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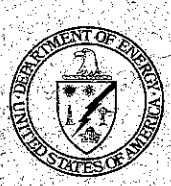
DOE/RL-2005-95
Rev. 0

Removal Action Work Plan #2 for the 324/327 Buildings and Ancillary Facilities



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9/28/2006 — Date

The approval signatures on this page indicate that this document has been authorized for information release to the public through appropriate channels. No other forms or signatures are required to document this information release.

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Removal Action Work Plan #2 for the 324/327 Buildings and Ancillary Facilities

September 2006

United States Department of Energy

P.O. Box 550, Richland, Washington 99352

TABLE OF CONTENTS

Table of Contents

Table of Contents

ACRONYMS

ACM	asbestos-containing material
ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
BFA	building footprint area
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CCRC	Centralized Consolidated/Recycling Center
CFR	*Code of Federal Regulations*
CWC	Central Waste Complex
D4	Deactivation, Decontamination, Decommissioning, and Demolition
DOE	U.S. Department of Energy
DOE-RL	Department of Energy, Richland Operations Office
DQO	data quality objective
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration and Disposal Facility
ETF	Effluent Treatment Facility
HEPA	high-efficiency particulate air
MITUS	Mobile Integrated Temporary Utility System
ODS	Ozone Depleting Substances
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PMII	Project Manager's Implementing Instructions
PPE	personal protective equipment
RAWP	removal action work plan
RCRA	*Resource Conservation and Recovery Act of 1976*
REC	radiochemical engineering cells
ROD	record of decision
RWP	radiological work permit
S&M	surveillance and maintenance
SAP	sampling and analysis plan
SSHASP	site-specific health and safety plan
TBC	to be considered
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSCA	*Toxic Substances Control Act of 1976*
WAC	*Washington Administrative Code*
WATS	Waste Acid Treatment System
WIDS	Waste Information Data System

Acronyms

METRIC CONVERSION CHART

Into Metric Units		
If You Know	*Multiply By*	*To Get*
Length		
inches	25.4	Millimeters
inches	2.54	Centimeters
feet	0.305	Meters
yards	0.914	Meters
miles	1.609	Kilometers
Area		
sq. inches	6.452	sq. centimeters
sq. feet	0.093	sq. meters
sq. yards	0.836	sq. meters
sq. miles	2.6	sq. kilometers
Acres	0.405	Hectares
Mass (weight)		
ounces	28.35	Grams
pounds	0.454	Kilograms
ton	0.907	metric ton
volume		
teaspoons	5	Milliliters
tablespoons	15	Milliliters
fluid ounces	30	Milliliters
cups	0.24	Liters
pints	0.47	Liters
quarts	0.95	Liters
gallons	3.8	Liters
cubic feet	0.028	cubic meters
cubic yards	0.765	cubic meters
Temperature		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius
Radioactivity		
picocuries	37	millibecquerel

Out of Metric Units		
If You Know	*Multiply By*	*To Get*
Length		
Millimeters	0.039	inches
Centimeters	0.394	inches
Meters	3.281	feet
Meters	1.094	yards
Kilometers	0.621	miles
Area		
sq. centimeters	0.155	sq. inches
sq. meters	10.76	sq. feet
sq. meters	1.196	sq. yards
sq. kilometers	0.4	sq. miles
hectares	2.47	acres
Mass (weight)		
grams	0.035	ounces
kilograms	2.205	pounds
metric ton	1.102	ton
Volume		
milliliters	0.033	fluid ounces
liters	2.1	pints
liters	1.057	quarts
liters	0.264	gallons
cubic meters	35.315	cubic feet
cubic meters	1.308	cubic yards
Temperature		
Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity		
millibecquerels	0.027	picocuries

1.0 INTRODUCTION

This document contains the removal[1] action work plan (RAWP) for the 324 and 327 Buildings and ancillary facilities (buildings and structures) within the Hanford Site 300 Area.[2] These buildings and ancillary facilities are located in the 300 Area of the Hanford Site, which is owned and operated by the U.S. Department of Energy (DOE), in Benton County, Washington (Figure 1-1). The 300 Area was constructed and operated as a reactor fuel fabrication and laboratory complex. Past operations, disposal practices, spills, and unplanned releases have resulted in contamination of the facility structures, underlying soil, and underlying groundwater in the 300 Area.

In November 1989, the 300 Area was one of four areas of the Hanford Site that were placed on the U.S. Environmental Protection Agency's (EPA) National Priorities List under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). The EPA and the U.S. Department of Energy, Richland Operations Office (DOE-RL) have determined that hazardous substances[3] in the facilities (listed in Table 1-1) present a potential threat of release that poses a substantial risk to human health and the environment to the extent that a removal action is warranted.

Alternatives for conducting a non-time-critical removal action were evaluated in the *Engineering Evaluation/Cost Analysis for the 324 and 327 Buildings* (EE/CA) (DOE-RL 2005c). The EE/CA resulted in the recommendation of deactivation, decontamination, decommissioning, and demolition (D4). The recommendation was approved in an action memorandum (EPA 2006) signed by the EPA and DOE. The DOE is the agency responsible for implementing the removal actions in the 300 Area. The EPA is the lead regulatory agency for facilities in the 300 Area. This RAWP directs the implementation of the non-time-critical removal action.

[1] "Remove" or "removal" as defined by the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), Section 101(23), refers to the cleanup or removal of released hazardous substances from the environment; actions if a threat of release of hazardous substances occur; actions to monitor, assess, and evaluate the release (or threat of release) of hazardous substances; the disposal of removed material; or other actions that may be necessary to prevent, minimize, or mitigate damage to public health or welfare or to the environment, which may otherwise result from a release or threat of release.

[2] The term "facility" is used generically to encompass all the surface and subsurface structures, associated above ground utilities, buildings, foundations, piping, ducting, etc., associated with the facility.

[3] "Hazardous substances" means those substances defined by CERCLA, Section 101(14), and include both radioactive and chemical substances.

Figure 1-1. Hanford Site Map.

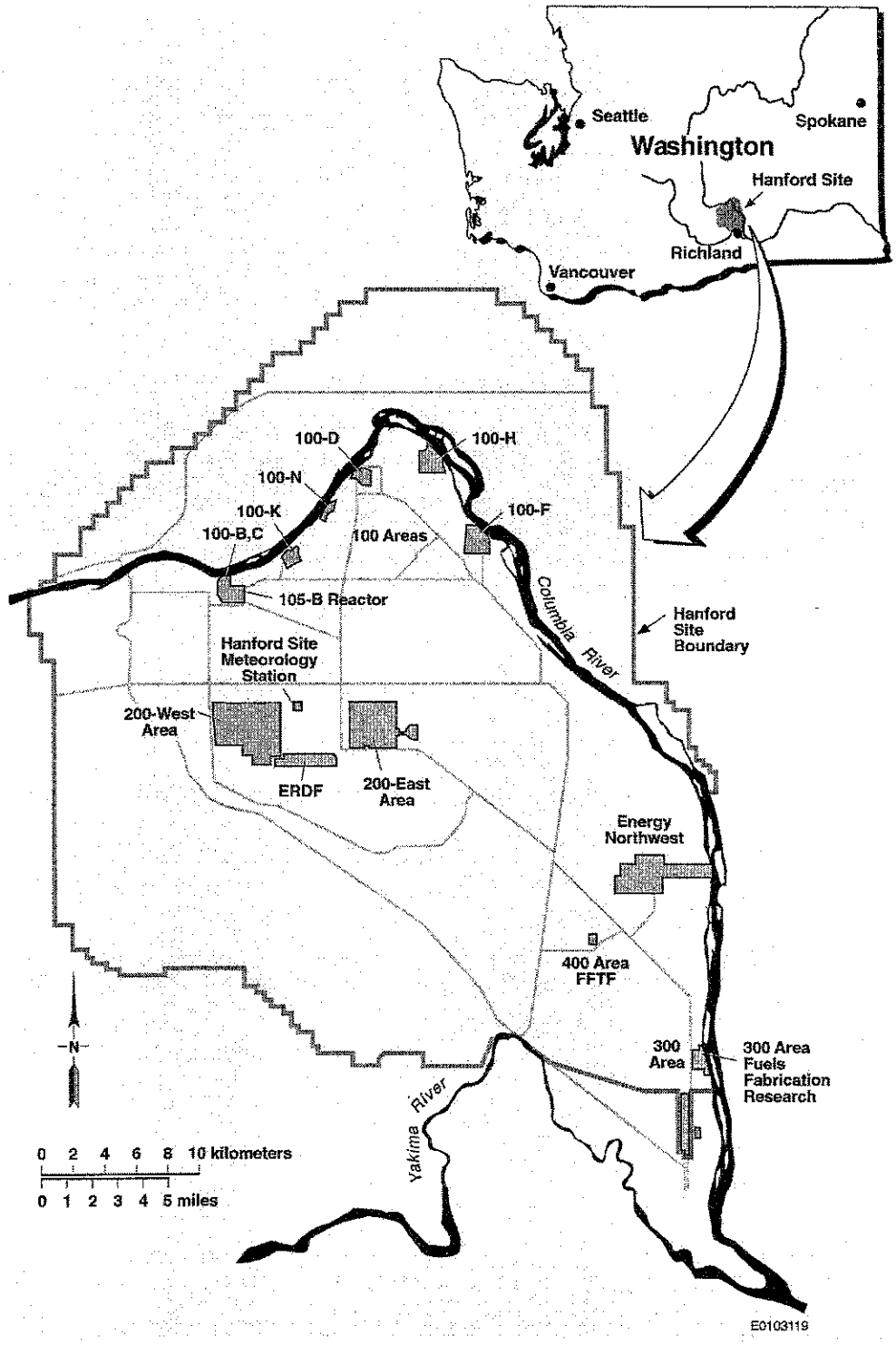


Table 1-1. Summary of Facilities in the Scope of the 324/327 Removal Action Work Plan and Associated Waste Information Data System Sites.

Facility	Name	Major Facilities[a]	Small Facilities[b]
324	Chemical Engineering Laboratory (Waste Technology Engineering Lab)	X	
324A	Chemical Engineering Building		X
324B	Chemical Engineering Laboratory Exhaust Stack		X
324C	Experimental Lithium Enclosure		X
324D	Stack Sampling Facility		X
324S	Wet Storage Basin		X
327	Post-Irradiation Test Laboratory	X	
327 Stack	327 Stack		X
3718E	Storage Building		X
3718G	Storage Building		X
3723	Solvent and Acid Storage Building		X
324/327 and Ancillary Facilities Associated WIDS Sites			
WIDS Site	**Description**		
300 RRLWS	Process Sewer		
300 RLWS	Retention Process Sewer		
300-15	324 Building Diversion Tank		
300-214	Pipe Trench Between 324 and 325 Buildings		
300-263	324 Building		
300-265	324 Building Stormwater Runoff, Miscellaneous Stream #354		
300-25	324 Building Stormwater Runoff, Miscellaneous Stream #711		
300-93	327 Post-Irradiation Testing Laboratory		
300-94	324 Building Stormwater Runoff, Miscellaneous Stream #711		
300-264	327 Post-Irradiation Testing Laboratory		

[a] Major facilities are the larger, multi-room structures, generally with radiological and/or chemical contamination.
[b] Small facilities are small structures, generally with one to three rooms, and may or may not be radiologically and/or chemically contaminated.
WIDS = Waste Information Data System

1.1 PURPOSE AND OBJECTIVE OF THE REMOVAL ACTION WORK PLAN

The purpose of this RAWP is to establish the methods and activities required to perform the following functions:

- Complete D4 of the 324 and 327 Buildings and ancillary facilities (e.g., building contents, above-ground structures and associated utilities, on-grade floor slabs, and the below-grade foundations and piping) addressed within the EE/CA (DOE-RL 2005c) in coordination with the *324 Building Radiochemical Engineering Cells, High-Level Vault, Low-Level Vault, and Associated Areas Closure Plan* (DOE-RL 2005b)

- Remediate contaminated soils within the footprint of the facilities or defer to a later remedial action (with approval from EPA)

- Manage and dispose of all waste generated during these actions.

This RAWP satisfies the requirement to submit a work plan outlining how compliance with the removal action objectives and applicable or relevant and appropriate requirements (ARARs) (see Section 4.1) will be achieved. This RAWP was prepared in accordance with Section 7.2.4 of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989).

This RAWP implements the removal action activities including the development of specific project tasks that are described in work packages and subcontract task orders. Using the most recent information concerning facility conditions, field-level work packages will be developed to direct work activities and instruct workers in the most applicable work methods. Existing contractor procedures and specifically developed instructions will be used to perform and control the facility removal and disposal actions.

The 324 and 327 Buildings and ancillary facilities removal action schedule (see Appendix A), which encompasses the work scope through project completion, presents the logical progression of events and the estimated durations for each activity. As of the writing of this document, only a draft schedule has been developed (see Appendix A) based on anticipated funding for this removal action. The schedule in Appendix A will be updated as this RAWP is revised.

1.2 OBJECTIVES OF THE REMOVAL ACTION WORK PLAN

The primary goal of CERCLA removal actions is to minimize or eliminate threats to public health or the environment caused by the presence of hazardous substances. The EE/CA for the 324 and 327 Buildings and ancillary facilities (DOE-RL 2005c) presented three alternatives for future facility management and the resulting levels of protection of public health and the environment that may be anticipated. Based on the evaluation, deactivation followed by demolition was the recommended alternative (Alternative 2). The selection and approval of this approach are documented in the action memorandum (EPA 2006).

Alternative number 2 reduces the potential for a release by reducing the inventory of contaminants. Alternative number 2 also provides the best balance of protecting human health and the environment, protecting workers, meeting the removal action objectives, achieving cost effectiveness, and providing an end state that is consistent with future cleanup actions and commitments to the Tri-Party Agreement (Ecology et al. 1989) Milestones M-89-01 and M-094-03 to be completed no later than September 30, 2010.

Complete or partial demolition and disposal of the structures will reduce the potential hazards the facilities currently pose to public health and the environment. Waste products generated from the D4 activities will be segregated into a variety of waste streams, each of which will be disposed at appropriate disposal facilities.

Below-grade structures may be left in place if it is believed that significant soil contamination or active utilities exist in close proximity to the structure. In addition, the structure may be left if it is believed that the removal of the structure could negatively impact a future remedial action. The decision to leave below-grade (as a general rule, "grade" is the top of the main foundation) structures shall be made on a case-by-case basis and requires the approval of the EPA. At the completion of the D4 activity, the site will either be stabilized in a manner that allows for future remediation or it will demonstrated that the soils meet the cleanup values established in the *Interim Action Record of Decision for the 300-FF-2 Operable Unit* (300-FF-2 ROD) (EPA 2001).

Based on the potential hazards identified in Section 1.4, the following removal action objectives have been identified:

- Protect human receptors from exposure to radiological and hazardous substances in facility structures above acceptable exposure levels for nonradiological general employees
- Control the release of radiological and hazardous substances from the facilities into the environment
- Facilitate remediation of 300 Area waste sites in accordance with the 300-FF-2 ROD (EPA 2001)
- Achieve ARARs to the fullest extent practicable
- Safely treat, as appropriate, and dispose of waste streams generated by the removal action.

In addition to the previously identified objectives, the end state of removal actions implemented in response to this removal action must be supportive of institutional controls prescribed by the 300-FF-2 ROD (EPA 2001) for the period between completion of the facility removal actions and initiation of the waste site remedial actions.

For the purposes of this document, the terms "closure" and "close out" are used synonymously throughout this document. The terms are used in CERCLA to describe when the waste management unit meets cleanup standards or other regulatory closure requirements.

The standards for defining when a site meets the applicable cleanup standards are not addressed as part of this removal action; they are contained within the *300 Area Remedial Action Sampling and Analysis Plan* (DOE-RL 2004).

1.3 SCOPE

The 324 and 327 Buildings and ancillary facilities included in the scope of this RAWP are limited to facilities (e.g., building contents, above-ground structures and associated utilities, on-grade floor slabs, and the below-grade foundations and piping) identified in the EE/CA and the action memorandum. Figure 1-2 illustrates the facilities addressed under this RAWP. The list of facilities that are addressed within this RAWP is provided in Table 1-1.

