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Draft A

Remedial Investigation/ Feasibility Study Work Plan 200-WA-1 and 200-BC-1 Operable Units

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

U.S. DEPARTMENT OF ENERGY | Richland Operations Office

P.O. Box 550
Richland, Washington 99352

Approved for Public Release; Further Dissemination Unlimited

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Executive Summary

This work plan describes the activities for conducting and developing the Remedial Investigation/Feasibility Study (RI/FS) for the 200-WA-1 and the 200-BC-1 Operable Units (200-WA-1/200-BC-1 OUs), located within the 200 West Inner Area of the Central Plateau at the Hanford Site. The work plan will serve as the basis for development of the RI/FS and baseline risk assessment (BRA) reports for the 200-WA-1/200-BC-1 OUs.

The purpose of the RI is to determine the nature and extent of contamination and the fate and transport of contaminants in the environment in order to evaluate risks and select remedies and remedial treatment technologies.

The RI serves as the mechanism for collecting data to accomplish the following:

- Characterize site conditions.
- Determine the nature of the waste.
- Assess risk to human health and the environment.
- Conduct treatability testing to evaluate the potential performance and cost of the treatment technologies that may be considered.
- Describe how remedial alternatives will be developed and evaluated in the FS.

A sampling and analysis plan (SAP) detailing the process of fulfilling additional data needs that are described in this work plan will be prepared and submitted for approval.

The 200 West Inner Area BRA report will identify waste sites that pose a potential threat to groundwater or a potential unacceptable human health and/or ecological risk.

The FS is the process through which the development, screening, and detailed evaluation of alternative remedial actions will occur. The results will be documented in the RI/FS report. The RI/FS report will also provide the basis for the development of a proposed plan that describes the preferred remedy for each waste site. Following the public comment period, the selection of the final actions will be documented in a record of decision (ROD).

This work plan also identifies data gaps and additional data needs, describes the general plan to collect additional data, identifies specific changes or additions to relevant approved plans, and includes the RI/FS execution schedule. If it is determined that remedial alternatives cannot be developed with existing and proposed characterization data, then a supplemental data quality objective (DQO) will be conducted with EPA during the RI, prior to remedy selection, to collect additional data.

Regulatory Framework—The U.S. Department of Energy (DOE) will prepare this RI/FS to satisfy requirements under the *Comprehensive Environmental Response, and Liability Act of 1980* (CERCLA). Cleanup of the Hanford Site is also subject to the *Resource Conservation and Recovery Act of 1976*[1] (RCRA). RCRA is a federal act that establishes requirements to treat, store, and dispose of hazardous wastes. The State of Washington has a federally authorized state RCRA program. RCRA also has a cleanup phase, similar to CERCLA, called corrective action.

The *Washington State Hazardous Waste Management Act of 1976* and the corresponding regulations in WAC 173-303, "Dangerous Waste Regulations," implement the State of Washington's federally authorized program under RCRA.

DOE, the U.S. Environmental Protection Agency (EPA), and Washington State Department of Ecology (Ecology) (known as the Tri-Parties) intend that cleanup activities under RODs will also fulfill state requirements for corrective action. For sites undergoing cleanup under CERCLA, it is DOE's policy to integrate the *National Environmental Policy Act of 1969* values into the procedural and documentation requirements of the RI/FS process.

To facilitate consistent remedial decisions across the Inner Area, the Tri-Parties modified the *Hanford Federal Facility Act and Consent Order* (Ecology et al., 1989a)[2] (Tri-Party Agreement) in 2009, to restructure Central Plateau remediation activities. Restructuring included consolidation of the 200 West Inner Area waste sites into geographical area-based OUs, resulting in the creation of the 200-WA-1 OU and retention of the 200-BC-1 OU. Figure ES-1 shows the geographical OU structure within the Central Plateau Inner Area.

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[1] *Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq. Available at: http://www.epa.gov/lawsregs/laws/rcra.html.

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

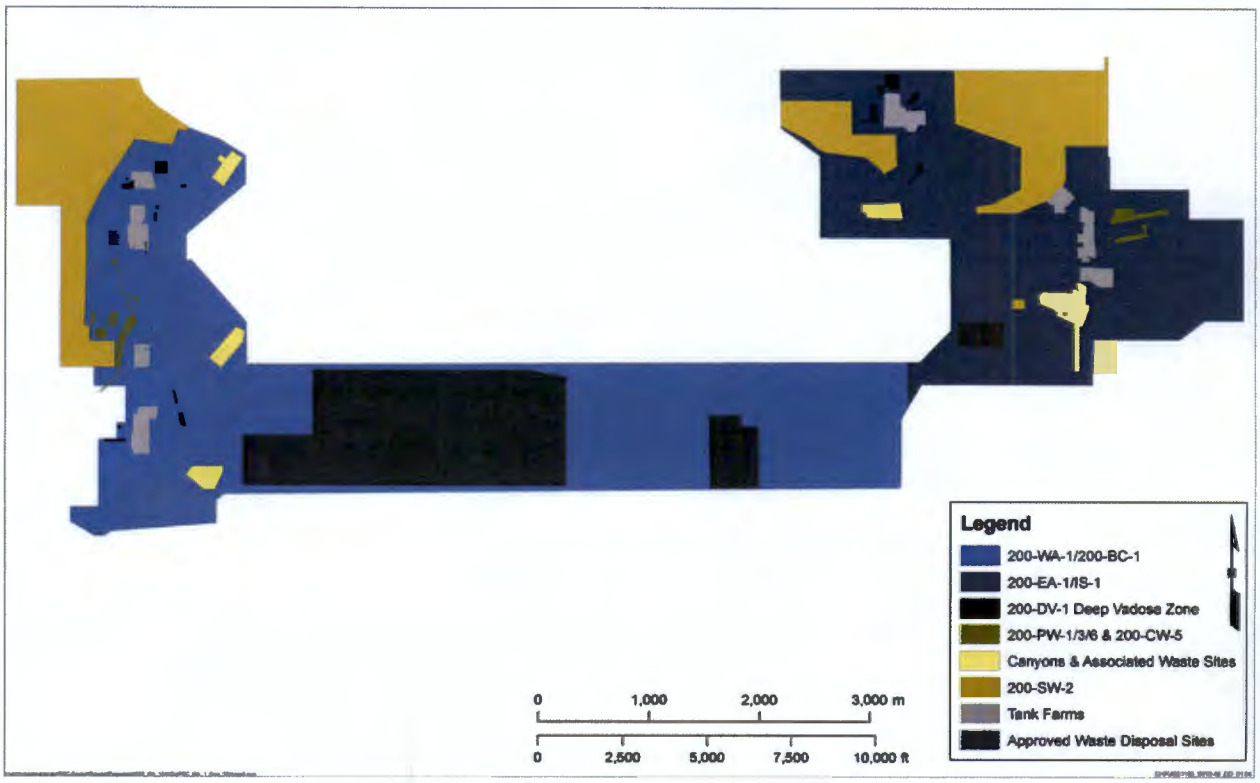

Figure ES-1. Decision Structure in the Central Plateau Inner Area

Work Plan Objectives—The primary objectives of this work plan are: (1) summarize process knowledge and existing characterization data for the waste sites, (2) identify the information needed and tasks to be completed to determine the nature and extent of contamination to support waste site remedy decisions, and (3) describe the potential remediation alternatives and the basis upon which they will be evaluated.

Integration with Other Projects—Implementation of this work plan will require close coordination with other Hanford projects, particularly those in the 200 West Inner Area. Key examples include:

- 200-PW-1/3/6 and 200-CW-5—The ROD for these sites has been issued; therefore, the remedy implementation will likely proceed independent of 200-WA-1.
- 200-IS-1 West Area Sites—Decision documents for all of the 200-IS-1 sites will proceed independent of 200-WA-1; however, 200-IS-1 waste sites remedy implementation may be integrated with other operable units such as 200-WA-1.
- Canyons—U Plant and REDOX Canyons are located in 200 West. Decision documents for the canyons will proceed independent of 200-WA-1; however, remedy

implementation of canyons may also be coordinated with 200-WA-1 waste sites where appropriate.

- 200-DV-1—Waste sites are anticipated to transition between 200-WA-1/200-BC-1 and 200-DV-1 as Conceptual Site Models (CSMs) and remedial alternatives are fully developed.

- 200-SW-2—The 200-SW-2 burial grounds and 200-WA-1 waste sites may share or have overlapping boundaries. Consequently, sampling and analysis results may provide information on the lateral extent of contamination across OU boundaries. Remedial action alternatives for 200-WA-1 OU waste sites adjacent to the burial grounds will take into consideration the proximity of the burial ground and the remedial alternatives selected for this OU.

Work Plan Scope—This work plan outlines the process to evaluate remedies for vadose zone waste sites located in the 200 West Inner Area. The 200 West Inner Area contains multiple OUs, as discussed above. The scope of this work plan includes the 129 sites in 200-WA-1. The 27 sites in 200-BC-1 were included in the review process and are retained for information and consistency. The 200-BC-1 sites have been evaluated in *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan and Addendum* (DOE/RL-2000-38). The types of waste sites in the 200-WA-1/ 200-BC-1 OUs are diverse but correspond to one of the following general categories:

1. **Cribs** are square- or rectangular-shaped below ground surface (bgs) infiltration structures. Cribs were initially constructed of a perforated discharge pipe installed within a gravel bed, with most supported by timber cribbing. Cribs were used to dispose of the largest volumes of liquid effluent from process facilities.

2. **Trenches** are typically V-shaped open excavations installed 3 to 6+ m (10 to 20+ ft) deep with a perforated pipe in the bottom used for short-term or single-use discharges of liquid effluent.

3. **Reverse Wells** are injection wells used for infiltration of generally low-volume/higher concentration liquid effluents deeper into the vadose zone (usually 15.2 to 30.5 m [50 to 100 ft] bgs).

4. **French Drains** are shallow vertical structures used for infiltration of liquid waste into the vadose zone (generally 1.5 to 4.6 m [5 to 15 ft] bgs). French drains are often between 0.76 and 1.5 m (2.5 and 5.0 ft) in diameter, constructed of concrete or steel culvert pipe.

5. **Basins** are generally concrete lined open depressions used to store or convey process-related liquid effluents (e.g., cooling water, steam condensate).

6. **Ponds and Ditches** are typically unlined, natural or anthropogenic features, used to convey or store process-related effluents (e.g., cooling water).

7. **Vaults** are underground structures used to house process equipment or tanks.

8. **Underground Storage Tank (UST)** waste sites in the 200-WA-1/200-BC-1 OUs range from septic tanks to tanks storing high concentrations of process-related contaminants.

9. **Septic Systems** consist of septic tanks and associated drain fields that are used for liquid waste disposal from individual process facilities. Normally, septic systems handle only sanitary waste from bathrooms or showers, but some are connected to floor drains that potentially received radiological and/or chemical contaminants.

10. **Unplanned Releases** are unintentional releases and are, on average, smaller areas of contamination associated with leaks, spills, or windblown contaminants. A large number of recent discoveries have been identified through surface radiological surveys along roadways, rail spurs, or areas downwind of tank farms, or are the result of periodic aerial radiologic surveys.

11. **Solid Waste** sites in the 200-WA-1/200-BC-1 OUs are nonengineered surface disposal areas (e.g., a construction lay-down yard).

12. **Process Sewers** convey liquid effluent from the process facilities to the waste disposal sites (cribs, trenches). Many of these sewers were constructed out of vitrified clay pipes.

Pipeline system waste sites within the 200 West Inner Area geography will be addressed in the 200-IS-1 OU. Some waste site movement between OUs will continue throughout the RI/FS process. Waste sites assigned to other Inner Area OUs, active facilities, tank farm facilities, or sites that do not contain CERCLA hazardous waste are not assessed in this work plan.

The following elements are described in this work plan:

- The process used to identify, evaluate, and incorporate (or exclude) waste sites into the 200-WA-1 or 200-BC-1 OUs, so that no waste site is unaccounted for in the 200 West Inner Area
- A description of the schedule and process to incorporate discovered or transferred waste sites into the 200-WA-1 or 200-BC-1 OUs
- An explanation of how existing data were evaluated to characterize 200-WA-1/200-BC-1 waste sites
- An assessment of site-specific data needs for all 200-WA-1/200-BC-1 waste sites to identify and fill data gaps in contaminant nature and extent to support risk determination and remedial action decision making
- The process for identifying initial contaminants of potential concern (COPCs) for waste sites and the process to be used for conducting the 200 West Inner Area BRA
- The preliminary applicable or relevant and appropriate state and federal regulatory requirements for consideration during the RI/FS and an integrated approach for closure of sites that are subject to CERCLA remedial action and RCRA corrective action
- The process for identifying and evaluating remedial alternatives for eliminating or mitigating unacceptable risks to human health and the environment

200-WA-1/200-BC-1 RI Waste Site Inventory—A 200 West Inner Area waste site evaluation resulted in identifying 129 waste sites in 200-WA-1 and 27 waste sites in 200-BC-1 for consideration in the RI/FS.

Reclassification/recategorization packages are being created by Waste Information Data System administrators for regulatory agency consideration. The preparation of a revision to the TPA-MP-14 process is currently underway. A Tri-Party Agreement (Ecology et al., 1989a) change package will be prepared to update Appendix C of the

Hanford Federal Facility Agreement and Consent Order Action Plan (Ecology et al., 1989b)[3] to reflect the revised waste site assignments.

200-WA-1/200-BC-1 RI Waste Site Evaluation—Relevant site information, including contaminant sources, process history, previous investigations, monitoring, and remediation activities, was integrated to create descriptions of each 200-WA-1/ 200-BC-1 OU waste site. More than 5,000 existing waste site records as listed in Appendix E were reviewed as part of this evaluation to support the development of this work plan. The volume and diversity of historical records provide the basis for identifying data gaps and needs that will support the RI/FS evaluations.

The process illustrated in Figure ES-2 was applied to each waste site to determine whether sufficient data exist to understand contaminant nature and extent, evaluate risks, and develop appropriate preliminary remedial alternatives.

200-BC-1 Findings - Consistent with the existing 200-BC-1 Work Plan Evaluation,[4] results of this evaluation indicate that no additional data are needed to support remedial action decisions for the 27 waste sites in the 200-BC-1 OU. The data needs evaluation resulted in each of these 27 waste sites being placed into one of the following three waste site categories for 200-BC-1:

1. **Sites that have sufficient vadose zone characterization to support a risk analysis that defined a need for action.** Within the 200-BC-1 OU, one crib (216-B-14) and three trenches (216-B-26, 216-B-53A, and 216-B-58) were identified in this category.

2. **Sites that have insufficient or no characterization data for detailed evaluation, but the site type or waste site knowledge is sufficient to recommend the site as a candidate for focused removal, treatment, and disposal (RTD).** It is assumed that all USTs in the OU will be removed; UST Site 200-E-14 falls into this category. If waste site 200-E-14 is determined to be within the remedial footprint boundary of an adjacent crib or trench waste site, then it may be incorporated into the remedy for the crib or trench.

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

[4] DOE/RL-2000-38, Rev. 0; *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan and Addendum.*

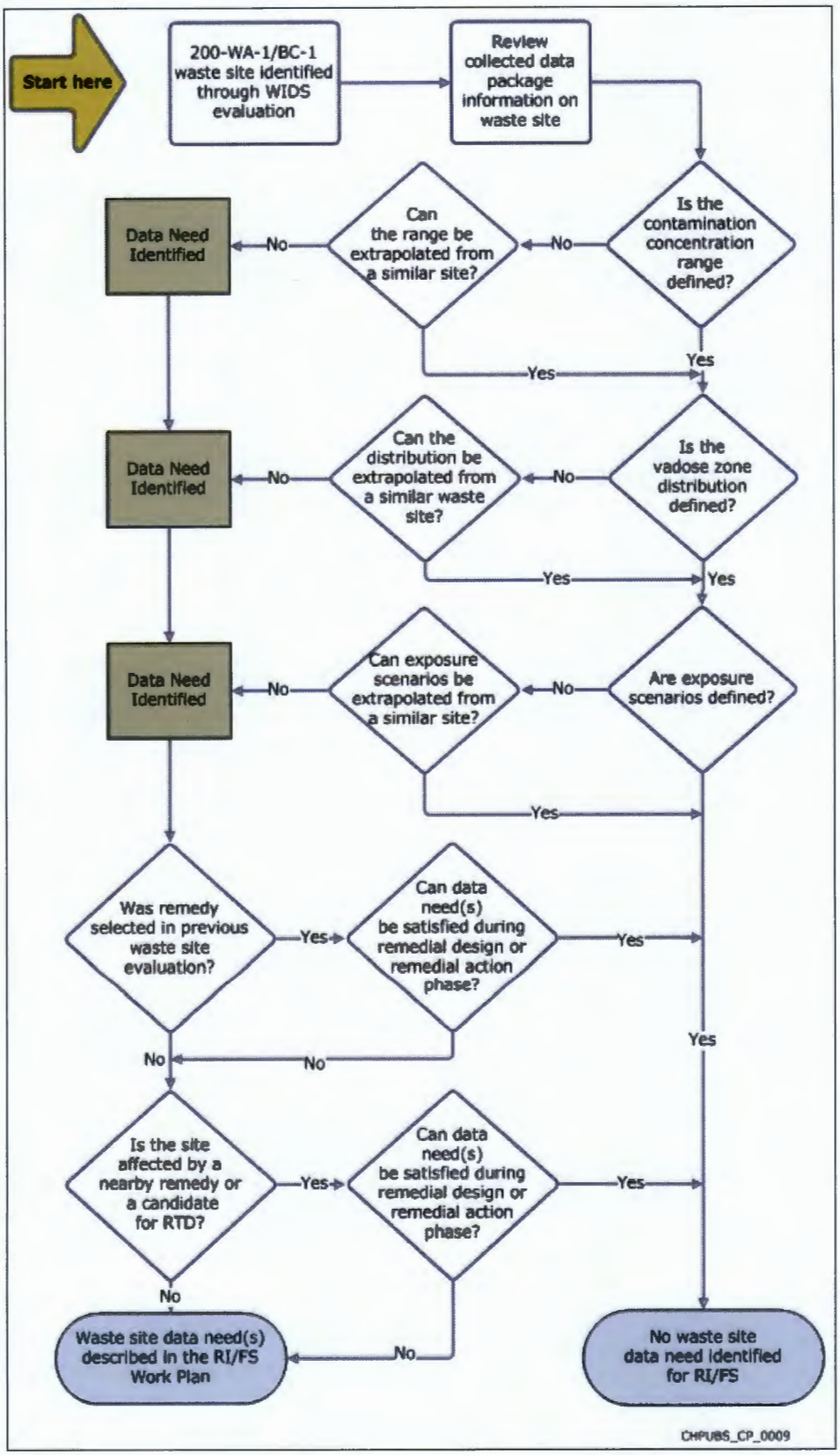

Figure ES-2. Site Specific Data Needs Assessment Process for this 200-WA-1/BC-1 Work Plan

3. **Sites for which characterization work at a comparable site can be used.** Using a comparable site requires that it be sufficiently similar in design, primary waste source and volume, waste release scenario, vadose zone characteristics, hydrogeologic conditions, and resultant contaminant migration. These similarities allow the characterized site to provide a comparable analysis or bounding conditions for the uncharacterized site and to support the development of a preliminary vadose zone site conceptual model or analytical/numerical modeling, if necessary. The remaining 22 sites are considered comparable to 1 of the 4 sites with ample vadose zone characterization in the 200-BC-1 OU.

200-WA-1 Findings - The 129 waste sites in the 200-WA-1 OU are more diverse and are currently in different stages of investigation, resulting in a higher complexity of data evaluation results than the 27 waste sites in the 200-BC-1 OU.

Figure ES-3 illustrates data needs assessment results for the 200-WA-1 OU, with the assumption that sites currently scoped for sampling and analysis are completed, to enable site comparisons.

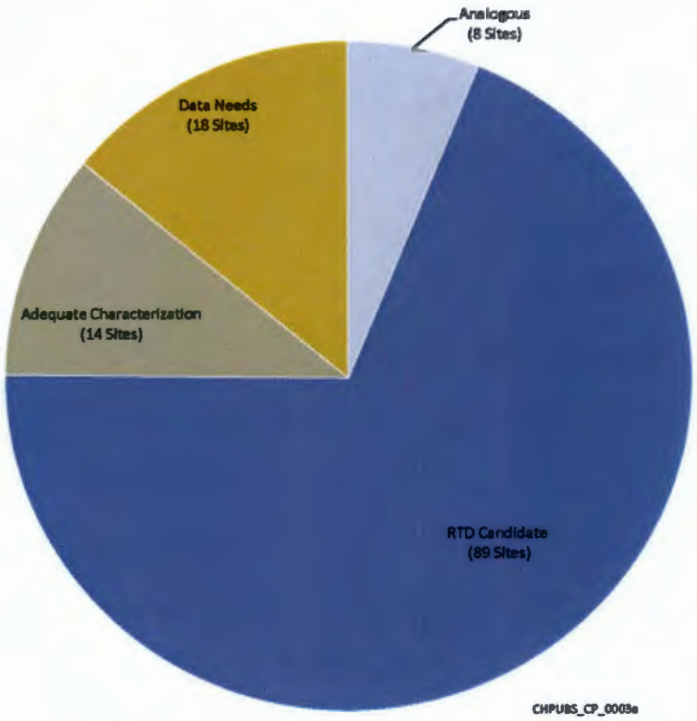

Figure ES-3. Site 200-WA-1 OU Data Needs Evaluation Results

The initial evaluation of the 200-WA-1/200-BC-1 OUs builds upon the operational history and environmental setting to describe what is known, or can be inferred about waste sites, to make remedial decisions. The evaluation integrates relevant site

information, including contaminant data, physical structures, and the nature and extent of environmental impacts to assess whether the information is sufficient to determine environmental risks and develop risk reduction strategies.

The data needs evaluation resulted in each of the 129 waste sites in 200-WA-1 being placed into one of the following four categories:

1. **Sites that have vadose zone characterization sufficient to support a risk analysis that defined a need for action, and an FS that identified and evaluated remedial alternatives.** Within the 200-WA-1 OU, 14 waste sites were identified in this category. Eleven of the characterized sites are in the U Plant geographical area, two in the Reduction-Oxidation Plant, and one in the vicinity of the T Plant.

2. **Sites that are candidates for RTD.** Within the 200-WA-1 OU 89 waste sites were identified in this category. Waste sites with near-surface vadose zone contamination and UST sites in 200-WA-1 are considered candidates for RTD. Since most of these sites have been evaluated for remedial alternatives in previous documents, the 89 sites can be further divided into the following groups:

    a. A total of 39 sites proposed for RTD in 200-MG-1/MG-2 engineering evaluation/cost analysis (EE/CA) documents

    b. A total of 20 sites proposed for confirmatory sampling in 200-MG-1/MG-2 EE/CA documents

    c. A total of 8 sites proposed for RTD in the 200-UW-1 FS and PP.

    d. A total of 22 are sites proposed as RTD candidates during the data needs evaluation

    Sampling and analysis associated with sites requiring additional field characterization will be conducted during the remedial design and/or implementation stage.

3. **Sites for which characterization work at a comparable site can be used.** Eight sites are considered comparable to another waste site in the 200-WA-1 OU. However, seven of the comparable sites are contingent on the execution of currently scoped sampling and analysis of the following sites: 216-S-6, 216-T-34, 216-U-8 and/or 216-U-12, 216-Z-16, and 216-Z-7. If these scoped SAPs are not executed during the RI phase, the seven comparable sites become sites with outstanding data needs.

4. **Sites requiring additional data to support selection of a remedy decision.** Eighteen waste sites in 200-WA-1 OU have been identified as having additional data needs. Sampling and analysis for eleven of these waste sites have already been scoped in existing SAPs (Section 3.2.2). The seven waste sites that require an approved SAP for recommended sampling and analysis are 216-S-3, 216-S-12, 216-S-14, 216-S-23, 216-S-25, 200-W-15, and 216-S-6.

Inputs to Support the Baseline Risk Assessment (BRA)—The waste site data will be used as inputs to support the BRA. A 200 West Area BRA will be developed that will support the determination of the need for action on the 200-WA-1 waste sites, identify COPCs, and support the development of preliminary remediation goals for all OUs within the 200 West Inner Area geography.

Remedial Alternatives—This work plan identifies general response actions for vadose zone contaminants to satisfy preliminary remedial action objectives (RAOs). An initial screening of remedial technologies has also been performed, based on contaminant and site characteristics. For many 200-WA-1/200-BC-1 OU waste sites, comparative analyses between remedial alternatives have been conducted during the Hanford cleanup process, and a preliminary list of alternatives identified. Some waste sites are proposed as candidates for RTD as the remedial action, and for these waste sites, the FS will provide a focused evaluation of this remedy. For other waste sites, where there is no clear preference, a comparative alternative evaluation will be conducted to assess the advantages and disadvantages of the remedies.

During the RI/FS process, waste sites within this OU will be evaluated during the development of remedial alternatives. If it is determined that remedial alternatives cannot be evaluated with the existing characterization data, then a supplemental Data Quality Objective (DQO) will be conducted with the EPA during the RI to collect the necessary data. This will occur prior to the remedy selection process.

Schedule—Completion of the 200-WA-1/200-BC-1 RI/FS report depends on execution of previously scoped work. For example, the majority of the data needs identified for the 200-WA-1 waste sites fall under approved SAPs that have not been completed. Evaluations are scheduled for pipeline system sites in the 200 West Inner Area under the 200-IS-1 OU. Tri-Party Milestone M-015-91B identifies December 31, 2015, as the submittal date of the 200-WA-1 OU FS report and proposed plan to EPA.

Contents

1 Introduction 1-1
1.1 Scope of Work and Objectives 1-1
1.1.1 Scope 1-1
1.1.2 Objectives 1-3
1.1.3 Work Plan Organization 1-3
1.2 CERCLA 1-4
1.3 Hanford Site Cleanup Framework 1-5
1.4 Integration of Other Activities 1-6
1.4.1 Other Regulatory Program Integration 1-9
1.4.2 RCRA TSD Closure and Corrective Action Coordination with CERCLA RI/FS Evaluations 1-9
1.4.3 RCRA TSD Units 1-10
1.4.4 Structures 1-12
1.4.5 Other Operable Units in the 200 West Inner Area of the Central Plateau 1-12
1.4.6 Integration of Previous Decisions 1-15
1.4.7 Integration with Ongoing Actions and Decisions 1-16
1.4.8 Sampling and Analysis Plans 1-16
2 Operable Unit Background and Environmental Setting 2-1
2.1 History of Operations 2-1
2.1.1 Liquid Waste Handling 2-2
2.1.2 Liquid Waste Storage/Disposal 2-3
2.1.3 Solid Waste Management Practices 2-5
2.1.4 Unplanned Releases in Waste Handling 2-5
2.2 200-WA-1/200-BC-1 Operable Unit Waste Sites 2-5
2.2.1 200 West Inner Area Geographical Evaluation 2-6
2.2.2 200 West Inner Area WIDS Evaluation Results 2-8
2.2.3 Planned Incorporation of Waste Sites into 200-WA-1/200-BC-1 OU 2-10
2.3 Environmental Setting 2-13
2.3.1 Physiography and Topography 2-13
2.3.2 Climate and Meteorology 2-13
2.3.3 Geologic Setting 2-15
2.3.4 Hydrogeology 2-18
2.3.5 Surface Water Hydrology 2-19
2.3.6 Environmental Resources 2-20
2.3.7 Human and Cultural Resources 2-22
3 Initial Evaluation 3-1
3.1 Contaminant Sources Based on Process History and Process Knowledge 3-1

3.1.1 Primary Contaminant Sources 3-1
3.1.2 Secondary Sources of Contamination 3-2
3.2 Previous Investigations, Monitoring, and Remediation Activities 3-2
3.2.1 Evaluation of Existing Data 3-2
3.2.2 Concurrent 200 West Inner Area Data Collection 3-6
3.3 Preliminary Understanding of the Nature and Extent of Contamination 3-6
3.3.1 Descriptions of 200-WA-1/200-BC-1 Site-Specific Contamination Conditions 3-6
3.3.2 Groundwater Contributions 3-20
3.4 Identification of Target Analyte List 3-23
3.4.1 Current Land Use 3-24
3.4.2 Reasonably Anticipated Future Land Use 3-24
3.4.3 Regional Land Use 3-26
3.4.4 Groundwater Use 3-27
3.5 Potential Applicable or Relevant and Appropriate Requirements 3-27
3.6 Methodology for Fate and Transport Evaluation 3-27
3.6.1 Computer Modeling for Evaluation of Groundwater Protection 3-28
3.6.2 Uncertainties 3-29
3.7 Conceptual Site Model Development 3-29
3.8 Preliminary Baseline Risk Assessment Approach 3-35
3.8.1 Baseline Risk Assessment—General Approach 3-35
3.8.2 Baseline Risk Assessment Components Common to Inner Area Operable Units 3-37
3.8.3 Baseline Risk Assessment Inputs 3-37
3.9 Preliminary Remediation Goals 3-37
3.10 Documenting Baseline Risks for 200 West and 200 East Areas (Inner Area) 3-37
3.11 Preliminary Remedial Action Objectives 3-38
4 Work Plan Approach and Rationale 4-1
4.1 Strategy for Defining Data Needs 4-1
4.1.1 Data Needs Assessment Process 4-2
4.1.2 Site-Specific Assessment Process 4-3
4.1.3 Integration of Previous Evaluations 4-4
4.1.4 Use of Representative Sites 4-4
4.2 Waste Sites Adequately Characterized to Support Selection of a Remedy Decision 4-6
4.2.1 200-BC-1 OU Data Needs Evaluation Results 4-6
4.2.2 200-WA-1 OU Data Needs Evaluation Results 4-7
4.3 Sites Requiring Additional Data to Support Selection of a Remedy Decision 4-8
5 Remedial Investigation/Feasibility Study Tasks 5-1
5.1 Task 1—Project Planning 5-1
5.2 Task 2—Community Relations 5-2
5.2.1 Tribal Nations Involvement 5-2

5.2.2 Stakeholder Involvement 5-2
5.2.3 Public Involvement 5-3
5.3 Task 3—Field Investigations 5-3
5.3.1 Sampling and Analysis Plan and Quality Assurance Project Plan 5-3
5.3.2 Investigation Implementation 5-3
5.3.3 Field Investigation Reporting 5-4
5.4 Task 4—Sample Analysis/Validation 5-4
5.4.1 Data Validation and Verification 5-7
5.4.2 Data Storage and Archiving 5-8
5.5 Task 5—Data Evaluation 5-8
5.5.1 Data Tabulation 5-8
5.5.2 Waste Site Data Summary 5-8
5.5.3 Conceptual Site Models 5-9
5.5.4 Summary Overview of Contamination Conditions in the Operable Unit 5-9
5.6 Task 6—Assessment of Risk 5-9
5.7 Task 7—Treatability Studies 5-10
5.8 Task 8—Field Summary Reports 5-10
5.9 Task 9—Remedial Alternatives Development and Screening 5-10
5.9.1 Development of the Range of Alternatives 5-11
5.9.2 Logic for Waste Site Remedy Selection 5-13
5.10 Task 10—Detailed Analysis of Alternatives 5-16
5.11 Task 11—RI/FS Report 5-17
5.12 Task 12—Post RI/FS Support 5-17
5.12.1 Proposed Plan 5-17
5.12.2 Record of Decision 5-17
5.12.3 Post-ROD Activities 5-18
6 Project Schedule 6-1
7 Project Management Considerations 7-1
7.1 Project Organization 7-1
7.1.1 DOE-RL Project Organization 7-1
7.1.2 Regulatory Agency Oversight Organization 7-1
7.1.3 Contractor Organization 7-2
7.2 Project Coordination, Decision Making, and Documentation 7-2
7.3 Change Control and Dispute Resolution 7-2
8 References 8-1

Appendices

A Waste Information Data System (WIDS) Assessment Spreadsheet ..... A-i

B Waste Site Supporting Information ..... B-i

C Map Plates – Waste Sites and Historical Groundwater Impacts ..... C-i

D Waste Site Descriptions ..... D-i

E Document List ..... E-i

F Regulatory Applicable or Relevant and Appropriate Requirements (ARARs) ..... F-i

G Basseline Risk Assessment Details ..... G-i

H Data Needs Assessment Checklists ..... H-i

Figures

Figure 1-1. The Hanford Site 1-2

Figure 1-2. Principal Components of Hanford's Completion Framework: River Corridor, Central Plateau, and Tank Farms 1-7

Figure 1-3. Preliminary Closure Zones for the Central Plateau Cleanup Strategy 1-9

Figure 1-4. RCRA and CERCLA Waste Sites in Western Portion of 200 West Inner Area 1-10

Figure 1-5. CERCLA Operable Units in Central Plateau Inner Area 1-13

Figure 2-1. Process to Identify WIDS Sites to Be Evaluated in the Remedial Investigation Work Plan 2-7

Figure 2-2. 200 West Inner Area WIDS Evaluation Results 2-9

Figure 2-3. Generalized Geologic Structure Map of the Pasco Basin 2-14

Figure 2-4. Generalized Stratigraphic and Hydrostratigraphic Column for the 200 Area 2-16

Figure 3-1. Data Quality Assessment Flow Chart 3-5

Figure 3-2. 200-BC-1 OU Waste Sites 3-7

Figure 3-3. Schematic Representation of Contaminant Distribution at the 200-BC-1 OU Waste Sites Based on Process Knowledge 3-9

Figure 3-4. 200-WA-1 OU Waste Sites in the U Plant Vicinity 3-10

Figure 3-5. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the U Plant Vicinity 3-13

Figure 3-6. 200-WA-1 OU Waste Sites in the REDOX Plant Vicinity 3-14

Figure 3-7. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the REDOX Plant Vicinity 3-16

Figure 3-8. 200-WA-1 OU Waste Sites in the PFP Vicinity 3-17

Figure 3-9. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the PFP Vicinity 3-18

Figure 3-10. 200-WA-1 OU Waste Sites in the T Plant Vicinity 3-19

Figure 3-11. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the Vicinity of T Plant Land and Groundwater Use 3-22

Figure 3-12. Land Uses from the Hanford Comprehensive Land Use Plan 3-25
Figure 3-13. Designated Land Uses in the HCP EIS 3-26
Figure 3-14. Adaptation of the DOE GA for Risk Assessment Applications to Groundwater Protection at the Hanford Site 3-29
Figure 3-15. Conceptual Site Model for the 216-S-6 Crib (cont) 3-32
Figure 3-16. Conceptual Site Model for the 216-U-7 French Drain (cont) 3-34
Figure 4-1. Data Needs Assessment Process Overview 4-3
Figure 4-2. Site-Specific Data Needs Assessment Process 4-5
Figure 4-3. Site 200-BC-1 OU Data Needs Evaluation Results 4-6
Figure 4-4. Site 200-WA-1 OU Data Needs Evaluation Results 4-7
Figure 4-5. RTD Breakout for 200-WA-1 OU Waste Sites 4-7
Figure 5-1. CERCLA RI/FS Tasks 5-1
Figure 5-2. Example of Remedial Technology Fact Sheet Logic for Waste Site Remedy Selection (only for illustration purposes) 5-14
Figure 5-3. Example of Decision Logic Diagram to Evaluate Initial Remedial Alternatives 5-15
Figure 7-1. Project Organization 200 WA-1 and 200-BC-1 OUs 7-1

Tables

Table 1-1. Overarching Goals for Cleanup 1-6
Table 2-1. Proposed Changes to Operable Unit Assignments 2-10
Table 2-2. Incorporation of 200-WA-1/200-BC-1 Waste Sites into the CERCLA Process 2-11
Table 3-1. Summary of Waste Site Types within 200-BC-1 OU 3-8
Table 3-2. Summary of Waste Site Types in the U Plant Vicinity 3-12
Table 3-3. Summary of Waste Site Types in the REDOX Plant Vicinity 3-15
Table 3-4. Summary of Waste Site Types in the Vicinity of the Z Plant 3-18
Table 3-5. Summary of Waste Site Types in the T Plant Vicinity 3-21
Table 3-6. OUs Addressed in the 200 West and 200 East Areas (Inner Area) Baseline Risk Assessments 3-38
Table 4-1. 200-WA-1 OU Areas of Uncertainty for Waste Sites with Data Needs 4-8
Table 5-1. 200-WA-1 OU Summary of Waste Sites with Outstanding Data Needs and Recommended Approach to Characterization 5-5
Table 6-1. Project Schedule for 200-WA-1/200-BC-1 Operable Units 6-1

Terms

AAMSR	Aggregate Area Management Study Report
Action Plan	*Hanford Federal Facility Agreement and Consent Order Action Plan*
AEA	*Atomic Energy Act of 1954*
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BRA	baseline risk assessment
CCU	Cold Creek unit
CEM	conceptual exposure model
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CHPRC	CH2M HILL Plateau Remediation Company
COPC	contaminant of potential concern
CPP	CERCLA past-practice
CSM	conceptual site model
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
DOE	U. S. Department of Energy
DOE-RL	DOE Richland Operations Office
DQA	data quality assessment
DQO	data quality objective
DST	double-shell tank
DVZ	deep vadose zone
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ERDF	Environmental Restoration Disposal Facility
ESD	explanation of significant difference
FS	feasibility study

GA	graded approach
GHG	greenhouse gas
GPL	geophysical logging
GRA	general response action
GSR	green sustainability and remediation
HAB	Hanford Advisory Board
HCP	Hanford Comprehensive Land Use Plan (also known as CLUP)
HEIS	Hanford Environmental Information System
HHRA	Human Health Risk Assessment
HI	Hazard Index
HMS	Hanford Meteorological Station
HSU	hydrostratigraphic unit
HWIS	Hanford Well Information System
IDMS	Integrated Document Management System
MDC	minimum detectable concentration
MTCA	*Model Toxic Control Act*
NAPL	non-aqueous phase liquid
NCP	National Contingency Plan
NEBA	net environmental benefit analysis
NEPA	National Environmental Policy Act
NPL	National Priorities List
O&M	operations and maintenance
OSWER	Office of Solid Waste Emergency Response
OU	operable unit
PFP	Plutonium Finishing Plant
PNNL	Pacific Northwest National Laboratory
PRG	preliminary remediation goal
QAPjP	quality assurance project plan
R-CPP	RCRA-CERCLA past-practice
RAO	remedial action objective
RBSL	risk-based screening level

RCRA	*Resource Conservation and Recovery Act of 1976*
RD/RA	remedial design/remedial action
REDOX	Reduction-Oxidation (Plant)
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
ROD	record of decision
RTD	removal, treatment, and disposal
SAP	sampling and analysis plan
SLERA	screening level ecological risk assessment
SST	single-shell tank
TBC	to be considered
TNC	The Nature Conservancy
TPA	Tri-Party Agreement
TPO	technology process option
Tri-Parties	U.S. Department of Energy, U.S. Environmental Protection Agency, and Washington State Department of Ecology
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TRU	transuranic
TSD	treatment, storage, and disposal
UIC	underground injection control
UPR	unplanned release
UST	underground storage tank
WAC	Washington Administrative Code
WIDS	Waste Information Data System
WMA	Waste Management Area

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1 Introduction

This document presents the work plan for a remedial investigation/feasibility study (RI/FS) to support the final remedy selection for the 200-WA-1 and 200-BC-1 operable units (OUs) at the Hanford Site. This work is being performed for the U.S. Department of Energy (DOE) under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA).

The Hanford Site encompasses approximately 1,517 km^2 (586 mi^2) in the Columbia River Basin of south-central Washington State. In 1989, the U.S. Environmental Protection Agency (EPA) placed the 100, 200, 300, and 1100 Areas of the Hanford Site on the 40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan" (NCP), Appendix B, "National Priorities List" (NPL), pursuant to CERCLA.[1] Each NPL site is divided into multiple OUs as outlined in the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989a), also known as the Tri-Party Agreement (TPA). The 200-WA-1 and 200-BC-1 OUs are part of the 200 Area NPL site.

In 2009, the DOE Richland Operations Office (DOE-RL) developed a cleanup framework to reduce the size of the Hanford Site active cleanup footprint to the area known as the Central Plateau. The Central Plateau is in the central portion of the Hanford Site and encompasses approximately 195 km^2 (75 mi^2). The two major geographic cleanup areas within the Central Plateau include the 170 km^2 (65 mi^2) Outer Area and the 25 km^2 (10 mi^2) Inner Area (Figure 1-1). The 200-WA-1 and 200-BC-1 OUs are located in the Central Plateau's Inner Area.

This work plan was prepared in accordance with the following guidance documents:

- *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (RI/FS CERCLA guidance), EPA/540/G-89/004, OSWER Directive 9355.3-01, 1988. (Note: Section 6.2.3.7 associated with cost estimating has been superseded by *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, OSWER 9355.0-75, dated July 2000.)
- *Remedial Investigation/Feasibility Study (RI/FS) Process, Elements, and Techniques*, DOE/EH-94007658, 1993.
- *Guidance on Systematic Planning using the Data Quality Objectives Process*, EPA/240/B-06/001, EPA QA/G-4, 2006.

1.1 Scope of Work and Objectives

A diverse group of waste sites, ranging from planned liquid waste disposal to unplanned releases (UPRs) of waste material, is encompassed in this work plan.

1.1.1 Scope

The information needed and activities to be conducted in support of risk determination and remedy selection for waste sites in 200-WA-1/200-BC-1 lie within the scope of this work plan, which includes:

- The process used to identify, evaluate, and incorporate (or exclude) waste sites into the 200-WA-1 or 200-BC-1 OUs, so that no waste site is unaccounted for in the 200 West Inner Area.
- A description of the schedule and process to incorporate discovered or transferred waste sites into the 200-WA-1 or 200-BC-1 OUs.

[1] The 1100 Area was removed from the NPL in September 1996.

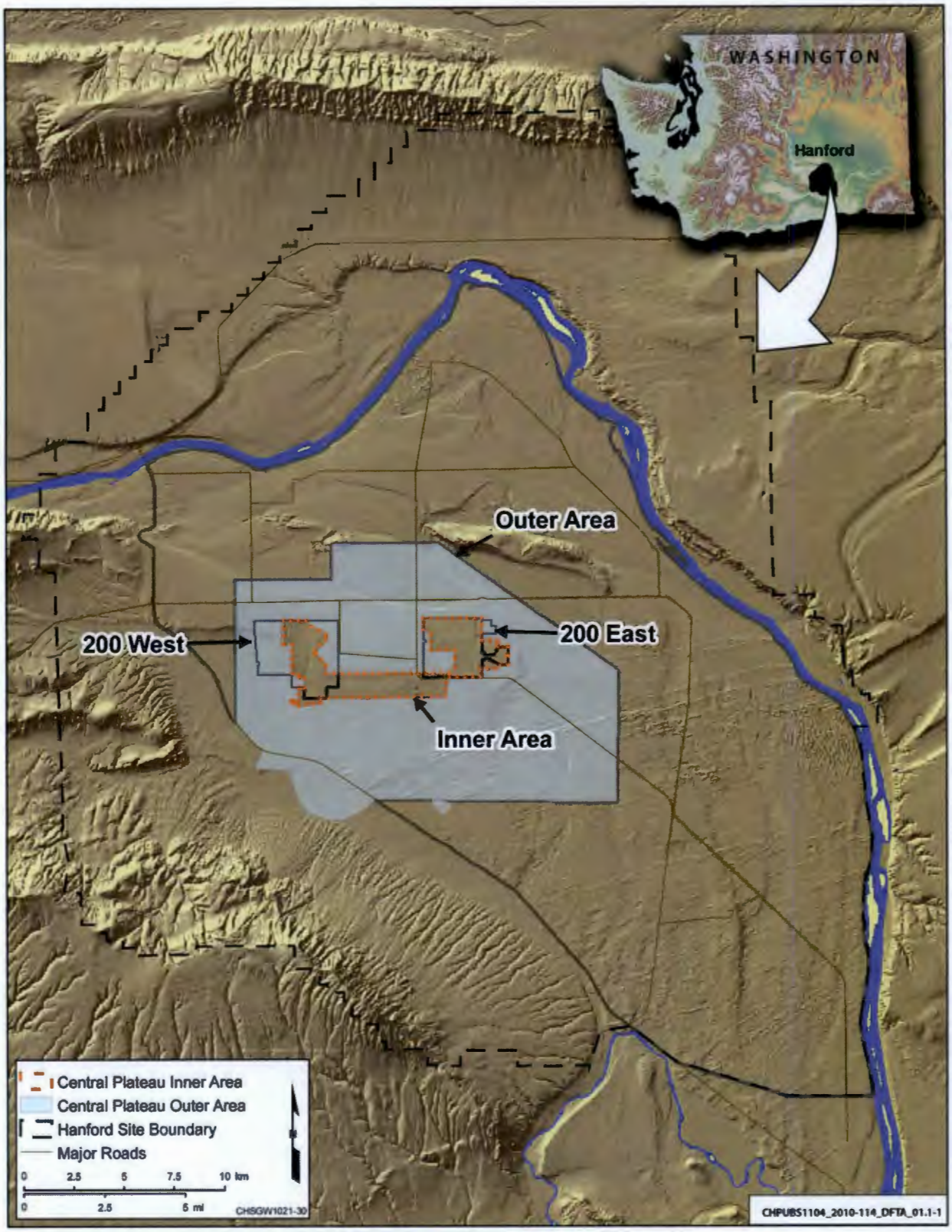


Figure 1-1. The Hanford Site

- An explanation of how existing data were evaluated to characterize the 200-WA-1 waste sites.
- A site-specific data needs assessment for all 200-WA-1/200-BC-1 waste sites to identify and fill data gaps in support of risk determination and remedial action decision making.
- The integration of the 200-BC-1 sites into the 200-WA-1 FS.
- A process for identifying initial contaminants of potential concern (COPCs) for waste sites and the process to be used for conducting the 200 West Inner Area Baseline Risk Assessment (BRA).
- The preliminary regulatory applicable or relevant and appropriate requirements (ARARs) for consideration during the RI/FS and an integrated approach (per Section 5.0, "Interface of Regulatory Authorities," of the Tri-Party Agreement Action Plan (Ecology et al., 1989b). Section 5.4, "Management of Past-Practice Units") for closure of sites that are subject to CERCLA remedial action and *Resource Conservation and Recovery Act of 1976* (RCRA) corrective action.
- The process for identifying and evaluating a protective and reasonable remedial strategy for eliminating or mitigating unacceptable risks to human health and the environment.

1.1.2 Objectives

The 200-WA-1/200-BC-1 RI/FS work plan includes the following objectives:

- Ensure that all identified waste sites in the 200 West Inner Area have been linked to a CERCLA or RCRA process document, or provide justification for not associating a waste site to a regulatory process document. A process document satisfies CERCLA or RCRA Program cleanup process requirements.
- Provide a general description of proposed data collection activities (numbers and types of samples and locations), necessary as part of the RI, to evaluate the nature and extent and to enable risk determination and remedial action decisions to be made for each waste site. If additional data collection at a waste site is not proposed, the use and adequacy of existing data are defined. The work plan provides enough specificity to prepare a sampling and analysis plan (SAP) for additional RI activities.
- Describe the overall Inner Area RI/FS approach and decision framework to support a final record of decision (ROD) for each waste site or waste site group, including protection of groundwater.
- Provide details on how the list of potentially applicable technologies and technology process options is compiled in the FS with the list then reduced by applying the technical implementability screening procedure. The work plan describes how the most viable options are analyzed individually against the nine CERCLA evaluation criteria and then compared against one another to determine their respective strengths and weaknesses.
- Describe the subsequent evaluation of data gaps discovered during the RI/FS process.
- Outline the RI/FS report contents and define the RI/BRA/FS execution schedule.

1.1.3 Work Plan Organization

This work plan is organized as follows:

- **Chapter 1: Introduction** describes the scope of work and identifies applicable OUs and waste site groupings in the Central Plateau 200 West Inner Area. This chapter provides a general site overview and the regulatory basis for cleanup.

- **Chapter 2: Operable Unit Background and Environmental Setting** presents information on the history of facility operations, descriptions of the waste sites, and the environmental setting for the 200-WA-1/200-BC-1 OUs.
- **Chapter 3: Initial Evaluation** summarizes the available information for waste sites within the 200-WA-1/200-BC-1 OUs, providing a basis for identifying key data gaps.
- **Chapter 4: Work Plan Approach and Rationale** presents the methods used to assess data adequacy to support the remedial action decision-making process.
- **Chapter 5: Remedial Investigation/Feasibility Study Tasks** describes the 12 standard federal lead RI/FS tasks, with special emphasis on the tasks related to the completion of the FS.
- **Chapter 6: Project Schedule** indicates how project deliverables relate to enforceable milestones established in the TPA. The schedule will serve as a baseline for the work planning process.
- **Chapter 7: Project Management Considerations** discusses project organization, project coordination, change control, and the dispute resolution process.
- **Chapter 8: References** lists the references consulted in this work plan.

The appendices include supporting information used in the assessment of data needs for each of the waste sites, and are provided in the following order:

- **Appendix A, Waste Information Data System (WIDS) Assessment Spreadsheet** provides a summary of the waste sites within 200 West Area, and presents the disposition of these waste sites into their appropriate OU.
- **Appendix B, Waste Site Supporting Information** contains an overview of supporting waste site information consisting of historical waste streams from operating facilities, availability of analytical and geophysical data, indications of historical groundwater impacts, and a preliminary screening of remedial technologies.
- **Appendix C, Map Plates –Waste Sites and Historical Groundwater Impact** includes a map that shows locations of waste sites in this work plan. In addition, a series of plates are provided that present historical groundwater impacts for several of the key contaminant indicators.
- **Appendix D, Waste Site Descriptions** provides extensive information (over 800 pages) on each waste site including process history, potential contaminants, maps, drawings, previous investigations in the site vicinity, etc.
- **Appendix E, Document List** contains a list of documents reviewed by authors in preparation of the 200-WA-1/ 200-BC-1 Remedial Investigation/Feasibility Study Work Plan.
- **Appendix F, Regulatory Applicable or Relevant and Appropriate Requirements (ARARs)**
- **Appendix G, Baseline Risk Assessment** provides an overview of the baseline risk assessment approach, procedures for the development of preliminary remediation goals, development of the remedial action objectives, and assessment documentation.
- **Appendix H, Data Needs Assessment Checklists** summarizes the basis for additional data needs associated with each of the 200-WA-1 OU waste sites.

1.2 CERCLA

The Hanford Site was placed on the NPL (53 FR 23988, "National Priorities List for Uncontrolled Hazardous Waste Sites – Update 7") on November 3, 1989 (54 FR 41015, "National Priorities List for

Uncontrolled Hazardous Waste Sites – Final Rule 10/04/89") to respond to the release of hazardous substances, and to investigate and respond to releases and potential releases from past-practice activities.

The TPA, originally published May 15, 1989 (Ecology et al., 1989a), is the *Hanford Federal Facility Agreement and Consent Order*. It implements the responsibilities of DOE, EPA, and the State of Washington Department of Ecology (the Tri-Parties) under Section 120 of CERCLA to jointly prosecute remedial actions on the Hanford NPL Site. The TPA is a dynamic document that incorporates the remedial investigations, decisions, and actions agreed upon by these three agencies. DOE is the lead agency responsible for conducting the response actions at the Hanford Site. Subsequent to 1989, the TPA has been revised and will continue to be update as necessary per TPA agency agreements. The most recent version of the TPA can be found at the following link: www.hanford.gov.

