from certain dangerous waste requirements. |
| Regulations pursuant to the *Toxic Substances Control Act (TSCA)*, 15 USC 2601 et seq | | | |
| *Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Provisions* (40 CFR 761) | | | |
| PCB Waste Management and Disposal<br><br>Specific subsections:<br>40 CFR 761.50(b)(1)<br>40 CFR 761.50(b)(2)<br>40 CFR 761.50(b)(3)<br>40 CFR 761.50(b)(4)<br>40 CFR 761.50(b)(7)<br>40 CFR 761.50(c) | ARAR | | These regulations are applicable to the onsite storage and disposal of PCB liquids, items, remediation waste, and bulk product waste at >50 parts per million. The specific identified subsections from 40 CFR 761.50(b) reference the specific sections for management of each PCB waste type.<br><br>Radioactive PCB waste can be disposed in accordance with the substantive requirements of 40 CFR 761.50(b)(7). |
| Regulations pursuant to the *Solid Waste Management, Recovery and Recycling Act*, RCW 70.95 | | | |
| *"Minimum Functional Standards for Solid Waste Handling,"* (WAC 173-304) | | | |
| Nondangerous, Nonradioactive Solid Waste Management<br><br>Specific subsections:<br>WAC 173-304-190<br>WAC 173-304-200 | ARAR | These regulations establish requirements for the management of solid waste that is not dangerous or radioactive waste. Affected solid waste includes garbage, industrial waste, construction waste, and ashes. Requirements for containerized storage, collection, transportation, treatment, and disposal of solid waste are included. | These regulations are applicable to onsite management and disposal of nondangerous, nonradioactive solid waste that could be generated during removal action. |
| To-Be-Considered pursuant to relevant facility acceptance criteria | | | |
| *Environmental Restoration Disposal Facility Waste Acceptance Criteria* (BHI-00139) | TBC | This document establishes waste acceptance criteria for ERDF. | Waste destined for management at ERDF must meet acceptance criteria to ensure proper disposal. |

| ARAR citation | ARAR or TBC | Requirement | Rationale for use |
|---|---|---|---|
| **5.1.2.2 STANDARDS CONTROLLING EMISSIONS TO THE ENVIRONMENT** | | | |
| Regulations pursuant to the *Clean Air Act of 1977*, 42 USC 7401, et seq. | | | |
| *"National Emission Standards for Hazardous Air Pollutants"* (40 CFR 61) | | | |
| 40 CFR 61.92 | ARAR | Emissions of radionuclides to the ambient air shall not exceed amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr. | Substantive requirements of this standard are applicable because this removal action may include activities such as open-air demolition of contaminated structures, excavation of contaminated soils, and operation of exhausters and vacuums, each of which may provide airborne emissions of radioactive particulates to unrestricted areas. As a result, requirements limiting emissions apply. This is a risk-based standard for the purposes of protecting human health and the environment. |
| 40 CFR 61.93 | ARAR | Emissions from point sources of airborne radioactive material shall be measured. Measurement techniques may include, but are not limited to, sampling, calculation, smears, or other methods for identifying emissions as determined by the lead agency and approved by the EPA. | Substantive requirements of this standard are applicable because point source emissions of radionuclides to the ambient air may result from activities performed during the removal action such as open-air demolition of contaminated structures, excavation of contaminated soils, and operation of exhauster and vacuums. This standard exists to assure compliance with emission standards. |
| 40 CFR 61.145(a)<br>40 CFR 61.145(c)<br>40 CFR 61.150 | ARAR | Regulated asbestos-containing materials shall be removed in accordance with specific handling, packaging, and disposal requirements where the potential to emit asbestos exists. | Substantive requirements of this standard are applicable because this removal action includes abatement of asbestos and asbestos-containing materials in the form of pipe and tank insulation, transite siding, and ductwork. As a result, there is potential to emit asbestos to unrestricted areas and the requirements for the removal, handling, and packaging of asbestos apply. |
| Regulations pursuant to the *Washington Clean Air Act*, RCW 70.94 / *Department of Ecology*, RCW 43.21A | | | |
| *Radiation Protection - Air Emissions*, (WAC 246-247) | | | |
| WAC 246-247-040(3)<br>WAC 246-247-040(4) | ARAR | Emissions shall be controlled to assure emission standards are not exceeded. | Substantive requirements of this standard are applicable because fugitive, diffuse, and point source emissions of radionuclides to the ambient air may result from activities performed during the removal action, such as open-air demolition of contaminated structures, excavation of contaminated soils, and operation of exhauster and vacuums. This standard exists to assure compliance with emission standards. |
| WAC 246-247-075 | ARAR | Emissions from non-point and fugitive sources of airborne radioactive material shall be measured. Measurement techniques may include, but are not limited to sampling, calculation, smears, or other method for identifying emissions. | Substantive requirements of this standard are applicable because fugitive and non-point source emissions of radionuclides to the ambient air may result from activities performed during the removal action such as open-air demolition of contaminated structures and excavation of contaminated soils. This standard exists to assure compliance with emission standards. |