1.3.1 Facilities Addressed By This RAWP

Table 1-1 lists the 324 and 327 Buildings and ancillary facilities that are located in the central region of the 300 Area. Facilities planned for D4 are described in Section 1.4. D4 activities may occur throughout the period suggested in the action memorandum (EPA 2006). The timing of D4 activities is dependent on the Tri-Party Agreement schedule, funding levels, coordination needed to address soil contamination sites in an efficient manner, and the most efficient use of available resources.

1.4 FACILITY AND HAZARD DESCRIPTION

This section discusses the hazards in the 300 Area facilities included in this RAWP. The facilities addressed are limited to those facilities included in Table 1-1. The neighboring Waste Information Data System (WIDS) sites are included in Table 1-1 for information only. It is not expected that these WIDS sites will be closed as part of this removal action, at this time, the facilities in this document have not been fully characterized; therefore, CERCLA hazardous substances have not been conclusively identified in all of the facilities. Following characterization, the CERCLA hazardous substances will be known. Should any facilities be determined to be free of CERCLA hazardous substances, they will not be addressed under this removal action. Facilities hazard categorization will be performed in accordance with established procedures.

The descriptions of the 324/327 Buildings and ancillary facilities included within this plan are provided in the following subsections. For a cross-reference to the related soil contamination areas (waste sites and unplanned release sites), refer to Table 1-1. Where appropriate, a single description is provided for groups of common facilities (e.g., boiler annexes). Orphan, excluded, or otherwise unidentified foundations or subsurface structures may be added to the scope of this removal action following approval by the EPA.

Figure 1-2. Facilities Addressed by this Removal Action Work Plan. (2 Pages)

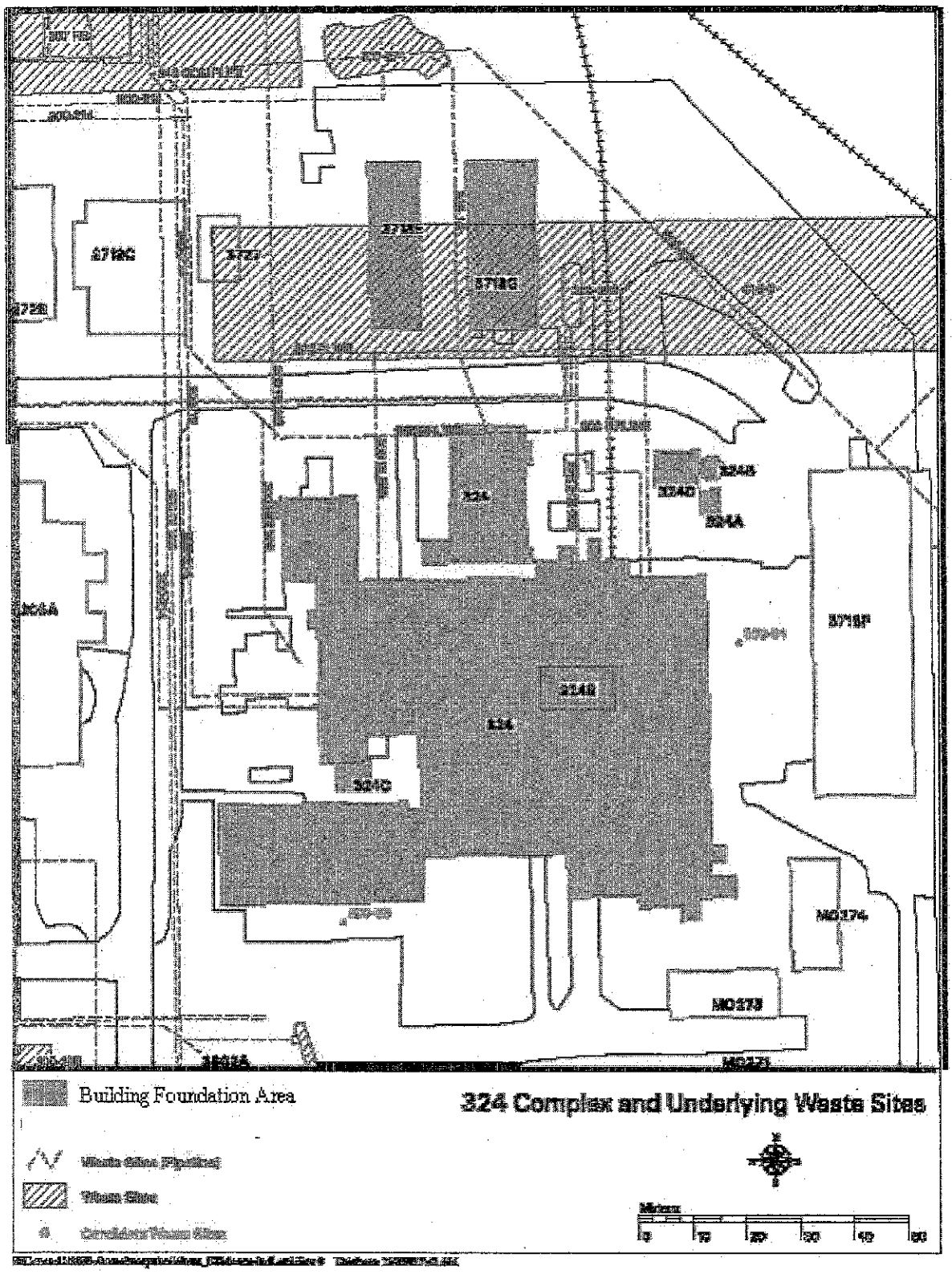
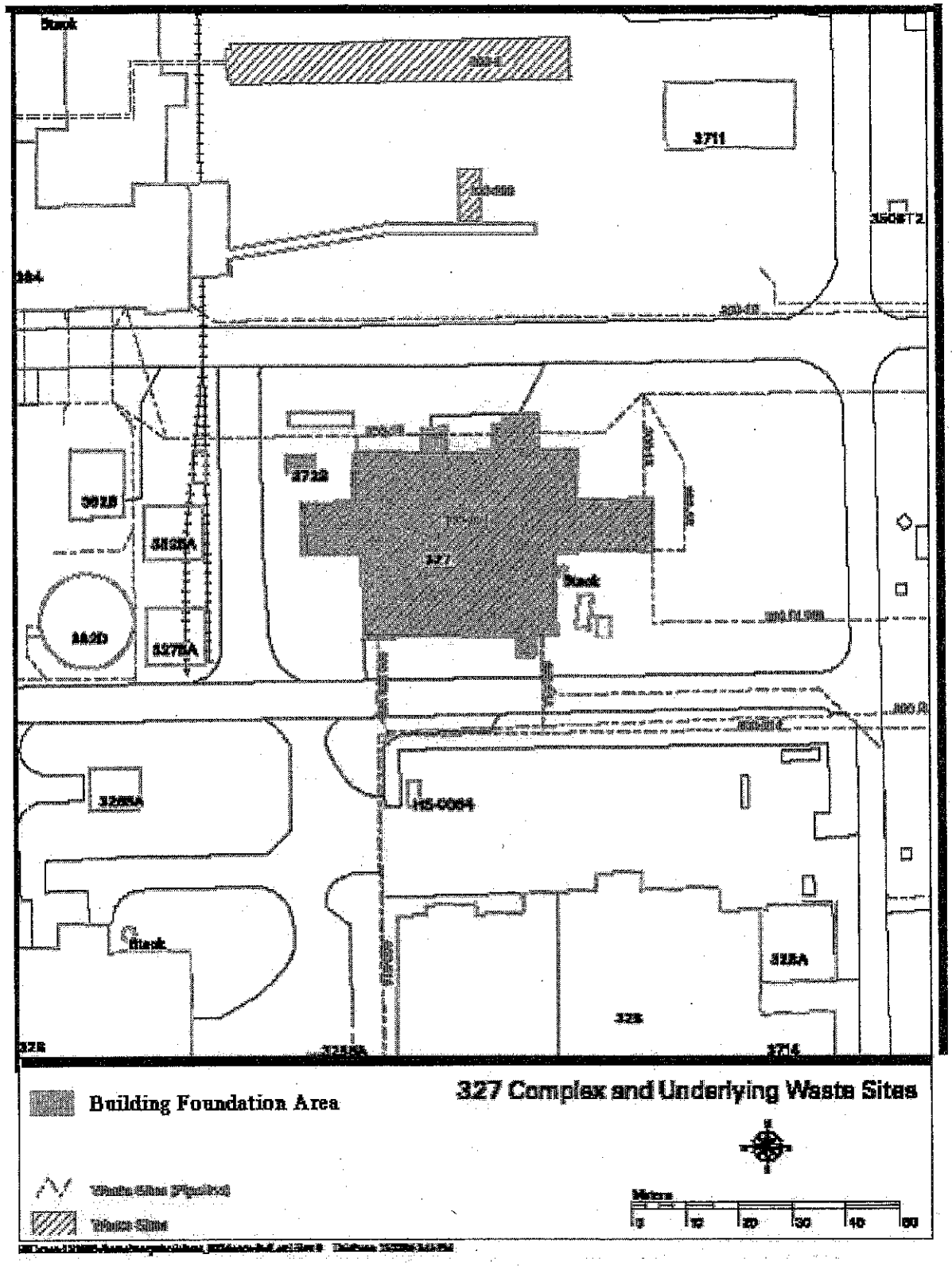


Figure 1-2. Facilities Addressed by this Removal Action Work Plan. (2 Pages)



1.4.1 Facility Radiological Information

Radiological conditions known to be present are identified in each individual facility description. Additional characterization will be conducted to further define the radiological conditions in facilities.

1.4.2 Facility Descriptions

The descriptions of the facilities included within this plan are provided in the following subsections. For a cross-reference to the related soil contamination areas (waste sites and unplanned release sites), refer to Table 1-1. The facilities addressed in this EE/CA include the 324 Building (Chemical Engineering Laboratory), the 327 Building (Post-Irradiation Test Laboratory), and ancillary facilities (Table 1-1). This section provides a brief description and history of each facility. The proximity of the facilities to one another and to underlying or adjacent 300-FF-2 OU waste sites is depicted in Figure 1-2.

1.4.2.1 324 Chemical Engineering Laboratory and Associated Structures

324 Chemical Engineering Laboratory

The 324 Building (also known as the Waste Technology Engineering Lab) is a 9,449-m^2 (101,709-ft^2) concrete and steel structure constructed between 1964 and 1966. The building was designed to allow for a high degree of versatility in completing complex and varied experimentation on highly radioactive materials. These activities included chemical processing and metallurgical engineering studies on highly radioactive materials and development of approaches for waste treatment and storage. Historical information indicates that part of the building was constructed over the 618-6 Burial Ground. The burial ground was used to dispose of dry low-level waste, but the contents of 618-6 were moved in 1962 to allow for the new construction. Based on historical information, the 618-6 waste site was reclassified as a rejected waste site under WIDS reclassification form 98-078. Therefore, no further actions are planned to address 618-6.

The facility contains a partial basement, and first, second, and partial third floors. The building provided office and laboratory space to support research and development activities associated with waste management, structural material for use in the nuclear industry, and nuclear fuels design and construction. The radiological laboratories included two hot cell facilities, the radiochemical engineering cells (REC) and Engineering Development Laboratory, and various low-level and nonradiological laboratories. Support facilities included the storage vault, used for storing special nuclear material, and the craft shop. Two vault areas are equipped with tanks for the temporary storage of radioactive liquid wastes and other building-generated solutions. Administrative areas include office spaces and lunchrooms. To protect against releases of radioactive material from the "hot cells" to the environment, integral metal liners with sumps (i.e., without drains) were installed in the cells and tank vaults. Confinement of radioactive particulate matter within the shielded cells is provided by a directed air flow through high-efficiency particulate air (HEPA) filter ventilation system. As a result of residues and internal

facility spills during the conduct of past activities, the facility contains areas with significant fixed and dispersible mixed waste contamination.

The REC is also being addressed as a *Resource Conservation and Recovery Act of 1976* (RCRA) closure under the *324 Building Radiochemical Engineering Cells, High-Level Vault, Low-Level Vault, and Associated Areas Closure Plan* (DOE-RL 2005b). D4 of the REC will be performed as a RCRA/CERCLA integration under the Tri-Party Agreement. The Washington State Department of Ecology will maintain regulator oversight of the REC closure, while the EPA maintains lead regulator authority for the scope of this removal action.

324A Chemical Engineering Building

The 324A Building is a 8-m^2 (84-ft^2) building located north of the 324 Building. It provides instrument support for the 324B exhaust stack.

324B Chemical Engineering Laboratory Exhaust Stack

The EP-324-S-01 exhaust stack is a 46-m (150-ft)-high concrete stack located north of the 324 Building. It traps airborne wastes that are generated at the 324 Building. Prior to the issuance of the CERCLA action memorandum, the stack was permitted under the Hanford Air Operating Permit.

324C Experimental Lithium Enclosure

The 324C facility is a 37-m^2 (84-ft^2) structure located to the northeast of the 324 Building. The purpose of the building was to support an experimental lithium system.

324D Stack Sampling Facility, 3718E Storage Building, and 3718G Storage Buildings

324D is a 50-m^2 (540-ft^2) metal shed located north of the 324 Building. The facility is used to store equipment.

3718E is a 279-m^2 (3,000-ft^2) metal and concrete structure used to store equipment and materials from the 324 Building.

3718G is a 372-m^2 (4,000-ft^2) metal shed used to store equipment and materials from the 324 Building.

324S Wet Storage Basin

The basin is located in the 324 Building and was used for transfers from the cask handling area and underwater storage of the radioactive materials fuel elements. Shielded transfers of highly radioactive materials from the wet basin were accomplished by two remotely operated, enclosed mechanical transfer conveyors that are no longer operational. The basin was deactivated by removing the water, and then filling the basin with sand and concreting the surface within the central handling area.

1.4.2.2 327 Post-Irradiation Test Laboratory and Associated Structure

327 Post-Irradiation Test Laboratory

The 327 Building is a 2,973-m^2 (32,000-ft^2) building constructed between 1951 and 1953. The building houses the Post-Irradiation Testing Laboratory, which consists of specially equipped shielded and ventilated hot cells and laboratories designed for physical and metallurgical examination and testing of irradiated fuels, concentrated fission products, and irradiated structural materials. The primary operating area is a canyon area and connecting bays where auxiliary operations are performed. The canyon area contains shielded hot cells and cell operating stations and consoles. A transfer and storage area, including two water-filled basins, is located at the west end of the building. Bridge cranes are used to transfer drums and casks containing radioactive material/waste between cells or from the cells to the transfer/storage area. Ventilation systems are generally designed to draw air from areas of lesser contamination potential through areas having greater contamination potential before being filtered through HEPA filters and exhausted from the stack. Testing at the laboratory ceased in 1996.

327 Exhaust Stack

The EP-327-S-01 stack traps airborne wastes that are generated at the 327 Building. Prior to the issuance of the CERCLA action memorandum, the stack was permitted under the Hanford Air Operating Permit.

3723 Solvent and Acid Storage Building

The 3723 Building is a 13-m^2 (144-ft^2) building located north of the 327 Building. It was used to store acids and solvents used at the 327 Building.

1.4.3 Hazardous Substance Inventory, Management, and Protection

- Radiological Material Inventory. A significant curie content of radionuclide inventories remain in the 324 and 327 Buildings and ancillary facilities. Bounding radionuclide inventories are contained in nuclear safety documents for the 324 and 327 Buildings. Many of the 324 and 327 Buildings and ancillary facilities are posted as radiologically controlled areas and high radiation areas. The radioactive materials contained in these facilities are outlined in the EE/CA (DOE-RL 2005c). In general, the primary contaminants of concern are the following radionuclides:

  - Americium-241
  - Cesium isotopes
  - Cobalt-60
  - Curium isotopes
  - Europium isotopes
  - Niobium-94
  - Radium-226
  - Selenium-79

- Strontium-90
- Plutonium isotopes
- Technetium-99
- Thorium isotopes
- Uranium isotopes.