CERCLA Process. The CERCLA process is clearly established and is addressed in detail on the EPA website available at: www.epa.gov/superfund. In brief, a remedial response is conducted at the completion of the assessment of an NPL site. The remedial process involves planning and decision-making steps, including conducting an RI/FS, developing a proposed plan and a ROD, and performing the actual remedial action. At any time in the response process, a removal action, such as a time critical removal action (TCRA) or non-time critical removal action (NTCRA), may be implemented if warranted by site conditions.

The CERCLA process for the remediation and closure of the 200-WA-1/200-BC-1 OUs consists of the following major activities, as defined by CERCLA guidance documents:

- Development of a final RI/FS work plan
- Implementation and completion of work needed to complete the RI/FS
- Development of a BRA report
- Development of a final RI/FS report
- Development of a proposed plan
- Public comment
- Development and approval of a final action ROD
- Development of a final remedial design/remedial action (RD/RA) work plan
- Implementation of the final remedy
- Achievement of construction completion status (if applicable)
- Achievement of a site completion status
- Development of a remedial action report
- Development and implementation of a monitoring program (if required)
- Development of a preliminary closeout report for the 200-WA-1/200-BC-1 OUs
- A cyclic 5-year review of the remedy effectiveness as required by CERCLA

This work plan has been developed to identify the process for the use of existing data and activities needed to gather additional data to make a remedial decision for the 200-WA-1/200-BC-1 OUs. After the data have been gathered and analyzed, the conceptual site model (CSM) updated, and the risk assessment performed, an FS will be completed to identify and evaluate alternatives. A proposed plan—containing a summary of the investigation and evaluation which includes the selection of preferred remedial alternative(s)—will be issued to the public for review and comment in accordance with 40 CFR 300.430(f)(3), "Remedial Investigation/Feasibility Study and Selection of Remedy." Following the receipt of public comments, and the response to those comments a ROD containing the responsiveness

summary will be developed by EPA and the Washington State Department of Ecology (Ecology) in cooperation with DOE. The ROD will be approved by the Tri-Parties.

1.3 Hanford Site Cleanup Framework

The DOE *Hanford Site Cleanup Completion Framework* (DOE/RL-2009-10) describes the overall site cleanup strategy and the approach to completing the remainder of the cleanup mission. The framework document defines the principal components of cleanup and provides the context for individual cleanup actions by establishing the approaches and common goals for those decisions needed to complete the cleanup mission.

The framework document defined the overarching goals for cleanup, as shown in Table 1-1. These goals embody more than 20 years of dialogue among the Tri-Party agencies, Tribal Nations, State of Oregon, stakeholders, and the public. The goals consider key values captured in forums, such as the Hanford Future Site Uses Working Group, Tank Waste Task Force, Hanford Summits, Tribal Nation values statements, and Hanford Advisory Board (HAB). These goals provide a set of principles that guide all aspects of Hanford Site cleanup. Cleanup activities at various areas of the site support the achievement of these goals. These goals help set priorities to apply resources and sequence cleanup efforts for the greatest benefit.

Table 1-1. Overarching Goals for Cleanup

Goals for Cleanup
Goal 1: Protect the Columbia River.
Goal 2: Restore groundwater to its beneficial use to protect human health, the environment, and the Columbia River.
Goal 3: Clean up River Corridor waste sites and facilities to accomplish the following: • Protect groundwater and the Columbia River. • Shrink the active cleanup footprint to the Central Plateau. • Support anticipated future land uses.
Goal 4: Clean up Central Plateau waste sites, tank farms, and facilities to accomplish the following: • Protect groundwater. • Minimize the footprint of areas requiring long-term waste management activities. • Support anticipated future land uses.
Goal 5: Safely manage and transfer legacy materials scheduled for offsite disposition, including special nuclear material (including plutonium), spent nuclear fuel, transuranic (TRU) waste, and immobilized high-level waste.
Goal 6: Consolidate waste treatment, storage, and disposal operations on the Central Plateau.
Goal 7: Develop and implement institutional controls and long-term stewardship activities that protect human health, the environment, and Hanford's unique cultural, historical, and ecological resources after cleanup activities are completed.

To achieve these goals, the Hanford Site cleanup is organized into three major components: (1) River Corridor, including the Hanford Reach National Monument, (2) Central Plateau, and (3) tank farms/tank waste, shown in Figure 1-2. Each component of cleanup is, in itself, a complex and challenging undertaking involving multiple projects and contractors that require many years and billions of dollars to complete. Cleanup of waste sites and facilities in the River Corridor will essentially be completed by 2015, with substantial progress made on groundwater remediation. Closure of tanks and tank farms is being evaluated in the ongoing *Tank Closure and Waste Management Environmental Impact Statement* (DOE/EIS-0391).

Figure 1-2. Principal Components of Hanford's Completion Framework: River Corridor, Central Plateau, and Tank Farms

The 200-WA-1 and 200-BC-1 OUs are located within the Central Plateau component, which includes approximately 195 km^2 (75 mi^2) in the central portion of the Hanford Site. This region contains the 200 East and 200 West Areas, which have been used primarily for nuclear fuel processing and waste management and disposal activities. The Central Plateau contains processing and support facilities, tank systems, liquid and solid waste disposal and storage facilities, utility systems, and contaminated groundwater. On the Central Plateau, a geographic approach will be implemented that will guide remedy implementation from a plateau-wide perspective, Figure 1-3 shows the geographic closure zones.

1.4 Integration of Other Activities

To facilitate consistent remedial decisions across the Inner Area, the Tri-Parties modified the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989a) (Tri-Party Agreement) in 2009, to restructure Central Plateau remediation activities. Restructuring included consolidation of the Inner Area waste sites into geographical area-based OUs, resulting in the creation of the 200-EA-1 OU, 200-WA-1 OU, and retention of the 200-BC-1 OU. An additional OU, 200-DV-1, was created to include those deep vadose zone waste sites where contamination is beyond any currently available remedy. The existing groundwater OUs on the Central Plateau remained unchanged.

In order to successfully execute geographic closure, this 200-WA-1 RI/FS work plan and subsequent decision documents must be closely integrated with the overall Hanford Site closure strategy. Integration of other regulatory programs and other OUs, active in the 200 West Inner Area, are discussed in the following text. Specific ongoing sampling, analysis, and remedial action activities that are critical to the 200-WA-1 decision process are highlighted.

1.4.1 Other Regulatory Program Integration

DOE's remediation activities are governed by CERCLA and the substantive requirements of RCRA and other environmental laws. CERCLA addresses the uncontrolled releases of hazardous substances to the environment and the cleanup of inactive waste sites. RCRA addresses the management of hazardous waste and requires that permits be obtained for DOE facilities that are actively treating, storing, or disposing of hazardous or mixed waste (i.e., mixed wastes includes both RCRA-regulated hazardous waste and non-RCRA regulated radioactive waste). RCRA also requires corrective action to address releases of hazardous waste constituents from operating facilities. It is DOE's policy to rely on the CERCLA process for the review of actions to be taken under CERCLA and to incorporate, to the extent practicable, National Environmental Policy Act of 1969 (NEPA) values into CERCLA documentation. NEPA values that may be addressed include, but would not be limited to: transportation; air quality; natural, cultural, and historical resources; socioeconomic impacts; environmental justice; irreversible and irretrievable commitments of resources; and cumulative impacts. The NEPA values analysis for this study area will be documented in the appropriate sections of the FS.

Three categories of units and regulated statutory or regulatory authorities are addressed under the *Hanford Federal Facility Agreement and Consent Order Action Plan* (henceforth referred to as the Action Plan [Ecology et al., 1989b]). These categories are (1) RCRA treatment, storage, and disposal (TSD) units, (2) RCRA-CERCLA past-practice units (RCPP), and (3) CERCLA past-practice (CPP) units. RCRA authority does not extend to the cleanup of radionuclides, while CERCLA and the *Atomic Energy Act of 1954* (AEA) do. At the current time, there are no R-CPP or TSD units located within 200-WA-1 OU.

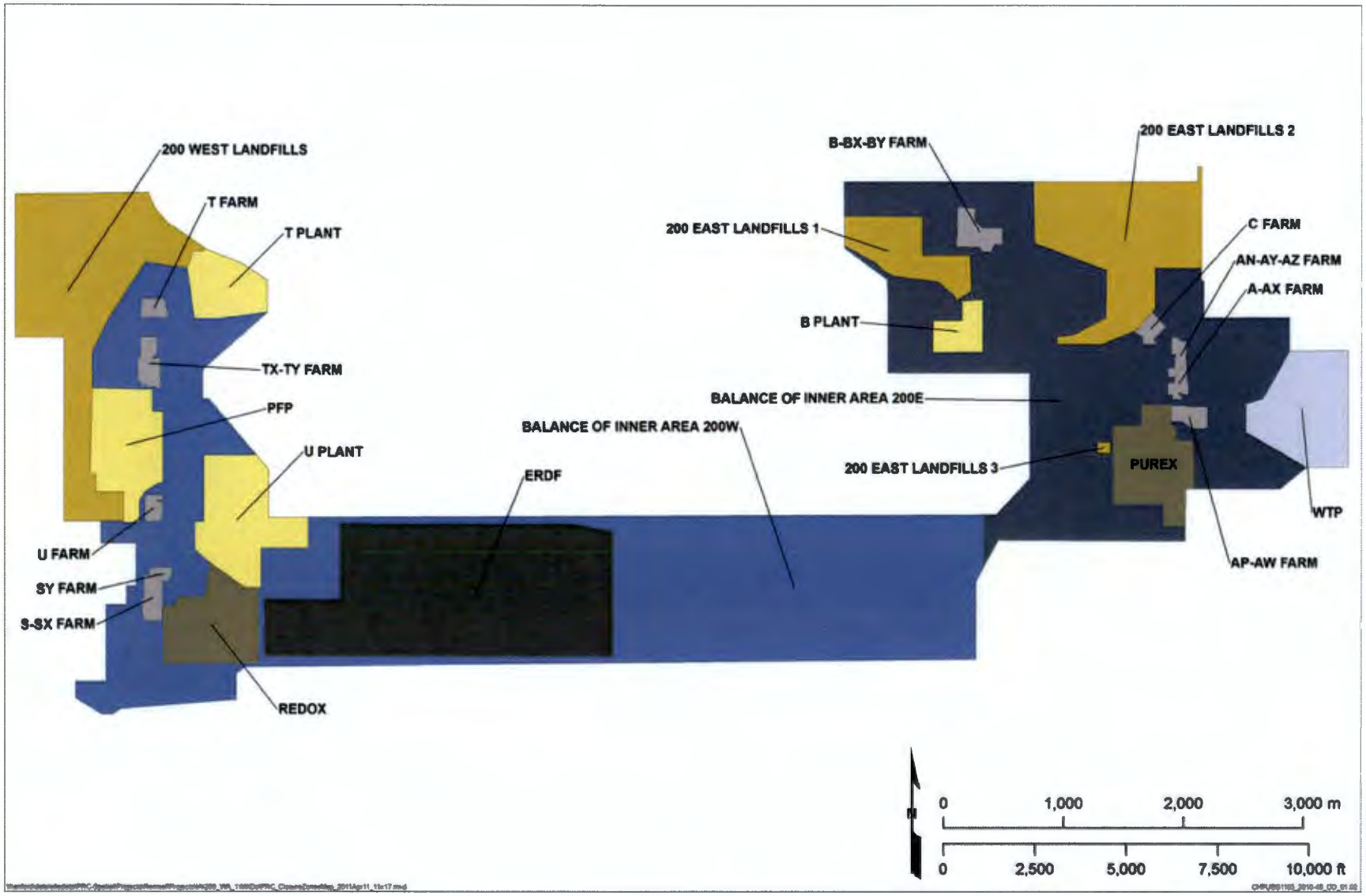


Figure 1-3. Preliminary Closure Zones for the Central Plateau Cleanup Strategy

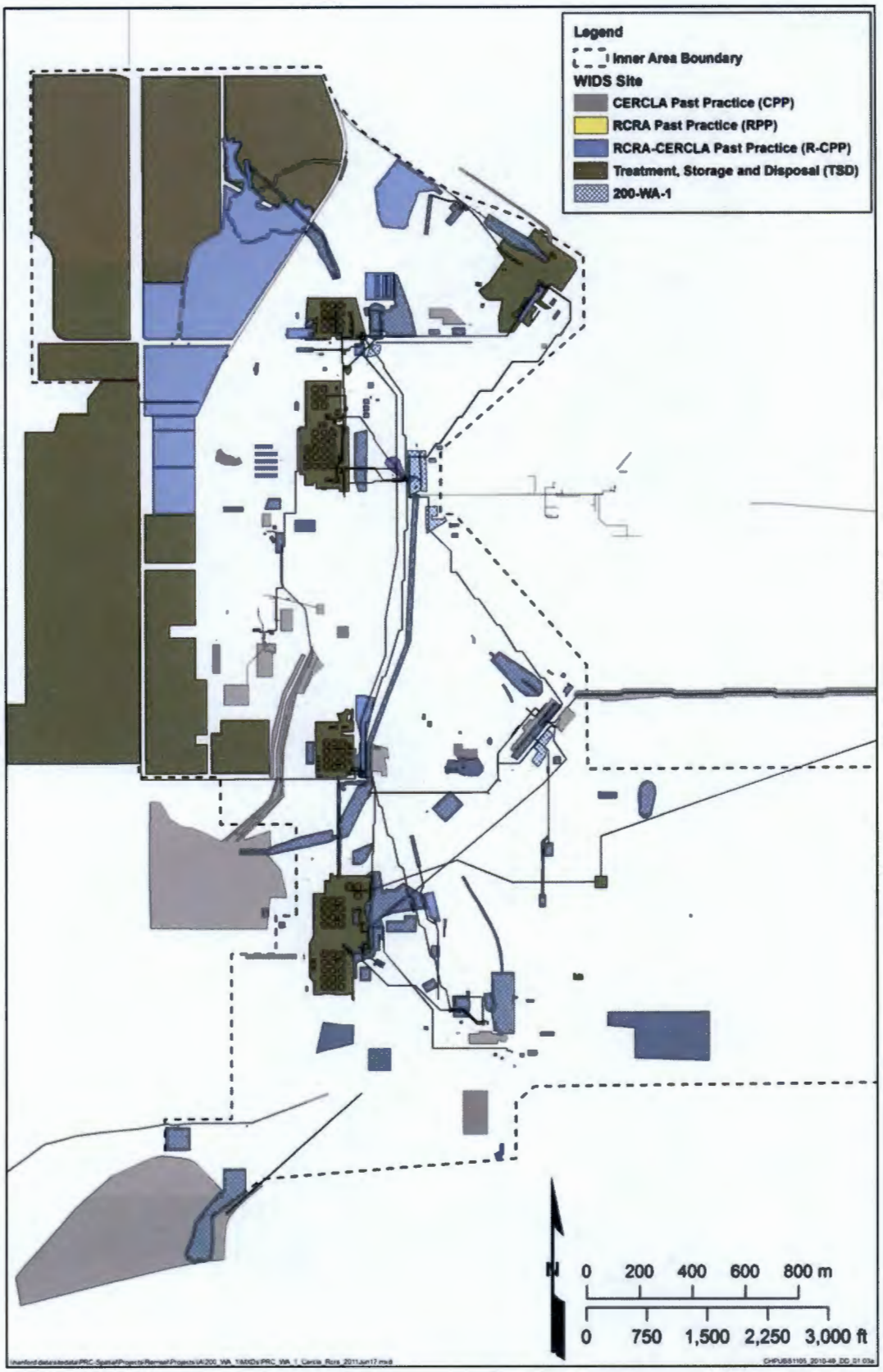


Figure 1-4. RCRA and CERCLA Waste Sites in Western Portion of 200 West Inner Area

In accordance with the *Final Approval: Hanford Federal Facility Agreement and Consent Order Change Forms Implementing Changes to Central Plateau Cleanup* (Ecology et al., 2010) and associated change packages, CERCLA decisions that encompass geographic decision areas inclusive of all CERCLA cleanup and RCRA corrective action sites will be pursued at Hanford. This approach will ensure that there is CERCLA coverage for radionuclides while also satisfying the technical requirements for RCRA corrective action.

In the BRA, human health scenarios will be evaluated for radionuclide exposure using the methodology based on CERCLA guidance. In addition, human health risks for nonradionuclide chemicals in soil will be assessed using Method B (WAC 173-340-740, "Unrestricted Land Use Soil Cleanup Standards") in the BRA. The alternative evaluations in the FS will use Method C (WAC 173-340-745, "Soil Cleanup Standards for Industrial Properties") which will be the basis for selecting a proposed plan.

If it is determined that there are RCRA TSD units in 200-WA-1 OU along with the CERCLA past-practice waste sites, coordination of closure requirements for RCRA TSD units and remedial action requirements for the CPP waste sites will be defined and agreed to among the Tri-Parties. The objectives of coordination are to optimize cleanup of the 200-WA-1 OU and to ensure compliance with applicable regulatory requirements.

1.4.2 Major Plant Operations

There are several major plant complexes located within the geographic area of 200 West Area. These complexes are the U Plant, T Plant, Reduction-Oxidation (REDOX) Plant, and the Plutonium Finishing Plant (PFP). These Central Plateau facilities are anticipated to require a CERCLA response action for cleanup.

Remedial action alternatives developed in the 200-WA-1/200-BC-1 RI/FS report for waste sites adjacent to major plant facilities will take into consideration the proximity of the facility and potential facility remedies. This consideration may result in a waste site transfer to a different OU, or incorporation of the waste site into the planned remedy for the facility. Any environmental sampling and analysis completed in conjunction with major plant facilities, or 200-WA-1/200-BC-1 waste sites, will be available through the Hanford Environmental Information System (HEIS) for use by all Central Plateau projects.

1.4.3 TSD Units Associated with Tanks

Tank closure planning involves numerous regulatory requirements and DOE orders, with the primary drivers being *Radioactive Waste Management* (DOE O 435.1) with authority from the AEA, and implementation of RCRA through WAC 173-303 and WA7890008967. Single-shell tanks (SSTs) are grouped into WMA Closure Action Plans. Each WMA consists of a single regulatory unit with component groupings of tanks, ancillary equipment, contaminated soil, and contaminated groundwater.

Remedial action alternatives developed in the 200-WA-1/200-BC-1 OU RI/FS report for waste sites adjacent to tank farms will take into consideration the TSD units proximity. This consideration may result in a waste site transfer to a different OU or the incorporation of the waste site into the planned remedy for the TSD unit. The detailed evaluation of alternatives performed in the 200-WA-1/200-BC-1 RI/FS report will determine whether a planned TSD action is also appropriate for the waste sites. Any environmental sampling and analysis completed in conjunction with TSD units or 200-WA-1/200-BC-1 waste sites will be available through HEIS for use by Central Plateau projects.

1.4.4 Structures

Structures on the Central Plateau that are not RCRA units, or part of an OU, will be characterized as they are decommissioned. If hazardous waste is detected through the DOE evaluation of a decommissioned structure, the lead regulatory agency's concurrence with the evaluation will be sought by approval of a

change to Tri-Party Agreement, Appendix J, to be completed in accordance with Tri-Party Agreement, Section 12.0, "Changes to the Agreement."

If the evaluation leads to the discovery of a new waste site, the discovery site will be entered into the WIDS and evaluated in accordance with the "Maintenance of the Waste Information Data System (WIDS)" (TPA-MP-14, Revision 2). If the new site is classified as "Accepted" or "Accepted (proposed)", then the waste site will be added to the appropriate Inner Area OU.

Currently in 200-WA-1, the PFP plant buildings are undergoing decontamination and demolition in accordance with the *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action* (DOE/RL-2005-13). After demolition, the debris will be removed, leaving the concrete floors of the various structures. The demolition sites will be evaluated and, if contaminated, entered into WIDS as waste sites in the appropriate OU.

1.4.5 Other Operable Units in the 200 West Inner Area of the Central Plateau

Because of the relatively large number of past-practice units at the Hanford Site, individual units were aggregated into OUs to facilitate investigation and development of remedial actions, and to prioritize cleanup work at the Hanford Site. Figure 1-5 illustrates the CERCLA OUs that are currently assigned in the Central Plateau Inner Area. The relationship between the 200-WA-1/200-BC-1 RI/FS and other 200 West Inner Area OUs is outlined below.

1.4.5.1 200-PW-1/3/6 and 200-CW-5 Operable Units

The plutonium- and organic-rich group process-based OUs include the 200-PW-1, 200-PW-3, 200-CW-5, and 200-PW-6 OUs. Waste sites in the 200-PW-1 and 200-PW-6 OUs primarily received plutonium- and organic-rich waste streams from PFP process operations. The 200-CW-5 OU received cooling water from the PFP and U Plant. The 200-PW-1, 200-PW-6, and 200-CW-5 OUs are in the 200 West Inner Area, and the 200-PW-3 OU waste sites are in the 200 East Inner Area. DOE submitted the *Feasibility Study for the Plutonium/Organic-Rich Process Waste Group Operable Unit: Includes the 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units* (DOE/RL-2007-27) and the *Proposed Plan for the Remediation of the 200-CW-5, 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units* (DOE/RL-2009-117) to EPA on January 11, 2011. The Record of Decision: Hanford 200 Area Superfund Site 200-CW-5 And 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units (DOE, EPA, and Ecology, 2011), was issued in September 2011. The remedy for these sites will be implemented outside of 200-WA-1.

1.4.5.2 200-IS-1 200 West Area/Pipelines

The 200-IS-1 OU consists of waste sites that are associated with inactive, buried waste-transfer pipelines and pipeline components (e.g., diversion boxes, catch tanks, valve pits, vaults, and control structures) located within the Inner Area of the Central Plateau. The 200-IS-1 OU also includes the contaminated soil that is the result of previously identified UPRs from the pipeline and pipeline components. The UPRs identified during remedial actions in 200-IS-1 will be evaluated under the procedural steps for adding, updating, classifying and reclassifying sites, in accordance with TPA-MP14 process and will be incorporated in the geographic OU where the site is located.

The data collection for a majority of the pipeline waste sites in the 200 West Inner Area will be conducted under the *200-IS-1 Operable Unit Pipeline System Waste Sites RFI/CMS and RI/FS Work Plan* (DOE/RL-2010-114).

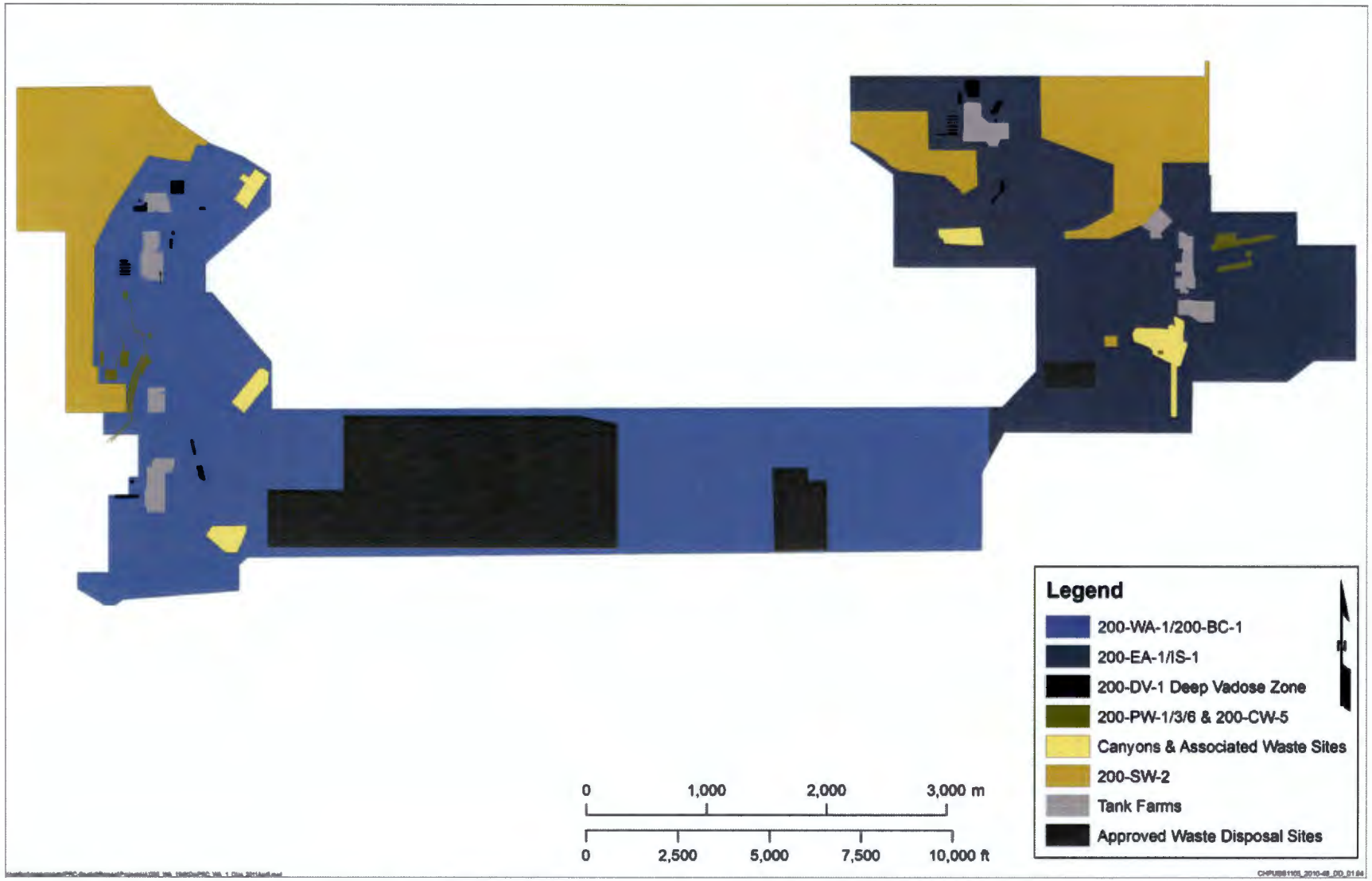


Figure 1-5. CERCLA Operable Units in Central Plateau Inner Area

1.4.5.3 Canyons

The U Plant and REDOX Canyons are located in the 200 West Inner Area. The canyons will be closed under their own specific decision documents and the appropriate RCRA closure documents:

- U Canyon: The 221-U Facility ROD (EPA et al., 2005, *Record of Decision 221-U Facility [Canyon Disposition Initiative] Hanford Site, Washington*) selected a barrier as a final remedy. The remedy also includes the Railroad Tunnel, structures 271-U, 276-U, and 292-U, and the 291-U-1 and 296-U-10 stacks.

- 200-CR-1 OU: The REDOX canyon building has been shut down for more than 40 years. It is anticipated that the canyon building will be brought down to deck level like the 221-U Facility. REDOX is included in C-09-07 (*Federal Facility Agreement and Consent Order Change Control Form: Revise Tri-Party Agreement Appendix C to Align Operable Unit Assignments with Proposed Central Plateau Decisions*).

1.4.5.4 200-DV-1 Deep Vadose Zone Operable Unit

The Deep Vadose Zone (DVZ) is defined as the region below the practical depth of the surface remedy's influence (for example, excavation or barrier) on the entire Central Plateau. Deep Vadose Zone contamination is not considered to pose human health or ecological risks through direct exposure or uptake by biota; however, it may be a potential source of groundwater contamination. The specific waste sites assigned to 200-DV-1 may vary, and waste sites are anticipated to move back and forth between 200-WA-1/200-BC-1 and 200-DV-1 as CSMs and remedial alternatives are fully developed.

1.4.5.5 200-SW-2 Burial Grounds Operable Unit

The 200-SW-2 OU consists of 24 landfills located in the Inner Area of the Central Plateau. Also, parts of the 200-SW-2 OU are associated waste sites located within the footprint of the 200-SW-2 landfills. These sites include 15 UPR sites, the Semi-Hot works (216-C-9 Pond), and the T Pond system (colocated in the 218-W-2A and 281-W-3AE Landfills).

The 200-SW-2 burial grounds and 200-WA-1 waste sites may share or have overlapping boundaries. Consequently, sampling and analysis results may provide information on the lateral extent of contamination across OU boundaries. As with the TSDs and canyons, remedial action alternatives for 200-WA-1 OU waste sites adjacent to the burial grounds will take into consideration the proximity of the burial ground. This consideration may result in a waste site transfer to a different OU, or incorporation of the waste site into the planned remedy for the burial ground. The 200-SW-2 OU burial grounds will be addressed under RCRA and CERCLA. An RI/FS work plan was submitted to Ecology on November 7, 2011 for 200-SW-2.

1.4.5.6 Groundwater Operable Units

Groundwater impacts resulted from a combination of medium- to high-volume discharges and, in some cases, vertical transport was enhanced by poorly sealed nearby wells. Three Groundwater OUs were affected by historic discharges to 200-WA-1 OU and 200-BC-1 OU waste sites. The 200-WA-1 OU waste sites are underlain by the 200-ZP-1 and 200-UP-1 Groundwater OUs; 200-BC-1 OU is underlain by the 200-PO-1 Groundwater OU.

A groundwater pump-and-treat remediation system is being constructed within the 200 West Inner Area to address contaminated groundwater present in the 200-ZP-1 and 200-UP-1 Groundwater OUs.

Carbon tetrachloride, trichloroethylene, total and hexavalent chromium, nitrate, technetium-99, iodine-129, and tritium are contaminants of concern that were identified in 200-ZP-1 and 200-UP-1 OUs.

In addition, uranium has been identified as a contaminant of concern in 200-UP-1. Chapter 3 discusses the potential contaminant migration from 200-WA-1/200-BC-1 vadose zone waste sites to the underlying groundwater and it will be more fully evaluated in the 200-WA-1/200-BC-1 RI/FS report. Chapter 5 presents additional information on the approach that will be used.

1.4.6 Integration of Previous Decisions

Many of the waste sites in 200-WA-1 have been evaluated in one or more of the following documents:

- DOE/RL-2003-23, *Focused Feasibility Study for the 200-UW-1 Operable Unit*
- DOE/RL-2003-24, *Proposed Plan for the 200-UW-1 Operable Unit*
- DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, and DOE/RL-2008-45, *Engineering Evaluation/Cost Analysis for the 200-MG-2 Operable Unit Waste Sites*
- DOE/RL-2009-86, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in the 200-MG-1 Operable Unit*
- DOE/RL-2009-37, *Action Memorandum for Non-Time-Critical Removal Action for 200-MG-2 Operable Unit*
- DOE/RL-2005-71, *Action Memorandum for the Time-Critical Removal Action for Support Activities to the 200-UW-1 Operable Unit*

These evaluations considered a range of remedial alternatives. The approach to determining data needs to support remedy selection of 200-WA-1 OU waste sites in this work plan assumes a bias toward removal, treatment, and disposal (RTD), whenever practicable, to break the direct contact pathway. Using this approach, no additional data collection would be required for the candidate waste sites since RTD would effectively remove the contaminant exposure pathway to human and ecological receptors. Using this logic, the data needs assessment concluded that no further data or information collection is anticipated to be needed for an additional 22 waste sites. These waste sites include underground storage tanks (USTs) and waste sites associated with near-surface vadose zone contamination. Sampling and analysis associated with the removal action will be conducted during the remedial design and/or implementation stage. In the event these site are determined to pose a threat to groundwater during the remedial design and/or implementation stage, the bias toward RTD as the appropriate remedy will be reevaluated.

During the RI/FS the waste sites will be evaluated for the development of remedial alternatives. However, characterization data is not available for many of the waste sites. If remedial alternatives cannot be developed and evaluated with the existing characterization data, then a supplemental DQO will be conducted with the EPA during the RI to collect data for the development of the remedial alternative.

1.4.7 Integration with Ongoing Actions and Decisions

Ongoing waste site characterization and/or remediation activities were considered in preparation of this work plan. These activities include currently approved plans for sampling and analysis of specific waste sites and previous evaluations of remedial alternatives. These activities are discussed in the following sections.

1.4.7.1 200-BC-1 Work Plan

The 200-BC-1 OU consists of 28 waste sites: 26 cribs and trenches, and 1 siphon tank and an associated pipeline. These waste sites are associated with former uranium recovery processes and tank-waste scavenging operations. Four trenches that received laboratory waste from the 300 Area also are included

in this OU. These sites are covered under DOE/RL-2000-38, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, but are included in this work plan for consistency in information collection and storage. These sites will also be covered in the 200-WA-1 FS; therefore, the feasibility study methodology discussed in this work plan covers the 200-BC-1 sites.

1.4.8 Sampling and Analysis Plans

This work plan considers the following environmental media sampling projects that have been approved in the 200 West Inner Area. The results will be applied to fully characterize the 200-WA-1 OU waste sites:

- *Sampling and Analysis Plan for Selected 200-MG-1 Operable Unit Waste Sites* (DOE/RL-2009-60, Rev. 1)
- *216-U-8 Crib and 216-U-12 Crib Vadose Zone Characterization Sampling and Analysis Plan* (DOE/RL-2009-94, Rev. 0)
- *Supplemental Remedial Investigation/Feasibility Study Work Plan for the 200 Areas Central Plateau Operable Units: Volume II: Site-Specific Field-Sampling Plan Addenda* (DOE/RL-2007-02, Rev. 0, Vol. II)

2 Operable Unit Background and Environmental Setting

This chapter describes the historical information and environmental conditions relevant to developing an understanding of risks posed by the 200-WA-1/200-BC-1 OU waste sites. It includes a summary of the historical operations, waste site descriptions, the environmental setting, and historical information pertinent to the development of the initial conceptual site model, evaluation of site risks, and selection of a final remedial action.

2.1 History of Operations

The operational history for the 200-WA-1/200-BC-1 OUs is organized around the major processing plants (T Plant, PFP, U Plant, and REDOX) and BC Cribs and Trenches. Tables B-1 through B-4 in Appendix B of this work plan summarize plant waste streams, estimated volumes, disposal sites, and chemical composition of wastes generated at major plants.

T Plant—The 221-T Building, also known as the T Plant or T Canyon Building, housed the first operational, full-scale plutonium separations facility in the world. This building is one of five Hanford Site canyon buildings, a reference to their large size and the canyon-like appearance of their upper galleries. The T Plant is currently an active decontamination and repair facility, where radioactive and hazardous wastes are processed and packaged; it is the only processing canyon that remains in operation at Hanford. The 221-T Building is located within the T Plant Complex, a RCRA-permitted TSD facility. The *T Plant Source Aggregate Area Management Study Report* (DOE/RL-91-61) provides a detailed discussion of the T Plant history.

PFP—The PFP was the location of the final step associated with plutonium metal production at Hanford. PFP was also known as the Z Plant. The plant is a complex consisting of more than 60 buildings, all of which are currently undergoing or slated for decontamination and demolition. A detailed discussion of Z Plant history is presented in the *Z-Plant Source Aggregate Area Management Study Report* (DOE/RL-91-58).

U Plant—U Plant was constructed in 1944. In October 2005, a ROD was signed by the Tri-Parties for the final disposition of the U Plant. However, waste streams generated during U Plant operations and during subsequent waste handling were disposed of at numerous nearby locations and facilities, including some 200-WA-1 waste sites. A detailed discussion of U Plant history is presented in the *U-Plant Source Aggregate Area Management Study Report* (DOE/RL-91-52) and *Focused Feasibility Study for the 200-UW-1 Operable Unit* (DOE/RL-2003-23).

REDOX Plant—The REDOX Plant (also known as S Plant) was in operation from 1953 through 1972 and processed approximately 24,000 tons of uranium fuel rods. Waste streams generated during REDOX Plant operations and during subsequent waste handling were disposed of at nearby facilities, including 200-WA-1 OU waste sites. A detailed discussion of S Plant history is presented in the *S-Plant Aggregate Area Management Study Report* (DOE/RL-91-60).

BC Cribs and Trenches—The BC Cribs and Trenches were used in the 1950s to dispose of more than 140 million L (38 million gal) of tank waste supernatant from the B, BX, BY, and C Tank Farms. Four trenches received smaller quantities of liquid waste that were generated in the 300 Area and transferred by tanker truck to the 200 Area. The largest volume of waste at these sites was disposed of in six cribs and 16 trenches and was conveyed by underground pipeline from the B, BX, BY, and C Tank Farms.

Waste management and disposal practices during the 1950s through the 1980s at Hanford adhered to the applicable management and disposal practices of the time. After the 1980s, waste has been managed,

treated, stored, and disposed of according to the applicable regulatory requirements, the associated waste type, degree of risk posed to humans or the environment, and its source.

2.1.1 Liquid Waste Handling

Various liquid waste streams were generated at the operating plants located within the 200-WA-1 OU, including process wastes, process wastewaters, and sanitary wastewater. During the early period of nuclear fuel reprocessing, the basis for segregating liquid wastes was established. Wastes were segregated first into streams that contained radioactive materials (called contaminated waste streams) and those that did not contain radioactive materials (or uncontaminated waste streams). Though "uncontaminated waste streams" were not considered to have radiological constituents, they could contain substantial amounts of chemical waste constituents. The nonradioactive streams were generally managed without stringent disposal and exposure controls, and most were discharged to surface ditches and ponds and allowed to infiltrate the vadose zone.

Liquid Waste Classification. The radioactive liquid waste streams were divided into three general categories:

- **High-Level or High-Activity Liquid Wastes**—High-level wastes contained large quantities of fission products, unrecovered uranium and TRU elements, and nonradioactive residuals from the chemical separation processes. The high-level waste was stored as it was created, first in single-shell tanks (SSTs) built between 1943 and 1964, then in double-shell tanks (DSTs) constructed between 1968 and 1986. The high-level wastes were generally aqueous liquids with a high suspended solids content. The waste was typically made alkaline before transfer, to prevent corrosion of the tanks and transfer lines. During the 1950s, some of these waste streams were disposed of in the vadose zone when available tank capacity was exceeded.

- **Intermediate-Level Liquid Wastes**—Intermediate-level wastes were generally aqueous liquids that contained varying numbers of fission products, uranium, and TRU elements, as well as varying numbers of organic and inorganic process chemicals, ranging from strongly alkaline to strongly acidic. These wastes were generally disposed of directly to the vadose zone through engineered structures such as cribs, trenches, French drains, and injection (or reverse) wells. All of these discharge structures were designed to facilitate infiltration of the liquid wastes into the vadose zone, thereby minimizing direct exposure potential to site workers. Intermediate-level wastes were generated in large volumes (i.e., billions of liters).

- **Low-Level or Low-Activity Liquid Wastes**—Low-level wastes typically contained low to variable radioactive content, fission products with relatively small amounts of uranium, and few TRU elements. These wastes generally consisted of steam condensate and cooling water. Although normally uncontaminated, they occasionally became contaminated through system upsets or equipment failure. In general, these waste streams were managed using the same systems and processes used for disposal of noncontaminated liquids (i.e., discharge directly to surface ditches and ponds). Low-activity wastes constitute the largest volume of liquid wastes discharged to the vadose zone in the Central Plateau. The primary effect of these discharges was substantial groundwater mounding beneath the waste sites, which affected groundwater flow gradients for many years.

Liquid Waste Transfer. The variety of liquid waste transfer methods used at the Hanford Site includes process lines, tanker trucks, rail cars, and localized pumping. Examples include highly radioactive waste piped to underground tanks, transfer of liquid wastes by tanker truck or by rail car via Waste Unloading Stations, and uncontaminated to slightly contaminated liquids and cooling water pumped to local ditches and ponds.

Within each operation, high-level waste transfer lines (also referred to as process lines) connect the major processing facilities with each other and with the various waste disposal and storage facilities. Most high-level waste transfer lines are 7.6 cm (3 in.) diameter stainless steel pipes with welded joints. These lines are generally enclosed in steel reinforced concrete encasements and are set below ground. Transfer lines to liquid effluent disposal facilities (e.g., cribs) were constructed from a variety of materials, including vitreous clay and galvanized metal.

Diversion boxes housed the switching facilities that were used to route waste from one process line to another. The diversion boxes were typically constructed from concrete and designed to contain waste leaks from high-level waste transfer line connections. The diversion boxes generally drain by gravity to nearby catch tanks where spilled waste is stored.

Diverter stations are generally rectangular, two-tiered reinforced concrete vaults constructed below ground. Diverter stations were used to allow waste streams coming into the diverter station to be routed to waste receiving tanks in the tank farms. The diverter station cells have floor drains that lead to the common catch tank or sump located directly below the diverter station.

Valve pits are concrete structures that house valves associated with the transfer of waste between tanks in the tank farms. A valve pit, sometimes referred to as a control structure, is a belowground, reinforced concrete structure. For a very long crib, up to 427 m (1,400 ft), valve pits also were used to evenly distribute flow over both halves of the crib. These structures most commonly were associated with pipelines that relied on gravity flow of waste streams that discharged to cribs, ponds, or ditches.

2.1.2 Liquid Waste Storage/Disposal

Tanks: Large underground radioactive waste storage tanks (SSTs and DSTs) were constructed to store high-level (activity) liquid waste streams. Because of waste leakage in a small number of SSTs and the potential for additional SST failures, no additional waste was added to the SSTs after 1980. All pumpable liquid has been transferred to sound DSTs. The DSTs have exceeded or are expected to exceed their design life and are managed under a comprehensive integrity management program.

Direct Discharge to the Soil: Direct discharge sites were constructed to receive varying volumes of uncontaminated and low- to intermediate-level radioactive liquid waste. When storage tank capacity was exceeded, high-level wastes were diverted to direct discharge sites for a time in the 1950s. Open ditches and percolation ponds allowed infiltration of liquid waste to the vadose zone. Reverse wells, cribs, and French drains were all designed to percolate wastewater into the ground without exposing the wastewater to the atmosphere. Open trenches were used to dispose of fixed volumes of low- to intermediate-level radioactive liquid waste. The types of direct discharge sites associated with the 200-WA-1/200-BC-1 OUs include the following:

- **Reverse wells:** Also known as injection wells, reverse wells served as disposal sites for liquid contaminants. Reverse wells were buried or covered. They featured drilled and cased holes, and the lower end of the well was perforated or open to allow liquid to seep into the vadose zone. These units injected wastewater into the vadose soil at depths greater than the cribs and French drains. Reverse wells were used for the disposal of intermediate-level liquid wastes in the early phases of Hanford Site operations.

- **Cribs:** Cribs were shallow excavations (e.g., typically less than 10 m [30 ft] deep) that were backfilled with granular material or held open by wood cribbing, and overlain by a vapor barrier. Many cribs were equipped with perforated drain piping that distributed the waste over a larger area. Most cribs were designed to receive liquid via a pipeline from the waste generating facility on a more

or less continuous basis until the unit's specific retention or radionuclide capacity was met. Following discharge of the specified volume of liquid, the crib was removed from service.

- **Trenches:** Trenches are shallow excavations (like cribs, they are typically less than 10 m [30 ft] deep) that were used to dispose of contaminated liquid wastes by direct discharge, typically via a temporary pipeline. Trenches generally did not have any permanent engineered features associated with them. They were commonly used on a specific retention basis, with a fixed volume of liquid identified for discharge prior to use. When the planned volume was discharged, the liquid was allowed to percolate from the trench, and then the trench was backfilled. Trenches, and particularly the specific retention trenches, were expected to exhibit residual contamination within the vadose zone immediately below the trench. Some trenches received only small quantities of wastewater; these trenches were used as vehicle and equipment cleaning and decontamination sites. A shallow excavation was opened, and vehicles or equipment were then placed into the trench where they were cleaned, typically with water or steam.

- **French drains:** French drains were designed to percolate wastewater into the ground without exposing it to the atmosphere. French drains were generally constructed of vertically oriented, large-diameter steel or concrete pipe with an open bottom that may have included perforations along a portion of the pipe length. The inside of the pipe was open or filled with gravel and covered with an impermeable layer. French drains were designed to receive relatively small liquid flow rates or volumes, although the total volume discharged over a particular site's service life may have been quite large (e.g., hundreds of thousands of liters). Most French drains received thousands to tens of thousands of liters of waste. French drains typically exhibit residual contamination beneath the structure within the upper portion of the vadose zone.

- **Retention basins, ditches, and ponds:** Basins, ditches, and ponds were components of a larger pond system or were autonomous waste sites. The pond systems were designed to receive large volumes of low-level or radiologically uncontaminated wastewater (e.g., steam condensate, cooling water, chemical sewer discharge) and percolate that wastewater into the vadose zone. Ponds were typically fed by ditches that originated near the various waste generating facilities.

  - **Retention basins** were open-topped concrete structures where liquid waste was held before it was discharged to ditches and ponds. The retention basins were associated with specific process plants (e.g., T, U, and REDOX, and PFP Plants, each have at least one retention basin). Some of the retention basins were lined with synthetic material during later periods of operation. Some retention basins were equipped to allow diversion of unacceptably high-level contaminated wastewater to alternative discharge points (e.g., a crib); however, most wastewater was discharged directly to ditches and, subsequently, to the receiving pond. Some retention basins were removed from service after becoming grossly contaminated.

  - **Ditches** were shallow, open excavations, often following natural surface topography and drainage pathways that conveyed wastewater to ponds. Ditches were typically unlined; therefore, a quantity of the wastewater infiltrated into the vadose zone beneath the ditch before reaching a pond.

  - **Ponds** associated with the 200-WA-1/200-BC-1 OUs (currently all ponds associated with these OUs are in Outer Area) were typically located in naturally occurring topographical low areas (they were initially referred to as swamps) and were subsequently modified to increase their surface area to enhance wastewater infiltration. Modifications included excavation to deepen ponds, construction of elevated berms or dikes to increase pond area or contain wastewater, and

excavation of accessory ditches to expand surface area and to divert excessive flows to other ponds. The discharge of extremely high volumes of water (e.g., hundreds of millions of liters per year) to the ditch and pond systems in the 200 Areas at Hanford resulted in creation of large groundwater elevation mounds beneath the site that, in turn, influenced groundwater flow gradients.

2.1.3 Solid Waste Management Practices

Solid waste disposal areas at Hanford range from engineered landfills to miscellaneous, shallow debris sites. No engineered landfills are in the 200-WA-1/200-BC-1 OUs. Miscellaneous, shallow debris sites in the 200 West Inner Area are addressed in the 200-WA-1/200-BC-1 OUs. These waste sites are laydown yards or general dumping areas that are known or suspected to contain nonliquid radioactive materials and potentially dangerous CERCLA waste (e.g., paint, batteries, creosote-treated wood poles, or lead-tipped bolts).

Airborne particulate waste was generated during facility operations and dispersed from facilities through unplanned releases (UPRs) or intentional releases from facility stacks, waste handling storage, or disposal facilities, and subsequently deposited on the ground surface. This airborne particulate waste includes fugitive dust and wind-blown particulates which may or may not contain radioactive or hazardous waste constituents.

2.1.4 Unplanned Releases in Waste Handling

Locations of UPRs of chemical and radiological materials are also designated as waste sites. Available information such as the release history, location, and quantities of chemicals released are documented in WIDS. This information is based primarily on historical operating records and descriptions of incident responses. Typical examples of UPR types in the 200 West Inner Area include the following:

- Waste transfer pipeline failure and discharges to the surface or subsurface.
- Contamination spread from a burial box in transit.
- Fire in a 200 West burial ground (landfill) that spread contamination in the vicinity of the PFP.
- Contaminated equipment being hauled to the 200 West burial ground from the T Plant that contaminated an area near the railroad tracks.
- Potentially contaminated surface soil that was eroded and transported by wind to an adjacent site.

UPRs vary substantially in magnitude, extent, and description. The overall effectiveness of UPR response actions has commonly not been well documented.

2.2 200-WA-1/200-BC-1 Operable Unit Waste Sites

The initial inventory of waste sites in the 200-WA-1 and 200-BC-1 OUs originated with Federal Facility Agreement and Consent Order Change Control Form Number M-15-09-02, signed October 2010. The number of waste sites is expected to change and will vary as the project proceeds through the CERCLA process; new waste sites may be discovered and added to 200-WA-1, and some waste sites may transfer between OUs.

A total of 174 waste sites were initially allocated to the 200-WA-1/200-BC-1 OUs in the TPA, Appendix C. To ensure that all waste sites in the 200 West Inner Area are included in a regulatory process, an evaluation of waste sites in the WIDS database was conducted. The results of this evaluation are presented in the following sections.

2.2.1 200 West Inner Area Geographical Evaluation

The 200 West Inner Area waste site evaluation had the following primary objectives:

- Account for all known CERCLA waste sites within the 200 West Inner Area.
- Detail the process and criteria used to determine whether a waste site belonged in the 200-WA-1/200-BC-1 RI/FS work plan.
- Provide documentation that is accountable, consistent, and understandable.
- Develop a list of waste sites for Tri-Party consideration in the 200-WA-1/200-BC-1 RI/FS work plan.

Waste sites in the 200 West Inner Area geographical boundary, as of March 18, 2010, and WIDS sites without coordinates, were assembled into the initial WIDS evaluation dataset. Eight hundred and six waste sites were identified (see Appendix A). Once identified, each waste site was evaluated using the process illustrated in Figure 2-1.

All waste sites were then mapped in QMAP. Of the 806 sites, 67 were incorporated into Outer Area OUs because the waste sites were within the Outer Area geography, or the waste sites were located on an Inner/Outer Area boundary line and had the potential for remediation to unrestricted land use as designated for the Outer Area. One site was identified as geographically in the 200-EA-1 OU.

Waste sites were reviewed to distribute the sites into their respective OUs, as specified in Appendices B or C of the Tri-Party Agreement Action Plan. In addition to 200-IS-1 OU waste sites assigned in Appendix B, most waste transfer component sites in the 200 West Inner Area are addressed in DOE/RL-2010-114, *200-IS-1 Operable Unit Pipeline System Waste Sites RFI/CMS and RI/FS Work Plan.* Waste site assignments outside of 200-WA-1/200-BC-1 OUs were confirmed with responsible parties.

The WIDS database waste site classification/reclassification status was investigated to verify and document that the waste sites meet classification criteria within WIDS of Not Accepted (Proposed), Rejected, No Action, Closed Out, Interim Closed Out, Consolidated, or Deleted. Waste sites that were classified/reclassified as Not Accepted/Not Accepted Proposed were reviewed by comparing the descriptions, the site type designations, and the physical locations. Appendix A of this work plan documents the findings of the review. Waste sites that were classified/reclassified were researched to identify that each met one of the following criteria:

- The WIDS site is a duplicate of or fully consolidated with another accepted WIDS site.
- As-left condition poses no threat to human health or the environment and does not require remediation, based on quantitative risk evaluation.
- No potential release or disposal of hazardous substances exists at the site.
- Visual indicators (staining or material) that warranted the initial evaluation as a WIDS site have been accurately characterized.

Waste sites that were classified/reclassified as No Action were reviewed for evidence of CERCLA constituents and to determine whether the No Action status was supported by the WIDS description. Waste sites that were classified/reclassified as Closed Out/Interim Closed Out were researched to determine whether the closure program was documented and to verify regulatory acceptance with a letter or other document in the Administrative Record. In addition, the regulatory program used for closure was reviewed to determine if it encompassed CERCLA constituents.

