U.S. Department of Energy
Hanford Site

22-PFD-003996 December 28, 2022

Mr. Craig E. Cameron, Project Manager
Superfund and Emergency Management Division
Site Cleanup Section 4
U.S. Environmental Protection Agency
825 Jadwin Avenue, Suite 210
Richland, Washington 99352

Dear Mr. Cameron:

REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR WASTE SITES IN THE 200-CW-3 OPERABLE UNIT, DOE/RL-2007-55, REVISION 1

This letter transmits the Remedial Design/Remedial Action Work Plan for Waste Sites in the 200-CW-3 Operable Unit, DOE/RL-2007-55, Revision 1 (Attachment 1), for your information. The Review Comment Record is also included (Attachment 2). If you have any questions, please contact me, or your staff may contact Anders Wiborg, Operations Activities Team Lead, Project and Facilities Division, on (509) 376-9238.

Sincerely,

Anders J. Wiborg

Digitally signed by Anders J. Wiborg
Date: 2022.12.28 13:48:17 -08'00'

Mark S. French, Director
Project and Facilities Division

PFD:PGE

Attachments

cc: See page 2

cc w/attachs:
D. J. Alexander, Ecology
J. Bell, NPT
D. B. Bowen, Ecology
A. Buck, Wanapum
J. Catrell, HAB
L. Contreras, YN
D. R. Einan, EPA
A. C. McCartney, EPA
M. Menard, Ecology
M. Murphy, CTUIR
S. N. Schleif, Ecology
K. R. Welsch, Ecology
M. Woods, ODOE
Administrative Record
Environmental Portal

cc w/o attach:
S. L. Brasher, HMIS
B. L. Cathel, CPCCo
S. W. Davis, HMIS
J. A. Hulstrom, CPCCo
L. C. Huntoon, CPCCo

Attachment 1
22-PFD-003996

Remedial Design/Remedial Action Work Plan for the Waste Sites in the
200-CW-3 Operable Unit
DOE/RL-2007-55, Revision 1

(91 pages including cover sheet)

DOE/RL-2007-55
Revision 1

REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR WASTE SITES IN THE 200-CW-3 OPERABLE UNIT

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

P.O. Box 550
Richland, Washington 99352

DOE/RL-2007-55
Revision 1

REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR WASTE SITES IN THE 200-CW-3 OPERABLE UNIT

Date Published
November 2022

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 Sarah Harrison at 2:44 pm, Nov 28, 2022

Release Approval Date

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Signature Page

Title: *Remedial Design/Remedial Action Work Plan for Waste Sites in the 200-CW-3 Operable Unit*

	MARK FRENCH Digitally signed by MARK FRENCH Date: 2022.11.17 13:49:28 -08'00'	
Print Name U.S. Department of Energy, Richland Operations Office	Signature	Date
	CRAIG CAMERON Digitally signed by CRAIG CAMERON Date: 2022.11.21 14:56:51 -08'00'	
Print Name U.S. Environmental Protection Agency	Signature	Date

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Terms

ACM	asbestos-containing material
ALARA	as low as reasonably achievable
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BMP	best management practice
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CPCCo	Central Plateau Cleanup Company
CS/NFA	confirmatory sampling/no further action
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
ECF	environmental calculation file
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ESD	explanation of significant differences
HASP	health and safety plan
IC	institutional control
LDR	land disposal restriction
MEI	maximally exposed individual
NCP	"National Oil and Hazardous Substances Pollution Contingency Plan," referred to as the National Contingency Plan
NFM	near-facility monitoring
NPL	National Priorities List
OU	operable unit
PCB	polychlorinated biphenyl
PCM	periodic confirmatory measurement
PPE	personal protective equipment

PTE	potential-to-emit
QA	quality assurance
QC	quality control
RAO	remedial action objective
RCRA	*Resource Conservation and Recovery Act of 1976*
RD/RA	remedial design/remedial action
ROD	record of decision
RSVP	remaining sites verification package
RTD	removal, treatment (as required), and disposal
RWP	radiological work permit
SAP	sampling and analysis plan
SPA	staging pile area
SWDP	state waste discharge permit
TBC	to be considered
TEDE	total effective dose equivalent
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)*
TRU	transuranic
TRUM	transuranic mixed
TSCA	*Toxic Substances Control Act*

1 Introduction

The U.S. Department of Energy (DOE) Hanford Site is a 1,500 km^2 (580 mi^2) federal facility located in southeastern Washington State along the Columbia River (Figure 1-1). For administrative purposes, the Hanford Site was divided into four National Priorities List (NPL) sites (40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," hereinafter called the National Contingency Plan [NCP], Appendix B, "National Priorities List") under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) in 1989, one of which is the 200 Area.
In anticipation of the NPL Appendix B listing, DOE, the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) entered into the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989a; hereinafter called the Tri-Party Agreement), in May 1989, which established a procedural framework and schedule for developing, implementing, and monitoring CERCLA response actions and *Resource Conservation and Recovery Act of 1976* (RCRA) compliance and permitting on the Hanford Site.

The 200 Area (CERCLA site identification number WA1890090078) includes the Central Plateau areas of the Hanford Site in Benton County, Washington. The 200 Area is further divided into an Inner Area and an Outer Area. The 200-CW-3 Operable Unit (OU) is part of the Outer Area within the Hanford Site 200 Area. Figure 1-1 shows the location and size of the 200 Area NPL site, which is approximately 190 km^2 (75 mi^2) near the center of the Hanford Site. The 200-CW-3 source OU encompasses waste sites within the Outer Area of the Central Plateau. This remedial design (RD)/remedial action (RA) work plan addresses the waste sites in the 200-CW-3 OU.

The U.S. Department of Energy, Richland Operations Office (DOE-RL) is the lead agency responsible to perform the RA, and EPA is the lead regulatory agency as identified in Section 5.6 and Appendix C of the Tri-Party Agreement (Ecology et al., 1989a).

The 200-CW-3 OU is included in EPA/ROD/R10-99/039, *EPA Superfund Record of Decision Hanford 200 Area (USDOE) and Hanford 100 Area (USDOE)* (hereinafter called the Remaining Sites Record of Decision [ROD]). This interim action ROD was intended to streamline the decision-making process and support the DOE vision of shrinking the area of land occupied by DOE at the Hanford Site. The Remaining Sites ROD contains provisions for removal, treatment (as required), and disposal (RTD) of miscellaneous sites not covered under prior RODs, as well as confirmatory sampling at sites identified as candidates for no action.

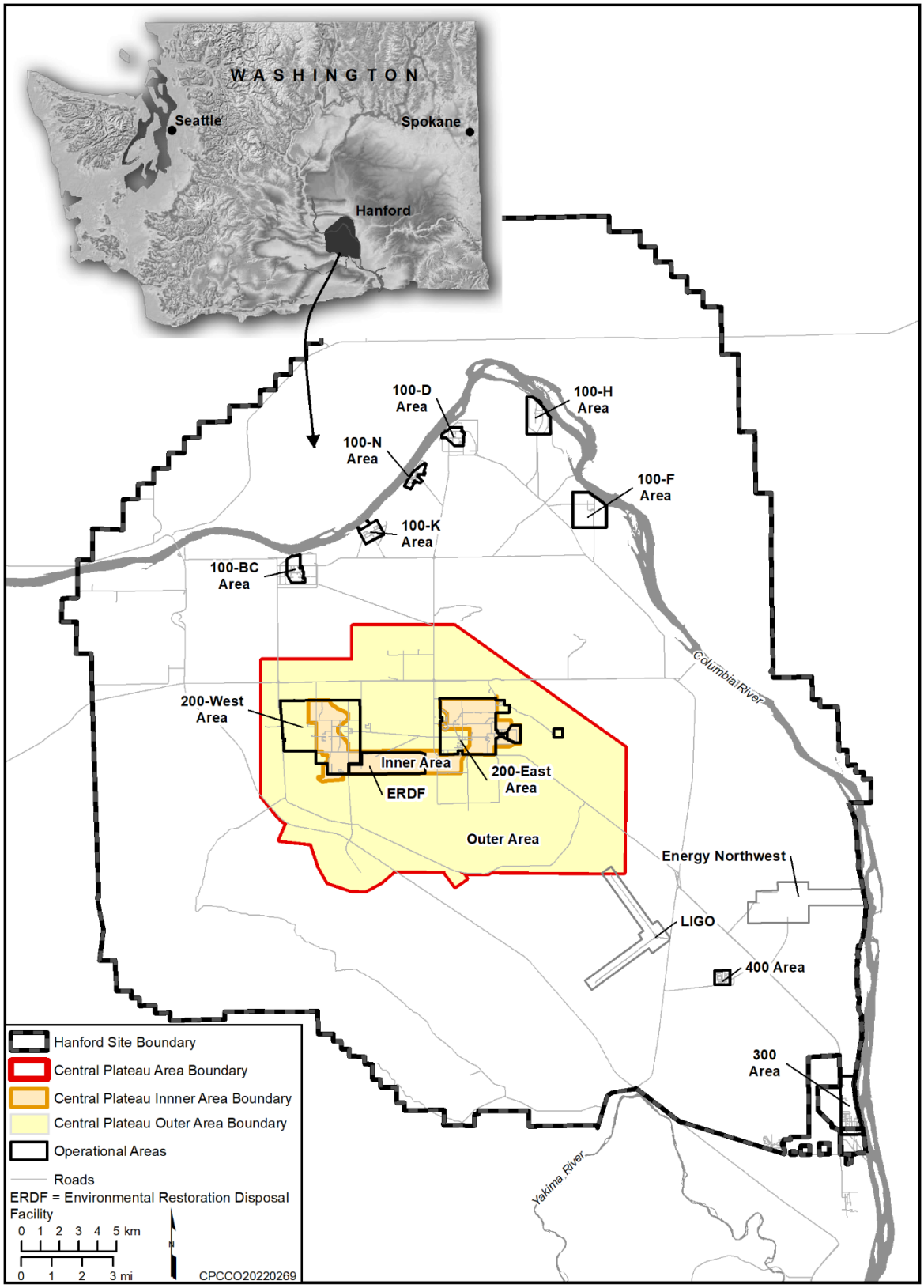

Figure 1-1. Hanford Site and Central Plateau Area

Originally, the 200-CW-3 OU included 16 waste sites located in the 200 North Area. These sites included dumping sites, pipelines, ponds, septic tanks, trenches, and unplanned releases. These sites were remediated between 2007 and 2011 (DOE/RL-2011-58, *200-CW-3 Operable Unit Interim Remedial Action Report*). In 2009, an explanation of significant differences (ESD) (EPA et al., 2009, *Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision, Hanford Site, Benton County, Washington*) was issued that incorporated the use of the plug-in approach for the 200-CW-3 OU. The 2009 ESD provided the regulatory framework for a "plug-in" approach for input to remediation decisions for analogous sites instead of a rigorous site characterization effort that is often conducted during a remedial investigation. The plug-in approach is proposed for any waste site that is similar to the sites addressed in the Remaining Sites ROD (EPA/ROD/R10-99/039). The plug-in approach allows the RA to begin much more quickly at a site and without the need for redundant remedy selection processes. Because these sites need further evaluation, the "observational approach" can be used to allow for remediation of waste sites with limited information using a "test as you go" approach to determine the nature and extent of contamination until cleanup goals have been met. Additional waste sites are being added to the 200-CW-3 OU remedy through the plug-in approach. Specific waste site information is provided in Appendix A of this RD/RA work plan.

The RA for the 200-CW-3 OU will minimize the release or threat of release of hazardous substances that pose a risk to human health and the environment. Completion of the RA will provide an end state consistent with the Remaining Sites ROD (EPA/ROD/R10-99/039). When this RD/RA work plan is approved, it will direct future RAs and will replace all interim action RD/RA work plan requirements. The following documents have been implemented for the 200-CW-3 OU interim action decisions.

- DOE/RL-2006-65, *Sampling and Analysis Plan for Remediation of Select 200 North Area Waste Sites (216-N-2, -3, -5, and -7) in the 200-CW-3 Operable Unit* (January 2007)
- DOE/RL-2006-69, *Remedial Design/Remedial Action Work Plan for Select 200 North Area Waste Sites (216-N-2,-3,-5, and -7) in the 200-CW-3 Operable Unit* (February 2007)
- DOE/RL-2007-54, *Sampling and Analysis Plan for Remediation of Select 200 North Area Waste Sites Located in the 200-CW-3 Operable Unit* (July 2008; hereinafter called the Sampling and Analysis Plan [SAP]), as modified by Tri-Party Agreement change notice (TPA-CN):
  - TPA-CN-295, *Change Notice for Modifying Approved Documents/Work Plans In Accordance with the Tri-Party Agreement Action, Plan Section 9.0, Documentation and Records: DOE/RL-2007-54, Rev. 0, Sampling and Analysis Plan for Remediation of 200 North Area Waste Sites Located In the 200-CW-3 Operable Unit* (January 2010)
- DOE/RL-2007-55, Rev. 0, *Remedial Design/Remedial Action Work Plan for 200 North Area Waste Sites Located in the 200-CW-3 Operable Unit* (October 2008), as modified by TPA-CNs:
  - TPA-CN-276, *Change Notice for Modifying Approved Documents/Work Plans In Accordance with the Tri-Party Agreement Action Plan, Section 9.0, Documentation and Records: DOE/RL-2007-55, Rev. 0, Remedial Design/Remedial Action Work Plan for 200 North Area Waste Sites Located in the 200-CW-3 Operable Unit* (April 2009)
  - TPA-CN-296, *Change Notice for Modifying Approved Documents/Work Plans In Accordance with the Tri-Party Agreement Action Plan, Section 9.0, Documentation and Records: DOE/RL-2007-55, Rev. 0, Remedial Design/Remedial Action Work Plan for 200 North Area Waste Sites Located in the 200-CW-3 Operable Unit* (January 2010)

1.1 Purpose

This RD/RA work plan describes how the site remedies will be designed and implemented to meet the remedial action objectives (RAOs) identified in the Remaining Sites ROD (EPA/ROD/R10-99/039). It establishes the general size, scope, and character of the RA and identifies the technical requirements. This RD/RA work plan is submitted in accordance with the Remaining Sites ROD and Section 11.6 of Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan* (hereinafter called the Tri-Party Agreement Action Plan). Sampling activities to support this RA will be performed in accordance with the SAP (DOE/RL-2007-54), and this SAP is considered part of this RD/RA work plan. This RD/RA work plan, along with DOE/RL-2007-54, are considered primary documents under the Tri-Party Agreement Action Plan, and require approval from DOE and EPA.

1.2 Scope

This RD/RA work plan provides the plan and schedule for the design and implementing activities necessary for successful implementation of the RA selected in the Remaining Sites ROD (EPA/ROD/R10-99/039). The selected remedy for the 200-CW-3 OU includes RTD and confirmatory sampling/no further action (CS/NFA).

Under the CS/NFA alternative, sampling and analysis (or direct radiological surveys for waste sites contaminated only with radionuclides) will be used to confirm soil contamination is at or below cleanup levels and that no further action is required. If results of confirmatory sampling indicate that contaminant concentrations are above cleanup levels, then the RTD alternative will be implemented.

RTD will be used to remove contaminated soil, structures, and debris from 200-CW-3 OU waste sites via excavation; treat material as necessary to meet disposal facility requirements, protect workers, and prevent unacceptable environmental releases; and dispose of waste. Waste will be disposed at Hanford's Environmental Restoration Disposal Facility (ERDF). The remediated sites will be backfilled, contoured, and native vegetation established. If a decision is made to leave waste in place below 4.6 m (15 ft) below ground surface (bgs), institutional controls (ICs) will be required.

The selected RA for waste sites is listed in Appendix A and includes the following activities, as necessary:

- Characterization activities
- Removal of contaminated soils
- Removal of solid waste
- Removal of piping
- Disposal of generated waste
- Removal of structures
- Stabilization of the area, including underground structures left in place
- Recontouring and backfilling of the area
- Revegetation

1.3 Site Description and Background

The Hanford Site is divided into numerically designated areas that served as the location for reactor, chemical separation, and related activities associated with the production and purification of special nuclear materials and other nuclear activities. The reactors and their support facilities were located along the south shore of the Columbia River in the 100 Area to facilitate access to the large quantities of water

to dissipate the heat generated during reactor operations. The 200 Area, located about 11 km (7 mi) from the Columbia River, contained facilities used to separate, isolate, store, and ship plutonium. The 300 Area, located adjacent to and north of the city of Richland, contained the reactor fuel manufacturing plants and the research and development laboratories. The 400 Area, located 8 km (5 mi) northwest of the 300 Area, contained the Fast Flux Test Facility designed for testing liquid metal reactor systems. The 1100 Area, located directly south of the 300 Area, contained the Hanford Site maintenance services area as well solid waste disposal. The 600 Area consisted of facilities that served more than one specific area or, in some cases, the entire project.

The 200-CW-3 OU is located within the Outer Area (Figure 1-1). The 200-CW-3 OU was originally a process-based OU for waste sites resulting from the storage or transport of cooling water from the 200 North facilities (212-N, 212-P, and 212-R). These facilities provided lag storage for irradiated fuel rods from reactors in the 100 Area. The fuel storage function, occurring from 1944 to 1952, was the source of the cooling water that was transferred by pipeline to the ponds and trenches for which this OU was created. Over time, other waste sites not directly associated with the cooling water waste stream were added to the OU to support geographic closure goals. The contaminant sources of these waste streams vary and are not process-based. The waste sites in 200-CW-3 OU consist of pipelines, trenches, ponds, septic tanks, debris pits, and unplanned releases.

Other waste sites located in the Outer Area were not associated directly with the nuclear weapons production byproducts or waste streams. These waste sites can have attributes that include either liquid or solid materials. They vary widely in form, design, and materials of construction. For example, due to the highly sensitive nature of the early Hanford Site mission, security and protection played a very large and active role on the Hanford Site. Military and security forces were scattered widely across the Hanford Site, including the Outer Area, and they varied in form and function, from very small manned or unmanned outposts and lone sections of fencing or bunkers to complex encampments. Some of the units, dating from the 1940s, include anti-aircraft artillery sites, radar sites, military camps, gun sites, and ammunition storage sites (igloos). The larger military camps included vehicle and truck garages, fuel storage, shooting ranges, maintenance shops and bays, debris dumps, personnel housing, and personnel support services (e.g., mess halls and barber shops). Most of the super structure components have been demolished, but certain remnants remain (e.g., building foundations; railroad lines, wood, or concrete pads; pits; debris dumps; and infrastructure components such as septic systems, water and energy systems, and communication systems). In addition, coal was used at various powerhouses within the 200 Area, resulting in coal piles as well as coal ash pits. In addition, ramp areas that were used to load coal were washed down, and the water was collected in associated pits.

Various disposal systems also exist in the Outer Area. These include french drains, chemical tile drain fields, retention tanks, brine pits for water treatment systems, and a variety of debris and trash dumps and disposal sites. Atmospheric dispersion modeling towers and meteorological towers used by Pacific Northwest National Laboratory, and lysimeter test sites are located in the Outer Area.