The following hazardous substances will be managed in accordance with as low as reasonably achievable (ALARA) considerations, the applicable requirements provided in Section 4.1, and the waste management plan (Section 4.2) of this RAWP. Compliance with hazardous material protection requirements is described in the contractor's operating procedures.

1.4.3.1 Lead. Lead may exist in surface coatings, plumbing, and as radiological shielding (e.g., lead shot, brick, sheet and cast-lead forms) inside some of the 300 Area facilities. Personnel must exercise caution to avoid disturbing or contacting lead or suspect lead material. Workers performing job tasks that involve lead shall follow the applicable requirements in the contractor's procedures and the associated work package.

1.4.3.2 Asbestos. Asbestos-containing material (ACM) is found in the 324/327 Buildings and ancillary facilities. Disturbance of vessel or piping insulation, loose floor tiles, transite wall coverings or panels, sheetrock, electrical wire insulation, ducting, or other suspect ACM must be avoided. Visible dust will be prevented from activities associated with asbestos removal activities. Personnel involved in asbestos cleanup will follow the applicable requirements of 29 *Code of Federal Regulations* (CFR) 1926.1101, "Asbestos." Task-specific requirements will be contained within the associated work package.

1.4.3.3 Biological Hazards. Biological hazards could be encountered in the facilities contained in this RAWP. Examples of biological hazards include bird and rodent carcasses and feces. Biological hazards will be identified as part of the surveillance and maintenance (S&M) and facility demolition process.

1.4.3.4 Chemicals. Some bulk chemical inventories have been disposed or recycled during deactivation of many of the 300 Area facilities; however, the potential exists for the discovery of old containers of residual chemical constituents (e.g., solvents, greases, hydraulic and fuel oils, and aerosols). If such containers are found, the Environmental Health and Safety professionals will be notified and specific management instructions will be provided to personnel.

1.4.3.5 Polychlorinated Biphenyls. Polychlorinated biphenyls (PCBs) may be found in the painted surfaces of the buildings and in waste oils collected during D4 activities. Material that is painted and for which the paint contains PCBs will be managed as "PCB Bulk Product Waste."

1.4.3.6 Beryllium. Beryllium contamination is present in many of the facilities addressed under this removal action. Although beryllium encountered during this removal action is not expected to be regulated as a hazardous waste, there are health and safety requirements that must be addressed when working with beryllium-contaminated structures. When work is performed inside a beryllium building, monitoring will be performed to ensure that airborne beryllium levels inside of the building do not exceed 0.1 $\mu g/m^3$.

1.4.3.7 Cadmium. Cadmium is a byproduct of the metal finishing process. Cadmium could also be present in electrical equipment. At certain levels, cadmium is regulated as a hazardous waste. Waste containing cadmium above regulatory limits will require treatment prior to disposal.

1.4.3.8 Mercury. Mercury could be present in electrical equipment. At certain levels, mercury is regulated as a hazardous waste. Waste containing mercury above regulatory limits will require treatment prior to disposal.

1.4.3.9 Refrigerants. Some refrigerants (such as chlorofluorocarbons) are regulated due to their effect on the ozone layer of the atmosphere. Regulated refrigerants will be "recovered" prior to disposal of the equipment.

1.4.3.10 Lubricants. Lubricants sometimes contain hazardous substances. Equipment will be drained of lubricants to the extent practical prior to disposal.

1.4.3.11 Commercial Solvents. Commercial solvents may designate as a hazardous waste. Equipment will be drained of commercial solvents and may require treatment prior to disposal.

1.4.3.12 Corrosives. Corrosives may be present in facilities that have not been deactivated. In the State of Washington, corrosive solids and liquid waste above the regulatory limits must be managed, treated, and disposed of as a hazardous waste.

1.4.3.13 HEPA Filter Media. HEPA filter media may contain toxic metals above the regulatory limits. HEPA filters may need to be sampled prior to disposal to demonstrate whether (or not) they contain toxic metals above the regulatory limits.

1.4.3.14 Light Bulbs. Will be dispositioned through the Centralized Consolidated Recycling Center (CCRC) whenever possible. Sodium vapor lights above a certain concentration are regulated within the State of Washington as a dangerous waste. Mercury vapor lights above a certain concentration are regulated as a hazardous waste.

2.0 REMOVAL ACTION ELEMENTS

2.1 REMOVAL ACTION WORK ACTIVITIES

The following subsections provide a general description of how work activities will be performed to remove the 324/327 Buildings and ancillary facilities. The general scope of work involved to implement this removal action includes the following activities:

- Performing characterization sampling and analysis (as necessary)
- Site mobilization and preparation
- Deactivating facilities, which includes the removal of hazardous substances (chemical, radiological, and biological)
- Removing facility equipment and miscellaneous piping
- Dismantling various facility structures
- Disposing of waste
- Documenting remaining conditions and stabilizing the site (if the site does not meet the cleanup goals)
- Demobilization.

The scope of work will be accomplished by completing the activities described in the following subsections.

2.1.1 Data Quality Objectives Process and Waste Characterization

Characterization is necessary to support waste disposal activities, to define contaminants present before or after the completion of the removal action, and in some cases to support site closure documentation.

At this time, it is expected that most (if not all) of the characterization activities conducted to support final site closure will be performed as part of the 300-FF-2 work. The documents needed to support final closure sampling will not be produced as part of this removal action. Instead, the *300 Area Remedial Action Sampling and Analysis Plan* (hereinafter referred to as the 300 Area SAP) (DOE-RL 2004) will be used in cases where it is appropriate to demonstrate that a site is below the desired cleanup levels.

Waste characterization documents are being produced to support this removal action and include the development of data quality objectives (DQOs) and the revision of the existing 300 Area

Waste Characterization SAP (DOE-RL 2005a). The contractor implements the DQO process per its procedures. The results of the DQO process(es) will be documented in the 300 Area Waste Characterization SAP (DOE-RL 2005a) that is approved by the EPA.

2.1.1.1 Waste Characterization. Waste characterization will be conducted prior to and during D4 activities for a given facility. The DQO process will be used to develop which waste streams are expected to be generated; the initial characterization data needs; and the rationale, strategy, and requirements for the data collection and analysis. Data collection may include survey and sample data. The initial characterization data will be used for the following purposes:

- Characterize waste for treatment and/or disposal
- Identify radiological and hazardous conditions that will be encountered during D4 of the facility
- Specify health and safety requirements.
- Support evaluation of additional remediation needed to support turnover of the site to Field Remediation Project.

Additional requirements related to the initial waste characterization are discussed in the ARARs section of this document (Section 4.1).

2.1.1.2 Final Characterization. In general, the scope of this removal action addresses only the facilities and small volumes of soil. It is already known that the soil beneath some of the facilities is contaminated. If extensive soil contamination is discovered, it will most likely be remediated under the authority of the 300-FF-2 OU interim action ROD (EPA 2001). Lead regulator concurrence will be obtained before deferring soils to a later cleanup activity.

2.1.2 Site Mobilization and Preparation Work

Upon initiation of D4 activities, personnel will be mobilized and required equipment and materials will be procured. The first activities to be performed will include mobilizing manual personnel and trailers to support project activities. Field support personnel will also terminate and/or verify termination of the 324/327 Buildings and ancillary facilities services and utilities, as appropriate. Electrical systems that will be used throughout the D4 activities are discussed in further detail in Section 3.4.

Concurrent with these activities, waste storage areas will be set up within the building footprint area (BFA) or within the onsite location outside the BFA to facilitate transportation of the material for recycling or disposal in accordance with this document. Supervisor trailers, lunch trailers, change trailers, office trailers, mobile shower trailers, and restroom facilities will also be mobilized as required at the sites to prepare for D4 activities. Electricity will be connected from an outside line or generator, and temporary power and lighting will be installed as needed. Occupational Safety and Health Administration (OSHA) concerns (e.g., fall protection, guarding, and electrical) will be managed as the concerns are identified.

2.1.3 Decontamination and Demolition Activities

The D4 activities will be conducted within the BFA of a given facility (although staging may occur in an onsite location within the 300 Area); however, the size of the area needed to excavate soils and/or demolish structures exceeds the size of the footprint. The demolition area necessary to excavate soils and/or demolish structures is considered to be part of the BFA.

In general, work activities will begin by developing a baseline of the facility conditions. Biological cleanup, general housekeeping, and removal of hazardous materials may also be necessary. Fluids will be drained from piping and equipment. Contaminated materials will be fixed in place. The interior fixtures of the building that cannot be demolished with the structure will be removed. The final activity will include the demolition of the structure.

Asbestos-containing material (ACM) typically consists of insulation for piping, floor tiles, and cement asbestos board. Regulated Asbestos Containing Material (RACM) will be removed prior to demolition of the facility unless the conditions of 40 CFR 61.145(a)(3) apply. In general, nonfriable asbestos (Category 1 and 2) will not be removed unless it has the potential of becoming friable. Asbestos work, air monitoring, and worker safety requirements will be performed in accordance with 40 CFR 61.145(c), 40 CFR 61.150, 29 CFR 1926.1101, and the contractor's procedures.

If ACM is not removed prior to demolition, the decision to not remove the asbestos must be made by an individual who meets the training requirements of 40 CFR 61.145, 40 CFR 61.150, and 29 CFR 1926.1101. A qualified asbestos project designer shall evaluate the work area, projected work practices, and engineering controls, and shall certify in writing that the planned control method is adequate and meets the requirements of 40 CFR 61.145, 40 CFR 61.150, and 29 CFR 1926.1101.

Unattached, not-in-use, and accessible lead bricks and sheeting; PCBs (primarily in transformers and motor oils); mercury (primarily in lighting components and switches); and other hazardous materials will be removed and disposed as hazardous or mixed waste or will be recycled consistent with guidelines found in Section 4.2.

Most of the loose, accessible radiological contamination will either be removed or fixed in place, depending on the levels, accessibility, complex shapes (e.g., grating), and type of contamination found. Some of the equipment/piping will be removed, and loose contamination will be wiped or vacuumed with a HEPA filter-equipped vacuum. If loose contamination remains after the initial decontamination effort (unless the area will be inaccessible after completion of the removal project, or if the building configuration or conditions make removal of loose contamination impractical), the contamination may be fixed in place, as required. Removal of fixed contamination (radiological or chemical) will be performed using nonaggressive means (e.g., wiping or using decontamination solutions). Aggressive means of decontamination (e.g., scabbling, grinding, or other abrasive/mechanical means) are planned to be used only as necessary to maintain levels ALARA.

Water may be used to control dust generated from demolition activities. The amount of water used will be minimized to prevent runoff. Additional work practices/controls may need to be implemented to control runoff because the 300 Area is mostly covered with asphalt.

The facilities will be demolished using standard demolition techniques (e.g., excavator with a hoe-ram, a hydraulic shear with steel shear jaws, concrete pulverizer jaws or breaker jaws, a crane with wrecking ball, and/or controlled explosives). Steel will be segregated for salvage if economically feasible and if it meets DOE criteria for free release from radiological controls. The above-grade structures of the facilities will be demolished and disposed.

Wells may be located near or within the footprint of the structures undergoing D4 activities. The wells may or may not be affected by the D4 activities. If required, the wells will be decommissioned in accordance with the substantive requirements of *Washington Administrative Code* (WAC) 173-160.

Other contaminated underground structures (including pipelines, pipe tunnels, and pipe trenches) may be exposed or affected by removing the below-grade ancillary facility structures. "Chasing" these other contaminated underground structures will be evaluated on a case-by-case basis to determine the practicality of removing the structure as part of the D4 work scope or deferring to a later remedial action.

In the event that large volumes of contaminated soil are encountered, other soil contamination sites are adversely affected by D4 activities, utilities of active facilities are impacted, or removal of contaminated soil inhibits D4 activities, the removal of contaminated soils may be deferred to future remedial action with concurrence of the EPA. The sites will be stabilized in a manner that will not hinder future remediation. Future cleanup efforts of the facility (if necessary) or transfer of the removal action scope to later remedial action will be coordinated with and approved by the EPA. Future cleanup efforts will occur at the same time that waste sites are addressed under the 300-FF-2 ROD (EPA 2001).

Decontamination that is necessary to allow removal of demolition equipment from contamination areas will be accomplished using standard industry practices and best management practices. One or more areas will be established within the BFA or in the onsite area at a location that may or may not have been previously contaminated to conduct additional or final decontamination. Gross equipment decontamination methods will be employed to remove loose contamination within the contamination area. Best management practices for gross cleaning and/or decontamination of heavy equipment and vehicles consist of using wipes and nonhazardous materials to remove loose contamination. Wet grit blasting or grinding may be used if other methods are not effective. Water may be used to clean equipment in the decontamination area; however, the use of large volumes of water will be minimized. Soaps, detergents, or other cleaning agents will not be added to the washwater. Pressure washing (if required) will normally be performed using cold water (however, hot water may be used to avoid icing). Steam cleaning will be used only after other decontamination methods prove to be ineffective.

Spent decontamination water and associated contamination from the decontamination of D4 equipment (e.g., trackhoe excavators, front-end loaders) will be discharged to the ground within the decontamination area. EPA and DOE-RL will agree on a case-by-case basis whether (or not) a decontamination area shall be demonstrated as meeting the 300-FF-2 cleanup levels at the end of D4 activities or whether this determination can be deferred to a later remedial action. Remediation of decontamination areas will be performed in accordance with the 300 Area SAP (DOE-RL 2004). Personnel responsible for equipment decontamination will be knowledgeable of the applicable requirements of this RAWP.

2.1.4 Waste Management and Disposal

All waste management activities will be performed in accordance with waste management ARARs identified in the action memorandum for the 324/327 Buildings and ancillary facilities (EPA 2006) and this RAWP. Certain materials are eligible for salvage and recycling, which is encouraged if the appropriate regulatory and project requirements are met and it is economically feasible for the project to do so. It is believed that nearly all the CERCLA waste from the removal action will be disposed at the Environmental Restoration Disposal Facility (ERDF). Treatment of waste may be necessary prior to disposal at ERDF.

If transuranic waste or other waste that cannot be sent to ERDF is encountered, disposal/storage is allowed at the Central Waste Complex (CWC) per the approved offsite determination for this facility (EPA 2002). Any transuranic waste generated will be shipped to the Waste Isolation Pilot Plant for final disposition in accordance with this work plan and a schedule established for remedial actions, no later than September 30, 2024. Liquid waste will either be sent to the Hanford Site's Effluent Treatment Facility (ETF) or treated to meet the acceptance criteria of the receiving facility. Liquid waste sent to the ETF will be treated separately from other non-CERCLA sources, and any treatment residues that meet ERDF waste acceptance criteria (BHI 2002b) may be disposed of at ERDF. By approval of this work plan, the EPA has determined that the ETF is an acceptable facility for storage and treatment of liquid waste (with segregated treatment residues disposed of in ERDF) in accordance with 40 CFR 300.440, provided the applicable facility waste acceptance criteria are met. This determination applies to any waste arising from this CERCLA-authorized removal action unless the EPA provides notification otherwise.

2.1.5 Site Stabilization (If Soil Remediation is Not Completed)

Following the D4 activity, if the site has not been demonstrated to meet the 300-FF-2 closure criteria, the site will be stabilized in a manner that will not hinder future remediation. Stormwater run-on and/or run-off issues may need to be addressed. Characterization information for the area will be generated to document the status of conditions at the conclusion of this project. Surveillance and maintenance (S&M) requirements will be established for the site. Final site restoration will be coordinated with remedial actions. The WIDS database will be updated to reflect the condition of the site following the D4 activity. Additional data may be included in the individual site deferral documents. The EPA will be provided documentation describing the environmental conditions at the end of the D4 activity.

2.1.6 Site Restoration

If, following the remediation of soils, it is believed the soils meet the 300-FF-2 cleanup values, field sampling will occur. If field sampling demonstrates that the soils are below cleanup criteria established for the 300-FF-2 Operable Unit soils, verification samples will be collected and analyzed as required by the 300 Area SAP (DOE-RL 2004). If verification sampling of the site indicates that cleanup levels for both soils and any remaining below-grade structures (if present) have been met, the below-grade void spaces will be backfilled with inert nonrecyclable material (e.g., concrete rubble qualifying as inert waste under WAC 173-350-990) and/or clean soil. Approximately the top 0.6 to 1 m (2 to 3.3 ft) will be backfilled to facilitate future revegetation of the site. The final grade of the site will match the surrounding terrain. Existing borrow pits will be used to obtain the backfill material.