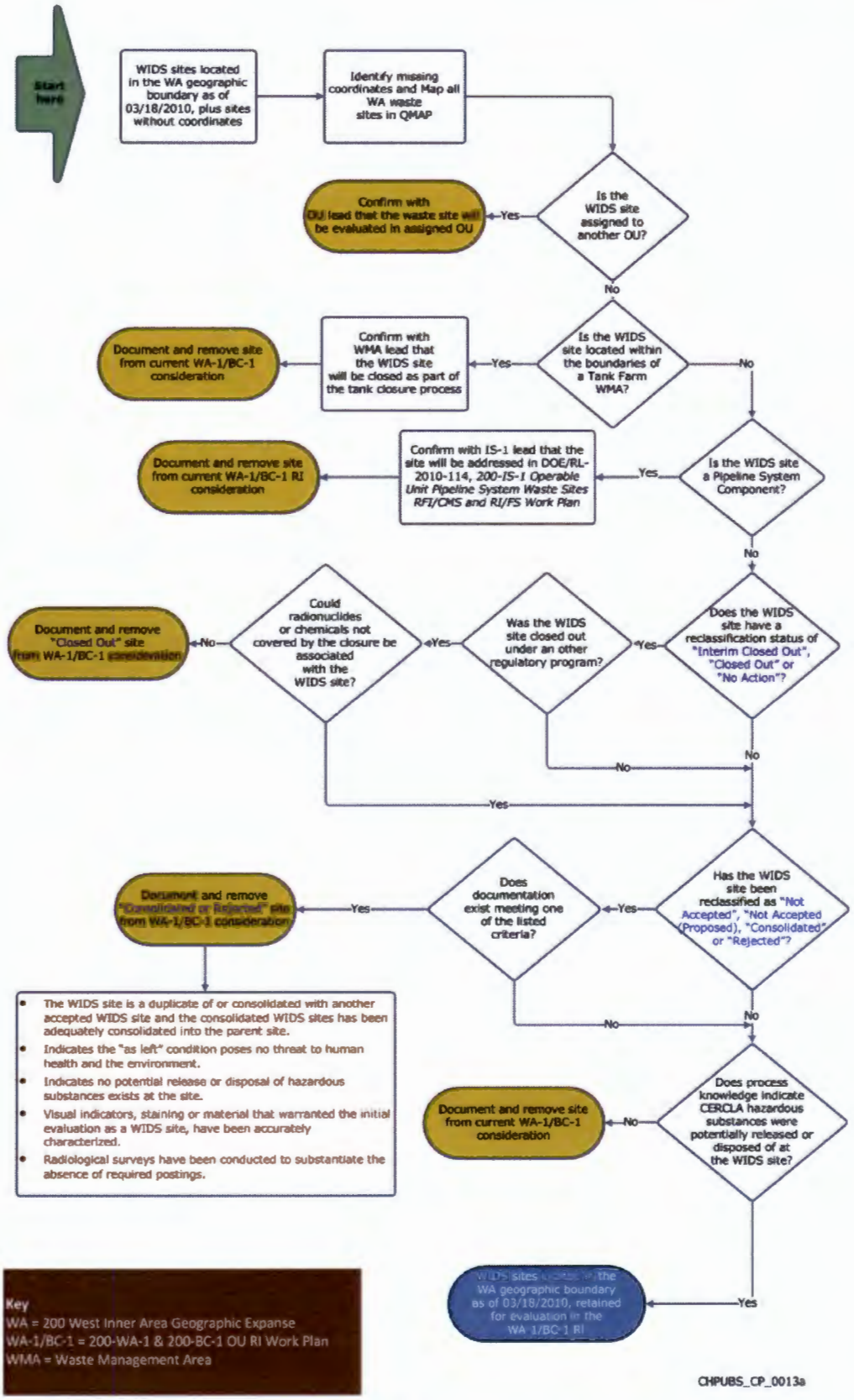


Figure 2-1. Process to Identify WIDS Sites to Be Evaluated in the Remedial Investigation Work Plan

Waste sites that were classified/reclassified as Consolidated or designated as Duplicate were reviewed. Sites were mapped in WIDS to ensure that the sites were collocated and that the full extent of contamination was captured by the Consolidated or Duplicate waste site.

The remaining sites were evaluated to determine if they met the definition of a CERCLA waste site. The following scenarios were evaluated:

- Is the waste site inactive?
- Does process knowledge indicate CERCLA hazardous substances were potentially released or disposed of at the WIDS site?
- Septic tanks with no potential for any waste stream except sanitary waste, and underground injection control (UIC) sites like roof drains without the potential of mixing with contaminated media, were removed from 200-WA-1/200-BC-1 OU RI/FS work plan consideration. These waste sites will be closed under the appropriate State of Washington programs.

During work plan preparation, 11 new sites were discovered in the 200 West Inner geographical area. These sites were submitted to the WIDS administrator as discovery sites and will be incorporated, if accepted, in accordance with the TPA-MP-14 process.

2.2.2 200 West Inner Area WIDS Evaluation Results

The distribution of waste sites in the 200 West Inner Area, as a result of the evaluation, is illustrated in Figure 2-2. WIDS evaluation results are summarized by waste site in Appendix A. Of the 806 waste sites, the majority of the sites are divided among 200-WA-1, tank farms, pipelines, or non-CERCLA sites. The largest remaining segments are divided between the 200-OA-1 and 200-BC-1 OUs. Waste sites in other 200 Inner Area OUs, the Environmental Restoration Disposal Facility (ERDF), and sites subject to closure under RCRA corrective action make up the smallest fraction of 200 West Inner Area waste sites.

2.2.2.1 Waste Sites Retained in 200-WA-1/200-BC-1 OUs

Waste sites retained for inclusion in the 200-WA-1/200-BC-1 RI/FS work plan are described in Table B-5 in Appendix B and illustrated on Map Plate C-1 in Appendix C. Waste site descriptions for each site retained in the 200-WA-1/200-BC-1 OUs are assembled in Appendix D. The waste site inventory in 200-WA-1 contains 129 waste sites, and the inventory in 200-BC-1 contains 27 waste sites. Waste site attributes of the retained waste sites are summarized in Table B-5 (Appendix B). Attributes include waste site type, closure zone, and plant geographical association.

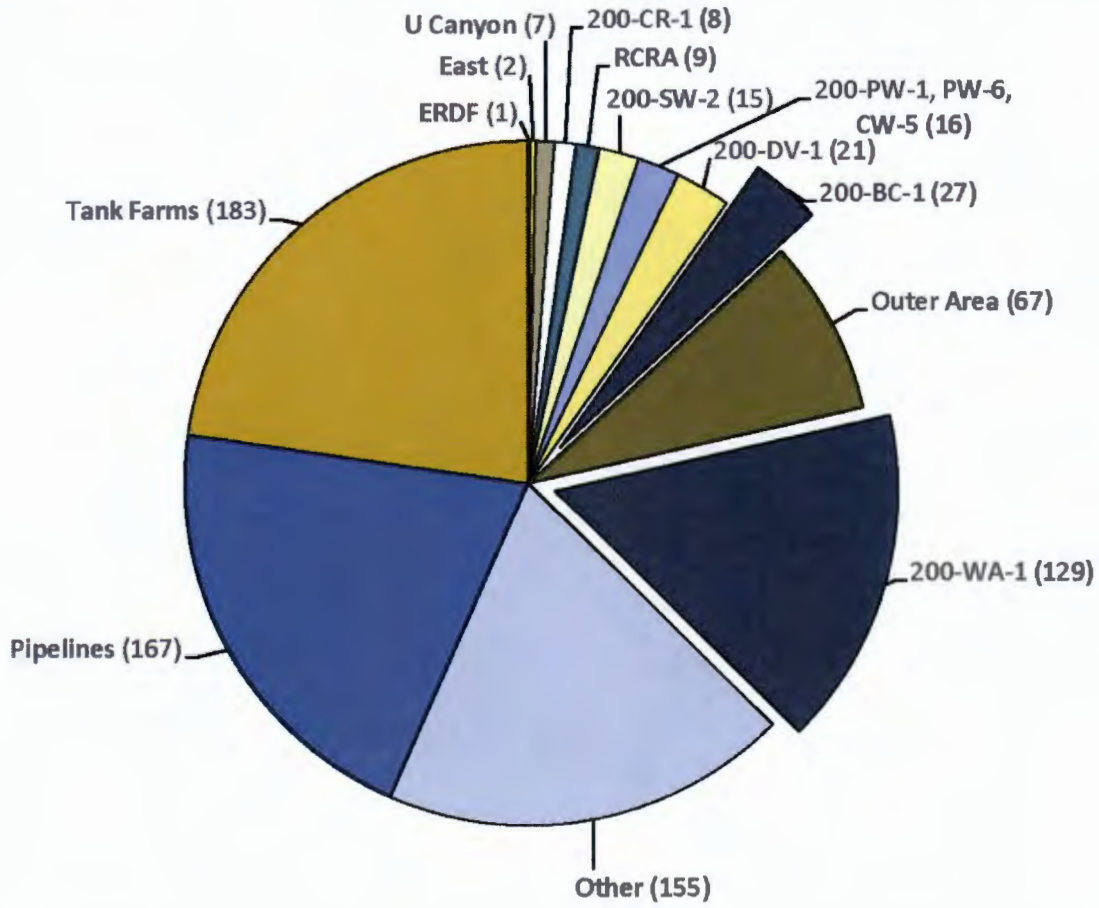
The TPA-MP-14 process will be followed to assign waste sites. A Tri-Party Agreement (Ecology et al., 1989a) change package will be prepared to update Appendix C of the Action Plan (Ecology et al., 1989b) to include the newly assigned waste sites.

Reclassification/recategorization packages are being created by WIDS administrators for regulatory agency consideration. TPA-MP-14, Revision 2, puts methods in place to administratively reclassify waste sites as being outside the scope of WIDS.

2.2.2.2 Waste Sites Proposed for Change Package Reassignment

Waste sites that are assigned to an OU in the C-09-07 change package, but have been subsequently identified for reassignment or removal from the specified OU, are summarized in Table 2-1. The physical locations of four unplanned release sites could not be identified through historic data review. These four sites have been proposed for WIDS reclassification consideration from the 200-WA-1 OU to Rejected.

Upon deactivation, sites that are currently active will follow the procedural steps for adding, updating, classifying and reclassifying sites, in accordance with TPA-MP-14, Revision 2.



- **Outer Area** Waste sites located along the Inner/outer area border assigned to an Outer Area OU; 200-OA-1 or 200-CW-1
- **200-WA-1** Waste sites in the 200 West Inner Area OU
- **Other** Sites do not currently meet CERCLA criteria. WIDS classifications include active, no action, rejected, closed out, discovery, consolidated, duplicate site, or not accepted/not accepted (proposed). Sites may become 200-WA-1 OU waste sites (eg accepted discovery sites or active waste sites, once closed).
- **Pipelines** Transfer pipeline system waste sites addressed in the DOE/RL-2010-114 Work Plan, including 200-IS-1 OU waste sites. Pipeline sites may be assigned to 200-WA-1 in the FS
- **Tank Farms** Tanks and ancillary equipment grouped into treatment, storage, and disposal facility groups.
- **ERDF** US Ecology Low Level Radioactive Waste Disposal Facility
- **East** 200 East Inner Area OU
- **U Canyon**
- **200-CR-1** REDOX Canyon OU
- **RCRA** Waste sites subject to closure under RCRA corrective action
- **200-SW-2** Burial Grounds OU
- **200-PW-1, PW-6, CW-5** Plutonium/Organic- Rich Group OUs
- **200 -DV-1** 200 Deep Vadose Zone OU
- **200-BC-1** 200 BC Cribs and Trenches OU

CHPUBS_CP_0014a

Figure 2-2. 200 West Inner Area WIDS Evaluation Results

Table 2-1. Proposed Changes to Operable Unit Assignments

Waste Site	Waste Site Type	OU Assignment	Proposed Reassignment	Rationale
200-E-114-PL	Pipeline release	200-WA-1	200 East	Location
200-W-109	French drain	200-WA-1	UIC Program[1]	No CERCLA constituents
200-W-111	French drain	200-WA-1	UIC Program	No CERCLA constituents
200-W-118	French drain	200-WA-1	UIC Program	No CERCLA constituents
200-W-55	Solid waste	200-WA-1		No CERCLA constituents
207-SL	Retention basin	200-WA-1		Active site
207-U	Retention basin	200-WA-1		Active site
216-S-14	Crib	DVZ	200-WA-1	Supplemental sampling scoped
216-Z-13	French drain	200-WA-1	UIC Program	No CERCLA constituents
216-Z-14	French drain	200-WA-1	UIC Program	No CERCLA constituents
216-Z-15	French drain	200-WA-1	UIC Program	No CERCLA constituents
2607-W3	Septic tank	200-WA-1		No CERCLA constituents
2607-W6	Septic tank	200-WA-1		Active site
2607-W9	Septic tank	200-WA-1		No CERCLA constituents
2607-Z	Septic tank	200-WA-1		No CERCLA constituents
UPR-200-W-165	UPR	200-WA-1		Site cannot be located
UPR-200-W-23	UPR	200-WA-1		Site cannot be located
UPR-200-W-44	UPR	200-WA-1		Site cannot be located
UPR-200-W-48	UPR	200-WA-1		Site cannot be located
UPR-200-W-82	UPR	IS-1	200-WA-1	Release not associated with pipeline component
UPR-200-W-20	UPR	IS-1	200-WA-1	Release not associated with pipeline component
UPR-200-W-76	UPR	IS-1	200-WA-1	Release not associated with pipeline component

Source: U.S. EPA website available at: http://water.epa.gov/type/groundwater/uic/index.cfm.

2.2.3 Planned Incorporation of Waste Sites into 200-WA-1/200-BC-1 OU

The waste site inventory in Table B-5 is subject to change as waste sites are transferred between OUs and as new waste sites are accepted. The waste site listing is expected to change throughout the CERCLA process as more information becomes available for specific sites.

[1] The UIC Program is responsible for regulating the construction, operation, permitting, and closure of injection wells that place fluids underground for storage or disposal.

2.2.3.1 Waste Sites to Be Incorporated into the RI/FS

In addition to the waste sites documented in Section 2.2.2, the 200 West Inner Area sites expected to be included in the 200-WA-1/200-BC-1 OU RI/FS include the following:

- Discovery waste sites that move into the Accepted WIDS Category
- Structures, following deactivation and decommissioning, if CERCLA constituents are detected after demolition (see detailed discussion in Section 2.2.3.2)
- Active sites that are closed and designated as waste sites
- Reclassified waste sites that move into the Accepted WIDS Category

The TPA-MP-14 process will be followed to assign waste sites. A Tri-Party Agreement (Ecology et al., 1989a) change package will be prepared to update Appendix C of the Action Plan (Ecology et al., 1989b) to include the newly assigned waste sites.

Waste sites that are either comparable to a waste site in the 200-WA-1/200-BC-1 RI/FS or have been adequately characterized can be incorporated into the RI/FS if received more than a year prior to the RI/FS Draft A transmittal deadline. Waste sites with data needs will be incorporated into the 200-WA-1/200-BC-1 RI/FS, depending on whether the data needs can be filled more than a year prior to the RI/FS Draft A transmittal deadline. The schedule of waste site incorporation into the RI/FS process is shown in Table 2-2.

Table 2-2. Incorporation of 200-WA-1/200-BC-1 Waste Sites into the CERCLA Process

Waste Site Description	Deadline	CERCLA Entry Point
Incoming waste sites without prior remedial investigation	2 years prior to Draft A due date	Remedial Investigation/Feasibility Study Baseline Risk Assessment
Incoming waste sites with prior remedial investigation	1.5 years prior to Draft A due date	Remedial Investigation/Feasibility Study Baseline Risk Assessment
Incoming waste sites (must be comparable to waste sites in 200-WA-1/200-BC-1 RI/FS or under prior investigation)	1 year prior to Draft A due date	Feasibility Study

2.2.3.2 Decontamination and Decommissioning Activities

Retired facilities, equipment, and waste disposal sites on the Central Plateau that are not RCRA units, or part of an OU, will be characterized as they are taken out of commission to determine potential hazards. A Facility Evaluation will be completed during the facility decommissioning process that will place each facility into one of the following categories:

- **Tier 1 facilities** are facilities historically designated as "Key" or other complex facilities that played a major role in Hanford's primary mission activities related to nuclear materials. Tier 1 facilities are generally large heavily shielded metal and concrete structures containing tanks, heavily shielded gloveboxes or hot cells, underground vaults, piping, etc., that are integral to the facility structure pose a threat of release of hazardous substances to the environment during disposition. Tier 1 facilities will be dispositioned under CERCLA as either a remedial action or a removal action, coordinated with closure of RCRA TSD units as needed.

- **Tier 2 facilities** are facilities not identified as Tier 1 that require a CERCLA response action. The disposition of Tier 2 facilities will be coordinated with closure of RCRA TSD units as needed.

- **Other facilities** not designated as Tier 1 or Tier 2. These facilities do not have a release or substantial threat of release of hazardous substances and will be dispositioned through the appropriate DOE processes.

Once DOE conducts the Facility Evaluation, the lead regulatory agency's concurrence with the designation of facilities as Tier 1 or Tier 2, and the selection of response actions for Tier 1 facilities will be obtained by approval of a change to the TPA, Appendix J, to be completed in accordance with Tri-Party Agreement, Section 12.0, *Changes to the Agreement*.

If the Facility Evaluation leads to the discovery of a new waste site, the discovery site will be entered into WIDS and evaluated in accordance with The TPA-MP-14 process. If the WIDS site is located in the 200 West Inner Area and is classified as "Accepted" or "Accepted (proposed)," then the waste site will be added into the 200-WA-1/200-BC-1 OU RI/FS, as appropriate.

2.2.3.3 Waste Sites to Be Incorporated Following the RI/FS

As the process of remediating 200-WA-1/200-BC-1 OUs progresses, new waste sites may discovered that were not included in this workplan. Additionally, currently identified waste sites may present unanticipated characteristics once design and implementation of remedial actions commence. When new sites are identified, they will be evaluated to determine whether they may be included within the scope of the actions required by the Record of Decision that follows this RI/FS as a non-significant change to the remedy, or whether an Explanation of Significant Difference or ROD amendment is required. DOE will consult with EPA to make this determination. The categories of sites that would be expected to be considered for inclusion/modification in the scope of the 200-WA-1/200-BC-1 OU would include:

- Known waste sites that may be reassigned from another OU

- Newly discovered waste sites

- Known waste sites where confirmatory sampling or characterization in support of remedial design indicates variations from the presumed CSM such that the selected alternative is no longer appropriate and a different alternative should be considered

In order to streamline the analysis of remedial alternatives in an ESD or ROD amendment, DOE intends to rely heavily on the analysis conducted in this document to develop and evaluate cleanup options for new sites. It is anticipated that the conceptual site models developed for various site types will be readily applied to sites to be added to the OU, or to be re-evaluated because of changed/newly discovered conditions. The benefit of this approach is that it builds upon previously conducted work and provides consistency in the alternatives evaluation process. This strategy would allow analyses and evaluations of remedial action alternatives identified in the 200-WA-1 RI/FS report and proposed plan to be rapidly developed for similar waste sites and facilitate the evaluation and remedy selection process in the appropriate CERCLA decision document.

During the RI/FS process, any additional waste sites within this OU will be evaluated during the development of remedial alternatives. If it is determined that remedial alternatives cannot be evaluated with the existing characterization data, then a supplemental Data Quality Objective (DQO) will be conducted with the EPA during the RI to collect the necessary data. This will occur prior to the remedy selection process.

2.3 Environmental Setting

This section describes the environmental setting for the Central Plateau's Inner Area. The description includes characteristics of surface and subsurface features and processes that are relevant to developing a preliminary understanding of contaminant distribution for each 200-WA-1/200-BC-1 OU waste site. This understanding provides the foundation for identifying data needs and investigation approaches to address specific data gaps.

2.3.1 Physiography and Topography

The Hanford Site lies within the Pasco Basin, as shown in Figure 2-3. 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. The elevation in the 200 West Inner Area ranges from approximately 221 m (725 ft) along the eastern part of the T Plant to around 197 m (647 ft) above mean sea level in the western part of U Plant and REDOX Plant. No natural surface water drainage channels are located within the area.

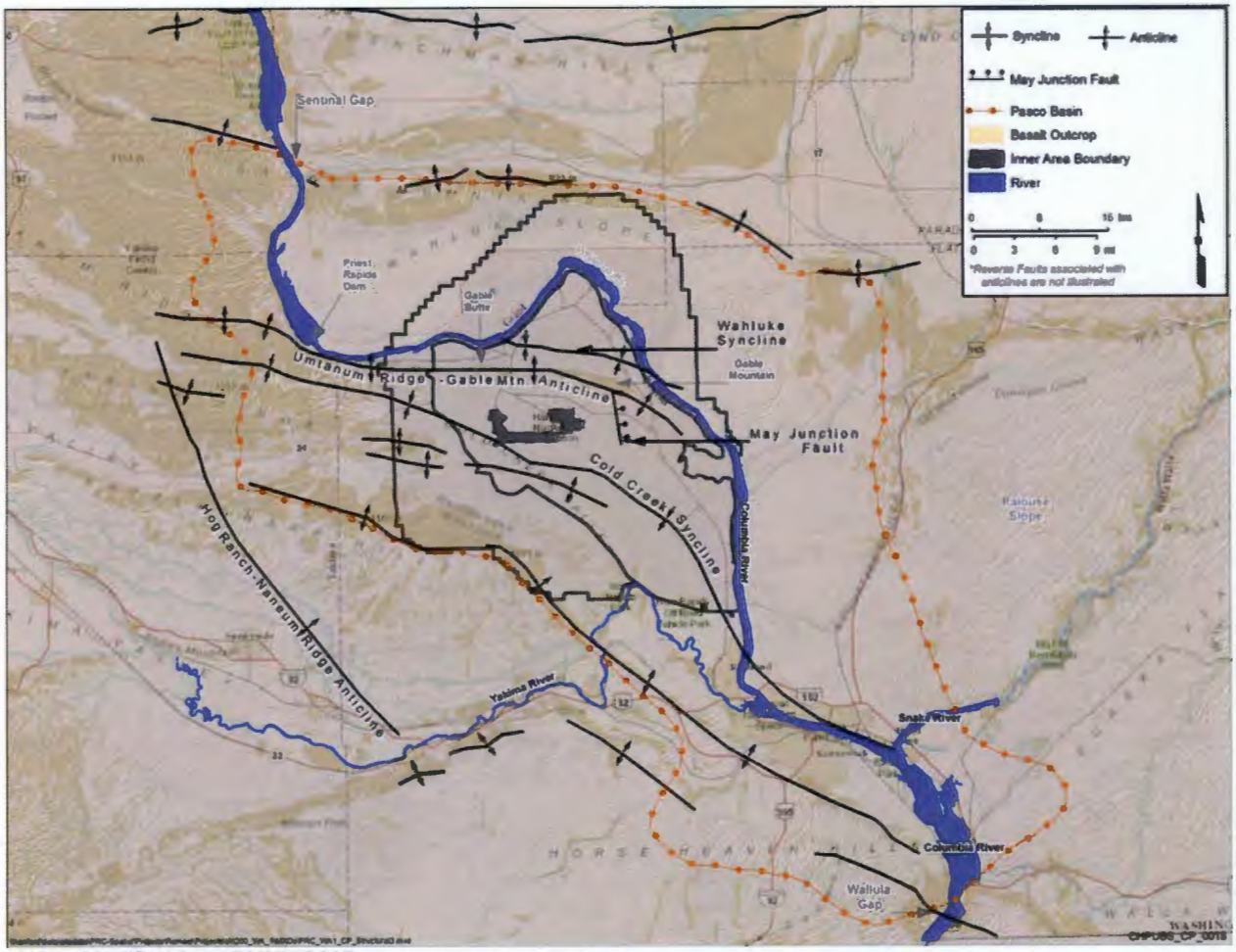
2.3.2 Climate and Meteorology

The Pacific Ocean moderates temperatures throughout the Pacific Northwest. The Cascade Range (located approximately 113 km [70 mi] west of the site) generates a rain shadow that limits rain and snowfall in the eastern half of Washington State. The Hanford Site is located within the driest part of that rain shadow. The Cascade Range also serves as a source of cold air drainage, which has a considerable effect on the site's wind regime. The Rocky Mountains to the north and east of the region shield the area from most of the severe winter storms and cold air masses that move south across Canada.

Climatological data for the Hanford Site are compiled at the Hanford Meteorological Station (HMS), which is located on the Central Plateau just outside the northeastern corner of the 200 West Area.

2.3.2.1 Wind

The Cascade Mountains have a considerable effect on the wind regime at the site by serving as a source of cold (more dense) air drainage. This orographic drainage results in a northwest to west-northwest prevailing wind direction. Summertime winds from the northwest frequently exceed 13 m/s (30 mi/h), although the fastest wind speeds at the HMS are usually associated with flow from the southwest. Monthly average wind speeds of 15.2 m (50 ft) above the ground were slower during the winter months, averaging 2.7 to 3.1 m/s (6 to 7 mi/h), and faster during the spring and summer months, averaging 3.6 to 4.0 m/s (8 to 9 mi/h). The maximum speed of the drainage winds (and their frequency of occurrence) tends to decrease as they move southeast across the site.



Note: Modified from PNNL-6415

Figure 2-3. Generalized Geologic Structure Map of the Pasco Basin

2.3.2.2 Temperature and Humidity

The average monthly temperatures at the HMS range from a low of -0.7°C (31°F) in January to a high of 24.7°C (76°F) in July, based on data collected from 1946 through 2004. Daily maximum temperatures at the HMS vary from an average of 2°C (35°F) in late December and early January to 36°C (96°F) in late July.

From mid-November through early March, the average daily minimum temperature is below freezing, with a daily minimum in late December and early January averaging -6°C (21°F). The annual average relative humidity at the HMS is 55 percent. It is highest during the winter months, averaging about 76 percent, and lowest during the summer, averaging about 36 percent.

2.3.2.3 Precipitation

Average annual precipitation at the HMS is 17cm (6.8 in.). Most precipitation occurs during the late autumn and winter months, with more than half of the annual amount occurring from November through February. Average snowfall ranges from 0.25 cm (0.1 in.) during October to a maximum of 13.2 cm (5.2 in.) during December, decreasing to 1.3 cm (0.5 in.) in March. Snowfall accounts for about 38 percent of all precipitation from December through February.

2.3.3 Geologic Setting

The geology of the Hanford Site has been extensively characterized through past investigation activities. The Inner Area of the Hanford Site is located in the central part of the Pasco Basin. Over the last 16 million years, the basin filled with materials that formed bedrock (i.e., volcanic lava flows) and unconsolidated sediments (e.g., silt, sand, gravel). Beneath the ground surface, major geologic units (from oldest to youngest) include the following: (1) the Elephant Mountain Member basalt of the Saddle Mountains Basalt Formation within the Columbia River Basalt Group, (2) the Ringold Formation, (3) the Cold Creek unit (CCU), (4) the Hanford formation, and (5) recent Holocene surficial deposits.

Previous studies containing geologic interpretations, related maps, and cross sections pertaining to the 200-WA-1/200-BC-1 OUs include the *200 West Aggregate Area Management Study Report* (AAMSR) (DOE/RL-92-16), the 200-UP-1 OU RI/FS Report, and the 200-PO-1 OU RI Report, which included cross sections from BHI-00184, *Miocene- to Pliocene-Aged Suprabasalt Sediments of the Hanford Site, South-Central Washington*. The updated hydrogeology is based on the revised hydrogeology of the 200 West Area (PNNL-13858, *Revised Hydrogeology for the Suprabasalt Aquifer System, 200-West Area and Vicinity, Hanford Site, Washington*).

Unconsolidated and partly consolidated fluvial (river-derived), lacustrine (lake), and cataclysmic flood sediments of the Miocene through Holocene ages (approximately 10.5 million years to the present) overlie the basalts. The 200-WA-1/200-BC-1 OU RI is expected to focus on these sedimentary units because they comprise the vadose zone and uppermost unconfined aquifer system within the OUs. Figure 2-4 presents a generalized stratigraphic column of the site.

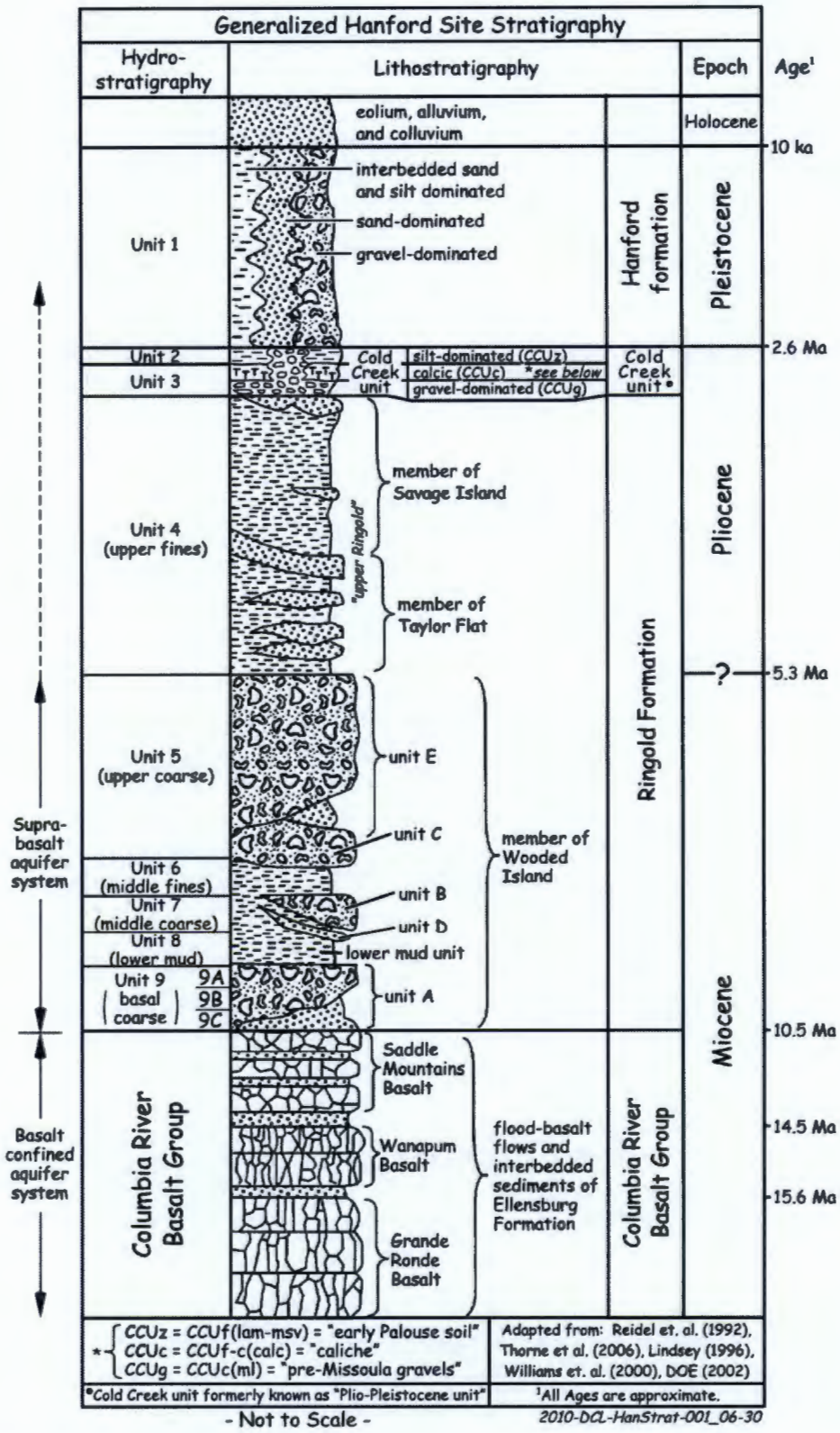
2.3.3.1 Columbia River Basalt

Basalt is an igneous rock ejected from the earth during volcanic events. The basalt flows of the Columbia River Basalt Group were deposited during Miocene time (23.7 to 10.5 million years ago) from source vents in southeastern Washington, northern Oregon, and western Idaho. These basalt flows form the basement rock for much of the overlying sedimentary deposits. Beneath the western portion of the Hanford Central Plateau, the youngest and uppermost basalts belong to the Saddle Mountains Basalt Formation (RHO-BWI-ST-4, *Geologic Studies of the Columbia Plateau: A Status Report*). The Saddle Mountains Basalt Formation is divided into the Ice Harbor, Elephant Mountain, Pomona, Esquatzel, Asotin, Wilbur Creek, and Umatilla Members. The Elephant Mountain Member is the uppermost basalt unit and is approximately 35 m (115 ft) thick beneath most of the Hanford Site, except in the vicinity of the 300 Area, where the overlying Ice Harbor Member is present and forms the top of the Saddle Mountains Basalt. The Rattlesnake Ridge interbed of the Ellensburg Formation is present between the Elephant Mountain Member and the underlying Pomona Member and comprises the uppermost basalt confined aquifer beneath the Central Plateau.

In the central portion of the Pasco Basin, the Ellensburg Formation interbed ranges from 1.5 to 15 m (5 to 50 ft) thick and is composed of clayey basalt conglomerates, fluvial floodplain deposits, and ash tuffs and tuffites (RHO-RE-ST-12P, *An Assessment of Aquifer Intercommunication in the B Pond-Gable Mountain Pond Area of the Hanford Site*).

Within the 200-WA-1/200-BC-1 OU, the basalt surface is interpreted as the basal hydrogeologic boundary for the overlying sedimentary aquifer system that has been affected by historic liquid effluent disposal practices.

Figure 2-4 shows the generalized stratigraphy and hydrogeologic nomenclature of the Central Plateau.



Note: Modified from PNNL-6515

Figure 2-4. Generalized Stratigraphic and Hydrostratigraphic Column for the 200 Area

The Ringold Formation is an unconsolidated to semiconsolidated sedimentary sequence deposited unconformably on the basalt. The Ringold Formation consists of an interstratified sequence of unconsolidated to semiconsolidated clay, silt, sand, and granule-to-cobble sized gravel deposited by the ancestral Columbia River (PNNL-12261, *Revised Hydrogeology for the Suprabasalt Aquifer System, 200-East Area and Vicinity, Hanford Site, Washington*; and PNNL-13858). The lower portion of the vadose zone in the 200-WA-1/200-BC-1 OUs, immediately above the water table, lies within the Ringold Formation.

Underlying the 200 West Area and vicinity are four distinct hydrostratigraphic units (HSUs) informally designated as Units 4, 5, 8, and 9. These units generally correspond to Lindsey's Ringold Formation upper unit (silt and sand), fluvial gravel unit E, the lower mud unit, and fluvial gravel unit A, respectively (PNNL-13858).

2.3.3.2 Cold Creek Unit

The CCU includes several post-Ringold Formation and pre-Hanford formation units beneath portions of the 200 East and West Areas (DOE/RL-2002-39, *Standardized Stratigraphic Nomenclature for Post-Ringold-Formation Sediments Within the Central Pasco Basin*). Three different formations of similar age comprise the CCU. These are a fine-textured silty deposit, a silt-to-gravel-sized unit that is variably cemented with calcium carbonate (caliche), and a compact gravel unit. The silty and carbonate-cemented units are found in the vadose zone in the western portion of the Central Plateau (including beneath 200-WA-1 OU). The compact gravel unit is found underlying the eastern portion of the Central Plateau, where it is typically encountered beneath the water table. The CCU is only present within the vadose zone beneath the 200 West Area where it is composed of fluvial (flood), eolian (wind deposited), and paleosol (old soil) deposits, which are divided into two separate units designated as the lower caliche unit (CCU_c) and the overlying silt unit (i.e., formerly "early Palouse soil") (CCU_z). The caliche layer formed during subareal exposure of the upper portions of the underlying sediment (e.g., Ringold Formation unit E or the Upper Ringold unit) and extended into overlying CCU_z sediment. The CCU_c deposit is composed of leached calcium carbonate that accumulated in available pore spaces between sediment grains (sand, silt, or gravel). The caliche forms a secondary mineral coating of cement that binds the sediment grains together, forming one or more hardpan layers. The stratigraphic location and amount of calcium carbonate cement are variable, therefore the physical properties of this unit vary from soil-like to rock-like.

The various CCU properties that affect the vadose zone in 200-WA-1 OU are important for two primary reasons: (1) the CCU generally exhibits much lower hydraulic conductivity than the overlying and underlying Hanford formation and Ringold Formation, and (2) the CCU exhibits much higher retention capacity for many contaminants of interest. The hydraulic properties of the CCU have historically resulted in accumulation and subsequent lateral spread of perched water (and associated contaminants) within the vadose zone atop this unit and beneath high volume discharge facilities (e.g., ditches, ponds, and cribs). The high contaminant retention capacity, a function of high ion exchange capacity (in the silty portion) and pH reactions (e.g. precipitation) due to the calcium carbonate (in the cemented portion), have historically resulted in accumulation and retention of certain contaminants. In addition to chemical reactions and exchange properties, the silty and carbonate-cemented elements of the CCU exhibit substantial water holding capacity. As a result, the vadose zone in some locations is expected to have retained substantial quantities of soluble contaminants within the soil water held by capillary forces in the CCU.

The CCU gravel (CCU_g), formerly known as the pre-Missoula Gravel, forms clast-supported, sandy pebble/cobble gravel that sharply truncates against the underlying Ringold Formation (HSU 4 or HSU 5) or basalt. This unit consists of post-Ringold deposits presumed to originate from the ancestral Columbia

River. This coarse-grained, generally permeable deposit exists only in the saturated zone (i.e., beneath the water table) within the 200-BC-1 OU. The CCU_g influences aquifer boundaries and groundwater/contaminant flow throughout the eastern portion of the Central Plateau.

2.3.3.3 Hanford Formation

The Hanford formation is the informal stratigraphic name given to the Pleistocene cataclysmic flood deposits in the Pasco Basin (DOE/RL-2002-39). The cataclysmic floodwaters eroded or reworked much of the pre-existing Ringold Formation and CCU sediment across the Gable Gap area and unconformably deposited the sediments at the Hanford formation. The floodwaters deposited a thick sand and gravel bar (Cold Creek Bar) that constitutes the Central Plateau. Remnant erosional channels, preserved during waning stages of the paleo-floods, remain visible north of the 200 Area in the vicinity of West Lake and the former Gable Mountain Pond.

The Hanford formation is important because it is the thickest geologic unit (comprising about half of the vadose zone thickness in the west and nearly all of the vadose zone thickness in the east) and lies directly beneath the waste sites that contaminants must pass through to reach the CCU and groundwater. The Hanford formation consists predominantly of unconsolidated sediments that range from boulder-size gravel to sand, silty sand, and silt. The sorting ranges from poorly sorted (for gravel facies) to well sorted (for fine sand and silt facies).

2.3.3.4 Holocene Surficial Deposits

Overlying the Hanford formation are recently deposited surficial deposits of eolian (windblown) silt and sand. Only about 6 percent of the Hanford Site has been disturbed or is actively used by DOE. These surficial materials within the 200 Area, and particularly those areas that constitute most of the 200-WA-1/200-BC-1 OUs, have been removed or reworked extensively by construction activities.

2.3.4 Hydrogeology

This section describes the hydrogeology of the Hanford Site with specific reference to the 200 Area.

2.3.4.1 Hydrostratigraphy

The HSUs of interest in the 200 Area include the following, in descending order: (1) recent surficial deposits and the Hanford formation, (2) the CCU (primary vadose zone perching horizons or perched groundwater zones within 200-WA-1 OU), (3) the Ringold Formation (unconfined in Unit E and Unit C gravels with semiconfined and confined water-bearing zones in Unit A gravels beneath the lower mud sequence), (4) the Elephant Mountain Basalt Member (confining horizon), and (5) the Rattlesnake Ridge interbed (a confined water-bearing zone). The hydrogeologic designations within the 200 Area were determined through examination of borehole logs and integration of these data with stratigraphic correlations from existing reports.

2.3.4.2 Vadose Zone

The thickness and stratigraphy of the vadose zone vary substantially between 200-WA-1 OU and 200-BC-1 OU. The vadose zone thickness ranges from about 55 m (180 ft) beneath the western portion of 200-WA-1 OU in the 200 West Area, to about 104 m (340 ft) in the vicinity of 200-BC-1 OU. Only the Hanford formation is continuous throughout the vadose zone in the 200 Area. The upper unit of the Ringold Formation and the CCU silt and carbonate units only occur in the vadose zone in the 200 West Area. The unconfined aquifer water table lies within the Ringold unit E in 200-WA-1 OU and within the Hanford formation in the vicinity of 200-BC-1 OU.

2.3.4.3 Uppermost Aquifer

The uppermost aquifer in the 200 Area occurs primarily within the sediments of the Ringold Formation and Hanford formation. In the 200 West Area, the uppermost aquifer is contained within the Ringold Formation and displays unconfined-to-locally confined or semiconfined conditions. The uppermost aquifer is unconfined at the water table in all locations within the 200-WA-1/200-BC-1 OUs. In the 200 East Area, the uppermost aquifer occurs in the Ringold Formation and Hanford formation.

The depth to groundwater in the uppermost aquifer underlying the 200 Area ranges from approximately 55 m (180 ft) beneath the former U Pond in the 200 West Area to approximately 104 m (340 ft) in the southwestern corner of the 200 East Area. The saturated thickness of the unconfined aquifer ranges from approximately 67 to 112 m (220 to 368 ft) in the 200 West Area. In the 200 East Area, the saturated thickness is as great as 61 m (200 ft) in the southern portion but absent in the northeastern portion where the aquifer thins and eventually terminates against the basalt located above the water table. The uppermost aquifer is important to the assessment of the 200-WA-1/200-BC-1 OUs because it is the first groundwater to be potentially affected by contaminants originating in the OU waste sites.

The water table elevation and (subsequently) the groundwater gradient within the uppermost aquifer underlying the 200-WA-1/200-BC-1 OUs have been historically altered by discharges of large quantities of wastewater to the vadose zone within the Central Plateau. Historically, large groundwater elevation mounds formed beneath 13 high-volume wastewater discharge sites. Although these large-volume discharges have been discontinued, the transient groundwater elevation mounds have not completely dissipated, particularly in the 200 West Area, where the aquifer occurs in the lower-hydraulic-conductivity deposits of the Ringold Formation. The groundwater elevation mounds historically present in the 200 East Area (i.e., those associated with B Pond and Gable Mountain Pond), where the water table is typically found within the Hanford formation, have generally dissipated.

2.3.5 Surface Water Hydrology

Primary surface water features associated with the Hanford Site are the Columbia and Yakima rivers and the Columbia's other major tributaries, the Snake and Walla Walla rivers. West Lake, about 4 ha (10 ac) in size and less than 0.9 m (3 ft) deep, is the only natural ephemeral lake within the Hanford Site (DOE/RW-0164). It is a playa formed by local discharge of groundwater.

The Columbia River flows through the northern and eastern margins of the Hanford Site. Routine water quality monitoring of the Columbia River is conducted by DOE for radiological and nonradiological parameters. This information has been compiled and reported by Pacific Northwest National Laboratory (PNNL) since 1973. Ecology has issued a Class A (excellent) quality designation for Columbia River water along the Hanford Reach, from Grand Coulee Dam through the Pasco Basin to McNary Dam. This designation requires that all industrial uses of this water be compatible with other uses, including drinking, wildlife habitat, and recreation. In general, the Columbia River water is characterized by a very low suspended load, a low nutrient content, and an absence of microbial contaminants (DOE/RW-0164, *Site Characterization Plan: Reference Repository Location, Hanford Site, Washington*).

Approximately one-third of the Hanford Site is drained by the Yakima River system. Cold Creek and its tributary, Dry Creek, are ephemeral streams on the Hanford Site that are within the Yakima River drainage system. Both streams drain areas along the western part of the Hanford Site and cross the southwestern part of the Hanford Site toward the Yakima River. Surface flow, which may occur during spring runoff or after heavier than normal precipitation, typically infiltrates and disappears into the surface sediments before reaching the Yakima River. Rattlesnake Springs, located on the western part of the Hanford Site, forms a small surface stream that flows for about 2.9 km (1.8 mi) before infiltrating into the ground.

2.3.6 Environmental Resources

Because of the long-standing management practices of DOE, most of the land on the Hanford Site is relatively undisturbed. Thus, the native terrestrial and aquatic ecological resources found on the Hanford Site are becoming increasingly rare and highly valuable as agricultural, industrial, and residential development continues to grow throughout the region.

The ecological setting has been characterized using a compilation of data from many biological inventories of plant and wildlife species and ecological characterizations from the following reports:

- The Nature Conservancy (TNC) of Washington sitewide Geographic Information System-based plant community mapping for all areas outside the facility boundaries and biodiversity surveys of mammals, birds, reptiles, amphibians, insects, and plants between 1994 and 1998. There are three annual reports (TNC, 1995, *Biodiversity Inventory and Analysis of the Hanford Site, 1994 Annual Report*; TNC, 1996, *Biodiversity Inventory and Analysis of the Hanford Site, 1995 Annual Report*; and TNC, 1998, *Biodiversity Inventory and Analysis of the Hanford Site, 1997 Annual Report*) and a final report in 1999 (TNC, 1999, *Biodiversity Inventory and Analysis of the Hanford Site, Final Report 1994-1999*).
- 200 Areas Ecological Data Compilation (PNNL-13230, *Hanford Site Environmental Report for Calendar Year 1999*; PNNL-13331, *Population Characteristics and Seasonal Movement Patterns of the Rattlesnake Hills Elk Herd—Status Report 2000*; PNNL-13487, *Hanford Site Environmental Report for Calendar Year 2000*; PNNL-13745, *Hanford Site Ecological Quality Profile*).
- Characterization of vegetative communities associated with the 200 Area facilities at the site (WHC-SD-EN-TI-216, *Vegetation Communities Associated with the 100-Area and 200-Area Facilities on the Hanford Site*).
- Vascular Plants of the Hanford Site (PNNL-13688, *Vascular Plants of the Hanford Site*).
- Hanford Biological Resource Management Plan (using TNC and other characterization reports), identifying four levels of habitat value and appropriate management strategies for the site (DOE/RL-96-32, *Hanford Site Biological Resources Management Plan*).

The Hanford Site is characterized as a cool desert or a shrub-steppe and supports a biological community typical of this environment. The Hanford Central Plateau contains a number of plant, mammal, bird, reptile, amphibian, and insect species as discussed in the following sections.

2.3.6.1 Vegetation of the 200 Areas Plateau

The vegetation of the 200 Areas Plateau is characterized by native shrub-steppe interspersed with large areas of disturbed ground with a dominant annual grass component. The native stands are classified as an *Artemisia tridentata/Poa sandbergii - Bromus tectorum* community (Rogers and Rickard, 1977, *Ecology of the 200 Area Plateau Waste Management Environs: A Status Report*), meaning that the dominant shrub is big sagebrush (*Artemisia tridentata*) and the understory is dominated by the native Sandberg's bluegrass (*Poa sandbergii*) and the introduced annual cheatgrass (*Bromus tectorum*). Other shrubs that are typically present include gray rabbitbrush (*Chrysothamnus nauseosus*), green rabbitbrush (*C. viscidiflorus*), spiny hopsage (*Grayia spinosa*), and occasional antelope bitterbrush (*Purshia tridentata*). Other native bunchgrasses that are typically present include bottlebrush squirreltail (*Sitanion hystrix*), Indian ricegrass (*Achnatherum hymenoides*), needle-and-thread (*Stipa comata*), and prairie junegrass (*Koeleria cristata*). Common and important herbaceous species include turpentine cymopteris (*Cymopteris terebinthinus*), globemallow (*Sphaeralcea munroana*), balsamroot (*Balsamorhiza careyana*), several milk vetch species (*Astragalus caricinus*, *A. sclerocarpus*, *A. succumbens*), long-leaf phlox (*Phlox*

longifolia), the common yarrow (*Achillea millifolium*), pale evening-primrose (*Oenothera pallida*), thread-leaf phacelia (*Phacelia linearis*), and several daisy/fleabane species (e.g. *Erigeron poliospermus*, *E. Filifolius*, and *E. pumilus*). In all, more than 100 plant species have been documented to occur in native stands on the 200 Area Plateau.

Disturbed communities on the 200 Area Plateau are primarily the result of mechanical disturbance or range fires. Mechanical disturbance such as construction activities, soil borrow areas, road clearings, and fire breaks result in drastic changes to the plant community and surface soil. These types of disturbance usually entail a complete loss of soil structure and total disruption of nutrient cycling. The principal colonizers of mechanically disturbed areas are the annual weeds of cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola kali*), Jim Hill mustard (*Sisymbrium altissimum*), and bur-ragweed (*Ambrosia acanthicarpa*). If no further disturbance occurs, the areas will eventually become dominated by cheatgrass. All of these annual weeds are occasionally found in native stands but only at relatively low frequencies.

Range fires also have dramatic effects on the overall ecosystem, the most obvious being the complete removal of sagebrush from the community and the rapid increase in cheatgrass coverage. Sagebrush is unable to resprout from rootstocks after being burned, unlike the native grasses, other important shrubs, and many of the perennial herbaceous species. Therefore, there is no dominant shrub component in burned areas until sagebrush is able to become re-established from seed. Burning also opens the community to the invasion of cheatgrass, which is capable of quickly using the nutrients that are released through burning. The extensive cover of cheatgrass may then prevent the re-establishment of many of the native species, including sagebrush. The species richness in formerly burned areas is usually much lower than in native stands, often consisting of only cheatgrass, Sandberg's bluegrass, Russian thistle, and Jim Hill mustard, with very few other species.

The vegetation in and around the ponds and ditches on the 200 Area Plateau is significantly different from that of the surrounding dry land areas. Several tree species are present, especially cottonwood (*Populus trichocarpa*) and willows (*Salix* spp.). Wetland species are also present, including several sedges (*Carex* spp.), bulrushes (*Scirpus* spp.), cattails (*Typha latifolia* and *T. angustifolia*), and pond weeds (*Potamogeton* spp.).

2.3.6.2 Mammals

The largest mammal living on the 200 Area Plateau is the mule deer (*Odocoileus hemionus*). Although mule deer are much more common to riparian sites along the Columbia River, they are frequently observed foraging throughout the 200 Area. Elk (*Cervus elaphus*) also occur at Hanford. They are occasionally seen on the 200 Area Plateau. Other mammal species common to the 200 Area include badgers (*Taxidea taxus*), coyotes (*Canis latrans*), blacktail jackrabbits (*Lepus californicus*), Townsend ground squirrels (*Spermophilus townsendii*), Great Basin pocket mice (*Perognathus parvus*), pocket gophers (*Thomomys talpoides*), and deer mice (*Peromyscus maniculatus*). Badgers are known for their digging capability and have been implicated several times for tunneling into inactive burial grounds throughout the 200 Area. Most badger excavations in the 200 Area are a result of badgers searching for prey (mice and ground squirrels). Coyotes are the principal predators, consuming such prey as rodents, insects, rabbits, birds, snakes, and lizards. The Great Basin pocket mouse is the most abundant small mammal, which thrives in sandy soils and lives entirely on seeds from native and revegetated plant species. Townsend ground squirrels are not abundant in the 200 Area, but they have been seen at several different sites.

