1251246

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19-PFD-0007

MAR 2 7 2019

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RECEIVED
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EDMC

Addressees:

REMOVAL ACTION WORK PLAN FOR THE 200 EAST TIER 2 MISCELLANEOUS BUILDINGS/STRUCTURES, DOE/RL-2016-50, REVISION 0

This letter transmits the approved Removal Action Work Plan (RAWP) for the 200 East Tier 2 Miscellaneous Buildings/Structures, DOE/RL-2016-50, Revision 0 to the Washington State Department of Ecology and U.S. Environmental Protection Agency, Attachment 1. The RAWP was signed by the U.S. Department of Energy Richland Operations Office on March 05, 2019.

The Review Comment Record, Attachment 2, is also included.

If you have any questions, please contact me, or your staff may contact Mark French, of my staff, on (509) 373-9863.

Sincerely,

William F. Hamel, Assistant Manager
for the River and Plateau

PFD:PGE

Attachments

cc: See page 2

MAR 27 2019

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DOE/RL-2016-50
Revision 0

Removal Action Work Plan for the 200 East Tier 2 Miscellaneous Buildings/Structures

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

U.S. DEPARTMENT OF ENERGY | Richland Operations Office

P.O. Box 550
Richland, Washington 99352

Approved for Public Release;
Further Dissemination Unlimited

DOE/RL-2016-50
Revision 0

Removal Action Work Plan for the 200 East Tier 2 Miscellaneous Buildings/Structures

Date Published
March 2019

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

U.S. DEPARTMENT OF ENERGY | Richland Operations Office
P.O. Box 550
Richland, Washington 99352

APPROVED
By Julia Raymer at 11:07 am, Mar 11, 2019

Release Approval Date

Approved for Public Release;
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Signature Page

Having considered the extent to which the *Removal Action Work Plan for the 200 East Tier 2 Miscellaneous Buildings/Structures* could be inconsistent with *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* processes, or could alter schedules set forth in Appendix D of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement), the U.S. Department of Energy approves.

Thomas K. Teynor for		03-05-2019
William F. Hamel, Jr. U.S. Department of Energy Richland Operations Office	Signature	Date

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Terms

ACM	asbestos-containing material
ALARA	as low as reasonably achievable
AM	action memorandum
ARAR	applicable or relevant and appropriate requirement
BFA	building footprint area
CAA	*Clean Air Act of 1990*
Cat I	Category I
Cat II	Category II
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CRR	cultural resource review
D4	decontamination, deactivation, decommissioning, and demolition
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
HASP	health and safety plan
HEPA	high-efficiency particulate air
HHE	human health and the environment
HPT	health physics technician
NESHAP	“National Emission Standards for Hazardous Air Pollutants”
NFM	near-facility monitoring
NRC	National Response Center
NTCRA	non-time-critical removal action
PCB	polychlorinated biphenyl
PCM	periodic confirmatory measurement
PPE	personal protective equipment

PTE	potential to emit
QA	quality assurance
RAO	removal action objective
RAWP	removal action work plan
RCRA	*Resource Conservation and Recovery Act of 1976*
RWP	radiological work permit
SAP	sampling and analysis plan
SWDP	State Waste Discharge Permit
TBD	to be determined
TEDE	total effective dose equivalent
TPA	Tri-Party Agreement
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSCA	*Toxic Substances Control Act of 1976*
TSD	treatment, storage, and disposal
WIDS	Waste Information Data System

1 Introduction

This removal action work plan (RAWP) provides guidance for implementing the selected removal action as specified in DOE/RL-2010-102, *Action Memorandum for Decontamination, Deactivation, Decommissioning, and Demolition (D4) Activities for 200 East Tier 2 Buildings/Structures*, for the Tier 2 Miscellaneous buildings/structures. The action memorandum (AM), hereinafter referred to as the Tier 2 AM, selected Alternative 3 (near-term decontamination, deactivation, decommissioning, and demolition [D4] of buildings/structures) as evaluated and recommended in DOE/RL-2010-54, *Engineering Evaluation/Cost Analysis for 200 East Tier 2 Buildings/Structures*, hereinafter called the Tier 2 engineering evaluation/cost analysis (EE/CA).

Implementation of this non-time-critical removal action (NTCRA) will minimize the potential for a release or threat of release of hazardous substances from the 200 East Tier 2 Miscellaneous buildings/structures to human health and the environment (HHE). The RAWP identifies technical requirements of the removal action and details the work elements, performance measurements, project management, oversight, and schedules for implementing the removal action.

The U.S. Department of Energy (DOE) was delegated the authority to conduct removal actions under Section 104, "Response Authorities," of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) by Executive Order 12580, *Superfund Implementation*. This removal action will be performed in a manner that is consistent with any anticipated long-term remedial action under authority of CERCLA and the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989a), also known as the Tri-Party Agreement (TPA), which designates the Washington State Department of Ecology (Ecology) as the lead regulatory agency for final response actions related to the 200 East Area Miscellaneous facilities.

This is one of several RAWPs being developed to implement removal action activities for the Tier 2 buildings/structures within the 200 East Area of the Hanford Site. This RAWP provides D4 implementation guidance for Tier 2 Miscellaneous buildings/structures, which are within the 200 East Area but outside of the canyon complex implementation areas. Buildings/structures located inside a canyon complex implementation area (i.e., B Plant Complex and Plutonium-Uranium Extraction Complex) are covered in complex-specific RAWPs. The Tier 2 Miscellaneous buildings/structures are listed in Table 1-1. Each building/structure will be described in an appendix. Appendices will be developed when the building/structure is designated for D4. Appendices will be added to the RAWP through the TPA (Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent Order*) change notice process.

Table 1-1. Buildings/Structures in the Scope of this RAWP

Appendix	Building/Structure Identification	Building/Structure Name
A	242B 242BL	Radioactive Particle Research Laboratory Cask Loading Building
B	276C	Solvent Handling Building
TBD	241C801	Cesium Load-Out Facility
TBD	291AR	Exhaust Air Filter Stack Building

TBD = to be determined

1.1 Purpose

This RAWP identifies the requirements and establishes the methods to conduct the removal action for the 200 East Tier 2 Miscellaneous buildings/structures. This RAWP describes the following details:

1. Removal action elements and how they will be implemented, as well as safety and health management controls
2. Environmental management and controls, including applicable or relevant and appropriate requirements (ARARs), waste management, airborne emissions, reporting for nonroutine releases, and cultural/ecological resources
3. Project administration

The intent of the RAWP is to identify the basis and provide criteria for the preparation of work packages and procedures to conduct D4 activities and to meet the removal action objectives (RAOs). Using the most recent information concerning the conditions for each building/structure, field-level work packages and procedures will be developed to direct work activities and instruct workers in the applicable work methods.

The removal action is consistent with the overall Hanford Site cleanup initiative and will, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action, as required by 40 CFR 300.415(d), "National Oil and Hazardous Substances Pollution Contingency Plan," "Removal Action." To accomplish this, the following RAOs were identified in the Tier 2 AM (DOE/RL-2010-102):

1. Protect human and ecological receptors from exposure to contaminants above acceptable exposure levels.
2. Reduce/eliminate the inventory of hazardous/radioactive substances.
3. Facilitate and, to the extent practicable, be consistent with anticipated remedial actions at the Hanford Site, while expediting actions to reduce the Hanford Site footprint.
4. Prevent adverse impacts to cultural resources and threatened or endangered species, and minimize wildlife habitat disruption.
5. Safely treat, as appropriate, and dispose waste streams generated.
6. Reduce or eliminate the need for future surveillance and maintenance activities.

DOE, as the lead agency for removal actions, will assign a Removal Action Manager from the Richland Operations Office (DOE-RL) to oversee the removal activities.

1.2 Scope

The scope encompasses D4 of Tier 2 Miscellaneous buildings/structures within the 200 East Area that are chemically and/or radiologically contaminated, but not designated as Tier 1 or general decommissioning. Tier 1 facilities are historically designated as "Key" facilities in the TPA Action Plan (Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*), Section 8.1.2, "Applicability." General decommissioning facilities were never used for radiological or chemical processing, though they may have incidental contamination. A list of buildings/structures planned for decommissioning by DOE and subject to the scope of this RAWP is provided in Table 1-1.

In the future, some buildings/structures in the scope of this NTCRA may become unsuitable for inclusion, or DOE may find unforeseen future uses prior to performing decommissioning. If this occurs and eliminating the buildings/structures from the list identified in Table 1-1 is appropriate, DOE will identify the building/structure, explain why it is no longer appropriate for inclusion in this NTCRA, and place documentation in the Administrative Record.

1.3 Site Conditions and Background

This section provides an overview of the site conditions and background information for the Hanford Site and the 200 East Area. Additional background information for buildings/structures subject to the removal action is included in the subsequent building/structure specific appendices.

1.3.1 Physical Location

The Hanford Site lies within the semiarid Pasco Basin of the Columbia Plateau in southeast Washington State. The site, a relatively undeveloped area of shrub-steppe habitat (a drought-resistant shrub and grassland ecosystem) containing a rich diversity of plant and animal species, occupies approximately 1,517 km^3 (586 mi^2) of land north of the City of Richland. The Hanford Site has restricted public access and provides a buffer for areas that were used for nuclear materials production, waste storage, and disposal. The Columbia River flows eastward through the northern part of the site and then turns south, forming part the eastern Hanford Site boundary.

The 200 East Area is located in the Inner Area of the Hanford Site Central Plateau. Highway 240 is to the southwest, and the Columbia River is to the north-northeast (Figure 1-1).

Public access to the Hanford Site is currently restricted and controlled at the Wye Barricade on Route 4 and the Yakima and Rattlesnake Barricades on State Highway 240. Therefore, unauthorized access to the 200 East Area is prohibited. Miscellaneous buildings/structures identified for D4 in this RAWP are located inside the 200 East Area but outside the boundary of the canyon complexes (Figure 1-2).

Table 1-1 lists the buildings/structures identified to undergo D4 by implementing this Tier 2 RAWP. The locations of the buildings/structures are depicted in Figure 1-2. The buildings/structures in the scope of this Tier 2 RAWP were identified in the Tier 2 AM (DOE/RL-2010-102) and are not located within a canyon complex implementation area. The buildings/structures listed as “TBD” in Table 1-1 will be added as appendices to this RAWP through a TPA change notice when a building is identified for removal.