If in-process measurements or final characterization sampling indicates that the cleanup standards have not been met, an evaluation will be performed (e.g., location, site access, contaminants of concern) to determine how much, if any, of the site will be backfilled. If it is determined that cleanup actions must stop, the site will be stabilized in a manner that will not hinder future remediation. Site restoration will be coordinated with remedial actions and 300 Area restoration actions. Characterization information for this area will be generated to document the status of conditions at the conclusion of this project. Determination of whether to proceed with soil cleanup and/or transfer of scope of work to later remedial action must be approved by the EPA.

2.1.7 Demobilization

At the completion of D4 activities, the trailers and equipment will either be demolished, demobilized, or turned over to personnel conducting the soil remediation work as part of the 300-FF-2 Operable Unit work scope.

3.0 SAFETY AND HEALTH MANAGEMENT AND CONTROLS

3.1 EMERGENCY MANAGEMENT

The S&M activities in 300 Area are addressed in the contractor's emergency management plan. A new emergency response plan will be written or an existing plan modified specifically for the D4 activities of the 324/327 Buildings and ancillary facilities.

All emergency planning and preparedness activities for these projects will be consistent with planning and preparedness actions taken by other Hanford Site contractors and similar projects. Activities will be in a manner that ensures the health and safety of workers and the public and the protection of the environment in the event of an abnormal incident during D4 of the 324/327 Buildings and ancillary facilities.

3.2 SAFEGUARDS AND SECURITY

Access to the 300 Area is controlled via postings (warning signs) and Hanford Security. Access and keys to 324/327 Buildings and ancillary facilities are controlled by the contractor. Access requirements for employees and/or visitors are defined in contractor's procedures.

3.3 STRUCTURES, SYSTEMS, AND COMPONENTS TO PROTECT FACILITY WORKERS

Controls that will be employed during the 324/327 Buildings and ancillary facilities removal project include temporary confinement enclosures, glovebag containments, and personal protective equipment (PPE), as directed by the facility-specific health and safety plan. To control emissions, vacuums will be equipped with HEPA and/or charcoal filters, and the exhausters will be equipped with HEPA filters. Radiological work permits (RWPs) and work packages specifically addressing the hazards associated with asbestos removal will also be in place. Personnel monitoring and area monitoring will be used as required to determine and document worker exposures and work conditions.

Temporary confinement enclosures will be constructed as required to provide proper airflow conditions and will be fabricated of noncombustible and fire-retardant materials. A standard type of temporary confinement is a glovebag enclosure, which will essentially be a one-time-use protective measure used to prevent contamination release during specific operations (e.g., pipe cutting and sample collection). Glovebags are available in a variety of sizes and designs and will be ordered to tailored specifications in accordance with their intended uses. Radiological containments will be evaluated and constructed in accordance with the contractor's procedure(s).

3.4 ELECTRICAL SYSTEMS

The removal of electrical systems is typically the last isolation activity performed because power would be needed to support the D4 and remediation activities. However, if the existing electrical systems pose a threat to workers (e.g., underground conduit interfering with an excavation or demolition), the electrical system would be deactivated first and alternative power supplies would be used.

Alternative power will consist of either generators or a stand-alone power system such as the Mobile Integrated Temporary Utility System (MITUS).

3.5 HEALTH AND SAFETY PROGRAM

3.5.1 Worker Safety Program

The contractor's Hazardous Waste Operations Safety and Health Program was developed for employees involved in hazardous waste site activities. The program was developed to comply with the requirements of 29 CFR 1910.120 and 10 CFR 835 to ensure the safety and health of workers during hazardous waste operations. The Integrated Safety Management System will be incorporated into all work activities. The program includes the following elements:

- Organizational structure that specifies the official chain of command and the overall responsibilities of supervisors and employees
- Comprehensive work plan developed before work begins at a site to identify operations and objectives and to address the logistics and resources required to accomplish project goals
- A site-specific health and safety plan (SSHASP) developed when workers may be exposed to hazardous substances
- Worker training commensurate with individual job duties and work assignments
- Medical surveillance program administered to comply with the OSHA requirements (29 CFR 1910.120)
- Contractor's procedures and project/task-specific implementing plans and procedures
- Voluntary Protection Plan.

3.5.2 Site-Specific Health and Safety Plan and Activity Hazards Analysis

A SSHASP will be prepared that defines the chemical, radiological, and physical hazards and specifies the controls and requirements for work activities. Building access and work activities are controlled in accordance with approved work packages, as required by established contractor procedures. The SSHASP addresses the health and safety hazards of each phase of site operation

and includes the requirements for hazardous waste operations and/or construction activities, as specified in 29 CFR 1910.120. Depending on the specific hazards present, one or more SSHASP will be written for D4 of 324/327 Buildings and ancillary facilities. As part of work package development, an activity hazards analysis will be written to identify the hazards associated with specific tasks not already covered under a SSHASP. The elements included in the SSHASP are as follows:

- A general overview of the hazards associated with the facility or facilities and the appropriate actions necessary to mitigate the hazards
- List of employee training assignments
- List of PPE to be used by employees at the work site
- Medical surveillance requirements
- Work site control measures
- Emergency response
- Confined space entry procedures
- Spill containment program.

In addition to the SSHASP, a RWP will be prepared for work in areas with potential radiological hazards. The RWP extends the Radiological Protection Program (discussed in Section 3.5.3) to the specific work site or operation. All personnel assigned to the project and all work site visitors must strictly adhere to the provisions identified in the SSHASP and RWP.

Before work and each activity begin, a pre-job briefing will be held with the involved workers. This briefing includes reviews of the hazards that may be encountered and the associated requirements. Throughout an activity, daily briefings may also be held, as well as special briefings prior to major evolutions.

3.5.3 Radiological Controls and Protection

The Radiological Controls and Protection Program is defined in DOE-approved programs and contractor-approved procedures. The Radiological Controls and Protection Program implements the contractor's policy to reduce risks to safety or health to levels that are ALARA and to ensure the adequate protection of workers. The contractor's Radiological Protection Program meets the requirements of 10 CFR 835. Appropriate dosimetry, RWPs, PPE, ALARA planning, periodic surveys, and radiological control technical support will also be provided.

The standard contractor's controls for work in radiological areas are assessed as adequate to control project activities. These controls provide for radiological controls planning to identify the specific conditions, and the controls also govern the specific requirements for an activity,

periodic radiation and contamination surveys of the work area, and periodic or continuous observation of the work by the Radiological Controls organization. The ALARA planning process will be used to identify shielding requirements, contamination control requirements (including local ventilation controls), radiation monitoring requirements, and other radiation control requirements for the individual tasks conducted during the projects.

Measures are also taken to minimize the possibility of releases to the environment. The air monitoring section of this document (see Appendix B) addresses the radionuclide inventory and activities that could cause potential release of this inventory.

4.0 ENVIRONMENTAL MANAGEMENT AND CONTROLS

4.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

40 CFR 300.415(j) requires that ARARs be met (or waived) to the extent practicable during the course of removal actions. When requirements are identified, a determination must be made as to whether those requirements are applicable or relevant and appropriate. A requirement is applicable if the specific terms (or jurisdictional prerequisites) of the law or regulations directly address the circumstances at a site. If not applicable, a requirement may nevertheless be relevant and appropriate if (1) circumstances at the site are, based on best professional judgment, sufficiently similar to the problems or situations regulated by the requirement; and (2) the use of the requirement is well suited to the site.

ARARs include only substantive requirements of environmental standards. ARARs do not include administrative requirements, including requirements to obtain any federal, state, or local permits (40 CFR 300.400[e] and 42 U.S.C. 9621[e]).

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, TBC information should be considered in determining the removal action necessary for protection of human health and the environment. Requirements drawn from TBC information may be included in the selected alternative.

Because the alternatives would result primarily in waste generation and potential releases to the environment, the key ARARs identified for the alternatives considered include waste management standards, standards controlling releases to the environment, standards for protection of natural resources, and safety and health standards.[1] The ARARs are discussed generally in the following sections.

The ARARs for this removal action were identified in the action memorandum for the 324/327 Buildings and ancillary facilities (EPA 2006). These ARARs include waste management standards; standards controlling releases to the environment; cleanup standards; and standards for the protection of cultural, historical, and ecological resources. A discussion of how the removal action will comply with these ARARs is provided in the following subsections.

4.2 WASTE MANAGEMENT PLAN

Waste management activities performed in this RAWP shall be in accordance with the waste management ARARs identified in the action memorandum for the 324/327 Buildings and

[1] Safety standards are not environmental standards per se and therefore not potential ARARs. Instead, compliance with applicable safety regulations, such as OSHA requirements, is required external to the CERCLA ARAR process. However, because of the nature and importance of these standards, a discussion of the safety requirements is included in the action memorandum (EPA 2006).

ancillary facilities (EPA 2006). Waste management activities will be performed in accordance with the following ARARs:

- The *Toxic Substances Control Act of 1976* (TSCA), as implemented by 40 CFR 761 and WAC 173-303-071(3)(k) with regards to management of PCB waste

- The *Resource Conservation and Recovery Act of 1976* (RCRA), as implemented by 40 CFR 260-268 and WAC 173-303 with regards to management of dangerous waste

- The *Hazardous Material Transportation Act of 1974* (49 U.S.C. 1801 to 1813), as implemented by 49 CFR 100-179 with regards to offsite transportation of hazardous materials.

The requirements specified by the ARARs and other applicable guidance will be addressed in the contractor's work control documents. The work control documents will address designation, waste minimization, packaging, handling, marking and labeling, storage, transportation, and treatment as they specifically apply to waste streams associated with the 324/327 Buildings and ancillary facilities. The expected waste streams include, but are not limited to, the following:

- Solid waste (nonradioactive, nondangerous waste)
- Low-level radioactive waste
- Hazardous and dangerous wastes
- Mixed waste (waste that is both low-level radioactive waste and hazardous waste)
- Asbestos waste
- PCB wastes
- Transuranic waste.

4.2.1 Waste Characterization and Designation

The waste characterization requirements will be developed as part of a DQO process. Waste generated will be characterized in accordance with the contractor's procedures, the requirements of the receiving facility, and the approved 300 Area Waste Characterization SAP (DOE-RL 2005a). Characterization will be conducted through process knowledge, sampling/analysis, and radiological surveys.

A team of skilled personnel will inspect the portions of the ancillary facilities as the removal action/maintenance occurs. The inspection will identify suspect chemical/hazardous and radiological materials in order to identify the waste streams for project planning.

Radiological surveys will be performed using hand-held and/or large-area detection equipment that may be augmented with the Laser-Assisted Ranging and Data System for record keeping during surveys. Additionally, an advanced characterization system consisting of an AIL GammaCam™ M31 gamma-ray/video imaging system (for locating hot spots), a Canberra In Situ

™ GammaCam is a trademark of AIL Systems, Inc., Deer Park, New York.

Object Counting System gamma-ray spectrometric system, and data-logging contamination monitoring equipment may be deployed for the rapid, economical, and accurate characterization of materials for radiological contamination.

The data generated as part of waste characterization will be used to develop the following information (as applicable):

- Contaminant identification
- Contaminant concentrations
- Waste treatment requirements
- Waste packaging and disposal requirements
- Worker health and safety conditions
- Decontamination requirements
- Operational precautions
- Waste acceptance documents
- Transportation documents.

Additional characterization may be required based on disposal facility acceptance criteria.

4.2.2 Waste Minimization

Waste minimization practices will be followed during all phases of waste management. Waste materials will be recycled, reused, or reclaimed when feasible. To be suitable for recycling or reuse, the materials in question must (1) be needed or in demand, (2) be able to meet the Hanford Site free release criteria, and (3) not result in an excessive cost to the government. The decision of whether materials meet this criteria will be made by management with input from technical personnel.

Introduction of clean materials into a contamination area and contamination of clean materials will be minimized to the extent practicable. During all phases of waste management, emphasis will be placed on source reduction to eliminate or minimize the volume of wastes that will be generated.

All materials released offsite for disposal/recycle must be certified free of radiological contamination in accordance with the contractor's material release procedures. Waste materials with no or de minimis levels of 300 Area CERCLA hazardous substance are not considered CERCLA waste and are therefore not subject to the 40 CFR 300.440 offsite acceptability determination.

4.2.3 Waste Handling, Storage, and Packaging

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, these facilities may be treated as one for the purposes 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 obtaining a permit. The facilities located outside of the 300 Area boundary that are considered to be within the CERCLA onsite area for this removal action are the ERDF, the Radiological Characterization Facility (RCF), and the Industrial Hygiene Field Services Facility.

4.2.3.1 Building Footprint Area and Onsite Area. The BFAs for this removal action are defined to include the individual facility footprint and the surrounding area needed to support the excavation of soils and/or demolition of the structure. The BFA is located within the onsite area. The CERCLA onsite area is defined as the 300 Area.

Any waste management locations outside of the BFA and within the onsite area must meet the substantive requirements of all ARARs. For waste management inside the BFA, safe and effective management practices shall be established to ensure protection of human health and the environment. Substantive provisions of waste management ARARs may be used, when appropriate, within the BFA in this regard. Standards for managing waste within and outside the BFA shall be documented in the contractor's work control documents.

For the 324/327 Buildings and ancillary facilities addressed under this action, the onsite area is defined as the 300 Area. Within the onsite area, only the substantive requirements of the ARARs apply.

4.2.3.2 Staging Piles. As an alternative to storage within the BFA, waste that is not immediately transported to ERDF or other EPA-approved disposal facility may be stored in staging piles. Staging used in the management of hazardous waste must be operated in accordance with the standards and design criteria prescribed in 40 CFR 264.554, paragraphs (d) through (k). General requirements for staging piles containing hazardous waste include the following:

- Staging piles are to be used only as part of this removal action for temporary storage at a facility and must be located within the contiguous property where the waste to be managed in the staging piles is oriented.

- The staging pile must be designed to prevent or minimize releases of hazardous wastes and hazardous constituents into the environment and minimize or adequately control cross-media transfer. To protect human health and the environment, this can include installation of berms, dust control practices, or using plastic liners or covers, as appropriate.

- The staging pile must not operate more than 2 years (measured from the first time remediation waste is placed in the pile), except when EPA grants an operating term extension. A record of the date when remediation waste was first placed in the staging pile must be maintained until final closeout of the site is achieved.

- Ignitable or reactive waste must not be placed in a staging pile unless it has been treated or mixed before being placed in the pile so that the waste no longer meets the definition of ignitable or reactive waste, or the waste is managed in order to protect it from exposure to any material or condition that may cause it to ignite.

- Incompatible wastes may not be placed in the same staging pile, unless the requirements in 40 CFR 264.17(b) have been met. The incompatible materials must be separated or the waste may not be piled on the same base where incompatible wastes or materials were previously piled, unless the base has been decontaminated sufficiently to comply with 40 CFR 264.17(b).

Approval of this RAWP by the EPA constitutes general authorization to operate staging piles during the execution of this removal action. Specific staging pile locations will be identified in project drawings and approved by EPA in the unit manager's meetings (or other forums approved by the EPA). Field operation of staging piles within the referenced regulatory provisions will be accomplished through the following controls:

- The maximum duration for operating a staging pile is 24 months, unless an extension is granted by the EPA.

- The staging area will be surrounded with a minimum of a 15-cm (6-in.) berm to control run-on or run-off.

- Dust control will be accomplished through standard industry practices such as the application of water sprays and fixatives. These techniques are considered to be reasonable precautions to control fugitive emissions as required by the regulatory standards and are the same techniques as those applied to control radionuclide air emissions.

Once the materials have been removed, to close out the staging pile samples of the residual soil will be collected in accordance with the 300 Area SAP (DOE-RL 2004). In cases where staging piles for industrial waste sites are located in an uncontaminated area, the sample results should be compared against the soil cleanup levels identified in the 300 Area SAP. If the sample results exceed the cleanup levels, the area shall be further remediated or deferred to the 300-FF-2 work scope following lead regulator concurrence.