Other small mammals that live in low numbers include the western harvest mouse (*Reithrodontomys megalotis*) and the grasshopper mouse (*Onychomys leucogaster*). Mammals associated more closely with buildings and facilities include Nuttall's cottontails (*Sylvilagus nuttallii*), house mice (*Mus musculus*),

Norway rats (*Rattus norvegicus*), and some bat species. Bats probably play a minor role in the 200 Area ecosystem, but no documentation is available on bat populations at Hanford. Mammals such as skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), weasels (*Mustela* spp.), porcupines (*Erethizon dorsatum*), and bobcats (*Lynx rufus*) have only been observed on very few occasions.

2.3.6.3 Birds

More than 235 species of birds have been documented to occur at the Hanford Site (WHC-EP-0402, *Status of Birds at the Hanford Site in Southeastern Washington*). At least 100 of these species have been observed in the 200 Area. The most common passerine birds include starlings (*Sturnus vulgaris*), horned larks (*Ermophila alpestris*), meadowlarks (*Sturnella neglecta*), western kingbirds (*Tyranus verticalis*), rock doves (*Columba livia*), barn swallows (*Hirundo rustica*), cliff swallows (*Hirundo pyrrhonota*), black-billed magpies (*Pica pica*), and ravens (*Corvus corax*). Common raptors include the northern harrier (*Circus cyaneus*), American kestrel (*Falco sparvarius*), and red-tailed hawk (*Buteo jamaicensis*). Swainson's hawks (*Buteo swainsoni*) sometimes nest in the trees at some of the army bunker sites used in the 1940s. Golden eagles (*Aquila chrysaetos*) are observed infrequently. Burrowing owls (*Athene cunicularia*) nest at several locations throughout the 200 Area. The most common upland game birds found in the 200 Area are California quail (*Callipepla californica*) and Chukar partridge (*Alectoris chukar*); however, ring-necked pheasants (*Phasianus colchicus*) and gray partridges (*Perdix perdix*) may be found in limited numbers. The only native game bird common to the 200 Area Plateau is the mourning dove (*Zenaida macroura*), which migrates south each fall. Other species of note that nest in undisturbed sagebrush habitats in the 200 Area include sage sparrows (*Amphispiza belli*) and loggerhead shrikes (*Lanius ludovicianus*). Long-billed curlews (*Numenius americanus*) also use the sagebrush areas and revegetated burial grounds for nesting and foraging.

Waterfowl and aquatic birds formerly inhabited 216-B-3 Pond, 216-U-10 Pond, and other areas with running or standing water. However, these areas have been removed through stabilization and remedial action cleanup activities. No substantial bodies of open water remain in the 200 Area.

2.3.6.4 Reptiles and Amphibians

Common reptiles include gopher snakes (*Pituophis melanoleucus*) and sideblotched lizards (*Uta stansburiana*). Other reptiles and amphibians that are infrequently observed include sagebrush lizards (*Sceloporus graciosus*), horned toads (*Phrynosoma douglassii*), western spadefoot toads (*Scaphiopus intermontana*), yellow-bellied racers (*Coluber constrictor*), Pacific rattlesnakes (*Crotalus viridis*), and striped whipsnakes (*Masticophis taeniatus*). Both lizards and snakes are prey items of mammalian and avian predators.

2.3.6.5 Insects

Hundreds of insect species inhabit the 200 Area. Two of the most common groups of insects include several species of darkling beetles and grasshoppers. Harvester ants are also common and have been implicated in the uptake of radionuclides from some of the burial grounds in the 200 East Area. Harvester ants can excavate and bring up material from as far down as 5 to 6 m (15 to 20 ft). Other major groups of insects include bees, butterflies, and scarab beetles. Insects affect the surrounding plant community and serve as the prey base for many species of birds, reptiles, and mammals.

2.3.7 Human and Cultural Resources

Comprehensive descriptions of cultural, archaeological, and historical resources associated with the Hanford Site are presented in PNNL-6415 (*Hanford Site Environmental Policy Act (NEPA) Characterization*) as are descriptions of the socioeconomics, visual resources, and other resources related to human activities (PNNL-6415).

3 Initial Evaluation

The initial evaluation of 200-WA-1/200-BC-1 OUs builds on the operational history and environmental setting to describe what is known, or can be inferred about waste sites, for the purpose of making cleanup decisions. The descriptions integrate relevant site information including contaminants, physical structures, future land use, and potential exposure pathways. Evaluation results create a basis on which to predict the nature and extent of environmental impacts, assess exposure to environmental risks, and develop strategies to reduce risk. The initial evaluations and site descriptions generated in Chapter 3 will be used to identify key additional data needs presented in Chapter 4.

3.1 Contaminant Sources Based on Process History and Process Knowledge

Environmental impacts in the 200 West Inner Area are primarily the result of facility processes, waste disposal practices, and unplanned releases. The process chemistry and waste-generating operations at these facilities were evaluated to identify the primary contaminant source contributors and release locations.

3.1.1 Primary Contaminant Sources

Liquid effluent, solid wastes, and airborne particulates that were discharged to the environment during facility operations are the primary contaminant sources in the 200 West Inner Area. At other locations, waste sites were created by the windblown erosion and transport of particulate matter from a waste management facility (e.g., tank farm) to an adjacent area. The waste sites within the 200-WA-1/200-BC-1 OUs exhibit a variety of primary waste sources and release mechanisms. The following general categories of primary contaminant sources are associated with the 200-WA-1/200-BC-1 OU waste sites:

- Liquid process wastes were generated during facility operations and released to the environment either intentionally (e.g., to engineered structures such as cribs or trenches) or during UPRs via spills or leaks from tanks, pipelines, or other storage or conveyance components. Process wastes may be aqueous or nonaqueous but are generally identified as exhibiting relatively high concentrations of known process-related contaminants (e.g., radionuclides or chemicals). This source category includes wastes that were initially sent to the tank farms and later decanted with the decanted liquid diverted to a vadose zone engineered structure.

- Process wastewater was generated during facility operations and released to the environment either intentionally (e.g., to cribs, trenches, ponds, and ditches) or during UPRs via spills or leaks from tanks, pipelines, or other storage or conveyance components. Process wastewater generally consisted of aqueous liquids that contain nominal or no apparent radionuclides and variable concentrations of chemical constituents. Examples of process waste water include non-contact cooling water, steam condensate, wash water from housekeeping in uncontaminated facilities, and sanitary waste water. Some process wastewater streams (e.g., process cooling water and steam condensate from process heat exchangers) were subject to contamination in the event of plant upset conditions. These streams may also contain constituents such as corrosion control chemicals that were added to the water as part of normal use. Process wastewater was generated and discharged to the environment in small (hundreds of thousands of liters) to very large (billions of liters) quantities at various locations within and adjacent to the 200-WA-1/200-BC-1 OUs. Sanitary wastewater was generated during historical and ongoing plant operations and typically discharged to the vadose zone via sanitary sewerage systems that included septic tanks and drain fields. The septic system sizes and the volume of sanitary wastewater that was received varied by location and number of employees present at each facility. Normally, septic systems handled only sanitary waste from bathrooms/showers, etc., but some were connected to floor drains that potentially received radiological and/or chemical contaminants.

- Solid wastes were generated during facility operations and placed in informal disposal sites, designated landfills, and burial grounds. Solid waste may have included solid chemical or process waste, contaminated equipment and hardware, and nonhazardous materials.
- Airborne particulate waste was generated during facility operations and dispersed from facilities through UPRs or intentional releases from facility stacks, waste handling storage, or disposal facilities, and subsequently deposited on the ground surface. This airborne particulate waste includes fugitive dust and wind-blown particulates.

Some waste sites received more than one type of primary source material.

3.1.2 Secondary Sources of Contamination

Secondary sources of contamination develop as a result of the release of primary contaminant source materials to the environment. The secondary release may contribute to ongoing or future contaminant release, transport, and exposure, away from the initial point of release of the primary sources. For the 200-WA-1/200-BC-1 OU waste sites, the following general types of secondary sources, associated with vadose zone soil, have been identified:

- Contaminated surface soil contact by equipment, personnel, vegetation, or wildlife; plant uptake or animal intake with subsequent distribution of contaminants; fugitive dust generated by wind
- Mobile contaminants within the vadose zone that may be leached and transported deeper into the vadose zone and possibly to groundwater by downward migration
- Contaminated subsurface soil disturbance and redistribution during excavation, construction, or other intrusive activity

The identification and assessment of secondary sources is an important element in the assessment of risks posed by site conditions, and the development and evaluation of remedial action alternatives. At the 200-WA-1/200-BC-1 OU waste sites, secondary sources related to residual mobile contaminants within the vadose zone are particularly important to the assessment of the potential future threat to groundwater.

3.2 Previous Investigations, Monitoring, and Remediation Activities

A substantial volume of information on 200-WA-1/200-BC-1 waste site conditions has been amassed over the life of investigations conducted at Hanford. The data reviewed in preparation of this work plan are organized by waste site and an index of the information is included in Appendix E.

3.2.1 Evaluation of Existing Data

Data pertaining to 200-WA-1/200-BC-1 exist in a variety of forms and are evaluated as follows:

- Identification of data sources
- Identification of data types
- Compilation and organization of data by waste site
- Data quality assessment (DQA)

3.2.1.1 Identification of Data Sources

The overall data assessment strategy integrates information on waste site design and process operations history, with information obtained from previous, ongoing, and planned investigations, or prior remedy decisions, to build a dataset that supports final remedial action decision making. To support this strategy, the following data reference sources were queried for 200-WA-1/200-BC-1 OU waste site information:

- Hanford Well Information System (HWIS)—A web-based interface that provides access to well information for the Hanford Site. HWIS is not a database but an interface to the Integrated Document Management System (IDMS), containing well history information such as drilling dates, construction dates, decommissioning status, survey information, well activity information (e.g., sampling and maintenance), construction details, and borehole and well records (e.g., as-builts, geologic logs, etc.).
- Hanford Environmental Information System (HEIS)—The official data repository for Hanford environmental data. It contains a variety of chemical and physical data for various sample media that include water and soil samples. Analytical data from these waste sites, generated through a selected data capture date (March 18, 2010), comprise the dataset that is subject to initial evaluation in this work plan.
- HEIS Geophysical Logging (GPL)—Hanford-specific database containing electronic geophysical logging data.
- Sampling and analysis results for environmental characterization or waste designation samples available in HEIS.
- Automated Water Level Network—Hanford-specific database containing water level measurements for onsite groundwater monitoring wells.
- Effluent Volumes and Discharges—Hanford-specific database that contains information on the effluent volumes released to the soil disposal sites in the Central Plateau (200 Area).
- Historic reports and information, including technical reports available from the IDMS, Administrative Record, Public Information Repository, and declassified documents; waste site figures and engineering drawings (as-built drawings were used to verify site location and construction of engineered features and dimensions, where available; design drawings were also used if as-built drawings were not available). Many studies and evaluations of waste sites, waste sources, and response actions have been published. These documents include the technical manuals for major operating facilities at Hanford.
- Hanford Soil Inventory Model (SIM)---Hanford-specific model that quantifies contaminant inventories and uncertainties for waste sites based on approximately 50 years of process knowledge.
- Routine environmental monitoring activities and site-specific and Hanford Site-wide groundwater monitoring reports.
- The Hanford WIDS database contains the history and status of individual waste sites at Hanford. Files may contain photographs, maps, and selected reference documents, either extracted pages or the entire document associated with the waste site.
- Remote imagery and data including aerial photos, Light Detection and Ranging data and aerial radiological surveys
- Extrapolation or inference of subsurface geologic conditions and contaminant distribution measured at representative waste sites to nearby, or operationally similar, waste sites that have not been investigated.

3.2.1.2 Compilation and Organization of Data

After the available data were assembled, the information was scanned and compiled by waste site into the 200-WA-1/200-BC-1 OU Waste Site Library. Data files containing information reviewed for each waste site are compiled in site-specific folders for the 200-WA-1/200-BC-1 OU waste sites and included

electronically as Appendix E. Table B-6 is a summary of 200-WA-1/200-BC-1 OU waste sites with direct analytical data or site-specific geophysical survey data organized by geographical area.

3.2.1.3 Data Quality Assessment

Because waste site information comes from a broad range of sources and time periods, a preliminary DQA was performed to determine the extent to which existing data provided representative measurements of specific site conditions. Figure 3-1 shows the DQA process followed. The most rigorous level of DQA was performed on older laboratory analytical data. Recent samples were collected in accordance with CERCLA SAPs, and their accompanying quality assurance projects plans (QAPjP), and were subsequently subjected to a less rigorous usability assessment. For these contemporary data, the DQA was conducted in accordance with the data quality objectives (DQOs) described in the SAP and QAPjP.

Data for which DQAs have already been performed were accepted as reported, and no additional data review was performed, unless specific data quality issues were discovered during the data needs assessment.

A majority of the data was deemed usable for the 200-WA-1/200-BC-1 OU RI/FS preliminary conceptual exposure model (CEM) development and data needs assessment.

3.2.1.4 Existing Soil Sampling and Analysis Data

The highest quality data for defining the nature and extent of residual contaminant concentrations in vadose zone soil are obtained from laboratory analysis of soil samples collected at multiple depths within or beneath the waste site footprint. Collection of representative subsurface soil samples from waste disposal sites can be complicated by anisotropic (nonuniform) movement of wastewater within the vadose zone soil. As a result, a clear understanding of vadose zone lithology (the primary influence of anisotropic wastewater movement) is critical to accurate interpretation of analytical data.

3.2.1.5 Existing Geophysical Survey Measurement Data

Varieties of geophysical survey measurement techniques have been applied to the waste sites in the 200-WA-1/200-BC-1 OUs. These are divided into two general categories: (1) surface geophysical techniques that are applied at or above (in the case on airborne radiation surveys) the ground surface, and (2) down-hole geophysical techniques that are applied to boreholes and provide depth profile information.

The following techniques provided information for this RI/FS work plan:

- Aerial gamma radiation surveys were conducted using helicopter-based sensors. These measurements provide a wide-area identification and assessment of significant sources of gamma radiation and some quantification of specific nuclides that account for the radiation observed. Two aerial survey reports were reviewed during preparation of this work plan: DOE-0335, *An Aerial Radiological Survey of the Hanford Reservation Richland Washington: Date of Survey: February 29 to March 21, 1996*; and EGG-1183-1661, *An Aerial Radiological Survey of the U.S. Energy Research and Development Administration's Hanford Reservation (Survey Period: 1973-1974)*.Surface soil electrical resistivity surveys were conducted at several locations. The most notable application of this technology was at the 200-BC-1 OU Cribs and Trenches, where a broad area was surveyed and selected locations subsequently examined by sampling and analysis of vadose samples collected from optimally located boreholes (PNNL-17821, *Electrical Resistivity Correlation to Vadose Zone Sediment and Pore-Water Composition for the BC Cribs and Trenches Area*, 2009). A soil resistivity survey was also conducted at 216-U-8 and 216-U-12 Crib locations in 2010.

- Down-hole radiation measurements were obtained, including gross gamma logs using scintillation counting equipment. More recently, down-hole spectral gamma measurements provided a quantitative measurement of gamma-emitting radionuclides (predominantly uranium, cobalt-60 and cesium-137) in subsurface soil.
- Neutron moisture determinations were made that provide quantitative estimates of soil moisture content in the subsurface. Passive neutron measurements provided gross detection of neutrons emitted by spontaneous fission of some TRU radionuclides in the subsurface soil.

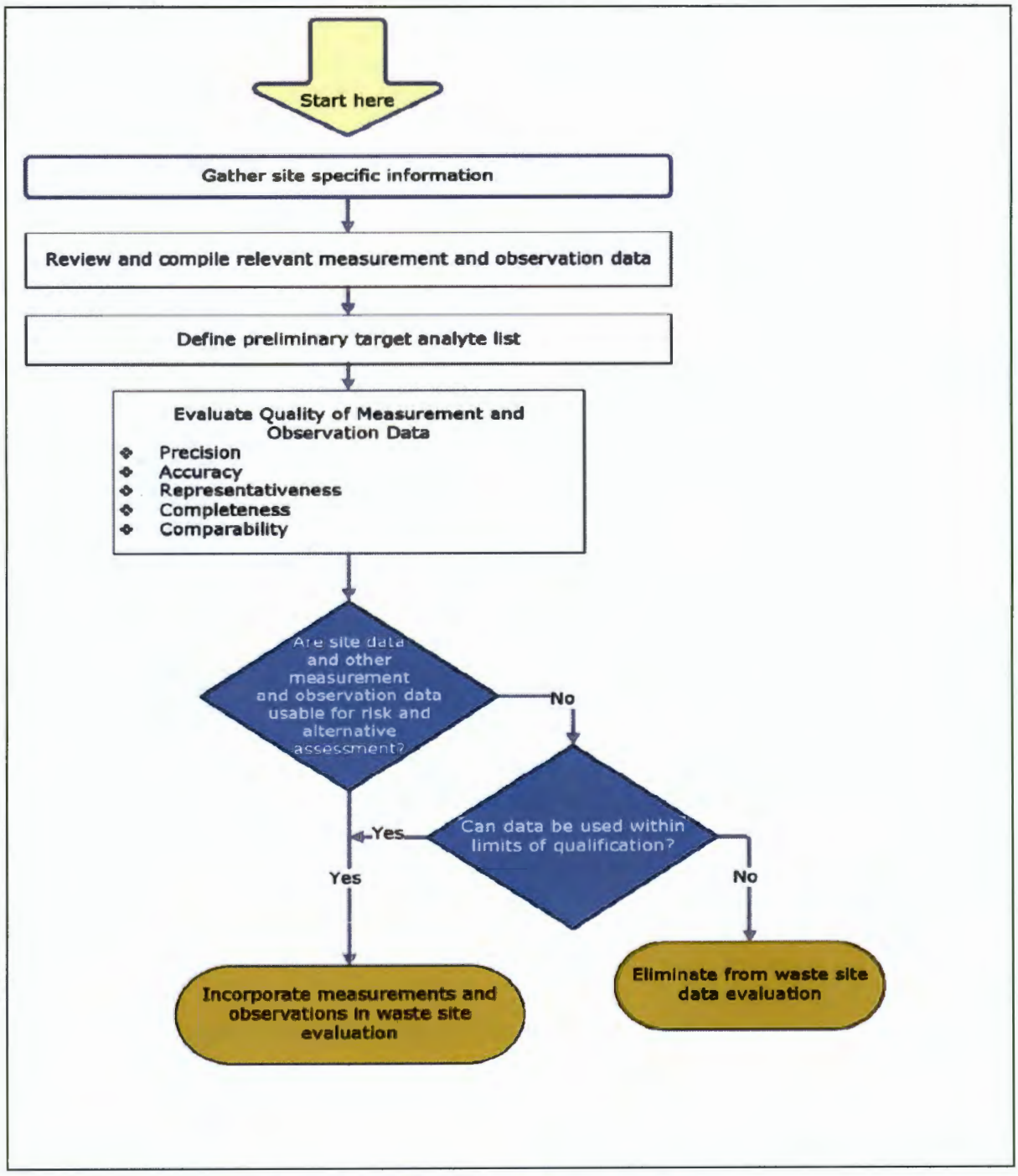


Figure 3-1. Data Quality Assessment Flow Chart

3.2.1.6 Evaluation of Existing Indirect Measurements to Support Vadose Contamination Assessment

Indirect data gathered for the 200-WA-1/200-BC-1 OU waste sites include radiation surveys that measure gross radiation conditions, civil surveys that provide waste site elevation and location information, and measurements and observations collected during spill or release response activities in the past. Historical photographs provide another element of indirect data by providing visible indication of site conditions.

3.2.2 Concurrent 200 West Inner Area Data Collection

In addition to existing historical investigations, contemporary environmental investigations have been planned for selected waste sites and are in various stages of implementation. The results of these investigations will be incorporated into the 200-WA-1/200-BC-1 OU RI/FS report. These current investigations include the following:

- Supplemental RI of selected waste sites in the 200 Area that will generate site-specific characterization information (DOE/RL-2007-02, Rev. 0, Vol. II)
- Vadose characterization of 216-U-8 and 216-U-12 Cribs
- MG-1 OU SAP

Existing data have been incorporated into the preliminary understanding of contaminant distribution presented in the following sections. The relevant results from independently scoped characterization activities will be integrated into the 200-WA-1/200-BC-1 RI/FS report.

3.3 Preliminary Understanding of the Nature and Extent of Contamination

This section describes the current understanding of the nature (type of contamination, including contaminants of interest and chemical and physical properties) and the extent of contamination (spatial distribution) as it currently exists in the OUs. The nature and extent of contamination are evaluated on a site-by-site basis to support assessment of potential risks, support initial identification and evaluation of potential remedial alternatives for each waste site, and to identify data needs.

3.3.1 Descriptions of 200-WA-1/200-BC-1 Site-Specific Contamination Conditions

The waste sites within the 200-WA-1/200-BC-1 OUs exhibit a variety of design, primary waste source, waste volume, and waste release scenarios. The waste sites range from those suspected of exhibiting low concentrations, to others having shallow contamination within small discrete areas, to waste sites that received large volumes of liquid effluent that migrated vertically downward through the soil column to groundwater.

An overview of waste site contamination conditions was developed based on the measurements and observation data sources described in the preceding sections. To simplify the discussion and presentation of waste site contaminant distribution within the 200-WA-1/200-BC-1 OUs, the waste sites were grouped by site type. The waste site groupings and their characteristics, including apparent contamination distribution, are presented by geography in the following sections.

The preliminary contaminants of potential concern (PCOPCs) include a broad range of radionuclide constituents as well as chemical constituents that include metals, other inorganics and organic cations, volatile organics, and semi-volatile organics. Details on the contaminants associated with each of the respective waste site groupings is provided in Appendix B. Additionally, the Waste Site Descriptions in Appendix D include information on potential contaminants for each waste site in Appendix D. Also, the

Data Needs Assessment Checklists in Appendix H offers summary-level information on existing characterization data for each waste site.

3.3.1.1 BC Cribs and Trenches

Waste sites at BC Cribs and Trenches that comprise the 200-BC-1 OU are shown in Figure 3-2 and were previously evaluated in DOE/RL-2000-38. These waste sites are further separated into discrete groups based on waste site configuration, primary waste source, and relative volume of waste received. Listed below are site groupings for the 200-BC-1 waste sites:

- **UST 200-E-14 Siphon Tank.** This tank received scavenged tank waste supernatant and distributed it to the six BC Cribs in 38,000 L (10,000 gal) batches via an automatic siphon action when the tank became full. This underground tank likely contains about 3,800 L (1,000 gal) of scavenged tank waste supernatant, its minimum design heel. The waste was strongly alkaline with a pH between 10 and 11.

Figure 3-2. 200-BC-1 OU Waste Sites

- **High-Volume Scavenged Waste Cribs and Trenches (216-B-14, -15, -16, -17, -18, -19 Cribs and 216-B-20, -21, -22 Trenches).** Groundwater analytical results indicate that waste sites likely impacted groundwater during their operation. Consequently, they are known or suspected to exhibit full thickness vadose zone contamination. The scavenged waste discharged to these waste sites originated in the B, BX, BY, and C Tank Farms where high-level waste was reacted with nickel ferrocyanide to enhance precipitation of cesium and strontium. The resulting supernatant, with reduced cesium-137 and strontium-90 activity, was then pumped to the BC Cribs for disposal.

- **Specific Retention Scavenged Waste Trenches (216-B-23 through 216-B-34 and 216-B-52 Trenches).** These waste sites received moderate volumes of the same scavenged tank waste supernatant; however, the waste volume was distributed along the trench bottoms and in a total volume that was intended to prevent the waste from migrating to groundwater. The resulting contamination was likely retained within the upper portion of the vadose zone.

- **Specific Retention 300 Area Waste Trenches (216-B-53A, 216-B-53B, 216-B-54, and 216-B-58 Trenches).** These waste sites received aqueous liquid waste that was generated in the 300 Area and transferred to the trenches in tanker trucks. The waste was generally neutral or alkaline and was collected in bulk in the 304 Building before shipment to the 200 Area for disposal to cribs. The 216-B-53A Crib is unique in that it received aqueous decontamination wastewater generated during cleanup of the Plutonium Recycle Test Reactor in the 300 Area following a fuel failure event.

Table 3-1 summarizes the waste sites in each site type within 200-BC-1 OU. Figure 3-3 is a schematic drawing that illustrates the inferred configuration of contamination distribution for the general site types within the 200-BC-1 OU.

Table 3-1. Summary of Waste Site Types within 200-BC-1 OU

Site Type	Associated Waste Sites	Overview of Impacted Vadose Zone	Historical Groundwater Impacts?
Underground Storage Tank	200-E-14	Residual waste in tank. No vadose impacts identified.	No
High-Volume Scavenged Waste Cribs and Trenches	216-B-14, 216-B-15, 16-B-16, 216-B-17, 216-B-18, 216-B-19216-B-20, 216-B-2,1216-B-22	Full thickness vadose zone impacts.	Yes
Specific Retention Scavenged Waste Trenches	216-B-23, 216-B-24, 216-B-25, 216-B-26, 216-B-27, 216-B-28, 216-B-29, 216-B-30, 216-B-31, 216-B-32, 216-B-33, 216-B-34, 216-B-52	Partial thickness vadose zone impacts.	No
Specific Retention 300 Area Waste Trenches	216-B-53A, 216-B-53B, 216-B-54, 216-B-58	Partial thickness vadose zone impacts.	No

3.3.1.2 Waste Sites in the Vicinity of the U Plant

Waste sites in the vicinity of the U Plant and included in 200-WA-1 OU are shown in Figure 3-4. These sites are divided into eight general waste site types based on waste site configuration, primary waste source, and relative volume of waste received. Listed below are site groupings for the U Plant vicinity waste sites:

Underground Storage Tanks. Two USTs are present in the vicinity of the U Plant. The 270-W Tank is an underground process waste neutralization tank that was charged with natural calcium carbonate limestone. The process condensate stream from 221-U and 224-U/UA flowed through the tank, neutralizing the waste stream. The tank was removed from service for neutralization (i.e., limestone was no longer added) but remained in place as part of the waste conveyance pipeline following removal of the 216-U-8 Crib from service. The contents of the tank are not specified, and the tank (if intact) may contain a heel of several thousand liters of acidic process condensate. It is believed that the bottom of this tank has corroded and the underlying vadose zone may be contaminated. The 241-U-361 Settling Tank

received process waste from the 274-U Solvent Recovery Building. This tank contains residual solids and has been recently sampled for characterization (D&D-36428, Rev. 0, 2008 "*Characterization Report for the 214-U-361 Settling Tank in the 200-UW-1 Operable Unit,*").

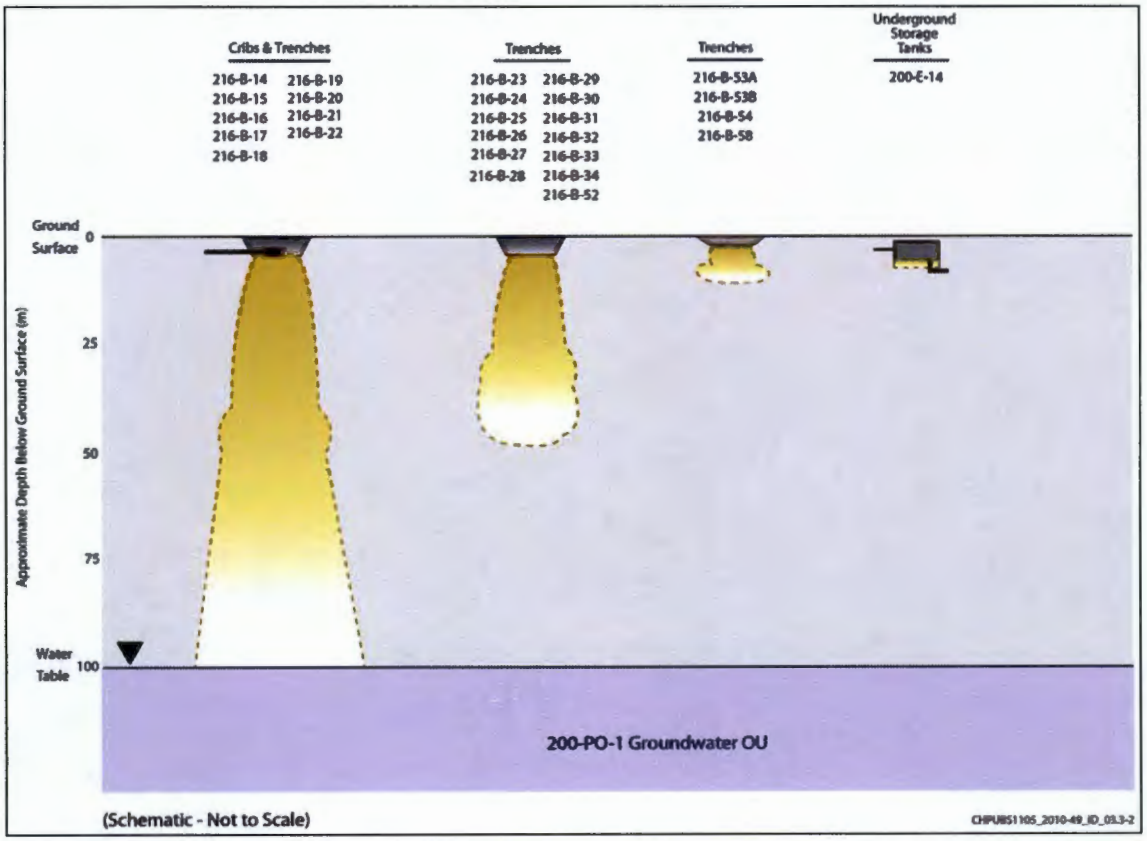


Figure 3-3. Schematic Representation of Contaminant Distribution at the 200-BC-1 OU Waste Sites Based on Process Knowledge

- **Structures and Foundations.** Waste Site 200-W-136 consists of foundations and surface soil contamination associated with demolition of the 222-U Building and some other U Plant ancillary facilities.

- **High-Volume Process Waste Cribs.** Three high-volume process waste cribs are located in the U Plant vicinity. The 216-U-8 Crib received radiologically contaminated process condensate from the 221-U and 224-U Buildings that was pH-adjusted to near neutral by passing the waste stream through the 270-W Tank limestone bed. The 216-U-12 Crib received strongly acidic process condensate from the 224-U Building that was not pH adjusted. The 216-U-1/-2 Crib received solvent recovery waste from the 274-U Building after passage through the 241-U-361 Settling Tank. Discharges to all three of these cribs affected groundwater during facility operations, and all three could exhibit full thickness vadose zone contamination. [Note: In previous documents, 216-U-1 and 216-U-2 were considered/counted as two cribs].

- **High-Volume Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches.** Ditches 216-U-14 and 216-U-16 are associated with high-volume discharge of cooling water, steam condensate, and chemical sewer (i.e., nonradiological chemical waste discharge) discharges from the U Plant facilities. The 216-U-14 Ditch is an unlined, open surface ditch that received process wastewater and chemical sewer discharges from 221-U, 271-U, 224-U, and UA Buildings. The ditch

also received wastewater discharges from the 284-W Powerhouse (a coal-fired steam plant), 2723-W and 2724-W Laundry Facilities, and steam condensate and cooling water from the 242-S Evaporator. The ditch discharged to the 216-U-10 Pond. Wastewater infiltrated into the vadose under the ditch as well as at the pond.

Figure 3-4. 200-WA-1 OU Waste Sites in the U Plant Vicinity

- **Moderate-Volume Process Waste Cribs and Trenches.** Two waste sites in the vicinity of the U Plant received moderate volumes of process waste and are expected to exhibit partial thickness vadose zone contamination. These sites are 216-U-13, which received wastewater from equipment decontamination, and 216-U-17, which received neutralized process condensate from the 224-U Building. These sites have not exhibited historical groundwater contamination. The terms "moderate-volume," as used here, are qualitative and refer to the lack of apparent/associated groundwater contamination suggesting less than one pore volume and only partial vadose thickness contamination.

- **Injection Wells.** Well 216-U-4 is configured as an injection well (perforated interval is 15.24 to 22.8 m [50 to 75 ft] below ground surface [bgs]) and is not expected to have impacted groundwater (depth of groundwater greater than 76.2 m [250 ft] bgs). Approximately 3.0E+05 L (7.9E+05 gal) were discharged to the 216-U-4 injection well.

- **French Drains.** French drains 216-U-4A, 216-U-4B, 216-U-3, and 216-U-7 are shallow. None of these waste sites is expected to have impacted groundwater during operation. Approximately 5.45E+05 L (1.44E + 05 gal), 3.3E+04 L (8.7E+03 gal), 7.91E+05L (2.09E+05 gal), and 7E+03 L (1.85E+03 gal) were discharged to these sites, respectively.

- **Low-Volume Cribs, Trenches, and Pipe Leaks.** Three waste sites (216-U-5, 216-U-6, and 216-U-15) all received relatively small volumes of liquid waste and are expected to exhibit some degree of residual contamination in the upper vadose zone. The 200-W-42 pipeline transported large volumes of effluent, but (based on pipeline removal excavations) does not appear to have leaked large volumes. Characterization of the bottom of the pipe-removal excavation revealed localized areas of residual contamination. Closure of the 200-W-42 waste site is pending regulatory agreement on soil cleanup values.

- **Surface Contamination Sites.** Numerous waste sites in the vicinity of the U Plant exhibit surface or near surface contamination (see Table 3-2). The source of contamination at these sites ranges from intentional discarding of contaminated debris to accumulation of contaminated wind-borne plants and unintentional leaks and spills of contaminated liquids and solids. Most of these sites have been subsequently covered with soil or gravel as an interim stabilization activity. Surface contamination sites pose primarily a potential for direct exposure at or near the ground surface.

The sites in each site type category in the vicinity of the U Plant are summarized in Table 3-2. Figure 3-5 is a schematic drawing that illustrates the inferred configuration of contamination distribution in the U Plant vicinity.

3.3.1.3 Waste Sites in the Vicinity of the REDOX Plant

Waste sites in the vicinity of the REDOX Plant (S Plant), included in 200-WA-1 OU, are shown in Figure 3-6. Listed below are site groupings for the REDOX Plant vicinity waste sites:

- **Underground Storage Tanks.** UST 200-W-75 consists of three in-ground steel cylinders containing soil around sealed radioactive sources. These structures were used to test and calibrate down-hole radiation detection devices. These USTs are now out of service and have been covered with gravel. The sealed radioactive sources remain within the cylinders of soil.

- **Structures and Foundations.** Site 207-S is the retention basin for historical cooling water and steam condensate discharges from the REDOX Plant. The basin became grossly contaminated and was taken out of service and filled with soil in 1954. Site 200-W-22 is composed of the remaining foundation works for the former 203-S, 204-S, and 205-S Buildings where uranyl nitrate hexahydrate solutions were managed.

- **High-Volume Process Waste Cribs and Trenches.** Sites 216-S-1& 2, 216-S-7, 216-S-20, 216-S-3, 216-S-22, 216-S-23, and 216-S-25 could exhibit full thickness vadose zone contamination.

- **High-Volume Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches.** Two waste sites, located in the vicinity of the REDOX Plant, include the 216-S-5 and 216-S-6 Cribs. These cribs received high contaminant inventories, which likely caused groundwater contamination during operation. Therefore, both cribs could exhibit full thickness vadose zone contamination.

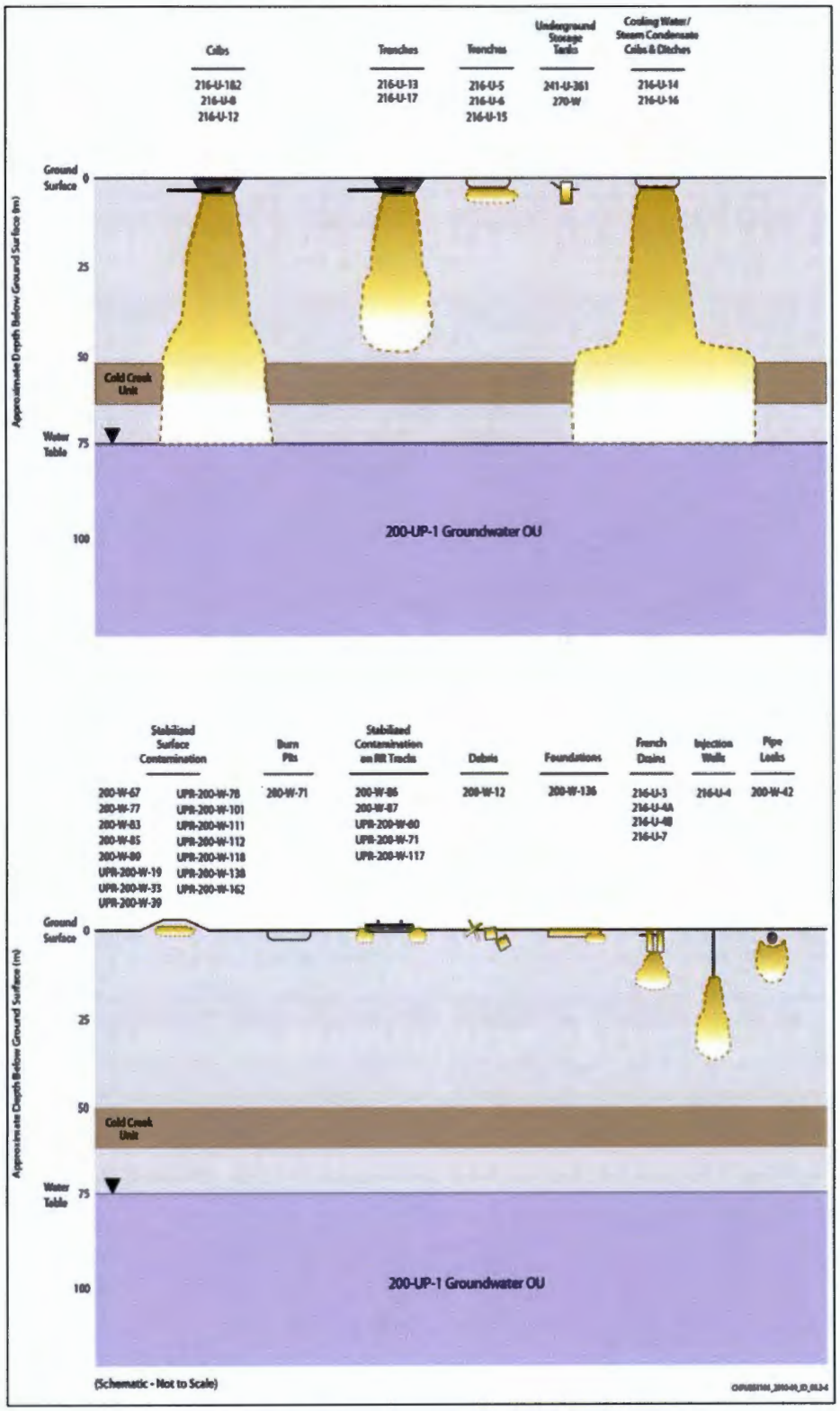
- **Injection Wells and French Drains.** One French drain waste site, 216-S-4, is included in the vicinity of the REDOX Plant. This site received a substantial volume of tank farm condensate. The site was subsequently inundated by 216-U-10 Pond. Vadose zone residual contamination resulting from this site's operation is expected to have been substantially diluted and moved away from the point of discharge by the large volume of water discharged to the pond. Residual vadose contamination at this waste site is expected to be similar to conditions observed in 216-U-10 Pond. UPR-200-36 was created when effluent from 216-S-1 and 2 Cribs discharged to groundwater through failed well casing.

Table 3-2. Summary of Waste Site Types in the U Plant Vicinity

Site Type	Associated Waste Sites	Overview of Impacted Vadose Zone	Historical Groundwater Impacts?
Underground Storage Tanks	270-W*, 241-U-361	Residual waste in tanks; no vadose impacts identified.	No*
Structures and Foundations	200-W-136	Partial thickness vadose zone impacts.	No
High-Volume Process Waste Cribs	216-U-8, 216-U-12, 216-U-1/-U-2	Full thickness vadose zone impacts.	Yes
High-Volume Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches	216-U-16, 216-U-14	Full thickness vadose zone impacts.	Yes
Moderate-Volume Process Waste Cribs and Trenches	216-U-13, 216-U-17	Partial thickness vadose zone impacts.	No
Injection Wells and French Drains	216-U-4, 216-U-4A, 216-U-4B, 216-U-3, 216-U-7	Partial thickness vadose zone impacts.	No
Low-Volume Cribs, Trenches, and Low-Volume Leaks from Pipeline	200-W-42, 216-U-5, 216-U-6, 216-U-15	Partial thickness vadose zone impacts.	No
Surface Contamination Sites	200-W-12, 200-W-67, 200-W-71, 200-W-77, 200-W-83, 200-W-85, 200-W-86, 200-W-87, 200-W-89, UPR-200-W-33, UPR-200-W-78, UPR-200-W-101, UPR-200-W-111, UPR-200-W-112, UPR-200-W-118, UPR-200-W-138, UPR-200-W-162, UPR-200-W-19, UPR-200-W-71, UPR-200-W-60, UPR-200-W-39, UPR-200-W-117	Partial thickness vadose zone impacts.	No

* Vadose conditions associated with Tank 270-W have not been characterized. However, potential contributions from this tank to observed groundwater contamination have been speculated.

- **Low-Volume Cribs, Trenches, and Pipe Leaks.** The 216-S-8 Crib received a poorly documented volume of cold startup waste from the REDOX Plant. The 216-SX-2 Crib received air compressor condensate from a tank farm compressor system. The discharge was expected to contain some compressor oil residues. Sites 216-S-14 Trench and 200-W-15 are hexone-related waste sites. Sites 216-S-12 Trench and 216-S-18 Crib are also expected to exhibit shallow, partial thickness vadose zone contamination.



* Vadose conditions associated with Tank 270-W have not been characterized. However, potential contributions from this tank to observed groundwater contamination have been speculated.

Figure 3-5. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the U Plant Vicinity

Figure 3-6. 200-WA-1 OU Waste Sites in the REDOX Plant Vicinity

- **Surface Contamination Sites.** Numerous waste sites in the vicinity of the REDOX Plant are expected to exhibit only surface or near-surface residual vadose zone contamination. These sites, listed in Table 3-3, result from various conditions ranging from surface debris to releases of small volumes of liquid waste and release of contents of waste containers that have resulted in residual contamination at or near the ground surface.

The sites in each site type category in the vicinity of the REDOX Plant are summarized in Table 3-3. Figure 3-7 is a schematic drawing that illustrates the inferred configuration of contamination distribution in the REDOX Plant vicinity.

3.3.1.4 Waste Sites in the Vicinity of the Z Plant

Waste sites in the vicinity of the Z Plant, included in 200-WA-1 OU, are illustrated in Figure 3-8. These sites fall into general waste site categories, based on waste site configuration, primary waste source, and relative volume of waste received. Listed below are site groupings for the Z Plant vicinity waste sites:

- **Structures and Foundations.** The 207-Z retention basin is an open-topped, in-ground concrete structure that provided hold-up of steam condensate and cooling water generated in the 234-5Z Building. The retention basin was removed from service and ultimately filled with controlled density fill. There are no known releases to the vadose zone from this waste site, and no vadose contamination is expected.

Table 3-3. Summary of Waste Site Types in the REDOX Plant Vicinity

Site Type	Associated Waste Sites	Overview of Impacted Vadose Zone	Historical Groundwater Impacts?
Underground Storage Tank	200-W-75	Residual radioactive sources in test calibration silo; no vadose impacts identified.	No
Structures and Foundations	200-W-22, 207-S	Partial thickness vadose zone impacts.	No
High-Volume Process Waste Cribs and Trenches	216-S-20, 216-S-7, 216-S-1 and 2, 216-S-3, 216-S-22, 216-S-23, 216-S-25	Full thickness vadose zone impacts.	Yes
High-Volume Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches	216-S-5, 216-S-6	Full thickness vadose zone impacts.	Yes
Injection Wells and French Drains	216-S-4, UPR-200-W-36	Full thickness vadose zone impacts.	Yes
Low-Volume Cribs, Trenches, and Pipe Leaks	216-S-8, 216-SX-2, 216-S-12, 216-S-14, 216-S-18, 200-W-15	Partial thickness vadose zone impacts.	No
Surface Contamination Sites	200-W-1, 200-W-101, 200-W-11, 200-W-2, 200-W-54, 218-W-9, 600-70, UPR-200-W-82, UPR-200-W-20, UPR-200-W-116, UPR-200-W-41, UPR-200-W-46, UPR-200-W-51, UPR-200-W-165	Partial thickness vadose zone impacts.	No

- **Underground Storage Tanks.** Waste site 2607-W8 septic system accepted waste from the 231-Z Building. Site 231-W-151 concrete receiving vault contains two tanks that were installed to receive drainage from floor drains in the 231-Z Building.

- **High-Volume Process Waste Cribs.** Three waste sites in the vicinity of the 231-Z Building (216-Z-7, 216-Z-16, and 216-Z-17) are identified as high-volume process waste cribs. These sites are known to have contaminated groundwater during operation and could exhibit full thickness vadose zone contamination. Two of the cribs, however, indicate two distinctly different phases of operation at the 231-Z Building. The 216-Z-7 Crib received neutralized evaporation and water vacuum jet discharges during the early plutonium production period at Hanford. The waste discharged to this crib tended to be relatively high in nitrate, sodium, and plutonium, and contained some residual fission products. The 216-Z-16 Crib entered service during metallurgical research operations at the 231-Z Building, and less residual nitrate and lower plutonium and fission product contamination in the vadose zone is expected.

- **Moderate-Volume Process Waste Cribs and Trenches.** The 216-Z-4 and 216-Z-6 Cribs fall into this category in the vicinity of the Z Plant. Both 216-Z-4 and 216-Z-6 received the same waste stream (evaporation condensate and vacuum water jet effluent) with 216-Z-6 replacing 216-Z-4 after only a short time. Both of these sites are expected to exhibit partial thickness vadose zone contamination.

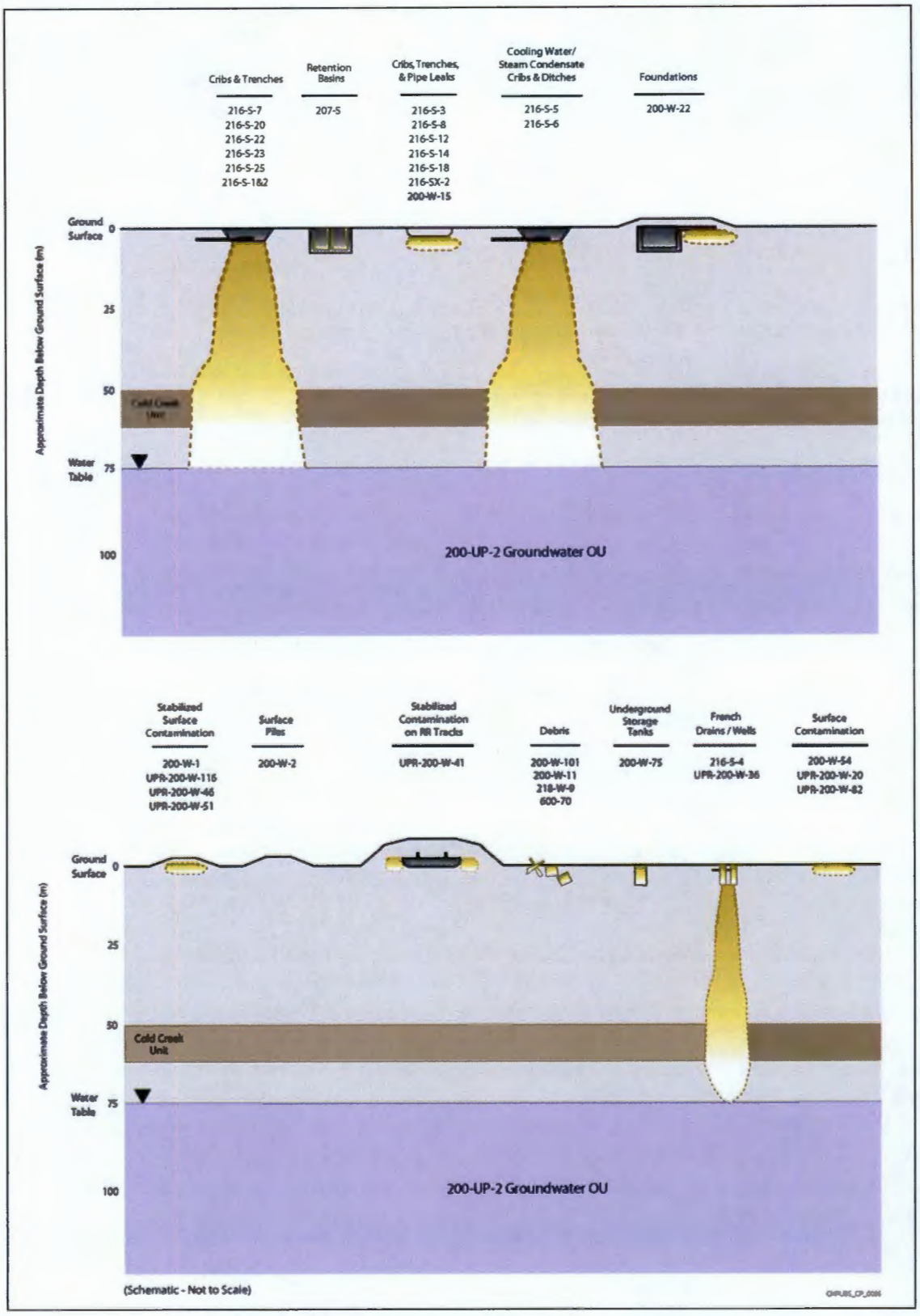


Figure 3-7. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the REDOX Plant Vicinity

Figure 3-8. 200-WA-1 OU Waste Sites in the PFP Vicinity

- **Pipe Leaks.** UPR-200-W-103 is a historical pipeline leak from the pipeline running between the 236-Z Building and the 216-Z-18 Crib. This site is expected to exhibit shallow, partial thickness vadose zone contamination.

The sites in each site type category in the vicinity of the Z Plant are summarized in Table 3-4. Figure 3-9 is a schematic drawing that illustrates the inferred configuration of contamination distribution in the PFP vicinity.

3.3.1.5 Waste Sites in the Vicinity of the T Plant

Figure 3-10 shows the waste sites in the vicinity of the T Plant that are included in the 200-WA-1 OU. These T Plant vicinity sites fall into the following general waste site categories:

- **Underground Storage Tanks.** Site 241-T-361 is a concrete, in-ground settling tank that was used to collect solids from the bismuth phosphate separation process in the 221-T Building. The solids tend to be high in uranium and exhibit alkaline pH. Site 218-W-8 is functionally a UST that was configured to allow for deposits of miscellaneous radioactive wastes (e.g., packaged solids, small containers of liquids) generated in the 222-T Process Control Laboratory. One septic tank system, Site 200-W-231, reportedly supported a temporary construction facility and an X-ray nondestructive examination laboratory. Its association with the film development laboratory suggests that nonsanitary wastes may have been received into the system.