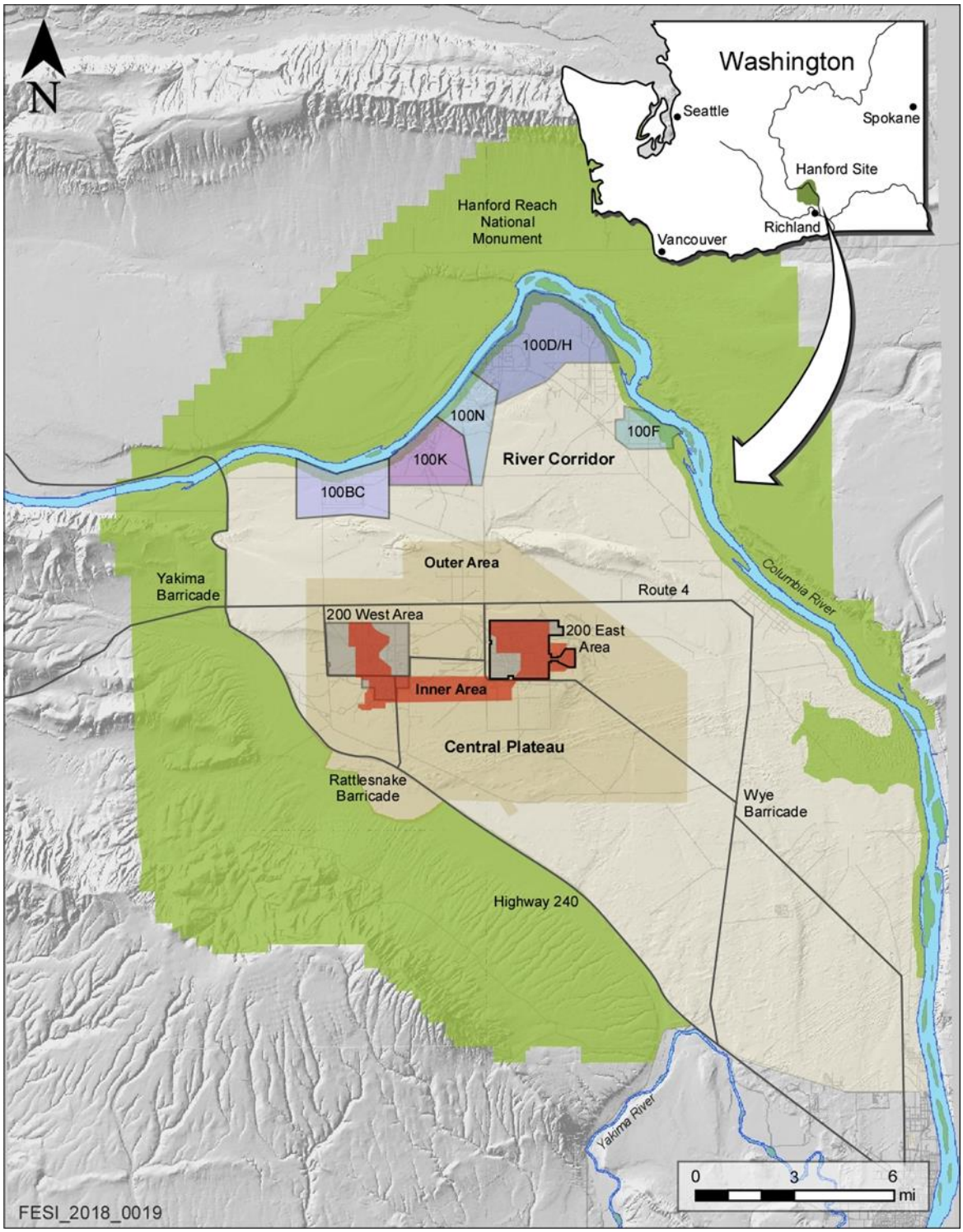

Figure 1-1. Hanford Site and 200 East Area

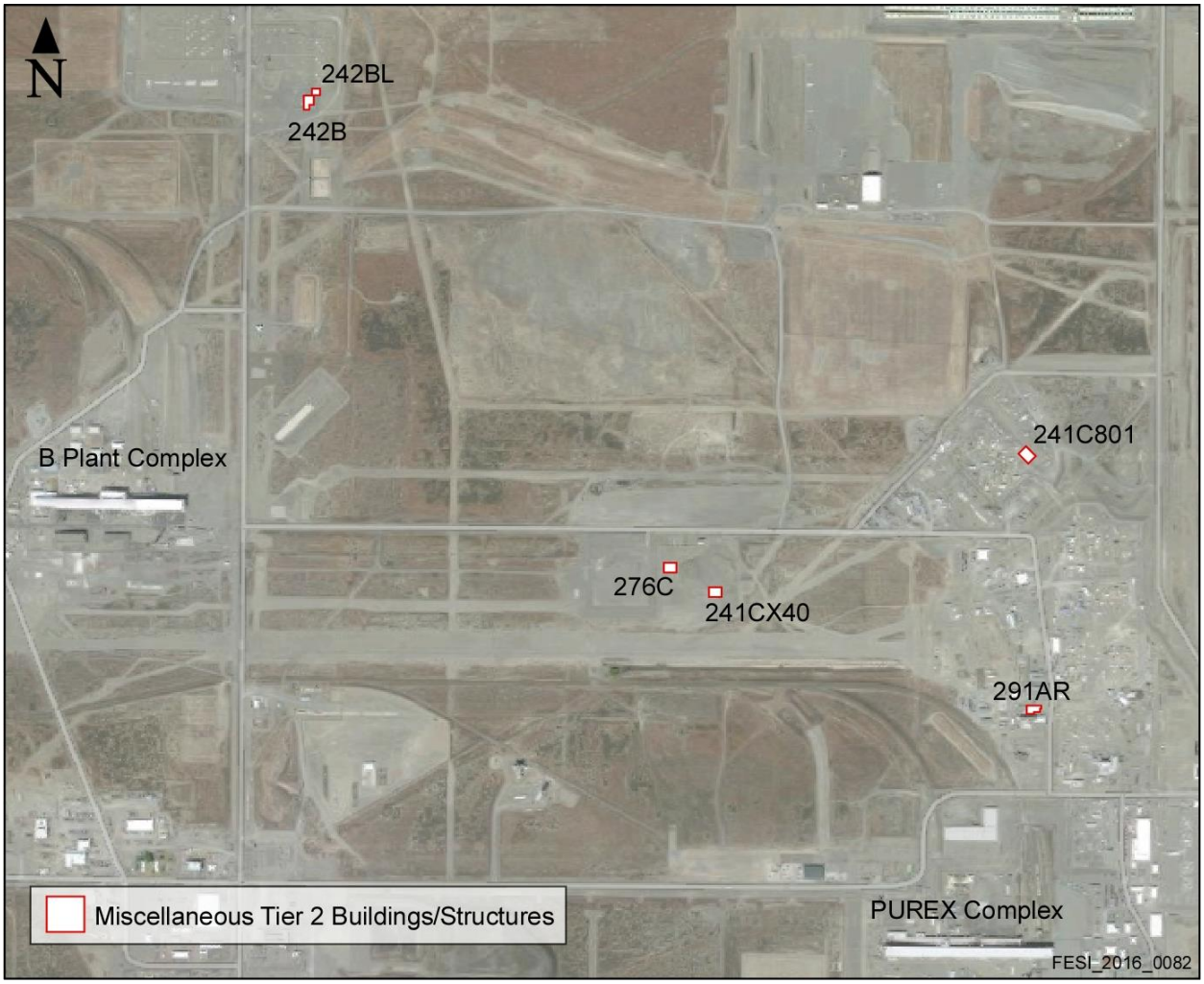

Figure 1-2. Tier 2 Miscellaneous Building/Structure Locations

1.3.2 Release or Threat of Release into the Environment of Hazardous Substances, Pollutants, or Contaminants

Removal activities will be performed in accordance with appropriate procedures that ensure control of hazardous substances. The standards and procedures for managing hazardous substances ensure that personnel removing, handling, and disposing of waste perform work in a manner that achieves the following objectives:

- Protect the safety of employees and the public
- Minimize spills and releases to the environment
- Meet applicable DOE, federal, state, and local regulatory requirements

1.3.2.1 Radiological Contamination

The primary hazardous substances associated with the Tier 2 Miscellaneous buildings/structures are radioactive materials. The primary radiological contaminants are uranium-234, uranium-235, uranium-238, plutonium-239/-240, americium-241, and mixed fission products such as strontium-90, and cesium-137. Most of the contaminants are found in the form of adherent films and residues.

The radiological contamination in each of the buildings/structures is described in the building/structure-specific appendices.

1.3.2.2 Nonradiological Contamination

The buildings/structures in the scope of this RAWP may potentially include the following nonradiological contaminants (additional nonradiological contaminants are described in the building/structure-specific appendices, as appropriate):

- Asbestos
- Cadmium
- Beryllium
- Lead
- Polychlorinated biphenyls (PCBs)
- Mercury
- Refrigerants
- Lubricants
- Commercial solvents
- Corrosives
- Sodium and mercury vapor lighting
- Biological hazards
- Residual chemicals

Asbestos

Asbestos-containing material (ACM) could be found in and around buildings/structures and within debris. Unnecessary disturbance of vessel or piping insulation, loose floor tiles, transite wall coverings or panels, sheetrock, electrical wire insulation, ducting, or other suspect ACM will be avoided.

Cadmium

Cadmium is a byproduct of the metal-finishing process and may also be present in electrical equipment. If waste containing cadmium above regulatory limits is generated, it will be treated as appropriate prior to disposal.

Beryllium

Beryllium contamination could be present in the buildings/structures and debris addressed under this removal action. Although beryllium is not regulated as a hazardous waste, there are health and safety requirements that must be addressed when working with beryllium-contaminated structures.

Lead

Lead may exist in surface coatings (e.g., lead-based paint, lead-shielded cables), plumbing, and in other forms (e.g., lead shot, brick, sheet, and cast-lead forms). If waste containing lead above regulatory limits is generated, it will be treated as appropriate prior to disposal.

PCBs

PCBs may be found in buildings/structures and debris (e.g., painted surfaces and waste oils). Materials removed or demolished that contain or may contain PCBs above regulated levels will be removed for disposal consistent with substantive standards of *Toxic Substances Control Act of 1976* (TSCA).

Mercury

Mercury may be present in manometers and electrical equipment (including thermostats, switches, and vapor lighting). If waste containing mercury above regulatory limits is generated, it will be treated as appropriate prior to disposal.

Refrigerants

Refrigerants are regulated due to their effect on the ozone layer of the atmosphere. Refrigerants will be “recovered” to the extent practicable prior to disposal of the equipment.

Lubricants
Lubricants may contain hazardous substances. Equipment will be drained of lubricants to the extent practicable prior to disposal.

Commercial Solvents
Commercial solvents may be categorized as a dangerous waste. Equipment will be drained of commercial solvents that may require treatment prior to disposal.

Corrosives
Corrosives may be encountered in the buildings/structures. In the State of Washington, corrosive solids and liquid waste above the regulatory limits must be treated, as appropriate, prior to disposal.

Sodium and Mercury Vapor Lighting
Sodium and mercury vapor lighting may be dispositioned through the Hanford Site Centralized Consolidated Recycling Center in lieu of disposal. Sodium and mercury above certain concentrations are regulated as dangerous waste. Regulated materials destined for disposal will be treated, as appropriate.

Biological Hazards
Biological hazards such as bird and rodent carcasses and feces could be encountered. Such materials will be treated and disposed as appropriate.

Residual Chemicals
The potential exists for the discovery of residual chemicals (e.g., solvents, greases, hydraulic and fuel oils, and aerosols). These materials will be recycled or disposed in accordance with requirements of the receiving facility.

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2 Removal Action Elements

This chapter provides general descriptions of the anticipated D4 activities for the Tier 2 Miscellaneous buildings/structures.

2.1 Removal Action Work Activities

Implementation of the removal action may include a multitude of activities. Activities specific to the buildings/structures in the scope of this RAWP are included in the subsequent appendices. Activities include the following, as appropriate:

- Initial characterization
- Removal of the nonradiological and radiological material/waste from within and around the buildings/structures
- Decontamination, fixation of contamination, and isolation of systems
- Demolition of each building/structure to grade or below
- Post-demolition screening or sampling
- Filling belowgrade void space
- Cleanup of miscellaneous debris
- Disposal of wastes generated during D4 activities
- Stabilization of the area
- Conducting visual and radiological surveys and, if needed, stabilization of the area to fix or isolate contamination

Field-level work packages and procedures will be written in accordance with this RAWP. Existing procedures and specifically developed instructions will be used to perform and control the removal and disposal activities.

2.2 Field Activities

The following sections describe the field activities that may be applicable to this removal action. The subsequent appendices provide specific building/structure detail of field activities.

2.2.1 Mobilization and Site Preparation

Mobilization and site preparation may include the following activities:

- Establish site utility services (e.g., temporary power, lighting, and water).
- Construct roads, field support facilities, waste container survey and storage areas, and decontamination stations. Hanford Site roadways will be constructed from existing site materials, except the surface course, which may be imported.
- Isolate and/or verify isolation of utilities and systems.
- Identify underground injection control wells in the proximity of the work area, and notify the Hanford Site single point of contact.

2.2.2 Decontamination Activities

Nonradiological hazardous substances will be removed from within and around the buildings/structures, as needed, prior to demolition, to facilitate compliance with the ARARs and to meet waste acceptance criteria for the Environmental Restoration Disposal Facility (ERDF) (ERDF-00011, *Environmental Restoration Disposal Facility Waste Acceptance Criteria, formerly WCH-191 Rev 4*) or other U.S. Environmental Protection Agency (EPA) approved facilities. Decontamination of equipment or structures, if needed, to support the removal action will generally be performed using dry methods (e.g., brushing, wiping, and using high-efficiency particulate air [HEPA] filtered vacuum cleaners) to the extent possible. When the use of wet methods (e.g., water wash and pressure washers) is required to achieve decontamination objectives, the associated water or cleaning solutions will be collected, and work will be conducted by trained site workers in accordance with the following best management practices:

- Decontamination activities will be performed within the area of contamination.
- The amount of water used to clean equipment will be minimized, using raw or potable water.
- Soaps, detergents, or other cleaning agents may be added to wash water as long as there are no regulated levels of constituents present.

More aggressive equipment decontamination methods (e.g., grinding or wet grit blasting) may be used if other methods fail. These methods will also be conducted by trained site workers using best management practices to minimize the potential for airborne contamination and waste generation.

The project may also perform other equipment washing and/or decontamination methods for completed sites (e.g., wrap equipment for transfer to a decontamination pad, provide a temporary site facility to collect wash water, or fix the contamination to the equipment). Decontamination fluid/wash water that is collected will be managed in accordance with Section 4.2 (Waste Management Plan) of this RAWP.

2.2.3 Removal of Hazardous and Radiological Waste

Nonradiological and radiological hazardous waste will be removed from within and around the buildings/structures, as needed, prior to demolition. Section 1.3.2 and the specific building/structure appendices list the primary hazardous substances.

2.2.3.1 Asbestos

ACM could be found in and around buildings/structures. Removal and disposal of ACM will be performed in accordance with the substantive provisions of the *Clean Air Act of 1990* (CAA) and Amendments (40 CFR 61, “National Emission Standards for Hazardous Air Pollutants” [NESHAP], Subpart M, “National Emission Standard for Asbestos”) as identified in the Tier 2 AM (DOE/RL-2010-102), which requires special precautions to control airborne emissions of asbestos fibers during asbestos removal activities.

Asbestos abatement activities will be performed in full compliance with all substantive NESHAP (40 CFR 61) standards that are ARARs for the work. Before demolition begins, a thorough inspection of the affected facility will be performed for the presence of asbestos, including Category I (Cat I) and Category II (Cat II) nonfriable ACM. All Cat II nonfriable ACM will generally be presumed potentially friable and will be removed before actual demolition activities begin. If DOE identifies any Cat II ACM that should be allowed to remain in place during demolition based on knowledge that the demolition will not render it friable, information identifying the planned demolition approach and describing how the Cat II ACM will not become crumbled, pulverized, or reduced to powder by the forces expected to act on it during the demolition or otherwise become friable, will be provided in advance to EPA for approval.

Cat I nonfriable ACM will also be removed prior to the start of actual demolition activities, except in situations where demolition practices will be used that can be or have been demonstrated to the satisfaction of EPA not to render the Cat I ACM friable, consistent with NESHAP (40 CFR 61). Demonstration can be performed using existing EPA or Washington State guidance regarding asbestos abatement under NESHAP. Such Cat I nonfriable ACM must not be in poor condition, and planned demolition activities must not subject the ACM to sanding, grinding, cutting, or abrading. In all cases, ACM that is either friable or cannot be demonstrated to remain nonfriable during demolition will be removed prior to such demolition, as required by NESHAP.

2.2.3.2 Beryllium

Beryllium could be present in the buildings/structures addressed under the removal action. Although beryllium is not regulated as hazardous waste, certain health and safety requirements must be addressed when working with beryllium contaminated structures. Beryllium-contaminated materials will be managed to ensure worker safety. Prior to demolition, beryllium may be fixed in place, as required. Beryllium waste will be disposed in accordance with the ERDF waste acceptance criteria (ERDF-00011).

2.2.3.3 PCBs

PCBs may be found in buildings/structures (e.g., painted surfaces and waste oils). Materials removed or demolished that contain or may contain PCBs will be removed for disposal consistent with the substantive provisions of TSCA.

Known liquid PCBs will be removed from buildings/structures prior to demolition and disposed in accordance with ARARs and the ERDF waste acceptance criteria (ERDF-00011). Other PCBs will only be removed, as needed, prior to demolition to facilitate proper disposal in accordance with ARARs and the waste acceptance criteria for ERDF or another receiving facility. PCB surface coatings and PCB spills (e.g., dried paints or adhesives) on concrete and other materials (porous and nonporous materials) may be stabilized or fixed in place prior to demolition, and the resulting demolition debris may be disposed as PCB bulk product waste or PCB remediation waste.

Where slabs or belowgrade structures with suspected PCBs will be left in place, sampling may be performed to determine if potentially contaminated surfaces meet the substantive PCB decontamination standards of 40 CFR 761.79, “Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions,” “Decontamination Standards and Procedures,” without further action. When performed, the sample results will be used to determine the TSCA status of the slab or structure to be left in place. If the results indicate the presence of PCB contamination above applicable 40 CFR 761 levels, the contamination will be removed from the slab or structure to be left in place, if practicable, in accordance with substantive standards of 40 CFR 761.79(b) or (c). Materials separated from the contaminated slab or structure will be disposed as PCB waste. Subsequent sampling of the slab or structure to be left in place will be performed after decontamination. When decontamination is achieved to below the applicable levels of 40 CFR 761.79, the slab or structure will no longer be subject to TSCA. If decontamination methods other than those identified in 40 CFR 761.79(b) or (c) are determined necessary, concurrence of the alternate method(s) would be obtained from EPA prior to implementation. If decontamination is impracticable or unachievable, the contractor may consult with the On-Scene Coordinator to determine if placement of the slab or structure into the Waste Information Data System (WIDS) is appropriate. If so, the site will be identified by DOE as a new site under the TPA (Ecology et al., 1989a), with concurrence from Ecology and EPA.