4.2.3.3 Common Waste Handling, Storage, and Packaging Requirements. The requirements in the following paragraphs are common to both the BFA and the onsite area.

- **Nonbulk** containers or packages (i.e., drums) of waste requiring tracking (e.g., hazardous, mixed) will be assigned a package identification number by a waste transportation specialist. Containers in poor condition will have the contents transferred to a container in good condition. Portable fire extinguishers and spill-control equipment will be available.

- **Bulk waste** will be placed in approved containers (i.e., bulk roll-off boxes) for ERDF disposal. The containers will be lined and covered (as appropriate). While waste are being

stored and if there is a potential for release, they will be managed in a manner (i.e., covered containers, wrapped in plastic, fixatives applied, etc.) that eliminates the threat of release of materials. Lightweight material (e.g., paper and plastic) will be bagged, if appropriate, prior to placement in the container to eliminate the potential of the materials blowing out of the container.

All containers, packages, or items requiring storage in a radioactive materials area will be marked/labeled with radioactive material markings. Containers will be appropriately labeled and/or marked in accordance with all applicable requirements. Containers will be stored to prevent the accumulation of water.

4.2.3.4 Specific Waste Handling, Storage, and Packaging Requirements. The following specific requirements apply only in the onsite area (outside the BFA) for the variety of wastes that may be encountered during the removal action.

4.2.3.5 Solid Waste. Nondangerous solid waste will be managed in accordance with WAC 173-350, with an emphasis on recycling. Management under WAC 173-303 is addressed in Section 4.2.3.7. Recyclable wastes (e.g., lead, aerosols, and fluorescent light tubes) should be managed in accordance with the management plan for recyclable materials administered by the Hanford Site's CCRC. All materials released offsite for disposal, recycle, or salvage must be certified as free of radioactive contamination in accordance with the contractor's material release procedures. Demolition debris will be sized in accordance with the waste acceptance criteria of the disposal facility. Additionally, materials containing CERCLA hazardous substances (unless present in de minimis concentrations) may only be released to an offsite facility that has received approval from EPA in accordance with 40 CFR 300.440.

4.2.3.6 Low-Level Radioactive Waste. Liquids will be collected in appropriate containers. Dependant upon volume and characteristics (e.g., pH, oils, waste codes), containers will vary from drums to bulk holding tanks. Low-level waste will (in most cases) be shipped to ERDF in rolloff boxes or containers.

Demolition debris will be sized in accordance with the waste acceptance criteria of the disposal facility. Radioactive solids will be placed in containers for ERDF disposal.

4.2.3.7 Hazardous/Dangerous Waste. Hazardous/dangerous waste managed outside of the BFA will be packaged and stored to prevent dispersion and public exposures as required by WAC 173-303. Management of hazardous/dangerous waste may include storage within onsite container storage areas operated in accordance with the substantive provisions of WAC 173-303-630. The substantive provisions of WAC 173-303-630, which apply to storage of hazardous waste within the CERCLA onsite area, include the following sections: 2, 3, 4, 5, 7(c) (nonliquid wastes), 8, 9, 10, and 11. Section 6 is applicable with the exception of the logkeeping requirements. Sections 7(a) and (b) are applicable to the storage of liquid dangerous waste. Management of hazardous/dangerous waste may include use of staging piles as described in Section 4.2.3.2 or storage within onsite container storage areas operated in accordance with the substantive provisions of WAC 173-303-630.

4.2.3.8 Mixed Waste. Mixed waste will be managed in compliance with the substantive requirements for both hazardous/dangerous wastes and radioactive waste in accordance the contractor work control documents. Requirements associated with the characterization, packagings, labeling, etc., are the same as those for hazardous/dangerous waste.

Storage, pending final disposal, will be allowed at the Hanford Site's CWC per the offsite approval granted by the EPA (EPA 2002) in accordance with 40 CFR 300.440.

4.2.3.9 Asbestos. Multiple forms of asbestos are expected to be encountered. Removal and disposal of asbestos and ACM are regulated under the *Clean Air Act Amendments of 1977* (40 CFR 61, Subpart M) and under health and safety regulations promulgated pursuant to the OSHA regulations (29 CFR 1910.1001 and WAC 296-62 Part I). The 40 CFR 61 requirements applicable to this removal action are contained in 40 CFR 61.145(c) and 40 CFR 61.150. These regulations establish removal requirements based on quantity present and handling requirements. These regulations also specify handling, packaging, and disposal requirements for regulated sources having the potential to release asbestos fibers. The substantive requirements of the *Clean Air Act Amendments of 1977* standards are applicable to the abatement of asbestos and ACM. Both the substantive and administrative requirements of the OSHA standards are applicable to the removal of asbestos and ACM. Asbestos is further discussed in Section 2.1.3 of this document and will be further addressed in work-specific documents.

4.2.3.10 Ozone-Depleting Substances. 40 CFR 82, Subpart F establishes requirements for the recovery, recycling, and reclamation of ozone depleting substances from refrigeration equipment that may be present within facilities addressed by the removal action. The substantive requirements of Subpart F will apply to actions being taken within the onsite area. The substantive and administrative requirements are applicable for any actions taken at an offsite facility.

4.2.3.11 PCBs. PCBs are identified as potential contaminants in the 300 Area facilities, and PCB-contaminated waste may be generated. The various waste matrixes that may contain PCBs include PCB oils, PCB solids in paint, PCB remediation waste, and PCB-contaminated items.

Staging of PCB waste at the 300 Area facilities must be done in a manner that satisfies substantive provisions of 40 CFR 761.65(b). PCB bulk product waste or remediation waste will be managed within the BFA or the onsite area. PCB liquids may be managed within the facility of origination or a centralized area within the CERCLA onsite area (following approval of a centralized area by the EPA). Outside the BFA, containers will be marked with a M_L marking (CAUTION – CONTAINS PCBs) as required by the TSCA.

Areas outside the BFA containing packaged PCBs will be marked with signs posting "DANGER-UNAUTHORIZED PERSONNEL KEEP OUT" at each entrance. The M_L marking will also be posted in accordance with 40 CFR 761. The use of an "overpack" container is acceptable for outside storage. Although the "overpack" containers may not represent the typical concept of a "facility," they satisfy the substantive requirements for roof, walls, nonporous floors, and spill protection.

4.2.3.12 Transuranic Waste. If encountered, transuranic waste will be managed in accordance with the contractor's procedure. The CWC or the Waste Receiving and Processing facility will be used for interim storage of any transuranic waste encountered. An EPA offsite determination will be required prior to sending waste to the Waste Receiving and Processing facility.

4.2.3.13 Liquid Waste. Qualifying liquid waste may be stabilized and disposed of at ERDF. All liquid waste disposed of at a location other than ERDF must first be approved by the EPA. The ERDF is not allowed to dispose of unstabilized liquid waste. Possible disposal locations include the ETF or a facility outside of the Hanford Site.

Applicable U.S. Department of Transportation requirements will be followed for all materials/ waste during transport occurring on public roads and highways.

4.2.4 Waste Treatment

Treatment of waste streams may be necessary to provide for safe transport or storage. Treatment may also be required prior to disposal or to meet the appropriate waste acceptance criteria. The type of treatment and the location of treatment will be approved by DOE and the EPA on a case-by-case basis in accordance with the substantive requirements of RCRA and WAC 173-303. Upon EPA approval (except for the previously approved treatment methods listed below), solidification, encapsulation, neutralization, and size reduction/compaction may be employed to treat various wastes. For wastes requiring onsite treatment that are not already approved via this document the techniques will be documented in a treatment plan approved by the EPA.

Several mixed waste streams have already been reviewed and approved for treatment and disposal at ERDF. These mixed waste streams are as follows:

- Radioactively contaminated elemental mercury may be amalgamated.
- Radioactively contaminated elemental lead may be macroencapsulated at ERDF.
- Aqueous solutions may be treated in accordance with an EPA-approved waste treatment plan and sent to ERDF.
- Stabilization of soils contaminated with lead or other heavy metals may be treated at ERDF.
- PCB waste requiring treatment will be treated in accordance with the requirements identified in 40 CFR 761.

The above-listed waste streams will be treated as they are encountered, and the contractor will notify the DOE and regulatory agencies via e-mail. If waste is encountered for which there is no available treatment, DOE will meet with the regulatory agencies to determine the appropriate action for the waste stream.

4.2.5 Waste Transportation and Shipping

All shipments will be made in accordance with U.S. Department of Transportation regulations, 49 CFR 171-179, WAC 173-303, and the contractor's waste transportation procedures, as applicable.

The removal action may require offsite transportation of wastes and potentially contaminated samples. The offsite handling and shipping of wastes and potentially contaminated samples will be in accordance with the *Hazardous Materials Transportation Act of 1974*, as implemented through 49 CFR 100 through 179.

4.2.6 Disposal

All waste resulting from this action will be evaluated to determine if the waste meets ERDF waste acceptance criteria for disposal. CERCLA waste disposed of at any disposal facility other than ERDF requires EPA approval in accordance with 40 CFR 300.440. Any PCB waste that does not meet ERDF waste acceptance criteria (BHI 2002b) may be transported for disposal to a TSCA offsite disposal facility following the receipt of an offsite acceptability determination by the EPA.

Solid waste may be sent for offsite disposal at a municipal/industrial landfill. Disposal of materials containing no or de minimis levels of CERCLA hazardous substances would not require an offsite acceptability determination per 40 CFR 300.440.

The *Hanford Site Solid Waste Acceptance Criteria* (FH 2005) identifies criteria for acceptance of waste at the CWC. The *Liquid Waste Processing Facilities Waste Acceptance Criteria* (FH 2004) identifies criteria for acceptance of waste at the ETF. The *Environmental Restoration Disposal Facility Waste Acceptance Criteria* (BHI 2002b) and ERDF supplemental waste acceptance criteria (BHI 2003) provide the waste acceptance criteria for ERDF.

4.2.7 Recycling

Some of the waste from the D4 of the 324/327 Buildings and ancillary facilities may contain materials that could be beneficially recycled. As applicable, these materials would be managed/recycled in accordance with the contractor excess procedures or the CCRC management plan. Recycling of materials from D4 activities that contain CERCLA hazardous substances will require an offsite acceptability determination from EPA in accordance with 40 CFR 300.440.

Recycling of materials (e.g., noncontaminated wood, steel, masonry brick) containing no or de minimis levels of CERCLA hazardous substances would not require an offsite acceptability determination per 40 CFR 300.440. Recycling of items generated as a result of routine operational or maintenance activities (e.g., replacement of burned-out light bulbs or discharged batteries from functioning equipment) would also not require an offsite acceptability determination. Aqueous waste may be reused for dust suppression with EPA approval.

4.3 STANDARDS CONTROLLING RELEASES TO THE ENVIRONMENT

4.3.1 Standards Controlling Air Emissions to the Environment

The proposed removal action alternatives would have the potential to generate both radioactive and nonradioactive airborne emissions.

The federal *Clean Air Act* and the "Washington Clean Air Act" (*Revised Code of Washington* [RCW] 70.94) regulate both criteria/toxic and radioactive airborne emissions. Implementing regulations found in 40 CFR 61.92 set limits for emissions of radionuclide airborne emissions. Radionuclide emissions cannot exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem/yr. This requirement is applicable because there is the potential to emit radionuclides to unrestricted areas from the removal action. WAC 173-480-070 requires verification of compliance with this standard.

Radioactive air emissions are to be controlled through the use of best available radionuclide control technology (WAC 246-247-040(3)) or as low as reasonable achievable control technology (WAC 246-247-040(4)). Emissions of radionuclides are to be measured for point sources (40 CFR 61.93) and for nonpoint sources (WAC 246-247-075(8)). Measurement techniques may include, but are not limited to, sampling, calculation, or smears for identifying emissions as outlined in Appendix B. The substantive requirements of these regulations are applicable because fugitive, diffuse, and point source emissions of radionuclides to the ambient air may result from activities performed during the removal action.

Conditions and limitations for the control and monitoring of radioactive emissions from the 324/327 Buildings were once incorporated into the Hanford Site Air Operating Permit. The terms and conditions contained in the Washington State Department of Health License and the Hanford Site Air Operating Permit for these two facilities will no longer apply upon EPA approval of this RAWP.

WAC 173-400 and WAC 173-460 establish the requirements for emissions of criteria/toxic air pollutants. The primary source of emissions resulting from this removal action would be fugitive particulate matter. Requirements applicable to this removal action are contained in WAC 173-400-040(3) and (8). These regulations require that reasonable precautions be taken to (1) prevent the release of air contaminants associated with fugitive emissions resulting from materials handling, demolition, and other operations; and (2) prevent fugitive dust from becoming airborne from fugitive sources of emissions.

WAC 173-460 would be applicable to removal actions that require the use of a treatment technology that emits toxic air pollutants. Treatment of some waste may be required to meet the ERDF waste acceptance criteria. In most cases, the type of treatment anticipate would consist of solidification/stabilization techniques such as macroencapsulation or grouting, and WAC 173-460 would not be considered an ARAR because it would not result in the emission of toxic air pollutants. No treatment requirements have been identified at this time that would be required to meet the substantive applicable requirements of WAC 173-460. However, if unknowns are encountered, that require more aggressive onsite treatment, resulting in the

emission of toxic air pollutants, the substantive requirements of WAC 173-460-030, WAC 173-460-060, and WAC 173-460-070 would be satisfied if the requirements are applicable or relevant and appropriate.

Emissions to the air will be minimized during D4 activities through the use of standard industry practices such as the application of water sprays and fixatives, temporary confinement enclosures/glovebag containments that may be HEPA filtered, and HEPA-filtered and/or charcoal-filtered vacuums. These techniques are considered to be reasonable precautions to control fugitive emissions as required by the regulatory standards and are the same techniques as those applied to control radionuclide air emissions. Prior to conducting demolition activities, hazardous substances and contaminated equipment and materials are removed to the extent practical. Piping will be drained and residual material removed (as practical). In addition, equipment containing hazardous materials such as mercury (lighting components and switches), PCBs (motor oils and transformers), friable asbestos or asbestos that has the potential to become friable (e.g., loose floor tiles, transite wall coverings or panels), or lead shielding (lead shot, brick, sheet and cast-lead forms) will be removed to the extent practical prior to demolition activities. These activities will be managed in accordance with the contractor's procedures and work packages that address removing, handling, and disposing of these materials in a manner that protects the safety of employees and the general public, minimizes spills and releases to the environment, and meets all regulatory requirements.

Appendix B of this document provides additional information pertaining to the release and control of potential radiological contaminants to the air. Appendix B is applicable only to emissions of radiological materials to the air.

4.3.2 Stormwater Runoff

Stormwater runoff from some of the facilities listed in the action memorandum (EPA 2005) discharge to engineered structures (e.g., injection wells). These injection wells are registered pursuant to WAC 173-218. State Waste Discharge Permit ST 4511 (Ecology 2005) issued pursuant to WAC 173-216 addresses discharges of stormwater to engineered structures. Substantive provisions of the permit include the implementation of best management practices, which are intended to prevent or reduce the spread of contamination and pollution of groundwater of the state, and meeting the groundwater quality criteria (GWQC). Sampling and analysis of the stormwater discharge is not normally required as long as the proper pollution prevention and best management practices (BMPs) are followed, unless contamination exists. Stormwater that has become contaminated is to be sampled to verify that the groundwater quality criteria (GWQC) are met prior to discharge to the injection well.

The BMPs identified in State Waste Discharge Permit ST4511 (Ecology 2005) and the Pollution Prevention and Best Management Practices Plan for State Waste Discharge Permit ST 4511 (DOE-RL 2005) will be implemented as appropriate. These BMPs include actions such as conducting inspections to identify and remove materials, etc., that could contaminate stormwater discharges; implementing good housekeeping practices to segregate and store materials and wastes in a manner to prevent the potential for contaminating stormwater; taking reasonable efforts to minimizing ponding; collecting discharges that have become contaminated; cleaning

up spilled materials and liquids promptly; and informing work crews of the appropriate BMPs to be implemented.