1.3.1 Physical Setting

The Hanford Site lies within the Pasco Basin, which is a smaller basin in the Yakima Fold Belt along the western margin of the Palouse Slope. The Pasco Basin is bounded on the north by the Saddle Mountains, on the west by Umtanum Ridge, Yakima Ridge, and the Rattlesnake Hills, on the south by Rattlesnake Mountain and the Rattlesnake Hills, and on the east by the Palouse slope. The physiographic setting of the Hanford Site is relatively low relief, resulting from river and stream sedimentation filling the synclinal valleys and basins between the anticlinal ridges. Surface topography has been modified within the past several million years by Pleistocene cataclysmic flooding, Holocene eolian activity, and landslides.

The topography of the Outer Area reflects large scale remnants of Pleistocene aged cataclysmic flood features. The relatively flat area constituting a local topographic high is commonly referred to as the Central Plateau. The plateau is a flood bar (Cold Creek Bar) formed during cataclysmic Ice Age floods from glacial Lake Missoula. The Cold Creek Bar trends generally east west, with elevations between 197 and 225 m (647 and 740 ft). The plateau drops off rather steeply to the north and northeast into a former flood channel system trending east southeast, with elevation changes of between 15 and 30 m (50 and 100 ft). The plateau gently decreases in elevation to the south into the Cold Creek Valley and to the southeast toward the Columbia River. Most of the 200 West Area and the southern half of the 200 East Area are situated on the Cold Creek Bar, while the northern half of the 200 East Area lies on the edge of a former flood channel system. A secondary paleo channel with surface expression runs south from the main flood channel to bisect the 200 West Area. The buried former river and flood channels may provide preferential pathways for contaminant movement in the vadose zone and groundwater.

1.3.2 Nature and Extent of Contamination

Based on previous 200-CW-3 OU remediation efforts, including available analytical data, operational history, and process knowledge, these sites are expected to be shallow (i.e., ~0 to 2 m [0 to 6 ft] bgs). The likelihood of impacts to the deep vadose zone (e.g., greater than 4.6 m [15 ft] bgs) and groundwater is minimal. The 200-CW-3 OU waste sites are associated with low levels of metals, organics, and radionuclide contaminants. The following general categories of primary sources of contamination have been identified.

1.3.3 Process Wastewater/Cooling Water

Process wastewater/cooling water was generated during facility operations and released to the environment either intentionally (e.g., to ponds or ditches) or during unplanned releases via spills or leaks from storage or conveyance components. Process wastewater generally consists of aqueous liquid that contains little or no radiological or chemical contaminants, except during unplanned releases or spills. Radiological and chemical contaminants were introduced to pond and ditch systems during unplanned releases and unusual occurrence events during the operational history of the canyon facilities. Process wastewater was generated and discharged to the environment at various locations in the Outer Area. This includes discharge of large volumes of cooling water to surface infiltration ponds at several locations in the Central Plateau, many of which are included in the 200-CW-1 OU. This RA excludes the ponds identified in the 200-CW-1 OU. Examples include cooling water, shutdown water, boiler blowdown water, decontamination water, and steam condensate.

1.3.4 Chemical Sewer Waste

Chemical sewer waste was generated during facility operations and generally had two types of discharges. One type of discharge went directly to ponds or ditches, and the other type of discharge went to a retention basin. In the event of an unplanned release, the discharge could be directed to the retention basin where, for at least two of the retention basins, the contaminated effluent could be recycled back to the facility. Several unplanned releases in the chemical sewer systems introduced significant amounts of radionuclides and unknown quantities of inorganic and/or organic chemicals into the ponds and ditch systems. Chemical sewers typically discharged to unlined ditches and occasionally to ponds and were intended to receive nonradioactive, dilute chemical waste from the major solvent extraction processing facilities. Chemical sewer waste was generated within the 200 East and 200 West Areas and discharged primarily within the Inner Area of the Central Plateau and at specific locations within the 200-CW-3 OU.

1.3.5 Sanitary Wastewater

Sanitary wastewater generated during historical and ongoing facility and area operations was typically discharged to the subsurface via sanitary sewage systems that included septic tanks and septic leach or

drain fields. The sizes of septic systems and the volume of sanitary wastewater discharged varied by location and the number of employees at the various site facilities. Sanitary wastewater generally did not contain chemical or radioactive contaminants. Sanitary waste was generated at specific locations within the 200-CW-3 OU.

1.3.6 Miscellaneous Liquid Waste

Miscellaneous liquid waste was generated during facility operations and released intentionally into ponds or ditches in both the Inner and Outer Areas or resulted from unplanned releases, which include leaks and spills. Examples include steam line relief valve and air conditioner condensate.

1.3.7 Solid Waste

Solid wastes were generated during facility and area operations and were placed into disposal sites, landfills, pits, and informal dumping areas. Solid waste sites are located within the 200-CW-3 OU. Examples include dumping areas, burn pits, and coal ash piles/pits.

1.3.8 Structures

Structures in the Outer Area include contaminated, abandoned infrastructure. Examples include concrete remnants and septic systems.

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2 Basis for Remedial Action

Waste sites located in the Outer Area of the Central Plateau are associated with past operations as well as site support activities. These Hanford Site activities left behind various waste sites that continue to pose potential risk to human health and the environment. These waste sites will undergo an interim remedial action consistent with this RD/RA work plan. The Remaining Sites ROD (EPA/ROD/R10-99/039) states that RA is necessary to protect public health and welfare and the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment. Such a release or the threat of release may present an imminent and substantial endangerment to public health, welfare, or the environment.

2.1 Selected Remedy

The following subsections summarize the components of the interim remedy selected for contaminated soil and present the RAOs and cleanup levels for 200-CW-3 OU soil as described in the Remaining Sites ROD (EPA/ROD/R10-99/039).

2.1.1 Waste Site Remedy Components

The interim remedy selected for the 200-CW-3 OU waste sites includes CS/NFA and RTD as summarized in the following subsections, Table 2-1, and Appendix A.

2.1.1.1 Confirmatory Sampling/No Further Action for Waste Sites

Confirmatory sampling data collection at CS/NFA sites will be evaluated to show that potential contamination identified by visual inspections and field screening does not exceed interim action cleanup levels and that no further action is necessary.

2.1.1.2 RTD for Waste Sites

RTD of waste sites to achieve RAOs and cleanup levels will be conducted as follows:

1. The “observational approach” will be used to allow for remediation of waste sites with limited information using a “test as you go” approach to determine the nature and extent of contamination until cleanup goals have been met.

2. Soil and debris up to 4.6 m (15 ft) bgs with contaminant concentrations exceeding soil cleanup levels will be removed to protect human health from direct exposure to contaminants.

3. Removal of soil and debris below depths of 4.6 m (15 ft) bgs with contaminant concentrations exceeding soil cleanup levels protective of groundwater and surface water will be evaluated. If waste is left in place, ICs will be required.

4. Contaminated soil and debris with concentrations above cleanup levels will be treated as necessary to meet applicable land disposal restrictions (LDRs) and disposal facility requirements and disposed at ERDF or another facility approved by EPA.

5. The excavated waste site will be backfilled with clean material to match the surrounding ground surface and revegetated with native plant species.

Table 2-1. Components of the 200-CW-3 Selected Remedy

Interim Remedy Component	Waste Sites*
Confirmatory sampling/no further action	CTFN 2703-E, 200-E-46, 200-W BP, 600-71, 600-227
Removal, treatment, and disposal	600-354, 600-355, 600-359, 600-360, 600-361, 600-362, 600-363, 600-365, 600-387, 600-388, 600-389, 600-391, 600-392, 600-394

*This table lists waste sites being addressed by this revision (Rev. 1) of DOE/RL-2007-55, *Remedial Design/Remedial Action Work Plan for Waste Sites in the 200-CW-3 Operable Unit*. Appendix A, Table A-1, includes a complete listing of waste sites in the 200-CW-3 OU. Any additional sites added via the plug-in approach will be incorporated in Table A-1.

BP = burn pit

CTFN = Chemical Tile Field North

2.1.1.3 Institutional Controls for Waste Sites

ICs are required before, during, and after the active phase of RA implementation where ICs are necessary to protect human health and the environment. ICs are used to control access to residual contamination in soil above standards for unlimited use and unrestricted exposure. If it is determined and agreed upon that contaminant concentrations above cleanup levels will be left in place at or below 4.6 m (15 ft) bgs, ICs will be required. The implementation, maintenance, and periodic inspection requirements for ICs at the Hanford Site are described in DOE/RL-2001-41, *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions*. ICs will be maintained until the concentrations of hazardous substances are at such levels to allow for unlimited use/unrestricted exposure and EPA authorizes removal of restrictions.

2.2 Remedial Action Objectives

The RAOs describe what the RA is expected to accomplish. RAOs generally include information on the media, contaminants of potential concern, potential exposure pathways, and cleanup levels, considering the current and reasonably anticipated future land and groundwater use.

Table 2-2 presents the RAOs identified in the Remaining Sites ROD (EPA/ROD/R10-99/039) and references the sections of the RD/RA work plan that describe the actions that address each RAO. The 200-CW-3 OU RAOs are based on a residential land use and exposure scenario. These RAOs address the risks in the Remaining Sites ROD and are protective of human health and the environment.

Table 2-2. 200-CW-3 Remedial Action Objectives

RAO	RD/RA Work Plan Locations
RAO 1. Protect human and ecological receptors from exposure to contaminants in soils, structures, and debris by dermal exposure, inhalation or ingestion of radionuclides, inorganics, or organics.	Section 2.1
RAO 2. Control the sources of groundwater contamination to minimize the impacts to groundwater resources, protect the Columbia River from further adverse impacts, and reduce the degree of groundwater cleanup that may be required under future actions.	Section 2.1.1.2

RAO = remedial action objective

RD/RA = remedial design/remedial action

2.3 Remedial Action Goals

Remedial action goals (RAGs) for 200-CW-3 OU are specified in the Remaining Sites ROD (EPA/ROD/R10-99/039). Soil cleanup levels were developed based on direct human contact as well as groundwater and surface water protection (Table 2-3). The RAGs are based on applicable or relevant and appropriate requirements (ARARs), to be considered (TBC) information, points of compliance, and assumed land use and exposure scenario for the RA identified in the Remaining Sites ROD.

Table 2-3. Soil Cleanup Level Summary: Contaminant-Specific Concentrations

Contaminant	First Remedial Action Objective – Protection from Direct Exposure		Second Remedial Action Objective – Protection of Groundwater/Columbia River		Cleanup Level Summary	
	Remedial Action Goal for Nonradionuclides (mg/kg)	Remedial Action Goal for Radionuclides (pCi/g)	Contaminant-Specific Concentration in Soil Protective of Groundwater[a] (pCi/g or mg/kg)	Contaminant-Specific Concentration in Soil Protective of the Columbia River[a] (pCi/g or mg/kg)	Remedial Action Goal Shallow Zone [<4.6 m (15 ft)][b]	Remedial Action Goal Deep Zone [>4.6 m (15 ft)][c,d]
Americium-241	N/A	32.1	[e]	[e]	32.1	N/A
Cesium-137	N/A	6.2	1,465	2,930	6.2	1,465
Cobalt-60	N/A	1.4	13,900	27,800	1.4	13,900
Europium-152	N/A	3.3	[e]	[e]	3.3	N/A
Europium-154	N/A	3.0	[e]	[e]	3.0	N/A
Europium-155	N/A	125	[e]	[e]	125	N/A
Nickel-63	N/A	4,013	83	166	4,013	83
Plutonium-238	N/A	38.8	[e]	[e]	38.8	N/A
Plutonium-239/240	N/A	35.1	[e]	[e]	35.1	N/A
Strontium-90	N/A	4.5	27.6	55.2	4.5	27.6
Technetium-99	N/A	5.8	0.46	0.96	5.8	0.46
Thorium-232	N/A	1.3	[e]	[e]	1.3	N/A
Tritium	N/A	459	12.6	25.2	459	12.6
Uranium-233/234	N/A	1.1[f]	1.1[f]	1.1[f]	1.1[f]	1.1[f]
Uranium-235	N/A	0.61	0.5[g]	0.5[g]	0.61	0.5[g]
Uranium-238	N/A	1.1[f]	1.1[f]	1.1[f]	1.1[f]	1.1[f]
Antimony	32	N/A	6.0[g]	6.0[g]	6.0[g]	6.0[g]
Arsenic	20[f]	N/A	20[f]	20[f]	20[f]	20[f]
Barium	5,600	N/A	200	[e]	5,600	N/A

Table 2-3. Soil Cleanup Level Summary: Contaminant-Specific Concentrations

Contaminant	First Remedial Action Objective – Protection from Direct Exposure		Second Remedial Action Objective – Protection of Groundwater/Columbia River		Cleanup Level Summary	
	Remedial Action Goal for Nonradionuclides (mg/kg)	Remedial Action Goal for Radionuclides (pCi/g)	Contaminant-Specific Concentration in Soil Protective of Groundwater[a] (pCi/g or mg/kg)	Contaminant-Specific Concentration in Soil Protective of the Columbia River[a] (pCi/g or mg/kg)	Remedial Action Goal Shallow Zone [<4.6 m (15 ft)][b]	Remedial Action Goal Deep Zone [>4.6 m (15 ft)][c,d]
Beryllium	10.4[h]	N/A	1.51[f]	1.51[f]	10.4[h]	1.51[f]
Boron	7,200	N/A	320	--	7,200	320
Cadmium	13.9[h]	N/A	0.81[f]	[e]	80	N/A
Chromium, total	80,000	N/A	18.5[f]	18.5[f]	80,000	18.5[f]
Chromium (VI)	2.1	N/A	4.8	2.0	2.1	2.0
Cobalt	24	N/A	15.7[f]	--	24	15.7[f]
Copper	2,960	N/A	59.2	22.0[f]	2,960	22.0[f]
Lead	353	N/A	10.2[f]	10.2[f]	353	10.2[f]
Lithium	160	N/A	33.5[f]	--	160	33.5[f]
Manganese	3,760	N/A	512[f]	512[f]	3,760	512[f]
Mercury	24	N/A	0.33[f]	0.33[f]	24	0.33[f]
Nickel	1,600	N/A	19.1[f]	27.4	1,600	19.1[f]
Selenium	400	N/A	5	1	400	1
Silver	400	N/A	8	0.73[f]	400	0.73[f]
Strontium	48,000	N/A	960	--	48,000	960
Tin	48,000	N/A	960	--	48,000	960
Uranium	240	N/A	3.21[f]	3.21[f]	240	3.21[f]
Vanadium	560	N/A	85.1[f]	--	560	85.1[f]
Zinc	24,000	N/A	480	67.8[f]	24,000	67.8[f]

Table 2-3. Soil Cleanup Level Summary: Contaminant-Specific Concentrations

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	Remedial Action Goal for Nonradionuclides (mg/kg)	Remedial Action Goal for Radionuclides (pCi/g)	Contaminant-Specific Concentration in Soil Protective of Groundwater[a] (pCi/g or mg/kg)	Contaminant-Specific Concentration in Soil Protective of the Columbia River[a] (pCi/g or mg/kg)	Remedial Action Goal Shallow Zone [<4.6 m (15 ft)][b]	Remedial Action Goal Deep Zone [>4.6 m (15 ft)][c,d]
Nitrate (as nitrogen)	128,000	N/A	1,000	2,000	128,000	1,000
Carbon tetrachloride	7.69	N/A	0.0337	0.05	7.69	0.0337
Acenaphthene	4,800	N/A	96	129	4,800	96
Anthracene	24,000	N/A	240	1,920	24,000	240
Benzo(a)anthracene	1.37	N/A	0.015[g]	0.015[g]	1.37	0.015[g]
Benzo(a)pyrene	0.137	N/A	0.015[g]	0.015[g]	0.137	0.015[g]
Benzo(b)fluoranthene	1.37	N/A	0.015[g]	0.015[g]	1.37	0.015[g]
Benzo(k)fluoranthene	1.37	N/A	0.015[g]	0.015[g]	1.37	0.015[g]
Chrysene	13.7	N/A	0.12	0.04[g]	13.7	0.04[g]
Dibenz(a,h)anthracene	1.37	N/A	0.03[g]	0.03[g]	1.37	0.03[g]
Fluoranthene	3,200	N/A	64	18.0	3,200	18.0
Fluorene	3,200	N/A	64	260	3,200	64
Indeno(1,2,3-cd)pyrene	1.37	N/A	0.03[g]	0.03[g]	1.37	0.03[g]
Naphthalene	1,600	N/A	16.0	988	1,600	16.0
Pyrene	2,400	N/A	48	192	2,400	48
Aldrin[i]	0.0588	N/A	0.0017[g]	0.0017[g]	0.0588	0.0017[g]
4,4'-DDD (Dichlorodiphenyl-dichloroethane)[i]	4.17	N/A	0.0365	0.0033[g]	4.17	0.0033[g]

Table 2-3. Soil Cleanup Level Summary: Contaminant-Specific Concentrations

Contaminant	First Remedial Action Objective – Protection from Direct Exposure		Second Remedial Action Objective – Protection of Groundwater/Columbia River		Cleanup Level Summary	
	Remedial Action Goal for Nonradionuclides (mg/kg)	Remedial Action Goal for Radionuclides (pCi/g)	Contaminant-Specific Concentration in Soil Protective of Groundwater[a] (pCi/g or mg/kg)	Contaminant-Specific Concentration in Soil Protective of the Columbia River[a] (pCi/g or mg/kg)	Remedial Action Goal Shallow Zone [<4.6 m (15 ft)][b]	Remedial Action Goal Deep Zone [>4.6 m (15 ft)][c,d]
4,4'-DDE (Dichlorodiphenyl-dichloroethylene)[i]	2.94	N/A	0.0257	0.0033[g]	2.94	0.0033[g]
4,4'-DDT (Dichlorodiphenyl-trichloroethane)[i]	2.94	N/A	0.0257	0.0033[g]	2.94	0.0033[g]
Dieldrin[i]	0.0625	N/A	0.0017[g]	0.0017[g]	0.0625	0.0017[g]
Polychlorinated biphenyl	0.5	N/A	0.017[g]	0.017[g]	0.5	0.017[g]
TPH – diesel range organics	2,000	N/A	2,000	N/A	2,000	2,000
TPH – gasoline range organics	100	N/A	100	N/A	100	100
TPH – kerosene range	2,000	N/A	2,000	N/A	2,000	2,000
TPH – motor oil	2,000	N/A	2,000	N/A	2,000	2,000

Note: Waste sites that contain multiple contaminants will meet a cumulative direct contact dose limit of 15 mrem/yr for radionuclides, $1x10^{-5}$ excess lifetime cancer risk for chemicals, and a hazard index of 1 for noncancer hazards. Current EPA guidance recommends the use of a 10^{-4} to 10^{-6} risk range over the 15 mrem/yr dose limit for establishing cleanup levels for radionuclides. The 15 mrem/yr is approximately equal to $3x10^{-4}$ excess lifetime cancer risk.

a. Values in the table are look-up values based on the generic site model. Verification of remedial action goals attainment will be demonstrated using site-specific information.

b. In the shallow zone, cleanup must achieve the direct exposure RAO and the groundwater/Columbia River RAO; therefore, the lowest value among the "Protection from Direct Exposure," "Protective of Groundwater," and "Protective of the Columbia River" values is the applicable look-up value.

c. In the deep zone, cleanup must achieve the groundwater/Columbia River RAO; therefore, the lowest value between the "Protective of Groundwater" and the "Protective of the Columbia River" values is the applicable look-up value.

d. Deep zone remedial action goals are not applicable for protection from direct exposure to radionuclides because a potentially exposed individual in a basement is protected from gamma radiation by 0.9 m (3 ft) of soil and a concrete floor.