2.2.3.4 Other Hazardous Substances

Hazardous substances, such as refrigerants, lubricants, solvents, greases, hydraulic oils, fuel oils, aerosols, corrosive liquids, and chemical residues, will be drained and recycled or disposed, as appropriate. Equipment containing mercury (e.g., switches, gauges, and thermometers) and lights containing sodium or mercury vapor will be removed and recycled or disposed per the requirements of the receiving facility.

Other hazardous substances on surfaces or embedded in structural materials (e.g., lead paint, heavy metals such as cadmium and arsenic, and creosote) may be fixed in place prior to demolition, and the resulting structural materials are disposed as solid, hazardous, or mixed waste, as appropriate, depending on the levels of contamination and waste characterization results.

2.2.3.5 Radiological Waste

The preferable way to control loose, accessible radiological contamination is to fix it in place. Removal of loose contamination will be performed only if necessary. Removal of fixed contamination must be performed using nonaggressive means (e.g., wet wiping or using decontamination solutions). Aggressive methods of decontamination (e.g., grinding or other abrasive/mechanical means) are used only as necessary to maintain as low as reasonably achievable (ALARA) radiological levels.

2.2.3.6 Biological Waste

Biological waste, such as bird and rodent carcasses and feces, could be encountered. Biological waste will be field surveyed and disposed in accordance with the ERDF waste acceptance criteria (ERDF-00011).

2.2.4 Demolition Activities

Demolition will include removal of abovegrade buildings/structures. The majority of demolition will require the use of heavy equipment (e.g., excavators with various attachments) to demolish structures. Other standard industry or conventional demolition practices may be used (e.g., hydraulic shears with steel shear jaws, concrete pulverizer or breaker jaws, pneumatic hammers, mechanical saws, cutting torches, and/or controlled explosives). Demolition methods will be selected based on the structural elements to be demolished, remaining contamination, location, and integrity of the structure. Controls, such as portable ventilation filter units, HEPA-filtered vacuum cleaners, greenhouses, fogging agents, and/or water, may be used to control dust generated through demolition activities. The amount of water used will be minimized to reduce ponding and runoff. Stormwater run-on and runoff controls may be implemented. Applicable controls will be described in the work packages.

Belowgrade structural components, such as basements, will preferentially be left intact (with penetrations secured or blanked), and backfilled with inert material, as appropriate. If warranted, belowgrade structures and/or related equipment may be removed to facilitate other D4 activities surrounding the area or as deemed necessary by DOE to support overall cleanup goals and priorities.

Equipment and piping within and around the buildings/structures, including pumps, pipes, tanks, boilers, compressors, ductwork, electrical components, and other equipment, may be removed, as necessary. Belowgrade structures will be removed and disposed in the same fashion as abovegrade buildings and structures. However, if belowgrade structures (including basements, pipes, and utility systems) are not contaminated or may be decontaminated, they may be left in place with void spaces backfilled to grade. Backfill will consist of clean fill materials, inert demolition waste from the abovegrade structures, or high-density grout. Belowgrade piping and drains entering or exiting each building/structure will be plugged (e.g., grouted) to prevent potential pathways to the environment. Depending on the areas to be excavated, shoring or sloping may be required for worker safety or to reduce excavated soil quantities. Excavations will be backfilled and/or contoured after completing the removal action.

To minimize precipitation infiltration to the underlying soils, the buildings/structures will be demolished to slab-on-grade. The abovegrade structures will be demolished to within 6 in. of the slab and foundation. Effort will be made to protect the slab and foundation. If the slab sustains damage such that precipitation infiltration could occur, repairs to the slab may be considered. Repair work may include the use of concrete or other materials. Belowgrade voids left by the demolition activities will be backfilled as needed, after required sampling or surveys are completed. A walkdown will be conducted following backfilling to ensure the absence of asbestos.

Contaminated soils may be encountered during D4 activities. Although the scope of this removal action does not include soil contamination found under the buildings/structures, if evidence of contamination to surrounding soils is encountered during D4 activities, those soils will be excavated and disposed at ERDF or other EPA-approved facilities in accordance with the waste acceptance criteria for the facility. Alternately, if the soil contamination is extensive or unusually complex or if contamination is encountered on remaining slabs or underground structures, DOE will consult with the lead regulatory agency and determine whether to address the residual contamination within the scope of this NTCRA, or implement temporary measures as part of this action and defer final action to the remedial investigation and remedy selection process by adding the site to the TPA Action Plan (Ecology et al., 1989b), Appendix C, in accordance with RL-TPA-90-0001, *Tri-Party Agreement Handbook Management Procedures*.

2.2.5 Stabilization

Upon completing removal activities at a site, the site will be stabilized in a manner that will mitigate potential industrial safety hazards and not unduly hinder future anticipated remediation. Specific site stabilization information will be described in the subsequent appendices. Post-demolition surveys will be performed to attain the as-left building/structure condition.

2.2.6 Sampling Activities

A sampling and analysis plan (SAP) (DOE/RL-2017-47, *Sampling and Analysis Plan for the 200 East Tier 2 Miscellaneous Building/Structures*) has been developed to support waste characterization and disposal activities. The purpose of the sampling activities is to collect any data necessary to confirm process knowledge that will demonstrate compliance with ERDF waste acceptance criteria (ERDF-00011). The data quality objectives process for data collection, sampling, and sampling rationale were used to develop the SAP. When available, process knowledge may be used, in lieu of analytical data, to support waste management activities. This SAP will be approved by EPA.

Characterization is necessary to support waste disposal activities, define contaminants present before or after completing the removal actions, establish worker protection controls, and possibly support site closure decisions. All waste (including unexpected waste) generated by sampling activities will be managed in accordance with applicable regulations.

Waste characterization will be conducted, as needed, prior to and during D4 activities. The sampling design is described in the SAP. Facility-specific historical information will be used to identify expected waste streams; initial characterization data needs; and the rationale, strategy, and requirements for data collection and analysis. Data collection may include field survey and sample data. The initial characterization data will be for the following activities:

- Characterize waste for treatment and/or disposal
- Identify radiological and hazardous conditions that will be encountered during D4 activities
- Specify worker health and safety requirements

Sampling plans will be developed to support waste characterization and disposal activities. In many cases, physical sampling and analysis are not needed because process knowledge, historical analytical data, and radiological and chemical screening are often sufficient to characterize waste for disposal.

2.2.7 Waste Disposal

Waste management and disposal activities will be performed in accordance with waste management ARARs identified in the Tier 2 AM (DOE/RL-2010-102) and as discussed in Section 4.2.

3 Safety and Health Management and Controls

This chapter describes the safety and health management and controls performed for the removal activities.

3.1 Emergency Management

The contractor Emergency Management Program (including preparedness, planning, and response) contains the administrative responsibilities for compliance with DOE/RL-94-02, *Hanford Emergency Management Plan*, and all applicable DOE orders. The Emergency Management Program establishes a coordinated emergency response organization capable of planning for, responding to, and recovering from industrial, security, and hazardous material incidents. Emergency action plans for contractor-managed hazardous facilities identify the capabilities necessary to respond to emergency conditions, provide guidance and instruction for initiating emergency response actions, and serve as a basis for training personnel in emergency actions for each facility.

The emergency response actions within the emergency action plan are provided for recognizing incidents and/or abnormal conditions, initiating protective actions, and making the proper notifications. Emergency response for this project will include required notification to the National Response Center (NRC) for reportable quantity releases and On-Scene Coordinator notification for other emergency situations.

3.2 Safeguards and Security

Access to the Hanford Site is restricted. Therefore, unauthorized access to the 200 East Area is prohibited. Access to each removal action area is controlled by the contractor using items such as fences and signs. Access requirements for employees, nonemployees, and/or visitors are defined in a health and safety plan (HASP).

3.3 Safety and Health Program

Potential personnel and environmental hazards are generally associated with nonroutine D4 activities. Buildings/structures that are the subject of this removal action were used for a variety of purposes. Due to the past uses, they may be contaminated with hazardous substances, as described in Section 1.3.2.

Because of the potential for these buildings/structures to be contaminated with chemical and radiological hazardous substances, the HASP prepared for this action will address chemical, radiological, and physical hazards as described in the following subsections. The HASP will specify the physical and administrative controls and requirements for work activities for the protection of personnel and the environment.

3.3.1 Worker Safety Program

The Integrated Safety Management System/Environmental Management System, which include the following elements, will be incorporated into all work activities:

- Organizational structure specifying the official chain of command and overall responsibilities of supervisors and employees
- Comprehensive work plan development before work begins at a site to identify operations and objectives and to address the logistics and resources required to accomplish project goals
- HASP developed when workers could be exposed to hazardous substances
- Worker training commensurate with individual job duties and work assignments

- Medical surveillance program administered to comply with 29 CFR 1910.120, "Occupational Safety and Health Standards," "Hazardous Waste Operations and Emergency Response"
- Contractor internal work requirements and processes
- Voluntary protection program

3.3.2 Health and Safety Plan and Activity Hazards Analysis

A HASP will be prepared that defines the chemical, radiological, and physical hazards and specifies the controls and requirements for implementing D4 and debris cleanup work activities for this RAWP.

Access and work activities are controlled in accordance with approved work packages, as required by established internal work requirements and processes. A HASP 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. As part of work package development, a job or activity hazards analysis will be written to identify the hazards associated with specific tasks not already covered under a HASP. The following elements are included in a HASP:

- General overview of the hazards associated with the area
- List of employee training assignments
- List of personal protective equipment (PPE) to be used at the work site
- Medical surveillance requirements
- Work site control measures
- Emergency response
- Confined space entry internal work requirements and processes
- Spill containment program

A prejob briefing will be held with the involved workers. This briefing will include reviews of the hazards that could be encountered and their associated worker protection requirements.

3.3.3 Radiological Controls and Protection

The radiological controls and protection program are defined in DOE approved programs and contractor-approved internal work requirements and processes. The radiological controls and protection program implements the contractor policy for reducing risks to worker safety or health to ALARA levels and ensuring adequate protection of workers. The Radiological Protection Program of the contractor meets the requirements of 10 CFR 835, "Occupational Radiation Protection." Appropriate dosimetry, PPE, ALARA planning, periodic surveys, and health physics technician (HPT) support will also be provided.

In addition to a HASP, a radiological work permit (RWP) will be prepared, as needed, for work in areas with potential radiological hazards. The RWP extends the Radiological Protection Program 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 HASP and RWP.

Standard contractor controls for work in radiological areas are assessed as adequate to control project activities. These controls will identify the specific conditions and will 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, radiation monitoring requirements, and other radiation control requirements for individual project tasks.

Measures will be taken to minimize impacts to the environment during work activities. Section 4.3 of this RAWP addresses the controls to be used during project activities to address the potential release of radionuclides to the environment but not to the exclusion of 10 CFR 835 requirements.

Radiological worker exposure will be monitored using approved occupational radiological protection methods.

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4 Environmental Management and Controls

This chapter describes the environmental management and controls needed to conduct the removal action.

4.1 Applicable or Relevant and Appropriate Requirement Compliance

ARARs for the removal action are identified in Appendix B of the Tier 2 AM (DOE/RL-2010-102). The key ARARs include standards for waste management, control of releases to the environment, reporting nonroutine releases to the environment, and protection of cultural and ecological resources.

Removal actions will be performed in compliance with the substantive portions of the identified ARARs to the extent practicable. Waste streams will be evaluated, designated, and managed in compliance with the ARARs. Before disposal, waste will be managed in a protective manner to prevent releases to the environment or unnecessary exposure to personnel.

4.2 Waste Management Plan

Several waste streams will be generated under this removal action. It is anticipated that most of the waste will be low-level waste. A small volume of dangerous waste, mixed waste, PCB waste, and asbestos and ACM could be generated. The majority of waste will be in a solid form; however, some liquid wastes might be generated. The following is a list of laws and regulations from which the ARARs have been developed (ARARs are listed in Appendix B of the Tier 2 AM [DOE/RL-2010-102]):

- *Atomic Energy Act of 1954* for management of radioactive waste by DOE.
- *Resource Conservation and Recovery Act of 1976* (RCRA), as implemented by 40 CFR 260, "Hazardous Waste Management System: General," through 40 CFR 268, "Land Disposal Restrictions," and WAC 173-303, "Dangerous Waste Regulations," for management of dangerous waste. The identification and treatment, storage, and disposal (TSD) of hazardous waste and the hazardous component of mixed waste are governed by RCRA. The State of Washington, which implements RCRA requirements under WAC 173-303, has been authorized by the EPA to implement most elements of the RCRA program. The dangerous waste standards for generation and storage will apply to the management of any dangerous or mixed waste generated by D4 activities at Hanford Site excess industrial buildings/structures and as a result of debris cleanup activities. Treatment standards for dangerous or mixed waste subject to RCRA land disposal restrictions are in WAC 173-303-140, "Land Disposal Restrictions," which includes 40 CFR 268 by reference.
- The TSCA includes standards for managing PCB waste. PCB waste disposal is governed by the rules of 40 CFR 761. PCB wastes generated during D4 and debris cleanup activities will be disposed at ERDF or another EPA-approved disposal facility in accordance with the substantive provisions of 40 CFR 761. PCBs may be considered underlying hazardous constituents under RCRA for waste that is designated as dangerous or mixed waste and could require treatment to meet WAC 173-303 and 40 CFR 268 requirements.
- The CAA, as implemented by 40 CFR 61, Subpart M, regulates removal and disposal of asbestos and ACM. These regulations provide for special precautions to control environmental releases or exposure to personnel due to airborne emissions of asbestos fibers during removal activities.

Wastes generated through implementation of this removal action will be disposed at appropriate EPA-approved facilities, in accordance with the waste acceptance criteria of those facilities. ERDF is the preferred waste disposal facility for waste meeting ERDF waste acceptance criteria (ERDF-00011).

Demolition debris will be transported to ERDF or other EPA-approved facilities, and treated as necessary, to meet applicable land disposal restriction requirements and waste acceptance criteria prior to disposal.

Waste management activities addressed in the work packages may include waste characterization, designation, staging, packaging, handling, marking, labeling, segregation, storage, transportation, and disposal. These activities are briefly described in the following subsections.

4.2.1 Projected Waste Streams

One or all of the following solid waste streams are anticipated to be generated during the removal action and may fall into any combination of categories (nondangerous/nonradioactive, radioactive, mixed, hazardous, dangerous, suspect radioactive, suspect dangerous, and suspect mixed):

- D4 debris (e.g., structural materials, concrete, wood, rebar, metal/plastic pipes, wire, equipment, pumps, tanks, boilers, compressors, ductwork, and electrical components)
- Low-level waste and low-level mixed waste
- Liquids (e.g., decontamination liquids)
- Spent/excess chemicals/reagents and used oils
- Miscellaneous solid waste (e.g., rubber, glass, paper, PPE, cloth, plastic, wipes, wood, equipment, tools, pumps, wire, metal casing, plastic piping, and sample returns)
- PCB waste
- Asbestos and ACM
- Soils (e.g., soils surrounding building slabs)

4.2.2 Waste Management and Characterization

Waste will be managed in a protective manner to prevent releases to the environment and unnecessary exposure to personnel. Waste-specific storage and packaging requirements will comply with the substantive requirements of WAC 173-303, as specified in the ARARs. Miscellaneous solid waste will be managed, as appropriate, for the nonradiological and radiological contaminants present or suspected to be present. The waste characterization process is discussed briefly in Section 2.2.6 and is discussed in the SAP (DOE/RL-2017-47).