The removal actions specified in the action memorandum (EPA 2005) will result in a unique set of circumstances for each facility. Additional BMPs may be needed to prevent the discharge of contaminated stormwater runoff to an injection well. These practices could include berming, rerouting stormwater discharges, closing existing injection wells, or creating new discharge locations. Where additional BMPs are required to prevent contamination of stormwater runoff to the injection wells, they will be documented in facility-specific work controlling documents (e.g., work packages) as appropriate. Injection wells, if closed, would be closed in accordance with WAC 173-218.

4.4 CLEANUP STANDARDS

4.4.1 RCRA Closure Plan Requirements for the 324 Building

Table 4-1 summarizes the activities and closure performance standards that must be performed to meet the requirements of the closure plan. Additional information and greater detail is provided in the closure plan (DOE-RL 2005b).

Table 4-1. Closure Plan Activities and Performance Standards. (3 Pages)

Area	Components	Closure Performance Standard	Closure Activities
A-Cell	No closure activities required.	• Piping removal under (A-Cell). • Piping in place (embedded in walls) will be removed.	• HLV piping in A-Cell crawl space will be removed. • Closure of soil in the crawl space below the piping is covered under the soil/ groundwater.
B-Cell	Cell contents (excess equipment, debris, and dispersibles), liner, and concrete.	• Removal of all mixed waste and excess equipment. • Remove liner. Note: HLV piping in B-Cell will be removed. Soil under B-Cell is covered under soils/groundwater.	• In cell excess equipment, debris, and dispersibles (including all mixed waste) will be removed. • Remove liner and concrete.
C-Cell	No closure activities required.	Not applicable.	Not applicable.

Table 4-1. Closure Plan Activities and Performance Standards. (3 Pages)

Area	Components	Closure Performance Standard	Closure Activities
D-Cell	Waste container storage area; HLV liquid treatment process equipment area.	• Removal of all mixed waste and equipment. Note: HLV piping in D-Cell will be removed. Soil under D-Cell is covered under soils/groundwater.	• Document visual inspection of waste container storage area. • Document visual inspection of equipment area. • Remove all equipment following any use during closure activities. • Remove liner and concrete.
Air lock	Piping from HLV.	• Remove piping. Note: HLV piping in the airlock will be removed.	• Remove all piping.
Pipe trench	Piping from HLV.	• Remove piping. • Removal of all mixed waste (if present). Note: HLV piping in the pipe trench will be removed. Soil under the pipe trench is covered under soils/groundwater.	• Remove all piping. • Remove all waste/debris. • Remove pipe trench and concrete. Note: In-cell debris will be designated and disposed of appropriately as either mixed waste or low-level waste.
Other REC components	Piping from HLV.	• Remove piping. Note: HLV piping in the cell cubicles and pass-through ports will be removed.	• Remove all piping.
HLV	Four tanks, piping, liner, concrete.	• Removal of all mixed waste and equipment. • Remove liner. Note: HLV piping will be removed. Soil under the HLV is covered under soils/ groundwater.	• Tank heels, ancillary equipment and the tanks will be removed. • Remove vault liner and concrete.
LLV	Four tanks, piping, liner, concrete.	• Removal of all mixed waste and equipment. • Remove liner, tanks, piping and concrete. Note: LLV piping will be removed. Soil under the LLV is covered under soils/groundwater.	• Tank heels, ancillary equipment, and the tanks will be removed. • Remove tanks, liner, piping, and concrete.

Table 4-1. Closure Plan Activities and Performance Standards. (3 Pages)

Area	Components	Closure Performance Standard	Closure Activities
HLV (sample room 145)	Piping from LLV and HLV.	• Remove piping. Note: HLV piping will be removed.	• Remove all piping.
Piping systems	Piping from REC cells and the HLV and LLV.	• Remove all piping. • Remove pipe runs.	• Remove all piping.
Cask handling area	No closure activities required.	Not applicable.	Not applicable.
Truck lock	No closure activities required.	Not applicable.	Not applicable.
EDL-146	Piping from HLV and LLV.	• Remove piping Note: HLV/LLV piping in EDL-146 will be removed.	• Remove all piping.
Galleries	Piping from HLV and LLV.	Note: HLV piping in the HLV sample room will be removed.	• Remove all piping.
Room 18	Piping from HLV and LLV and potentially contaminated concrete.	• Remove HLV/LLV piping and contaminated concrete in room 18.	• Remove contaminated concrete. • Remove piping.
Soil/ groundwater	Potentially contaminated soil.	• Localized soil removal.	• Remove soil to a depth of 0.5 m under the TSD footprint.

HLV = high-level vault
LLV = low-level vault
REC = radiochemical engineering cells
TSD = treatment, storage, and disposal

4.4.2 Final Characterization

As previously stated, it is anticipated that very few sites will be closed as part of this removal action. It is more likely that sites will be characterized to document the condition following the removal of the facility and/or structure.

Characterization will be conducted through evaluation of historical data, collection of radiological surveys (as appropriate), collection of location data, and sampling and analysis to identify the site location and site radiological and chemical constituents that may remain after completion of the D4 activities. Analytical data generated in these efforts will be used to develop information regarding soils and structures that require additional remediation in the future.

The location data will be used to develop the following information:

- Location of the site within the 300 Area
- Location of the site relative to WIDS waste sites and unplanned release sites
- Location of pipelines/pipe tunnels/pipe trenches (as appropriate) that intersect the site as an aid to future remediation
- Provide the EPA with a status of the environmental condition of a site or remaining portions of facilities after D4.

If final characterization or closeout of a site is pursued following the D4 activity, it will meet the cleanup values identified within the 300 Area SAP (DOE-RL 2004). A DQO process may need to occur to address any additional contaminants of concern not identified in the 300 Area SAP.

4.4.3 Release of Property

All property that is released for offsite disposal and/or reuse and recycle is nonreal property. The release of nonreal property will follow the guidance provided in the contractor's documents. Property released via this process will contain no or de minimis levels of radioactive constituents. If such materials contain nonradiological hazardous substances (other than true de minimis levels), the materials would still be subject to CERCLA.

4.5 STANDARDS FOR THE PROTECTION OF NATURAL AND HISTORICAL RESOURCES

The *Archeological and Historic Preservation Act of 1974* (16 U.S.C. 469-469c) provides for the preservation of historical and archeological data (including artifacts) that might be irreparably lost or destroyed as the result of a proposed action. Although the removal action will occur in previously disturbed areas and the discovery of artifacts is unlikely, this law would be applicable to any significant artifacts that may be discovered. Artifacts discovered will be tagged and removed or at the very least photographed prior to the demolition of the facility.

The *Native American Graves Protection and Repatriation Act of 1990* (as implemented by 43 CFR 10) requires agencies to consult and notify culturally affiliated tribes when Native American human remains are inadvertently discovered during project activities. It is unlikely that work proposed in this removal action would inadvertently uncover human remains. If human remains were encountered, the procedures documented in the *Hanford Cultural Resources Management Plan* (DOE-RL 2003) would be followed.

The *National Historic Preservation Act of 1966* (as implemented by 36 CFR 800) requires federal agencies to evaluate historic properties for National Register of Historic Places eligibility and to mitigate adverse effects of federal activities on any site eligible for listing in the Register.

The facilities included in the scope of this removal action will be inspected to identify artifacts that may have interpretive or educational value prior to deactivation, decontamination, or decommissioning activities. Artifacts that have interpretive or educational value may be removed and placed in storage or may simply be saved as a photograph.

The *Endangered Species Act of 1973* and WAC 232-012-297 require the conservation of critical habitat on which endangered or threatened species depend and prohibit activities that threaten the continued existence of listed species or destruction of critical habitat. The *Migratory Bird Treaty Act of 1918* makes it illegal to remove, capture, or kill any migratory bird or any part of nests or the eggs of any such birds. If there is a potential to disturb the nesting of migratory birds, mitigating measures will be implemented to protect nests during the nesting season. Although adverse impacts to endangered or threatened species or migratory birds are generally not expected, activity-specific ecological reviews will be conducted to identify and mitigate any potentially adverse impacts prior to beginning field work.

5.0 PROJECT MANAGEMENT AND ORGANIZATION

5.1 PROJECT SCHEDULE AND COST ESTIMATE

The 324/327 Buildings and ancillary facilities' removal action will be scheduled and estimated using the contractor's hierarchy of schedules, which include activity logic and restraints. Activities will be resource loaded for both nonmanual and manual personnel. Equipment needs are identified and other materials are estimated and included in the budgeted cost of work scheduled.

The schedule, which encompasses the anticipated work scope of the 324/327 Buildings and ancillary facilities' removal action for the next 2 years (beginning in fiscal year 2005 through 2006), is included in Appendix A. A more detailed schedule, including assumptions, resources, and activity breakdown, will be developed and submitted with the detailed work plans for each fiscal year. The schedule included in this document is also subject to change to be compliant with the River Corridor Closure Project strategy and funding of continued work in the 300 Area. The schedule in Appendix A will be updated as this RAWP is revised.

5.1.1 Project Cost and Schedule Tracking

Performance measurement and analysis is performed by the contractor. Project cost and schedule are controlled and updated using the contractor's Management Control System.

An earned-value system tracks the cost, schedule, and performance as the project progresses towards completion. Cost/schedule performance reports provide budgeted cost of work-scheduled comparisons and budgeted costs of work performed against the actual cost of work performed. These reports provide variances to the baseline schedule and cost as budgeted in the project's detailed work plan. Variances above threshold values are documented, as well as the rationale for the variance(s) and any recovery plan required.

Trends and baseline change proposals are readily identified through the contractor's formal trend and change control program. All changes that affect the baseline are documented. The contractor's trend register, which is reviewed monthly by contractor senior management, categorizes trends from conception to final resolution. Trends are identified as either performance trends or scope trends and are further defined as resolved or unresolved.

Fiscal year project staffing, as budgeted, is reconciled monthly during project review meetings to the actual number of full-time-equivalent personnel used during the month. Likewise, the corresponding number of hours actually worked are presented and compared to the budgeted current work plan. Actual overtime is monitored monthly (by department) and is reconciled to the current budgeted overtime.

Cost and schedule variances to the current budget are tracked monthly and are reconciled back to the cause of the variance. Project impacts due to the cost and/or schedule variance are described and corrective actions are identified and tracked to the point of final resolution.

5.2 CONDUCT OF OPERATIONS

Conduct of operations is imposed to ensure that work is performed in a controlled and organized manner that all facets of work activities have been considered, and that necessary documentation is maintained. Line organizations review existing and planned programs important to safe and reliable facility operations and assess the effectiveness of corporate directives, plans, or procedures at facilities under their cognizance.

The *Decommissioning Projects Project Manager's Implementing Instructions* (PMII) (BHI 2002a) provides policy, performance standards, and administrative procedures to support the contractor's Conduct of Operations Program. The PMII is applicable to all contractor personnel (assigned or matrixed) who perform activities under the responsibility and direction of the contractor's project manager.

Conduct of operations strongly emphasizes technical competency, workplace discipline, and personal accountability to ensure the achievement of a high level of performance during all activities. Safety is the first priority, and all planning will include appropriate safety analyses to identify potential safety and health risks and the means to appropriately mitigate these risks. Workers will not start work until approved safety procedures, instructions, and directions implementing Integrated Environment, Safety, and Health Management System are provided.

Conduct of operations requires workers to be alert and aware of conditions affecting the job site. Operators and workers conducting field activities should be notified of changes in the building and/or work area status, abnormalities, and difficulties encountered in performing project operations. Similarly, operators and workers will notify the chain of command of any unexpected situations. In accordance with the severity of a finding (i.e., emergency condition), notification requirements will be expanded to include upper tier management and regulatory agencies.

5.3 CHANGE MANAGEMENT/CONFIGURATION CONTROL

If a change arises that results in a fundamental change to the selected response action that is not within the scope of work, another EE/CA or proposed plan and supporting documentation will be prepared to allow DOE and the EPA to select a revised response action.

Established configuration/change control processes ensure that proposed changes are reviewed in relation to the specified commitments. If a breach of these commitments is discovered, work ceases so stabilization and/or recovery actions may be identified and implemented as appropriate. Change management will comply with the appropriate contractor's procedure.

The management of change process for facilities that have a final hazard classification of Category Two nuclear facility is defined by the contractor's procedure(s). The management of change process is used for the following purposes:

- Evaluate the impact of proposed changes that could affect authorization basis documents
- Determine whether proposed changes require prior DOE approval
- Evaluate the impact of discovered conditions using the management of change process
- Evaluate the effect of deviations from activities or commitments described in authorization basis documents.

5.4 PERSONNEL TRAINING AND QUALIFICATIONS

During the performance of project activities, the experience and capabilities of the operating staff are extremely important in maintaining worker and environmental safety. Day-to-day knowledge of ongoing operations, conditions encountered, and lessons learned will be imperative to continued safe operations.

Training requirements will ensure that personnel have been instructed in the technologies to work safely in and around radiological areas and to maintain their individual radiation exposure and the radiation exposures of others ALARA. Standardized core courses and training material will be presented, and site-specific information and technologies will be added to adequately train workers.

Health physics workers are required to have completed and be current in radiological control technician qualification training. These training courses require the successful completion of examinations to demonstrate understanding of theoretical and classroom material.

Specialized training will be provided as needed to instruct workers in the use of nonstandard equipment, in the performance of abnormal operations, and in the hazards of specific activities. Specialized training may be provided by on-the-job training activities, classroom instruction and testing, or pre-job briefings. The depth of training in any discipline will be commensurate with the degree of the hazard(s) involved and the knowledge required for task performance.

Some activities will require the acquisition of expert services as opposed to project staff training. Assaying of waste packages and dismantling the facility by specialized methods (e.g., diamond wire sawing) are examples of activities requiring expert assistance.

The contractor training program provides workers with the knowledge and skills necessary to safely execute assigned duties. A graded approach is used to ensure that workers receive a level of training commensurate with their responsibility that complies with applicable requirements. Specialized employee training includes pre-job safety briefings, plan-of-the-day meetings, and

facility/work site orientations. The following training and qualifications may be applicable as required by job assignment for work activities:

- Training in accordance with 29 CFR 1910.120
  - 40-Hour Hazardous Waste Worker/8-Hour Refresher
  - 24-Hour Experience Component
  - 8-Hour Supervisor Training (for selected individuals)
  - SSHASP and RWP
  - Respirator Training
  - First Aid (two qualified persons per shift/crew)
  - Certified Asbestos Worker and/or Asbestos Awareness
  - Lead Worker
  - Radiation Worker
- Training in accordance with 49 CFR 172 Subpart H, "Training"
- Hazardous material training
- Medical surveillance requirements
  - Hazardous waste worker physical
  - Mask fit
  - Lead worker baseline
  - Asbestos worker
- Dosimetry and bioassay requirements
  - Thermoluminescent dosimeter (as directed in the RWP)
  - Plutonium bioassay (as determined by the Radiological Controls organization)
  - Whole body count.

The SSHASP, RWP, and activity hazards analysis will include specific requirements for project activities being conducted, which include PPE and required training for project personnel. This is discussed in detail in Section 3.5.

5.5 QUALITY ASSURANCE REQUIREMENTS

Overall quality assurance for the RAWP will be planned and implemented in accordance with 10 CFR 830.120 and other applicable standards. The quality assurance activities will be graded based on the potential impact on the environment, safety, health, reliability, and continuity of operations. Specific activities include quality assurance implementation, responsibilities and authority, document control, quality assurance records, and audits.

5.5.1 Quality Assurance Implementation

All project-related activities will establish and implement appropriate quality assurance requirements. Conditions adverse to quality will be identified in nonconformance reports, audit reports, surveillance reports, and corrective action requests. Investigation and corrective actions in response to these adverse conditions will be completed in a timely manner.

5.5.2 Responsibilities and Authority

The contractor must perform quality engineering, design reviews, surveillance, and audits (as necessary) to achieve quality assurance objectives. The contractor must also ensure that the various contractors and design agencies establish design and quality assurance programs to control design in accordance with applicable requirements. The D4 contractor(s) must establish, implement, and document an inspection plan in accordance with approved specifications and drawings.