| ARAR citation | ARAR or TBC | Requirement | Rationale for use |
|---|---|---|---|
| *"General Regulations for Air Pollution,"* (WAC 173-400) | | | |
| WAC 173-400-040<br>WAC 173-400-113 | ARAR | Methods of control shall be employed to minimize the release of air contaminants associated with fugitive emissions resulting from materials handling, construction, demolition, or other operations. Emissions are to be minimized through application of best available control technology. | Substantive requirements of these standards are applicable to this removal action because there may be visible, particulate, fugitive, and hazardous air emissions and odors resulting from decontamination, demolition, and excavation activities. As a result, standards established for the control and prevention of air pollution may be applicable. |
| *Controls for New Sources of Air Pollution,* (WAC 173-460) | | | |
| WAC 173-460-030<br>WAC 173-460-060<br>WAC 173-460-070 | ARAR | Emissions of toxic air contaminants shall be quantified and ambient impacts evaluated. Best available control technology for toxics shall be used. | Substantive requirements of these standards are applicable to this removal action because there is the potential for toxic air pollutants to become airborne as a result of decontamination, demolition, and excavation activities. As a result, standards established for the control of toxic air contaminants may be applicable. |

## 5.4 ESTIMATED COSTS

The following is a summary of estimated costs for each removal action alternative, excluding the No Action alternative, evaluated in the EE/CA. The near-term costs for implementing the No Action alternative are negligible as no costs are expended on security, radiological surveys, maintenance activities, etc.; therefore, costs are not included.

The summarized estimate for Alternative Two is shown in Table 5-2, which includes a projection of costs over the S&M period for roof replacement and maintenance. The present-worth (discounted) cost for Alternative Two is approximately $3.2 million. The total nondiscounted cost for Alternative Two is approximately $4.4 million. Present-worth costs are used for evaluation of alternatives in the CERCLA process. Actual costs could vary. The total nondiscounted costs are presented only for information and comparison purposes.

Consistent with guidance established by the U.S. Office of Management and Budget (OMB), present-worth analysis is used as the basis for comparing costs of cleanup alternatives under the CERCLA program (OMB 1992). For purposes of this evaluation, present-worth (discounted) cost values are calculated using a discount rate of 3.2% for Alternative Two, 1.9% for Alternative Three, and 2.2% for Alternative Four (Marske 2004; OMB 1992). Note: The difference in the discount rates is due to the difference in time periods to complete the different alternatives.

S&M cleanup actions often incur costs at different times. For example, construction costs (e.g., roof replacement) could be followed by periodic costs in subsequent years or decades to maintain the effectiveness of the remedy. Because of the time-dependent value of money, future expenditures are not considered directly equivalent to current expenditures. The present-worth cost method shows the amount of money required at the initial point in time (e.g., in the current year) to fund all cleanup activities occurring over the life of the alternative. Present-worth analysis assumes that the funding set aside at the initial point in time increases in value as time goes on, similar to how money placed in a savings account gains in value as a result of interest paid on the account. Although the federal government typically does not set aside the money in this manner, the present-worth analysis is specified under CERCLA as the

approach for establishing a common baseline to evaluate and compare alternatives that have costs occurring at different times. While the money actually might not be set aside, the present-worth costs are considered directly comparable for the purpose of evaluating alternative costs.

In contrast with the present-worth costs, the total nondiscounted costs do not take into account the value of money over time. The nondiscounted cost method displays the total costs occurring over the entire duration of an alternative, with no adjustment (or discounting) to reflect current year or set aside cost based on an assumed interest rate. Because nondiscounted costs do not reflect the changing value of funds over time, presentation of this information under CERCLA is for only information purposes, not for alternative selection purposes.