Contamination on surrounding soils or portions of slabs may be encountered during the course of D4 activities. Any soil or portions of the slab that are contaminated with substances that are known or easily determined to be associated with normal building/structure operation or maintenance may be removed for disposal during building/structure demolition, as appropriate.

Sampling for such excavation will be performed using an observational approach focused on process knowledge, with visual inspections, radiological and chemical field screening, and focused judgmental sampling where appropriate. Sampling will be performed in accordance with the SAP (DOE/RL-2017-47). Removal of contaminated soils is generally deferred to a future remedial action. The sites will be stabilized in a manner that will not hinder future remediation.

Waste generated through the removal action will be characterized in accordance with the waste acceptance criteria of the receiving facility (e.g., ERDF). Characterization is performed using a variety of information that includes, but is not limited to, process knowledge, historical analytical data, new sampling and analysis data, and radiological and chemical field screening.

4.2.2.1 Hazardous/Dangerous Waste, Low-Level Waste, and Mixed Waste

These wastes will be managed in a protective manner to prevent releases to the environment or exposure to personnel. Waste-specific storage and packaging requirements will comply with the substantive requirements of WAC 173-303, as specified in the ARARs.

4.2.2.2 Solid Waste

Solid waste (e.g., PPE) will be managed, as appropriate, for the nonradiological and radiological contaminants present or suspected to be present. Miscellaneous solid waste that has contacted suspect dangerous or suspect mixed waste will be managed as such. Field screening will be used to segregate radioactive waste from nonradioactive waste. Containers will be properly marked and labeled.
The containers will be segregated, as appropriate, and then stored within a designated waste container storage area within the area of contamination or at ERDF. The area of contamination will be established as part of the work planning process. Miscellaneous solid waste will be dispositioned based on waste characterization information.

4.2.2.3 Asbestos and ACM Waste

Removing, handling, packaging, and disposing of asbestos and ACM will be performed in accordance with the substantive provisions of 40 CFR 61.145(c), “National Emission Standards for Hazardous Air Pollutants,” “Standard for Demolition and Renovation;” 40 CFR 61.150, “Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations;” and 29 CFR 1926.1101, “Safety and Health Regulations for Construction,” “Asbestos,” for ACM removal. Additional information about asbestos and ACM waste generated from the D4 activities will be specified in the field work packages and procedures, as necessary.

4.2.2.4 PCB Waste

The management and disposal of PCB wastes is governed by TSCA, which is implemented by 40 CFR 761. The TSCA regulations contain specific provisions for PCB waste, including PCB waste that contains a radioactive component. PCBs are also considered underlying hazardous constituents under RCRA and may be subject to WAC 173-303-140 and 40 CFR 268 requirements. Additional information about PCB waste generated from the D4 activities will be specified in the field work packages and procedures, as necessary.

4.2.2.5 Decontamination Fluids

Although CERCLA removal actions are exempt from the Hanford Site State Waste Discharge Permit (SWDP), decontamination fluids (water and/or nondangerous cleaning solutions) will be discharged if they meet the substantive provisions of the existing SWDP. If the decontamination fluids do not meet the Hanford Site SWDP, fluids generated from cleaning equipment and tools in the area of contamination may need to be contained, sampled, and as necessary, transported or solidified for disposal at ERDF or another EPA-approved facility.

4.2.2.6 D4 Equipment Waste

Equipment used to support the removal action that is chemically or radiologically contaminated will be decontaminated as described in Section 2.2.2. If the equipment cannot be decontaminated, the equipment will be disposed at ERDF or other EPA-approved facilities.

4.2.2.7 Management of Bulk Waste

Bulk waste will be placed in ERDF cans for eventual disposal at ERDF or other EPA-approved facilities and treated as necessary to meet applicable land disposal restriction requirements and waste acceptance criteria prior to disposal. Waste will be stored in the area of contamination or at a site-specific storage area at ERDF, as appropriate. Bulk containers will be covered when waste is not being added or removed. Lightweight material (e.g., plastic and paper) will be bagged, if appropriate, prior to placement in the bulk container to eliminate the potential for materials blowing out of the bulk container or truck. Applicable packaging and pre-transportation requirements for dangerous or mixed waste generated by the removal action will be identified and implemented before the waste container is moved. Additionally, a fixative will be applied, as needed, to the demolition site and any loose soil to control dust, which may contain radiological and nonradiological contaminants.

4.2.2.8 Management of Waste Containers

Prior to disposal, dangerous waste containers will be managed in accordance with the substantive provisions of WAC 173-303-200, "Accumulating Dangerous Waste On-Site," as specified in the ARARs. Waste containers, including the ERDF roll-on/roll-off containers, are inspected before use to ensure container integrity. The containers will be stored inside the applicable site-specific waste container storage area or area of contamination. Containers awaiting analytical results will be marked and labeled, as appropriate. Weekly inspections of the containers will be performed to document the integrity, container marking/labeling, physical container placement, storage area boundaries/identification/warning signs, and sign of any potential leakage. Containers showing signs of deterioration will be identified and will be over packed or repackaged, as necessary.

Spills or releases will be reported, as stated in Section 4.4. In the event of a spill or release, action will be taken to protect HHE.

4.2.3 Waste Handling, Storage, and Packaging

Marking, labeling, segregating, and staging waste containers will be performed or directed by the waste specialist. Waste containers will be shipped directly to the disposal site. In the event that waste containers need to be temporarily stored pending final disposition, they will be stored at an EPA-approved facility. Dangerous or mixed waste may also be accumulated in accordance with the substantive generator requirements of WAC 173-303-200.

Applicable packaging and transportation requirements for dangerous or mixed waste generated by the removal action will be identified and implemented before movement of waste. Before being removed from the area of contamination or site-specific waste storage area, containers and haul trucks released from radiologically controlled areas will meet exterior contamination limits. Other waste type specific handling and packaging requirements may be applicable and will be described in the contractor's work documents, as appropriate.

The building footprint area (BFA) will include the individual building/structure footprint and the surrounding area suitable to support D4 of buildings/structures and excavations. The BFA will be established as part of the work planning process. Waste management locations outside of the BFA will meet the substantive requirements of the ARARs. For waste management inside the BFA, safe and effective management practices will be established to ensure protection of HHE during performance of demolition and related work.

As an alternative to management within the BFA, waste that is not immediately transported to ERDF or other EPA-approved disposal facility may be stored in staging piles. Staging piles used for management of dangerous waste will be operated in accordance with substantive provisions of standards and design criteria prescribed in 40 CFR 264.554, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," "Staging Piles," paragraphs (d) through (k) as follows:

- Staging piles will 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 will 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 HHE, this may 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 will 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 to protect it from exposure to any material or condition that may cause it to ignite.
- Incompatible wastes will not be placed in the same staging pile, unless the requirements in 40 CFR 264.17(b), "General Requirements for Ignitable, Reactive, or Incompatible Wastes," have been met. The incompatible materials will be separated, or the waste will 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).

Once the waste has been removed, to close out the staging pile, characterization of the residual soil will be performed as appropriate. In cases where staging piles for industrial waste sites are located in an uncontaminated area, the observational approach may be used. In situations where sampling is appropriate and results indicate presence of residual contamination, efforts will be made to remove such contamination.

4.2.3.1 Waste Profile

Waste profiling to establish values for the waste tracking form may take place concurrently with removal action activities. Field screening measurements may be used to adjust the waste tracking form. The waste profile may be adjusted (as necessary) through a combination of in-process field screening data and analytical laboratory analyses.

4.2.3.2 Final Waste Disposal

Dangerous, mixed, and radioactive wastes generated through the removal action will be disposed at ERDF. ERDF is the preferred disposal location for waste meeting the facility waste acceptance criteria (ERDF-00011) because it is engineered to meet appropriate RCRA technological requirements for landfills, as described in EPA, 1995, *Record of Decision U.S. DOE Hanford Environmental Restoration Disposal Facility Hanford Site Benton County, Washington*. If any waste does not meet the ERDF waste acceptance criteria, it will be transferred to an offsite disposal facility that has been deemed suitable by the EPA regional office.

4.2.3.3 Waste Disposal Records

Original sample reports and a copy of the shipping papers for each waste container will be retained and forwarded to the assigned waste specialist for inclusion in the project file following final waste disposal.

4.2.4 Waste Treatment

Treatment of waste generated from demolition activities (e.g., grouting, macroencapsulation, solidification, separation, and size reduction) will be performed, if needed. If treatment is deemed necessary to provide safe transport, such treatment may be conducted at the generating site. If treatment is deemed necessary to meet the disposal facility waste acceptance criteria and/or address land disposal restriction requirements, such treatment may be conducted at the generating site or the receiving site. Treatment will be performed at an EPA-approved facility in accordance with 40 CFR 300.400, "General." Residuals from waste treatment originating from the removal action can be disposed at ERDF if they meet ERDF waste acceptance criteria (ERDF-00011).

4.2.5 Waste Minimization and Recycling

Waste minimization practices will be followed to the extent technically and economically feasible during waste management. Introducing clean materials into a contamination area, as well as contaminating clean materials, will be minimized to the extent practicable. Emphasis will be placed on source reduction to eliminate or minimize the volume of waste generated.

4.2.6 Equipment

Equipment used to support the removal action that contacts dangerous and/or mixed waste will be decontaminated as described in Section 2.2.2. If the equipment cannot be decontaminated, the equipment will be designated for disposal at ERDF or other appropriate facility.

4.3 Standards Controlling Releases to the Environment

Airborne emissions associated with the removal action will be minimized through appropriate work controls, in accordance with DOE radiation control and substantive air pollution control standards, to keep Hanford Site air pollutant emissions at ALARA levels. A graded approach for application of air control emission technologies will be followed. Building demolition will generate diffuse and fugitive emissions. Therefore, powered emissions abatement technology that is used for point sources (such as portable exhausters) will not be used. Section 4.3.4 provides the types of controls that may be utilized dependent upon the type of emissions (e.g., dust, radionuclides) expected to be created by the demolition activity.

4.3.1 Radiological Air Emissions

Radionuclide contamination may be encountered during D4 activities under this NTCRA. Federal and state regulations and requirements for radiological air emissions are identified in Appendix B of the Tier 2 AM (DOE/RL-2010-102). Substantive requirements of these standards are applicable to activities that will involve fugitive, diffuse, and/or point source emissions of radionuclides to the ambient air, such as demolition and excavation of radioactively contaminated structures and/or soils, performed during the NTCRA.

Radiological contaminants of concern will be identified and quantified in the structure specific appendices. The potential to emit (PTE) calculation or modeling will be performed prior to work initiation. The PTE calculations are used to perform prospective calculations of the total effective dose equivalent (TEDE) to the maximally exposed individual who abides or resides in an unrestricted area. The PTE calculations uses an estimated holdup in the structures to derive a maximum emission from the structure and then applies the dose-per-unit-release factors from DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*, to estimate the TEDE to the maximally exposed individual at a location off the Hanford Site. Air emission controls and monitoring requirements will be identified, as needed, based on the calculated/modeled value of the potential emissions and resultant public exposure. The subsequent appendices provide specific building/structure information on the approach for PTE calculations and radiological air emission controls/monitoring.

The 200 East Area Near-Facility Ambient Air Program stations nearest the 200 East Tier 2 Miscellaneous buildings/structures provide monitoring effectiveness validation utilizing the near-facility monitoring (NFM). These stations do not provide real-time data so their bi-weekly data will be used as indicators along with the worksite monitoring data for overall trending of the effectiveness of the contamination control measures. The monitoring stations are discussed in more detail in Section 4.3.5.

4.3.2 Nonradioactive Air Emissions

The primary source of emissions resulting from the removal action will be fugitive particulate matter. In accordance with the substantive requirements of WAC 173-400-040(3) and (8), “General Regulations for Air Pollution Sources,” “General Standards for Maximum Emissions,” reasonable precautions will be taken to prevent the release of air contaminants associated with fugitive emissions due to demolition, materials handling, or other operations and prevent fugitive dust from becoming airborne from fugitive emission sources.

Operating trucks and other diesel-powered equipment during the removal activities would be expected, in the short term, to introduce quantities of sulfur dioxide, nitrogen dioxide, particulates, and other pollutants to the atmosphere, typical of similar sized construction projects. These releases would not be expected to exceed air quality standards. Dust generated during removal activities would be minimized by applying water or other dust control measures (e.g., fixatives). Vehicular and equipment emissions will be controlled and mitigated in compliance with the substantive standards for air quality protection that apply to the Hanford Site. These techniques are considered reasonable precautions to control fugitive emissions, as required by the substantive requirements of air emissions ARARs.

Toxic air emissions may be subject to the substantive applicable requirements of WAC 173-460, “Controls for New Sources of Toxic Air Pollutants.” Airborne emissions control and monitoring requirements for toxic air pollutants will be identified, as needed, based on the calculated value of the potential emissions and resultant public exposure. This information will be provided in subsequent implementing documents/work packages, as necessary.

Some waste encountered during the removal action may require treatment to meet ERDF waste acceptance criteria (ERDF-00011). In most cases, the type of treatment anticipated will consist of solidification or stabilization techniques, such as macroencapsulation or grouting, and WAC 173-460 will not be considered an ARAR because the work will not result in toxic air pollutant emissions at regulated levels. If more aggressive treatment is required that would result in regulated air pollutant emissions above the de minimis values in WAC 173-460-150, “Table of ASIL, SQER and de Minimis Emission Values,” the substantive requirements of WAC 173-400-113(2), “Requirements for New Sources in Attainment or Unclassifiable Areas,” and WAC 173-460-060, “Control Technology Requirements,” will be evaluated to determine their applicability in satisfying the substantive requirements determined to be ARAR.

4.3.3 Asbestos Emissions

Removal and disposal of asbestos and ACM are regulated under the CAA. The substantive provisions of these regulations provide for special precautions to prevent environmental releases or personnel exposure to airborne emissions of asbestos fibers during the removal action.