Table 3-4. Summary of Waste Site Types in the Vicinity of the Z Plant

Site Type	Associated Waste Sites	Overview of Impacted Vadose Zone	Historical Groundwater Impacts?
Structures and Foundations	207-Z	No known releases to vadose zone.	No
Underground Storage Tanks	2607-W8, 231-W-151	Partial thickness vadose zone impacts.	No
High-Volume Process Waste Cribs	216-Z-7, 216-Z-16, 216-Z-17	Full thickness vadose zone impacts.	Yes
Moderate-Volume Process Waste Cribs and Trenches	216-Z-4, 216-Z-6	Partial thickness vadose zone impacts.	No
Pipe Leaks	UPR-200-W-103	Underground pipeline leak; partial thickness vadose zone impacts.	No

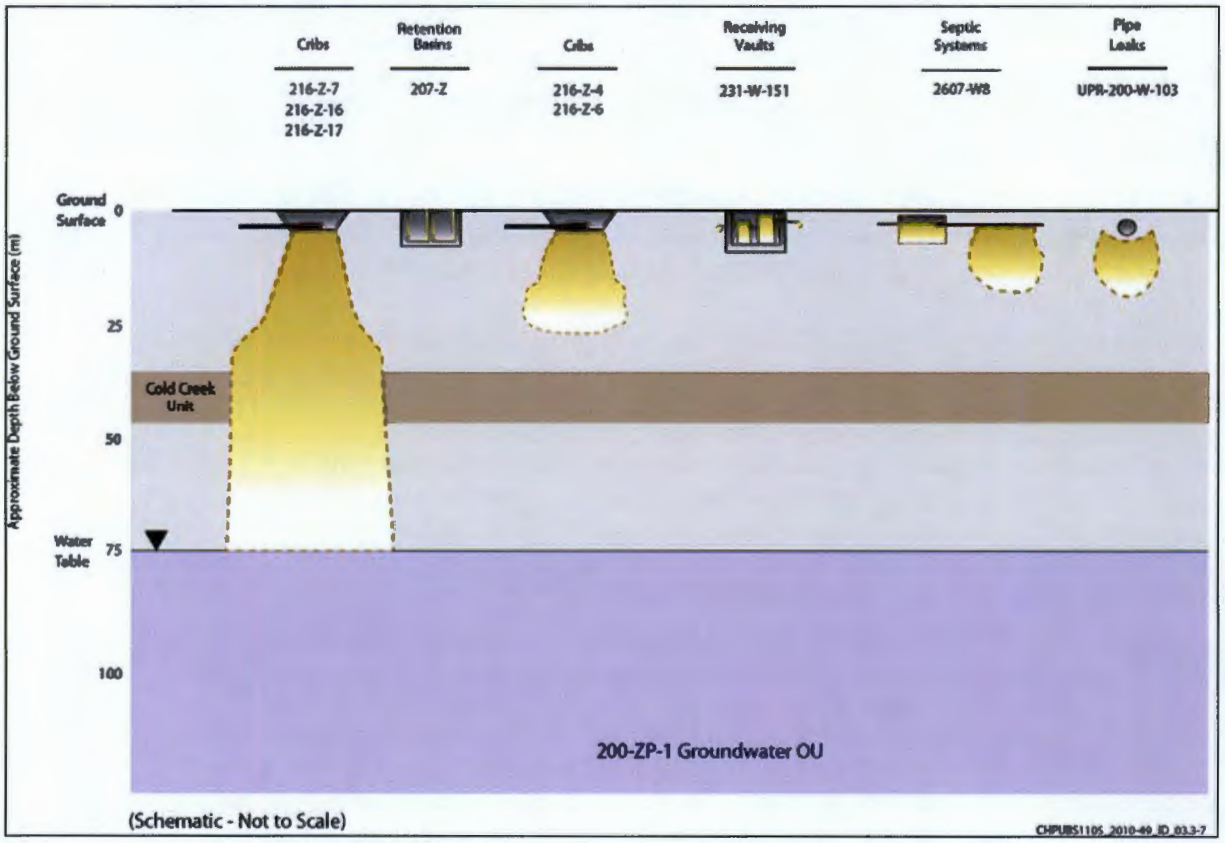


Figure 3-9. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the PFP Vicinity

Figure 3-10. 200-WA-1 OU Waste Sites in the T Plant Vicinity

- **Structures and Foundations.** Site 207-T is the retention basin for the historical discharge of steam condensate, cooling water, and the chemical sewer from the original bismuth phosphate separation and plutonium concentration processes in the 221-T and 224-T Buildings, respectively. The basin also received cooling water and steam condensate from tank farm evaporator operations. Streams passing through the basin were discharged to the 216-T-4-1D Ditch and allowed to infiltrate. The basin exhibits surface contamination and has been backfilled. Sites 200-W-6, 200-W-63, and 200-W-82 are all radiologically contaminated concrete foundation slabs.

- **High-Volume Process Waste Cribs.** Sites 216-T-27, 216-T-28, 216-T-33, 216-T-34, and 216-T-35 Cribs are all high-volume process waste cribs, receiving greater than one pore volume of waste effluent. These cribs received a variety of liquid wastes ranging from tank waste supernatant from T, TX, and TY Tank Farms to radioactive waste generated in the 300 Area and transferred to the cribs by tanker truck or rail tanker car. Four of these cribs are known to have contained contaminated groundwater during operation, and all of these cribs could exhibit full thickness vadose zone contamination.

- **High-Volume Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches.** Site 216-T-4-1D received a very large volume of combined wastewater generated primarily from bismuth phosphate reprocessing at the 221-T Building, plutonium concentration at the 224-T Building, and waste management operations at T, TX, and TY Tank Farms. Discharges to this ditch resulted in the development of an extensive groundwater mound under the northern portion of the 200 West Area during ditch operation. This site is expected to exhibit full thickness but very diluted vadose zone contamination.

- **Moderate-Volume Process Waste Cribs and Trenches.** Site 216-T-8 Crib received about 0.5 pore volume of liquid waste generated in the 222-T Laboratory. This site is expected to exhibit partial thickness vadose zone contamination.

- **Injection Wells and French Drains.** Site 216-T-29 French drain received condensate from the 221-T Building ventilation stack sand filter. This drain is estimated to have received greater than one pore volume of wastewater. Site 216-T-2 Injection Well received radioactive waste containing fission products and plutonium generated in the 222-T Laboratory and may be expected to exhibit full thickness residual contamination.

- **Low-Volume Cribs, Trenches, and Pipe Leaks.** Sites 216-T-9, 216-T-10, 216-T-11, 216-T-12, 216-T-13, 216-T-20, and 216-T-36 received relatively small waste discharge volumes (i.e., less than 0.25 pore volume), and all are expected to exhibit shallow, partial thickness vadose zone contamination. 200-W-9 and UPR-200-W-14 resulted from pipe leaks and are also expected to exhibit partial thickness vadose zone contamination.

- **Surface Contamination Sites.** Numerous waste sites in the vicinity of the REDOX Plant exhibit only surface or near-surface residual vadose zone contamination. These sites, listed in Table 3-5, result from various conditions ranging from surface debris to releases of small volumes of liquid waste and release of contents of waste containers that have resulted in residual contamination at or near the ground surface.

Table 3-5 summarizes the sites in each site type category in the vicinity of the T Plant. Figure 3-11 is a schematic drawing that illustrates the inferred configuration of contamination distribution in the T Plant vicinity.

3.3.2 Groundwater Contributions

In addition to evaluating the nature and volume of discharges to waste sites, the apparent historical impacts on underlying groundwater were also evaluated during this scoping effort. To support this evaluation of groundwater effects, historical monitoring results for selected waste constituents were assessed. Some waste constituents (e.g., nitrate and tritium) are highly mobile in both the vadose zone and in the underlying groundwater. The occurrence of these constituents in groundwater near a particular waste site (with associated, rapid, significant concentration increases in the PCOCs) can indicate that wastewater has migrated through the vadose zone beneath the waste site and entered groundwater. There exist, however, large and expansive groundwater plumes of nitrate and tritium within the Central Plateau, and it can be difficult to determine whether or not detections of nitrate or tritium originated with a particular waste site if the site lacks nearby up-gradient and down-gradient wells. One method to tell if the monitoring well is in close proximity to the contaminant source is to have nearby up and down gradient monitoring wells. In this case, if the upgradient well shows no change in a specific PCOC and the down gradient well shows a rapid increase in PCOC concentrations, it is likely that the source is the waste site. In general hydrogeologic terms, the further the well from the source, the more gradual the increase in PCOCs. This is primarily due to the processes of advection/dispersion as well as other contributing factors (e.g., cation/anion exchange, oxidation/reduction, precipitation, etc.). Other common waste constituents (e.g., cesium-137 and strontium-90) exhibit relatively lower mobility than that of nitrate and tritium. Groundwater monitoring results for cesium-137, cobalt-60, and strontium-90 were evaluated during waste site operations, and detection of excessive concentrations of these radionuclides in groundwater were historically used to indicate that a waste site had reached its capacity. Therefore, a substantial body of historical groundwater monitoring data exists for these nuclides. In general, cesium, cobalt and strontium are not very mobile in alkaline soils. However, when dissolved in highly acidic solutions and in large volumes, they can migrate through the vadose zone to the underlying groundwater.

Table 3-5. Summary of Waste Site Types in the T Plant Vicinity

Site Type	Associated Waste Sites	Overview of Impacted Vadose Zone	Historical Groundwater Impacts?
Underground Storage Tank	241-T-361, 218-W-8, 200-W-231	These tanks represent substantial solid-phase source terms. No vadose impacts identified.	No
Structures and Foundations	207-T, 200-W-6, 200-W-63, 200-W-82	Contamination expected to be contained to structures. Partial thickness vadose zone impacts.	No
High-Volume Process Waste Cribs	216-T-27, 216-T-28, 216-T-33, 216-T-34, 216-T-35	Full thickness vadose zone impacts.	Yes
High-Volume Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches	216-T-4-1D	Full thickness vadose zone impacts expected at low concentration.	Yes
Moderate-Volume Process Waste Cribs and Trenches	216-T-8	Partial thickness vadose zone impacts.	No
Injection Wells and French Drains	216-T-2, 216-T-29	Partial to full thickness vadose zone impacts.	None confirmed
Low-Volume Cribs, Trenches, and Pipe Leaks	216-T-9, 216-T-10, 216-T-11, 216-T-12, 216-T-13, 216-T-36, 216-T-20, 200-W-9, UPR-200-W-14	Partial thickness vadose zone impacts.	No
Surface Contamination Sites	200-W-106, 200-W-127, 200-W-128, 200-W-53, 200-W-80, 200-W-81, 200-W-90, UPR-200-W-63, 200-W-13, 200-W-14, UPR-200-W-166, UPR-200-W-65, UPR-200-W-67, UPR-200-W-99, 216-T-31, 200-W-21, UPR-200-W-3, UPR-200-W-4, UPR-200-W-73, 200-W-92, UPR-200-W-76	Partial thickness vadose zone impacts.	No

For this planning effort, historical groundwater monitoring results for wells in the vicinity of the 200-WA-1 waste sites were evaluated for the presence of cobalt-60, cesium-137, and strontium-90, and the observed concentration trends were evaluated against the historical discharges to the waste sites. These three nuclides were used as indicators of historical groundwater contamination related to waste sites. These indicator constituents are not highly mobile in the aquifer and therefore are not expected to be detected at a substantial distance from their release points. Plate C-2 (Appendix C) is a map of 200-WA-1/200-BC-1 waste sites where Cs-137 concentrations have been detected. Plate C-3 (Appendix C) is a map of 200-WA-1/200-BC-1 waste sites where Sr-90 concentrations have been detected. The 200-WA-1 OU waste sites with Cs-137 or Sr-90 detections are scattered throughout the geographical region, and the majority of identified sites have both contaminants in common. The affected 200-BC-1 waste sites are on the eastern side of the OU.

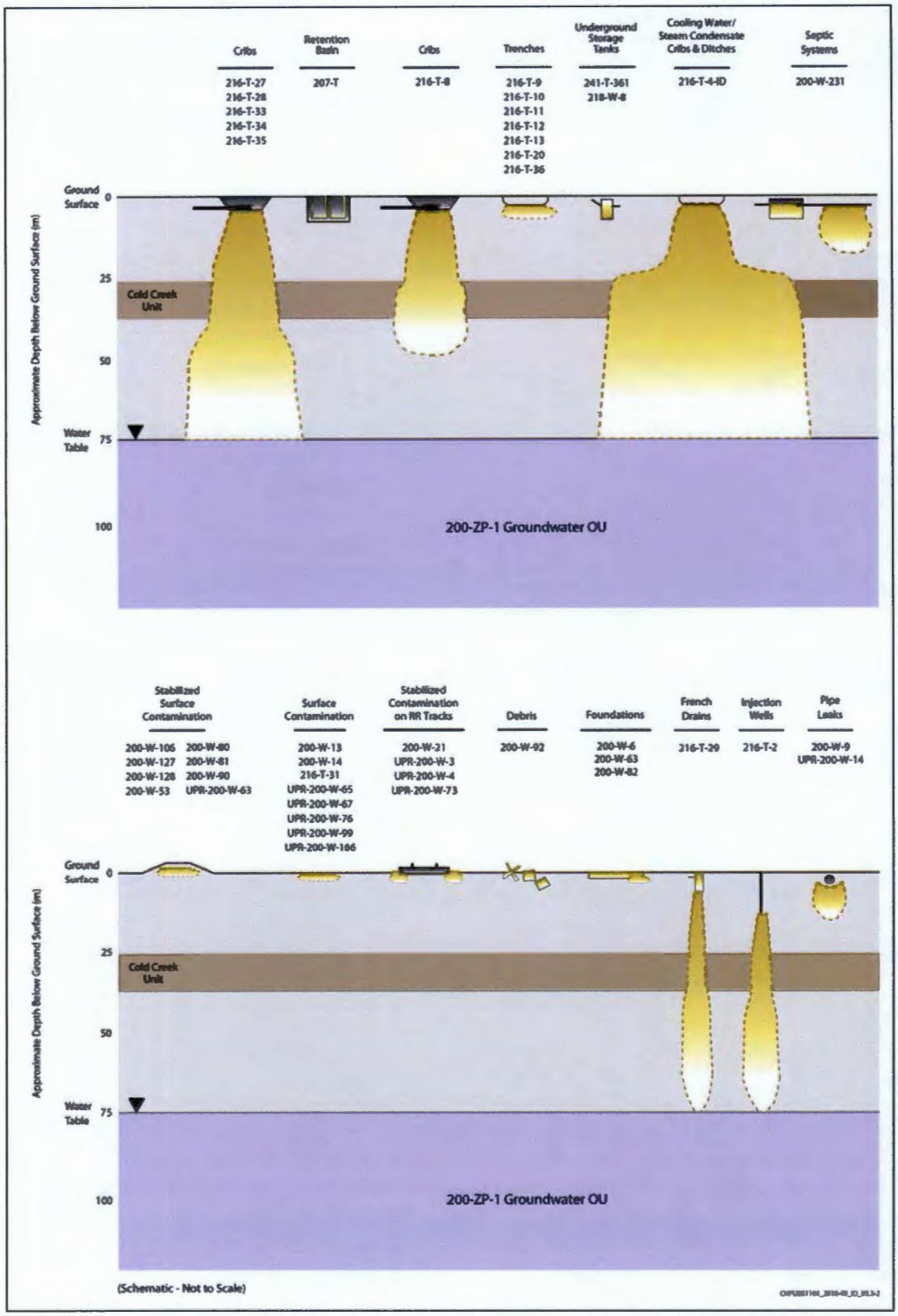


Figure 3-11. Schematic Representation of Contaminant Distribution at the 200-WA-1 OU Waste Sites in the Vicinity of T Plant Land and Groundwater Use

A total of 18 waste sites in the 200-WA-1 OU exhibited historical groundwater contamination by cesium-137, strontium-90, and cobalt-60, consistent with discharges to the waste sites. Nine waste sites in the 200-BC-1 OU exhibited groundwater contamination that may be attributed to the waste sites.

Table B-7 in Appendix B is a summary of waste sites with historical indicators of groundwater impacts (based on groundwater monitoring data in HEIS).

3.4 Identification of Target Analyte List

Previous sections describe contaminant waste streams, contaminant sources, constituents of interest that may be mobile in the environment, and an overview of waste site contamination conditions. Tables B-1 through B-4 (Appendix B) identify waste stream source, composition, and receiving waste sites. These tables present generalized contaminant descriptions based on process knowledge of the various operations that occurred in the five geographical plant groupings. These lists, along with the available analytical data for the 200-WA-1/200-BC-1 waste sites, will be used to develop target analyte lists for each of the five geographical areas for additional site characterization activities that are identified through the data needs assessment (see Chapter 4). Analytical data are available for a subset of the 200-WA-1/200-BC-1 waste sites (see Table B-6). If an analyte is detected in soil at any of the waste sites within a geographical area, it will be considered for inclusion on that area's target analyte list. The following types of analytes will not be included on the target analyte lists:

- Essential nutrients (e.g., calcium, magnesium, potassium, and sodium) that are not elevated above background or are not associated with the waste at a waste site
- Radionuclides that are associated with background conditions and not associated with waste site activities (e.g., potassium-40; note that radium-226, radium-228, thorium-228, and thorium-232 will be retained for further evaluation since they may be associated with waste sites), (e.g., PCOC daughter products).
- Radionuclides with half-lives of less than three years and, upon decay, they produce no significant daughter products

Maximum detected concentrations of analytes from each geographical area will also be compared to the following criteria to develop the target analyte lists:

- Maximum detected concentrations of analytes that are not excluded using the criteria described above will be compared to risk-based screening levels (RBSLs). Description of the RBSLs for human health risks, ecological risks, and groundwater protection are described in Appendix G. Contaminants with maximum concentrations less than all RBSLs will not be carried forward as target analytes.
- Maximum detected concentrations for each detected analyte are compared against 90th percentile background vadose zone concentrations. Further discussion of available background data is presented in Appendix G. Contaminants with maximum concentrations less than background concentrations will not be carried forward as target analytes.
- Analytes that do not have published toxicity values for carcinogenic or noncarcinogenic adverse health effects (based on EPA published databases) will not be carried forward as target analytes.

These criteria are used to focus the target analyte list on the analytes that have the most potential to contribute to human health or ecological risk associated with exposure to vadose zone soil. Radionuclides with half-lives of less than three years are not expected to be present at significant levels in the

environment, and chemicals with no available published toxicity values cannot be readily evaluated for potential risk.

The 200-WA-1/200-BC-1 OU is located on the Hanford Central Plateau within the 200 West Inner Area. Land use is one of the factors considered for exposure assessment assumptions and risk characterization conclusions (see Section 5.6, Assessment of Risk).

3.4.1 Current Land Use

The current land use activities in the Inner Area are industrial in nature. Soil waste sites in the 200-WA-1/200-BC-1 OUs were used for liquid process wastes, process wastewater, sanitary wastewater, solid wastes, and airborne particulate wastes that were discharged to the environment during facility operations. Several waste management facilities continue to operate in the Central Plateau, including permanent waste disposal facilities such as the ERDF, low-level radioactive waste burial grounds, and mixed waste trenches permitted by RCRA. Construction of tank waste treatment facilities in the Central Plateau began in 2002. The Integrated Disposal Facility in the 200 East Inner Area is the planned disposal location for the vitrified low-activity tank wastes. Non-Hanford Site DOE organizations and the U.S. Department of the Navy use the TSD units on the Central Plateau. In addition, U.S. Ecology, Inc. operates a commercial low-level radioactive waste disposal facility on a 40 ha (100 ac) tract on land. This tract of land is leased to Washington State, and is located southwest of the 200 East Area.

3.4.2 Reasonably Anticipated Future Land Use

The reasonably anticipated future land use for the portion of the Central Plateau where the 200-WA-1/200-BC-1 OU sites are located has been industrial for at least 50 years and is expected to remain industrial over the longterm.

DOE worked for several years with cooperating agencies to define land use goals for the Hanford Site. The cooperating agencies and stakeholders included the National Park Service, Tribal Nations, the States of Washington and Oregon, local/county and city governments, economic and business development interests, environmental groups, and agricultural interests. A 1992 report, *The Future for Hanford: Uses and Cleanup, The Final Report of the Hanford Future Site Uses Working Group* (Drummond, 1992), was an early product of the efforts to develop land use assumptions. The report recognized that the Central Plateau would be used for waste management activities for the foreseeable future. Following the report, DOE issued DOE/EIS-0222F, *Final Hanford Comprehensive Land Use Plan Environmental Impact Statement* (HCP EIS), and associated ROD (64 FR 61615, "Record of Decision: Hanford Comprehensive Land Use Plan Environmental Impact Statement [HCP EIS]") in 1999, and a supplemental analysis (DOE/EIS-0222-SA-01, *Supplement Analysis: Hanford Comprehensive Land-Use Plan Environmental Impact Statement*) in 2008.

The HCP EIS analyzed the potential environmental impacts of alternative land use plans for the Hanford Site and considered the land use implication of ongoing and proposed activities. Under the preferred land use alternative selected in the HCP EIS ROD, the Central Plateau was designated for Industrial-Exclusive use, defined as areas "suitable and desirable for management of hazardous, dangerous, radioactive, nonradioactive wastes, and related activities" (Figure 3-12). The 2008 supplemental analysis reconfirmed the land use designations in the HCP EIS and clarified that the comprehensive land use plan will remain in effect as long as DOE retains legal control of some portion of the Hanford Site, which is expected to be longer than 50 years.

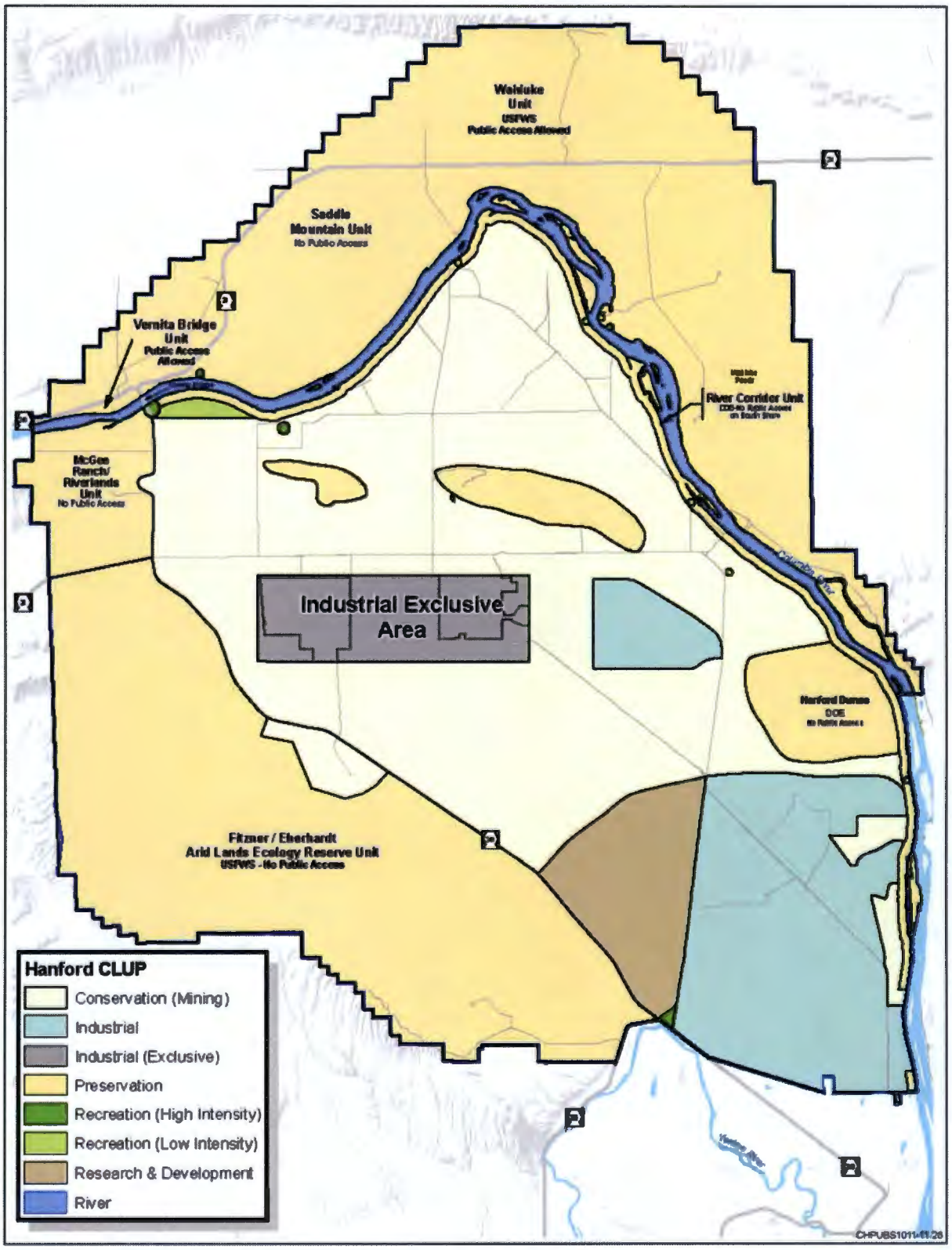


Figure 3-12. Land Uses from the Hanford Comprehensive Land Use Plan

Note that the area designated as the Central Plateau in the Future Site Uses Working Group report and the HCP EIS is only a portion of the area now commonly known as the Central Plateau. The current 195 km^2 (75 mi^2) area Central Plateau also encompasses a portion of the land known in the previous documents as "All Other Areas", with a designated land use of Conservation (Mining). The Inner Area portion of the Central Plateau (described in Section 1.3) is contained within the area designated for Industrial/ Industrial-Exclusive land use. At approximately 25 km^2 (10 mi^2), the Inner Area covers about half of the Industrial-Exclusive area and is defined by DOE as the final footprint area of the Hanford Site that will be dedicated to permanent waste management and containment of residual contamination.

3.4.3 Regional Land Use

Communities in the region of the Hanford Site consist of the incorporated cities of Richland, West Richland, Kennewick, and Pasco, and numerous other smaller communities within Benton and Franklin counties. No residences are located on the Hanford Site. The inhabited residences nearest to the 200 Area are farmhouses on land approximately 16 km (10 mi) north across the Columbia River. The City of Richland corporate boundary is approximately 27 km (17 mi) to the south (PNNL-6415). Land uses in and around the Hanford Site are shown in Figure 3-13.

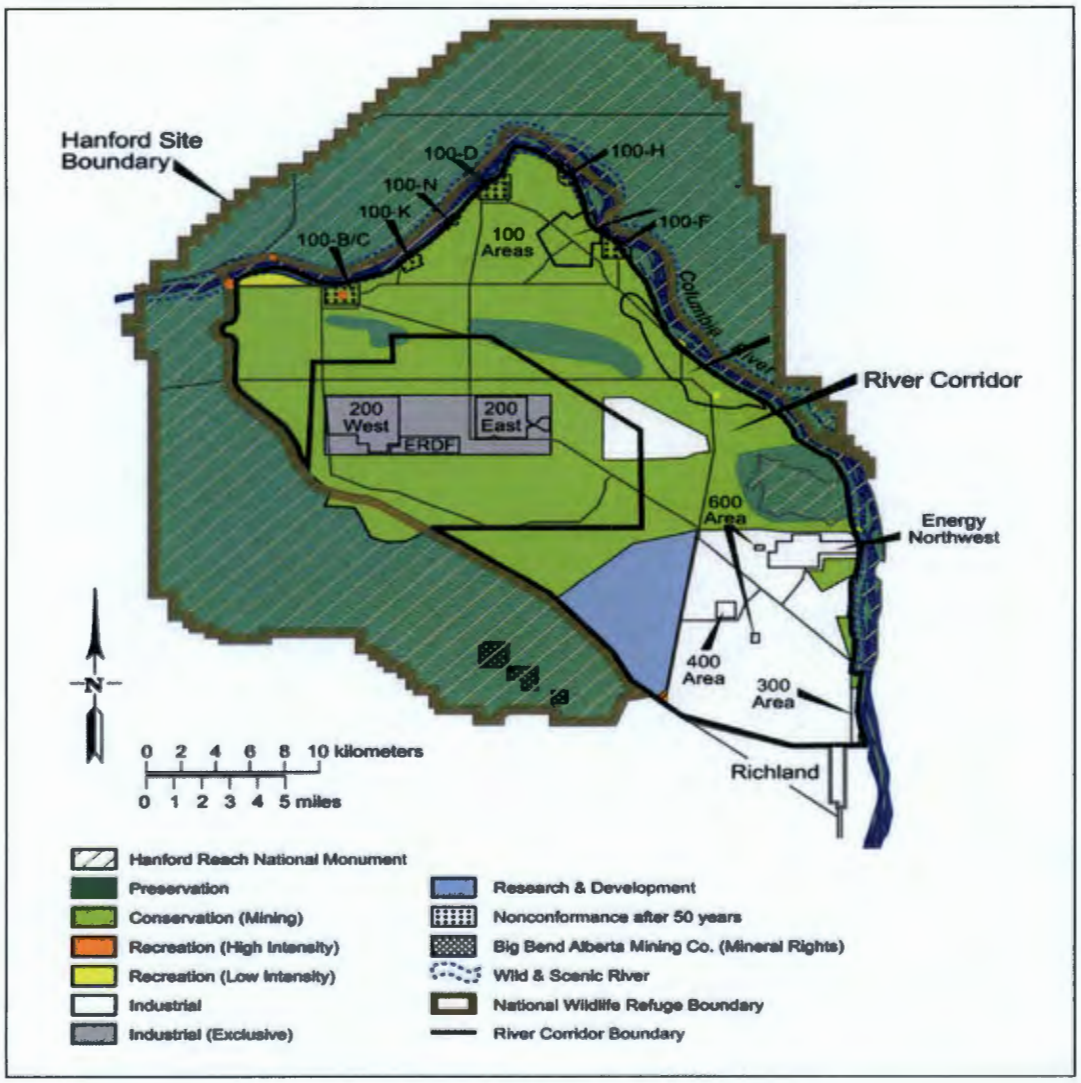


Figure 3-13. Designated Land Uses in the HCP EIS

3.4.4 Groundwater Use

The groundwater underlying the Central Plateau is contaminated and is not currently withdrawn for beneficial uses. Groundwater wells are routinely used on the Central Plateau to measure or monitor groundwater contaminants, groundwater conditions, and to support groundwater pump-and-treat systems. Several wells are also available to supply emergency cooling water to facilities, if needed. Groundwater beneath the Central Plateau is not anticipated to become a future source of drinking water until cleanup criteria are met. DOE's goal is to restore Central Plateau groundwater to beneficial use, unless restoration is determined to be technically impracticable.

3.5 Potential Applicable or Relevant and Appropriate Requirements

A preliminary identification of potential ARARs and to-be-considered (TBC) information in the scoping phase can assist in initially identifying remedial alternatives and is useful for initiating communications with the support agency to facilitate the identification of ARARs. Furthermore, early identification of potential ARARs will allow better planning of field activities. Because of the iterative nature of the RI/FS process, ARAR identification continues throughout the RI/FS as a better understanding is gained of site conditions and remedial action alternatives.

ARARs may be categorized: (1) as chemical-specific requirements that may define acceptable exposure levels and, therefore, be used in establishing preliminary remediation goals (PRGs); (2) as location-specific requirements that may set restrictions on activities within specific locations such as floodplains or wetlands; and (3) as action-specific, which may set controls or restrictions for particular treatment and disposal activities related to the management of hazardous wastes. *CERCLA Compliance with Other Laws Manual Interim Final* (EPA/540/G-89/006) contains detailed information on identifying and complying with ARARs.

Appendix F provides a table of potential ARARs and TBC material for the 200-WA-1 and 200-BC-1 OUs.

3.6 Methodology for Fate and Transport Evaluation

In most instances, the primary source material released to a waste site does not remain at the site in its original form and may migrate vertically and laterally within the vadose zone. Significant fate and transport studies and evaluations have been conducted in the 200 West Inner Area, and are described in the following reports:

- *Supplemental Remedial Investigation/Feasibility Study Work Plan for the 200 Areas Central Plateau Operable Units* (DOE/RL-2007-02, Draft A)
- *Final Feasibility Study for the Canyon Disposition Initiative (221-U Facility)* (DOE/RL-2001-11)
- *Vadose Zone Contaminant Fate-and-Transport Analysis for the 216-B-26 Trench* (PNNL-14907)
- *Vadose Zone Transport Field Study: Summary Report* (PNNL-15443)
- "Development of a Conceptual Model for Vadose Zone Transport of Tc-99 at Hanford's BC Cribs and the Screening of Remedial Alternatives-9458" (PNNL and CH2M HILL Plateau Remediation Company [CHPRC], 2009)
- *Regulatory Criteria for the Selection of Vadose Zone Modeling in Support of the 200-UW-1 Operable Unit* (DOE/RL-2007-34)

These studies (listed above) indicate that precipitation/dissolution affect transport mechanisms in the 200 West Inner Area sites. Other transport mechanisms such as degradation/transformation are considered less significant due to the slow rates or reaction and the accumulation of transformation products of equal or even greater toxicity. With the exception of VOCs, volatilization/condensation for most contaminants are not considered significant because of the generally low volatility of contaminants. Radioactive species with long half-lives are the species of interest. Fate and transport evaluations conducted for 200-WA-1/200-BC-1 waste sites are based on previous study results cited earlier in this section.

Mobile contaminants of interest for the 200-WA-1/200-BC-1 OU waste sites include radionuclides (e.g., technetium-99, tritium, iodine-129, and some constituents not generally considered to be readily mobile, such as strontium-90 and cesium-137), and highly mobile chemical constituents (e.g., nitrate).

Historically, during active operations, artificial recharge and acidified waste streams contributed to leaching and transport of mobile contaminants in the vadose zone. Alterations of the natural vadose soil geochemistry by large volumes of highly concentrated waste materials may affect the relative mobility of site contaminants. Such alterations include extreme pH values (both alkaline and acidic), potential oxidation reduction changes, and high concentrations of competing ions. These effects may enhance or reduce the mobility of specific contaminants of interest.

At Hanford, ongoing field monitoring, characterization, laboratory, and modeling activities provide contemporary information necessary to understand and predict the fate and transport of contaminants through the vadose zone and groundwater.

3.6.1 Computer Modeling for Evaluation of Groundwater Protection

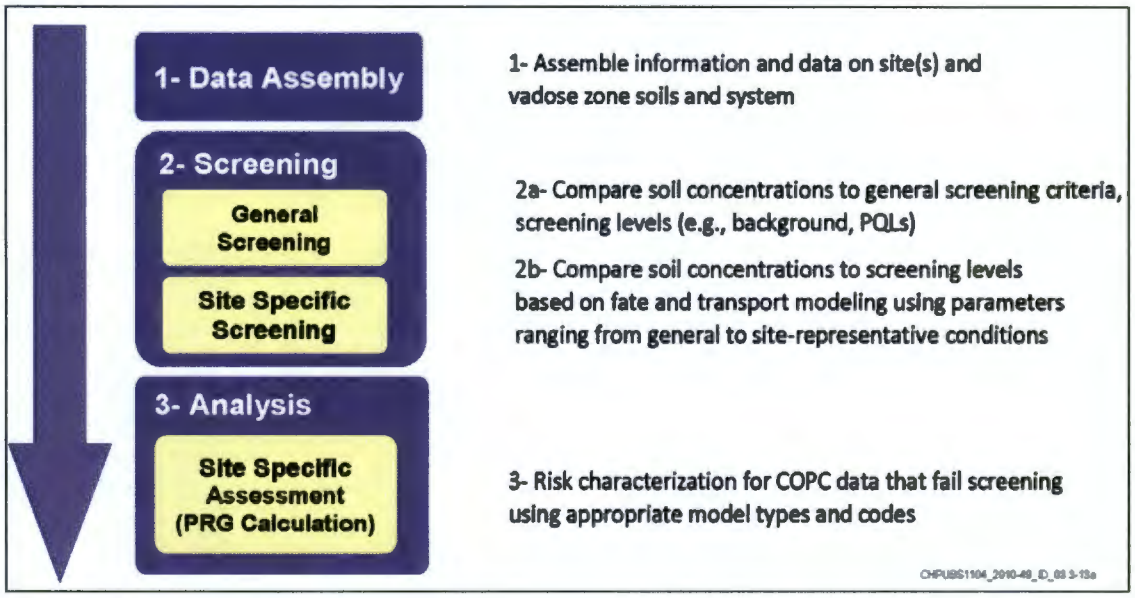
Vadose zone contaminant transport may be modeled to calculate the potential for exceedance of groundwater PRGs for those sites with available soil analytical data but may or may not have lacking groundwater analytical data.

The graded approach (GA) for the determination and use of soil levels protective of groundwater is based on the framework in the DOE technical standard for the general use of the GA for risk-based applications. Figure 3-14 is a summary of the DOE GA adapted for groundwater protection applications for the Hanford Site (DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*). The Hanford Site GA for the determination and use of soil levels protective of groundwater involves the three steps shown in Figure 3-14.

The following is a summary of the three steps in this GA:

1-Data Assembly: The data assembly step involves the compilation and assembly of information and data on the system of interest that are needed for screening and, if necessary, site-specific analysis or assessments. These data and information include soil concentration measurements to be compared to screening or protection levels, and all available information that contributes to the CSM.

2-Screening: The second step in the GA involves a process of step-wise general screening, followed by a tiered process of site-specific screening, as needed, to identify COPCs and/or sites that warrant no further assessment. The general screening step involves the use of criteria, methods, and models ranging from existing information (e.g., background) to generic (conservative) soil screening levels based on analytical methods or simplified numerical models. Site-specific screening involves the development of a CSM to support the calculation of screening levels using simplified to detailed site-specific information and easily obtained site-specific parameters. The specificity in the screening levels can range from area-wide to waste site-specific, with conservatism in the levels reduced as the screening model and parameters become more representative of site conditions.



Source: DOE-STD-1153-2002.

Figure 3-14. Adaptation of the DOE GA for Risk Assessment Applications to Groundwater Protection at the Hanford Site

3-Site-specific Analysis/Risk Characterization: The third step in the GA process, which includes the determination of PRGs, involves a single characterization of the risk as a final product of the risk assessment (EPA/240/B-01/002, *EPA Requirements for Quality Management Plans*, EPA QA/R 2). This characterization is intended to be the most comprehensive and representative evaluation practically achievable for the system of interest. The level of rigor in the determination of PRGs or evaluation of risk associated with risk characterization is greater than that for screening. Risk characterization involves more comprehensive requirements to meet the associated technical and scientific expectations (EPA-100-B-00-002, *Risk Characterization Handbook*).

Implementation of the steps in the GA for groundwater protection is described in DOE/RL-2011-50 (*Regulatory Basis and Implementation of a Graded Approach to Evaluation of Groundwater Protection*). A future document will provide details for the modeling assumptions, implementation, and results for every step of the GA.

3.6.2 Uncertainties

Uncertainties exist with respect to estimation of contaminant fate and transport. Where specific uncertainties are identified during the fate and transport analysis, the sensitivity of estimate results to those uncertainties will be examined and quantified to the extent appropriate. This effort may include multiple calculations to describe the sensitivity in terms of contaminant transport time and resultant concentration impacts. Sensitivity analysis results will be included in the discussion of fate and transport estimation results.

3.7 Conceptual Site Model Development

The CSM is a schematic diagram based on historical data that does the following:

- Identifies the primary source of contamination in the environment
- Shows how chemicals at the original point of release might move in the environment

- Identifies the different types of human populations or ecological receptors that might come into contact with contaminated media
- Lists the potential exposure pathways that may occur for each population

The conceptual model is used to plan the risk assessment and associated data collection activities and will be revised as data become available at a site, and as the BRA evolves.

The proposed format for CSMs in the 200-WA-1/200-BC-1 RI/FS report is two 11-by-17-inch sheets presenting an information summary on one side of the page and the CSM on the reverse side. Figures 3-15 and 3-16 provide example CSMs for waste sites 216-S-6 and 216-U-7, respectively.

The waste site-specific information to be included in the Information Summary is as follows:

- **History.** This section provides site-specific information behind the process waste stream, the type of waste, and waste site use. Other site associations and consolidations are described. Interim actions are summarized to indicate the time period, basis for action, and the action taken/completed. Post action results including remaining impacts and current waste site configuration are defined. Site posting information is also described, if applicable.
- **Description of Construction.** If the waste site is an engineered structure, dimensions and types of materials used to construct the site are discussed. For nonengineered structures, land surface features (e.g., natural depression, natural pit) are described.
- **Waste Quantity.** The total quantity of waste managed or stored within the waste site over the life of the site is summarized.
- **Duration.** The number of years of operation or the occurrence report date (for UPRs) is reported in this section. If a waste site had a significant nonoperating period and was then reactivated, this information is indicated.
- **Contaminant Inventories.** Radioactive contaminants followed by nonradioactive contaminants are described. Contaminant volumes and mobility are presented.
- **Knowledge Basis.** Four check boxes representing history/process knowledge, geophysics, geologic logs, and analytical data are available for selection to represent the sources of information used to support the development of the Information Summary.
- **Characterization.** Summary of investigation and actions are included in this section. Example information may include site walk survey results, surface and/or down-hole geophysics, soil vapor surveys, geologic log results, and high-level sampling and analysis.
- **Uncertainty.** Waste site uncertainties are identified in this section.
- **Nature and Extent.** The current nature and extent of contamination is identified. If cleanup activities have been performed at the site, only postcleanup characterization results are included. Where limited characterization information for potential migration to groundwater is available for the waste site, vadose zone pore volume will be estimated, based on discharge volumes.
- **Summary Statements.** This section identifies whether the available information suggests that the site poses a threat to human health and the environment through a direct exposure pathway or is a potential threat to groundwater.

Crib

SAMPLE -- 216-S-6 Conceptual Site Model (draft)

200-SC-1

HISTORY

The 216-S-6 Crib is located southwest of the 202-S Building and northwest of the 216-S-5 Crib. 216-S-5 and S-6 Cribs were constructed in 1954 to replace 216-S-17 Pond. The crib received contaminated cooling water condensate from the 202-S Building until June 1967, when the 202-S Building was put on standby. In September 1955, the crib was intentionally breached to allow overflow to the ground surface south of the crib in the general vicinity of 216-S-17 Pond. From July 1967 to July 1972, the crib received condensate from waste concentrators in the 202-S Building. The waste was low-salt, neutral to basic, and contained nitrates and varying concentrations of mixed fission products. The crib was surface stabilized in September 1990 and designation changed to Underground Radioactive Material (URM) Area.

Construction

The crib has bottom dimensions of 64 m (210 ft) by 64 m (210 ft), and is 4.5 m (15 ft) deep with a side slope of 1.5:1. It contains approximately 42,400 cubic m of gravel fill and 12,000 cubic m of backfill soil. A perforated corrugated metal pipe runs down the center of the crib, and six 0.3 m (12 in) pipes branch off perpendicular to the main pipe to distribute liquid waste 2 m (7 ft) below grade. Each pipe is 33 m (100 ft) long with a riser at each end located 0.6 m (2 ft) below the surface. The surface is sand and gravel with minimal vegetation.

Waste Quantity 4.47 E+9 Liters

Duration November 1954 through July 1972

Contaminant Inventories

Constituent	Amount	Mobility
Nitrate	250000kg	High
Nitrite	220000kg	High
Tritium	3.5Ci	High
Strontium-90 + D	5.8Ci	Low
Yttrium-90	5.8Ci	No Kd
Cesium-137 + Daughters	11.3Ci	Low
Barium-137m	10.7Ci	No Kd
Samarium-151	0.6Ci	Low
Uranium-234	0.3Ci	Low
Uranium-238 + D	0.3Ci	Low
Plutonium-239	0.2Ci	Low
Plutonium-241 + D	0.3Ci	Low

KNOWLEDGE BASIS

☑ History/Process Knowledge ☑ Geophysics ☑ Geologic Logs ☑ Analytical Data

CHARACTERIZATION

The crib is characterized by the following activities:
1. Drilled vadose well 299-26-51 (A8061) to 30 m (100 ft) bgs in 1983 near the center of the crib and conducted gamma logging.
2. Drilled boring C8174 in the center of the crib in 2006 to a depth of 30 m (100ft). Soil samples were collected and analyzed and spectral gamma logging was conducted.
3. Groundwater monitoring of the site was conducted at well 299-W26-2 and well 299-W26-3.
4. Spectral gamma logging of well 299-26-2 was conducted in 1977.

UNCERTAINTY

The actual discharges to the Crib were variable and not well defined at the time of discharge. The potential for groundwater impacts from neighboring waste sites (e.g., 216-S-5 and 215-S-17) may complicate interpretation of impacts from this Crib. Potential co-mingling of contamination from this waste site with previous contamination from 216-S-17 complicates evaluation of near surface contamination. Records reviewed indicated that no flow was observed from the opened side of the Crib, however, aerial photos from 1954 suggested ponded water in the vicinity south of 216-S-6.

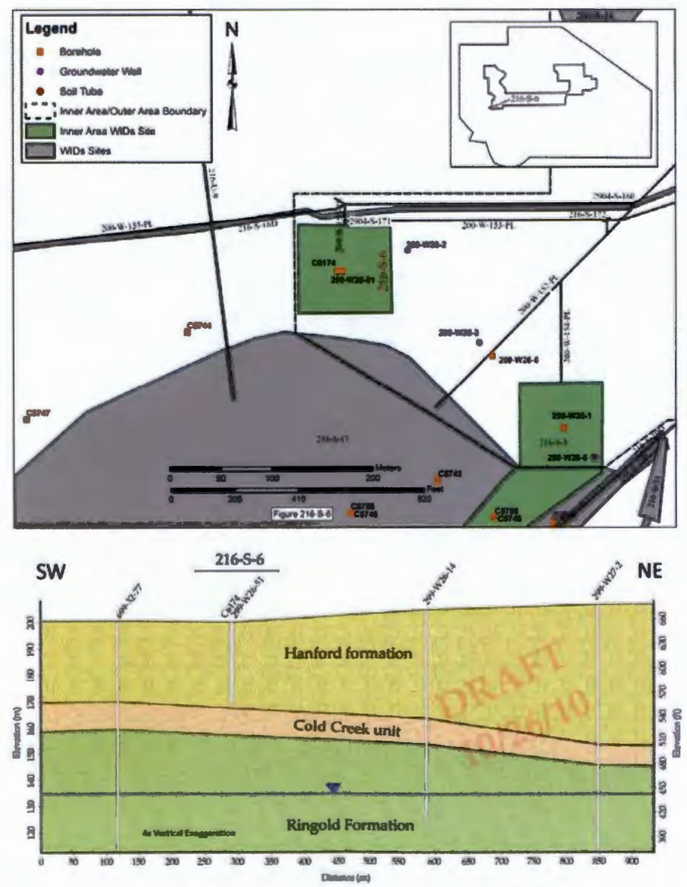


Figure 3-15. Conceptual Site Model for the 216-S-6 Crib

NATURE AND EXTENT

Contaminant inventories are based on the process description for 216-S-6 and are estimated values from the Soil Inventory Model (SIM), decayed through 2001. The model results indicate a moderate contaminant inventory at Site 216-S-6.

Radiological contaminants were detected in Borehole A8061 from 3 m (10 ft) bgs to 24 m (80 ft) bgs in 1983. Spectral logging in 2006 detected cesium-137 from 2 m to 19 m (7 to 62 ft) bgs and intermittently from 19.5 m to 27 m (64 to 89 ft). The maximum concentration of cesium-137 was approximately 3,800 pCi/g at 14 m (45 ft) bgs.

Analysis of soil samples collected from borehole C8174 during drilling revealed the following contaminant concentrations in the vadose zone underlying the crib:
-- Chromium from 1.2 to 30 m (4-99 ft) bgs / max of 29 mg/g @ 5 m
-- Nickel from 1.2 to 30 m (4-99 ft) bgs / max of 21.7 mg/g @ 5 m
-- Barium from 1.2 to 30 m (4-99 ft) bgs / max of 141 mg/g @ 7.3 m
-- Cs-137 from 1.2 to 21 m (4-69 ft) bgs/max of 13,800 pCi/g @ 5 m
-- Pu-238 from 2.4 to 5 m (8-16 ft) bgs/max of 2.0 pCi/g @ 5 m
-- Pu-239/240 from 2.4 to 26 m (8-85 ft) bgs/max of 1000 pCi/g @ 5 m
-- U-233/234 from 1.2 to 30 m (4-99 ft) bgs/max of <5 pCi/g @ 7.3 m
-- U-235 from 1.2 to 30 m (4-99 ft) bgs/max of 1.4 pCi/g @ 7.3 m
-- U-238 from 1.2 to 30 m (4-99 ft) bgs/max of 2.6 pCi/g @ 9.3 m
-- Am-241 from 2.4 to 30 m (8-99 ft) bgs/max of 273 pCi/g @ 5 m
-- Np-237 from 2.4 to 21 m (8-69 ft) bgs/max of 0.58 pCi/g @ 7.3 m
-- Ni-63 from 5 to 7.3 m (16-24 ft) bgs/max of 46 pCi/g @ 7.3 m
-- Radio-Sr from 5 to 21 m (21-69 ft) bgs/max of 6,600 pCi/g @ 7.3 m

The deepest detections of contaminants exceeding background were uranium-235 and uranium-238 at a depth of 26 m (85 ft) bgs beneath the Crib.

Spectral gamma logging of borehole C6174 detected cesium-137 from 0.3 m (1 ft) to 30 m (99 ft) bgs with a maximum of 13,000 pCi/g at 5 m (15 ft) bgs. Neutron moisture data indicated variable residual moisture over the inspected profile. Passive neutron data indicate no evidence of neutron activity.

The 1977 scintillation probe profile for well 299-W26-2 found only background radiation levels outside the crib, indicating minimal horizontal spreading in the vadose zone.

Groundwater monitoring at well 299-W26-2 indicated elevated Sr-90 (960 pCi/L) in 1960. Monitoring well 299-W26-3 exhibited in a tritium concentration of 400,000 pCi/L in 1974 as well as Sr-90 at 960 pCi/L. Cs-137 and Co-60 were also detected at well 299-W26-3.

The following contamination conditions are indicated at 216-S-6 Crib:

-- Vadose zone contamination by variable levels of residual Cs-137 and other contaminants between 0.3 and 30 m (1 to 99 ft) bgs.

-- Although the point of release of the crib was well below ground surface, spectral gamma logging has detected contamination near the ground surface.

-- Historical groundwater monitoring has detected elevated concentrations of radionuclides in groundwater immediately down gradient of the crib. This indicates the likelihood that the site historically exhibited full-thickness vadose zone contamination. Historical discharges to nearby sites (e.g., 216-S-17 Pond and 216-S-5 Crib) may also have contributed to observed contamination.