The present-worth (discounted) cost for Alternative Three is approximately $25.3 million. The total nondiscounted cost (approximately $26.5 million) is a summation of the D&D costs for the duration of the project and reflects potential long-term costs that have not been discounted to reflect cost in 2004 dollars (present worth).

The present-worth cost for Alternative Four is approximately $30.0 million. The total nondiscounted cost (approximately $32.0 million) is a summation of the D&D costs for the duration of the project and reflects potential long-term costs that have not been discounted to reflect cost in 2004 dollars (present worth).

Table 5-2. Total Costs for the U Plant Ancillary Facilities Removal Action Alternatives.

| Alternative | Total Cost ($1,000) | |
|---|---|---|
| | Present worth | Nondiscounted |
| Two – S&M | $ 3,180 | $ 4,370 |
| Three – D&D (excluding building foundation and underlying soils/structures) | $ 25,320 | $ 26,530 |
| Four – D&D (including building foundation underlying soils/structures to 1 meter below foundation) | $ 29,970 | $ 31,960 |

## 5.5 PROJECT SCHEDULE

The U Plant Ancillary Facilities removal action is scheduled to begin in November 2004. Demolition of the 224-U and 224-UA Buildings is expected to be deferred to coincide to the remedial action for the 221-U Canyon Facility.

The U Plant Ancillary Facilities sampling and analysis plan will be approved by EPA. The waste management plan and removal action work plan will be submitted to EPA during project activities for review and approval and will be implemented as written and approved. When the 224-U, 224-UA, 2712-U, 203-UX, 211-U, and 211-UA Buildings are scheduled for demolition, plans will be developed and submitted to EPA for review and approval per the Tri-Party Agreement. No transuranic waste is expected to be generated during demolition of the U Plant Ancillary Facilities. Any transuranic waste generated during demolition activities will be shipped to WIPP for final disposition in accordance with an approved work plan and a schedule established for remedial actions, no later than September 30, 2024.

## 6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Severe weather can create facility conditions amenable to radiological releases, and long-term aging of engineered controls can lead to eventual failure. These conditions could result in an unplanned release. This may cause a threat to human health and the environment by direct exposure to nearby personnel and the environment, and exposure to the public through airborne radioactive contaminants.

## 7.0 OUTSTANDING POLICY ISSUES

There are no outstanding policy issues for this removal action.

## 8.0 SELECTED ALTERNATIVE

The recommended removal action alternative for the U Plant Ancillary Facilities is Alternative Three – D&D (to grade, excluding building foundations and underlying soils/structures). This alternative would provide the best balance of protecting human health and the environment associated with the hazardous substance inventory within each facility, meeting the removal action objectives, and providing a cost-effective option.

Alternative One does not provide overall protection to human health and the environment. Alternative Two provides adequate overall protection of human health and the environment, but at an increasing cost over time. Additionally, Alternative Two would not remove the radioactive or other hazardous substance inventory within each facility. The risk to human health and the environment from exposure resulting from facility deterioration increases with time. Furthermore, these alternatives are not consistent with remedial actions currently being evaluated for the U Plant canyon and the U Plant area waste sites. Therefore, neither of these alternatives is selected.

Alternatives Three and Four are judged to be comparable in terms of long-term protectiveness. Removal of the aboveground structures and their inventory of radioactive materials and other hazardous substances substantially reduces the potential exposure threat to human health and the environment. Both Alternatives Three and Four provide comparable protection from potential exposure to radioactive or other hazardous substances that may be present in the building foundation or underlying soils. Alternative Three isolates potential subsurface contamination by leaving the stabilized facility foundations in place. Alternative Four removes the material to a separate approved waste disposal location.