Table 2-3. Soil Cleanup Level Summary: Contaminant-Specific Concentrations

Contaminant	First Remedial Action Objective – Protection from Direct Exposure		Second Remedial Action Objective – Protection of Groundwater/Columbia River		Cleanup Level Summary	
	Remedial Action Goal for Nonradionuclides (mg/kg)	Remedial Action Goal for Radionuclides (pCi/g)	Contaminant-Specific Concentration in Soil Protective of Groundwater[a] (pCi/g or mg/kg)	Contaminant-Specific Concentration in Soil Protective of the Columbia River[a] (pCi/g or mg/kg)	Remedial Action Goal Shallow Zone [<4.6 m (15 ft)][b]	Remedial Action Goal Deep Zone [>4.6 m (15 ft)][c,d]

e. The RESidual RADioactivity model predicts the contaminant will not reach groundwater within a 1,000-year time frame.

f. The remedial action goal is below background. The value presented is background.

g. The remedial action goal is below the PQL. The value presented is the PQL.

h. Carcinogenic cleanup level calculated based on the inhalation exposure pathway (WAC 173-340-750[3], "Model Toxics Control Act—Cleanup," "Cleanup Standards to Protect Air Quality") using an airborne particulate mass-loading of 0.0001 g/m^3 (WDOH/320-015, *State of Washington Department of Health Interim Regulatory Guidance: Hanford Guidance for Radiological Cleanup*).

i. Analysis may be included based on process knowledge and field observations for specific waste sites.

N/A = not applicable

PQL = practical quantitation limit

RAO = remedial action objective

2.4 Applicable or Relevant and Appropriate Requirement Compliance

ARARs are determined based on analysis of which requirements are applicable or relevant and appropriate to the distinctive set of circumstances and actions at a site. The NCP (40 CFR 300, Appendix B) requires that ARARs be attained or appropriately waived during implementation and at completion of the RA. This section provides examples for how ARARs identified in the Remaining Sites ROD (EPA/ROD/R10-99/039) will be met during RA. Tables 2-4 and 2-5 identify specific regulatory sections in each overarching regulation in which an ARAR is identified, with an explanation as to why the regulation is an ARAR. In addition, TBC information consists of nonpromulgated advisories or guidance issued by federal or state governments that are not legally binding and do not have the status of ARARs. However, as appropriate, TBCs should be considered in determining the RA necessary for protection of human health and the environment.

All activities associated with the RA for the source area sites covered under the Remaining Sites ROD (EPA/ROD/R10-99/039) will occur onsite, as defined in the NCP. As a result, the RA described in this document needs only meet the substantive requirements of the ARARs established in the ROD.

If any requirement that would be applicable or relevant and appropriate for the selected RA is promulgated subsequent to the Remaining Sites ROD (EPA/ROD/R10-99/039) being signed, EPA will review the requirement and determine whether or not the selected remedy is still protective under the new requirement. This determination will be documented in the Administrative Record.

Table 2-4. Identification of Federal Applicable or Relevant and Appropriate Requirements and To Be Considered for the Remedial Action.

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," 40 CFR 761			
"Applicability," Specific subsections: 40 CFR 761.50(b)(1) 40 CFR 761.50(b)(2) 40 CFR 761.50(b)(3) 40 CFR 761.50(b)(4) 40 CFR 761.50(b)(7) 40 CFR 761.50(c)	ARAR	Establishes standards for the storage and disposal of PCB waste.	The substantive requirements of these regulations are applicable or relevant and appropriate to the storage and disposal of PCB liquids, items, remediation waste, and bulk product waste at ≥50 ppm. The specific subsections identified from 40 CFR 761.50(b) reference the specific sections for the management of PCB waste type. The disposal requirements for radioactive PCB waste are addressed in 40 CFR 761.50(b)(7).
Archeological and Historic Preservation Act of 1974 (National Archaeological and Historic Preservation Act of 1976) 16 USC 469aa-mm	ARAR	Requires that remedial actions at 200-CW-3 OU waste sites do not cause the loss of any archaeological or historic data. This act mandates preservation of the data and does not require protection of the actual waste site or facility.	Archeological and historic sites have been identified within the 100 and 200 Areas, and therefore the substantive requirements of this act are applicable to actions that might disturb these sites.
National Historic Preservation Act of 1966 16 USC 470, Section 106	ARAR	Requires federal agencies to consider the impacts of their undertaking on cultural properties through identification, evaluation, and mitigation processes and consultation with interested parties.	Cultural and historic sites have been identified within the 100 and 200 Areas, and therefore the substantive requirements of this act are applicable to actions that might disturb these types of sites.
Native American Graves Protection and Repatriation Act of 1990 25 USC 3001, et seq.	ARAR	Establishes federal agency responsibility for discovery of human remains, associated and unassociated funerary objects, sacred objects, and items of cultural patrimony.	Substantive requirements of this act are applicable if remains and sacred objects are found during remediation and will require Native American Tribal consultation in the event of discovery.

Table 2-4. Identification of Federal Applicable or Relevant and Appropriate Requirements and To Be Considered for the Remedial Action.

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
Endangered Species Act of 1973 16 USC 1531 et seq, subsection 16 USC 1536(c)	ARAR	Prohibits actions by federal agencies that are likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification or critical habitat. If remediation is within critical habitat or buffer zones surrounding threatened or endangered species, mitigation measures must be taken to protect the resource.	Substantive requirements of this act are applicable if threatened or endangered species are identified in areas where remedial actions will occur.
"National Primary Drinking Water Regulations," 40 CFR 141			
"Maximum Contaminant Levels for Organic Contaminants," 40 CFR 141.61	ARAR	Establishes MCLs that are drinking water criteria designed to protect human health from the potential adverse effects of organic contaminants in drinking water.	The groundwater in the 200-CW-3 OU is not currently used for drinking water. However, Central Plateau groundwater may be considered a potential drinking water source, and because the groundwater discharges to the Columbia River (which is used for drinking water), the substantive requirements in 40 CFR 141.61 for organic constituents are relevant and appropriate.
"Maximum Contaminant Levels for Inorganic Contaminants," 40 CFR 141.62	ARAR	Establishes MCLs that are drinking water criteria designed to protect human health from the potential adverse effects of inorganic contaminants in drinking water.	The groundwater in the 200-CW-3 OU is not currently used for drinking water. However, Central Plateau groundwater may be considered a potential drinking water source, and because the groundwater discharges to the Columbia River (which is used for drinking water), the substantive requirements in 40 CFR 141.62 for inorganic constituents are relevant and appropriate.
"Maximum Contaminant Levels for Radionuclides," 40 CFR 141.66	ARAR	Establishes MCLs that are drinking water criteria designed to protect human health from the potential adverse effects of radionuclides in drinking water.	The groundwater in the 200-CW-3 OU is not currently used for drinking water. However, Central Plateau groundwater may be considered a potential drinking water source, and because the groundwater discharges to the Columbia River (which is used for drinking water), the substantive requirements in 40 CFR 141.66 for radionuclides are relevant and appropriate.

Table 2-4. Identification of Federal Applicable or Relevant and Appropriate Requirements and To Be Considered for the Remedial Action.

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
Regulations Pursuant to the *Resource Conservation and Recovery Act of 1976* and Implemented Through WAC 173-303, "Dangerous Waste Regulations"			
40 CFR 61, "National Emission Standards for Hazardous Air Pollutants" 40 CFR 141, "National Primary Drinking Water Regulations" 40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions" WAC 173-303, "Dangerous Waste Regulations"			

References: Full reference citations are provided in Chapter 8.

ARAR = applicable or relevant and appropriate requirement
MCL = maximum contaminant level
OU = operable unit
PCB = polychlorinated biphenyl
ppm = parts per million
TBC = to be considered

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Dangerous Waste Regulations," WAC 173-303			
"Identifying Solid Waste," WAC 173-303-016	ARAR	Identifies those materials that are and are not solid waste.	Substantive requirements of these regulations are applicable because they define how to determine which materials are subject to the designation regulations. Specifically, materials that are generated for removal from the CERCLA site during the remedial action would be subject to the procedures for identifying solid waste to ensure proper management.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Recycling Processes Involving Solid Waste," WAC 173-303-017	ARAR	Identifies materials that are and are not solid waste when recycled.	Substantive requirements of these regulations are applicable because they define how to determine which materials are subject to the designation regulations. Specifically, materials that are generated for removal from the CERCLA site during the remedial action would be subject to the procedures for identifying solid waste to ensure proper management.
"Designation of Dangerous Waste," WAC 173-303-070(3)	ARAR	Establishes the method for determining whether a solid waste is or is not a dangerous waste or an extremely hazardous waste.	Substantive requirements of these regulations are applicable to materials encountered during the remedial action. Specifically, solid waste generated for removal from the CERCLA site during this remedial action would be subject to the dangerous waste designation procedures to ensure proper management.
"Excluded Categories of Waste," WAC 173-303-071	ARAR	Describes those waste categories that are excluded from the requirements of WAC 173-303 (excluding WAC 173-303-050).	The conditions of this requirement are applicable to remedial actions in the 200-CW-3 OU should waste identified in WAC 173-303-071 be encountered.
"Conditional Exclusion of Special Wastes," WAC 173-303-073	ARAR	Establishes the conditional exclusion and the management requirements of special waste, as defined in WAC 173-303-040.	Substantive requirements of these regulations are applicable to materials encountered during the remedial action. Specifically, the substantive standards for management of special waste are applicable to the interim management of certain waste that will be generated during the remedial action.
"Requirements for Universal Waste," WAC 173-303-077	ARAR	Identifies waste exempted from regulation under WAC 173-303-140 and WAC 173-303-170 through 173-303-9906 (excluding WAC 173-303-960). This waste is subject to regulation under WAC 173-303-573.	Substantive requirements of these regulations are applicable to materials encountered during the remedial action. Specifically, the substantive standards for management of universal waste are applicable to the interim management of certain waste that will be generated during the remedial action.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Recycled, Reclaimed, and Recovered Wastes," WAC 173-303-120 Specific subsections: WAC 173-303-120(3) WAC 173-303-120(5)	ARAR	Defines the requirements for the recycling of materials that are solid and dangerous waste. Specifically, WAC 173-303-120(3) provides for the management of certain recyclable materials, including spent refrigerants, antifreeze, and lead-acid batteries. WAC 173-303-120(5) provides for the recycling of used oil.	Substantive requirements of these regulations are applicable to certain materials that might be encountered during the remedial action. Recyclable materials that are exempt from regulation as dangerous waste and that are not otherwise subject to CERCLA as hazardous substances can be recycled and/or conditionally excluded from certain dangerous waste requirements.
"Land Disposal Restrictions," WAC 173-303-140(4)	ARAR	This regulation establishes state standards for land disposal of dangerous waste and incorporates by reference the federal land disposal restrictions of 40 CFR 268 that are applicable to solid waste designated as dangerous or mixed waste in accordance with WAC 173-303-070(3).	The substantive requirements of this regulation are applicable to materials encountered during the remedial action. Specifically, dangerous and/or mixed waste generated and removed from the CERCLA site during the remedial action for offsite (as defined by CERCLA) land disposal would be subject to the identification of applicable land-disposal restrictions at the point of waste generation. The actual offsite treatment of such waste would not be an ARAR to this remedial action, but would be subject to all applicable laws and regulations.
"Requirements for Generators of Dangerous Waste," WAC 173-303-170	ARAR	Establishes the requirements for dangerous waste generators.	Substantive requirements of these regulations are applicable to materials encountered during the remedial action. Specifically, the substantive standards for management of dangerous and/or mixed waste are applicable to the interim management of certain waste that will be generated during the remedial action. For purposes of this remedial action, WAC 173-303-170(3) includes the substantive provisions of WAC 173-303-200 by reference. WAC 173-303-200 further includes certain substantive standards from WAC 173-303-630 and WAC 173-303-640 by reference.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Model Toxics Control Act—Cleanup," WAC 173-340			
"Unrestricted Land Use Soil Cleanup Standards," WAC 173-340-740(3)	ARAR	Identifies the methods used to identify risk-based concentrations and their use in the selection of a cleanup action. Cleanup and remediation levels are based on protection of human health and the environment, the location of the site, and other regulations that apply to the site. The standard specifies cleanup goals that implement the strictest federal or state cleanup criteria.	The State-established risk-based concentrations for soils and protection of groundwater are relevant and appropriate to the 200-CW-3 OU waste site remedial action because no federal standard exists.
"Minimum Functional Standards for Solid Waste Handling," WAC 173-304			
"On-Site Containerized Storage, Collection and Transportation Standards for Solid Waste," WAC 173-304-200(2)	ARAR	Establishes the requirements for the onsite storage of solid waste that is not radioactive or dangerous waste.	Substantive requirements of these regulations are applicable to materials encountered during the remedial action. Specifically, nondangerous, nonradioactive solid waste (i.e., hazardous substances that are only regulated as solid waste) that will be containerized for remediation from the CERCLA site would be managed onsite according to the substantive requirements of this standard.
"Solid Waste Handling Standards," WAC 173-350			
"On-Site Storage, Collection, and Transportation Standards," WAC 173-350-300	ARAR	Establishes the requirements for the temporary storage of solid waste in a container onsite and the collecting and transporting of the solid waste.	The substantive requirements of this newly promulgated rule are relevant and appropriate to the onsite collection and temporary storage of solid waste at the 200-CW-3 OU waste sites. Compliance with this regulation is being implemented in phases for existing areas.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"General Regulations for Air Pollution Sources," WAC 173-400			
"Washington Clean Air Act," RCW 70.94 and "Department of Ecology," RCW 43.21A		The regulation requires that all sources of air contaminants meet emission standards for visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust. Requires the use of RACT. Controls may be determined for some source categories to be more stringent than the emission limitations listed in this chapter.	Substantive requirements of the general standards for control of fugitive emissions are applicable to remedial actions at the site due to the generation of fugitive dust that occurs during excavation or other types of construction activities.
"General Regulations for Air Pollution Sources," WAC 173-400 Specific subsection: WAC 173-400-040	ARAR		
Specific subsection: WAC 173-400-113	ARAR	This regulation requires that methods of controls be employed to minimize the release of air contaminants resulting from new or modified sources of regulated emissions. Emissions are to be minimized through application of best available control technology.	Substantive requirements of this regulation would be applicable to remedial actions performed at the site if a treatment technology that emits regulated air emissions were necessary during the implementation of the remedial action.
"Controls for New Sources of Toxic Air Pollutants," WAC 173-460 Specific subsections: WAC 173-460-030 WAC 173-460-060 WAC 173-460-070	ARAR	This regulation requires that emissions of toxic air contaminants listed in the regulation be quantified and ambient impacts evaluated. Best available control technology for toxics shall be used as determined by the lead agency to protect human health and the environment.	Substantive requirements of these regulations would be applicable to remedial actions performed at the site if a treatment technology that emits toxic air emissions were necessary during the implementation of the remedial action.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Radiation Protection—Air Emissions," WAC 246-247			
"National Standards Adopted by Reference for Sources of Radionuclide Emissions," WAC 246-247-035(1)(a)(ii)	ARAR	This regulation establishes requirements of 40 CFR 61, Subpart H, by reference. Radionuclide airborne emissions from the facility shall be controlled so as not to exceed amounts that would cause an exposure to any member of the public of greater than 10 mrem/yr effective dose equivalent.	Substantive requirements of this standard are applicable because this remedial action may include activities such as excavation, decontamination and stabilization of contaminated areas and equipment, and operation of exhausters and vacuums, each of which may provide airborne emissions of radioactive particulates to unrestricted areas. As a result, requirements limiting emissions apply. This is a risk-based standard for the purposes of protecting human health and the environment.
"General Standards," WAC 246-247-040(3) WAC 246-247-040(4)	ARAR	Emissions shall be controlled to ensure that emission standards are not exceeded.	Substantive requirements of this standard are applicable because fugitive, diffuse, and point source emissions of radionuclides to the ambient air may result from activities, such as excavation of contaminated soils and operation of exhauster and vacuums, performed during the remedial action. This standard exists to ensure compliance with emission standards.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Monitoring, Testing, and Quality Assurance," WAC 246-247-075(1) WAC 246-247-075(2) WAC 246-247-075(4)	ARAR	Establishes the monitoring, testing, and quality assurance requirements for radioactive air emissions from major sources. Effluent flow rate measurements shall be made and the effluent stream shall be directly monitored continuously with an in-line detector, or representative samples of the effluent stream shall be withdrawn continuously from the sampling site following the specified guidance. The requirements for continuous sampling are applicable to batch processes when the unit is in operation. Periodic sampling (grab samples) may be used only with lead agency prior approval. Such approval may be granted in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. In such cases, grab samples shall be collected with sufficient frequency so as to provide a representative sample of the emissions. When it is impractical to measure the effluent flow rate at a source in accordance with the requirements or to monitor or sample an effluent stream at a source in accordance with the site selection and sample extraction requirements, the facility owner or operator may use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures as approved by the lead agency. Emissions from nonpoint and fugitive sources of airborne radioactive material shall be measured. Measurement techniques may include, but are not limited to, sampling, calculation, smears, or other reasonable methods for identifying emissions as determined by the lead agency.	Substantive requirements of this standard are applicable because fugitive and nonpoint source emissions of radionuclides to the ambient air may result from activities, such as excavation of contaminated soils and operation of exhauster and vacuums, performed during the remedial action. This standard exists to ensure compliance with emission standards.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use
"Monitoring, Testing, and Quality Assurance," WAC 246-247-075(3)	ARAR	Methods to implement periodic confirmatory monitoring for minor sources may include estimating the emissions or other methods as approved by the lead agency.	Fugitive and diffuse emissions from the excavation and related activities will require periodic confirmatory measurements to verify low emissions.
"Monitoring, Testing, and Quality Assurance," WAC 246-247-075(8)	ARAR	Facility (site) emissions resulting from nonpoint and fugitive sources of airborne radioactive material shall be measured. Measurement techniques may include ambient air measurements, in-line radiation detector or withdrawal of representative samples from the effluent stream, or other methods as determined by the lead agency.	Fugitive and diffuse emissions of airborne radioactive material due to excavation and related activities will require measurement.
"General Standards," WAC 246-247-040(4) and "General Standards for Maximum Permissible Emissions," WAC 173-480-050(1)	ARAR	At a minimum, all emission units shall make every reasonable effort to maintain radioactive materials in effluents to unrestricted areas, ALARA. Control equipment of facilities operating under ALARA shall be defined as RACT and ALARACT.	The potential for fugitive and diffuse emissions due to excavation and related activities will require efforts to minimize those emissions.
"Emission Monitoring and Compliance Procedures," WAC 173-480-070-(2)	ARAR	Determine compliance with the public dose standard by calculating exposure at the point of maximum annual air concentration in an unrestricted area where any member of the public may be.	Fugitive and diffuse emissions resulting from excavation and related activities will require assessment and reporting.
To Be Considered Pursuant to Relevant Waste Site Acceptance Criteria			
Environmental Restoration Disposal Facility Waste Acceptance Criteria (ERDF-00011)	TBC	This document establishes waste acceptance criteria for ERDF.	Waste destined for management at ERDF must meet acceptance criteria to ensure proper disposal.