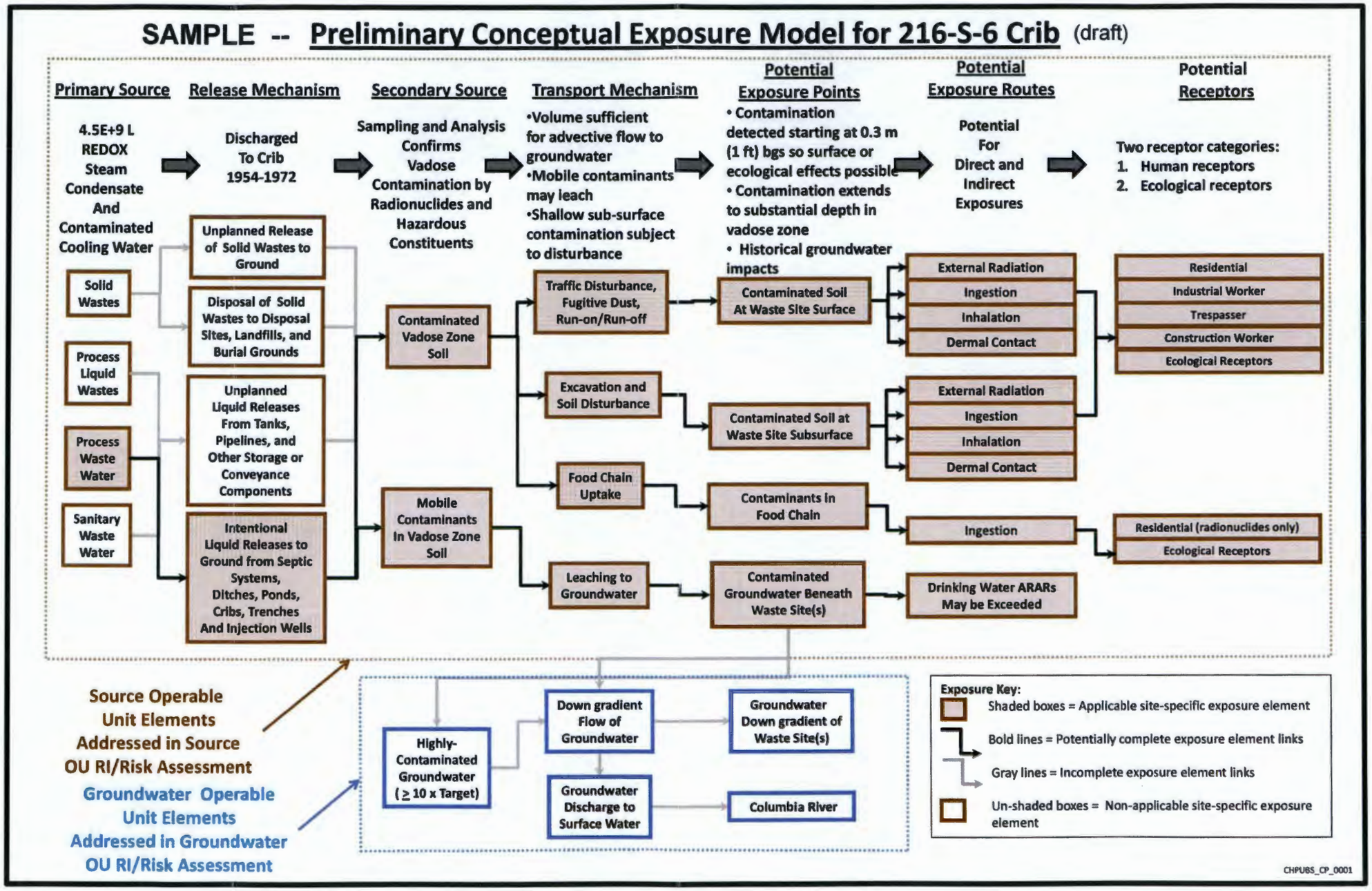


Figure 3-15. Conceptual Site Model for the 216-S-6 Crib (cont)

French Drain

SAMPLE -- 216-U-7 Conceptual Site Model (draft)

200-MG-2

HISTORY

The 216-U-7 French Drain is located on the southeast side of the 221-U Building near Section 6, northwest of the 241-UX-154 Diversion Box. It received episodic release of acidic process condensate from a counting box floor drain during the metal recovery program at the 221-U Building. The volume discharged was not measured and is not specified. The site was retired in June 1957 after the uranium recovery operations in the 221-U Building were shut down. In 1998, the surface contamination areas on the East side of the 221-U building (where this site is located) were surface stabilized with material from the 200 Area Ash Pit and clean gravel. The French Drain is now within a larger area that has been stabilized and posted with Underground Radioactive Material (URM) signs.

Construction

The French Drain is constructed of a 76 cm (30 in) diameter concrete pipe set vertically to a depth of 5.2 m (17 ft) bgs. Gravel fills 1.1 m (3.5 ft) of the pipe. The site has been covered with clean backfill material and 2.5 cm to 7.5 cm (1 in to 3 in) of 2.5 cm (1 in) minus gravel. Detailed drawings indicate that the French Drain is connected to the 221-U counting box. The pipe from the floor drain enters the French drain at a depth of 4 m (13 ft) bgs.

216-U-7 is located close to the southeast side of 221-U Building and is expected to fall within the footprint of the planned engineered barrier to be constructed over 221-U Building.

Waste Quantity Unspecified; assume <10,000 Liters

Duration March 1952 to June 1957

Contaminant Inventories

Constituent	Amount	Mobility
Nitrate	2kg	High
Sulfate	0.5kg	No Kd
Fluoride	0.004kg	No Kd
Chloride	0.005kg	No Kd
Nickel-63	1E-05Ci	Low
Strontium-90 + D	7E-07Ci	Low
Cesium-137 + Daughters	1E-05Ci	Low
Samarium-151	4E-06Ci	Low
Tributyl Phosphate		Low

KNOWLEDGE BASIS

☑ History/Process Knowledge ☐ Geophysics ☐ Geologic Logs ☐ Analytical Data

CHARACTERIZATION

No site-specific characterization of this waste site has been performed. This waste site is expected to be functionally similar to the 216-U-4A French drain and the process condensate waste discharged is expected to be the same waste discharged to 216-U-8, 216-U-12 , and 216-B-12 Cribs, without pH adjustment.

UNCERTAINTY

The site-specific horizontal and vertical extent of contamination is undefined by measurements. The quantity of liquid waste discharged to this site, however is expected to be relatively small as the drain would have been used during episodic maintenance and/or repair activities. For planning purposes, it is assumed that the counting box was drained and flushed 2 x per year for 5 years, using 1,000 L per flush (10,000 L total discharge). Actual volume could be as low as near zero. Subsurface contamination conditions can be represented by conditions observed at nearby 216-U-4A French drain.

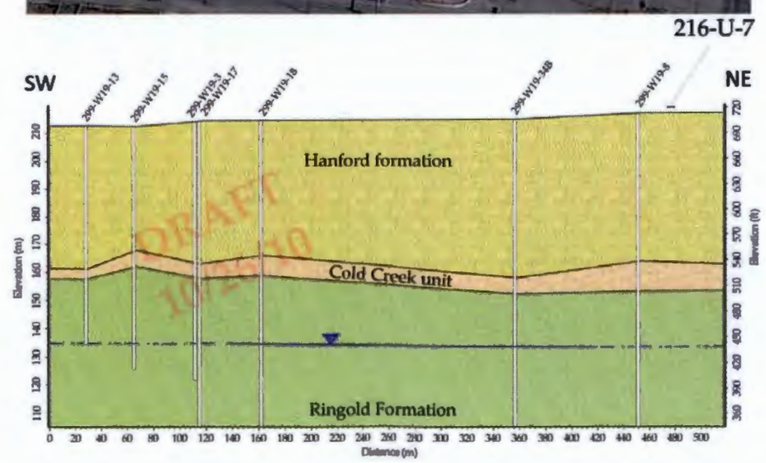


Figure 3-16. Conceptual Site Model for the 216-U-7 French Drain

NATURE AND EXTENT

The site inventory is estimated using the Soil Inventory Model (SIM). The site should have received only a modest volume of waste over the operating period. 216-U-7 French drain has not been characterized, however, the waste stream and operating conditions are similar to two other characterized waste sites (e.g., 216-U-12 and 216-U-4A, respectively) associated with historical U Plant operations.

The nature of the waste can be extrapolated from knowledge of discharges of this waste stream (i.e., acidic process condensate) to other waste sites (e.g., 216-U-8 and 216-U-12). The waste was strongly acidic (i.e., pH about 0.5) and contained nitric acid, uranium, mixed fission products, and some organics (i.e., kerosene-range hydrocarbons and tributyl phosphate). Observations from these cribs indicate that the contaminants in process condensate were relatively mobile in the large volumes discharged to the cribs. Although geochemically similar to to the crib discharges, this French drain is expected to have received orders of magnitude less volume than the cribs.

Understanding of the estimated extent of potential contamination at this waste site may be extrapolated from observations and measurements made in soil boring 299-W19-98 near waste site 216-U-4A French drain, which received acidic laboratory waste from the nearby 222-U Building. Contamination at 216-U-7 would not be expected to have migrated farther into the vadose zone than that observed at 216-U-4A.

Soil contamination apparently related to 216-U-4A was observed to a depth of about 5 m (16 ft) bgs. Contaminants measured in this interval included:
– Am-241 from 1.49 to 7.7 m (5 to 25 ft) bgs/max of 200 pCi/g at 3.7 m (12 ft) bgs
– Cs-137 from 1.49 to 3.73 m (5 to 12 ft) bgs/ max of 420 pCi/g at 1.49 m (5 ft) bgs
– Sr-90 from 1.49 to 4.91 m (5 to 16 ft) bgs/ max of 93 pCi/g at 1.49 (5 ft) bgs

Between 5 m and 11 m (16 ft to 37 ft) bgs, contaminant concentrations interpreted as related to 216-U-4A diminished to, or below, background levels.

The waste stream released to 216-U-7 French drain would have been process condensate, which was routed through the counting box for in-line radiation monitoring on its way to the 241-WR vault. During maintenance activities, pipes within the counting box would have been drained to the box floor and the drainage and flush water routed to the French drain.

Reports of a June 1953 release of uranyl nitrate hexahydrate (UNH) solution that overflowed to the 221-U Building vessel vent blower pit were incorrectly assigned to 216-U-7; this release reportedly went to the vessel vent blower pit, where the floor sump drained to the 241-WR Vault.

The following contamination conditions are indicated at 216-U-7 French drain:

– Contamination by relatively low levels of radionuclides, nitrate, and kerosene-range hydrocarbons and TBP is expected within the upper 4.6 m (15 ft) of the vadose zone, but not at the surface (i.e., the discharge to the French drain occurred at 4 m (13 ft) bgs.

– The point of release is deeper than 3 m (10 ft) bgs and exposure to ecological receptors and food chain effects are not anticipated.

– The relatively small volume of waste discharged to 216-U-7 French drain is not expected to have directly affected groundwater during the operating period.

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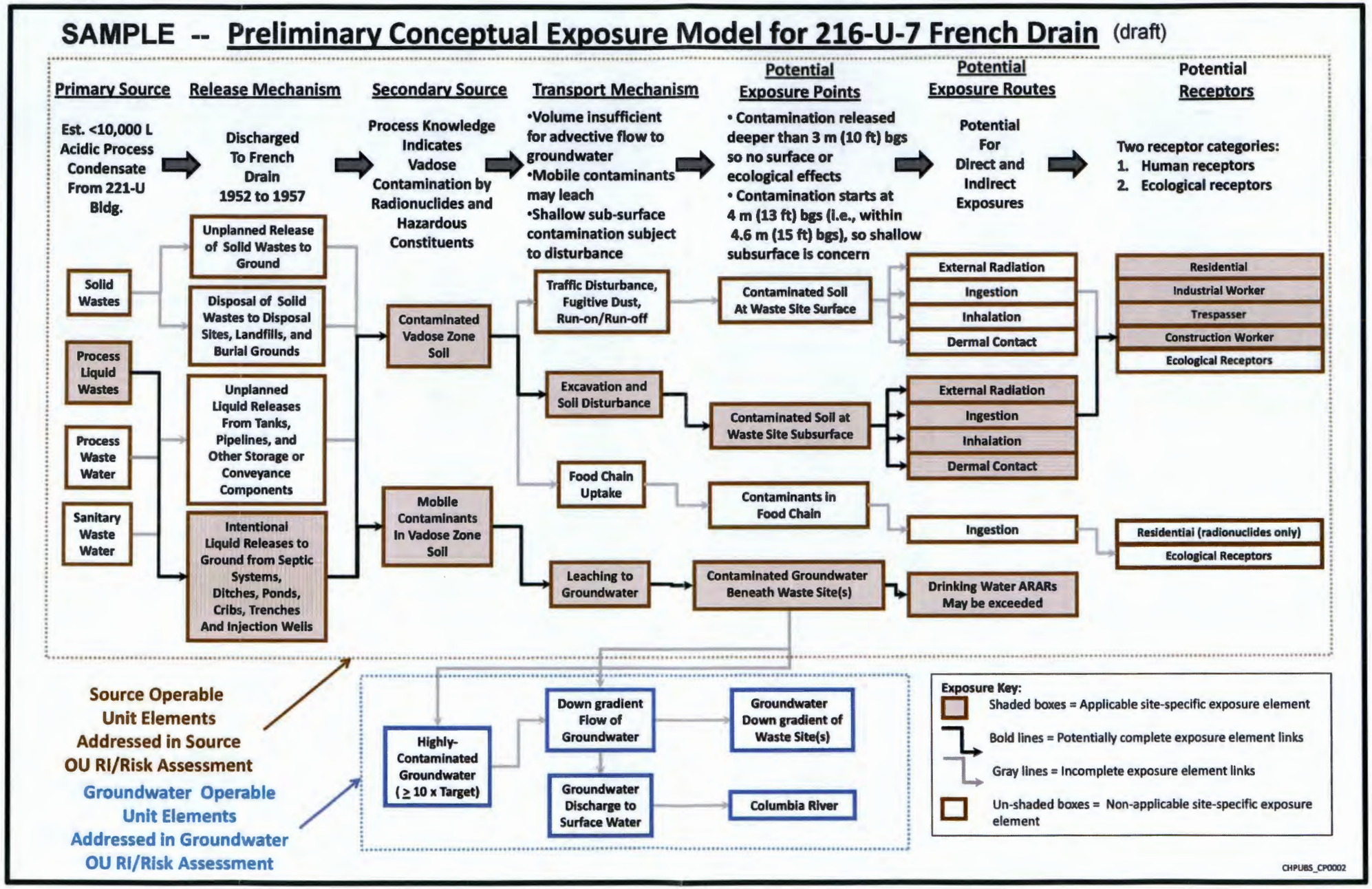

Figure 3-16. Conceptual Site Model for the 216-U-7 French Drain (cont)

- **Aerial View Figure** This image shows the waste site in relation to waste sites and sampling locations within the immediate vicinity and may be represented by a map or photograph.

- **Cross Section Figure .** This image depicts the cross section of the site, groundwater level, and geological formation in relation to the sampling depths and waste site location.

3.8 Preliminary Baseline Risk Assessment Approach

The purposes of a BRA are to assess potential risks associated with residual contamination at a site under baseline conditions (i.e., no further action), identify key radionuclide and chemical contributors to risk, identify key exposure pathways, and determine if there is a need to take an action to reduce risks. "Role of Baseline Risk Assessment in Superfund Remedy Selection Decisions" (Clay, 1991 [OSWER Directive 9355.0-30]) provides clarification of the role of the BRA in developing Superfund remedial alternatives and supporting risk management decisions. This directive states that the BRA is part of the RI. It further states the following:

> The baseline risk assessment should "characterize the current and potential threats to human health and the environment that may be posed by contaminants migrating to groundwater or surface water, releasing to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain" ([NCP] Section 300.430(d)(4)). The primary purpose of the baseline risk assessment is to provide risk managers with an understanding of the actual and potential risks to human health and the environment posed by the site and any uncertainties associated with the assessment. This information may be useful in determining whether a current or potential threat to human health or the environment exists that warrants remedial action.

3.8.1 Baseline Risk Assessment—General Approach

The following sections provide a brief overview of the elements that will be used for the human health risk assessments (HHRAs) and ecological risk assessments (ERAs) for the Inner Area. The complete description of the methodology is presented in Appendix G, including components specific to the 200-WA-1/200-BC-1 waste sites.

3.8.1.1 Human Health Risk Assessment Approach

The HHRA methodology under CERCLA is a four-step process: hazard identification, exposure assessment, toxicity assessment, and risk characterization. Human health risks also will be assessed based on methods described in WAC 173-340, "Model Toxics Control Act—Cleanup." Methods in the *Model Toxics Control Act* (MTCA) are derived from EPA's Risk Assessment Guidance for Superfund (EPA/540/1-89/001, *Risk Assessment Guidance for Superfund Volume II Environmental Evaluation Manual: Interim Final*). Along with the exposure scenarios, which will be evaluated using the methodology based on CERCLA guidance, human health risks for nonradionuclide COPCs in soil will be assessed using Method B (WAC 173-340-740, "*Unrestricted Land Use Soil Cleanup Standards*") to evaluate baseline risk and Method C (WAC 173-340-745, "*Soil Cleanup Standards for Industrial Properties*") to support the alternatives analysis in the FS. Cancer risks evaluated using Method B will be compared to a target cancer risk of 10^{-6} for individual COPCs and a target cancer risk of 10^{-5} when multiple COPCs are present at a site. Noncancer effects for individual and multiple COPCs will be evaluated by comparison with a hazard index (HI) of 1. Cancer risks evaluated using Method C will be compared to a target cancer risk of 10^{-5} and an HI of 1 for both individual and multiple COPCs (WAC 173-340-700(5)(b)).

3.8.1.2 Ecological Risk Assessment Approach

The ERAs will present an assessment of the potential adverse effects to ecological receptors. Evaluation of potential ecological risks will achieve the following objectives:

- Evaluate potential threats to the ecological receptors in the terrestrial environment from releases of hazardous substances (chemicals and radionuclides).
- Establish Hanford Site-specific PRGs, as appropriate.
- Facilitate selection of remedial alternatives with respect to risks to ecological receptors.

The ERAs for the Inner Area will be conducted using a tiered approach. The basic approach for the ERAs will be consistent with EPA guidance (EPA/540-R-97-006, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments: Interim Final*; EPA/630/R-95/002F, *Guidelines for Ecological Risk Assessment*; and EPA/540/F-01/014, *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments*), which is an eight-step process with built-in critical management and decision points to allow stakeholder input on the evaluation of interim findings and refinement of the technical approach. The approach will also be consistent with Ecology's "Terrestrial Ecological Evaluation Procedures" (WAC 173-340-7490, "*Terrestrial Ecological Evaluation Procedures*") and DOE-STD-1153-2002.

The approach will incorporate concepts discussed in EPA's *Framework for Metals Risk Assessment* (EPA 120/R-07/001) and EPA/540/F-01/014. In addition, data from the numerous ecological studies (including biological surveys, environmental sampling programs, and risk assessments that have been conducted at the Hanford Site since the 1970s) will be discussed and incorporated, as appropriate.

The ERAs will include a comparison of radionuclide and chemical concentrations to the risk-based ecological concentrations that are available at the time the risk assessment is submitted (see Appendix G for a description of the tiers of ecological risk-based concentrations that will be used in the ERAs). This screening of data against ecological risk-based concentrations is intended to differentiate between analytes that clearly present no risk and those for which existing data are not sufficient to conclude the absence of risk. This information will help guide future actions that will be used in the FS process and will help select PRGs from the available ecological risk-based concentrations.

3.8.1.3 Protection of Groundwater Evaluation Approach

The assessment of the potential for contaminants to migrate to groundwater will be conducted using a GA that is currently under development and will be further detailed in the RI/FS reports and summarized in the BRAs for the Inner Area. At the current stage of development, the GA for assessment of groundwater protection consists of two tiers. The first tier uses screening levels as thresholds for determining whether further evaluation of an analyte is warranted for the groundwater protection pathway. The second tier uses PRGs as comparison criteria. Appendix G provides the basis for the screening levels and the groundwater protection PRGs. The overall approach will include the following activities:

- Comparison of concentrations of analytes in the vadose zone to background levels and screening levels
- Site-specific evaluation for waste sites that do not meet generic criteria used for screening levels
- Comparison of concentrations of analytes in the vadose zone to groundwater protection PRGs
- Site-specific evaluation, including fate and transport modeling, for waste sites that do not meet generic criteria used for groundwater protection PRGs

Waste sites with analyte concentrations in the vadose zone that exceed the groundwater protection PRGs will be carried forward to the FSs for remedial alternatives analysis. The GA and model inputs/outputs will be provided in the RI/FS reports and summarized in the BRAs for the Inner Area.

3.8.2 Baseline Risk Assessment Components Common to Inner Area Operable Units

The components of the BRAs that are common to each of the Inner Area OUs are current and reasonably anticipated future land use, current and reasonably anticipated future groundwater use, and the Inner Area human and ecological receptors. In addition, there will be a single approach used for the identification of COPCs for quantitative evaluation in the risk assessment and development of the PRGs.

3.8.3 Baseline Risk Assessment Inputs

In addition to defining the elements of the BRA, there will be specific inputs to the BRA for each OU in the Inner Area. OU-specific input information includes preliminary CSMs and information on the nature and extent of known contamination.

3.8.3.1 Preliminary Conceptual Exposure Model

The preliminary CEM will support the Inner Area BRAs. Information pertaining to contaminant sources, release mechanisms, transport media, exposure routes, and receptors is used to develop a conceptual understanding of potential exposure pathways. Assumptions concerning potential receptors are based on the current and reasonably-anticipated future Industrial land use.

3.9 Preliminary Remediation Goals

The PRGs are radionuclide-specific or chemical-specific concentration goals for specific media and anticipated future use of land. The PRGs serve as a target to use during the initial development, analysis, and selection of cleanup alternatives. These goals should be protective of human health and the environment and comply with ARARs for all exposure pathways being addressed.

Initial risk-based PRGs will be developed for use in the ERA portions of the BRA and the FS. These PRGs may be modified later during development of the FS and based on results of the BRA. The BRAs clarify exposure pathways and may identify situations where cumulative risk of multiple contaminants or multiple exposure pathways indicate the need for more or less stringent cleanup levels than those initially developed as PRGs. In addition to being modified based on the baseline risk assessment, PRGs and the corresponding cleanup levels may also be modified based on the given waste management strategy selected at the time of remedy selection that is based on the balancing of the nine criteria used for remedy selection (40 CFR 300.430). The FS will develop and evaluate a range of alternatives, including No Action. In order for all alternatives to be considered viable, they must demonstrate they are protective of human health and the environment and be compliant with ARARs.

3.10 Documenting Baseline Risks for 200 West and 200 East Areas (Inner Area)

The results of the BRAs will be documented in two reports: the BRA for the 200 West Inner Area and the BRA for the 200 East Inner Area. The two reports will document the risks associated with the waste sites in the 200 West and 200 East Areas (Inner Area), provide documentation of the need for taking cleanup actions, and provide a basis of comparison for risks at the waste sites. The BRAs for the Inner Area will address both human health and ecological risks for each of the OUs within the respective areas. In addition, a summary discussion of potential threats to groundwater will be included in the Inner Area BRAs. The groundwater OUs will each have their own BRAs that are independent of the Inner Area BRAs.

Table 3-6 identifies the OU inputs that will be included in the 200 West and 200 East Areas (Inner Area) BRAs. Pipeline systems and associated UPR waste sites within these OUs will be included in the BRAs.

Table 3-6. OUs Addressed in the 200 West and 200 East Areas (Inner Area) Baseline Risk Assessments

200 West Inner Area	200 East Inner Area
200 WA-1 OU/200-BC-1	200-EA-1 OU/200-IS-1 OU
200-CR-1 OU (REDOX)	200-CB-1 OU and 200-CP-1 OU (B Plant and PUREX)
200-SW-2 OU (west landfills only)	200-SW-2 OU (east landfills only)
200-DV-1 OU (west area waste sites only)	200-DV-1 OU (east area waste sites only)
200-IS-1-OU (west area waste sites only)	200-IS-1 OU (east area waste sites only)

These two documents will be published as stand-alone reports that will support the development of the RI reports for the OUs in each geographical area.

Appendix G provides details of the methodology that will be used for the West Inner Area BRA. Both current and future risks (assuming reasonably anticipated future land use) will be considered to evaluate whether a waste site grouping does or does not present an unacceptable risk to human health and the environment. These Inner Area BRAs will also include an exposure scenario that assumes unrestricted land use for evaluating baseline risks.

3.11 Preliminary Remedial Action Objectives

Section 300.430(e)(2)(i) of the NCP specifies that remedial action objectives (RAOs) be developed that specify contaminants and media of concern, potential exposure pathways, and remediation goals. For the purposes of assessing data adequacy, this section includes an initial identification of RAOs. The RAOs will be refined as needed, based on the BRA, and used during the detailed analysis of alternatives conducted in the FS. The RAOs will be finalized and documented in the ROD.

The RAOs listed below are preliminary descriptions of what the remedial action is expected to accomplish. RAOs are also used to evaluate the various remedial alternatives and long-term protectiveness:

- **RAO-1**—Prevent or mitigate unacceptable risk to human health and ecological receptors associated with radiological exposure to waste or soil contaminated above risk-based criteria.
- **RAO-2**—Prevent or mitigate unacceptable risk to human and ecological receptors associated with chemical exposure to waste or soil contaminated above risk-based criteria.
- **RAO-3**—Control the sources of potential groundwater contamination to support the Central Plateau groundwater goal of restoring and protecting the beneficial uses of groundwater.

4 Work Plan Approach and Rationale

This chapter presents the approach and rationale for conducting the RI/FS for the 200-WA-1/ 200-BC-1 OUs. The data collected during the RI will be used to characterize the waste sites, support the BRA, and evaluate remedial action alternatives. Characterization activities are based on identified data gaps that will be filled to support the RI/FS. The SAP will describe the types of analyses to be performed; the samples to be analyzed; and the precision, accuracy, representativeness, completeness, and comparability parameters to be used in order to obtain a sufficient representation of conditions at the site. The SAP will be prepared following approval of this work plan. If during the RI/FS process additional data needs are identified to support development of remedial alternatives, then a supplemental DQO and SAP will be developed.

4.1 Strategy for Defining Data Needs

Data gathering occurs at various stages in the RI/FS, remedial design, and remedial action process:

Decision Stage. Data are collected during the RI to support the following actions:

- Identify contaminant sources.
- Evaluate the nature and extent of contaminants in environmental media.
- Evaluate potential risks to human health and the environment.
- Determine the need for action through the BRA.
- Support the development and evaluation of remedial action alternatives to mitigate unacceptable risks.

Remedial Design Stage. Additional field data may be collected to support remedial design. For example, sampling may be conducted to more precisely determine the boundaries of an excavation and to verify waste characterization information for disposal purposes.

Remedy Implementation Stage. Additional confirmation or verification data may be obtained to support remedy implementation and may be obtained during the observational approach.

Remedy Completion Stage. Data may be collected during this stage to verify that the remedy is effective and mitigates the identified risk for the waste sites, and that the remedial action is complete.

This work plan presents an evaluation of data at the decision stage. Information concerning the nature and extent of contamination at waste sites was assessed to determine whether sufficient data exist to evaluate risks and consequently develop an appropriate remedial decision. It is important to remember that in assessing the need for data at this stage, the desired outcome is risk and remedy determination, not elimination of all uncertainty. The 200 West Area has a significant body of historical data that was included in this evaluation. This chapter focuses additional data gathering on waste sites where uncertainty precludes risk evaluation or remedial alternative decision.

The approach to determining data needs to support remedy selection of 200-WA-1 OU waste sites in this work plan assumes a bias toward RTD, whenever practicable, to break the direct contact pathway to receptors. RTD candidates include waste USTs and waste sites associated with near-surface vadose zone contamination. Sampling and analysis associated with the removal action will be conducted during the remedial design and/or implementation stage. In the event these site are determined to pose a threat to groundwater during the remedial design and/or implementation stage the bias toward RTD as the

appropriate remedy will be re-evaluated and other remedial alternatives may be selected (e.g. monitored natural attenuation, no further action, partial RTD or construction of an engineered barrier).

4.1.1 Data Needs Assessment Process

The goal of the data needs assessment is to identify waste sites that require additional data in order to evaluate risks or to enable selection of a final remedy. Data needs are identified by reviewing uncertainties associated with the nature and extent of contamination, contaminant migration pathways, future groundwater quality impacts, assessment of risk to human health and the environment, and development of remedial action alternatives.

The following are site-specific objectives of the data needs assessment:

- Evaluate the available data on the nature and extent of known and potential environmental contamination at each waste site.
- Determine whether the data are sufficient to assess risk to human health and the environment and to make remedial decisions.
- Where data are determined to be insufficient, recommend sampling and analysis to fill the data gap.

This section presents a summary of the process that was used to meet site-specific objectives. As described in Section 3.3.1, the 200-WA-1/200-BC-1 waste sites were segregated into the following five geographical and operation-based units:

1. T Plant Vicinity
2. PFP (Z Plant) Vicinity
3. U Plant Vicinity
4. REDOX (S Plant) Vicinity
5. BC Cribs and Trenches Vicinity (200-BC-1 OU)

The distribution of sites within the geographical and operation-based areas allows for the assessment of data needs for the following situations:

- Sites with similar plant process, geochemistry, and potentially expected contaminants
- Analytical data, geologic and soils information, and groundwater parameters for a similar area
- Other remedial action decisions affecting waste sites within a geographical area (for example, proposed Canyon facility or tank farm barriers)
- Potentially similar contaminant exposure routes

The 200-WA-1/200-BC-1 waste sites are identified by geographical area, waste site type, and primary source in Table B-5, located in Appendix B. Figure 4-1 provides an overview of the data needs assessment process.

Baseline risk screening is focused on in Chapter 3. Section 3.12 summarizes preliminary RAOs. Table B-8 (in Appendix B) is a Preliminary Screening of Remedial Technologies for Vadose Zone Remediation of Radionuclides, Hexavalent Chromium, Other Metals, and Organic Compounds—Hanford 200 West Area.

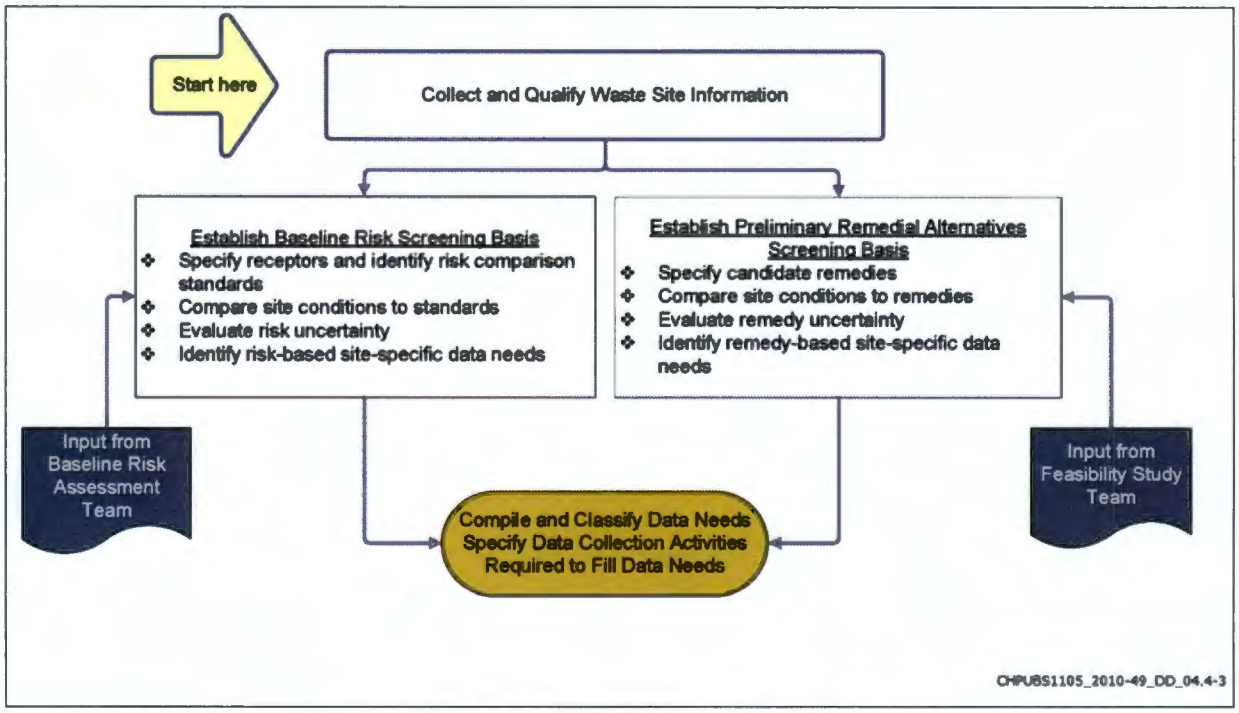

Figure 4-1. Data Needs Assessment Process Overview

4.1.2 Site-Specific Assessment Process

Information on the nature and extent of contamination at waste sites was assessed to determine whether sufficient data exist to evaluate risks and consequently develop an appropriate remedial decision. Data needs checklists were filled out for each 200-WA-1/200-BC-1 waste site during process execution and are included as Appendix H. The checklists start with identification of previous remedy evaluations in former documents for the waste site and whether a planned remedy for a nearby site potentially affects the waste site.

The following categories are then evaluated for outstanding data:

- **Site Location Confirmed?**
- **Contamination Present?**
  (Process-related constituents greater than background concentration; radioactive/nonradioactive/organic/inorganic)
- **Primary Source Identified?**
  (Solid waste, process liquid waste, process waste water, sanitary waste water)
- **Secondary Source(s) Identified?**
  (Non-aqueous phase liquid (NAPL), volatile organic compounds, contaminants in soil, surface contamination)
- **Concentration Range Defined?**
  (Apparent minimum and maximum)
- **Distribution in Affected Media Described?**
  (Extent of lateral and vertical contaminant distribution; estimated volume of affected media)
- **Exposure Scenario(s) Identified?**
  (Migration mechanisms defined, potential exposure points identified, exposure routes identified, potential receptors identified)

- **Unique Geochemical Characteristics Identified?**
  (Presence of NAPLs, extreme pH conditions, mobility enhancing/retarding conditions)
- **Deep Vadose[1] Impacts Present?**
  (Greater than 4.6 m [15 ft] bgs)

The site-specific evaluation process, illustrated in Figure 4-2, was applied to each site using the information compiled on the checklists.

4.1.3 Integration of Previous Evaluations

Many of the waste sites in 200-WA-1 have been evaluated in one or more of the following reports:

- DOE/RL-2003-23, *Focused Feasibility Study for the 200-UW-1 Operable Unit*
- DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*, and DOE/RL-2008-45, *Engineering Evaluation/Cost Analysis for the 200-MG-2 Operable Unit Waste Sites*
- DOE/RL-2003-24, *Proposed Plan for the 200-UW-1 Operable Unit*
- DOE/RL-2009-86, *Action Memorandum for Non-Time-Critical Removal Action for 37 Waste Sites in the 200-MG-1 Operable Unit*
- DOE/RL-2009-37, *Action Memorandum for Non-Time-Critical Removal Action for 200-MG-2 Operable Unit*
- DOE/RL-2005-71, *Action Memorandum for the Time Critical Removal Actions for Support Activities to the 200-UW-1 Operable Unit*

These evaluations considered a range of remedial alternatives.

4.1.4 Use of Representative Sites

Using a comparable site requires that it be sufficiently similar in design, primary waste source and volume, waste release scenario, hydrogeologic conditions, and contaminant migration. These similarities allow the characterized site to provide a comparable analysis or to provide bounding conditions for the uncharacterized site, to support vadose zone modeling, if necessary. Appropriate remedial design characterization, as necessary to support remedial action, will then be performed at waste sites during design or remediation.

Generally, the representative sites are conservative comparisons and require that the following elements be similar:

1. **Design:** Waste site construction determines the depth and configuration of the discharge area.
2. **Primary waste source and volume:** Waste sites that received large radionuclide inventories as a liquid waste pose a different threat than sites receiving solid waste or liquid discharge containing contaminant concentrations near background levels.
3. **Waste release scenario:** Are the total discharges to the units comparable and are loading rates comparable?

[1] This definition of Deep Vadose is solely for the purpose of the 200-WA-1 data needs assessment.

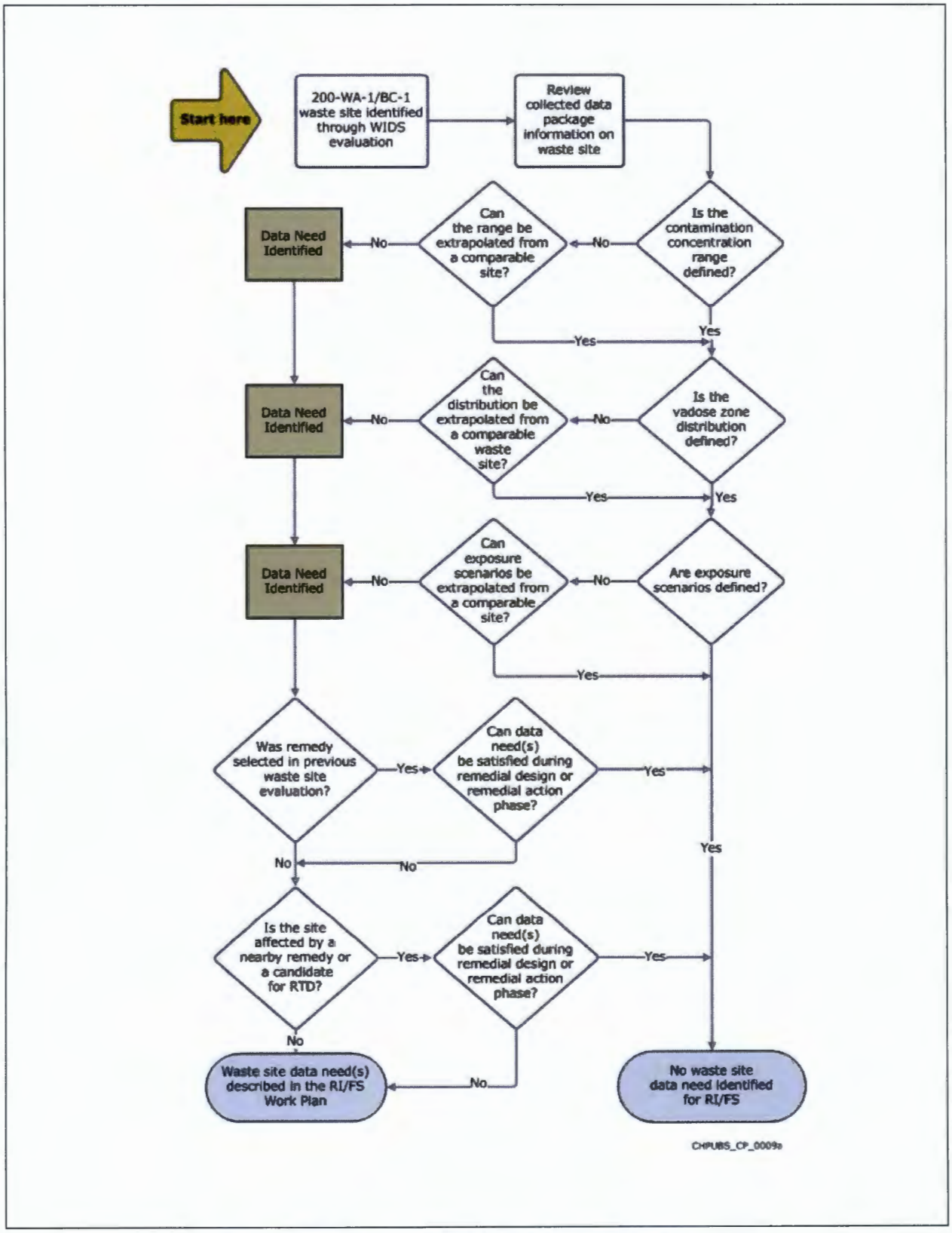

Figure 4-2. Site-Specific Data Needs Assessment Process

4. **Hydrogeologic conditions:** The depth to groundwater beneath the point of discharge and the stratigraphic sequence that will influence the probability of contaminants reaching the unconfined aquifer.

5. **Geochemical characteristics:** The distance that contaminants travel in the vadose zone depends on how strongly they are partitioned to the soils. Acids or solvents that keep contaminants in solution may transport contaminants farther from the point of discharge than they would normally travel.

4.2 Waste Sites Adequately Characterized to Support Selection of a Remedy Decision

At the end of the site-specific evaluation, waste sites are divided into sites with sufficient data to evaluate risk and select a remedy, and into sites that require additional data to support risk assessment or remedy selection. Table B-5 (Appendix B) identifies which waste sites have outstanding data needs along with the specific rationale applied to the data needs decision for each site.

The results of the data needs evaluation for 200-BC-1 OU and 200-WA-1 OU are summarized separately in the following sections.

4.2.1 200-BC-1 OU Data Needs Evaluation Results

Figure 4-3 illustrates data need assessment results for OU 200-BC-1.

Evaluation results indicate that no additional data are needed to reach remedial action decisions for any of the 27 waste sites in the 200-BC-1 OU. The basis of this decision falls into three general categories:

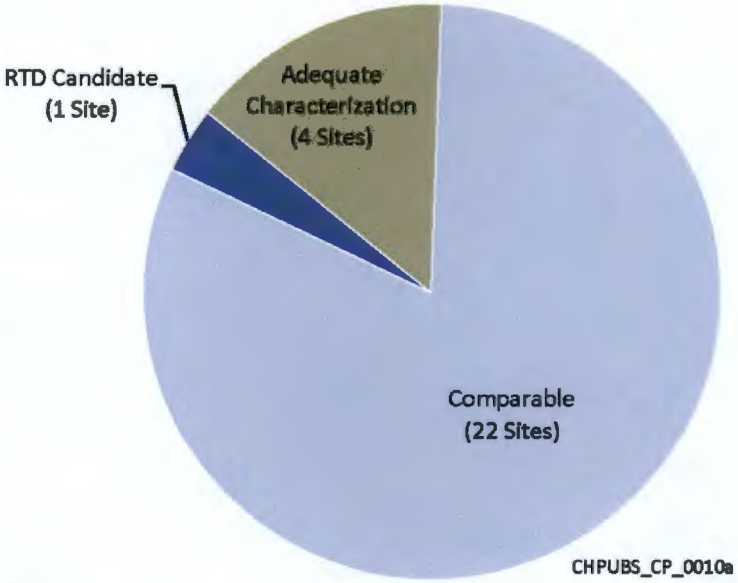

Figure 4-3. Site 200-BC-1 OU Data Needs Evaluation Results

1. Sites that have already received vadose zone characterization sufficient to support a risk analysis that defined a need for action. Within the 200-BC-1 OU, one crib (216-B-14) and three trenches (216-B-26, 216-B-53A, and 216-B-58) were identified in this category.

2. Sites that have insufficient or no characterization data for detailed evaluation, but site type or waste site knowledge is sufficient to recommend the site as a candidate for RTD. A management decision was made to assume all USTs in the OU will be removed; therefore, UST Site 200-E-14 falls into this category. If waste site 200-E-14 lies within the boundary of an adjacent crib or trench remedial technology, this technology will also be considered.

3. Sites for which characterization work at a comparable site can be used. Using a comparable site requires that it be sufficiently similar in design, primary waste source and volume, waste release scenario, hydrogeologic conditions, and contaminant migration. These similarities allow the characterized site to provide a comparable analysis or to provide bounding conditions for the

uncharacterized site, to support vadose zone modeling, if necessary. The remaining 22 sites are considered comparable to one of the four sites with ample vadose zone characterization in the 200-BC-1 OU.

4.2.2 200-WA-1 OU Data Needs Evaluation Results

The 129 waste sites in the 200-WA-1 OU are diverse and are currently in different stages of investigation, resulting in a higher complexity of data evaluation results than in the 200-BC-1 OU.

Figure 4-4 illustrates data needs assessment results for the 200-WA-1 OU, with the assumption that sites currently scoped for sampling and analysis as described in Section 3.2.2 are completed to enable comparable site comparison.

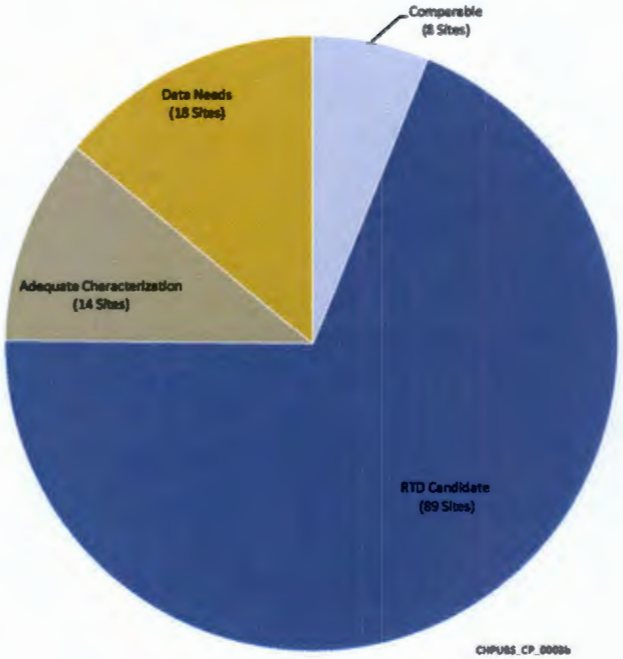

Figure 4-4. Site 200-WA-1 OU Data Needs Evaluation Results

The basis of this decision falls into four general categories:

1. Sites that have already received vadose zone characterization sufficient to support a risk analysis that defined a need for action, and an FS that identified and evaluated remedial alternatives. Within the 200-WA-1 OU, 14 waste sites were identified in this category. Eleven of the characterized sites are in the U Plant geographical area, two in REDOX, and one in the vicinity of the T Plant.

2. Sites which are considered candidates for RTD. Within 200-WA-1 OU 89 waste sites were identified in this category. Waste sites with near-surface vadose zone contamination and UST sites in 200-WA-1 are considered candidates for RTD. Sampling and analysis associated with the removal will be conducted during the remedial design and/or implementation stage. The 89 sites can be further divided into the groupings listed below and are illustrated in Figure 4-5.

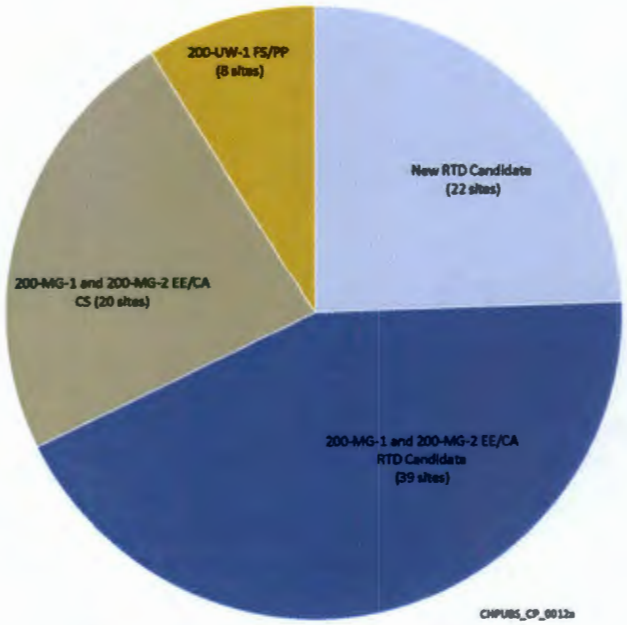

Figure 4-5. RTD Breakout for 200-WA-1 OU Waste Sites

   a. A total of 39 sites proposed for RTD in 200-MG-1/MG-2 engineering evaluation/cost analysis (EE/CA) documents.

   b. A total of 20 sites proposed for confirmatory sampling in 200-MG-1/MG-2 EE/CA documents.

c. A total of eight sites proposed for RTD in the 200-UW-1 FS and PP.

d. A total of 22 sites proposed as candidates for RTD during the data needs evaluation because they are UST sites or contamination is restricted to shallow soils.

3. Sites for which characterization work at a comparable site can be used. Using a comparable site requires that it be sufficiently similar in design, primary waste source and volume, waste release scenario, hydrogeologic conditions, and contaminant migration. These similarities allow the characterized site to provide a comparable analysis or to provide bounding conditions for the uncharacterized site, to support vadose zone modeling, if necessary. Eight sites are considered comparable to another waste site in the 200-WA-1 OU. However, seven of the comparisons are contingent on execution of currently scoped sampling and analysis for the following sites: 216-S-6, 216-T-34, 216-U-8 and/or 216-U-12, 216-Z-16, and 216-Z-7. If these scoped SAPs are not executed, the seven comparable sites become sites with outstanding data needs.

4. Sites requiring additional data to support selection of a remedy decision. In 200-WA-1 OU, 18 waste sites have been identified as having additional data needs.

4.3 Sites Requiring Additional Data to Support Selection of a Remedy Decision

If selection of a remedy decision could not be made because of the level of uncertainty in site conditions, then a data need was identified for the waste site. In 200-WA-1 OU, 18 waste sites have been identified as having additional data needs. These sites and areas of uncertainty are summarized in Table 4-1.

Table 4-1. 200-WA-1 OU Areas of Uncertainty for Waste Sites with Data Needs

Geographical Area	Waste Site(s)	Waste Site Type	Areas of Uncertainty
REDOX Plant Vicinity	216-S-6	Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches	Existing data do not characterize the deep vadose zone. Additional data needed to describe residual contamination between 33 m (100 ft) bgs and the water table in order to fully evaluate the potential for future groundwater impacts.
	216-S-3	Process Waste Cribs, Trenches, and Pipe Leaks	Additional data needed to characterize the source area and evaluate extent of contamination.
	216-S-1 and 2	Process Waste Crib	Additional data needed to assess risk, deep vadose zone, and groundwater impacts. Waste discharged to this crib reportedly had a pH of 2.1.
	216-S-12	Cribs, Trenches, and Pipe Leaks	The site has not been previously investigated, and there are no adequately characterized similar sites available.
	216-S-23	Process Waste Crib	Additional data needed to evaluate extent of contamination.
	216-S-25	Process Waste Crib	Additional data needed to evaluate extent of contamination.
	216-S-14	Cribs, Trenches, and Pipe Leaks	Additional data needed to evaluate extent of contamination.

Table 4-1. 200-WA-1 OU Areas of Uncertainty for Waste Sites with Data Needs

Geographical Area	Waste Site(s)	Waste Site Type	Areas of Uncertainty
	200-W-15	Process Waste Cribs and Trenches and Pipe Leaks	Additional data needed to evaluate extent of contamination.
	216-T-34	Process Waste Crib	Site exhibits high uncertainty in potential for future impacts to groundwater. Additional data needed to evaluate extent of contamination.
T Plant Vicinity	216-T-36	Process Waste Cribs and Trenches and Pipe Leaks	Additional data needed to characterize the source area and evaluate extent of contamination. There are no adequately characterized similar sites available.
	216-T-8	Process Waste Cribs and Trenches and Pipe Leaks	Data needed to evaluate extent of contamination.
U Plant Vicinity	216-U-8	Process Waste Crib	Additional data needed to evaluate vertical extent of contamination. Previous remedy evaluation documented in DOE/RL-2003-23, *Focused Feasibility Study for the 200-UW-1 Operable Unit*, but additional data needed.
	216-U-12	Process Waste Crib	Additional data needed to evaluate vertical extent of contamination. The 216-U-12 Crib was identified as the suspected source of elevated Tc-99 and nitrate concentrations in groundwater (PNNL-14187, *Hanford Site Groundwater Monitoring for Fiscal Year 2002*).
	216-U-7	Injection Wells and French Drains	No information regarding the range of contaminant concentrations is available. A previous report of release of uranyl nitrate solution (UPR-200-W-138) at this location appears to be in error and did not occur at this location.
	216-U-15	Cribs, Trenches, and Pipe Leaks	Site location is not confirmed and geophysical survey suggests another location.
	200-W-136	Structures and Foundations	The surface soil area between the foundations was found by surface radiation surveys to be contaminated following the building demolition. Additional data needed to characterize contaminant distribution.
PFP Vicinity	216-Z-7	Process Waste Crib	Additional data needed to evaluate contaminant distribution because of the large volume of waste discharged to 216-Z-7.
	216-Z-16	Process Waste Crib	Additional data needed to evaluate the potential for continuing contribution to groundwater contamination.