Alternatives Three and Four are both consistent with future remedial actions being considered in the area. The U Plant Area was selected as a prototype for resolution of issues and demonstration of cleanup methods in the Central Plateau. The U Plant Area initiative coordinates the cleanup of the major facilities, waste sites, contaminated ancillary facilities, and contaminated pipelines within the geographic area as described in Section 2.1. The U Plant Ancillary facilities are adjacent to the 221-U Plant canyon structure and must be removed to allow placement of a barrier over the demolished canyon structure which is the current preferred alternative being considered in the Canyon Disposition Initiative Feasibility Study/Proposed Plan. The U Plant Area waste sites and pipelines are near and some are directly beneath the U Plant Ancillary Facilities. The recommended removal action is needed to provide access to some waste sites and pipelines for potential subsurface remediation. Alternative Three has somewhat lower

costs, has reduced exposure of the workers to industrial hazards, and requires a lesser commitment of additional backfill materials.

Environmental sampling will be conducted in conjunction with, or following, D&D activities to assess whether the removal action objectives have been achieved. This is necessary to ensure that removal action objectives are met for Alternative 3, the selected alternative. A need for follow-on actions will be determined utilizing the steps listed below:

- Implementing the approved sampling and analysis plan (SAP) for samples of the slab and soil surrounding and below the slab. The data quality objectives process will identify the contaminants of concern to be identified in the SAP.

- Obtaining analytical results from samples. Verifying that the quality assurance/quality controls specified in the SAP were met by the laboratory.

- Placing analytical data in the administrative record.

- Comparing analytical results with industrial clean-up standards. These standards will be the same as the standards used for the 200 Area remedial actions.

- If the results are below the industrial clean-up standards, then no further action is necessary under this removal action. Results will be documented in the administrative record through appropriate closure documentation.

- If the results are above industrial clean-up standards, then a work plan addendum to identify follow-on actions will be negotiated between DOE and EPA. These actions may include no further action, performing additional removal, or deferring to a later remedial action.

Table 8-1 identifies costs for major activities to be performed as part of implementation of the selected alternative.

Table 8-1. Cost Estimate for Alternative Three: D&D (To Grade, Excluding Building Foundation and Underlying Soils/Structures).

| Item | Estimated cost ($1,000) |
|---|---|
| Project planning and equipment procurement | $ 12,460 |
| Site mobilization and facility upgrades | 220 |
| Facility/waste characterization | 1,460 |
| Facility demolition | 9,810 |
| Waste disposal | 2,030 |
| Project closeout/demobilization | 360 |
| Post D&D Surveillance and Maintenance | 190 |
| **Nondiscounted Grand Total** | **$ 26,530** |
| **Present-Worth (Discounted)** | **$ 25,320** |

Note: Details on the removal alternative estimates are discussed in Marske (2004).

This decision document represents the selected removal action alternative as decontamination and demolition of the U Plant Ancillary Facilities based on the evaluation presented in the EE/CA and public comments. This alternative removes the potential for a release of hazardous substances that could pose a threat to public health and the environment, is protective of workers, and minimizes disposal costs. To the extent possible, by removing sources of contamination before a release occurs, this action will contribute to the efficient performance of any long term remedial actions taken in this area. This proposal was developed in accordance with CERCLA, as amended by the *Superfund Amendments and Reauthorization Act* and is not inconsistent with the *National Oil and Hazardous Substance Pollution Prevention Contingency Plan*. This decision is based on the information provided in the Administrative Record for this project.

## 9.0 REFERENCES

DOE/RL-2004-40, *Engineering Evaluation/Cost Analysis for the U Plant Ancillary Facilities*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

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## DOE APPROVAL SIGNATURE

The following signature pages (Approval-1 of 2) provide documented agreement between the DOE and the EPA for the ACTION MEMORANDUM FOR THE NON-TIME-CRITICAL REMOVAL ACTION FOR THE U PLANT ANCILLARY FACILITIES. Conditions at the site meet the NCP section 300.415(b)(2) criteria for a removal action. The total estimated cost for the project is $25,320,000.

Nov. 23, 2004

Keith A. Klein, Manager
Richland Operations Office
U.S. Department of Energy

Date

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## EPA APPROVAL SIGNATURE

The following signature pages (Approval-2 of 2) provide documented agreement between the DOE and the EPA for the ACTION MEMORANDUM FOR THE NON-TIME-CRITICAL REMOVAL ACTION FOR THE U PLANT ANCILLARY FACILITIES. Conditions at the site meet the NCP section 300.415(b)(2) criteria for a removal action. The total estimated cost for the project is $25,320,000.

Nicholas Ceto, Program Manager
Hanford Project Office
U.S. Environmental Protection Agency, Region 10

23 Nov 04
Date

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