4.3.4 Emission Controls

Based on an analysis of the potential emissions and available control technologies, the following controls have been selected for use during the removal action:

- Water will be applied, as needed, during excavation and backfilling/recontouring activities, to suppress fugitive emissions, including dust.
- Fixatives will be applied to structural materials, debris and equipment, or contaminated soil to minimize airborne contamination during the removal action activities for fugitive emissions and dust. Fixative application techniques may include spraying, fogging, brushing on, pouring, or other methods, as necessary.
- Fixatives or cover material (e.g., soil and gravel) will be applied to disturbed contaminated soils, when field activities will be inactive more than 24 hours (except as noted in the next bullet).
- Fixatives will be applied using manufacturers' recommended specifications. The fixative will be examined to ensure it has remained in the proper configuration. Fixative will be reapplied as necessary to ensure it is performing it intended purpose.
- Field activities will be temporarily ceased, and the area will be placed in a safe configuration if airborne contamination control measures are not expected to be adequate, based on site conditions (e.g., excessive wind). Appropriate controls such as water, fixatives, covers, containment tents, windscreens, or other controls during cessation of work activities will be applied, to the extent practicable based on conditions in the work environment (i.e., weather conditions and predicted wind speeds greater than 32 km/hr [20 mi/hr]). Additionally, fixatives will be applied to demolition sites and debris piles, as needed, to help control dust and radiological or nonradiological contaminants.
- Waste packages will remain closed once they are staged, except as necessary due to inspection or repackaging activities.
- Operational limits for removable or transferable radioactive contamination levels will be established in work packages and associated radiation work procedures. Fixatives or other physical controls will be employed if removable or transferable contamination levels above 100,000 disintegrations/min per 100 cm^2 beta/gamma or exceeding 2,000 disintegrations/min per 100 cm^2 alpha are measured or expected.

In addition to the controls listed above, best available radionuclide control technology and ALARA control technology controls will be applied based on the PTE using a graded approach. These controls will be selected and agreed upon in the Project Manager Meeting based on established radiologic control practices.

4.3.5 Monitoring Requirements

The calculated, unabated annual doses for D4 activities for each of the buildings/structures addressed in this RAWP will be calculated as the building/structure is scheduled for near-term D4. The need for continuous emissions monitoring as required by the substantive requirements of WAC 246-247-075(1), "Radiation Protection—Air Emissions," "Monitoring, Testing, and Quality Assurance," will be dependent on the calculated PTE. If continuous emissions monitoring is required, it will be discussed in the appendix for that building/structure.

Periodic confirmatory measurement (PCM) will be provided, as required by the substantive requirements of WAC-246-247-075(3) and (8) for all buildings/structures. Ambient air monitoring and radiological surveys will be provided to meet the PCM requirement. The primary PCM will be provided through the use of work space monitoring and radiological surveys performed in accordance with the current radiological control manual. Air monitoring will consist of portable air samplers placed in the prevailing downwind locations in the immediate work area. The samplers will be operated during work activities that have a potential for radionuclide air emissions. Results are used for verifying acceptable occupational conditions and to help confirm effectiveness of contamination controls. Hand-held survey instruments will be used for alpha and beta-gamma contamination surveys.

In addition, existing near-facility ambient air monitoring station data will be used to track and trend, on a historical basis, any diffuse and fugitive emissions created by the removal activities. The 200 East Area Near-Facility Ambient Air Program stations provide monitoring effectiveness validation utilizing the NFM. The stations do not provide real-time data, so their bi-weekly data will be used as indicators along with the worksite monitoring data for overall trending of the effectiveness of the contamination control measures. During periods of demolition and debris removal, no more than one of the four specified monitors identified in each appendix (242B/BL and 276C) will be allowed to be inoperative for more than 24 hours. For work activity locations not identified in an appendix, the N976, N999, N977, and N969 NFM stations will be utilized. As part of the site-wide evaluation of NFM data, the electronic release summary database compares NFM 6-month composite air sample results to 10% of the 40 CFR 61, Appendix E, Table 2 values. The database identifies results that exceed these values. Results from the air monitors identified in this document that are above these values will be reviewed, the adequacy of the controls evaluated as appropriate, and DOE-RL and Washington State Department of Ecology will be notified. The specific monitors will be identified in the building/structure-specific appendices.
The Hanford Site protocol established for the Near-Facility Monitoring Program ambient air stations will be followed for station repairs, retirement, data collection, sampling frequencies, sample analysis, and data reporting (DOE/RL-91-50, *Hanford Site Environmental Monitoring Plan*).

The well-established Hanford Site protocol for emission monitoring will be followed, including Hanford Site perimeter ambient air data collection, sampling frequencies, sample analysis, and data reporting (DOE/RL-91-50). This method will address the substantive requirements of WAC 246-247-075.
The Hanford Site perimeter monitoring is used to measure the diffuse and fugitive emissions from the Hanford Site. Demonstration of compliance with the 40 CFR 61.92, "National Emission Standards for Hazardous Air Pollutants," "Standard," effective dose equivalent of 10 mrem/yr limit is provided by the Radioactive Air Emissions Report for the Hanford Site. Compliance with the 10 mrem/yr standard by the entire site ensures compliance of the Tier 2 Miscellaneous buildings/structures work with the substantive requirements of the WAC 173-480-070, "Ambient Air Quality Standards and Emission Limits for Radionuclides," "Emission Monitoring and Compliance Procedures," standard.

4.3.6 Liquid Effluents

Liquid effluents may be generated during the removal activities (e.g., decontamination solutions, water sprays for dust suppression). Although CERCLA removal actions are exempt from Hanford Site SWDP, liquid effluents will be discharged if they meet the substantive provisions of existing Hanford Site SWDP. If the liquid effluents do not meet Hanford Site SWDP, effluents may need to be contained, sampled, and as necessary, transported and discharged into the Effluent Treatment Facility, or solidified for disposal at ERDF or another EPA-approved facility. Water spray for dust suppression will be used in a manner that minimizes the potential for ponding or runoff that could result in the spread of contamination.

4.4 Reporting Requirements for Nonroutine Releases

The following reporting requirements apply for hazardous substances that could be released during removal action activities:

- 40 CFR 302, "Designation, Reportable Quantities, and Notification," requires immediate notification to the NRC on discovery of a release of a hazardous substance into the environment in excess of a reportable quantity.
- 40 CFR 355, "Emergency Planning and Notification," requires immediate notification to the community emergency coordinator for the local emergency planning committee and to the State Emergency Response Commission for a release of a reportable quantity of an extremely hazardous substance, a comprehensive release of a reportable quantity of an extremely hazardous substance, or a CERCLA hazardous substance.
- Emergency response for this project will include required notification to the NRC for reportable quantity releases and On-Scene Coordinator notification for other emergency situations.

4.5 Cultural/Ecological Resources

Cultural and ecological resource reviews will be performed, as appropriate, before starting removal activities. These reviews will be conducted in accordance with DOE requirements. If potential impacts are identified, mitigation action plans will be developed and implemented. Scenarios described in the following subsections provide further detail for these reviews.

4.5.1 Cultural

Cultural resource reviews (CRRs) will follow the substantive requirements of the *National Historic Preservation Act of 1966*, Section 106. These buildings/structures are in areas that have been extensively disturbed by past construction activities, and most buildings/structures have been evaluated for their National Register of Historic Places eligibility as part of DOE/RL-97-56, *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan*. Some buildings/structures are contributing properties to the Manhattan Project/Cold War Era Historic District, and they require mitigation through documentation (e.g., completed inventory forms). DOE/RL-97-56 also requires walkthroughs to identify artifacts of educational and interpretive value. Before field activity begins, each building/structure requiring documentation will be evaluated for the following information:

- Type of documentation required for each building/structure (Historic Property Inventory Form or Expanded Historic Property Inventory Form)
- Status of the documentation

Walkthroughs of the buildings/structures will be conducted before demolition to finalize all mitigation requirements. CRR documentation requirements for any specific building/structure will be identified/completed before demolition activities begin.

CRR(s) will also be conducted to address debris cleanup. A graded CRR could be developed to address debris cleanup that has been identified to date, as well as cleanup identified in the future, to ensure that adverse effects on potential archaeological sites are avoided. CRR documentation requirements, including site-specific field evaluations, will be identified/completed before debris cleanup begins.

Impacts on cultural resources in the vicinity of the removal action will be mitigated in accordance with DOE/RL-98-10, *Hanford Cultural Resources Management Plan*.

4.5.2 Ecological

Ecological reviews will be completed before work begins in areas where there is potential for adverse effects to sensitive or rare biological resources, consistent with existing routine procedures (DOE/RL-95-11, *Ecological Compliance Assessment Management Plan*). Since all buildings/structures could support ecological resources (e.g., nesting birds or bat roosts), surveys must be conducted prior to decommissioning. Project engineers will consult with the ecological compliance staff in advance of planned activities to allow for sufficient ecological surveys.

If nesting migratory birds are observed, decommissioning will be delayed until after the end of the nesting season. Prior to D4 of a structure, a facility walkdown/survey will be performed during daylight hours to document any evidence that could indicate high numbers of bats that could suggest possible roosting site(s). In the event such evidence is discovered, DOE will be consulted for further recommendations.

No plants or animals listed as threatened, endangered, or candidate species under the federal *Endangered Species Act of 1973* are known to be affected by building/structure decommissioning. Very little native or natural habitat is present in the vicinity of buildings/structures. However, care will be taken to avoid or minimize damage to vegetation, especially shrubs or trees in the vicinity of buildings/structures.

Workers will avoid wildlife that may be found in and around the buildings/structures. Appropriate ecological surveys of debris cleanup sites also will be conducted before field activities begin. Procedures to avoid or mitigate damage to sensitive areas identified during ecological reviews will be established before work begins, including activities on the Hanford Reach National Monument. For example, it is expected that many of the buildings, structures, and debris cleanup sites will have relatively small collections of debris that could be removed without disturbing the surrounding areas. However, debris cleanup requiring vehicles off maintained roadways or the use of heavy equipment and/or excavation will require site-specific evaluations and reviews of the ecological resources when the work is scheduled. If off-road travel is necessary during cleanup, additional disturbance will be minimized to the extent possible, and travel will be planned to avoid sensitive ecological resources identified within the area.

Impacts on ecological resources in the vicinity of the removal action will continue to be mitigated in accordance with DOE/RL-96-32, *Hanford Site Biological Resources Management Plan.*

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5 Project Administration

The following sections describe the management approach for implementing the removal action, including schedule summary information, project team descriptions, training and qualifications, quality assurance (QA), and post-removal action activities.

5.1 Cost Summary

Table 5-1 presents the costs identified in the Tier 2 EE/CA (DOE/RL-2010-54). Nondiscounted costs are present day costs that are not affected by general price inflation (i.e., they represent units of stable purchasing power).

Table 5-1. Projected Costs

Identification	Building/Structure Name	Nondiscounted Cost Estimate ($)
242B	Radioactive Particle Research Laboratory	3,700,000
242BL	Cask Loading Building	811,000
276C	Solvent Handling Building	640,000
241C801	Cesium Load-Out Facility	1,194,000
291AR	Exhaust Air Filter Stack Building	446,000

5.2 Schedule

This removal action is expected to begin following issuance of this RAWP, which is anticipated by February 2019. As discussed in Section 1.2, appendices for the buildings/structures identified in Table 1-1 will be added as appendices to this RAWP when they are scheduled for D4. Appendix A for 242B and 242BL and Appendix B for 276C are included in this revision of the RAWP. The remaining buildings/structures will be added to this RAWP when they are scheduled for D4. New appendices will be added through a TPA change notice and approved by Ecology, the lead regulatory agency. The removal action activities will continue until all 200 East Tier 2 Miscellaneous buildings/structures identified in this RAWP are demolished.

5.3 Project Team

The project team includes the individuals working to accomplish the removal action. Accordingly, the project team includes the lead regulatory agency (Ecology); lead agency (DOE); contractor removal action organization, site project organization, QA organization, radiological control organization, health and safety organization, sample and data management organization, environmental compliance officer, Waste Management Lead, and other contractor and subcontractor staff. The HASP lists the key project team member names, their roles and responsibilities, and their respective organizations.

5.4 Change Management

If a fundamental change to the selected removal action that is not within the scope of work is identified, another EE/CA or an EE/CA addendum and supporting documentation will be prepared to allow DOE to consider a revised removal 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 will cease so that stabilization and/or recovery actions can be identified and implemented. Change management will comply with appropriate contractor procedures.

Determining the significance of the change is the responsibility of DOE. Contractor management is responsible for tracking changes and obtaining appropriate reviews by contractor staff. Contractor management will discuss the change with DOE, and DOE will then discuss the type of change that is necessary with Ecology. Appropriate documentation will follow.

5.5 Personnel Training and Qualifications

Staff experience and capabilities are important in maintaining worker and environmental safety. Knowledge of ongoing operations, understanding of conditions encountered, and lessons learned will ensure continued safe operations.

Training requirements will ensure that personnel are able to work safely in and around radiological areas and maintain ALARA radiation exposures. Safety courses, training materials, site-specific information, and available technologies will be presented to provide adequate training for workers. Records of required training will be maintained in readily accessible personnel files.

Health physics workers are required to be current in HPT qualification training. These courses require passing examinations to demonstrate their understanding of theoretical and applied classroom materials.

Specialized training will be provided, as needed, to instruct workers in the use of nonstandard equipment, performance of abnormal operations, and hazards of specific activities. Specialized training could be provided through on-the-job activities, classroom instruction and testing, or prejob briefings. The depth of training in any discipline will be commensurate with the degree of the hazards involved and the knowledge required for task performance. Some activities will require using expert services as opposed to project staff training.

The contractor training program will provide workers with the knowledge and skills necessary to execute assigned duties safely. A graded approach will be used to ensure that workers receive a level of training commensurate with their responsibility that complies with applicable requirements. Specialized employee training will include prejob safety briefings, plan-of-the-day meetings, and facility/work site orientations. Training and qualifications will be determined, as required by job assignment for specific work activities.

The HASP, RWP, and activity hazards analysis will include specific requirements for project activities conducted, which will include PPE and required training for project personnel.

5.6 Quality Assurance Program

Overall QA for the RAWP will be planned and implemented in accordance with 10 CFR 830, “Nuclear Safety Management,” Subpart A, “Quality Assurance Requirements;” EPA/240/B-01/003, *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5); and SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition, Final Update V*. QA activities will use a graded approach based on potential environmental, safety, health, reliability, and continuity of operation impacts. Other specific activities will include QA implementation, responsibilities and authority, document control, QA records, and audits.

5.7 Post-Removal Action Activities

Following the removal action, the soil and remaining slabs will be visually inspected and surveyed. Although the scope of this removal action does not include soil contamination found under the buildings/structures, if evidence of contamination to surrounding soils is encountered during D4 activities, those soils will be excavated and disposed at ERDF or other EPA-approved facilities. Alternately, if the soil contamination is extensive or unusually complex or if contamination is encountered on remaining slabs or underground structures, DOE will consult with the lead regulatory agency. The parties will determine whether to address the residual contamination within the scope of this NTCRA, or implement temporary measures as part of this action and defer final action to the remedial investigation and remedy selection process by adding the site to the TPA Action Plan (Ecology et al., 1989b), Appendix C, in accordance with RL-TPA-90-0001.

Potential post-removal activities are summarized in the following subsections.