Table 2-5. Identification of State Applicable and Relevant or Appropriate Requirements and To Be Considered for the Remedial Action

ARAR Citation	ARAR or TBC	Requirement	Rationale for Use

References: Complete reference citations are provided in Chapter 8.

ALARA = as low as reasonably achievable
ALARACT = as low as reasonably achievable control technology
ARAR = applicable or relevant and appropriate requirement
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
ERDF = Environmental Restoration Disposal Facility
OU = operable unit
RACT = reasonably available control technology
TBC = to be considered

3 Remedial Action Management

This chapter describes the work elements and management approach associated with implementation of the selected remedy.

3.1 Project Organization

The DOE contractor, which has responsibility for the RA, will conduct the RA on behalf of DOE. The management responsibilities for the project team, which includes the individuals working to accomplish the 200-CW-3 OU RA, are described in this section.

3.1.1 Lead Agency (U.S. Department of Energy)

The lead agency for the project includes both a project manager and a project lead, whose responsibilities are highlighted in their respective sections.

3.1.1.1 DOE-RL Manager

The DOE-RL Project Manager is responsible for the following tasks:

- Monitoring contractor performance of the 200-CW-3 OU RA
- Obtaining lead regulatory agency approval of the RD/RA work plan and SAP
- Authorizing RA activities
- Approving the RD/RA work plan

3.1.1.2 DOE-RL Project Lead

The DOE-RL Project Lead is responsible for the following tasks:

- Providing day-to-day oversight of contractor work scope performance
- Working with the contractor and the lead regulatory agency to identify and resolve technical issues
- Providing technical input to the DOE-RL Manager

3.1.2 Regulatory Lead

EPA is the lead regulatory agency and is responsible for the following tasks:

- Providing regulatory oversight of the RA
- Approving the RD/RA work plan, SAPs, and other associated regulatory documentation
- Working with DOE-RL to resolve concerns over the work described in the RD/RA work plan and SAPs, in accordance with the Tri-Party Agreement (Ecology et al., 1989a)

3.1.3 Remediation Contractor

The DOE remediation contractor performs work under the direction of the DOE-RL Project Manager, assisted by other DOE personnel, as outlined in the following descriptions.

3.1.3.1 Regulatory Strategy & Integration Manager

The Regulatory Strategy and Integration Manager is responsible for the following tasks:

- Providing oversight
- Coordinating with DOE-RL and primary contractor management in support of the RA and reporting activities
- Providing support to the OU Project Manager to ensure that work is performed safely and cost effectively

3.1.3.2 Project Manager

The Project Manager is responsible for implementing source OU remediation activities, including waste site remediation and closure.

3.1.3.3 Operable Unit Project Manager

The OU Project Manager (or designee) is responsible and accountable for the following tasks:

- Coordinating project-related activities for both waste sites and groundwater
- Coordinating with DOE-RL, regulatory agencies, and contractor management in support of the RA activities to ensure that work is performed safely, compliantly, and cost effectively
- Managing documents, requirements, field activities, subcontracted tasks, and the project file
- Ensuring that project personnel are working to the current version of this work plan

3.1.3.4 Operable Unit Technical Lead

The OU Technical Lead is responsible for the following tasks:

- Developing specific RA design, sampling design, analytical requirements, and quality control (QC) requirements, either independently or as defined through a systematic planning process
- Ensuring that RA activities (as delegated by the OU Project Manager) are carried out in accordance with the lower tier implementation documents
- Working closely with the Environmental Compliance Officer, Quality Assurance (QA), Health and Safety, Field Sample Operations, and Sample Management and Reporting to integrate these and other technical disciplines in planning and implementing the work scope

3.1.3.5 Sample Management and Reporting

The Sample Management and Reporting group is responsible for the following activities:

- Generating field sampling paperwork, labels, and instructions for field sampling personnel
- Revising field sampling paperwork to reflect approved changes
- Developing sample authorization forms to provide information and instructions to the analytical laboratories
- Coordinating laboratory analytical work with the SAPs
- Verifying laboratories are qualified for performing analytical work outlined in the SAPs

- Resolving sample documentation deficiencies or issues associated with the field sampling operations, laboratories, or other entities
- Receiving analytical data from the laboratories
- Entering data into the Hanford Environmental Information System database
- Arranging for data validation (as requested) and recordkeeping
- Informing the OU Project Manager of issues reported by the analytical laboratories, as appropriate

3.1.3.6 Field Sampling Operations

Field Sampling Operations is responsible for the following tasks:

- Planning and coordinating field sampling resources and personnel
- Collecting samples in accordance with the SAPs
- Completing field logbooks, data forms, and chain-of-custody forms, including any shipping paperwork
- Assisting sample delivery to analytical laboratories

3.1.3.7 Quality Assurance

The QA point of contact is responsible for the following tasks:

- Providing independent oversight
- Addressing QA issues on the project
- Overseeing implementation of the project QA program
- Reviewing project documents (including the RD/RA work plan, data quality objective summary report, SAPs, and other lower-tier implementation documents)

3.1.3.8 Environmental Compliance Officer

The Environmental Compliance Officer is responsible for the following tasks:

- Providing technical oversight, direction, and acceptance of project and subcontracted environmental work
- Developing appropriate mitigation measures to minimize adverse environmental impacts
- Reviewing plans, protocols, and technical documents to ensure that environmental requirements have been addressed
- Identifying environmental issues affecting operations
- Responding to environmental and regulatory issues or concerns
- Overseeing project implementation for compliance with applicable internal and external environmental requirements

3.1.3.9 Health and Safety

The Health and Safety organization is responsible for the following tasks:

- Coordinating project industrial safety and health support in accordance with the health and safety program, job hazard analyses, and pertinent federal regulations
- Assisting project personnel in complying with the applicable health and safety program
- Coordinating with Radiological Engineering to determine personal protective equipment (PPE) requirements

3.1.3.10 Radiological Engineering

Radiological Engineering is responsible for the following tasks:

- Providing radiological engineering and project health physics support
- Conducting as low as reasonably achievable (ALARA) reviews, exposure and release modeling, and radiological controls optimization
- Identifying radiological hazards and ensuring that appropriate controls are implemented to maintain worker exposures to hazards at ALARA levels
- Interfacing with the project Health and Safety representative and other appropriate personnel as needed to plan and direct project Radiological Control Technician support

3.1.3.11 Waste Management

Waste Management is responsible for the following tasks:

- Communicating policies and protocols for waste storage, transportation, disposal, and tracking in a safe and cost-effective manner
- Identifying waste management sampling and characterization requirements for regulatory compliance
- Interpreting data to determine waste designations and profiles

3.1.3.12 Analytical Laboratories

Analytical laboratories are accredited by Ecology for the analyses performed under the SAPs and are responsible for the following:

- Maintaining custody and analyzing samples in accordance with established quality systems
- Providing data packages containing sample and QC results
- Providing explanations of results to support data review and resolve analytical issues

3.2 Change Management

Three types of changes may occur during implementation of the RA that could affect compliance with the Remaining Sites ROD (EPA/ROD/R10-99/039). These changes may include the following:

- A nonsignificant or minor change does not have a significant impact on the remedy scope, performance, or cost. An example of a nonsignificant change may include modifications to the RA schedule that do not impact an agreed-upon milestone. Minor changes should be documented in the

appropriate post-decision project file (e.g., through interoffice memoranda or in logbooks) or the unit manager's meeting minutes.

- A significant change is defined as a change that significantly modifies the scope, performance, or remedy cost but does not fundamentally alter the overall cleanup approach. Significant changes will be addressed in an ESD.
- A fundamental change involves an appreciable change or changes in the scope, performance, or cost or may be a number of significant changes that together have the effect of a fundamental change. Should this situation arise, the Remaining Sites ROD (EPA/ROD/R10-99/039) must be amended.

Determining the significance of the change is the responsibility of DOE and EPA. The remediation contractor OU Project Manager is responsible for tracking all changes and obtaining appropriate reviews by DOE and EPA. The remediation contractor OU Project Manager will discuss the change with DOE, and DOE will then discuss the type of change necessary with EPA. A determination on which document type to use will be made based on guidance provided in EPA 540-R-98-031, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*. ESDs and ROD amendments are subject to public notice and public participation, respectively. In addition, the 2009 ESD (EPA et al., 2009) allowed for the use of a fact sheet to identify waste sites being added to the RA. All change documents will undergo EPA review and be posted to the Administrative Record. Table 3-1 identifies types of changes and processes associated with the change.

Table 3-1. Project Modifications and Approval Mechanisms for Change Management

Type of Change	Documentation Process	Potential Examples
Nonsignificant changes	Project file (technical memos or calculations)	The addition of waste sites that are adjacent to and within the area required for remediation of sites addressed in the Remaining Sites ROD (EPA/ROD/R10-99/039)
		Modifications to the remedial action schedule that do not impact agreed upon milestones.
	Tri-Party Agreement-Change Notice or document revision	Revision(s) to the RD/RA work plan or addenda.
Significant changes	Explanation of significant differences	Realize cost increase or decrease (>+50% or <−30%).
		A significant delay in the point in time when the remedial action or objectives are met.
Fundamental changes	ROD amendment	Remedy change.

References: EPA/ROD/R10-99/039, *EPA Superfund Record of Decision Hanford 200 Area (USDOE) and Hanford 100 Area (USDOE).*

Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent Order.*

RD/RA = remedial design/remedial action

ROD = record of decision

Tri-Party Agreement = *Hanford Federal Facility Agreement and Consent Order*

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4 Waste Site Remedial Design /Remedial Action Approach

This chapter presents the RD/RA technical approaches to support implementation of the waste site RTD (Section 4.1.1) and CS/NFA (Section 4.1.2) components of the selected remedy.

4.1 Waste Site Scope

The waste site scope includes both CS/NFA and RTD remedies as assigned in Appendix A. The CS/NFA remedy includes characterization to confirm the RAOs are met. If those results verify the RAOs, then no further action is required. In instances where the RAOs have not been met, the waste site remedy will default to the RTD remedy. When the RTD action is selected, soil with contaminant concentrations above the cleanup levels is excavated to depths up to 4.6 m (15 ft) bgs. The "observational approach" will be used to allow for remediation of waste sites with limited information using a "test as you go" approach to determine the nature and extent of contamination until cleanup goals have been met. Excavated material exhibiting concentrations above the cleanup levels will be disposed at ERDF, in accordance with ERDF-00011, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*.

The RTD remedy component will include the following activities:

- Excavating using best practices, including appropriately sloped sidewalls based on the type of the material being removed, benching, shoring, and proper placement of excavated overburden
- Suppressing dust while excavating, loading, and transporting to ensure dust and contaminants are not spread by wind

Contaminated soil, if discovered, will be excavated and treated to meet LDRs and waste acceptance criteria, as necessary, and disposed at ERDF. Following RTD, the disturbed area will be backfilled with clean fill material, graded and contoured to match the surrounding area, and planted with native vegetation. Additional information on the RD/RA approach is presented in the following sections.

4.1.1 Waste Site RTD – Remedial Action Work Tasks

RA work tasks specific to waste site RTD are described in the following subsections. These tasks include Task 1 – Mobilization; Task 2 – RTD; Task 3 – Verification Sampling; and Task 4 – Backfill, Recontour, and Revegetate. The RD for waste site RTD includes the development of a RD package that consists of all design work, project plans, project procedures, drawings, and specifications required to perform the RA. Project plans will define the data-gathering requirements to ensure worker health and safety and demonstrate the waste site meets cleanup levels. DOE shall provide the RD package to EPA for review and approval. Summary briefings and discussions may be held at Unit Manager's Meetings or other forums, as agreed. Issues will be identified and resolved in a timely manner to prevent or minimize impacts to the remediation.

4.1.1.1 Task 1 – Mobilization

Mobilization and construction include the following activities that are necessary to prepare the waste site for excavation:

- Establishing site utility services and field support facilities as required.
- Constructing roads, field support facilities, container survey stations, and decontamination stations. Hanford Site roadways are constructed of existing site materials, except the surface course, which is imported. Field support facilities provide a changing area, lunchroom, and construction offices at

individual sites. The changing area includes lockers, benches, and storage for both clean and contaminated personal protection equipment (PPE).

- Stripping to remove surface and near-surface materials (including vegetation, roots, and cobbles) that may be stockpiled and used later as a top dressing and planting medium for revegetation.
- Removing clean overburden material. Clean overburden and layback soils may be segregated and stockpiled onsite for later use as backfill material.

4.1.1.2 Task 2 – RTD

This section addresses activities specific to waste site RTD. Dust control will be maintained at the excavation site and active work areas. Dust control water use at the excavation site will be minimized. Soil fixatives (e.g., soil cement) will be applied during periods of extended inactivity or when potential concerns arise about health issues or the spread of contaminants.

Under the RTD process, soil and debris with contaminant concentrations exceeding residential direct contact exposure cleanup levels will be removed to depths up to 4.6 m (15 ft) bgs (Table 2-3). Site-specific modeling and consideration may be used to demonstrate groundwater and surface water protectiveness for contaminant concentrations at depths greater than 4.6 m (15 ft) bgs that are nominally above the cleanup level.

Excavation

Excavation requires equipment operations in uncontaminated and contaminated soil and debris of varying physical properties (e.g., fine sand to boulders of varying sizes). While the 200-CW-3 OU waste sites excavations are in progress, the actual side slope required to prevent cave-ins and sloughing will vary with differences in such factors as materials that have been previously disturbed, excavation depth, soil type, environmental conditions of exposure, and location of personnel near the excavation. Guidance for the excavation shall be determined in accordance with the requirements of 29 CFR 1910, "Occupational Safety and Health Standards," and 29 CFR 1926, "Safety and Health Regulations for Construction," Subpart P, "Excavations." Excavations will be completed using standard construction equipment and techniques.

Material that is free of anomalous waste (e.g., unknown materials) and below cleanup levels may be stockpiled onsite for use as backfill material. Excavated nonradiological contaminated material with concentrations above cleanup levels and within ERDF waste acceptance criteria may be placed in an approved staging pile area (SPA) for subsequent loadout or may be loaded directly into waste transportation containers or material handling vehicles (e.g., dump trucks) at the excavation site. Debris may be size-reduced in the excavation or SPA as needed to facilitate container loading and meet waste acceptance criteria. While not anticipated, other excavated material will be managed as follows:

- Contaminated soil and debris with concentrations above cleanup levels and ERDF waste acceptance criteria will be set aside within the area of contamination (AOC) or within a designated SPA for further characterization and dispositioning. Waste that is identified for ERDF disposal or staging will be managed as described in Section 5.4. Excavated material that must be sent to facilities other than ERDF for treatment or disposal will be stockpiled or drummed and staged within the AOC, within designated SPAs, or within a container storage area until loaded for offsite shipment. Identification of an appropriate treatment or disposal facility and arrangements for loading and transporting excavated material to facilities other than ERDF will be made on a case-by-case basis by project waste management personnel. Prior to shipment, an offsite acceptability determination in accordance with 40 CFR 300.440, "Procedures for Planning and Implementing Off-Site Response Actions," must be

obtained from EPA for receipt, storage, treatment, and disposal of CERCLA waste at the identified treatment and disposal facility.

- LDR waste or containers of LDR waste that do not comply with ERDF waste acceptance criteria may need repackaging or treatment. LDR waste that has been placed into a container will not be placed back into the AOC (i.e., on the land), except with EPA approval. LDR waste may be removed from a container and placed directly into another container, even within the AOC boundary, if no land placement occurs. Containerized LDR waste that needs to be placed on the ground for treatment or repackaging will be done within a designated SPA or as otherwise approved by EPA.

- Radiological contaminated material, if encountered, with concentrations above cleanup levels and within ERDF waste acceptance criteria will be loaded into plastic-lined roll-off containers on project haul trucks at the excavation site. The loaded containers will be covered (i.e., by folding and securing the liner over the load) and surveyed prior to being transported. If radiological contamination is found on a container exterior, the container will be decontaminated using standard equipment and techniques. If a container cannot be decontaminated using standard methods, advanced techniques will be implemented. Released containers will be staged at the site until applicable shipping papers (e.g., a waste tracking form) are completed. When the shipping papers have been completed, ERDF transport vehicles will pick up the containers and haul them to ERDF.

- A temporary soil cover may be placed over an excavation footprint or stockpile as a temporary measure to minimize an imminent threat to workers (e.g., a high-dose item is uncovered and a temporary soil cover is appropriate to control worker exposure) or the environment. A temporary soil cover may also be used to prevent windborne dispersal of excavated material or highly contaminated soil and to maintain segregation from other waste site materials. These temporary measures may be undertaken while plans are developed for safe re-excavation and removal of this material. In these instances, EPA notification will be made.

- Non-LDR material that has been packaged may be returned to an excavation or SPA in situations where the dose rates, contamination levels, free liquids, or other abnormalities have subsequently been determined to exceed normal transport requirements. In these situations, when repackaging is necessary, the material will be reloaded into the transportation container. Notification to EPA is generally not required for these actions.

Materials transported from the excavation site are covered, contained, or have moisture content adequate for inhibiting dust without being covered or contained during transport and disposal. The moisture content of bulk contaminated material destined for ERDF disposal will be in accordance with ERDF waste acceptance criteria.

When site excavation is complete, exposed dig faces will be sampled in accordance with the SAP (DOE/RL-2007-54) to verify that cleanup levels have been achieved. When cleanup levels have been met and backfill concurrence is obtained from EPA, backfilling is authorized. Approval of a waste site reclassification form constitutes backfill approval, or EPA may approve backfill in advance. Unless specified otherwise, the term “backfill” refers to filling in or recontouring an excavation once waste site remediation sampling has demonstrated that cleanup levels have been met. Clean backfill material is obtained from overburden stockpiles and local borrow sites. Excavations are backfilled as described further in Section 4.1.1.4.