5.5.3 Document Control

All technical documents (e.g., specifications and drawings) will be controlled in accordance with approved configuration management procedures. The responsible design agency will maintain control of the design documents through acceptance of the documents. A project records checklist will be initiated to identify those records required for the final project file.

5.5.4 Quality Assurance Records

Each organization that maintains quality assurance records will be required to control the records in accordance with applicable contractor quality assurance requirements.

5.5.5 Audits/Assessments

Internal and external audits are to be performed by the contractor's Quality Assurance organization to ensure project compliance with the quality assurance program requirements.

5.5.6 Self-Assessments

Self-assessments will be conducted by project personnel to determine compliance in accordance with the requirements of the contractor's procedure.

5.6 PROJECT CLOSEOUT

At the completion of all removal action activities, any documentation that addresses remaining facility conditions that has not already been recorded will be forwarded to the records retention center where it will be included in the Administrative Record for the 324/327 Buildings and ancillary facilities. Updates to WIDS may also be necessary to address any previously undocumented soil contamination.

6.0 REFERENCES

10 CFR 830, "Nuclear Safety Management," *Code of Federal Regulations,* as amended.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

29 CFR 1910, "Occupational Safety and Health Standards," *Code of Federal Regulations,* as amended.

29 CFR 1926, "Safety and Health Regulations for Construction," *Code of Federal Regulations,* as amended.

36 CFR 800, "Protection of Historic and Cultural Properties," *Code of Federal Regulations*, as amended.

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations,* as amended.

40 CFR 260, "Hazardous Waste Management System: General," *Code of Federal Regulations,* as amended.

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations,* as amended.

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations,* as amended.

40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations,* as amended.

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations,* as amended.

40 CFR 763, "Asbestos," *Code of Federal Regulations*, as amended.

43 CFR 10, "Native American Graves Protection and Repatriation Regulations," *Code of Federal Regulations*, as amended.

49 CFR 100-179, "U.S. Department of Transportation Requirements for the Transportation of Hazardous Materials," *Code of Federal Regulations,* as amended.

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FH, 2005, *Hanford Site Solid Waste Acceptance Criteria*, HNF-EP-0063, Fluor Hanford, Inc., Richland, Washington.

Hazardous Materials Transportation Act of 1974, 49 U.S.C. 1801-1813, et seq.

Migratory Bird Treaty Act of 1918, 16 U.S.C. 703, et seq.

National Historic Preservation Act of 1966, 16 U.S.C. 470, et seq.

Native American Graves Protection and Repatriation Act of 1990, 25 U.S.C. 3001, et seq.

RCW 70.94, "Washington Clean Air Act," *Revised Code of Washington* 70.94, as amended.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.

Toxic Substances Control Act of 1976, 15 U.S.C. 2601, et seq.

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

WAC 173-350, "Solid Waste Handling Standards," *Washington Administrative Code*, as amended.

WAC 173-400, "General Regulations for Air Pollution Sources," *Washington Administrative Code*, as amended.

WAC 173-460, "Controls for New Sources of Toxic Air Pollutants," *Washington Administrative Code*, as amended.

WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides," *Washington Administrative Code*, as amended.

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References

WAC 246-247, "Radiation Protection -- Air Emissions," *Washington Administrative Code*, as amended.

WAC 296-62, "General Occupational Health Standards," *Washington Administrative Code*, as amended.

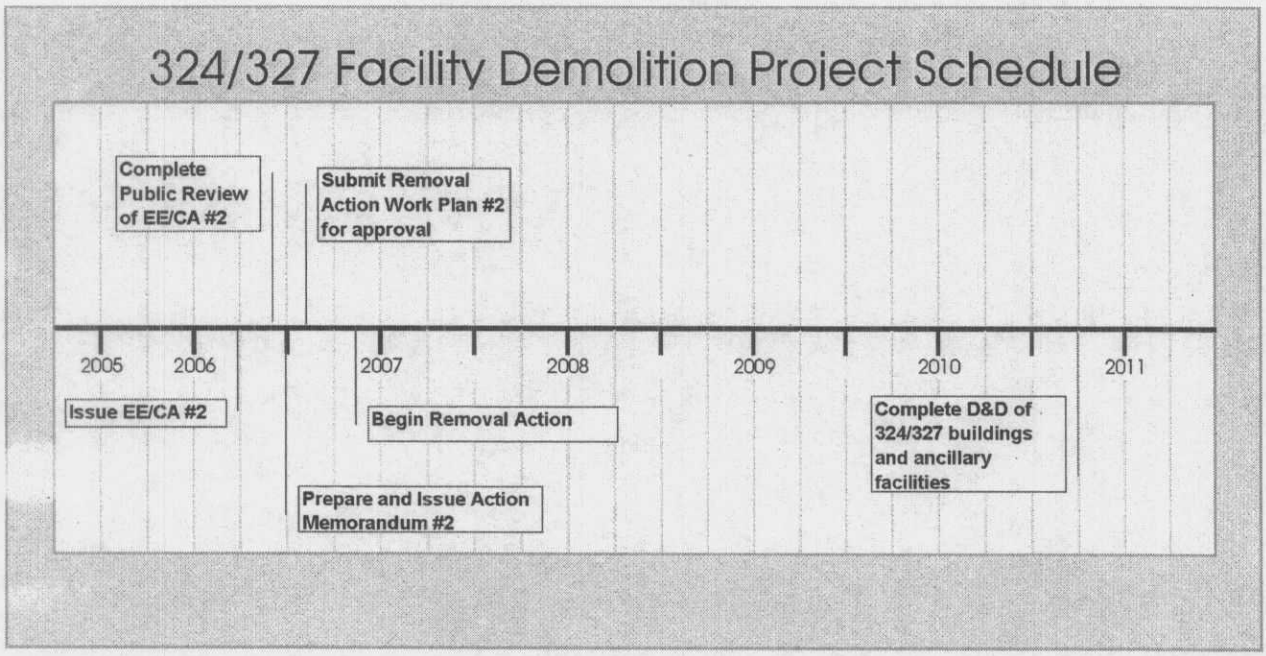
APPENDIX A

324/327 AREA D4 PROJECT SCHEDULE

APPENDIX A

324/327 AREA D4 PROJECT SCHEDULE

Proposed 324/327 Facilities D4 Schedule (Calendar Year).



Appendix A – 324/327 Area D4 Project Schedule

APPENDIX B

AIR MONITORING SECTION

APPENDIX B
AIR MONITORING SECTION

B.1 INTRODUCTION

Deactivation/decontamination and decommissioning (D4) of the 324/327 Buildings and ancillary facilities located in the 300 Area (Figure 1-2 of the removal action work plan [RAWP]) have the potential to emit (PTE) radionuclides. This activity is being conducted as part of a non-time-critical *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) removal action under an action memorandum (EPA 2006). Portions of this action have been undertaken prior to CERCLA decision document approval under Washington Department of Health (WDOH) approval orders AIR 03-106 and AIR 03-107. These two approval orders and the conditions that have been incorporated into the Hanford Site Air Operating Permit are obsolete and are no longer applicable to the 324 and 327 Buildings.

Implementing best available radionuclide control technology (BARCT) for new construction or significant modifications, pursuant to *Washington Administrative Code* (WAC) 246-247-040(3) and 40 *Code of Federal Regulation* (CFR) 61.12(c) has been identified as applicable requirements. Air monitoring (40 CFR 61.93(b), (e), and (f) as appropriate, and WAC 246-247-075[8]) has also been identified as a requirement that is applicable for the removal action. This air monitoring plan (AMP) describes how the substantive portions of these requirements will be implemented for this removal action.

Updates to this AMP may be accomplished through the unit manager's meeting minutes. When the RAWP is updated, changes to this AMP will be incorporated into the revised RAWP.

Additional standards controlling air emissions to the environment are addressed in Section 4.3.1 of this RAWP.

B.2 PLANNED ACTIVITIES

The removal action work scope includes conducting routine surveillances, sampling to characterize the nature and extent of contamination; deactivating, decontaminating, and demolishing facilities; excavating contaminated soil; treating waste (e.g., solidification) as necessary to meet waste acceptance criteria; and storing, handling, loading, and transporting waste for disposal. The facilities within the scope of this plan are identified in Table 1-1 of the RAWP.

The 324/327 Buildings and ancillary facilities were constructed in 1966 as a research and development mission for nuclear fuels characterization and waste technology research. In the late 1990s a significant amount of nuclear fuel and radioactive materials were removed from the facilities in support of preparation for demolition of the facilities. The 324 Building has office

space, both radioactive and nonradioactive development laboratories, hot cells, vaults, tanks, galleries, pipeways, a truck lock, and a loadout station.

The 327 Building and its supporting ancillary facilities were constructed in 1953 as a spent reactor fuel research facility. In the 1990s materials were removed from the facilities in support of preparation for demolition of the facilities. The 327 Building has office and laboratory space for conducting research on post-irradiated fuels and structural materials. The 327 Building is a single-story structure with a partial basement containing common ventilation and auxiliary equipment.

Routine surveillances are necessary on buildings awaiting D4 to ensure conditions within the facility have not changed to the point where the threat of a release has increased. The purpose of deactivation is to identify and remove barriers (e.g., physical, chemical, and radiological) to demolition of each facility. Hazardous substances and contaminated equipment and materials are removed and disposed. Process systems and utility systems are removed and drains plugged. Piping is drained and residual materials are removed from tanks, lubricant reservoirs, refrigerant systems, etc.

Decontamination activities are conducted to remove loose accessible contamination from components, equipment, structures, etc. Decontamination activities also include stabilizing or "fixing" contaminants in place so that contaminants are attached to the materials and would be less likely to be disturbed during subsequent demolition activities. Decontamination methods may include, but are not limited to, wiping; applying paint, asphalt, or other fixatives; scabbling; abrasive blasting; and vacuuming. Facility hot cells, may be "flood grouted" and then cut up to minimize radiological dose to works, the public, and protect the environment.

The 324 Building areas that will undergo demolition include, but are not restricted to, the following:

- A-Cell
- B-Cell
- C-Cell
- D-Cell
- Various airlocks
- B-Cell sample room
- High-level vaults and tanks
- Low-level vaults and tanks
- Radiochemical engineering cells pipe trenches
- Cask handling areas
- Truck lock and loadout station
- Laboratories and support room including piping and utilities
- The lithium development enclosure
- Shielded Materials Facility (SMF) east cell
- SMF south cell
- SMF airlock cell

- The Engineering Development Laboratory rooms 101, 102, 145, 146, and 147
- The high-bay engineering laboratory
- The tank pit in the basement
- The wastewater diverter tank.

The 327 Building radiological areas that will undergo demolition include but are not restricted to the following:

- Canyon Operating Area (containing Cells A through I)
- Wet Storage Basin
- Low Level Laboratory
- SERF Cell
- Dry Storage Cell.

The following ancillary facilities will also demolished under this AMP:

- 324A stack monitoring building
- 324B Chemical engineering laboratory stack
- 324C Experimental lithium enclosure
- 324D Effluent monitoring station
- 324S Wet storage basin (undergoing characterization)
- 3718E Storage Building
- 3718G Storage Building
- 327 Post-irradiation test laboratory
- 3723 Solvent and acid storage building.

The radiological inventory of the ancillary facilities are assumed to contain little or de minimus levels of radiological contamination and are "bound" by the inventories for 324/ 327; if during facility characterization this assumption is determined to be incorrect the inventory in Tables B-1 or B-2 will be revised as appropriate.

Large items (equipment and waste materials) will be size reduced and packaged for transport to compliant storage/disposal facilities as appropriate. Any loose materials and radiologically contaminated materials will be collected and packaged for disposal. Various decontamination methods will be employed to reduce/remove radiological contamination. As the decontamination work is completed, before demolition the associated ventilation ductwork will be isolated and removed. Conventional methods (e.g., brushing or wiping, water wash, or high-efficiency particulate air [HEPA]-filtered vacuum cleaners) will be used. More aggressive equipment decontamination methods (e.g., grinding or wet grit blasting) may be used for equipment decontamination if other methods fail.

If decontamination has been achieved to acceptable levels for the areas served by the EP-324-S-01 and/or EP-327-S-01 stacks, portable exhausters, portable temporary radiological air emission units, HEPA vacuums, or other similar particulate emission control devices, those control devices will be removed and/or isolated. Ventilation equipment may be operated both

for radiological control to workers, the public, and the environment along with controls needed for worker protection from industrial hazard materials such as beryllium and cadmium, etc. During deactivation the EP-324-S-01 and/or EP-327-S-01 stacks will operate at a reduced flow, shutting down in stages over an extended period, culminating in eventual closure of the exhaust stacks. The 327-02-V stack has been shut down and will no longer be utilized.

Both stacks will be demolished near the end of the facility demolition. During demolition both fixatives and water will be used to effectively control air emissions both in the workspaces and outside the facility in a manner that is protective of both the air and groundwater pathways. The building hot cells may be "flood grouted" or have some other definite solidification measure completed and cells cut or size reduced to meet transportation requirements to the Environmental Restoration Disposal Facility (ERDF).

Demolition generally means large-scale facility destruction using heavy equipment. Demolition methods will be selected based on the structural elements to be demolished, remaining contamination, location, and integrity of the structure. Conventional equipment such as the following will be used:

- Excavator with a hoe-ram
- Hydraulic shears with steel shear jaws
- Concrete pulverizer jaws or breaker jaws
- Crane with wrecking ball
- Pneumatic hammers
- Controlled explosives
- Crane to remove and size reduce materials
- Mechanical/power saws
- Cutting torch.

It is assumed that a portion of concrete demolition work will make use of a HEPA-filtered vacuum cleaner. Portable ventilation filter units and gloveboxes may also be used. Standard construction equipment will be used for excavating, loading, and hauling. If extensive soil contamination is found in adjacent and underlying soils, work will be deferred to the Field Remediation Project, with approval from the U.S. Department of Energy, Richland Operations Office and the U.S. Environmental Protection Agency (EPA).

Equipment (e.g., haul trucks, containers) used in D4 activities will also be decontaminated, as necessary. Excavation work may also take place in support of removing/ blanking/ isolation of utilities.

B.3 AIRBORNE SOURCE INFORMATION

The potential exists for radioactive airborne emissions resulting from the D4 activities. This section of the AMP discusses the radiological inventory of the 324/327 Buildings and ancillary facilities and associated waste sites along with the subsequent PTE radionuclides and the

resulting total effective dose equivalent (TEDE) to the maximally exposed individual (MEI). The activities will be conducted over several years. However, the estimates conservatively assume that the activities are accomplished in a single year, when in fact the PTE will be reduced each year as the inventory is reduced. The actual and potential diffuse and fugitive emissions from the proposed activities are not expected to be significant and are bounded within the overall inventory; therefore, a separate estimate has not been provided. Excavation of any significant residual contamination in soils will be deferred to the Field Remediation Project with regulatory approval. The ancillary facilities are assumed to be bound by the inventory and emission estimates for the 324 and 327 facilities.

The radionuclide inventory, PTE and estimated dose are summarized in Table B-1 and Table B-2, respectively, for the 324 Building and 327 Building. The inventory for the 324 Building was obtained from the following three calculations with the addition of 100 Ci to account for miscellaneous areas (ductwork, piping, filters, rooms, and hoods).

- *Radiological Inventory for the 324 Building Shielded Materials Facility*, Calculation No. 0300X-CA-N0078 (WCH 2006a)

- *Bounding Radiological Characterization for the 324 Building Radiochemical Engineering Cells and Airlock*, Calculation No. 0300X-CA-N0079 (WCH 2006b)

- *Radiological Inventory for the 324 Building Low Level Vaults and High Level Vaults*, Calculation No. 0300X-CA-N0080 (WCH 2006c).

The inventory for the 327 Building is from the *327 Building Basis of Interim Operation* (WCH 2006d) minus the inventory that has been removed from the facility.

The appropriate release fractions (i.e., for solid or particulate) were applied to the inventory to determine the PTE. The unit dose conversion factors from *Calculating Potential-to Emit Radiological Releases and Doses* (DOE-RL 2006) were applied to the PTE to generate the dose estimate at the offsite maximum public receptor (1,400 m to the northeast).