5.7.1 Post-Removal Action Sample Collection

Field investigations (e.g., visual inspections and radiological and/or chemical field screening) will be conducted throughout the D4 process to assess potentially contaminated areas. Although the scope of this removal action does not include soil contamination found under the buildings/structures, if soil contamination surrounding buildings/structures is detected, post-removal contaminated soil excavation may be performed, as identified in Section 2.2.4. Alternatively, post-removal contaminated soil sites may be identified by DOE as new WIDS sites under the TPA (Ecology et al., 1989a) with concurrence from Ecology.

5.7.2 CERCLA Cleanup Documentation

A completion report will be prepared to document the completion of the removal action. This report will summarize the scope of the removal action, the removal activities that were completed, the characterization data collected, the waste types and volume removed, the assessment of the underlying soil (if applicable), and the as-left conditions. This report will support the future remediation action and the eventual disposition of the entire 200 East Area of the Hanford Site.

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6 References

10 CFR 830, "Nuclear Safety Management," Subpart A, "Quality Assurance Requirements," *Code of Federal Regulations*. Available at: http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title10/10cfr830_main_02.tpl.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*. Available at: http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title10/10cfr835_main_02.tpl.

29 CFR 1910.120, "Occupational Safety and Health Standards," "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*. Available at: http://www.gpo.gov/fdsys/pkg/CFR-2010-title29-vol5/xml/CFR-2010-title29-vol5-sec1910-120.xml.

29 CFR 1926.1101, "Safety and Health Regulations for Construction," "Asbestos," *Code of Federal Regulations*. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=37de2bd269b9ab58d11c9c30923b4252&mc=true&node=se29.8.1926_11101&rgn=div8.

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*. Available at: http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol8/xml/CFR-2010-title40-vol8-part61.xml.

61.145, "Standard for Demolition and Renovation."

61.150, "Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations."

Subpart M, "National Emission Standard for Asbestos."

40 CFR 260, "Hazardous Waste Management System: General," *Code of Federal Regulations*. Available at: http://www.ecfr.gov/cgi-bin/text-idx?SID=d1942f7836418ae38dd06846c0d0ca9f&mc=true&node=pt40.26.260&rgn=div5.

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=d1942f7836418ae38dd06846c0d0ca9f&mc=true&node=pt40.26.264&rgn=div5.

264.17, "General Requirements for Ignitable, Reactive, or Incompatible Wastes."

264.554, "Staging Piles."

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*. Available at: http://www.ecfr.gov/cgi-bin/text-idx?SID=d1942f7836418ae38dd06846c0d0ca9f&mc=true&node=pt40.27.268&rgn=div5.

40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations*. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=d1942f7836418ae38dd06846c0d0ca9f&mc=true&node=pt40.27.300&rgn=div5.

300.400, "General."

300.415, "Removal Action."

40 CFR 302, "Designation, Reportable Quantities, and Notification," *Code of Federal Regulations*. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=d1942f7836418ae38dd06846c0d0ca9f&mc=true&node=pt40.27.302&rgn=div5.

40 CFR 355, "Emergency Planning and Notification," *Code of Federal Regulations*. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=d1942f7836418ae38dd06846c0d0ca9f&mc=true&node=pt40.27.355&rgn=div5.

40 CFR 61.92, "National Emission Standards for Hazardous Air Pollutants," "Standard," *Code of Federal Regulations*. Available at: https://ecfr.io/Title-40/se40.10.61_192.

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations*. Available at: http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr761_main_02.tpl.

761.79, "Decontamination Standards and Procedures."

Atomic Energy Act of 1954, as amended, 42 USC 2011, Pub. L. 83-703, 68 Stat. 919. Available at: https://science.energy.gov/~/media/bes/pdf/nureg_0980_v1_no7_june2005.pdf.

Clean Air Act of 1990, Pub. L. 101-549, as amended, 42 USC 7401, et seq. Available at: http://www.epa.gov/air/caa/.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq., Pub. L. 107-377, December 31, 2002. Available at: https://www.csu.edu/cerc/researchreports/documents/CERCLASummary1980.pdf.

DOE/RL-91-50, 2015, *Hanford Site Environmental Monitoring Plan*, Rev. 7, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/files.cfm/DOE-RL-91-50-Rev-7.pdf.

DOE/RL-94-02, 2014, *Hanford Emergency Management Plan*, Rev. 6, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://www.emcbc.doe.gov/SEB/HMESC/Documents/Document%20Library/Plans/Hanford%20Emergency%20Management%20Plan_DOE_RL-94-02_REV._6.pdf.

DOE/RL-95-11, 2006, *Ecological Compliance Assessment Management Plan*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/pdf.cfm?accession=0084174.

DOE/RL-96-32, 2013, *Hanford Site Biological Resources Management Plan*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/files.cfm/DOE-RL-96-32-01.pdf.

DOE/RL-97-56, 1998, *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0081103H.

DOE/RL-98-10, 2003, *Hanford Cultural Resources Management Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/pdf.cfm?accession=0088380.

DOE/RL-2006-29, 2016, *Calculating Potential-to-Emit Radiological Releases and Doses*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0072749H.

DOE/RL-2010-54, 2010, *Engineering Evaluation/Cost Analysis for 200 East Area Tier 2 Buildings/Structures*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/pdf.cfm?accession=0084114.

DOE/RL-2010-102, 2011, *Action Memorandum for Decontamination, Deactivation, Decommissioning, and Demolition (D4) Activities for 200 East Tier 2 Buildings/Structures*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/pdf.cfm?accession=0072140H.

DOE/RL-2017-47, 2017, *Sampling and Analysis Plan for the 200 East Tier 2 Miscellaneous Building/Structures*, Decisional Draft, CH2M HILL Plateau Remediation Company, Richland, Washington.

Ecology, EPA, and DOE, 1989a, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: http://www.hanford.gov/?page=81.

Ecology, EPA, and DOE, 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: http://www.hanford.gov/?page=82.

Endangered Species Act of 1973, Pub. L. 93-205, as amended, 7 USC 136, 16 USC 1531, et seq. Available at: http://www.nmfs.noaa.gov/pr/pdfs/laws/esa.pdf.

EPA, 1995, *Record of Decision U.S. DOE Hanford Environmental Restoration Disposal Facility Hanford Site Benton County, Washington*, U.S. Environmental Protection Agency, U.S. Department of Energy, and Washington State Department of Ecology, Seattle, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=D196041064.

EPA/240/B-01/003, 2001, *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5, Office of Environmental Information, U.S. Environmental Protection Agency, Washington, D.C. Available at: https://www.epa.gov/sites/production/files/2016-06/documents/r5-final_0.pdf.

ERDF-00011, 2016, *Environmental Restoration Disposal Facility Waste Acceptance Criteria, formerly WCH-191 Rev 4*, Rev. 0, CH2M HILL Plateau Remediation Company, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0068234H.

Executive Order 12580, 1987, *Superfund Implementation*, Ronald W. Reagan, January 23. Available at: http://www.archives.gov/federal-register/codification/executive-order/12580.html.

National Historic Preservation Act of 1966, Pub. L. 89-665, as amended, 16 USC 470, et seq. Available at: https://www.nps.gov/history/local-law/nhpa1966.htm.

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq. Available at: https://www.gpo.gov/fdsys/pkg/STATUTE-90/pdf/STATUTE-90-Pg2795.pdf.

RL-TPA-90-0001, 2007, *Tri-Party Agreement Handbook Management Procedures*, Guideline Number TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)," Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www.hanford.gov/files.cfm/TPA-MP14.pdf.

SW-846, 2015, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update V*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C. Available at: https://www.epa.gov/hw-sw846/sw-846-compendium.

Toxic Substances Control Act of 1976, Pub. L. 107-377, as amended, 15 USC 2601, et seq. Available at: https://www.gpo.gov/fdsys/pkg/STATUTE-90/pdf/STATUTE-90-Pg2003.pdf.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-303.

303-140, "Land Disposal Restrictions."

303-200, "Accumulating Dangerous Waste On-Site."

WAC 173-400, "General Regulations for Air Pollution Sources," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-400.

400-040, "General Standards for Maximum Emissions,"

400-113, "Requirements for New Sources in Attainment or Unclassifiable Areas,"

WAC 173-460, "Controls for New Sources of Toxic Air Pollutants," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-460.

460-060, "Control Technology Requirements."

460-150, "Table of ASIL, SQER and de Minimis Emission Values."

WAC 173-480-070, "Ambient Air Quality Standards and Emission Limits for Radionuclides," "Emission Monitoring and Compliance Procedures," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-480-070.

WAC 246-247-075, "Radiation Protection—Air Emissions," "Monitoring, Testing, and Quality Assurance," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=246-247-075.

Appendix A

242B Radioactive Particle Research Laboratory and 242BL Cask Loading Building

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Terms

D4	decontamination, deactivation, decommissioning, and demolition
ERDF	Environmental Restoration and Disposal Facility
HEPA	high-efficiency particulate air
MEI	maximally exposed individual
PNNL	Pacific Northwest National Laboratory
PTE	potential to emit

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A1 Introduction

This appendix addresses the non-time-critical removal action of the 242B Radioactive Particle Research Laboratory and 242BL Cask Loading Building. This removal action will be implemented as specified per DOE/RL-2010-102, *Action Memorandum for Decontamination, Deactivation, Decommissioning and Demolition (D4) Activities for 200 East Tier 2 Buildings/Structures*.

The lead agency for this removal action is the U.S. Department of Energy. The Washington State Department of Ecology is the lead regulatory agency. The 242B and 242BL Buildings are located in the 200 East Area of the Hanford Site. Figure A-1 identifies the locations and Figure A-2 provides a photograph of the buildings.

Figure A-1. 242B and 242BL Buildings Within the 200 East Area

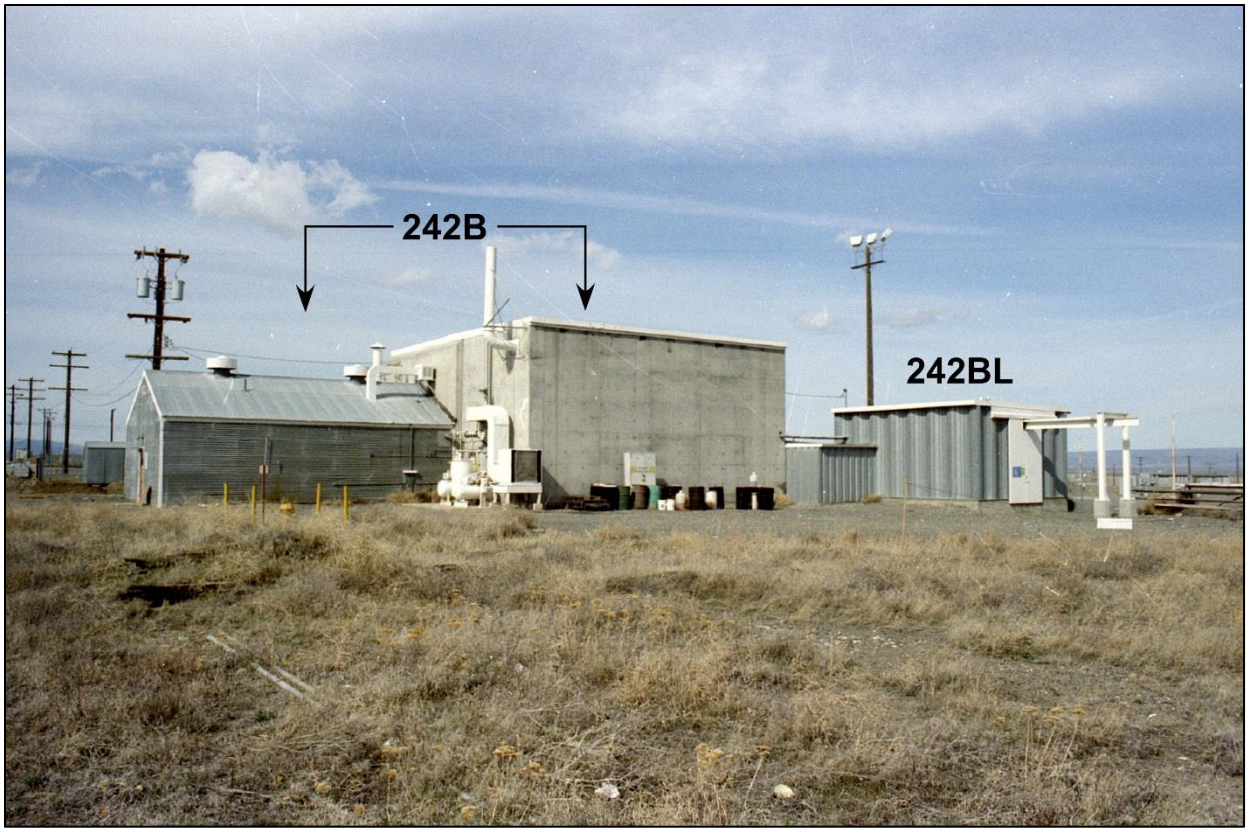

Figure A-2. 242B and 242BL Buildings

A1.1 Physical Description

The 242B and 242BL Buildings are located north of the B Plant Complex and south of the 241B Tank Farm. The two buildings are separate and are connected by a hallway. Figure A-3 provides a floor plan of the buildings.

A1.1.1 242B Radioactive Particle Research Laboratory

The 242B Radioactive Particle Research Laboratory was built in 1951 and initially served as an evaporator. The building is 3,067 ft^2 and is constructed of reinforced concrete with an attached metal building. The 242B Building consists of two sections: the north operating area (rooms 1 through 4) and the south service area (rooms 5 through 11). The building was reroofed in 1969 and repaired in 1996. Equipment such as a hydrostatic pump, heaters, control panels, a rupture test loop, a wind tunnel, aerosol tanks, and associated piping remains in the facility.

Room 1 contains remnants of the Crud Product Transfer Facility loop, a project that supported the C and K Reactors. The room was used to store cobalt-60 and contains miscellaneous equipment racks, carts, and piping, as well as an autoclave that stands vertically on the north wall. Remnants of a breathing air compressor and ventilation ducts are located on the south side of the room. A contaminated sump that is dry and does not have a drain line is located on the west wall, and fixed contamination remains on the floors from the evaporator era. Some sections of floor were chipped up and covered with concrete, while other areas were covered with paint.