Material Handling and Transportation to ERDF

Contaminated materials (including excavated soils, debris, disposable protective clothing, air filters, and trash) require proper packaging, handling, and transportation in accordance with Section 5.4, “Waste

Management Plan." Onsite transportation and packing will be conducted in accordance with DOE/RL-2001-36, *Hanford Sitewide Transportation Safety Document*. Contaminated bulk materials will be transported for disposal using approved vehicles and containers. Drummed waste may be loaded into standard ERDF containers or transported by other means, such as flatbed tractor-trailer units or cargo vans.

Containers will be transported from the remediation site to ERDF over existing Hanford Site roadways. Each waste shipment to ERDF will be referenced to a waste profile that is intended to provide an upper bound on the contaminant concentrations in the materials found at the waste site. The waste profile is in effect until the characteristics change significantly.

ERDF containers will be inspected for the presence of water prior to placing a liner or waste into the container. Water in a container with an estimated volume of less than 150 L (40 gal) or less than a depth of 1.3 cm (0.5 in.) in the bottom of the container may be used as an aid for dust suppression in an adjacent excavation or staging pile, or absorbent materials may be used in the container. For water found in a container with an estimated volume greater than 150 L (40 gal), EPA approval is necessary to use the water as an aid for dust suppression. Transportation and handling for offsite treatment or disposal of contaminated material will be coordinated on a case-by-case basis. All offsite shipments will be conducted using equipment and methods that are compliant with applicable U.S. Department of Transportation regulations.

Soil and Debris Characterization

Soil and debris characterization will be based on the observational approach and performed in accordance with the procedures described in the SAP (DOE/RL-2007-54). This observational approach relies on available historical information, previous investigations, and a "characterize-and-remediate-in-one-step" methodology. This methodology uses visual evaluation of waste forms (e.g., discoloration of soil) encountered during remediation and in-process analytical sampling. These elements are used together and in consideration of waste-site-specific information to characterize waste as remediation proceeds. Site-specific cleanup verification sampling is performed as described in Section 6.1.2.

Decontamination

While not expected, when radiological decontamination is necessary to support excavation activities, it will generally be performed using dry methods (e.g., wiping and high-efficiency particulate air-filtered vacuum cleaners). When the use of wet methods (e.g., pressure washers and steam cleaners) are required to achieve decontamination objectives, the associated water or cleaning solutions are not collected. Using either dry or wet methods, the work will be conducted by trained site workers in accordance with the following best management practices (BMPs) described in the following section. Other decontamination, when necessary, will generally be performed using wet methods in accordance with the following BMPs.

General BMPs

The following BMPs apply to equipment cleaning and decontamination activities within the waste site:

- Decontamination is typically performed within an active excavation AOC.
- The amount of water used to clean equipment will be minimized.
- Only raw or potable water will be used.
- Soaps, detergents, or other cleaning agents that would be regulated as a hazardous waste will not be added to wash water.
- Pressure washing will normally use cold water (hot water may be used to avoid icing).

- Steam cleaning will be used only after other methods prove to be ineffective.
- Decontamination practices will be documented in the daily log.
- Personnel responsible for equipment decontamination will be trained to the general BMPs.
- A pre- and post-survey will be performed on the washing or decontamination area to assess and remediate (if required) areas affected by the activity. When the washing and decontamination is set up in an area where cleanup levels have been attained, sampling of the area may be performed in accordance with the RD package work instruction at the discretion of EPA.
- Project personnel may perform other methods of equipment washing or decontamination for the completed site (e.g., wrap the equipment for transfer to a decontamination pad, provide for a temporary facility at the site to collect wash water, or fix the contamination to the equipment).

4.1.1.3 Task 3 – Verification Sampling

Verification sampling to confirm that cleanup levels have been achieved following RTD will be performed as described in Section 6.1.2.

4.1.1.4 Task 4 – Backfill, Recontour, and Revegetate

Once RAO attainment has been verified (Section 6.1.3), the waste site RTD footprint will be backfilled. Stockpiled overburden material and material transported from approved borrow areas will be used to return the surface of the site to a grade that matches surrounding topography.

Revegetation will be performed after backfilling to minimize runoff and erosion effects, as well as to restrict the spread of noxious weeds. Revegetation may be delayed in areas intentionally maintained without vegetative cover. Native plant species will be selected based on availability and appropriateness for the structure of the soils to be revegetated. Shrubs such as sagebrush, bitterbrush, and hopsage may be planted as tubelings to provide habitat and structure for nesting wildlife. Native grasses adapted to site conditions may be planted to provide an understory. Areas that have been excessively compacted may be loosened by ripping the soil with heavy equipment. Linear rip lines should be smoothed prior to revegetation. Based on site-specific conditions, fertilizer and straw mulch may be applied to support revegetation. Revegetation monitoring will be performed annually. If vegetation development after five years does not meet the guidance specifications provided in DOE/RL-2011-116, *Hanford Site Revegetation Manual*, additional revegetation activities, such as transplanting or interseeding, will be performed as appropriate.

4.1.2 Waste Site CS/NFA – Remedial Action Work Task

RA work task for CS/NFA includes confirmatory sampling, sampling and analysis (or direct radiological surveys for waste sites contaminated only with radionuclides) to confirm that soil is at or below cleanup levels and that no further action is required. Radiological or chemical surveys will be included in the initial site investigation as appropriate for site conditions to support the selection of sampling locations. The SAP (DOE/RL-2007-54) contains the necessary information to support both chemical and radionuclide data collection at a sufficient quantity and quality to determine whether RAOs have been met.

4.2 Waste Site Institutional Controls

ICs and long-term monitoring will be required for waste sites that are left in place and preclude an unrestricted land use. ICs selected as part of this remedy are designed consistent with the interim action. Specific ICs can be found in the Remaining Sites ROD (EPA/ROD/R10-99/039).

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5 Environmental Management and Controls

This chapter describes environmental management and controls associated with implementation of the 200-CW-3 RA.

5.1 Air Emissions

Airborne emissions associated with the RA 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. Waste site RTD will generate diffuse and fugitive emissions; therefore, powered emissions abatement technology used for point sources (such as portable exhausters) will not be used and Potential Impact Categories will not apply. Section 5.1.4 provides the types of controls that may be used depending on the type of emissions (e.g., dust, radionuclides, etc.) expected to be created by the RA activity.

5.1.1 Radiological Air Emissions

Radionuclide contamination may be encountered during activities under this RA. Federal and state regulations and requirements for radiological air emissions are identified in Section 2.4. Substantive requirements of these standards are applicable to activities that will involve fugitive, diffuse, or point source emissions of radionuclides to the ambient air such as excavation of radioactively contaminated soils and debris performed during the RA.

Potential radiological contaminants of concern will be identified and quantified in an environmental calculation file (ECF). The potential-to-emit (PTE) is determined through calculation or modeling and will be performed prior to work initiation. PTE calculations are needed to determine the abatement technology required to control the potential for contamination release during the work activities. PTE calculations are based on prospective calculations that delineate the total effective dose equivalent (TEDE) to the maximally exposed individual (MEI) who abides or resides in an unrestricted area. For this RD/RA work plan, the estimated holdup in the sources is used to calculate the PTE and TEDE to the MEI. Hypothetical offsite and onsite Hanford Site MEIs are then evaluated. The TEDEs to the MEIs are calculated using the CAP-88 PC software version 4.0.[1] Calculation parameters and the assumptions used to derive the PTE and TEDEs to the MEIs are presented in a supporting ECF (ECF-HANFORD-22-0101, *Potential-to-Emit (PTE) Calculation to Support 200-CW-3 Operable Unit Remedial Action*). The unabated PTE is estimated at the point of the offsite MEI.

In accordance with the 2001 agreement reached between DOE-RL, Washington State Department of Health, and EPA, the PTE for a second MEI location, termed the onsite MEI, is also calculated and included in the ECF. Air emission controls and monitoring requirements will be identified as needed based on the calculated and modeled value of the potential emissions and resultant public exposure.

ECF-HANFORD-22-0101 provides source information as well as the approach for PTE calculations. Table 5-1 provides concise PTE values for the 200-CW-3 sources as they relate to the offsite and onsite MEI.

[1] A regulatory compliance tool under 40 CFR 61, “National Emission Standards for Hazardous Air Pollutants,” the Clean Air Act Assessment Package-1988 (CAP-88) model is a set of computer programs, databases, and associated utility programs for estimating dose and risk from radionuclide emissions to the air. CAP-88 PC Version 4.0 allows modeling on a personal computer and is a recent version of the code.

Table 5-1. 200-CW-3 Sources and TEDE Values

Source	Unabated Onsite TEDE to the MEI	Unabated Offsite TEDE to the MEI	Abated Onsite TEDE to the MEI	Abated Offsite TEDE to the MEI	NFM Station IDs
600-387[a]	1.80E-04	1.27E-04	1.80E-04[b]	1.27E-04[b]	N498, N588, N928, N967

a. Facility descriptions, history, potential-to-emit assumptions, etc., can be found in ECF-HANFORD-22-0101, *Potential-to-Emit (PTE) Calculation to Support 200-CW-3 Operable Unit Remedial Action*.

b. No credit taken for abatement technology due to the fugitive nature of this remedial action.

ID = identification
MEI = maximally exposed individual
NFM = near-facility monitoring
TEDE = total effective dose equivalent

Radiological air emission controls/monitoring for all applicable sources is discussed in Sections 5.1.4 and 5.1.5.

The 200 West Area Near Facility Ambient Air Program stations nearest the 200 West Area Tier 2 buildings and structures provide monitoring effectiveness validation using the near-facility monitoring (NFM). These stations do not provide real-time data, so their biweekly data, along with the worksite monitoring data for overall trending, will be used as indicators of the effectiveness of the contamination control measures.

5.1.2 Nonradiological Air Emissions

The primary source of emissions resulting from the RA will be fugitive particulate matter. In accordance with the substantive requirements of WAC 173-400-040(3), (4), (5), (8), and (9), "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 the RA, materials handling, or other operations and to prevent fugitive dust from becoming airborne from fugitive emission sources.

Operating trucks and other diesel-powered equipment during the remedial 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 remedial 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 and work packages, as necessary.

Some waste encountered during the RA 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), "New Sources in Attainment or Unclassifiable Areas—Review for Compliance with Regulations," and WAC 173-460-060, "Control Technology Requirements," will be evaluated to determine their applicability in satisfying the substantive requirements determined to be ARAR.

5.1.3 Asbestos Emissions

Removal and disposal of asbestos and asbestos-containing material (ACM) are regulated under the *Clean Air Act Amendments of 1990*. 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 RA.

5.1.4 Emission Controls

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

- Water in mists or fine sprays will be applied as practicable for suppression of fugitive emissions and dust during mechanical excavation and backfilling activities.
- Radiological surveys (e.g., swipes/smears) will be taken from remediation equipment, leaving any areas where there is the potential for removable contamination above 2,000 dpm per 100 cm^2 alpha or 100,000 dpm per 100 cm^2 beta/gamma following any remediation activity.
- Operational limits for removable or transferable 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 dpm per 100 cm^2 beta/gamma or exceeding 2,000 dpm per 100 cm^2 alpha are measured or expected.
- Fixatives will be applied to contaminated soil and/or debris and equipment per manufacturer instructions as needed to minimize airborne contamination during the RA activities for fugitive emissions and dust. Fixative application techniques may include spraying, brushing, pouring, or another method, as necessary. Due to their high tack and soil binding nature, fixatives provide greater suppression of the soil matrix and reduce the amount of particle movement when exposed to wind forces. Fixatives, water, covers, containment tents, windscreens, or other controls during cessation of work activities will be applied to the extent practicable based on the work environment (i.e., weather conditions and predicted wind speeds above 32 km/hr [20 mi/hr]).
- Fixatives or cover material (e.g., soil, gravel, and plastic) will be applied to disturbed contaminated soils associated with the RA at any time that field activities will be idle for more than 24 hours.
- If the overnight sustained wind speed is predicted overnight to be greater than 32 km/hr (20 mi/hr) based on the Hanford Meteorological Station forecast, fixative or cover material will also be applied to contaminated soil or debris, as practicable. If a fixative has already been applied and the contaminated items will remain undisturbed, further use of fixatives will not be needed. The fixatives

or other controls will not be applied when the contaminated soil surface is frozen or it is raining, snowing, or other freezing precipitation is falling at the end of work operations.

- Field activities should be temporarily ceased and the area should be placed in a safe configuration if contamination control measures are not adequate based on site conditions (e.g., excessive wind).
- Waste containers will remain closed, except during packaging and waste inspection activities.
- Radiological surveys (e.g., swipes/smears) will be taken from remediation equipment leaving any areas where there is the potential for removable contamination above 2,000 dpm per 100 cm^2 alpha or 100,000 dpm per 100 cm^2 beta/gamma following any remediation action.

5.1.5 Monitoring Requirements

Unabated annual doses for RA activities for radiologically contaminated waste sites addressed in this RD/RA work plan will be calculated. 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 (Table 5-1).

Periodic confirmatory measurement (PCM) will be provided as required by the substantive requirements of WAC 246-247-075(3) and (8) for all waste sites. Radiological surveys will be provided to meet the PCM requirement. The primary PCM will be provided through the use of workspace monitoring and radiological surveys performed in accordance with the current radiological control manual. Monitoring for diffuse and fugitive emissions will be conducted and will consist of radiological surveys using hand-held instruments at the excavation activities. Both alpha and beta-gamma surveys will be performed for all removable contamination surveys and for soil surveys (direct readings).

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 remedial activities. The Hanford Near Facility Ambient Air Program stations provide monitoring effectiveness validation using the NFM. These stations do not provide real-time data, so their biweekly data, along with the worksite monitoring data for overall trending, will be used as indicators of the effectiveness of the contamination control measures. 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 Table 2 values in 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Appendix E, "Compliance Procedures Methods for Determining Compliance With Subpart I." 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 EPA will be notified. The specific monitoring stations are identified in Table 5-1. The Hanford Site protocol established for the NFM 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. Perimeter monitoring is used to measure the diffuse and fugitive emissions from the Hanford Site. Demonstration of compliance with the 40 CFR 61.92, "Standard," effective dose equivalent of 10 mrem/yr limit is provided by DOE/RL-2020-08, *Radionuclide Air Emissions for the Hanford Site, Calendar Year 2019*. Compliance with the 10 mrem/yr standard by the entire Hanford Site ensures compliance of the 200 West Area work with the standard in WAC 173-480-070, "Ambient Air Quality Standards and Emission Limits for Radionuclides," "Emission Monitoring and Compliance Procedures."

5.2 Liquid Effluents

Liquid effluents may be generated during the RA activities (e.g., decontamination solutions, water sprays for dust suppression). Although CERCLA RAs are exempt from the Hanford Site state waste discharge permit (SWDP), liquid effluents will be discharged if they meet the substantive provisions of existing Hanford Site SWDP. Based on process knowledge or sample results, if the liquid effluents do not meet substantive standards of the Hanford Site SWDP, effluents may need to be contained, 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.

5.3 Reporting Requirements for Nonroutine Releases

40 CFR 302, "Designation, Reportable Quantities, and Notification," requires immediate notification to the National Response Center upon discovery of a release of a hazardous substance into the environment in excess of a reportable quantity in a 24-hour period. 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 or a CERCLA hazardous substance in a 24-hour period, except for releases exempted from reporting under 40 CFR 355.31, "What Types of Releases are Exempt from the Emergency Release Notification Requirements of this Subpart?" The Hanford Site has comprehensive policies and procedures in place to report nonroutine releases to the environment. These procedures will be followed during the 200-CW-3 OU RA implementation phase. Notwithstanding, any incident that involves a spill, release, fire, explosion, or environmental permit exceedance will be reported to the contractors' environmental event single point of contact, as required by DOE/RL-94-02, *Hanford Emergency Management Plan*, to determine the applicability of requirements and to perform appropriate environmental notifications.

5.4 Waste Management Plan

Management and disposal of wastes resulting from implementation of this RD/RA work plan will be performed in accordance with CERCLA and the ARARs specified in Section 2.4. Several waste streams will be generated under this RD/RA work plan. It is anticipated much of the waste will be designated as low-level waste. However, quantities of dangerous waste, mixed low-level waste, transuranic (TRU)/TRU mixed (TRUM) waste, polychlorinated biphenyls (PCB)-contaminated waste, and ACM may also 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 waste management ARARs have been developed:

- As implemented in 40 CFR 268, "Land Disposal Restrictions," and WAC 173-303, "Dangerous Waste Regulations," RCRA is used for management of dangerous waste. The identification and treatment, storage, and disposal of hazardous waste and the hazardous component of mixed waste are also governed by RCRA. The State of Washington, which implements RCRA requirements under WAC 173-303, has been authorized 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 remedial activities at Hanford Site waste sites and as a result of debris cleanup activities. Treatment standards for dangerous or mixed waste subject to RCRA LDRs are found in WAC 173-303-140, "Land Disposal Restrictions," which includes 40 CFR 268 by reference.

- The *Toxic Substances Control Act of 1976* (TSCA) includes standards for managing PCB waste. PCB waste disposal is governed by the rules of 40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions." PCB wastes generated during RA 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 designates as dangerous or mixed waste and could require treatment to meet WAC 173-303 and 40 CFR 268 requirements.
- As implemented by 40 CFR 61, Subpart M, "National Emission Standard for Asbestos," the *Clean Air Act Amendments of 1990* regulate removal and disposal of asbestos and regulated ACM prior to demolition or renovation. These regulations provide for special precautions to control airborne emissions of asbestos fibers during remedial activities. The provisions of 10 CFR 851.23(a)(7), "Worker Safety and Health Program," "Safety and Health Standards," implement the asbestos-related requirements of 29 CFR 1926.1101, "Asbestos," for the regulation of worker safety with respect to asbestos.

Wastes generated through implementation of this RA 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). ERDF is considered to be onsite for management and disposal of waste from RA activities proposed in this document. Waste will be transported to ERDF or other EPA-approved facilities and treated as necessary to meet applicable LDR requirements and waste acceptance criteria prior to disposal.

Although not anticipated, waste that is characterized as either contact-handled or remote-handled TRU/TRUM waste will be staged at the Central Waste Complex or another EPA-approved facility until eventual shipment to the Waste Isolation Pilot Plant.

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.

5.4.1 Projected Waste Streams

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

- Low-level waste and mixed low-level waste
- Excavated materials (soils, structural materials)
- Miscellaneous solid waste (e.g., concrete, wood, glass, asphalt, PPE, cloth, plastic, and metal)
- Liquids (e.g., decontamination liquids)
- Equipment and construction materials (such as construction equipment and materials, and sampling equipment)
- PCB waste
- Asbestos and ACM

Although not anticipated, TRU/TRUM waste may be generated.

5.4.2 Waste Management and Characterization

Waste will be managed in a protective manner to prevent releases to the environment or 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 here and in the SAP (DOE/RL-2007-54). New waste streams are not anticipated but would be characterized as necessary for designation purposes.