The total curie content for the 324 Building and ancillary facilities is estimated at 8.15E+04, and the maximum unabated TEDE from the D4 activities of the 324 Building and ancillary facilities is estimated at 9.78E+01 mrem/yr. The abated TEDE, if all emissions are through the stack, would be 4.89E-02 mrem/yr.

The total curie content for the 327 Building is 1.40E+03 mrem/ yr. The maximum unabated TEDE from the D4 activities of the 327 Building is estimated at 2.1E+00 mrem/yr. The abated TEDE, if all emissions are through the stack, would be 1.05E-03.

The air emission estimates described above are document in Calculation No. 0300X-CA-V0078 (WCH 2006e).

B.4 BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY

Implementing BARCT for the control of 324 Building and 327 Building radionuclide air emissions has been identified as an applicable relevant and appropriate requirement. Tables B-3 and B-4 lists the current abatement control technology for each building. Each stationary source shall be maintained and operated, including associated equipment for air pollution control, in a manner consistent with good air pollution control practice for minimizing emissions pursuant to WAC 246-247-040(3) and 40 CFR 61.12(c)." After deactivation and decontamination efforts have been completed for a particular area of the building, the ventilation ductwork and any associated controls (e.g., HEPA filter) will be isolated and/or removed.

Portable exhausters and vacuum cleaners will also be utilized to control emissions. For vacuuming and the use of portable ventilation units, HEPA filters are used to collect generated dust. The use of HEPA filters has been generally accepted as BARCT. Glovebags may also be used to reduce potential emissions. Because structure demolition may be a source of radioactive fugitive emissions, dust suppressants (e.g., water and fixatives) will be used and are considered BARCT for demolition. When using water, quantities used will be minimized to prevent water accumulation, puddles, and runoff within the area where the water is being used.

The following provides additional details concerning the control of fugitive emissions:

- Water will be applied during demolition, excavation, container loading, and backfilling processes to minimize airborne releases.

- Fixatives will be applied to any nonwrapped contaminated debris or soils that are being stockpiled and that will be inactive for more than 24 hours.

- Fixatives will be applied to contaminated soils and debris (with removable contaminants) that are being stockpiled and will be inactive less than 24 hours at the end of work operations. If a soil fixative has already been applied and the soil and/or debris will remain undisturbed, further uses of fixatives will not be reapplied, unless needed. The fixatives or other controls will not be applied when the contaminated soils and/or debris are frozen or it is raining, snowing, or other freezing precipitation is falling at the end of work operations.

- Haul trucks transporting bulk materials with removable contaminants will be covered to contain the materials while in transit to ERDF.

B.5 MONITORING

The 324-S-01 and 327-S-01 stack will be continuously sampled in accordance with 40 CFR 61.93(b)(2)(ii) and (iii). All radionuclides that could contribute greater then 10% of the potential effective dose equivalent shall be measured as required by 40 CFR 61.93(b)(4)(i). Flow rate measurements will be made in accordance with 40 CFR 61.93(b)1. The maintenance, calibration and field check requirements of 40 CFR 61, Appendix B, Method 114, Table 2, will be

implemented during stack operation. Stack operating records will be maintained for a period of 1 year at the 300 Area or other nearby location and/or in an electronic format such that the records are readily retrievable.

Requirements for the stacks may change in the future when the available potential to emit drops below 0.1 mrem/yr to the MEI. The evaluation of the potential to emit will be conducted in accordance with 40 CFR 61.93(b)(4). This plan will be updated and approved by EPA prior to changing stack sampling requirements or shutting down the stacks.

Diffuse/fugitive radionuclide emissions from the activities described in the AMP will be monitored by air monitoring stations 300 South West #1 (N557), 300 Trench, 300 NE, and 300 Water Intake. The locations of the air monitoring stations are shown in Figure B-1. The operation of the air monitors will follow the protocol for the Environmental Surveillance Program or the Near-Facility Environmental Monitoring Program on the Hanford Site. The air samples will be changed every 2 weeks and analyzed for total alpha and total beta. The current protocol for these air samplers is as follows:

- 300 South West #1 (N557), 300 Trench, 300 NE, and 300 Water Intake air monitors will be composited quarterly and analyzed for gamma energy-emitting radionuclides, strontium, plutonium, and uranium. The EPA may choose to take split samples of composite air samples.

- The data results for these air monitors are entered into the Hanford Environmental Information System and/or the Automated Bar Coding of Air Samplers at Hanford database.

The data collected from air monitoring described above will be included in the annual report that is prepared for the Hanford Site in compliance with 40 CFR 61 Subpart H and WAC 246-247 and that is used to demonstrate compliance with 40 CFR 61.92.

B.6 REFERENCES

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*, as amended.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq.

DOE-RL, 2001, *Radioactive Air Emissions Notice of Construction for Deactivation Activities at the 324 Building*, DOE/RL-2000-05, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington

DOE-RL, 2002, *Radioactive Air Emissions NOC for Deactivation of the 327 Building*, DOE/RL-2002-08, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 2006, *Calculating Potential-to-Emit Radiological Releases and Doses,* DOE/RL-2006-29, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOH, 1994, letter from A. W. Conklin to S. H. Wisness, AIR 94-802, dated August 1, 1994, Washington State Department of Health, Olympia, Washington.

EPA, 2006, *Action Memorandum #2 for 324/327 Buildings and Ancillary Facilities,* U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

FH, 2002, *Calculating Potential-to-Emit Releases and Doses for FEMPs and NOCs*, HNF-3602, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

WAC 246-247, "Radiation Protection – Air Emissions," *Washington Administrative Code*, as amended.

WCH, 2006a,"*Radiological Inventory for the 324 Building Shielded Materials Facility*, 0300X-CA-N0078, Washington Closure Hanford, Richland, Washington.

WCH, 2006b, *Bounding Radiological Characterization for the 324 Building Radiochemical Engineering Cells and Airlock,* 0300X-CA-N0079, Washington Closure Hanford, Richland, Washington.

WCH, 2006c, *Radiological Inventory for the 324 Building Low Level Vault and High Level Vault Tanks,* 0300X-CA-N0080, Washington Closure Hanford, Richland, Washington.

WCH, 2006d, *327 Building Basis of Interim Operation,* WCH-HNF-4667, Rev. 2, Washington Closure Hanford, Richland, Washington.

WCH, 2006e, *PTE/Dose to the Maximum Public Receptor (MPR) for 324/327*, 0300X-CA-V0078, Washington Closure Hanford, Richland, Washington.

Figure B-1. Scope Boundary and 300 Area Air Monitor Locations.

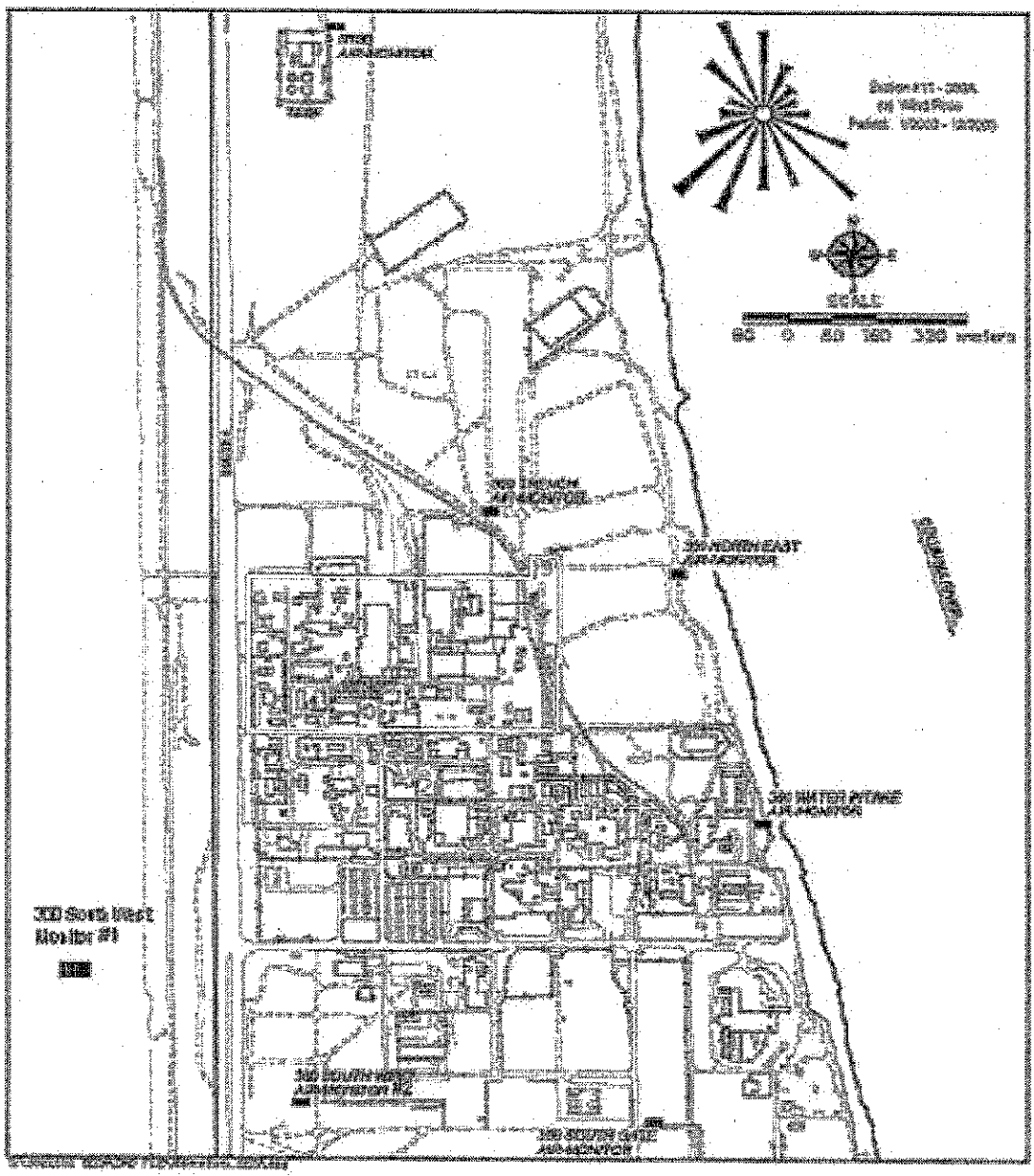


Table B-1. 324 Building Inventory and Potential-to-Emit Assessment.

Isotope	Total Inventory in Curies	RF	Potential to Emit (PTE) Unabated	Potential to Emit (PTE) Abated	Dose per Unit Release Factors (mRem/ Ci)	Offsite Unabated Dose mrem/yr	Offsite Abated Dose mrem/yr
Fe-55	6.13E+03	1.00E-03	6.13E+00	3.07E-03	1.4E-03	8.58E-03	4.29E-06
Mn-54	1.57E+01	1.00E-03	1.57E-02	7.85E-06	1.0E-01	1.57E-03	7.85E-07
Mo-93	4.91E+02	1.00E-03	4.91E-01	2.46E-04	1.8E-02	8.84E-03	4.42E-06
Co-60	4.51E+02	1.00E-03	4.51E-01	2.26E-04	1.6E+00	7.22E-01	3.61E-04
Se-79	1.55E-02	1.00E-03	1.55E-05	7.77E-09	7.9E-01	1.23E-05	6.14E-09
Sr-90	2.60E+04	1.00E-03	2.60E+01	1.30E-02	7.1E-01	1.84E+01	9.22E-03
Tc-99	5.21E+01	1.00E-03	5.21E-02	2.61E-05	1.4E-01	7.30E-03	3.65E-06
Sb-125	1.53E+00	1.00E-03	1.53E-03	7.65E-07	1.6E-01	2.45E-04	1.22E-07
Cs-137	4.79E+04	1.00E-03	4.79E+01	2.40E-02	1.5E+00	7.19E+01	3.59E-02
Eu-154	9.69E+01	1.00E-03	9.69E-02	4.85E-05	1.2E+00	1.16E-01	5.82E-05
Eu-155	7.58E+01	1.00E-03	7.58E-02	3.79E-05	5.0E-02	3.79E-03	1.90E-06
Pu-238	1.23E+01	1.00E-03	1.23E-02	6.14E-06	4.6E+01	5.65E-01	2.82E-04
Pu-239	3.74E+00	1.00E-03	3.74E-03	1.87E-06	5.0E+01	1.87E-01	9.34E-05
Pu-240	3.67E+00	1.00E-03	3.67E-03	1.83E-06	5.0E+01	1.83E-01	9.16E-05
Pu-241	2.18E+02	1.00E-03	2.18E-01	1.09E-04	7.9E-01	1.72E-01	8.62E-05
Pu-242	6.12E-03	1.00E-03	6.12E-06	3.06E-09	4.8E+01	2.94E-04	1.47E-07
Am-241	5.79E+01	1.00E-03	5.79E-02	2.89E-05	7.7E+01	4.46E+00	2.23E-03
Cm-243	3.53E-01	1.00E-03	3.53E-04	1.76E-07	5.2E+01	1.83E-02	9.17E-06
Cm-244	2.43E+01	1.00E-03	2.43E-02	1.22E-05	4.1E+01	9.98E-01	4.99E-04
Total	**8.15E+04**		**8.15E+01**	**4.08E-02**		**9.78E+01**	**4.89E-02**

Source: Table taken from calculation 0300X-CA-V0078.
RF = release fraction

Table B-2. 327 Building Inventory and Potential-to-Emit Assessment.

Potential To Emit (PTE) Calculation							
Radio-nuclide	Inventory Ci	WAC 246-247 Physical Form	WAC 246-247 Release Fraction	Potential to Emit (PTE) Ci/yr	Dose Factor mrem/Ci	Unabated Dose (offsite) mrem/yr	Abated Dose (offsite) mrem/yr
Pu-238	7.79E-01	particulate	1.0E-03	7.79E-04	1.3E+02	1.01E-01	5.07E-05
Pu-239	2.00E+00	particulate	1.0E-03	2.00E-03	1.4E+02	2.79E-01	1.40E-04
Pu-240	1.05E+00	particulate	1.0E-03	1.05E-03	1.4E+02	1.47E-01	7.34E-05
Pu-241	4.93E+01	particulate	1.0E-03	4.93E-02	2.2E+00	1.08E-01	5.42E-05
Am-241	2.66E+00	particulate	1.0E-03	2.66E-03	2.2E+02	5.85E-01	2.92E-04
Cm-244	6.15E-02	particulate	1.0E-03	6.15E-05	1.2E+02	7.37E-03	3.69E-06
Sr-90	2.50E+02	particulate	1.0E-03	2.50E-01	1.9E+00	4.75E-01	2.38E-04
Cs-137	1.00E+02	particulate	1.0E-03	1.00E-01	4.0E+00	4.00E-01	2.00E-04
Co-60	9.52E+02	solid	1.0E-06	9.52E-04	4.1E+00	3.90E-03	1.95E-06
Mn-54	4.00E+01	solid	1.0E-06	4.00E-05	2.7E-01	1.08E-05	5.40E-09
Total	1.40E+03			4.1E-01		2.1E+00	1.05E-03

Source: Table taken from calculation 0300X-CA-V0078.
RF = release fraction

Table B-3. BARCT Requirements Applicable for Operating the 324 Building Stack.

Zone or Areas	Abatement Technology	# of Units	Additional Description
Zone 2	HEPA	1	Stage is for control of Zone 2
Zone 2	Prefilter	1	
Zone 2	Fan	1	2 in parallel
Cell	Electro Static Precipitator	1	
Cell	Prefilter	2	
Zone 1 Cells	Fan	1	3 in parallel, Serves B Cell, Zone 1 cells
Zone 1 Cells	HEPA	1	Last stage shared with B Cell
Zone 1 Cells	Prefilter	2	1 for Zone 1 Cell, 1 for POG V/V

Table B-4. BARCT Requirements Applicable for Operating the 327 Building Stack.

Zone or Areas	Abatement Technology	# of Units	Additional Description
Rm 15, Hood and Cells	HEPA	1	
Rm 15, Hood and Cells	Prefilter	1	Cells only
Rm 15, Hood and Cells	Fan	1	2 in parallel
Remaining areas	HEPA	1	Single stage
Remaining areas	Fan	1	2 in parallel

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