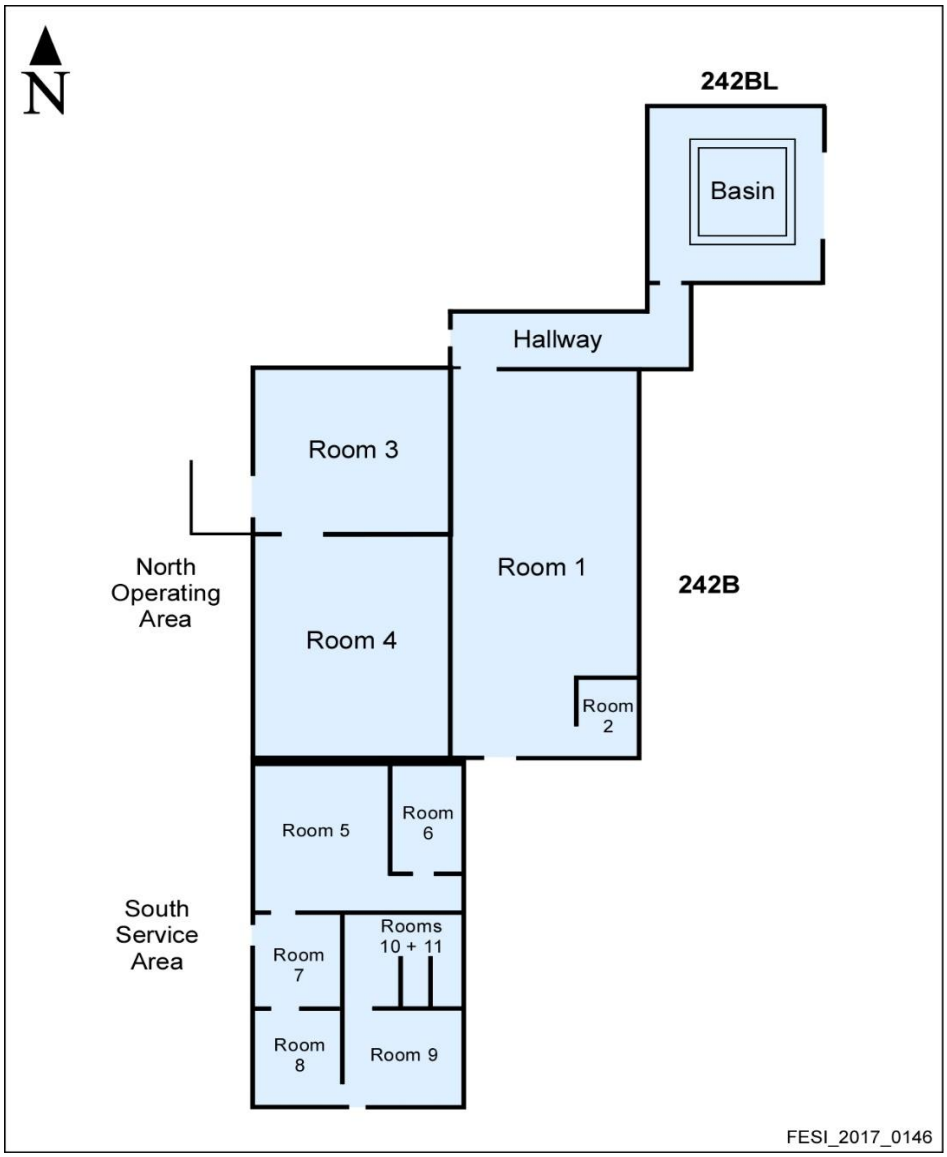

Figure A-3. Floor Plan of the 242B and 242BL Buildings

Room 2 is located in the southeast corner of room 1 and is made of concrete blocks. The room contains the N Reactor fuel element rupture test loop, pipes, and a metals filter, all of which are contaminated and covered with lead brick shielding. There are several shielded N Reactor steam tubes on the floor. High-efficiency particulate air (HEPA) filters remain on the ceiling.

Room 3 was a former storage area with two levels. The main level contained evaporator equipment that was later removed. A hood is located on the south wall, and sheets of lead shielding lie beneath the hood to cover residual fixed contamination from the original evaporator equipment. The upstairs part of the room contains furniture and empty shelving. The floors on the first floor of this room were recemented after the evaporator was removed.

Room 4 was originally the evaporator cell and was last used as the Radioactive Aerosol Release Laboratory. Process vessels, waste tanks, hoods, ductwork, HEPA filters, sinks, electrical/instrument controls, and miscellaneous equipment from the Pacific Northwest National Laboratory (PNNL) research era remain in the room. Fixed contamination from previous operations is still present in room 4, and tank interiors are likely contaminated with low levels of uranium. A collection sump with no drain remains under a large tank. There is no evidence of floor drains in the room. The inlet and exhaust ductwork to support aerosol tests is located on the west wall of the building.

Room 5 was used as a control room during the evaporator operation era and later for storage. It contains old piping with asbestos lagging, shelves, and a wooden storage cabinet.

Room 6 has a hood that was used by PNNL for corrosion studies on unirradiated fuel and a sink with capped off drain lines.

Rooms 7 and 8 were storage rooms that are now empty, room 9 was a lunchroom with a small kitchen, room 10 was a restroom, and room 11 was an equipment room with a water heater.

A hallway connects the 242B and 242BL Buildings. Within the hall are remnants of a water purification system and an empty stainless-steel hydrogenated water tank (600 gal capacity). Hydrogen gas cylinders external to the building were used to charge the tank.

A1.1.2 242BL Cask Loading Building

The 242BL Cask Loading Building was constructed in 1963 to support fuel element rupture tests in the 242B Building. The 600 ft^2 metal building contains a pool basin and equipment. The basin is located in the center of the 242BL Building.

The basin is 8 ft wide by 10 ft long by 10 ft deep. It has a capacity of 6,000 gal and is currently about half full. There are no drains in the basin. There is a centrifugal pump in the northwest corner of the 242BL Building that was used to vacuum the basin floor in 1972. The collected material was pumped to a building floor drain that was connected to the 241B Tank Farm. A valve handle that was used to open the drain line to Tank 241B106 is located outside of the exit door on the west end of the hallway. A hoist and cable remain above the pool. Additionally, some pool tools in the basin are propped up in the corner.

A1.2 Process Information

The 242B and 242BL Buildings were used for three missions during operations. The first mission started in 1951 and the last mission ended in 1985. Both buildings are currently under surveillance and maintenance.

A1.2.1 Mission 1: Evaporator – 1951 Through 1954

The first mission was conducted solely within the 242B Building following its construction in 1951. The 242B Building was used as an evaporator facility for the 241B Tank Farm to evaporate cladding/first-cycle waste and reduce the tank supernate until the mission ended in 1954. Following the end of evaporator activities, the 242B Building was internally contaminated. To prepare the facility for the next mission, the interior concrete surfaces were sandblasted or chipped up to remove surface contamination. New cement was placed over remaining areas of contamination to fix it in place. All evaporation related equipment was removed and disposed.

A1.2.2 Mission 2: Fuel Corrosion Testing – 1954 Through 1970

The second mission used both the 242B and 242BL Buildings. The 242BL Building was constructed in 1963 to support fuel element rupture testing and houses a basin that was filled with 6,000 gal of water used to store irradiated fuel elements. The fuel elements were defected in the 327 Building prior to being shipped in casks to the 242BL Building. During operation, the basin housed a cobalt-60 source of up to 60,000 Ci. Although this mission ended in 1970, some fuel element casks remained in the basin until they were removed and disposed in 1981.

During this mission, the 242B Building housed two fuel corrosion test loops: The Crud Product Transfer Facility loop located in room 1 and the N-fuel rupture test loop in room 2. During operation, room 1 of the 242B Building contained a 30,000 Ci source of cobalt-60 within an autoclave and portable storage casks. The source has since been removed. The test loops were used to heat the fuel elements to the point of rupture. Following these rupture tests, the fuel elements were repackaged and sent back to the 327 Building for examination. Equipment and piping, including the test loops associated with the second mission, remain within rooms 1 and 2 of the 242B Building.

A1.2.3 Mission 3: Radioactive Particle Aerosol Testing – 1970 Through 1985

The third mission was conducted solely within rooms 3 and 4 of the 242B Building. From 1970 through 1985, Rooms 3 and 4 of the 242B Building were used by PNNL for research on radioactive particles. The research consisted of accident simulation related to airborne releases of radioactive material using depleted uranium as the particle. Studies, such as burning various types of materials and free fall of powders and liquids, were conducted within a wind tunnel and aerosol tanks in room 4 of the 242B Building. The wind tunnel, aerosol tanks, and associated piping and equipment remain in the facility.

A1.3 Radiological and Nonradiological Contamination

Equipment, piping, HEPA filters, ducts, and six tanks are believed to remain in the 242B Building. The as-left conditions of the tank contents have been confirmed using process knowledge, including characterization information on any remaining liquids. The remaining equipment is expected to be contaminated with radionuclides that were used in the three missions described in Sections A1.2.1 through A1.2.3. Historical documents indicate that no chemicals other than decontamination agents and those generally found in industrial facilities were present in the 242B and 242BL Buildings.

The remaining hazards associated with the 242B and 242BL Buildings include fixed radioactive contamination, biological hazards, and asbestos insulation. Rooms 1 and 2 contain fixed surface contamination as a result of activities from the second mission. Room 2 is currently considered a high radiation area due to a beta and gamma radiation emitting source located behind lead brick shielding. Uranium contamination is expected in the ductwork in room 4.

As the basin water evaporated over the years, additional water was pumped in, and a layer of mineral oil was added. The basin is currently filled with water to a depth of 8 ft and covered with a plastic tarp held in place by cinder blocks to keep out windblown dust. A layer of sediment is expected in the bottom of the basin. Animal intrusions have been an issue at the 242BL Building, so rodent carcasses are also expected in the bottom of the basin. The water and sediment in the 242BL Building basin are radioactively contaminated with cesium-137 and strontium-90. Basin sample results obtained in 2004 also indicate that the sediment contains minor amounts of americium-241 as a result of fuel storage activities. Most of the contamination is believed to be trapped in the scale on the walls.

A radionuclide inventory was calculated in 1995. The calculation estimated that there was 8.85 Ci of cesium-137, 8.85 Ci of strontium-90, and 1.32E-4 Ci of uranium-238 remaining in the 242B and 242BL Buildings. Throughout the various missions of these buildings, a variety of radioactive materials passed through the buildings and contributed to the existing radioactive contamination. The alpha-emitting radionuclides plutonium-239/240 and americium-241 are assumed to be present within the 242BL Basin sediment, based on the facility history of storing N Reactor fuel elements.

Soil surrounding the buildings is contaminated due to diverter box failures by the 241B Tank Farm operations. Historically, Tank 241B106 would burp and contaminate the surrounding areas.

A2 Removal Action Activities

Decontamination, deactivation, decommissioning, and demolition (D4) activities for the 242B and 242BL Buildings include demolition of the buildings to slab-on-grade and disposal of demolition waste. This includes all remaining piping, tanks, and equipment inside and outside the buildings. Water from the 242BL Basin will be pumped out, and the basin will be grouted, stabilized, or removed, as necessary.

The following waste streams are anticipated to be generated from these removal activities:

- D4 debris (e.g., structural materials, concrete, wood, rebar, metal/plastic pipes, wire, equipment, pumps, tanks, compressors, ductwork, and electrical components)
- Low-level waste and low-level mixed waste
- Liquids (e.g., decontamination liquids)
- Contaminated basin water and sediment
- Spent/excess chemicals/reagents and used oils
- Miscellaneous solid waste (e.g., rubber, glass, paper, personal protective equipment, cloth, plastic, wipes, wood, equipment, tools, pumps, wire, metal casing, plastic piping, and sample returns)
- Polychlorinated biphenyl waste
- Asbestos and asbestos-containing material
- Biological waste
- Soil

Waste generated through implementation of these removal actions will be disposed at the Environmental Restoration and Disposal Facility (ERDF) or another U.S. Environmental Protection Agency-approved facility. The demolition method is discussed in Chapter 2 in the main text of this document. Basin water will be either treated (e.g., at the Effluent Treatment Facility) or solidified and disposed at ERDF.

The 242B and 242BL Buildings are radiologically contaminated, and potential radionuclide air emissions could be generated from the D4 activities. The air emission calculation is documented in ECF-HANFORD-17-00084, *Radiological and Toxic Air Emission for 242B and 242BL Buildings*.

The annual unabated potential to emit (PTE) and resultant total effective dose equivalent calculations for the maximally exposed individual (MEI) use estimated holdup in the 242B and 242BL Buildings and then apply dose-per-unit-release factors from DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*. The PTE calculation estimates a total effective dose equivalent of 8.28E-03 mrem/yr to the offsite MEI. Because the PTE is less than 0.1 mrem/yr, this activity is not subject to continuous

emissions monitoring as required by WAC 246-247-075, “Radiation Protection – Air Emissions,” “Monitoring, Testing and Quality Assurance.” Ambient air monitoring and radiological surveys will be provided to meet the requirement for periodic confirmatory measurements.

Currently, there are four existing near-facility ambient air monitoring stations surrounding the 242B and 242BL Buildings (Figure A-4). These four stations (N019, N967, N973, and N976) do not provide real-time data so their bi-weekly data will be used as indicators along with the worksite monitoring data for overall trending of the effectiveness of the contamination control measures. Section 4.3.5 of the main text of this removal action work plan describes the monitoring requirements associated with near-facility ambient air monitoring stations.

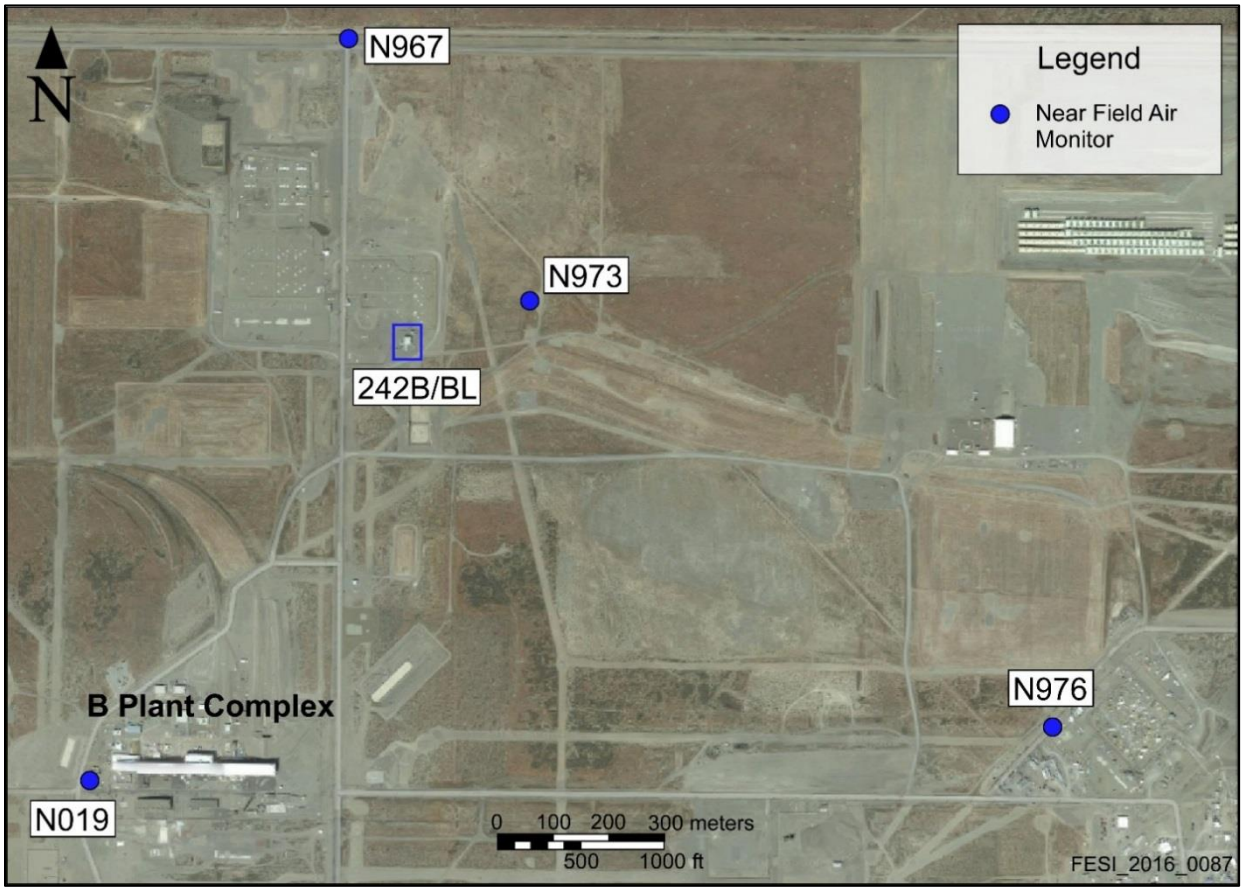

Figure A-4. Near-Field Monitoring Locations

The removal activities for the 242B and 242BL Buildings are considered complete after the structures have been demolished to slab-on-grade, the basin has been drained and backfilled/grouted, and all waste generated from demolition activity has been removed. The remaining slab and surrounding soil will be inspected. A radiological survey and asbestos walkdown will be performed. The site may be leveled and stabilized, as needed.