Sampling of contaminated soil or remaining structures 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.

Contact solid waste that is nonhazardous and radiologically released, or waste that has not contacted potentially contaminated materials, may be disposed offsite to a solid waste landfill or recycled, as appropriate.

Waste generated through the RA will be characterized in accordance with the approved SAP (DOE/RL-2007-54) and waste acceptance criteria of the receiving facility (i.e., ERDF). Characterization criteria identified in the SAP provides the rationale and strategy for conducting sampling and analysis activities. 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. The SAP contains sampling, analysis, and radiological survey requirements to support waste designation and disposal decisions. Characterization data will be used to prepare waste profile summaries to determine appropriate disposal options.

5.4.2.1 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.

5.4.2.2 Transuranic Waste/Transuranic Mixed Waste

Although not anticipated, TRU/TRUM waste may exist and will likely be solid if found.

5.4.2.3 Excavated Material

Excavated material may include soil, debris, engineered structures (e.g., pipeline segments, slabs, and foundations), and stripped vegetation removed during RTD activities. Excavated material will be surveyed and characterized prior to disposal.

5.4.2.4 Miscellaneous Solid Waste

Miscellaneous solid waste is nonhazardous, nonradioactive waste that is expected to consist of paper, PPE, debris, materials from cleanup of unplanned releases, communication equipment, and other solid waste that will be collected during remediation activities. Miscellaneous solid waste that has contacted potentially contaminated materials will be segregated from other materials and placed into containers that are appropriate for the material and disposal facility. Miscellaneous solid waste that has contacted contaminated media may be disposed at ERDF if the waste acceptance criteria can be met (ERDF-00011). If the ERDF waste acceptance criteria cannot be met, the waste will be shipped to an offsite facility, as appropriate and authorized by EPA, depending on the waste designation.

Miscellaneous solid waste that has not contacted contaminated media, has contacted miscellaneous solid waste that is nondangerous, and has been released for radionuclides may be disposed at an offsite solid waste landfill.

5.4.2.5 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), "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 for ACM removal. Additional information about asbestos and ACM waste generated from the remediation activities will be specified in the field work packages and procedures as necessary.

5.4.2.6 PCB Waste

The management and disposal of PCB wastes is governed by the 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 remedial activities will be specified in the field work packages and procedures as necessary.

5.4.2.7 Returned Sample Waste

Screening and analysis of both solids and liquids may be conducted at the project site, at laboratories on and off the Hanford Site, or at a radiological counting facility. Samples analyzed at a radiological counting facility or at Hanford Site laboratories may be returned to the original waste location or to ERDF for disposition with other CERCLA waste. Unused samples and associated waste generated at offsite laboratories will be dispositioned in accordance with contract specifications.

5.4.2.8 Decontamination Fluids

Although CERCLA RAs are exempt from the Hanford Site 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 AOC may need to be contained, sampled, and as necessary, transported or solidified for disposal at ERDF or another EPA-approved facility.

5.4.2.9 Equipment Waste

Equipment used to support the RA that is chemically or radiologically contaminated will be decontaminated as described in Section 4.1.1.2. If the equipment cannot be decontaminated, the equipment will be disposed at ERDF or other EPA-approved facilities.

5.4.2.10 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 LDR requirements and waste acceptance criteria prior to disposal. Waste will be stored in the AOC 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 pretransportation requirements for dangerous or mixed waste generated by the closure action will be identified and

implemented before the waste container is moved. In addition, a fixative will be applied as needed to the remediation site to control dust, which may contain radiological and nonradiological contaminants.

5.4.2.11 Management of Waste Containers

Prior to disposal, dangerous waste containers will be managed in accordance with the substantive provisions of WAC 173-303-200, "Conditions for Exemption for a Large Quantity Generator that Accumulates Dangerous Waste," 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 AOC. 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 and labeling; physical container placement; storage area boundaries, identification, and warning signs; and sign of any potential leakage. Containers showing signs of deterioration will be identified on the container inspection form and will be overpacked or repackaged, as necessary.

Spills or releases will be reported as stated in Section 5.3. In the event of a spill or release, action will be taken to protect human health and the environment.

5.4.3 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 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 RA will be identified and implemented before movement of waste. Before being removed from the AOC 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.

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 RA for temporary storage 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 human health and the environment, this activity 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).

Specific staging pile locations will be identified in project drawings. Field operations of staging piles will be accomplished as described in the preceding list.

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

5.4.3.1 Waste Profile

Waste profiling to establish values for the waste tracking form may take place concurrently with RA 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.

5.4.3.2 Final Waste Disposal

Dangerous, mixed, and radioactive wastes generated through the RA will be disposed at ERDF. ERDF is the preferred disposal location for waste that meets facility waste acceptance criteria (ERDF-00011) because it is engineered to meet appropriate RCRA technological requirements for landfills as described in EPA et al., 1995, *Record of Decision U.S. DOE Hanford Environmental Restoration Disposal Facility, Hanford Site, Benton County, Washington*. If waste cannot be disposed at ERDF, it may be transferred to an EPA-approved disposal facility.

TRU/TRUM waste generated as part of this RA will be sent to the Central Waste Complex or other EPA-approved facility. TRU/TRUM waste will be treated, as necessary, certified, and disposed at the Waste Isolation Pilot Plant.

5.4.3.3 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.

5.4.3.4 Waste Treatment

Treatment of waste generated from the RA (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 or address LDR 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 RA can be disposed at ERDF if they meet ERDF waste acceptance criteria (ERDF-00011).

5.4.4 Waste Minimization and Recycling

By using waste separation and segregation, waste generation will be kept to a minimum. Waste will be segregated within the RA area as generated, which will minimize the volume of regulated waste.

Waste minimization practices will be followed to the extent technically and economically feasible during waste management. Introducing clean materials into a contamination area or otherwise 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.

All materials released offsite for disposal or recycling must be certified free of contamination in accordance with DOE guidance for nonreal property. Waste materials with no or de minimis levels of CERCLA hazardous substances are not considered CERCLA waste and therefore are not subject to the 40 CFR 300.440 offsite acceptability determination.

5.4.5 Equipment

Equipment used to support the RA that contacts dangerous and/or mixed waste will be decontaminated as described in Section 4.1.1.2. If the equipment cannot be decontaminated, the equipment will be designated for disposal at ERDF or other appropriate facility.

5.5 Cultural/Ecological Resources

DOE will comply with the location-specific ARARs, as identified in Section 2.4. Additional details are provided in the following subsections.

5.5.1 Cultural/Historical Resources

Cultural resource reviews will be completed to identify historic properties and evaluate potential impacts at 200-CW-3 OU waste sites. Consultations are being conducted to ensure that a good faith effort is made to identify all historic properties within the area of potential effects of the RA. If required, qualified personnel will complete additional cultural resource reviews and surveys, determinations, and notifications, as necessary, prior to undertaking ground-disturbing activities for the remaining work scope, using DOE/RL-98-10, *Hanford Cultural Resource Management Plan*, as guidance. Potential adverse effects are to be avoided or resolved through consultation. If adverse effects cannot be avoided, further procedures, including entering into memoranda of agreement or other agreement documents, will be entered into to resolve the adverse effect.

5.5.2 Ecological Resources

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*). Project engineers will consult with the ecological compliance staff in advance of planned activities to allow for sufficient ecological surveys. Procedures to avoid or mitigate damage to sensitive areas identified during ecological reviews will be established before work begins.

No plants or animals listed as threatened, endangered, or candidate species under the federal *Endangered Species Act of 1973* are known to be near the impacted areas. Care will be taken to avoid or minimize damage to any vegetation, especially shrubs that are near waste sites and well installation locations. Workers will avoid wildlife that may be found in and around the vicinity of waste sites and well installation locations. If any nesting birds (if not a nest, a pair of birds of the same species or a single bird that will not leave the area when disturbed) are encountered or suspected, remediation activities shall be evaluated before continuing work.

5.6 Health and Safety Program

A health and safety plan (HASP) is required to protect personnel from environmental hazards associated with hazardous substances (chemical and radiological), as well as physical hazards. The HASP specifies the physical and administrative controls to protect personnel and the environment.

5.6.1 Worker Safety Program

Work activities identified in this RD/RA work plan are regulated under 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response." The Site Wide Health and Safety Program includes all procedures for occupational safety and industrial hygiene developed and implemented to protect the health and safety of workers. The Health and Safety Program meets the requirements of 29 CFR 1910.120 for a written safety and health program. The HASP that will be followed for this RA is an extension of the overall Remediation Contractors Safety and Health Program. The HASP identifies the controls necessary to mitigate general hazards that can be encountered on the project. The controls to mitigate task-specific hazards are identified and evaluated in task-specific job hazard analyses as part of the work package development process.

5.6.2 Integrated Safety Management System

The Integrated Safety Management System is incorporated into all work activities and includes the following elements:

- Organizational structure that specifies the official chain of command and the overall responsibilities of supervisors and employees
- Comprehensive work plan developed before work begins at a site to identify operations and objectives and address the logistics and resources required to accomplish project goals
- Comprehensive hazard analysis when workers could be exposed to hazardous substances (chemical and radiological), as well as physical hazards
- Worker training commensurate with individual job duties and work assignments
- Medical surveillance program administered to comply with 29 CFR 1910.120 requirements
- Central Plateau Cleanup Company (CPCCo) procedures, as well as project- and task-specific implementing plans and procedures
- Voluntary protection plan

5.6.3 Health and Safety Plan and Activity Hazards Analysis

Access and work activities are controlled in accordance with approved work packages, as required by established internal work requirements and procedures. The HASP identifies how safety and health requirements are integrated into the work control process:

- Safety and health hazard analysis identifying hazards and their mitigations
- Employee training assignments
- PPE to be used by employees for tasks and operations
- Medical surveillance requirements
- Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques
- Site control measures

- Decontamination procedures
- Emergency response plan, including necessary PPE and other equipment
- Confined space entry procedures
- Spill containment measures

As part of work package development, a job hazards analysis is completed to identify and control hazards associated with work tasks. Before work activities begin, a pre-job briefing is held with the involved workers. This briefing includes a review of the hazards that may be encountered and their associated safety requirements.

5.6.4 Radiological Controls and Protection

The Radiological Controls and Protection Program is defined in DOE-approved programs and approved procedures. This program implements CPCCo policy to reduce safety and health risks to levels that are ALARA and ensure adequate worker protection.[2] The CPCCo Radiological Protection Program complies with the requirements of 10 CFR 835, "Occupational Radiation Protection." Appropriate dosimetry, radiological work permits (RWPs), PPE, ALARA planning, surveys, and radiological control technician support are provided.

In addition to the HASP, RWPs are prepared 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 HASP and RWP provisions.

Radiological control requirements are assessed as necessary. These controls identify specific requirements for activities, such as periodic or continuous radiation monitoring by radiological control technicians. The ALARA planning process is used to identify contamination control requirements, radiation monitoring requirements, and other radiation control requirements for individual tasks conducted during the remedial and removal action.

Measures are implemented to minimize the possibility of releases to the environment. Radiological worker exposure is monitored using approved occupational radiological protection methods.

5.7 Emergency Response

During remediation activities, emergency response for project activities will be covered by the project-specific HASP, related health and safety procedures, and work instructions. The HASP, health and safety procedures, and work instructions contain primary emergency response actions for site personnel, area alarms, implementation of the emergency action plan, and emergency equipment at each task site, as well as emergency coordinators, emergency response procedures, and spill containment. A copy of the HASP will be kept in the field office.

5.8 Quality Assurance Program

Overall QA for the RD/RA work plan will be planned and implemented in accordance with the following:

- 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)

[2] Worker safety and health standards are not environmental standards by definition; therefore, they are not potential ARARs. Instead, compliance with applicable safety and health regulations is required external to the CERCLA ARAR process.

- EPA/240/R-02/009, *Guidance for Quality Assurance Project Plans* (EPA QA/G-5)
- EPA/240/B-05/001, *Guidance on Quality Assurance for Environmental Technology Design, Construction, and Operation* (EPA QA/G-11)

QA activities will use a graded approach based on the potential impact on the environment, safety, health, reliability, and continuity of operations. QA for sampling and analysis is discussed in the applicable SAP (DOE/RL-2007-54) and will comply with the following requirements:

- DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD)
- DOE O 414.1D, *Quality Assurance*
- CPCC-00172, *Central Plateau Cleanup Company Environmental Quality Assurance Program Plan*[3]

The laboratories analyze samples in accordance with established procedures and the requirements of this plan and provide data packages containing analytical and QC results. Laboratories provide explanations of results to support data review and resolve analytical issues. Statements of work flow down quality requirements consistent with HASQARD (DOE/RL-96-68). The laboratories are evaluated under the DOE Consolidated Audit Program – Accreditation Program to DoD/DOE, 2021, *Department of Defense (DoD), Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories*, requirements, or its successor programs, and must be accredited by Ecology for the analyses performed.

The SAP (DOE/RL-2007-54) supporting this RA will contain a QA project plan. This plan establishes the quality requirements for environmental data collection, including planning, implementation, assessment of sampling, field measurements, and laboratory analysis, and corrective and quality improvement actions.

5.8.1 Quality Assurance Implementation

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

5.8.2 Responsibilities and Authority

The contractor must perform quality engineering, design reviews, surveillance, and audits (as necessary) to achieve QA objectives. The contractor also must ensure that the various contractors and design agencies establish programs to control design and QA in accordance with applicable requirements.

5.8.3 Document Control

All technical documents (e.g., specifications and drawings) will be controlled in accordance with approved configuration management internal work requirements and processes. The responsible design agency within the Remediation Contractor's organization (Section 3.1.3) will maintain control of the design documents through acceptance of the documents.

[3] The QA/QC planning and implementing elements described in Chapters 1, 2, and 3 of the SAP (DOE/RL-2007-54) are consistent with the associated environmental management plan elements described in CPCC-00172. CPCC-00172 is not a Tri-Party Agreement (Ecology et al., 1989a) primary or secondary document and thus is not subject to Lead Regulatory Agency review or approval.

5.8.4 Quality Assurance Records

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

5.8.5 Audits/Assessments

Internal and external audits may be performed by contractor assessments and regulatory and quality program organizations to ensure project compliance with the QA program requirements.

5.8.6 Self-Assessments

Self-assessments may be conducted by project personnel to determine compliance in accordance with the contractor's internal work requirements and processes.

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6 Remedial Action Completion

This chapter describes the approach for completing and documenting waste site RA closeout. It also includes information on waste site cleanup verification and closeout and demonstrating attainment of cleanup levels in soil.

Waste site RAOs are presented in Chapter 2. Waste site RAOs are achieved through CS/NFA or RTD. The RA will confirm no action is required or reduce contaminant concentrations in waste site soil until cleanup levels are achieved.

6.1 Verification of Waste Site Cleanup

The waste site cleanup verification approach will be consistent with the approach used for previous interim action remedial decisions for waste sites elsewhere in the 100 Area and the 200-CW-3 OU. A remaining sites verification package (RSVP) will be used to document the relevant waste site has been remediated in accordance with the applicable ROD and that the RAOs under the applicable land-use scenario have been achieved. Site-specific data evaluations are presented in the RSVP to demonstrate that the waste site, following remediation, does not pose unacceptable risk to human health and the environment under unlimited use/unrestricted exposure conditions.

The primary determination of the successful completion of remediation is comparison of residual contaminant concentrations in soil against cleanup levels. Site-specific factors such as contaminant concentrations, the type of waste site (solid or liquid), and residual site risk calculations are used to verify that remaining contaminant concentrations are protective of direct exposure and groundwater. A site-specific contaminant distribution model may be necessary to describe site conditions more accurately and show that contaminant concentrations decrease with soil depth. The model information may be used to determine if residual contaminant concentrations in vadose zone soil are protective of groundwater, or if further vadose zone excavation is required. Results are documented in the RSVP.

Waste site closeout includes confirmatory and verification sample collection, demonstrating RAO attainment, cleanup and waste site closure documentation, and site release. These methods are summarized in the following sections.

6.1.1 Confirmatory Sample Collection

Confirmatory samples will be collected from the surface of the CS/NFA waste sites. A combination of initial field screening and sampling results will be evaluated to determine if concentrations are below cleanup levels. Once confirmatory sampling indicates contamination levels are below cleanup levels, the site will be reclassified as “no action.” If sampling results exceed cleanup levels, the RTD remedy will be implemented. Confirmatory samples will only be collected from waste sites where no action is expected.

6.1.2 Verification Sample Collection

Verification samples of the residual soil collected from the waste site excavation floor and sidewalls, any clean soil stockpiles intended for use as backfill material, and residual soil from associated SPAs will be collected in accordance with the SAP (DOE/RL-2007-54). The SAP will also provide sufficient detail on the sampling and analysis procedures to ensure the verification data meet QA/QC requirements for project objectives. Results from laboratory analysis of the verification samples will be used to demonstrate RAO and cleanup level attainment. Verification samples will only be collected from the RTD waste sites.

6.1.3 Attainment of Remedial Action Objectives

The approach for verifying RAO attainment involves the following steps:

- Evaluate summary analytical data against the appropriate cleanup levels
- If needed, model exposure and risk to future site inhabitants (human and ecological)
- If needed, model future impacts to groundwater

Details regarding confirmatory and verification sampling and analyses will be established in the SAP (DOE/RL-2007-54). Once sampling and analyses are completed, the bulleted steps have been addressed, and the RAOs have been attained, then the site will be reclassified as "interim closed out" in accordance with TPA-MP-14, *Maintenance of the Waste Information Data System (WIDS)*.

6.1.4 CERCLA Cleanup Documentation

After determining RAO attainment, waste site reclassification documentation will be prepared, typically including an RSVP or other closeout documentation. The waste site reclassification documentation summarizes the RA process, verification sampling results (if applicable), RAO attainment under the appropriate land use at a site, and eventual removal of the site from the NPL. Closeout documentation may be used to support other CERCLA closeout documentation (e.g., RA reports, construction completion reports, and NPL deletion packages).

The original 200-CW-3 OU scope completions are documented in DOE/RL-2011-58. In anticipation of future waste sites added through the plug-in approach, the next RA report will not be developed until it has been determined that no additional sites will be added to 200-CW-3 OU.

6.2 Site Release

DOE will continue to manage the 200 and 600 Areas of the Hanford Site for as long as necessary to support RAs and other missions. The release of land areas will depend on release of the individual waste sites and completion of other work in the OU, such as decontamination and decommissioning of facilities and final cleanup verification under CERCLA.