Sampling and analysis for eleven of these waste sites have already been scoped in existing SAPs (Section 3.2.2). The seven waste sites that require an approved SAP are 216-S-3, 216-S-12, 216-S-14, 216-S-23, 216-S-25, 200-W-15, and 216-S-6. Waste site 216-S-6 was included in the Supplemental RI SAP; however, the depth of the sampling and analysis was inadequate for making a remedial action decision. The Supplemental RI SAP could be amended to include additional depth of sampling and analysis for 216-S-6. A new 200-WA-1 SAP could be developed for the six excluded sites, or the six sites could be included in an existing SAP addendum. Data needs and fulfillment requirements are expounded in Chapter 5.

5 Remedial Investigation/Feasibility Study Tasks

This chapter describes the tasks and processes that will be used during the RI/FS process. These descriptions will incorporate RI site characterization efforts, data evaluation methods, formulation and evaluation of remedial alternatives, report preparation, and recommendations for follow-on characterization work during the design phase. Figure 5-1 illustrates the relationships among these CERCLA RI/FS tasks.

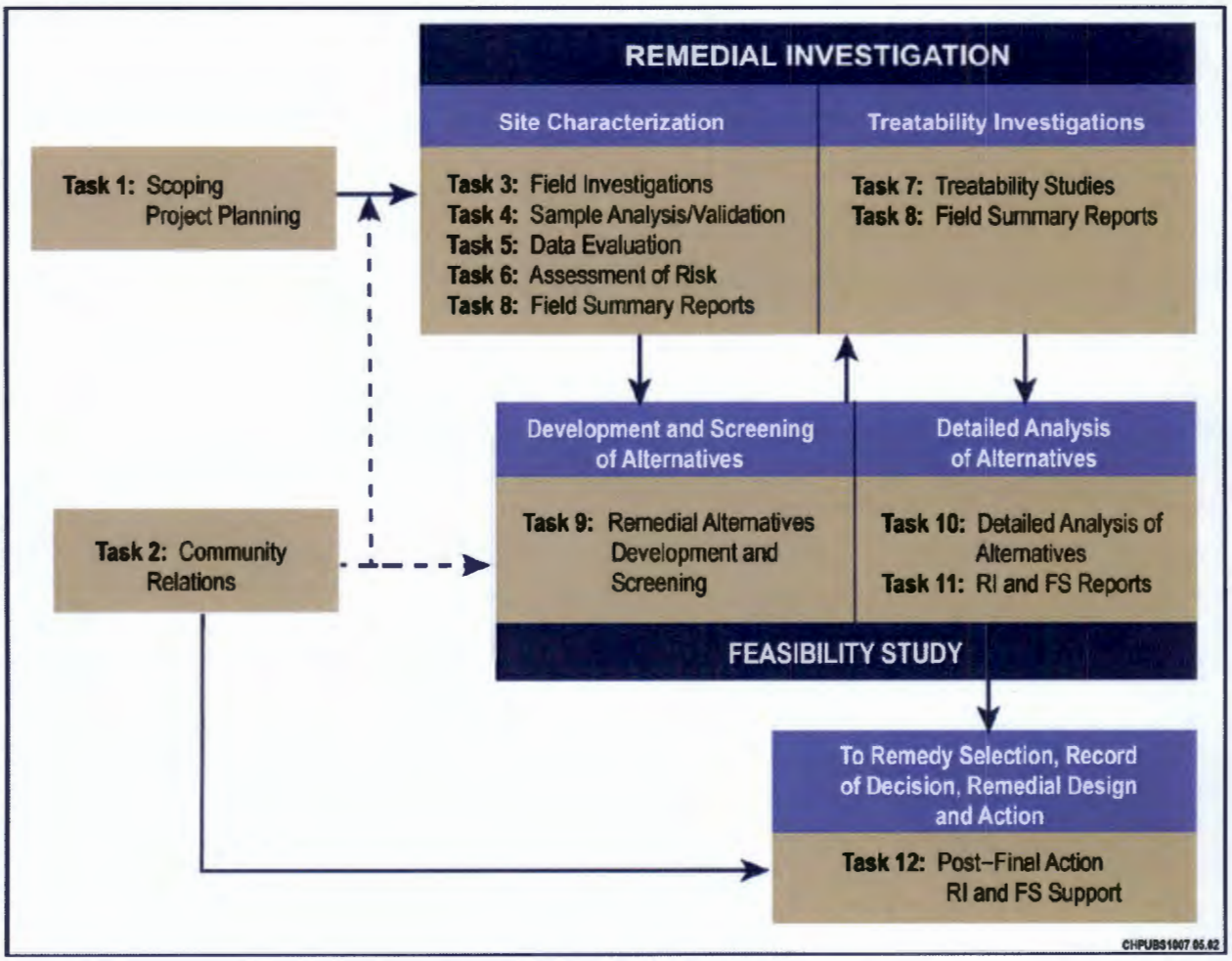

Figure 5-1. CERCLA RI/FS Tasks

An integrated geographic based cleanup program is being implemented in the Inner Area to clean up waste sites for the purposes of (1) mitigating exposures to human and ecological receptors, (2) protecting groundwater, and (3) supporting the anticipated future land use of long-term waste management activities.

5.1 Task 1—Project Planning

Project planning involves preparing the scope of work descriptions that are presented in the RI/FS work plan. The work plan describes how the RI/FS will be implemented; how the investigation will support the overall assessment of site conditions; how investigation data will be evaluated, reduced, and presented; and how the essential elements of the RI/FS and proposed plan will be performed. The work plan includes the overall schedule for the investigation, subsequent studies, and document production. The following tasks will be accomplished to complete the RI/FS and BRA reports:

- Prepare a SAP.
- Collect data in accordance with the SAP.
- Complete the nature and extent of contamination evaluation, including the development of CSMs for each waste site.
- Evaluate contaminant fate and transport.
- Complete the BRA, including the identification or calculation of PRGs for complete receptor pathways, as appropriate.
- Define RAOs and ARARs.
- Develop and screen remedial technologies.
- Develop remedial alternatives.
- Complete a detailed and comparative analysis of the remedial alternatives.

5.2 Task 2—Community Relations

The Community Relations Plan and the NCP outline stakeholder and public involvement opportunities. Community involvement during the RI/FS activities will be consistent with the Community Relations Plan and comply with the NCP. The project will use existing public, stakeholder, and Tribal Nation involvement mechanisms and approaches.

Community involvement efforts fall into three categories: public, stakeholders, and Tribal Nations. All interactions with HAB and the public are done through and coordinated with the DOE-RL Public Involvement Manager.

5.2.1 Tribal Nations Involvement

All interactions with Tribal Nations are conducted through the DOE-RL Tribal Liaison. DOE-RL has biweekly conference calls with the Tribes. Because Tribal Nations are not stakeholders, their involvement is on a government-to-government basis. Where possible, briefings for Tribal Nations will be done through existing forums such as the monthly Tribal Nations, State of Oregon, and DOE groundwater and vadose zone meetings. DOE-RL will work with the Tribal Nations to ensure ongoing communication and involvement in the Inner Area decision-making process.

This effort will include timely notice to potentially affected Tribal Nations in the early planning stages of the decision-making process. Further, to the extent allowed by law, consultation will defer to Tribal Nation policies on confidentiality and management of cultural resources.

5.2.2 Stakeholder Involvement

Stakeholders are those who see themselves as affected by, or have an interest in, Hanford Site issues. Hanford Site stakeholders include the Hanford Natural Resources Trustees; local governments; local and regional businesses; Hanford Site work force; local, regional, and national environmental interest groups; and local and regional public health organizations.

The HAB is a Federal Advisory Committee Act Board. The HAB advises the Tri-Parties on cleanup issues. The body of HAB advice has been reviewed to ensure this work plan is responsive to HAB values, principles, and issues. The HAB's River and Plateau Committee addresses River Corridor and Central Plateau issues. The 200-WA-1/200-BC-1 project will work with DOE to identify opportunities to inform

and involve this committee on significant work plan issues and progress. The River and Plateau Committee meets approximately 10 times each year. On the basis of the timing of the development of significant work plan components, periodic updates will be provided to the River and Plateau Committee.

The River and Plateau Committee provides an ongoing opportunity for informal stakeholder feedback on work plan components and evolving project activities. The committee decides if an issue should be brought to the HAB. These issues, if identified, will be considered in the final work plan.

5.2.3 Public Involvement

Public involvement also is governed by Tri-Party Agreement (Ecology et al., 1989a) activities. The general public consists of people who are aware of decisions but choose not to be involved in those decisions. At this time, public meetings or comment periods are not conducted on work plans. If an addendum or change to this work plan is developed, consultation with the Tri-Parties, River and Plateau Committee, and the Public Involvement and Communication Committee will determine the need for public involvement.

5.3 Task 3—Field Investigations

The 200-WA-1 OU RI/FS will use field investigation information generated through a number of specific data collection activities, including site-specific investigations described in this work plan. The sources of data that will be used to support the 200-WA-1 OU RI/FS include the following:

- Reduction and extrapolation of existing measurement and observation data generated during previous site characterization activities at the Hanford Site, including the results of RI, FS, and other CERCLA-related reports prepared for previous Central Plateau OUs
- Reduction and integration of measurements and observations collected during historical environmental monitoring activities
- Integration of measurements and observations collected during structure demolition and remedial actions at other locations within the Central Plateau and other relevant parts of the Hanford Site
- Measurements and observations collected during site-specific vadose zone characterization activities specified in this work plan for 200-WA-1 OU waste sites

The objective of collecting and assembling environmental measurement and observation data from multiple sources is to understand the nature and extent of vadose zone contamination at the 200-WA-1 OU.

Specific elements of the field investigations are described in the following sections.

5.3.1 Sampling and Analysis Plan and Quality Assurance Project Plan

Site-specific vadose zone characterization activities will be described in a SAP. The SAP will be a stand-alone document or an addendum to the *Supplemental Remedial Investigation/Feasibility Study Work Plan for the 200 Areas Central Plateau Operable Units, Volume I: Work Plan and Appendices* (DOE/RL-2007-02, Rev. 0, Vol. I).

5.3.2 Investigation Implementation

Table 5-1 shows the overall scope of field investigation activities identified for 200-WA-1 OU. It addresses characterization of the 17 waste sites identified as requiring pre-decision information to assess risk or select remedial alternatives. Characterization will include the following general types of regulatory agency approved activities:

- Nonintrusive Techniques
  - Surface and down-hole geophysics (e.g., surface electrical resistivity surveys and geophysical surveys in existing wells and borings)
  - Collection and analysis of soil samples from the ground surface
- Intrusive Techniques
  - Collection and analysis of vadose zone soil samples from the borings drilled at specific locations and to various target depths (borings may be completed as monitoring wells, if appropriate)
  - Collection and analysis of vadose zone soil samples using direct-push technology systems
  - Collection and analysis of vadose zone soil samples from test pits or other excavations
- Analysis and Measurement Techniques
  - Samples may be analyzed using either field or fixed laboratory methods. Field measurements may include screening level measurements (i.e., qualitative or semiquantitative measurements) or field quantitative measurements. Quantitative field measurements will be subject to applicable measurement quality standards established for fixed laboratories.

Additional data collection methods may be used depending on site conditions, data needs, and availability of technologies. The overarching SAP is written to encompass other potential investigative techniques.

5.3.3 Field Investigation Reporting

A field investigation report will be prepared following completion of field activities to describe the work completed and conditions observed and measured at each waste site investigated. Section 5.8 provides additional information regarding the field investigation report.

5.4 Task 4—Sample Analysis/Validation

Laboratory analysis of environmental samples will be conducted by laboratories that have established their performance credentials and are under contract. DOE will verify that contracted laboratories are using established analytical protocols and that measurement quality criteria and metrics are established.

A DQA will be performed at the completion of the measurement and observation data collection activity. The DQA will be a formal evaluation of all of the measurement data that will be used for subsequent data evaluation and reduction for risk assessment, fate and transport analysis, and FS purposes. The purpose of the DQA is to ensure that available data are of sufficient known quality to meet the DQOs, which will be identified for this RI/FS. Data must meet the criteria established for the following qualitative and quantitative metrics to be suitable for use in the RI/FS:

- Precision
- Accuracy and sensitivity
- Representativeness
- Completeness
- Comparability

Table 5-1. 200-WA-1 OU Summary of Waste Sites with Outstanding Data Needs and Recommended Approach to Characterization

Geographical Area	Waste Site(s)	Waste Site Type	Recommended Characterization Activity[1]	Recommended Depth of Examination	Estimated Number of Samples	Sampling and Analysis Addressed Under
REDOX Plant Vicinity	216-S-6	Cooling Water/Steam Condensate/Chemical Sewer Cribs and Ditches	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	12	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	216-S-3	Process Waste Cribs and Trenches and Pipe Leaks	Deep Subsurface Soil Sampling	≤33 m (100 ft) bgs	12	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	216-S-1 and 2	Process Waste Crib	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	25	Supplemental RI SAP
	216-S-12	Cribs, Trenches, and Pipe Leaks	Deep Subsurface Soil Sampling	≤33 m (100 ft) bgs	12	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	216-S-23	Process Waste Crib	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	25	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	216-S-25	Process Waste Crib	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	25	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	216-S-14	Cribs, Trenches, and Pipe Leaks	Shallow Vadose Soil Sampling	≤33 m (100 ft) bgs	12	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	200-W-15	Process Waste Cribs and Trenches and Pipe Leaks	Vadose Soil Sampling	≤10 m (33 ft) bgs	10	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	216-T-34	Process Waste Crib	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	25	Supplemental RI SAP

Table 5-1. 200-WA-1 OU Summary of Waste Sites with Outstanding Data Needs and Recommended Approach to Characterization

Geographical Area	Waste Site(s)	Waste Site Type	Recommended Characterization Activity[1]	Recommended Depth of Examination	Estimated Number of Samples	Sampling and Analysis Addressed Under
T Plant Vicinity	216-T-36	Process Waste Cribs and Trenches and Pipe Leaks	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	25	Supplemental RI SAP
	216-T-8	Process Waste Cribs and Trenches and Pipe Leaks	Deep Subsurface Soil Sampling	≤33 m (100 ft) bgs	12	Supplemental RI SAP
U Plant Vicinity	216-U-8	Process Waste Crib	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	100	216-U-8 and U-12 SAP[2]
	216-U-12	Process Waste Crib	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	100	216-U-8 and U-12 SAP[2]
	216-U-7	Injection Wells and French Drains	Shallow Vadose Soil Sampling	≤4.6 m (15 ft) bgs	5	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	216-U-15	Cribs, Trenches, and Pipe Leaks	Shallow Vadose Soil Sampling	≤4.6 m (15 ft) bgs	5	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
	200-W-136	Structures and Foundations	Shallow Vadose Soil Sampling	≤4.6 m (15 ft) bgs	25	To be determined: either Supplemental RI SAP Addendum or 200-WA-1 SAP
PFP Vicinity	216-Z-7	Process Waste Crib	Geophysical logging (GPL) of existing wells	Depth of existing wells	-NA-	Supplemental RI SAP
	216-Z-16	Process Waste Crib	Soil Sampling to Groundwater	≈75 m (246 ft) bgs	25	Supplemental RI SAP

≈ = approximately

≤ = less than or equal to

[1] Locations identified in existing SAPs or will be developed as part of 200-WA-1 SAP or Supplemental RI SAP.

[2] SAP may contain additional sampling and analysis beyond to that required under this work plan.

The metrics for DQAs are defined in the QAPjP. QAPjPs are quality assurance (QA) plans required for activities conducted or funded by EPA. The QAPjP will be prepared in accordance with the *EPA Requirements for Quality Assurance Project Plans (QA/R-5)*, (EPA/240/B-01/003. 2001). Only data of known and acceptable quality will be used for this RI/FS. The approach to sample analysis and validation and DQA of project measurement data are described in the following sections.

5.4.1 Data Validation and Verification

A DQA will be performed to ensure that all measurement data used in the RI/FS are of known quality, and that nonrepresentative data are not used for decision making. The DQA will include data verification, and validation will be performed on analytical datasets. These activities confirm that sampling and chain-of-custody documentation are complete and sample numbers can be tied to the specific sampling location described in the SAP, that samples were analyzed within required holding times identified in the QAPjP, and that sample analyses met the data quality requirements specified in the QAPjP.

Data verification will be performed on analytical datasets to ensure and document that the reported results reflect what was actually done. The criteria for verification include, but are not limited to, review for completeness (i.e., all samples were analyzed as requested), use of the correct analytical method, transcription errors, correct application of dilution factors, appropriate reporting of dry weight versus wet weight, and correct application of conversion factors. Laboratory personnel may perform data verification.

Data validation will be performed on analytical datasets to ensure that the data quality goals established during the planning phase has been achieved. As recommended in EPA guidance (Bleyler 1988a, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*; Bleyler 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*), the criteria for data validation are based on a GA. The Contractor has defined five levels of validation; A to E. Level A is the lowest level and is the same as verification. Level E is a 100 percent review of all data (e.g., calibration data and calculations of representative samples from the dataset). Validation will be performed to Level C.

Level C validation includes a review of the quality control data and requires the following:

- Verification of deliverables
- Requested versus reported analyses
- Qualification of the results based on analytical holding times
- Method blank results
- Matrix spike/matrix spike duplicate
- Surrogate recoveries
- Duplicates
- Analytical method blanks

Level C validation will be performed for up to 5 percent of the data by matrix and analyte group. Analyte group refers to categories, such as radionuclides, volatile chemicals, semivolatile chemicals, polychlorinated biphenyls, metals, and anions. The goal is to cover the various analyte groups and matrices during the validation.

The results of physical and field measurements will be reviewed for measurement quality to ensure that the data are useable for site characterization and remedial alternative analysis.

At the conclusion of the data review, a DQA report will be produced. The DQA report will describe the result of the data assessment, verification, and validation, and will assign appropriate data qualifiers to

individual datasets. Any unusable or nonrepresentative data will be identified in the report, and those data will not be used in the RI/FS analyses.

5.4.2 Data Storage and Archiving

The results of laboratory analyses generated during this investigation will be archived in the HEIS for future use.

5.5 Task 5—Data Evaluation

The measurement and observation data collected during the field activities of this RI will be evaluated, reduced, and presented in tabular and graphic format for subsequent use in the risk assessment, fate and transport evaluation, the FS, and in preparing the RI/FS report. The results of the measurement data review and validation presented in the DQA report will be used to qualify the data to confirm that only data of known and acceptable quality are used in subsequent data analyses. The data reduction activities are described in the following sections.

5.5.1 Data Tabulation

Field and laboratory measurements will be assembled in tabular format for quick reference. The data tables will include the following specific information regarding laboratory analyses and field measurements:

- Sample identifier
- Sample matrix (e.g., soil, groundwater, pore water, or waste)
- Associated waste site
- Sample collection method (e.g., grab sample or core sample)
- Specific sample location (e.g., sample, well, or boring number)
- Depth of sample collection
- Sample measurement result and units
- Measurement of minimum detectable concentration (MDC)

5.5.2 Waste Site Data Summary

For each waste site, a data summary will be prepared describing information that will be used to evaluate site risk, assess potential threats to groundwater, and develop and evaluate remedial alternatives. The waste site data summary will include the following elements:

- Tabulation of measurement results for each affected medium (e.g., soil and water), including relevant field measurements in addition to laboratory measurements
- Range of measurements for each analyte in each medium examined
- Summary of MDC for each analyte in each medium, compared to ARARs, PRGs, or other applicable metrics
- Estimation of the dimensions of affected media for each waste site
- Conversion of units of measurement and units of reporting to consistent values and units, so that measurements may be compared within the waste site, compared to other waste sites, and compared to historical measurements

- Plan-view maps and cross section drawings that clearly illustrate the location of the measurements reported
- Discussion of the comparability and representativeness of measurements extrapolated from other sites for use at an individual site (i.e., representative/comparable information), including discussion of what specific data are being applied to the site, the technical basis for the extrapolation, and the applicable limitations to the extrapolation

5.5.3 Conceptual Site Models

Based on the information collected for waste sites and assembled in the waste site data summary described above, a CSM will be prepared for each waste site in the 200-WA-1/200-BC-1 OU. The CSM will contain two parts: (1) a concise narrative and tabular and graphical depictions of waste site conditions and (2) a graphical depiction of the site-specific CEM. The CSM will include the following essential elements:

- Summary of site function and operating history
- Summary of estimated waste constituent inventory
- Graphical depiction of the waste site and interpretation of contaminant distribution
- Summary of characterization activities
- Overview of apparent threats posed by site conditions
- Summary of knowledge uncertainty
- Graphical depiction of the site-specific CEM

5.5.4 Summary Overview of Contamination Conditions in the Operable Unit

An overall summary of the observed and inferred contaminant distribution within the 200-WA-1 OU will be prepared. This summary will include a tabulation of the specific waste sites within the OU that exceed PRGs for the identified COPCs and a summary of observed COPC concentrations compared to PRGs. The tabulation will include the waste site identification, the contaminants that exceed PRGs, COPC distribution in media (e.g., surface soil, shallow soil—less than 4.6 m [15 ft]—and in deep soil—4.6 m [15 ft]), and any other relevant information.

The contaminant distribution summary will also include plan-view maps indicating the location of waste sites with contaminant levels that exceed PRGs, including an illustration of which sites exhibit surface or subsurface soil exceedances and sites that contain deep soil contamination.

5.6 Task 6—Assessment of Risk

Section 3.9 discusses the process and activities for evaluating baseline risks for the 200-WA-1/200-BC-1 waste sites. As noted in Section 3.9, two BRAs will be prepared for the Central Plateau Inner Area: one for the West Inner Area and one for the East Inner Area. The BRAs for the Inner Area will address both human health and ecological risks for each of the OUs within the respective areas. In addition, a summary discussion of potential threats to groundwater will be included in the Inner Area BRAs. The groundwater OUs will each have a BRA separate from the Inner Area BRAs. However, the results of the groundwater BRAs will be discussed in the Inner Area BRAs to provide information related to potential cumulative risks from multiple environmental media, as appropriate.

Results of the Inner Area West BRA pertinent to the 200-WA-1/200-BC-1 RI/FS will be summarized in the 200-WA-1/200-BC-1 RI/FS report. Appendix G contains details of the BRA.

5.7 Task 7—Treatability Studies

Treatability studies may be conducted to provide more detailed information on the performance of specific remedial technologies. Treatability studies can reduce remedial technology costs and performance uncertainties, provide information that enables a technology to be scaled up for alternative development and evaluation purposes, avoid the potential creation of an "orphaned" secondary waste stream, and support remedial design of a selected alternative.

The decision as to whether treatability studies are necessary to support the FS will be made following data evaluation and assessment of risk and as part of planning for remedial alternatives development, screening, and detailed evaluation. If data are needed to support FS decision making, then a separate treatability test plan will be prepared. At this time, treatability studies are not anticipated for Inner Area waste sites. If new technologies are identified as candidate technologies for 200-WA-1/200-BC-1 waste sites, then treatability testing may be considered.

5.8 Task 8—Field Summary Reports

As the field investigations are completed, field reports will be prepared for each waste site or group of waste sites, to summarize the activities performed and the information collected in the field. The report will include survey data for borehole locations, the number and types of samples collected, inventory of investigation-derived waste containers, geological logs, field screening results, and GPL results. The field reports support the preparation of the RI reports and FSs.

5.9 Task 9—Remedial Alternatives Development and Screening

Once the RAOs are established and the general response actions (GRAs) are developed, an initial screening of available technologies and process options is conducted with the purpose of evaluating each technology against the CERCLA criteria of effectiveness, implementability, and relative cost. *Effectiveness* refers to the ability of the process option to perform as part of a comprehensive remediation plan to meet RAOs under the conditions and limitations present at the site. *Implementability* refers to the relative degree of difficulty anticipated in implementing a particular process option under regulatory, technical, and schedule constraints posed by the site. For the initial screening of technology types and process options, the *cost criterion is relative and plays a limited role.*

GRAs are developed to meet the RAOs, and the remedial technologies are then developed and screened to address the GRAs and, in turn, achieve the RAOs based on the general screening process as outlined in the RI/FS CERCLA guidance (EPA/540/G-89/004).

In the EPA guidance document, technology types are defined as "general categories of technologies" (e.g., chemical or thermal treatment or capping) and technology process options are "specific processes within each technology type" (EPA/540/G-89/004). A wide span of technology types and process options are evaluated and refer to general categories of technologies and specific process options within each technology type, respectively. For example, technology types could include ex-situ treatment processing or disposal. The process options for ex-situ treatment processing could include either soil washing or ex-situ thermal desorption, while the process options for disposal could include backfill with treated soil or onsite landfill at the ERDF. An outline of the relationships among RAOs, GRAs, remedial technology types, and process options is presented in Table 4-1 of the RI/FS CERCLA guidance (EPA/540/G-89/004).

Process knowledge of the waste site (dimensions, point of release, exposure routes, volume of release, etc.), COPCs, and the CERCLA criteria will be used as evaluation matrices to tabulate a list of

candidate technologies. The screening process will consider the physical specifications, operation unit process history, and operational logistics of each waste site, but will be focused primarily on waste streams, COPCs, and extent of impact for those sites where historical analytical data are available.

Characteristics of the nature and extent of contamination for each waste site are based on data derived from the specific waste site or assumed by considering the known attributes of the site (e.g., site history, similarity to a comparable site, etc.). The waste site groupings, based on waste site configuration, primary waste source, and relative volume of waste received, are presented in Chapter 3. The schematic drawings characterize waste sites in relationship to relative depth of contamination, which identifies sites likely to affect groundwater or pose risks to human or ecological receptors. Based on the known or assumed nature and extent of contamination, each site will be subjected to a decision logic process to identify which retained remedial technologies are to be further evaluated for each site.

As previously described in Section 3.10, the PRGs are radionuclide-specific or chemical-specific concentration goals for specific media and anticipated future use of land. The PRGs serve as a target to use during the initial development, analysis, and selection of cleanup alternatives. These goals should be protective of human health and the environment and comply with ARARs for all exposure pathways being addressed.

Initial risk-based PRGs will be developed for use in the ERA portions of the BRA and the FS. These PRGs may be modified later during development of the FS and based on results of the BRA. The BRAs clarify exposure pathways and may identify situations where cumulative risk of multiple contaminants or multiple exposure pathways indicate the need for more or less stringent cleanup levels than those initially developed as PRGs. In addition to being modified based on the baseline risk assessment, PRGs and the corresponding cleanup levels may also be modified based on the given waste management strategy selected at the time of remedy selection that is based on the balancing of the nine criteria used for remedy selection (40 CFR 300.430). The FS will develop and evaluate a range of alternatives, including No Action. In order for all alternatives to be considered viable, they must demonstrate they are protective of human health and the environment and be compliant with ARARs.

5.9.1 Development of the Range of Alternatives

A sample matrix that may be used to screen technologies and remedial process options for the 200 West Area is presented in Table B-8 (Appendix B). This matrix was developed from the candidate remedial technologies identified in Section 5.10.

In accordance with EPA and NCP guidance, remedial technologies and technology process options (TPOs) are categorized by their respective GRAs. For in-situ treatment, TPOs can be subdivided by technologies that require delivery of a chemical or biological reagent to the subsurface for treatment, and those that do not. Within actions requiring delivery of a reagent, technologies can be further subdivided by the reagent approach (physical, chemical, or biological) and the method for delivering the reagent to the subsurface.

The remaining columns in the matrix presented in Table B-8 serve the following purposes:

COPC Applicability is intended to differentiate technologies that are only applicable to a distinct contaminant of concern. If a screening table is only developed for one contaminant, this column may not be required.

Depth Range is defined as shallow or deep and is based on the practical implementation of the technology in the field. For example, 6.1 m (20 ft) is considered the maximum depth at which mechanical

excavation is feasible, whereas direct-push sampling technology may reach depths exceeding 45.7 m (150 ft.); each technology will have its own qualitative definition of shallow versus deep

Description is a brief description of the technology.

Effectiveness, Implementability, Relative Capital Cost, and Relative Operation and Maintenance (O&M) Cost include information relevant to the screening criteria in accordance with EPA and NCP guidance. The screening criteria also include how the criteria rates with respect to other technologies, taking into account site-specific information. These are labeled as low, moderate, or high, and are designated based on field implementation experience, results of pilot tests or case studies, and engineering/professional judgment.

Sustainability is not one of the EPA core screening criteria, but it is included for informational purposes. Sustainability is not used as a determining factor in retaining or not retaining a particular process option. Sustainability evaluates the relative impact the technology could have on energy and water use, generation of greenhouse gases (GHGs), water use, waste generation, or land and ecosystem protection. Under Task 9, the following will be considered:

- Green sustainability and remediation (GSR) (EPA 542-F-08-002, *Incorporating Sustainable Practices into Site Remediation*; EPA 542-R-08-002, *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*; and EPA, 2009, *Principles for Greener Cleanups*)
- Net environmental benefit analysis (NEBA) (Efroymson et al., 2004, "A Framework for Net Environmental Benefit Analysis for Remediation or Restoration of Contaminated Sites")

The goal will be to include EPA's green remediation considerations (including application of NEBA to address ecosystem service changes) and NEPA values into NCP criteria evaluation during the FS. GSR and NEBA evaluations will be presented in more detail in an appendix to the RI/FS report.

Examples of how GSR metrics could be used in the FS relative to ARARs, NCP criteria, and NEPA values include the following:

- Relative amount of waste generated
- Relative amount of GHG generated
- Impacts to the vadose zone and other resources for each alternative
- Demonstration of NEBA to determine whether a particular remedial alternative causes more environmental harm than the exposure it is intended to address

NEBA is a method for comparing and ranking the net environmental benefits of various remedial action alternatives to natural resource costs associated with multiple management alternatives. Net environmental benefits are the gains in environmental services or other ecological properties attained by remediation or ecological restoration, minus the environmental injuries caused by those actions.

NEBA involves activities common to remedial action alternatives analyses for state regulations, CERCLA, response actions under the NCP, compensatory restoration actions under the Natural Resource Damage Assessment, and proactive land management actions that do not occur in response to regulations (valuing ecological services or other ecological properties, assessing adverse impacts, and evaluating restoration options).

Retained/Not Retained identifies which technologies are retained for further consideration in the 200 West Area.

Screening Comment presents the screening rationale for technologies that are not retained.

Technologies that are not retained during the evaluation will be identified, and a thorough explanation will be provided in an appendix to the RI/FS report. The appendix will present a description of the technology, followed by an applicable case study and a screening rationale for why the technology was not retained. The results of the waste site type categorization process will facilitate selection from Table B-8 of the appropriate retained technology that is applicable for each waste site.

The preliminary list of retained technologies will be described in more detail in the RI/FS report on technology fact sheets. The purpose of the technology fact sheets will be to briefly describe and show graphically how a remedial technology would be implemented for each waste site type category. The fact sheets will follow the GRAs and process options screening process presented in Chapter 7 of the RI/FS report and will provide a bridge for more detailed discussion of the remedial alternatives presented in Chapters 8 and 9 (as discussed under Tasks 9 and 10). The fact sheets, in general, will include the following:

- High-level concepts of the technology
- Conceptual cartoon depicting the technology
- Simplified exposure model showing how the technology removes risk to receptors
- Typical implementation steps

The fact sheets will present elements related to a generic technology process but will not provide details about waste sites, costs, or other information that will be identified in more detail in Chapter 8 (Task 9) and Chapter 9 (Task 10) of the RI/FS report. Figure 5-2 provides a sample draft technology fact sheet for a standard excavation.

The list of technologies and corresponding fact sheets will be used to identify the initial alternatives and process options. The mix of technologies and process options for each waste site type category will then be organized into various remedial alternatives that are compared to the CERCLA evaluation criteria for effectiveness, implementability, and cost. Detailed matrix tables will provide the data necessary to conduct a more detailed evaluation of the various alternatives. The remedial action alternatives developed through this process will be further screened, and FS-level designs and costs will be developed for the preferred alternatives.

5.9.2 Logic for Waste Site Remedy Selection

The *Hanford Site Cleanup Completion Framework* document (DOE/RL-2009-10) presents the strategy for completion of cleanup activities throughout the Hanford Site, including the Inner Area of the Central Plateau, which encompasses the 200 West Area. The remedial alternatives need to be evaluated with an understanding of the risk pathways, remedial strategy for adjacent sites, and future plans to address the groundwater plume that extends beyond the Inner Area. As indicated in Section 5.9.1, the remedial alternatives considered are expected to range from no further action to complete RTD of all waste material exceeding a specified cleanup level. Decision logic diagrams will be used to evaluate efficiently and equitably the multitude of waste sites in the 200 West Area; the decision logic diagrams for each waste site will help to determine which remedial alternatives appear to be reasonable based on an understanding of the overall approach to remediation of the 200 West Area (and by extension the Inner Area, Central Plateau, and entire Hanford Site). A sample draft decision logic diagram is provided in Figure 5-3. Refined decision logic diagrams may be used for the completion of the FS.

Standard Excavation

Key Components

- Completed using standard earthmoving equipment (backhoes and front end loaders).
- Conventional open-pit (standard) excavation limited to approximately 20 feet below ground surface; standard excavation (SE) typically done to 15 feet at Hanford.
- Extent of excavation required can be determined using an observational approach.
- Clean overburden soil is removed and stockpiled.
- Contaminated soil is removed and segregated to determine disposal or treatment requirement, or direct-loaded into containers for disposal.
- Confirmation sampling can be performed to verify cleanup to RAOs.
- Excavations are backfilled and compacted using clean overburden and borrow soil.

Shallow excavation at 100-B-19.

Examples of Relevant Experience

- Removal, treatment, and disposal (RTD) has been selected as a remedial alternative in previous 100 Area decision documents. Full-scale remediation in the 100 Areas using RTD began in July 1996. Over one million tons of contaminated soil and debris have been disposed of. *(EPA/ROD/R10-99/039)*
- Excavations completed at Trenches 216-B-26 and 216-B-53A and at 216-B-14 Crib for Sr-90 and Cs-137 bearing soils. *(HNF-36881)*
- Excavation completed at uranium-contaminated sediments at Process Trench 316-5 were also excavated. *(WHC-SA-2062-FP)*

Risk Reduction Mechanism

- Contaminated materials removed, eliminating source of exposure.
- Mitigates further migration of contaminants to groundwater.

Screening Criteria *(dashed line indicates range)*

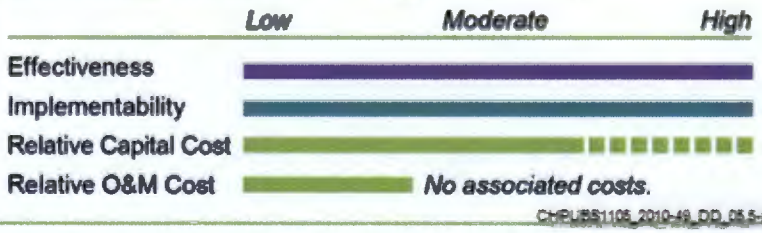

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Figure 5-2. Example of Remedial Technology Fact Sheet Logic for Waste Site Remedy Selection (only for illustration purposes)

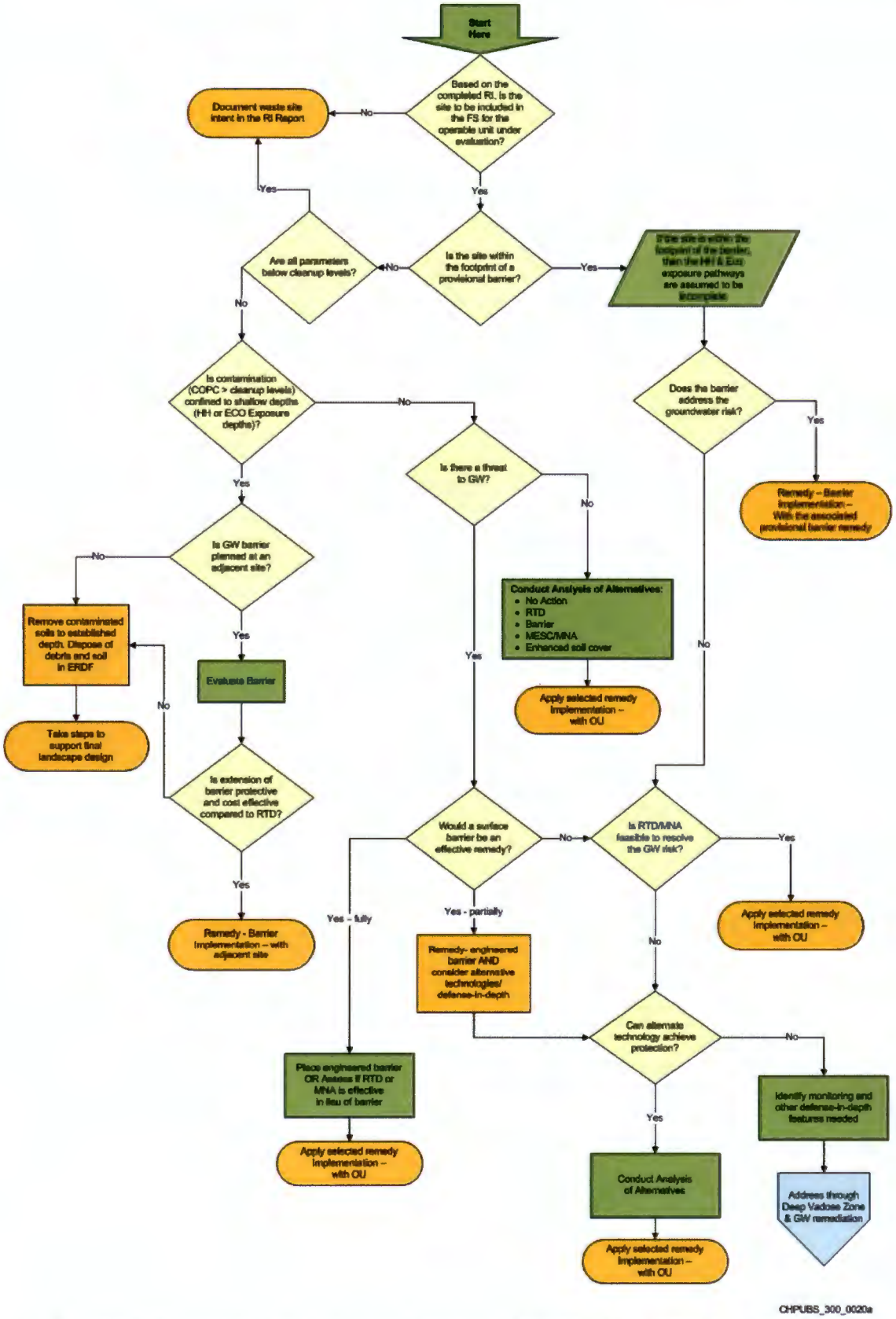

Figure 5-3. Example of Decision Logic Diagram to Evaluate Initial Remedial Alternatives

If a determination is made that remedial alternatives cannot be evaluated using existing characterization data and process knowledge, then a supplemental DQO process will be conducted (with EPA's involvement) in order to ensure that necessary data is collected prior to completing the remedy selection.

5.10 Task 10—Detailed Analysis of Alternatives

During the detailed analysis, the alternatives identified in Task 9 that passed screening will be further refined and analyzed. The waste site type category will be instrumental in implementing the analogous approach for those waste sites without analytical data. The comparable waste site approach establishes a set of parallel waste site characteristics such as source waste streams, operational history, physical waste site dimensions, waste site disposal practices, and proximity to other contaminated features or waste streams. A set of alternatives for a particular waste site that has previous analytical data and a list of COPCs will be applied to a comparable waste site that has no analytical data.

Alternatives will be developed that provide a range of options and sufficient information to adequately compare alternatives. For source control options, the following types of alternatives will be developed to the extent practicable (EPA/540/G-89/004):

- Treatment alternatives will range from eliminating or minimizing, to the extent feasible, the need for long-term management (including monitored natural attenuation) to using treatment as an alternative to address the principal threats to the site. Alternatives within this range typically will differ in the type and extent of treatment used and the management requirements of treatment residuals or untreated wastes.
- One or more alternatives may involve containment of waste with little or no treatment but will protect human health and the environment by preventing potential exposure or reducing the mobility of contaminants.
- No action alternative.

Chapter 9 of the RI/FS report will provide more detailed explanations of each alternative. The selection of the preferred alternative is determined by applying the nine CERCLA evaluation criteria identified in the detailed analysis of alternatives. These criteria are grouped by their importance. Each alternative must meet the following threshold criteria:

- Overall protection of human health and the environment
- Compliance with ARARs

The analysis of alternatives is based on the following primary balancing criteria:

- Long-term effectiveness and permanence
- Reductions in toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying criteria evaluated following comment on the proposed plan and addressed in the ROD are as follows:

- State acceptance
- Community acceptance

5.11 Task 11—RI/FS Report

The final RI/FS report will present the collection of data and evaluations that characterize waste site conditions, determine the nature and extent of contamination for each waste site, and assess risk to human health and the environment from each waste site. The field summary reports will address individual field investigation activities and are summarized overall within the final RI report. The FS elements represent the RAOs, the results of the remedial technologies screening process, and the detailed evaluation of remedial alternatives. The proposed plan will present the Preferred Remedial Alternative.

The final RI/FS report also will consider activities conducted outside of this work plan. Key among those activities is updated findings and conclusions from the 200-ZP-1 or 200-UP-1 groundwater OU remedy decisions, or RCRA closure/TSD unit decision.

5.12 Task 12—Post RI/FS Support

The Inner Area RI/FS report will be subject to EPA review and approval. Following this review, the proposed plan will be created. The proposed plan will be the primary subject of the public comment period. The RI/FS and other final project deliverables will be in the Administrative Record available at: http://www5.hanford.gov/arpir/?content=simpleSearch and subject to public review, but the proposed plan is the primary document. Once the public comment period is complete, the selected remedy will be defined and documented in the ROD. The ROD will also contain a responsiveness summary reflecting all the public comments received and the DOE's response to each comment. Additional information concerning the proposed plan and ROD is presented below.

5.12.1 Proposed Plan

The proposed plan is the mechanism by which the Tri-Parties present the 200-WA-1/200-BC-1 site information and preferred remedy to the public. The plan briefly describes the site background, the risks associated with each waste site, and the remedial alternatives evaluated in the RI/FS. The proposed plan also summarizes the results of the detailed and comparative analyses of the remedial action alternatives and presents the proposed preferred remedial alternative.

The proposed plan provides the public with the opportunity to comment on the alternatives and to participate in the selection of the final remedial alternative. Following public review and comment, a responsiveness summary will be prepared that presents significant comments and new relevant information received during the public comment process. The responsiveness summary will be incorporated into the final ROD.

5.12.2 Record of Decision

Following final comments from the public (including supporting agencies), a remedy is selected and documented in a final ROD. The ROD documents the remedial action plan for each of the waste sites and serves four basic functions (EPA 540-R-98-031, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*):

- A ROD is a legally enforceable document that certifies the remedy selection process was carried out in accordance with CERCLA and, to the extent practicable, in accordance with the NCP.
- A ROD contains a substantive summary of the technical rationale and background information contained in the Administrative Record file.
- A ROD serves as a technical document that provides information necessary for determining the conceptual engineering components and remedy costs. It also outlines the RAOs and cleanup levels for the selected remedy.

5.12.3 Post-ROD Activities

The selected remedial alternative is implemented when the final ROD is approved. This stage usually involves remedial design and design investigation studies to support detailed design and construction.

Protectiveness of the remedy will be evaluated through the use of the five-year review process.

If new information is generated that could affect the implementation of the selected remedy, the information will be addressed through one of the following means:

- Memorandum to the post-ROD file for an insignificant or minor change
- ESD for a significant change
- ROD amendment for a fundamental change

6 Project Schedule

Table 6-1 shows the project schedule for the activities described in this work plan. The schedule will be evaluated to identify efficiencies, will serve as the baseline for the work-planning process, and will be used to measure the progress of implementing this work plan.

The schedule includes Tri-Party Agreement milestones, field activities, and due dates. Any revisions to the project schedule will be done in accordance with Tri-Party Agreement, Section 11.4 (Ecology et al., 1989a).

Table 6-1. Project Schedule for 200-WA-1/200-BC-1 Operable Units

Activity	Period or Completion Date
Submit RI/FS work plan for the 200-WA-1 OU (200 West Inner Area) to EPA (Tri-Party Agreement Milestone M-015-91A)	December 31, 2011
RI/FS Work Plan approval	6 months
Work Plan SAP preparation	9 months
Characterization—field effort	24 months
Characterization—data receipt, validation, and evaluation	12 months
Preparation of RI/FS report	18 months
Submit FS report and proposed plan for the 200-WA-1 OU (200 West Inner Area) to EPA (Tri-Party Agreement Milestone M-015-91B)	December 31, 2015

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7 Project Management Considerations

This chapter discusses the project organization, project coordination, change control, and dispute resolution processes. Change control processes are used to document and achieve approval for changes that arise during the RI/FS. Problems are resolved at the lowest possible level, with higher levels of project oversight engaged to resolve the issues.

7.1 Project Organization

DOE-RL is responsible for cleanup on the Central Plateau. The DOE-RL contractor implements the cleanup for DOE-RL and is responsible for planning, coordinating, and executing the RI/FS activities. The lead regulatory agency (EPA) authorizes the work scope in accordance with the Tri-Party Agreement (Ecology et al., 1989a) and oversees the work for regulatory compliance. Figure 7-1 illustrates the project organization structure for cleanup of 200-WA-1 and 200-BC-1 OUs.

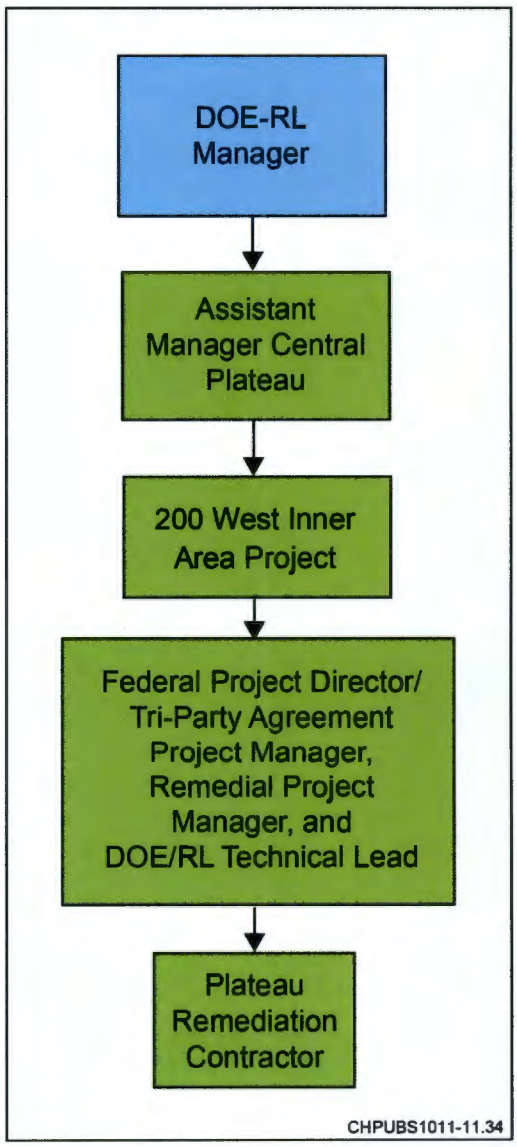

Figure 7-1. Project Organization 200 WA-1 and 200-BC-1 OUs

7.1.1 DOE-RL Project Organization

The DOE-RL Groundwater and Vadose Zone Remediation Project is responsible for cleanup of 200-WA-1/200-BC-1. The federal project director for the Groundwater and Vadose Zone Remediation Project reports to the assistant manager for the Central Plateau.

The DOE-RL federal project director is responsible for authorizing the Plateau remediation contractor to perform the RI/FS tasks for 200-WA-1/200-BC-1.

DOE-RL federal project directors are responsible for authorizing the respective contractors to perform the RI/FS activities for the Central Plateau. The federal project director also is responsible for obtaining lead regulatory approval of the work plan and SAPs, which authorize the RI/FS activities under the Tri-Party Agreement (Ecology et al., 1989a). DOE-RL technical leads are responsible for day-to-day oversight of contractors performing the RI/FS activities, for working with the contractors and the regulatory agencies to identify and work through issues, and for providing technical input to DOE-RL federal project directors.

7.1.2 Regulatory Agency Oversight Organization

In accordance with the proposed changes to the Tri-Party Agreement for Central Plateau cleanup work, 200-WA-1 and 200-BC-1 OUs are assigned to EPA as the lead regulatory agency. EPA has assigned a project manager who is responsible for overseeing various RI/FS activities. The project manager is responsible for working with DOE-RL to resolve issues and approve the documents in accordance with the Tri-Party Agreement, Article XVI (Ecology et al., 1989a). The project manager is responsible

for approving the RI/FS work plan and subsequently for approving the final remedy, approving completion of construction, and proposing sites for deletion from the NPL.

As a participating agency, Ecology's regulatory responsibilities are to provide assistance if requested by the lead regulatory agency (EPA), to fulfill mandatory legal obligations (such as under a permit), and to consider concurrence for a CERCLA remedial action.

7.1.3 Contractor Organization

RI/FS activities are being conducted by CHPRC under DE-AC06-08RL14788, *CH2M HILL Plateau Remediation Company Plateau Remediation Contract.* CHPRC is responsible for integrating and executing the full scope of RI/FS activities in the Central Plateau.

7.2 Project Coordination, Decision Making, and Documentation

Coordination among EPA, the lead federal agency (DOE), and the contractors is essential for successful execution of the decision document development activity. Consensus from the regulatory agency project managers will be documented using change control forms in accordance with RL-TPA-90-0001.

7.3 Change Control and Dispute Resolution

The work plan represents the Tri-Parties' assessment of the data needs at the end of the systematic planning process. As new information becomes available, changes to the work scope may be required. These changes will be made to the work plan, depending on the nature of the change. Changes that affect the Tri-Party Agreement (Ecology et al., 1989a) are documented using change control forms. The class or level of the change (i.e., signatory, executive management, or project management) is noted and the description, justification, and impact of the change are documented.