A3 Cost Summary and Schedule

The projected discounted costs for the removal action of the 242B and 242BL Buildings are $3,700,000 and $811,000, respectively. This estimate was performed in 2010 per DOE/RL-2010-54, *Engineering Evaluation/Cost Analysis for 200 East Area Tier 2 Buildings/Structures*. The accuracy range of the cost estimate is –30% to +50% based on the best available information regarding the anticipated scope of the removal action.

The removal action is anticipated to begin in fiscal year 2019. Supporting work plans and procedures will be prepared to provide detailed work instructions, as needed.

A4 Post-Removal Action Activities

Post-removal activities will be performed as specified in Section 5.7 of the main text of this removal action work plan. A completion report will be prepared to document completion of the removal action.

A5 References

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*. Available at: http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol8/xml/CFR-2010-title40-vol8-part61.xml.

DOE/RL-2006-29, 2016, *Calculating Potential-to-Emit Radiological Releases and Doses*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0072749H.

DOE/RL-2010-54, 2010, *Engineering Evaluation/Cost Analysis for 200 East Area Tier 2 Buildings/Structures*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0084114.

DOE/RL-2010-102, 2011, *Action Memorandum for Decontamination, Deactivation, Decommissioning, and Demolition (D4) Activities for 200 East Tier 2 Buildings/Structures*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0072140H.

ECF-HANFORD-17-0084, 2018, *Radiological and Toxic Air Emission for 242B and 242BL Buildings*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0065730H.

WAC 246-247-075, "Radiation Protection—Air Emissions," "Monitoring, Testing, and Quality Assurance," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=246-247-075.

Appendix B

276C Solvent Handling Building

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Terms

D4	decontamination, deactivation, decommissioning, and demolition
MEI	maximally exposed individual
PTE	potential to emit
RAWP	removal action work plan

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B1 Introduction

This appendix addresses the non-time-critical removal action for the 276C Solvent Handling Building. This removal action will be implemented as specified per DOE/RL-2010-102, *Action Memorandum for Decontamination, Deactivation, Decommissioning and Demolition (D4) Activities for 200 East Tier 2 Buildings/Structures*.

The lead agency for this removal action is the U.S. Department of Energy, and the lead regulatory agency is the Washington State Department of Ecology. Figure B-1 identifies the location of the 276C Building within the Hot Semiworks Complex in the 200 East Area of the Hanford Site, and Figure B-2 provides a photograph of the 276C Building.

B1.1 Physical Description

The 276C Solvent Handling Building was built in 1952 and is a four-story structure that is 18 ft wide by 49 ft long and extends approximately 46 ft abovegrade, with a total floor area of 2,300 ft^2. It has a steel frame with metal siding, concrete floors, and a concrete roof. All exposed steel framework is covered with 1 in. of heat-resistant plaster.

Figure B-1. 276C Solvent Handling Building Within the 200 East Area

Figure B-2. 276C Solvent Handling Building

B1.2 Process Information

The 276C Solvent Handling Building contained equipment and tanks for treatment and storage of process solvents used to recover and purify strontium in the 201C Hot Process Building. The solvents stored and used in the 276C Building included diethylenetriaminepentaacetic acid, Di-(2-ethylhexyl)phosphoric acid, tributyl phosphate, sodium hydroxide, and nitric acid. One of the tanks was radiologically contaminated; this tank was later removed from the building.

Equipment used for solvent treatment was located on the first level, with the chemical addition tanks on the second level mezzanine. Storage tanks for clean solvents were on the third and fourth floors. There are removable panels on the top two floors to allow access to large equipment. The heating, ventilation, and air conditioning system was located on the second level, and a power control room was attached to the south side of the building (SD-DD-FL-001, *Rockwell Retired Contaminated Facility Listing and Description*).

The building was subsequently used for storing equipment unrelated to any Strontium Semiworks activities. The first floor was used as a rigging loft, but the remaining floors were unused. The building is not currently entered and is assumed to contain both industrial and biological hazards. Large quantities of bird droppings are present at access points to the building.

The 276C Solvent Handling Building was decommissioned in 1984. It was documented that all radioactively contaminated equipment within the building was removed and all exposed surfaces were decontaminated, although this has not been confirmed. The assumption was made in 1993 that 10% of the original inventory is still present (BHI-01173, *Auditable Safety Analysis for Surveillance and Maintenance of the 241-CX Tank System*). A bounding inventory of 0.1 Ci for plutonium (assumed to be plutonium-239) and 1.0 Ci beta (assumed to be strontium-90) was assumed to remain as surface contamination within the facility.

B1.3 Radiological and Nonradiological Contamination

Table B-l contains a summary of historical information regarding the radioactive inventory of the 276C Building. The facility does not present significant nonradiological hazards (toxic materials or carcinogens) because of previous decontamination efforts in 1984 (BHI-01173).

Table B-1. 276C Radiological Inventory

Year	Inventory	Technical Basis/Source Document
1982	1 Ci Pu 10 Ci beta	No basis is provided for estimated inventory (SD-DD-FL-001, *Rockwell Retired Contaminated Facility Listing and Description*).
1993	Low levels (estimated 0.1 Ci Pu; 1.0 Ci beta)	Based on BHI-01173, *Auditable Safety Analysis for Surveillance and Maintenance of the 241-CX Tank System*. BHI-01173 assumes that decontamination efforts removed the contaminated equipment and only contaminated surfaces remain. It is conservatively estimated that 10% of original inventory is still present as surface contamination.

Past surveillance records indicate several issues with the building, such as open windows, massive amounts of bird droppings, potentially asbestos-containing material scattered around the building, and extension cords and hoses coming out of the building. A 2010 assessment determined the 276C Solvent Handling Building to be a Beryllium Clean Facility. Soil surrounding the 276C Building was stabilized in 1999.

B2 Removal Action Activities

Decontamination, deactivation, decommissioning, and demolition (D4) activities of the 276C Building include demolition of the building to slab-on-grade and removal of demolition waste. The following waste streams are anticipated to be generated from this removal action:

- D4 debris (e.g., structural materials, concrete, wood, rebar, metal/plastic pipes, wire, equipment, pumps, tanks, boilers, compressors, ductwork, and electrical components)
- Biological waste
- Asbestos and asbestos-containing material
- Soil

Waste generated through implementation of this removal action will be disposed at the Environmental Restoration and Disposal Facility or another EPA approved facility. The demolition method is discussed in Chapter 2 in the main text of the removal action work plan (RAWP).

The 276C Building is radiologically contaminated and potential radionuclide air emissions could be generated from the D4 activities. The air emission calculation for the 276C Building removal action is documented in ECF-HANFORD-17-0036, *Radiological and Toxic Air Emissions for the 276C Solvent Handling Facility*.

The annual unabated potential to emit (PTE) and resultant total effective dose equivalent calculations for the maximally exposed individual (MEI) use estimated holdup in the 276C Building and then apply dose-per-unit-release factors from DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*. The PTE calculation estimates a total effective dose equivalent of 4.71E-03 mrem/yr to the offsite MEI. Because the PTE is less than 0.1 mrem/yr, this activity is not subject to continuous emissions monitoring as required by WAC 246-247-075, "Radiation Protection – Air Emissions," "Monitoring, Testing and Quality Assurance." Ambient air monitoring and radiological surveys will be provided to meet the requirement for periodic confirmatory measurements.

Currently, there are four existing near-facility ambient air monitoring stations surrounding the 276C Building (Figure B-3). These four stations (N019, N970, N973, and N976) do not provide real-time data so their bi-weekly data will be used as indicators along with the worksite monitoring data for overall trending of the effectiveness of the contamination control measures. Section 4.3.5 of the main text of the RAWP describes the monitoring requirements associated with near-facility ambient air monitoring stations.

The removal activities for the 276C Building are considered complete after the structure has been demolished to slab-on-grade and all waste generated from demolition activity has been removed. The remaining slab and surrounding soil will be inspected. A radiological survey and asbestos walkdown will be performed. The site may be leveled and stabilized, as needed.

B3 Cost Summary and Schedule

The projected discounted cost for the removal action of the 276C Solvent Handling Building is $640,000. This estimate was performed in 2010 per DOE/RL-2010-54, *Engineering Evaluation/Cost Analysis for 200 East Area Tier 2 Buildings/Structures*. The accuracy range of the cost estimate is –30% to +50%. The cost estimate was based on the best available information regarding the anticipated scope of the removal action.

The removal action is anticipated to begin in fiscal year 2019. Supporting work plans and procedures will be prepared to provide detailed work instruction, as needed.

B4 Post-Removal Action Activities

Post-removal activities will be performed, as specified in Section 5.7 of the main text of this RAWP. A completion report will be prepared to document completion of the removal action.

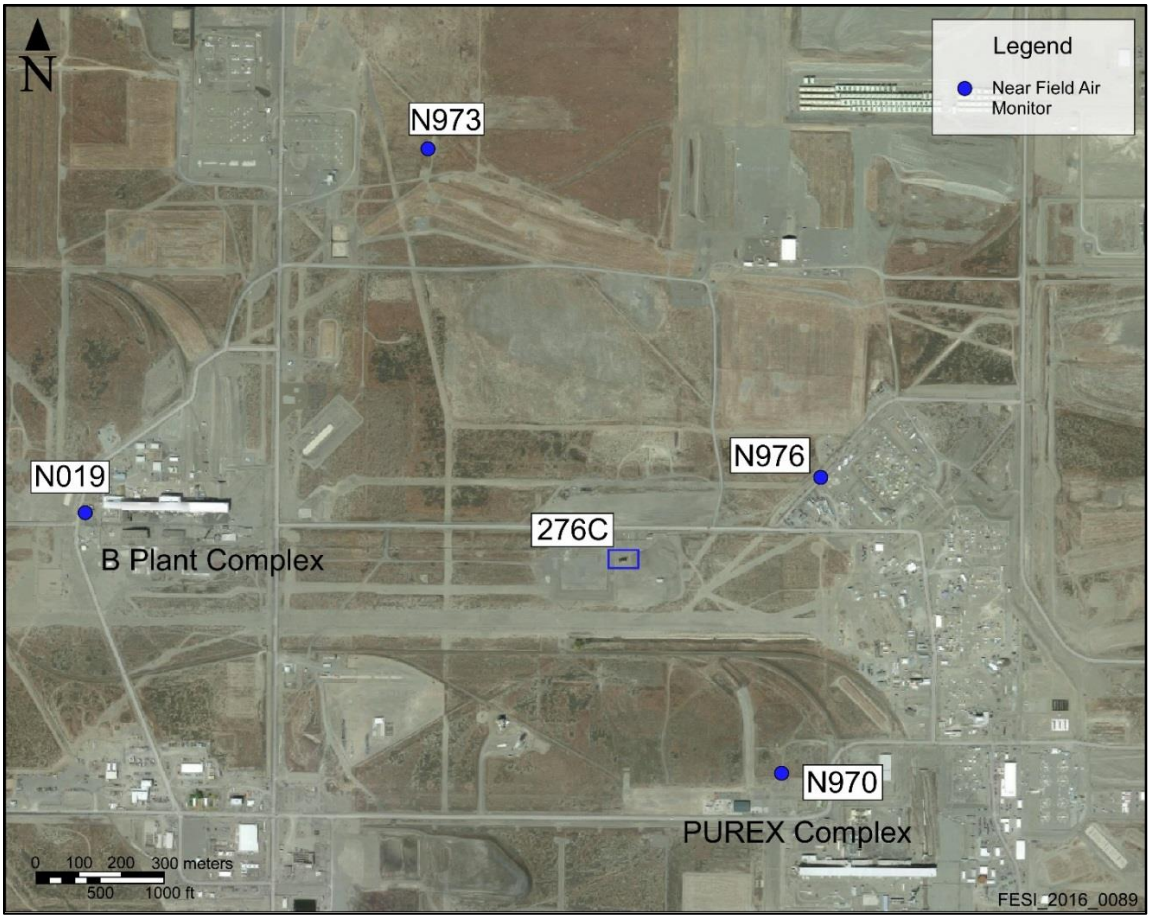

Figure B-3. Near-Field Monitoring Locations

B5 References

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*. Available at: http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol8/xml/CFR-2010-title40-vol8-part61.xml.

BHI-01173, 2000, *Auditable Safety Analysis for Surveillance and Maintenance of the 241-CX Tank System*, Rev. 1, Bechtel Hanford, Inc., Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0071638H.

DOE/RL-2006-29, 2016, *Calculating Potential-to-Emit Radiological Releases and Doses*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0072749H.

DOE/RL-2010-54, 2010, *Engineering Evaluation/Cost Analysis for 200 East Area Tier 2 Buildings/Structures*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0084114.

DOE/RL-2010-102, 2011, *Action Memorandum for Decontamination, Deactivation, Decommissioning, and Demolition (D4) Activities for the 200 East Tier 2 Buildings/Structures*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0072140H.

ECF-HANFORD-17-0036, 2017, *Radiological and Toxic Air Emissions for the 276C Solvent Handling Facility*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0068222H.

SD-DD-FL-001, 1982, *Rockwell Retired Contaminated Facility Listing and Description*, Rev. 0, Rockwell Hanford Operations, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0077155H.

WAC 246-247-075, "Radiation Protection—Air Emissions," "Monitoring, Testing, and Quality Assurance," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=246-247-075.