Where deed notices or other ICs are used in accordance with the Remaining Sites ROD (EPA/ROD/R10-99/039), DOE will not allow activities that would interfere with the RA prior to EPA approval. In addition, DOE will take necessary measures, such as filing deed notices in appropriate county offices and enforcing such land-use limitations through contractual mechanisms, to ensure the continuation of these restrictions prior to any transfer or lease of the property to any private party in accordance with the statutory requirements of Section 120(h), "Federal Facilities," of CERCLA and the regulatory requirements of 40 CFR 373, "Reporting Hazardous Substance Activity When Selling or Transferring Federal Real Property." A copy of any restriction notification will be given to any prospective purchaser or transferee before any transfer or lease by DOE. DOE shall provide a copy of the executed deed or transfer assembly to Ecology and EPA. In addition, unless and until cleanup levels are attained (as defined in the Remaining Sites ROD [EPA/ROD/R10-99/039]), evaluation of the RA will occur as part of the CERCLA 5-year reviews.

7 Cost and Schedule

This chapter presents general RA cost and schedule information associated with implementation of the 200-CW-3 waste site remediation.

7.1 Cost Summary

A cost estimate for the 200-CW-3 OU waste sites added via the plug-in approach was prepared and document in ECE-22-200CW300001, *Environmental Cost Estimate for the 200 North Area Waste Sites, 200-CW-3 Remedial Design/Remedial Action Work Plan*. Per CERCLA remedial investigation/feasibility study guidance (EPA 540-R-00-002, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*), the feasibility cost estimate has an accuracy of -30% to +50%. For this RD/RA work plan, the feasibility cost estimate for the selected remedy was based on 2022 as shown in Table 7-1. The actual cost for the original 200-CW-3 OU RAs as documented in DOE/RL-2011-58 are also provided in Table 7-1.

Table 7-1. 200-CW-3 OU Cost Summary Table

Remedy Component	CS/NFA or No Action	RTD
Original 200-CW-3 OU scope	$296,000	$8,301,600
Sites add via plug-in	$2,000,000	$24,700,000
Total cost per remedy component	$2,296,000	$33,001,600
Total Cost for Remedy Components	$35,297,600	

CS/NFA = confirmatory sampling/no further action
OU = operable unit
RTD = removal, treatment, and disposal

Starting with RD/RA work plan Revision 1, the cost estimate for the 200-CW-3 remedy components (excluding Revision 0 scope) added via the plug-in approach, is as follows:

- Soil (CS/NFA): $2 million
- Soil (RTD): $24.7 million

This revision results in a total estimated cost of $26.7 million which is within the -30/+50% range of the Remaining Sites ROD (EPA/ROD/R10 99/039) estimate of $128 million, as amended by the 2000 ESD (EPA et al., 2000, *Explanation of Significant Differences for the 100 Area Remaining Sites ROD*), 2004 ESD (EPA et al., 2004, *Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision*), and 2009 ESD (EPA et al., 2009) ($90 to $192 million). In total, approximately $57.7 million in waste site scope has been incorporated into the Remaining Sites ROD using Tri-Party Agreement (Ecology et al., 1989a) Fact Sheets (e.g., Ecology et al., 2011, *Fact Sheet: 100 Area "Plug-In" and Candidate Waste Sites for Fiscal Year 2010*).

7.2 Schedule Summary

This RA is expected to begin following issuance of this RD/RA work plan, which is anticipated to be in September 2022. Implementation of the RA will be performed to support Tri-Party Agreement (Ecology et al., 1989a) Milestone M-016-202, tentatively scheduled for September 30, 2024.

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303-071, "Excluded Categories of Waste."

303-073, "Conditional Exclusion of Special Wastes."

303-077, "Requirements for Universal Waste."

303-120, "Recycled, Reclaimed, and Recovered Wastes."

303-140, "Land Disposal Restrictions."

303-170, "Requirements for Generators of Dangerous Waste."

303-200, "Conditions for Exemption for a Large Quantity Generator that Accumulates Dangerous Waste."

303-573, "Standards for Universal Waste Management."

303-630, "Use and Management of Containers."

303-960, "Special Powers and Authorities of the Department."

303-9906, "Special Waste Bill of Lading."

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304-200, "On-Site Containerized Storage, Collection and Transportation Standards for Solid Waste."

WAC 173-340, "Model Toxics Control Act—Cleanup," *Washington Administrative Code*, Olympia, Washington. Available at: https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340.

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480-050, “General Standards for Maximum Permissible Emissions.”

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247-035, “National Standards Adopted by Reference for Sources of Radionuclide Emissions.”

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Appendix A

200-CW-3 Waste Sites

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A1 Introduction

This appendix provides general information about the waste sites within the 200-CW-3 Operable Unit. The information provided in this appendix is summary level. Table A-1 provides the following information for each waste site:

- Waste site identification number
- Waste site type identified in the Waste Information Data System (WIDS)
- Brief site description
- Selected remedy

As additional sites are identified that fit the plug-in approach, Table A-1 will be updated with the appropriate information.

Table A-1. Summary of 200-CW-3 OU Waste Sites

Waste Site	WIDS Unit Type	Description	Selected Remedy
Original 200-CW-3 Waste Sites			
200-N-3	Depression/pit (nonspecific)	A series of electrical ballast pits located southwest of the 212-P Building, and northwest of the intersection of two gravel roads, one road leading north toward the 212-P Building and the other leading west toward the 212-N Building. The pits were originally used as a source of rock for the railroad track beds and now contain a large amount of gravel-sized rock with some metal pipes, wood, electrical insulators, metal cans, and rusted drums.	No action[a]
216-N-1	Pond	A pond located 274 m (900 ft) south-southeast of the 212-N Building. The pond received basin overflow cooling water from the storage of fuel in each building. The pond measured approximately 152 m (500 ft) in length, 30 m (100 ft) in width, and 1.83 m (6 ft) in depth, including backfill material. The pond consisted of a natural depression in the natural terrain during operation, with the discharged water dispersed by evaporation and percolation into the ground.	RTD[a]
216-N-2	Trench	The 216-N-2 Trench was 15.24 m (50 ft) in length by 3.05 m (10 ft) in width and 2.13 m (7 ft) deep prior to backfilling. The trench received basin water and sludge cleanout from the 212-N Building during the shutdown of the area. When the trench was no longer needed for disposal, it was backfilled. Any aboveground piping was placed in the trench prior to backfilling.	No action[a]
216-N-3	Trench	The 216-N-3 Trench was 15.24 m (50 ft) in length by 6.1 m (20 ft) in width and 1.83 m (6 ft) deep prior to backfilling. The trench received basin water and sludge cleanout from the 212-N Building basin during the shutdown of area. When the trench was no longer needed for disposal, it was backfilled. Any aboveground piping was placed in the trench prior to backfilling.	No action[a]
216-N-4	Pond	A pond located 274 m (900 ft) south-southeast of the 212-P Building. The pond received basin overflow cooling water from the storage of fuel in each building. The pond measured approximately 152 m (500 ft) in length, 61 m (200 ft) in width, and 2.74 m (9 ft) in depth, including backfill material. The pond consisted of a natural depression in the natural terrain during operation, with the discharged water dispersed by evaporation and percolation into the ground.	RTD[a]
216-N-5	Trench	The 216-N-5 waste site received basin water and sludge from the 212-P Building during shutdown of the area. The trench was approximately 24 m (80 ft) in length by 4.6 m (15 ft) in width and 1.8 m (6 ft) deep prior to backfilling. When the trench was no longer needed for disposal, it was backfilled. Any aboveground piping was placed in the trench prior to backfilling.	RTD[a]

Table A-1. Summary of 200-CW-3 OU Waste Sites

Waste Site	WIDS Unit Type	Description	Selected Remedy
216-N-6	Pond	A pond located 274 m (900 ft) south-southeast of the 212-R Building. The pond received basin overflow cooling water from the storage of fuel in each building. The pond measured approximately 152 m (500 ft) in length, and 46 m (150 ft) in width. The exact depth is not documented, but clean fill up to 1.83 m (6 ft) was placed over the pond. The pond consisted of a natural depression in the natural terrain during operation, with the discharged water dispersed by evaporation and percolation into the ground.	RTD[a]
216-N-7	Trench	The 216-N-7 waste site received basin water and sludge from the 212-R Building during shutdown of the area. The trench was approximately 24.3 m (80 ft) in length by 4.6 m (15 ft) in width and 1.8 m (6 ft) deep prior to backfilling. When the trench was no longer needed for disposal, it was backfilled. Any aboveground piping was placed in the trench prior to backfilling.	RTD[a]
2607-N	Septic tank	A septic tank that consists of a rectangular concrete reinforced tank, buried to grade level, and filled with soil. The original tank system consisted of a tank that was 1.2 m (4 ft) long, 0.6 m (2 ft) wide, and 2.5 m (8.25 ft) deep (inner dimensions) with a capacity of between 795 and 910 L (210 and 240 gal) based on a user capacity for six people. It was connected to a drain field that extends south of the septic tank and was tied to the already demolished 2743-N Guard House.	No action[a]
2607-P	Septic tank	A septic tank that consists of a rectangular concrete reinforced tank, buried to grade-level, and filled with soil. The original tank system consisted of a tank that was 1.2 m (4 ft) long, 0.6 m (2 ft) wide, and 2.5 m (8.25 ft) deep (inner dimensions) with a capacity of between 795 and 910 L (210 and 240 gal) based on a user capacity for six people. It was connected to a drain field that extends south of the septic tank and was tied the already demolished 2743-P Guard House.	No action[a]
2607-R	Septic tank	A septic tank that consists of a rectangular concrete reinforced tank, buried to grade level, and filled with soil. The original tank system consisted of a tank that was 1.2 m (4 ft) long, 0.6 m (2 ft) wide, and 2.5 m (8.25 ft) deep (inner dimensions) with a capacity of between 795 and 910 L (210 and 240 gal) based on a user capacity for six people. It was connected to a drain field that extends south of the septic tank and was tied the already demolished 2743-R Guard House.	No action[a]
600-285-PL	Radioactive process sewer	A 46 cm (18 in.) diameter vitrified clay pipe underground pipeline that serviced the 212-N Building and extended to the 216-N-1 Pond for gravity-fed discharge of basin liquids.	No action[a]
600-286-PL	Radioactive process sewer	A 46 cm (18 in.) diameter vitrified clay pipe underground pipeline that serviced the 212-P Building and extended to the 216-N-4 Pond for gravity-fed discharge of basin liquids.	RTD[a]

Table A-1. Summary of 200-CW-3 OU Waste Sites

Waste Site	WIDS Unit Type	Description	Selected Remedy
600-287-PL	Radioactive process sewer	A 46 cm (18 in.) diameter vitrified clay pipe underground pipeline that serviced the 212-R Building and extended to the 216-N-6 Pond for gravity-fed discharge of basin liquids.	RTD[a]
UPR-200-N-1	Unplanned release	An unplanned release site on a 91 m (300 ft) leg of the railroad track extending south from the 212-R Building. From 1944 to 1952, irradiated fuel rods were transported to the 212-R Building from the 100 Area reactors by train in water-filled cask cars. The fuel rods were transferred from the railcars to water-filled storage basins inside the building, where the short-lived radionuclides were allowed to decay before transporting the fuel rods to the 200 Areas for processing. From 1982 to 1986, the 212-R Building was used as a maintenance facility for radiologically contaminated railcars in need of brake and wheel maintenance. Over time, movement and repair of the contaminated railcars caused the track and soil to become contaminated.	No action[a]
UPR-200-N-2	Unplanned release	An unplanned release site with approximate dimensions of 20 ft by 20 ft (6.1 m by 6.1 m). There are two open wood-lined holes with valves inside the radiologically posted area. The holes measure approximately 1 m (3.2 ft) square and are approximately 1 m (3.2 ft) in depth. The waste site is adjacent to the northern Well Pump House (referred to as Well House No. 2) foundation located east of the 212-R Building. The Well Pump House was demolished in September 2004. The two valve boxes are associated with the old well water supply system; however, there is no information to explain the exact nature or cause of the radiological contamination.	No action[a]
Waste Sites Added to 200-CW-3 via Plug-In Approach			
CTFN 2703-E[b]	Drain/tile field	A trench and seepage basin often referred to the 200-E Chemical Drain Field. There is no evidence that suggests the drain field was lined.	CS/NFA
200-E-46[b]	Dumping area	An area of debris identifying an old laydown area located near the 282E Pump House and Reservoir and running along the south side of the railroad spur.	CS/NFA
200-W-BP[b]	Burn pit	An area where in the past trailers and chemicals and currently tumbleweeds are sent to be burned. This area also coincides with a borrow pit.	CS/NFA
600-71[b]	Burn pit	An area of scattered charred debris located next to Gravel Pit 30.	CS/NFA
600-227[b]	Foundation	An abandoned military site containing contaminants of potential concern include test firing and routine maintenance of 120 mm anti-aircraft artillery guns, ammunition assembly and storage, painting, and possible transformer leaks. No chemical or radiological processes were associated with this site.	CS/NFA

Table A-1. Summary of 200-CW-3 OU Waste Sites

Waste Site	WIDS Unit Type	Description	Selected Remedy
600-354[b]	Dumping area	Large area of scattered debris and stressed vegetation near the H-61-H Anti-Aircraft Artillery Site. Radiological processes are not expected to be associated with this site.	RTD
600-355[b]	Dumping area	Large area of scattered debris along a ridge near the H-61-H Anti-Aircraft Artillery Site. Chemical and radiological processes are not expected to be associated with this site.	RTD
600-359[b]	Dumping area	Three spot locations of some debris, stressed vegetation, and soil staining along the railroad between the Susie Junction and Ethel Junction. This site also has a rail oiler for the railroad that may have contained PCB oil. Railroad ties and tracks also have oil staining.	RTD
600-360[b]	Dumping area	Several areas of debris and stressed vegetation near the 251W Substation. Debris includes, but is not limited to, concrete blocks, treated wood, metal, drums, glass jars, asphalt, etc.	RTD
600-361[b]	Dumping area	Several areas of debris, stained soil, and stressed vegetation east and southeast of the former 212-R Storage Building. Also, an area east of Route 4N with a mound of asphalt. Debris includes, but is not limited to, utility poles, concrete cones, cables, wires, drums, hose, electrical equipment, metal, insulators, etc.	RTD
600-362[b]	Dumping area	Nine areas of debris, stressed vegetation, tar, mechanically disturbed dirt, and a trench-like depression east of Route 4N near the 216-N-8 Pond. Debris includes, but is not limited to, wood, metal, cans, glass jars, metal garbage can, bottles, etc.	RTD
600-363[b]	Dumping area	An area of surface debris including lumber, roofing material transite, tar, and asphalt north of the former 212-N Storage Building.	RTD
600-365[b]	Dumping area	An area identified as a small landfill or dumping area previously not identified with the 600-228 landfill. As of June 2019, the debris was not visible and the area had been backfilled.	RTD
600-387[b]	Unplanned release	Two areas of radiological contamination along the railspur leading to the former 212-R Storage Building. Radiological contamination was found in the soil and is also expected on the railroad ties and rails.	RTD
600-388[b]	Dumping area	An area of surface debris with evidence of mechanical ground disturbance, stressed vegetation, and indications of potentially buried material.	RTD
600-389[b]	Dumping area	Areas of surface debris located near the H-42 Gun Site.	RTD

Table A-1. Summary of 200-CW-3 OU Waste Sites

Waste Site	WIDS Unit Type	Description	Selected Remedy
600-391[b]	Dumping area	An area of significant mechanically disturbed ground and partially buried rusted metal debris southeast of the H-40 Gun Site.	RTD
600-392[b]	Dumping area	Area of debris located southwest of the former 212-N Storage Building. Some debris includes signage that indicates they were related to safety and radiological controls.	RTD
600-394[b]	Dumping area	An area of debris that includes degrading battery components and unbroken glass jars containing an unknown substance.	RTD

a. Waste sites completed under DOE/RL-2006-69, *Remedial Design/Remedial Action Work Plan for Select 200 North Area Waste Sites (216-N-2,-3,-5, and -7) in the 200-CW-3 Operable Unit,* and DOE/RL-2007-55, *Remedial Design/Remedial Action Work Plan for 200 North Area Waste Sites Located in the 200-CW-3 Operable Unit*, Rev. 0, were completed with the selected remedy of no action or RTD.

b. Scope addition per this document (DOE/RL-2007-55, Rev. 1).

CS/NFA = confirmatory sampling/no further action
CTFN = Chemical Tile Field North
PCB = polychlorinated biphenyl
RTD = removal, treatment (as required), and disposal
WIDS = Waste Information Data System

A2 References

DOE/RL-2006-69, 2007, *Remedial Design/Remedial Action Work Plan for Select 200 North Area Waste Sites (216-N-2,-3,-5, and -7) in the 200-CW-3 Operable Unit,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/document/0084080.

DOE/RL-2007-55, 2008, *Remedial Design/Remedial Action Work Plan for 200 North Area Waste Sites Located in the 200-CW-3 Operable Unit,* Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/document/0810230107.

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Attachment 2
22-PFD-003996

Review Comment Record
Remedial Design/Remedial Action Work Plan for 200 North Area Waste Sites
Located in the 200-CW-3 Operable Unit
DOE/RL-2007-55, Rev.1 Draft A

(8 pages including cover sheet)

Comment Record	U.S. Environmental Protection Agency Comments on Draft A of Rev. 1 of the 200-CW-3 RD/RA Work Plan	Date: 10/13/2022 Page **1** of **7**

Document Title(s)/Number(s):

Remedial Design/Remedial Action Work Plan for 200 North Area Waste Sites Located in the 200-CW-3 Operable Unit (DOE/RL-2007-55, Rev. 1 Draft A)

Document Manager	Telephone Number	Project Manager	Telephone Number	Facility Site ID	Cleanup Site ID
Craig Cameron	509-376-8665	NA	NA	NA	NA

Item No.	Pg. # Sec. # Line #	Comment or Question	Modification Needed	Basis/ Justification	DOE Response	EPA Response	Open/Close	Reviewer Initials
EPA_01	Section 1.0, page 1-1, lines 4	Typo – NPL = National Priorities			Accept, text will be updated as suggested.		Close	AM
EPA_02	Section 1.0, page 1-3, lines 9-11.	Should refrain from saying these sites are “newly discovered”. That isn’t the only criteria for plugging in sites.			Accept, text will be updated as follows: The plug-in approach is proposed for any ~~newly discovered~~ waste site that is similar to the sites addressed in the Remaining Sites ROD (EPA/ROD/R10-99/039).		Close	CC
EPA_03	Section 1.0, page 1-3, bullets.	The dates of these change notices should be provided.			Accept, reference bullets will be updated to include the published date.		Close	CC
EPA_04	Section 1.0, page 1-5, lines 2-6.	Mention the 1100 Area if listing all the areas.			Accept, the identified text will be updated as follows: The 300 Area, located adjacent to and north of the city of Richland, contained the reactor fuel manufacturing plants and the research and development laboratories. The 400 Area, located 8 km (5 mi) northwest of the 300 Area, contained the Fast Flux Test Facility designed for testing liquid metal reactor systems. The 1100 Area, located directly south of the 300 Area, contained the Hanford Site maintenance services area as well solid waste disposal. The 600 Area consisted of facilities that served more than one specific area or, in some cases, the entire project.		Close	CC
EPA_05	--	Please don’t use “RAs” plural. There is one remedial action we just chose to extend it by continuing to use the plug-in approach.			Accept, text will be updated as appropriate. In some places “RAs” is still appropriate.		Close	CC
EPA_06	--	Please refer to the “selected remedy” singular. It is only one selected remedy even though it has two main components (three if you count ICs).			Accept, text will be updated as suggested.		Close	CC
EPA_07	--	Need a more explicit statement up front that the ROD is and interim ROD.			Accept, the text in Chapter 1 will be updated as follows: The 200-CW-3 OU is included in EPA/ROD/R10-99/039, *EPA Superfund Record of Decision Hanford 200 Area (USDOE) and Hanford 100 Area (USDOE)* (hereinafter called the Remaining Sites Record of Decision [ROD]). This interim action ROD was intended to streamline the decision-making process and support the DOE vision of shrinking the area of land occupied by DOE at the Hanford Site.		Close	CC

Comment Record	U.S. Environmental Protection Agency Comments on Draft A of Rev. 1 of the 200-CW-3 RD/RA Work Plan	Date: 10/13/2022 Page **2** of **7**

Item No.	Pg. # Sec. # Line #	Comment or Question	Modification Needed	Basis/ Justification	DOE Response	EPA Response	Open/Close	Reviewer Initials
EPA_08	--	Do we need to emphasize that we are not addressing large or TSD related ponds because they are in 200-CW-1?			Accept, the text in Section 1.3.3 will be updated as follows: This includes discharge of large volumes of cooling water to surface infiltration ponds at several locations in the Central Plateau, many of which are included in the 200-CW-1 OU. This RA excludes the ponds identified in the 200-CW-1 OU. Examples include cooling water, shutdown water, boiler blowdown water, decontamination water, and steam condensate.		Close	CC
EPA_09	Section 1.3.6, page 1-7, Line 5.	Was Misc. Liquid Waste released only in the outer area? Clarify if also in the Inner Area too.			Accept, the text in Section 1.3.6 will be updated as follows: Miscellaneous liquid waste was generated during facility operations and released intentionally into ponds or ditches in both the Inner and ~~the~~ Outer Areas or resulted from unplanned releases, which include leaks and spills. Examples include steam line relief valve and air conditioner condensate.		Close	CC
EPA_10	Section 2, page 2-1, line 2-5.	This introductory description doesn't address past releases where we want to remediate to prevent exposures.			Accept, the identified text in Section 2 will be updated as follows: Waste sites located in the Outer Area of the Central Plateau are associated with past operations as well as site support activities. These Hanford Site activities left behind various waste sites that continue to pose potential risk to human health and the environment. These waste sites will undergo an interim remedial action consistent with this RD/RA work plan. The Remaining Sites ROD (EPA/ROD/R10-99/039) states that RA is necessary to protect public health and welfare and the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment. Such a release or the threat of release may present an imminent and substantial endangerment to public health, welfare, or the environment.		Close	AM
EPA_11	Table 2-1.	Could add BP – Burn Pit to the notes at the bottom.			Accept, text will be updated as suggested.		Close	CC
EPA_12	Table 2-1.	Use of the word "Additional" seems to imply different sites are listed in Appendix A than in Table 2-1. Reword footnote to clarify waste sites existing in CW-3 vs. being added here, and what Table 2-1 represents compared to Appendix A.			Accept, the identified footnote will be updated as follows: This table lists ~~W~~waste sites ~~listed are those~~ being ~~added to~~ addressed by this revision (Rev. 1) of DOE/RL-2007-55, *Remedial Design/Remedial Action Work Plan for ~~200 North Area~~ Waste Sites ~~Located~~ in the 200-CW-3 Operable Unit~~, Rev. 1~~*. Appendix A, Table A-1, includes a complete listing of waste sites in the 200-CW-3 OU. Any ~~A~~additional sites added via the plug-in approach will be incorporated in ~~Appendix A,~~ Table A-1.		Close	CC
EPA_13	Section 2.1.1.3, page 2-2.	Should explain that the ICs would be necessary if waste left behind below 15' that doesn't meet UU/UE. We shouldn't need ICs for areas above 15'.			Accept, the identified text will be updated as follows: ICs are required before, during, and after the active phase of RA implementation where ICs are necessary to protect human health and the environment. ICs are used to control access to residual contamination in soil above standards for unlimited use and unrestricted exposure. If it is determined and agreed upon that contaminant concentrations above cleanup levels will be left in place at or below 4.6 m (15 ft) bgs, ICs will be required. The implementation, maintenance, and periodic inspection requirements for ICs at the Hanford Site are described in DOE/RL-2001-41, *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions*. ICs will be maintained until the concentrations of hazardous substances are at such levels to allow for unlimited use/unrestricted exposure and EPA authorizes removal of restrictions.		Close	CC

Comment Record	U.S. Environmental Protection Agency Comments on Draft A of Rev. 1 of the 200-CW-3 RD/RA Work Plan	Date: 10/13/2022 Page **3** of **7**

Item No.	Pg. # Sec. # Line #	Comment or Question	Modification Needed	Basis/ Justification	DOE Response	EPA Response	Open/Close	Reviewer Initials
EPA_14	--	We don't understand why the work plan calls cleanup levels Remedial Action Goals. It is fine to describe the pre-ROD RAGs but once the ROD and any changes were signed the appropriate term is "cleanup levels". Table 2-3 also still mentions RAGs. There are many other locations that mention RAGs like in Section 4.1.			Accept with modification, Section 2.3 and Table 2-3 are from the Remaining Sites ROD and 100 Area Work Plan and will remain unchanged as they are factual. The other "RAG" callouts in the document will be changed to "cleanup levels".		Close	CC
EPA_15	Table 2-3	How were the deep zone cleanup levels derived? Some use of RESRAD? Are they appropriate for the area or more based on work along the 100 Areas?			Clarification: The deep zone cleanup levels for radionuclides were derived using the same approach as those in the River Corridor, which included RESRAD. The deep zone cleanup levels for chemicals were derived from the applicable version of MTCA. For more information, see Section 2.1.2 of DOE/RL-96-17, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, Rev. 6. As defined in Section 4.3.1 of DOE/RL-2009-10, *Hanford Site Cleanup Completion Framework*, Rev. 1, DOEs strategy for the Outer Area of the Central Plateau is to remediate waste sites using cleanup levels comparable to the River Corridor. No change to the document		Close	CC
EPA_16	--	The 15 mrem/year above background should be de-emphasized and focus on describing the CERCLA risk range.			Accept, language is intended to remain consistent with the Remaining Sites ROD and DOE/RL-96-17, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*. However, the note has been expanded as follows: Note: Waste sites that contain multiple contaminants will meet a cumulative direct contact ~~exposure~~ dose limit~~s~~ of 15 mrem/yr for radionuclides, $1x10^{-5}$ excess lifetime cancer ~~carcinogenic~~ risk for chemicals, and a hazard index of 1 for noncancer hazards. Current EPA guidance recommends the use of a 10^{-4} to 10^{-6} risk range over the 15 mrem/yr dose limit for establishing cleanup levels for radionuclides. The 15 mrem/yr is approximately equal to $3x10^{-4}$ excess lifetime cancer risk.		Close (email)	CC
EPA_17	--	Are there any cleanup levels that we might want to exceed the meeting of in order to make it easier for the future final remedy? We understand that the ARARs are locked in, but it may make sense in some cases to achieve a little more robust cleanup of these sites.			Clarification: There are three rads where the risk-based value is lower than the previous dose based value provided in the Remaining Site ROD. Also, there are three non-rad contaminants where the MTCA Method B values were updated and decreased the cleanup level from the Remaining Sites ROD. During implementation, the RA manager will consider any cleanup levels that are more stringent and determine additional actions, as necessary. No change to the document		Close	CC
EPA_18	Section 2.4, page 2-8, lines 15-18.	Does DOE know of any ARARs that might need to be added or modified? Generally, they are frozen unless we do at least a ROD Amendment. However, some nuances of the application of the ARARs can be addressed in the work plan.			Clarification: Agree with the concept that EPA is expressing, the ARARs are aligned to the interim ROD and the previous version of the RD/RA work plan. The ARARs identification in this ROD were general and application specifics are addressed within the RD/RA work plan text. In some cases, some of the ARARs have more modern revisions which could affect elements such as cleanup levels, however this is not expected to be significant for the use of this interim action. No change to the document		Close	CC

Comment Record	U.S. Environmental Protection Agency Comments on Draft A of Rev. 1 of the 200-CW-3 RD/RA Work Plan	Date: 10/13/2022 Page **4** of **7**

Item No.	Pg. # Sec. # Line #	Comment or Question	Modification Needed	Basis/ Justification	DOE Response	EPA Response	Open/Close	Reviewer Initials
EPA_19	--	We should mention the requirement for a fact sheet for the plug-in process wherever that is appropriate in the document.			Accept, the follow edits will be made to Section 3.2 on page 3-4: ESDs and ROD amendments are subject to public notice and public participation, respectively. In addition, the 2009 ESD (EPA et al., 2009) allowed for the use of a fact sheet to identify waste sites being added to the RA. All change documents will undergo EPA review and be posted to the Administrative Record. Table 3-1 identifies types of changes and processes associated with the change.		Close	CC
EPA_20	Section 4.1.1, Lines 25, 26.	Task 3/4 have typo/duplication, and Task 4 Section refers to it as Backfill, Recontour, and revegetation.			Accept, text in Section 4.1.1 will be updated as follows: RA work tasks specific to waste site RTD are described in the following subsections. These tasks include Task 1 – Mobilization; Task 2 – RTD; Task 3 – Verification Sampling; ~~Task 4 – Verification Sampling;~~ and Task 4 – Backfill, Rec~~C~~ontour, and Revegetate~~ion~~.		Close	CC
EPA_21	Section 4.1.1.2, p. 4-2, lines 13-16.	How do we know what to model if we don't have the nature and extent below the excavation? Confirmatory or verification sampling going to help address this?			Clarification: Confirmatory or verification sample results will be used to confirm the conceptual site model understanding to support modeling as needed if residual contamination at depth will pose a risk to groundwater. The modeled results would be used to determine if additional action is warranted at the site prior to backfill. No change to document		Close	CC
EPA_22	--	Are we modifying the existing SAP or writing a new one?			Clarification: Yes, we are revising the previous 200-CW-3 SAP (DOE/RL-2007-54). No change to document		Close	CC
EPA_23	Section 4.1.1.4, p. 4-5.	What document covers the revegetation requirements?			Accept, revegetation on the Hanford site is covered by DOE/RL-2011-116, Hanford Site Revegetation Manual. For consistency with the 100-BC RD/RA work plan, the following text updates were made in Section 4.1.1.4: Based on site specific conditions, fertilizer and straw mulch may be applied to support revegetation. Revegetation monitoring will be performed annually. If vegetation development after five years does not meet the guidance specifications provided in DOE/RL-2011-116, *Hanford Site Revegetation Manual*, additional revegetation activities, such as transplanting or interseeding, will be performed as appropriate. ~~Site monitoring will be conducted annually for a minimum of 5 years after planting. If the planting does not meet minimum specifications after 5 years, additional actions such as transplanting more shrubs or forbs, interseeding grasses, or repeating any or all of the original revegetation actions will be performed.~~		Close	CC
EPA_24	Section 5.2, Line 7.	Would like to know if discharging to ETF will continue to be an option, as we heard in passing it may become a Haz Cat 3 facility and make that more difficult?			Clarification: ETF will continue to support the Hanford site for treatment of liquid waste. The change in hazard category should not affect ETF's ability to accept liquid waste, but any difficulties will be addressed as they arise. No change to the document		Close	AM

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EPA_25	Section 5.4, p. 5-6, lines 14-22.	Keep in mind that an offsite acceptability determination has to come from EPA if waste is going to anywhere else but ERDF since the IROD only specifies ERDF and of course the location of the waste sites as being onsite. We would prefer you say that and not just write along the lines of "or other approved by EPA". We are kind of tired of this attempt to continue to hold to the dream of the whole Hanford Site as onsite for CERCLA (which conflicts with the administrative law judge ruling on the issue).			Noted, off-site determinations are addressed under Section 4.1.1.2. No change to the document.		Close	CC
EPA_26	Section 5.4.3.	The SAP should cover sampling or surveying related to the use and removal of staging piles. This should be stated. Speaking of that, if it doesn't say it already, the work plan should indicate that the SAP is a part of it even if it has a separate document number.			Accept, sampling of staging piles is stated on page 5-9, lines 12 through 15 and will be included in the SAP (DOE/RL-2007-54). The following text will be added to Section 1.1 as follows: This RD/RA work plan is submitted in accordance with the Remaining Sites ROD and Section 11.6 of Ecology et al., 1989b, Hanford Federal Facility Agreement and Consent Order Action Plan (hereinafter called the Tri-Party Agreement Action Plan). Sampling activities to support this RA will be performed in accordance with the SAP (DOE/RL-2007-54), and the SAP is considered part of this RD/RA work plan.		Close	CC
EPA_27	--	Is there a new specific HASP being developed for this work?			Clarification: A new health and safety plan is being written for this scope of work. No change to document		Close	CC
EPA_28	Section 6.1.4, p. 6-2, lines 17-19.	Good!			No change to document. Glad EPA likes this language.		Close	CC
EPA_29	Section 6.2, Line 21-22.	Why is this specific to 100 and 200 Areas?			Accept with modification, this reference is specific to the actions which apply to the 200 and 600 Areas. In order to be consistent between other RD/RA work plans, we have kept the specificity with modification as follows: DOE will continue to manage the ~~100 and~~ 200 and 600 Areas of the Hanford Site for as long as necessary to support RAs and other missions.		Close	CC
EPA_30	Section 6.2, p. 6-2.	Should the Sitewide IC Plan be referenced?			Clarification: In order to be consistent between other RD/RA work plans, the IC plan is referenced in Section 2.1.1.3. No change to document		Close	CC

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EPA_31	Section 7.1	Please make the section and table consistent with the information described in the draft fact sheet. This makes the case better how we are not exceeding the cost trigger for more changes to the IROD. In particular, the other previous plug-in efforts should be discussed and maybe added to the table as their own lines.			Clarification: Only one of the previous six plug-in fact sheets added scope to the 200-CW-3 OU. The additional information would not entirely apply to 200-CW-3 OU but rather the entire River Corridor cleanup effort. The current level of detail maintains consistency with language between current RD/RA work plans. Based on a review of Section 7.1 and an EPA review comment on the 100-BC-5 RD/RA work plan, a minor edit was made, and the following text has been updated: A cost estimate for the 200-CW-3 OU waste sites added via the plug-in approach was prepared and document in ECE-22-200CW300001, *Environmental Cost Estimate for the 200 North Area Waste Sites, 200-CW-3 Remedial Design/Remedial Action Work Plan*. This revision results in a total estimated cost of $26.7 million which is within the ~~with a~~ -30/+50% range of the Remaining Sites ROD (EPA/ROD/R10 99/039) estimate of $128 million, as amended by the 2000 ESD (EPA et al., 2000, *Explanation of Significant Differences for the 100 Area Remaining Sites ROD*), 2004 ESD (EPA et al., 2004, *Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision*), and 2009 ESD (EPA et. al. 2009) ($90 to $192 million). In total, approximately $57.7 million of waste site scope has been incorporated into the Remaining Sites ROD using Tri-Party Agreement (Ecology et al., 1989a) Fact Sheets (e.g., Ecology et al., 2011, *Fact Sheet: 100 Area "Plug-In" and Candidate Waste Sites for Fiscal Year 2010*). ~~$18.7 to $40.1 million.~~		Close	CC
EPA_32	Section 7.2	The schedule section is completely inadequate. Please at least add the new milestone which is about to be finalized now that the public comment period on the near-term milestone changes is over.			Accept, the text in Section 7.2 will be updated as follows: This RA is expected to begin following issuance of this RD/RA work plan, which is anticipated to be in September 2022. Implementation of the RA will be performed to support Tri-Party Agreement (Ecology et al., 1989a) Milestone M-016-202, tentatively scheduled for September 30, 2024.	If the milestone is finalized prior to the signing of the RD/RA work plan, please remove the "tentatively".	Close	CC
EPA_33	--	Please add the contractors Quality Assurance Program Plan (CPCC-00172, CENTRAL PLATEAU CLEANUP COMPANY ENVIRONMENTAL QUALITY ASSURANCE PROGRAM PLAN) to Section 5.8, Quality Assurance Program.			Accept, reference to CPCC-00172 will be added consistent with language in the SAP, including the footnote as follows: • CPCC-00172, *Central Plateau Cleanup Company Environmental Quality Assurance Program Plan* ○ Footnote: The QA/QC planning and implementing elements described in Chapters 1, 2, and 3 of the SAP (DOE/RL-2007-54) are consistent with the associated environmental management plan elements described in CPCC-00172. CPCC-00172 is not a Tri Party Agreement (Ecology et al., 1989a) primary or secondary document and thus is not subject to Lead Regulatory Agency review or approval.		Close	CC

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EPA_34		For 5.1: "Waste site RTD will generate diffuse and fugitive emissions; therefore, 9 powered emissions abatement technology used for point sources (such as portable exhausters) will not be used." This doesn't make sense until after the CAP 88 is run.			Clarification, this sentence is attempting to convey that this scope of work will only generate diffuse and fugitive emissions. Powered abatement technologies such as portable exhausters will not be used in this case. PIC categories would not apply due to the fugitive element of this work. The RD/RA work plan includes an Environmental Calculation File (ECF) that is called out in Section 5.1.1, Radiological Air Emissions, and identifies the prospective PTE in Table 5-1. After a follow up phone conversation with EPA, DOE has made the following change to the language to better identify that PIC categories will not apply in this case. Waste site RTD will generate diffuse and fugitive emissions; therefore, powered emissions abatement technology used for point sources (such as portable exhausters) will not be used <u>and Potential Impact Categories will not apply.</u> Also, reference to the ECF-HANFORD-22-0101 in Section 8 was updated as the document was finalized and added to the administrative record.		Close (email)	JM
EPA_35	--	Based on discussions that occurred during a recent waste site walk-down, add DDT to Table 2-3.			Accept, the appropriate information for DDD, DDE, DDT, Aldrin, and Dieldrin will be added to Table 2-3. Also, the following footnote will be added: <u>i. Analysis may be included based on process knowledge and field observations for specific waste sites.</u>		Close (email)	CC
DOE_01	--			Document title clarity	The current RD/RA Work Plan title "*Remedial Design/ Remedial Action Work Plan for Remediation of the 200 North Area Waste Sites*" is mis-leading. Now may be the opportune time to re-title the RD/RA Work Plan to remove the specificity in the title. We would recommend "*Remedial Design/Remedial Action Work Plan for Waste Sites in the 200-CW-3 Operable Unit.*" If you agree with this title change, we will also apply it to Rev 1 of the SAP. Please consider this change for Rev 1.	Email concurrence	Close (email)	DOE