Dispute resolution is handled in accordance with the Tri-Party Agreement, Article XVI (Ecology et al., 1989a). The Tri-Parties are to make reasonable attempts to resolve all disputes informally at the project manager level. Disputes that cannot be resolved informally are submitted in writing to, and resolved by, the interagency management integration team at the executive manager level. If resolution is not achieved at this level, the dispute is forwarded to higher levels of management. As a last resort, the dispute resolution process outlined in the Tri-Party Agreement, Article XXVI (Ecology et al., 1989a), is used. To promote dispute avoidance, potential problems will be identified early in the RI/FS process, and associated contingency/variance plans will be developed.

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Appendix A

WIDS Assessment Spreadsheet

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Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
16	616, 616 Building Non-Radioactive Dangerous Waste Storage Facility, 616 Nonradioactive Dangerous Waste Storage, 616 NRDWSF	200-OA-1	
200-E-114-PL	200-E-114-PL, Pipeline from 241-BY Tank Farm to 241-C Tank Farm and BC Cribs Trenches, 2805-E1, 2805-E2, 2805-E3, 2805-E4, 216-BC-2805, Pipeline from 216-BY-201 to 216-BC-201 (See Subsites)	East	
200-E-14	200-E-14, 216-BC-201 Siphon Tank, 216-B-201, IMUST (Inactive Miscellaneous Underground Storage Tank)	200-BC-1	
200-E-202-PL	200-E-202-PL; Transfer Lines from 241-BX-155 Diversion Box to 241-BX-153 Diversion Box; Lines V315, V316, V317, V318, and V319	Pipeline	
200-E-210-PL	200-E-210-PL; Encased Lines Between 241-AW Tank Farm and 242-A Evaporator Building; Lines SL-167, SL-168, SN-219, SN-220, SN-269, and SN-270	Pipeline	
200-W ADB	200-W ADB, 200-W Ash Disposal Basin	200-OA-1	
200-W ADS	200-W ADS, 200-W Ashpit Demolition Site	200-OA-1	
200-W BP	200-W BP, 200-W Burning Pit, Pit 34	200-OA-1	
200-W CSLA	200-W CSLA, 200-W Construction Surface Laydown Area, Non-Rad Burial Ground, Construction Surface Laydown Area	Other	This site was found to contain no radioactive or hazardous material, so the site would not adversely affect the environment or human health. Site walk downs were conducted multiple times and all concluded there was nothing of potential threat. The site was consolidated into 200-W-71, which is an accepted site and will be evaluated. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
200-W PAP	200-W PAP, 200-W Powerhouse Ash Pit	200-OA-1	
200-W PP	200-W PP, 200-W Powerhouse Pond, 200 West Powerhouse Ponds, 284-W-B	Other	Consolidated with 216-U-14, this site was completely contained within the boundaries of 216-U-14, and only water was used in this PP. No hazardous or radioactive waste was found. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
200-W-1	200-W-1, REDOX Mud Pit West	200-WA-1	
:00-W-10	200-W-10, Item 10 (RCRA General Inspection), Grout Wall Test, Lysimeter Test Site	Other	No hazardous or radioactive material was located at the site. The area was used in 1976 for a grout wall test. The tank was excavated within the grouted area. Tests were performed to minimize leaks. The wood covered pit presented a physical hazard. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
200-W-100-PL	200-W-100-PL; Encased Pipeline from 241-UX-154 to 241-SX-152 Diversion Box; Lines 4700, 4701, 4853, V762, V503 and V505	200-IS-1	
200-W-101	200-W-101, Contaminated Material West of 216-S-12 Crib	200-WA-1	
200-W-102	Duplicate of 200-W-102-PL	200-OA-1	
200-W-102-PL	200-W-102-PL, Pipeline from Laundry, Powerhouse and Shops to 216-U-14 Ditch, 200-W-102	200-OA-1	
200-W-103	200-W-103, 201-W Concrete Silo	Other	This was a test facility that did not receive any waste. The silo was constructed to test the feasibility of aboveground dry waste storage. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-104	200-W-104, 2714-U Building, UO3 Storage Warehouse, 2714-U Foundation	Other	The building was located northwest of the 221-U canyon facility. The site was a metal building. The building had been posted with Contamination Area, Radioactive Material Area signs. The 2714-U and 275-UR buildings were demolished in 2005. The 2714-U foundation is posted with Underground Radioactive Material signs. Site is not currently included in RI/FS work plan as included in WA-1 OU. The operable unit in WIDS is currently not applicable. Remove from RI consideration.
200-W-105-PL	200-W-105-PL; Encased Transfer Line Between 241-UX-154 Diversion Box and 241-TX-155-Diversion Box; Encased Lines V375, V382, and 4859/4703	200-IS-1	
200-W-106	200-W-106, Soil Contamination Area Adjacent to 200-W-55	200-WA-1	
200-W-107	200-W-107, Miscellaneous Stream #685, 222-U Building Stormwater Runoff	Other	This site is associated with the 222-U Building and 200-W-136. Received stormwater runoff from the 222-U Building. When the 222-U building was demolished in 2005, the metal french drain lids were removed. The french drains were filled with gravel to within 7.6 to 10 centimeters (3 to 4 inches) of the top of the drains. Crushed rock was added around the drain structures. It is unclear how it received runoff since there were no pipes extending from the 222-U Building. Was Demolished with the 222-U Building. Project team decision considering validation of site classification of Not Accepted (proposed). Removed from RI consideration.

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
200-W-108	200-W-108, Miscellaneous Stream #687, 222-U Building Stormwater Runoff	Other	The drain is associated with the demolished 222-U building and the 200-W-136 remediation area. Documentation states that the site received stormwater runoff from the east side or backside of the 222-U Building. During the 2003 site walkdown, it was unclear how the drain received stormwater because no pipes were observed extending from the building into the drain. A small (cut off) steel pipe was visible extending out of the 222-U building above the drain area. Was demolished with the 222-U Building. Project team decision considering validation of site classification of Not Accepted (proposed). Removed from RI consideration.
200-W-109	200-W-109, Miscellaneous Stream #521, 222-U Building Stormwater Runoff	Other	Remove from RI consideration based on UIC evaluation.
200-W-11	200-W-11, Concrete Foundation South of 241-S, S-Farm Foundation and Dump Site	200-WA-1	
200-W-110	200-W-110, Miscellaneous Stream #393	Other	Unable to locate from the description provided in DOE/RL-88-11. The drain was on the east side of the 222-U building. The 222-U building has been demolished. Unable to locate in the field. The drain received stormwater run off from the 222-U facility. Site walkdown was conducted and no drain was found. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted (Proposed). Removed from RI consideration.
200-W-111	200-W-111, Miscellaneous Stream #394, 222-U Building Stormwater Runoff	Other	Remove from RI consideration based on UIC (Underground Injection Control) evaluation.
200-W-112	200-W-112, Miscellaneous Stream #52, Steam Condensate	Other	The drain is located approximately 1.8 meters (6 feet) south of the southwest corner of the 224-U building. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.
200-W-113	200-W-113, Miscellaneous Stream #54, North Steam Pit	Other	The drain is located approximately 4.5 meters (15 feet) from the northwest corner of the 224-U building. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.
200-W-114	200-W-114, Miscellaneous Stream #55	Other	Unable to locate based on the description provided in DOE/RL-88-11. Visits were made to the 224-U facility on both March 10th and April 10th to try to find visual evidence of the stormwater drain listed in DOE/RL-88-11. No drain structure is evident. Remove from RI consideration based on UIC evaluation.
200-W-115	200-W-115, Miscellaneous Stream #138, Steam Condensate MSS-003, 063	Other	The drain is located northeast of the 221-U Building and is northeast of the 241-WR Vault. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.
200-W-116	200-W-116, Miscellaneous Stream #139, Steam Condensate MSS-TRP-004	Other	The drain is located adjacent to Beloit Ave. and 16th Street, east of the north end of 221-U. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.
200-W-117	200-W-117, Miscellaneous Stream #140, Steam Condensate MSS-TRP-005	Other	The drain is located adjacent to Beloit Ave. and 16th Street, south of the 291-U Stack. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Remove from RI consideration based on UIC evaluation.
200-W-118	200-W-118, Miscellaneous Stream #141, Steam Condensate MSS-TRP-006	Other	Remove from RI consideration based on UIC evaluation.
200-W-119	200-W-119, Miscellaneous Stream #142, Steam Trap 007	Other	The site is located inside the 224-U facility fence, in the southeast corner of the fenced area. It is approximately 1.8 meters (6 feet) north of 16th Street. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.
200-W-12	200-W-12, 201-W Soil Mound and Plastic Pipe	200-WA-1	
200-W-120	200-W-120, Miscellaneous Stream #143, Miscellaneous Steam Trap 008	Other	The site is a steam trap located outside the 224-U facility fence, on the south side of 16th Street. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium).Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
200-W-121	200-W-121, Miscellaneous Stream #144, Miscellaneous Steam Trap 009	Other	The site is located south of 16th Street, southwest of the 221-U building. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.
200-W-122	200-W-122, Miscellaneous Stream #145, Miscellaneous Steam Trap 014	Other	The site is located south of 16th Street, southwest of the 221-U building. It is located adjacent to the railroad track that leads to the REDOX facility. Not mapped. Steam was produced from sanitary water that had been sent through a water softener system to remove minerals (calcium and magnesium). Physically located in 200 West Inner Area. Remove from RI consideration based on UIC evaluation.
200-W-123	200-W-123, Gravel Pit 35	Other	This site was a gravel pit. The waste was soil and categorized as not dangerous and nonradioactive. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-124	200-W-124, PFP Stormwater Pond, Z-9 Pond	Other	This site is no longer visible and is not marked or posted. The waste was stormwater runoff and was nonradioactive/nondangerous. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted (Proposed). Removed from RI consideration.
200-W-125-PL	200-W-125-PL, 216-Z-1 Ditch Replacement Pipeline (See Subsites)	Pipeline	
200-W-126	200-W-126, Tank Farm Vertical Storage Units, Vertical Storage Units West of 241-T Tank Farm	Tank Farm	
200-W-127	200-W-127, Surface Stabilized Area East of UPR-200-W-29/UPR-200-W-97 (UN-216-W-5)	200-WA-1	The site is located on the south side of 23rd Street in 200 West Area. It is west of T Plant and east of UPR-200-W-29/UPR-200-W-97, a posted Underground Radioactive Material area on the corner of 23rd St. and Camden Ave. Physically located in 200 West Inner Area. Project team decision considering no site left behind. Carry forward to RI.
200-W-128	200-W-128, Underground Radioactive Material Area East of 218-W-4A	200-WA-1	The site is located approximately 100 feet south of 23rd Street, inside 200 West Area. It is adjacent to the 218-W-4A fence. Physically located in 200 West Inner Area. Project team decision considering no site left behind. Carry forward to RI.
200-W-129-PL	200-W-129-PL; Encased Pipeline from 241-T-151 and 241-T-152 to 241-TX-155 Diversion Box; Lines V399, V405, and V411	Pipeline	
200-W-13	200-W-13, 2713-WB Green Hut Complex	200-WA-1	The site is located within the 200 West Area, north of 19th Street. 2713-WB is approximately 100 meters west of Bridgeport Ave. Physically located in 200 West Inner Area. Project team decision considering no site left behind. Carry forward to RI.
200-W-130-PL	200-W-130-PL; Pipelines from 241-T-151 and 241-T-152 Diversion Boxes to 241-U-151 Diversion Box; Lines V445, V663, V601, and V416 and Spare Lines V662, V682, and V683	Pipeline	
200-W-131-PL	200-W-131-PL, V601, Spur to 241-TX Tank Farm	Pipeline	
200-W-132-PL	200-W-132-PL; Pipelines from 221-T to 241-T-151 and 241-T-152; V653, V654, V667, V668, V669, V706, and V707	Pipeline	
200-W-133-PL	200-W-133-PL, V682 Spare Line	Pipeline	Will be Reclassified as Not Accepted proposed.
200-W-134-PL	200-W-134-PL, V683 Spare Line	Pipeline	Will be Reclassified as Not Accepted proposed.
200-W-135-PL	200-W-135-PL, V662, Spare Line	Pipeline	Will be Reclassified as Not Accepted proposed.
200-W-136	200-W-136, Underground Radioactive Material Area Including 222-U Building Foundation, Demolished 203-U Area and Contaminated Soil	200-WA-1	The site is located east of the 221-U canyon building, northeast of 224-U, and southwest of the 291-U exhaust stack. It is west of Beloit Ave. Physically located in 200 West Inner Area. Project team decision considering no site left behind. Carry forward to RI.
200-W-137-PL	200-W-137-PL, Pipeline from 241-S-151 Diversion Box to 216-S-1 & 2 Cribs, Line V533	Pipeline	
200-W-138-PL	200-W-138-PL, Pipeline from 240-S-151 to 216-S-7 Crib, V547	Pipeline	
200-W-139-PL	200-W-139-PL, Pipeline from 200-W-138-PL to 216-S-9 Crib, V547	Pipeline	
200-W-14	200-W-14, 200 West Heavy Equipment Storage Area	200-WA-1	
200-W-140-PL	200-W-140-PL, Pipeline from 292-T(200-W-40)	Pipeline	
200-W-141-PL	200-W-141-PL, Pipeline Connecting 200-W-139-PL Pipeline to 216-S-23 Crib, V547	Pipeline	
200-W-142-PL	200-W-142-PL, Pipeline from 222-T to 216-T-8 Crib	Pipeline	
200-W-143-PL	200-W-143-PL; Encased Pipeline from 241-TX-154 Diversion Box to 241-TX-152 and 241-TX-155 Diversion Boxes; Lines V383, V384, V385, V387, V388, V391, V392, and V393	Pipeline	
200-W-144	200-W-144, Room 4E 222-S Laboratory TSD	Tank Farm	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
200-W-145	200-W-145, Hidden Wells South of U-Plant, U Plant Dry Wells	Other	Multiple (more than a dozen) 91 to 106 centimeter (36 to 42 inch) diameter concrete dry wells were found in an undeveloped area south of U Plant on the west side of Beloit Ave. The open concrete wells ranged in size from 91.4 centimeters (36 inches) to 106.6 centimeters (42 inches) in diameter. The estimated depths are greater than 1.8 meters (6 feet). The wells are located south of 16th Street, west of Beloit Ave., and southeast of 224-U. A 2006 review of historical drawings, photographs, and documents was not successful in definitely determining the history of these structures. A few aerial photographs from the early 1950s indicate a group of temporary facilities were located in this area. They apparently were connected to raw water and potable water utilities. They also appear to have had a buried steam distribution system. A 2006 field inspection found one caisson that was open and empty enough to reveal several small diameter pipelines entering the concrete caisson wall approximately 4 feet below the ground surface. This supports the concept that they were used as drywells. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted (Proposed). Removed from RI consideration.
200-W-146-PL	200-W-146-PL, 216-S-22 Crib Pipeline	Pipeline	
200-W-147-PL	200-W-147-PL, Pipeline from 207-SL to 216-S-19 Pond	Pipeline	
200-W-148-PL	200-W-148-PL, 216-S-26 Crib Pipeline	Pipeline	Will be designated to 200-MG-1 based on the MG-1 change package into their EECA.
200-W-149-PL	200-W-149-PL, Pipelines Related to 216-S-20 Crib (See Subsites)	Pipeline	
200-W-15	200-W-15, S Plant Project W-087 Hexone Discovery	200-WA-1	The site is located approximately 18 meters (59 feet) southwest of the southwest corner of REDOX (202-S). Physically located in 200 West Inner Area. Project team decision considering no site left behind. Carry forward to RI.
200-W-150-PL	200-W-150-PL, Pipelines Associated with 216-S-13 Crib (See Subsites)	Pipeline	
200-W-151-PL	200-W-151-PL, 200-W-42 Pipe Remaining Under 16th Street	Pipeline	
200-W-152-PL	200-W-152-PL, Pipeline from 202-S to 2904-S-170, 207-S Retention Basin and 216-S-17 Pond, REDOX Process Sewer	Pipeline	
200-W-153-PL	200-W-153-PL, Steel Pipeline from 240-S-151 Diversion Box to the 2904-S-172 and 2904-S-171 Control Structures (See Subsite)	Pipeline	
200-W-154-PL	200-W-154-PL, Pipeline from 200-W-152-PL to 216-S-5 Crib	Pipeline	
200-W-155-PL	200-W-155-PL, Pipeline from 2904-S-160 Control Structure to 216-S-16 Ditch	Pipeline	
200-W-156-PL	200-W-156-PL, 216-S-6 Crib Pipeline, Pipeline from 200-W-155-PL to the 2904-S-171 Control Structure	Pipeline	
200-W-157-PL	200-W-157-PL, REDOX Chemical Sewer, Pipeline from 202-S to 200-W-152-PL, Pipeline from 205-S to REDOX Chemical Sewer (See Subsites)	Pipeline	
200-W-158-PL	200-W-158-PL, Pipeline from 293-S to 200-W-152-PL	Pipeline	
200-W-159-PL	200-W-159-PL, Cooling Water Lines from 241-SX-401 and 241-SX-402 to 216-U-10 Pond	Pipeline	
200-W-16	200-W-16, 292-T Underground Tanks, IMUST, Inactive Miscellaneous Underground Storage Tank, 292-TK-1, 292-TK-2	Pipeline	
200-W-160-PL	200-W-160-PL, Pipeline from 241-SX-401 and 241-SX-402 to 216-S-21 Crib	Pipeline	
200-W-161-PL	200-W-161-PL, Pipeline from 242-S to 216-S-25 Crib, Line 557	Pipeline	
200-W-162-PL	200-W-162-PL, Pipeline from 241-SX-701 to 216-SX-2 Crib	Pipeline	
200-W-163-PL	200-W-163-PL, T Plant Process Sewer, 18-Inch 221-T Process Sewer Pipeline (See Subsites)	Pipeline	
200-W-164-PL	200-W-164-PL, Pipeline from 207-T Retention Basin to the 216-T-4 Ditch	Pipeline	
200-W-165-PL	200-W-165-PL, Pipeline from Tank 241-TX-112 to 207-T Retention Basin	Pipeline	
200-W-166-PL	200-W-166-PL, Pipeline from 242-T Evaporator Building to the 207 T Retention Basin	Pipeline	
200-W-167-PL	200-W-167-PL, Pipeline from 242-T Evaporator to 207-T Retention Basin, V610	Pipeline	
200-W-168-PL	200-W-168-PL, 216-U-3 Crib and 216-U-14 Ditch Pipelines (See Subsites)	Pipeline	
200-W-169-PL	200-W-169-PL, Pipeline Between 216-U-10 Pond and 216-U-11 Overflow	Pipeline	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
200-W-17	200-W-17, S Plant Project W-087 Aluminum Silicate Discovery	Other	The pipe trench where white aluminum silicate was found has been back-filled to grade. There is no evidence of aluminum silicate on the surface. The chemical release is nondangerous/nonradioactive. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
200-W-170-PL	200-W-170-PL, 216-U-16 Crib Pipeline	Pipeline	
200-W-171	200-W-171, Leak from 234-5Z Pipe Trench to 241-Z Tank D-6, 200-W-219-PL Line Leak	Pipeline	
200-W-172	200-W-172, Liquid Leaking from Drain Laterals Below 234-5Z Floor Slab	Pipeline	
200-W-173-PL	200-W-173-PL, 216-T-33 Crib Pipeline, Pipeline from 2706-T to 216-T-33 Crib	Pipeline	
200-W-174-PL	200-W-174-PL, Pipelines from 234-5Z to 216-Z-1A and 216-Z-18 Crib, 216-Z-1A Modified Pipeline, Lines 1035 and 1036 (See Subsites)	Pipeline	
200-W-175-PL	200-W-175-PL; Pipeline to Route Waste from 241-T-112 to 216-TY-201 Flush Tank and 216-T-26, 216-T-27, and 216-T-28 Cribs; Line V681	Pipeline	
200-W-176-PL	200-W-176-PL; Encased Transfer Lines Between 241-TX-153 Diversion Box and 241-TX-155 Diversion Box; Lines V396, V397, V401, V403, V407, V409, and V413	Pipeline	
200-W-177-PL	200-W-177-PL, Direct Buried Tank Farm Lines Between 241-TXR-151 and 241-TX-155 Diversion Boxes, Lines V7616 and V7653	Pipeline	
200-W-178-PL	200-W-178-PL, Pipeline from 241-Z to 244-TX DCRT, Lines HSW-202 and HSW-203	Pipeline	
200-W-179-PL	200-W-179-PL; Pipelines Between 241-S-152 Diversion Box and 241-U Tank Farm; Lines SL100, SL101, SN216/281, and DR327	Pipeline	
200-W-18	200-W-18, S Plant Project W-087 Aluminum Oxide Discovery	Other	Aluminum oxide and calcium were found underneath a pipeline. Source was likely the 200-W-1 Mud Pit. The material was removed with the excavation for the pipeline. The material was designated as nondangerous/nonradioactive. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
200-W-180-PL	200-W-180-PL, Pipelines from 221-T to 216-T-1 Ditch (See Subsites)	Pipeline	
00-W-181-PL	200-W-181-PL; Transfer Lines Between 241-U-152 and 241-U-153 Diversion Boxes; Lines V426, V427, and V428/V461	Pipeline	
200-W-182-PL	200-W-182-PL; Encased Transfer Lines Between 241-U-152 Diversion Box and 241-TX-152 and 241-TX-155 Diversion Boxes; Lines V398, V404, and V410	Pipeline	
200-W-183-PL	200-W-183-PL, Transfer Lines Between 241-U-151 and 241-U-152 Diversion Boxes, Lines V422/V452 and V421/V453	Pipeline	
200-W-184-PL	200-W-184-PL; Drain Lines from 241-U-151, 241-U-152 and 241-U-153 Diversion Boxes to 241-U-301 Catch Tank; Line V478	Pipeline	
200-W-185-PL	200-W-185-PL; Transfer Lines Between 241-U-151 and 241-U-153 Diversion Boxes; Lines V450 and V451	Pipeline	
200-W-186-PL	200-W-186-PL, Transfer Lines from 240-S-152 Diversion Box to 204-S and 205-S, Lines 1006 and 1045	Pipeline	
200-W-187-PL	200-W-187-PL; Transfer Lines Between 240-S-151 and 240-S-152 Diversion Boxes; Lines V552, V553, and V555	Pipeline	
200-W-188-PL	200-W-188-PL; Waste Distribution Line from 216-TY-201 Flush Tank to 216-T-26, 216-T-27 and 216-T-28 Cribs and Truck Unloading Station Line (See Subsites)	Pipeline	
200-W-189-PL	200-W-189-PL, Transfer Lines from 219-S to 241-SY Tank Farm, Lines SNL-5350 and SNL-5351	Tank Farm	
200-W-19	200-W-19, Steam Line Asbestos Release	Other	The site is not marked or posted. It is under a lawn between the M0039 building and a sidewalk. The site was wetted to avoid airborne asbestos release. The area was encapsulated and the asbestos was cleaned up by the next day. Remove from RI consideration.
200-W-190-PL	200-W-190-PL, Discharge Line from 240-S-151 Diversion Box to 240-S-302 Catch Tank, Line V554	Pipeline	
200-W-191-PL	200-W-191-PL; Encased Transfer Line Between 241-TX-155 and 241-TY-153 Diversion Boxes; Lines V402, V406, V408, and V412	Pipeline	
200-W-192-PL	200-W-192-PL; U Plant Process Sewer; Pipeline from 221-U, 222-U and 224-U to the 207-U Retention Basin (See Subsites)	Pipeline	
200-W-193-PL	200-W-193-PL, Pipeline from 224-U to 241-U-361 Settling Tank	Pipeline	
00-W-194-PL	200-W-194-PL, Pipeline from 241-U-361 Settling Tank to 216-U-1 and 216-U-2 Cribs	Pipeline	
00-W-195-PL	200-W-195-PL, Pipeline from U Plant to 216-U-17 Crib	Pipeline	
200-W-196-PL	200-W-196-PL, Pipelines from Railcar Unloading Stations to 216-T-34 Crib	Pipeline	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
200-W-197-PL	200-W-197-PL, Pipelines from Railcar Unloading Stations to 216-T-35 Crib	Pipeline	
200-W-198-PL	200-W-198-PL, Pipelines from Truck Unloading Station to 216-T-34 and 216-T-35 Cribs	Pipeline	
200-W-199-PL	200-W-199-PL, Pipelines from Building 231-Z to 231-W-151 Vault	Pipeline	
200-W-2	200-W-2, REDOX Berms West	200-WA-1	
200-W-20	200-W-20, T Plant Complex	Other	The T Plant Complex is located inside the 200 West Area near the corner of Beloit Ave. and 23rd Street. The T Plant Complex is enclosed within a 2.4 meter (8 foot) chain link fence. Facilities within the fence include the 221-T Canyon Building, the 2706-T Decontamination Facility, the 211-T Sump, the 214-T Storage Building, the 277-T Storage Building, the 2715-T Material Storage Building, the 291-T Ventilation Stack Complex, and several small support buildings. The T Plant Complex is considered a RCRA Treatment and Storage Unit. Currently, the T Plant Complex is a treatment and storage unit for dangerous and mixed waste.TSD number T-2-7. This site is still active. Physically located in 200 West Inner Area. Remove from RI consideration based on site activity.
200-W-200-PL	200-W-200-PL, 216-Z-16 Crib Pipeline	Pipeline	
200-W-201-PL	200-W-201-PL, 216-Z-17 Crib Pipeline	Pipeline	
200-W-202-PL	200-W-202-PL, Pipeline from 231-W-151 to 216-Z-5 Crib (See Subsites)	Pipeline	
200-W-203-PL	200-W-203-PL, Pipeline from 231-W-151 Vault to 216-Z-7 Crib	Pipeline	
200-W-204-PL	200-W-204-PL, Pipeline from 231-W-151 Vault to 216-Z-10 Reverse Well	Pipeline	
200-W-205-PL	200-W-205-PL, Pipelines from 235-5Z to 241-Z-8 Silica Storage Tank and 216-Z-8 French Drain (See Subsites)	Pipeline	
200-W-206-PL	200-W-206-PL, Pipelines from 234-5Z to 216-Z-9 Crib	Pipeline	
200-W-207-PL	200-W-207-PL; Z Plant Radioactive Process Sewer to 216-Z-11, 216-Z-19 and 216-Z-20 Ditches (See Subsites)	Pipeline	
200-W-208-PL	200-W-208-PL, Pipeline from Diversion Boxes 200-W-58 and 200-W-59 to 216-Z-12 Crib (See Subsites)	Pipeline	
200-W-209-PL	200-W-209-PL, 207-Z Pipelines (See Subsites)	Pipeline	
200-W-21	200-W-21, 204-T Unloading Station, T-Plant Waste Railcar Unloading Facility, Unloading Station 1 and Unloading Station 2	200-WA-1	
200-W-210-PL	200-W-210-PL; Pipeline from 241-Z-361 Settling Tank to 216-Z-1, 216-Z-2 and 216-Z-3 Cribs and 216-Z-1A Tile Field (See Subsites)	Pipeline	
200-W-211-PL	200-W-211-PL, 207-SL Retention Basin Sewer Pipelines, Retention Waste Sewer from 219-S and 222-S to 207-SL Basin, Pipelines from Boiler Annex and Pump Lift Station to 207-SL Basin (See Subsites)	Pipeline	The waste site is four underground effluent pipelines that feed the 207-SL Retention Basin. The 207-SL basin is located east of the 222-S laboratory. The three effluent lines enter the west side of the 207-SL basin. The pipelines are associated with the 222-S Laboratory, 219-S, the 222-S Boiler Annex, and the 222-SA pump lift station. The 207-SL Basin and the 219-S storage tanks, inside the 219-S building, are RCRA TSD units. This site is active.
200-W-212-PL	200-W-212-PL; Encased Transfer Line from 240-S-151 Diversion Box to Pipeline 200-W-153-PL; Lines V550, V551, V544, V546, V548, and V549	Pipeline	
200-W-213-PL	200-W-213-PL Pipelines from 241-TX-153 Diversion Box and 241-TX-302A to 216-T-19 Crib, Lines V795 and V605 (See Subsites)	Pipeline	
200-W-214-PL	200-W-214-PL, Pipeline from 291-Z to 216-Z-13 French Drain	Pipeline	
200-W-215-PL	200-W-215-PL, Pipeline from 291-Z to 216-Z-14 French Drain	Pipeline	
200-W-216-PL	200-W-216-PL, Pipelines from 291-Z to 216-Z-15 French Drain	Pipeline	
200-W-217-PL	200-W-217-PL, Pipeline from the Counting Box to 216-U-7 French Drain	Pipeline	
200-W-218-PL	200-W-218-PL, Pipeline from 216-U-10 Pond to 216-U-9 Ditch	Pipeline	
200-W-219-PL	200-W-219-PL, Pipelines from 235-Z to the North Side of 241-Z, 241-Z Primary Pipe Trench, Pipe Tunnel 3	Pipeline	
200-W-22	200-W-22, 203-S/204-S/205-S Stabilized Area	200-WA-1	
200-W-220-PL	200-W-220-PL, Pipeline from 241-Z to 241-Z-361 Settling Tank	Pipeline	
200-W-221-PL	200-W-221-PL, Laundry Waste Crib (LWC) Pipeline	Pipeline	
200-W-222-PL	200-W-222-PL, 207-U Retention Basin Outlet Pipeline to the 216-U-14 Ditch	Pipeline	
200-W-223-PL	200-W-223-PL, Pipeline from 242-S Evaporator to 216-U-14 Ditch	Pipeline	
200-W-224-PL	200-W-224-PL, Pipeline from 234-5Z and 236-Z to West Side of 241-Z (See Subsites)	Pipeline	
200-W-225-PL	200-W-225-PL, PFP Six Inch Condensate Line Connecting to Process Sewer	Pipeline	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
00-W-226-PL	200-W-226-PL; Pipeline from 224-T Plutonium Concentration Facility to 241-T-361 Settling Tank and 216-T-3 Reverse Well; Lines V326, V671, and V706	Pipeline	
200-W-227-PL	200-W-227-PL, Pipeline from 221-T Separations Facility to 216-T-6 Crib	Pipeline	
200-W-228-PL	200-W-228-PL, Pipeline from 232-Z to 241-Z, 3-Inch Contaminated Waste Line	Pipeline	
200-W-229-PL	200-W-229-PL, Pipeline from 2736-ZB to 241-Z	Pipeline	
200-W-23	200-W-23, 203-S and 205-S Underground Contaminated Zone	Other	Duplicate of 200-W-22/check for duplicate site on WA-1 list and other list. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-230-PL	200-W-230-PL, Pipeline from Railroad Unloading Station to 276-S-141 and 276-S-142 Hexone Tanks (See Subsites)	Pipeline	
200-W-231	200-W-231, Temporary Facilities Construction Trailer Septic Tank and Tile Field	200-WA-1	The septic tank and tile field are located west of Camden Ave. and south of 23rd St. They are approximately 16.7 meters (55 feet) south of the 200-W-79-PL pipeline, the pipeline that fed the 216-T-36 crib. Physically located in 200 West Inner Area. Project team decision considering no site left behind. Carry forward to RI.
200-W-232	200-W-232, 2607-WT Replacement Septic Tank and Dry Well	Other	The septic tank and dry well are located east of the 241-TY Tank Farm, outside the tank farm fence. Nondangerous/nonradioactive. Remove from RI consideration.
200-W-233	200-W-233, Plutonium Finishing Plant (PFP) Treatment Unit, TSD: T-2-9	Other	Site has been properly closed out. Remove from RI consideration. http://www5.hanford.gov/arpir/?content=findpage&AKey=D7293346
200-W-24	200-W-24, 216-S-10 Borrow Pit, S-10 Pond Borrow Area	Other	Clean backfill material was taken from this area in 1984 during the 216-S-10 stabilization. No waste was deposited in this area, which is associated with the 216-S-10 pond. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-28	200-W-28, 216-U-10 Borrow Pit, U Pond Borrow Area	Other	The borrow area is located south of 16th Street, east of Dayton Avenue, and north of the 216-U-10 Pond. The 216-U-10 Borrow Pit is a large, shallow, scarred sandy area adjacent to the north side of the backfilled 216-U-10 Pond. It is sparsely vegetated with crested wheatgrass. Provided backfill for the 219-U-10 pond. No waste was placed in this borrow area; it provided fill for 216-U-10 Pond. Remove from RI consideration.
200-W-29	200-W-29, 216-U-11 Borrow Pit	200-OA-1	
200-W-3	200-W-3, 2713-W North Parking Lot, 220-W-1	200-OA-1	
200-W-30	200-W-30, 218-W-1A Borrow Pit	200-OA-1	
200-W-31	200-W-31, 218-W-2A Borrow Pit	Other	Borrow Pit. This area was used for backfill material for the 218-W-2A stabilization. The borrow pit is no longer visible. Is associated with the 218-W-2A Burial Ground. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-32	200-W-32, 216-Z-19 Borrow Pit	Other	Borrow pit. Clean backfill material was taken from this area and used to stabilize the surface of another ditch. No waste was placed here. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-33	200-W-33, Solid Waste Dumping Area, Debris Near 609 Gate	200-OA-1	
200-W-35	200-W-35, Various Sites North of 201-W, 200-W-35-A Infiltration Test Site, Lysimeter Test Site, 200-W-35-B Bentonite Slurry Test Site, 200-W-35-C Buried Garbage Can with Lid (See Subsites)	Other	This area was used for testing equipment and processes to support waste management operations. Did not contain any contaminated facilities or vadose contamination. Associated with 200-W-35,12, and 10. The waste was nondangerous/nonradioactive equipment. No radiological material was used in any of the tests. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
200-W-36	200-W-36, TK-SQ-143, EP 211-143	Other	The tank is in the 211-T tank farm area, which is between 221-T and 2706-T. Located 10 meters northwest of 221-T Canyon. Solid mixed chemical wastes were contained in this tank. Part of an active facility.
200-W-37	200-W-37, Buried Tygon Tubing Near 241-S-101	Other	Located completely inside the boundaries of 200-W-96 (s/sx/sy tank farm). The waste was radioactive tygon tubing; the site also contained radioactive process effluent. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
00-W-4	200-W-4, U-Farm Landfill	Other	The unit waste includes lead, chromium, and cadmium. It was assumed to be dried, yellow paint. Samples of the material were collected and a radiological survey was done. There was no detectable contamination above background. Remove from RI consideration.

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200-W-40	200-W-40, 292-T, Emission Control Lab, Stack Gas Sampling Building	Other	The building is located in northeast portion of 200 West Area, within T-Plant Complex. It is about 60m southeast of 291-T stack, north of 222-T building, and east of 57m 221-T building. The site is a grey concrete block building. Tie back side of the building is surrounded by post and chain labeled "Contamination Area". This site is inactive. WIDS Designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
200-W-41	200-W-41, Abandoned Drums, Drums Found East of T Plant	200-OA-1	
200-W-42	200-W-42, U Plant Radioactive Process Sewer from 221-U to 216-U-8 & 216-U-12 Cribs, 200-W-42-PL	200-WA-1	
200-W-43	200-W-43, 291-S Stack Sand Filter	Other	The 291-S Stack Sand Filter is a belowgrade concrete structure containing seven layers of sand and gravel. The 291-S Stack Sand Filter is located adjacent to the east end and is 10 m from the 202-S Facility, southwest of the 291-S Stack. The sand filter was part of the original REDOX building design. The sand filter, stack, and fans are to remain in service until the 202-S Facility is decommissioned. This site is still active. Remove from RI consideration based on site activity.
200-W-44	200-W-44, 291-U Stack Sand Filter	Other	The sand filter is located 49 meters east of the 221-U Building and northeast of the 291-U Stack. The sand filter is constructed of reinforced concrete that is partially below grade with asphalt covered, concrete slab roof. It is assumed the sand filter at U Plant was constructed from 1945 until 1952; it was only used for training of canyon building workers. The exhaust ventilation system is planned to remain in service until the 221-U Building is decommissioned. This site is active. Physically located in 200 West Inner Area. Remove from RI consideration based on site activity.
200-W-45	200-W-45, 291-T Sand Filter, T Plant Stack Sand Filter	Other	The sand filter is located near the northeast corner of 221-T 47 meters from T-Canyon, adjacent to the 291-T stack. The sand filter was used to filter the 291-T stack air. The sand filter is a partially buried concrete structure measuring 33.5 X 15.25 X 4.8 meters (110 X 50 X 16 feet). This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
200-W-46	200-W-46, 222-S Laboratory Room 4-E 90-Day Waste Accumulation Area, Satellite Accumulation Area	Other	This site is not a 90 day storage area but is a Satellite Accumulation Area for Room 4E of the 222-S Analytical Laboratory. Maintenance waste and expired reagents and chemicals are held here. This site is still active. Remove from RI consideration based on site activity.
200-W-47	200-W-47, 211-T Storage Pad 90-Day Waste Accumulation Area	RCRA	The 90 day storage area was removed when the T Plant Complex became a Treatment, Storage, and Disposal (TSD) facility. With the TSD Permit, mixed waste storage for the T Plant Complex was designated to be "a combination of paved and gravel surfaces and is surrounded by the fencing that encloses the 2706-T Building." An evaluation of the site in April 2000 showed no wastes stored in this area, but signs on the fence indicate that it is occasionally used for waste storage under the TSD Permit. No wastes are evident.
200-W-48	200-W-48, 241-TX 90-Day Waste Accumulation Area	RCRA	The 241-TX Tank Farm 90 Day Waste Accumulation Area has been inactive since October 1993, per the 90-day inspection records maintained by Environmental Waste Operations at the 209-E Building. The site was a self-contained conex box with a spill berm.
200-W-49	200-W-49, 222-S Laboratory Room 2-D 90-Day Waste Accumulation Area	Other	The storage pad is located in Room 2D of the 222-S Analytical Laboratory and holds solid and liquid mixed waste from laboratory sample analysis activities. The storage pad is in room 2D of the 222-S Laboratory. Weekly inspections are performed. This site is still active. Remove from RI consideration based on site activity.
200-W-50	200-W-50, 2706-T 90-Day Waste Accumulation Area	RCRA	The 90 day storage area was removed when the T Plant Complex became a Treatment, Storage, and Disposal (TSD) facility. With the TSD Permit, mixed waste storage for the T Plant Complex was designated to be "a combination of paved and gravel surfaces and is surrounded by the fencing that encloses the 2706-T Building." An evaluation of the site in April 2000 showed no wastes stored in this area, but signs on the fence indicate that it is occasionally used for waste storage under the TSD Permit.
200-W-51	200-W-51, Septic Tank (Abandoned)	Other	Does not contain hazardous or radioactive waste with potential human health risk. Remove from RI consideration.
200-W-52	200-W-52, 216-T-7 Crib, 241-T-3 Crib	Tank Farm	The crib is located inside the 241-T Tank Farm fence, east of the 216-T-7 Tile Field.
200-W-53	200-W-53, UPR-200-W-166, UN-216-W-31	200-WA-1	
200-W-54	200-W-54, Contamination Migration from 241-SX Tank Farm	200-WA-1	
200-W-55	200-W-55, Dumping Area North of 231-Z	Other	No CERCLA constituents

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
200-W-56	200-W-56, Debris North of 221-U	Other	Consists of a pile of dirt approximately 10 ft in diameter containing wire, fencing, fencing material, metal scrap, cable, and grounding rods. This site is not marked or posted. There was miscellaneous trash and debris, categorized as nondangerous/nonradioactive. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
200-W-57	200-W-57, Excess Equipment Laydown Area Identified in RCRA General Inspection #200WFY97 Item #10, Area West of 2714-U Fence	Other	This site had been two excess equipment lay down areas. Equipment was in the process of being salvaged or recycled. The material has been removed and is now an empty gravel area. The waste was equipment and categorized as nondangerous/nonradioactive. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-58	200-W-58, Z-Plant Diversion Box #1	Pipeline	
200-W-59	200-W-59, Z-Plant Diversion Box #2	Pipeline	
200-W-6	200-W-6, 200-W Painter Shop Paint Solvent Disposal Area	200-WA-1	
200-W-60	200-W-60, 284-W Brine Pit, 284-W Salt Dissolving Pit and Brine Pump Pit	200-OA-1	
200-W-63	200-W-63, Contaminated Concrete Pad	200-WA-1	
200-W-64	200-W-64, 2724-W Contaminated Laundry Facility Building Foundation	200-OA-1	
200-W-66	200-W-66, Oil Spill at JCI Annex Feeding 283-W/262-WC	200-OA-1	
200-W-67	200-W-67, Contaminated Soil at the Corner of Cooper and 16th Street	200-WA-1	
200-W-68	200-W-68, RCRA General Inspection Report 200WFY99 Item #3, Historic Disposal Site	Other	This site contains rusted electrical equipment that includes conduit, light reflector, space heater, vent pipe, broken glass, and charcoal. None of the equipment would have held any liquids such as cooling oils or PCSs. The waste was miscellaneous trash and debris and was categorized as nondangerous/nonradioactive. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-69	200-W-69, 222-S Laboratory Complex	Other	The 222-S Laboratory Complex is on the north side of 10th Street, west of Beloit Ave. in the 200 West Area. The laboratory complex is south of REDOX. This site is still Active. Remove from RI consideration based on site activity.
200-W-7	200-W-7, 246-L, 241-S-TK-1, 243S-TK-1, 243-S-TK1, 200-W Personnel Decontamination Facility Catch Tank, IMUST, Inactive Miscellaneous Underground Storage Tank	Pipeline	
200-W-70	200-W-70, Old Burn Pit Southeast of Z Plant, 200 West Original Burn Pit, 2731 Burning Pit	Other	This site is no longer visible, marked, or posted. Used by construction forces for burning noncontaminated scrap lumber and miscellaneous debris. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
200-W-71	200-W-71, Undocumented Trench, Undocumented Burn Pit	200-WA-1	
200-W-72	200-W-72, 200-ZP-1 Pump and Treat Unplanned Release	Other	There is no visual evidence of the release. The water that leaked out of the pump-and-treat system was recovered with pumps and transported to Modu-tanks. This was termed a nonreportable incident. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
200-W-73	200-W-73, Contaminated Debris Near Railroad Track (East of 218-W-2A)	Other	No contamination was found in the soil or vegetation after the contaminated material was removed based on surveys held after the cleanup. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of No Action. Removed from RI consideration.
200-W-74	200-W-74, 90 Day Storage Area East Side of 622 F	200-OA-1	
200-W-75	200-W-75, Radiological Logging System (RLS) Calibration Silos	200-WA-1	
200-W-76	200-W-76, Room 2B 222-S Laboratory TSD	Other	The north end of Room 2B in the 222-S Laboratory is partitioned off as a Treatment, Storage, and Disposal (TSD) area using a locked accordion style gate to prevent unauthorized access. The site is located inside the 222-S Laboratory facility. This site is still active. Remove from RI consideration based on site activity.
200-W-77	200-W-77, Posted Contamination Area East of 216-U-14 Ditch	200-WA-1	
200-W-78-PL	200-W-78-PL; Pipeline Between 241-TX/TY and 241-T Tank Farms; Lines 6012, 6025, 7624 and 7630	Pipeline	
200-W-79-PL	200-W-79-PL, 216-T-36 Crib Pipeline, V663	Pipeline	
00-W-80	200-W-80, Stabilized Contaminated Soil Area Southwest of T Plant, Mound of Contaminated Soil Southwest of T Plant	200-WA-1	
200-W-81	200-W-81, Contaminated Tumbleweed Fragments Along Railroad Track East of 218-W-3AE	200-WA-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
200-W-82	200-W-82; Risers East of 216-TY-201 and 216-T-26, 216-T-27, and 216-T-28 Cribs; Crib Unloading Station	200-WA-1	
200-W-83	200-W-83, Contamination Area North of 2727W	200-WA-1	
200-W-84-PL	200-W-84-PL, U Plant Chemical Process Sewer to 216-U-14 Ditch, 200-W-84, VCP Process Sewer (See Subsites)	Pipeline	
200-W-85	200-W-85, Soil Contamination Area East of 2727 W	200-WA-1	
200-W-86	200-W-86, Contamination Area Around Light Pole	200-WA-1	
200-W-87	200-W-87, Unplanned Release on Chemical Spur Railroad Track Northwest of 221-U Plant	200-WA-1	
200-W-88-PL	200-W-88-PL, T Plant Process Sewer Pipeline, 221-T Process Sewer, 24 Inch Process Sewer, 200-W-88 (See Subsites)	Pipeline	
200-W-89	200-W-89, 252-U, U Plant Electrical Substation, C8S17 Substation, U-Cat Substation	200-WA-1	
200-W-9	200-W-9, Project W291 Excavation VCP Contamination	200-WA-1	
200-W-90	200-W-90, Underground Radioactive Material Areas Posted Along 23rd Street in 200 West Area	200-WA-1	
200-W-91	200-W-91, Underground Radioactive Material Area Adjacent to the North Side of 241-U Tank Farm	Tank Farm	The site is a large, irregular shaped area. The area has been covered with clean gravel and posted with Underground Radioactive Material signs. The 2607-WUT sanitary tile field is located adjacent to the western edge of this stabilized zone. The area was surveyed with GPS in 2009. The size and shape of the posted area is larger than the area reported in 1995. The waste site was consolidated into 200-W-95. Site 200-W-95 is accepted into tank farms.
200-W-92	200-W-92, Contaminated Mound of Soil and Debris, Soil Mound West of 241-TY Tank Farm	200-WA-1	
200-W-93	200-W-93, Contaminated Soil at 241-T Tank Farm	Tank Farm	
200-W-94	200-W-94, Contaminated Soil at 241-TX/TY Tank Farm	Tank Farm	
200-W-95	200-W-95, Contaminated Soil at 241-U Tank Farm, Contamination Migration Beyond the 241-U fence	Tank Farm	
200-W-96	200-W-96, Contaminated Soil at 241-S/SX/SY Tank Farm	Tank Farm	
200-W-97-PL	200-W-97-PL; Encased Pipeline from 240-S-151 Diversion Box to 241-S-151 Diversion Box; Lines V508, V509, V512, V513, V514, V515, V516, V517/3603, and V519/1115	Pipeline	
200-W-98-PL	200-W-98-PL; Encased Pipeline from 240-S-151 to 241-U-153 Diversion Box; V458, V459, and V460	Pipeline	
200-W-99-PL	200-W-99-PL, Encased Pipeline from 241-U-151 to 241-S-151 Diversion Boxes, Lines V455 and V456	Pipeline	
202-S	202-S, 202-S REDOX, S Plant (See Subsites)	200-CR-1	
203-S & 205-S	203-S & 205-S; 203-S, 204-S, and 205-S Stabilized Area; 203-S Uranyl Nitrate Hexahydrate Tank Farm; 204-S Tank Farm & Pumphouse; 205-S Process Vault & Chemical Makeup Building; 205-S Uranyl Nitrate Hexahydrate Processing Facility	Other	The aboveground tanks and features of these facilities were removed in 1983. The area was backfilled and surface stabilized. The site is currently a posted Underground Radioactive Material area. Routine radiation surveys and visual inspections are performed. Consolidated into 200-W-22.
207-S	207-S, REDOX Retention Basin, 207-S Retention Basin	200-WA-1	
207-SL	207-SL, 222-S Retention Basin, REDOX Lab Retention Basin, 207-SL Retention Basin	Other	Remove from RI consideration based on site activity.
207-T	207-T, T Plant Retention Basin, 207-T Retention Basin	200-WA-1	
207-U	207-U, 207-U Retention Basin	Other	Remove from RI consideration based on site activity.
207-Z	207-Z, 207-Z Retention Basin, 241-Z Retention Basin, 241-ZRB, 241-Z-RB	200-WA-1	
213-W	213-W, 213-W Compactor Facility	200-OA-1	
213-W-1	213-W-1, 213-W-TK-1, 213-W Compactor Facility Retention Tank	200-OA-1	
216-B-14	216-B-14, 216-BC-1 Crib	200-BC-1	
216-B-15	216-B-15, 216-BC-2 Crib	200-BC-1	
216-B-16	216-B-16, 216-BC-3 Crib	200-BC-1	
216-B-17	216-B-17, 216-BC-4 Crib	200-BC-1	
216-B-18	216-B-18, 216-BC-5 Crib	200-BC-1	
216-B-19	216-B-19, 216-BC-6 Crib	200-BC-1	
216-B-20	216-B-20, 216-BC-7 Trench, 216-B-20 Trench	200-BC-1	
216-B-21	216-B-21, 216-BC-8 Trench, 216-B-21 Trench	200-BC-1	
216-B-22	216-B-22, 216-BC-9 Trench, 216-B-22 Trench	200-BC-1	
216-B-23	216-B-23, 216-BC-10 Trench, 216-B-23 Trench	200-BC-1	
216-B-24	216-B-24, 216-BC-11 Trench, 216-B-24 Trench	200-BC-1	
216-B-25	216-B-25, 216-BC-12 Trench, 216-B-25 Trench	200-BC-1	
216-B-26	216-B-26, 216-BC-13 Trench, 216-B-26 Trench	200-BC-1	
216-B-27	216-B-27, 216-BC-14 Trench, 216-B-27 Trench	200-BC-1	
216-B-28	216-B-28, 216-BC-15 Trench, 216-B-28 Trench	200-BC-1	
216-B-29	216-B-29, 216-BC-16 Trench	200-BC-1	
216-B-30	216-B-30, 216-BC-17 Trench, 216-B-30 Trench	200-BC-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
16-B-31	216-B-31, 216-BC-18 Trench, 216-B-31 Trench	200-BC-1	
16-B-32	216-B-32, 216-BC-19 Trench, 216-B-32 Trench	200-BC-1	
216-B-33	216-B-33, 216-BC-20 Trench, 216-B-33 Trench	200-BC-1	
216-B-34	216-B-34, 216-BC-21 Trench	200-BC-1	
216-B-52	216-B-52, 216-B-52 Trench, 216-BC-22	200-BC-1	
216-B-53A	216-B-53A, 216-B-53A Trench, PRTR Trench	200-BC-1	
216-B-53B	216-B-53B, 216-B-53 Trench, 216-B-53B Trench	200-BC-1	
216-B-54	216-B-54, 216-B-54 Trench	200-BC-1	
216-B-58	216-B-58, 216-B-58 Trench, 216-B-59 Crib	200-BC-1	
216-S-1&2	216-S-1&2, 216-S-5 Crib, 216-S-1 & 2	200-WA-1	
216-S-10D	216-S-10D, 216-S-10D Ditch, 202 Chemical Sump #1 and Ditch, Chemical Sewer Trench, Open Ditch to the Chemical Sewer Trench, 216-S-10 Ditch	200-OA-1	
216-S-10P	216-S-10P, 216-S-10P Pond, 202-S Chemical Sump #1 and Ditch, Chemical Sewer Trench	200-OA-1	
216-S-11	216-S-11, 202-S Chemical Sump #2, Chemical Sewer Trenches, 216-S-11 Swamp	200-OA-1	
216-S-12	216-S-12, UPR-200-W-30, 291-S Stack Wash Sump, REDOX Stack Flush Trench	200-WA-1	
216-S-13	216-S-13, 276-S Crib, 216-S-6	200-DV-1	
216-S-14	216-S-14, Buried Contaminated Hexone, Cold Organic Trench or Grave, 216-S-4 Burial Contaminated Hexone	200-WA-1	
216-S-15	216-S-15, 216-S-2, 241-S-110 Pond, 110-S Tank Overflow Pond, UN-216-W-3	Tank Farm	This site consists of a pond that was deactivated by removing the aboveground piping and backfilling it with clean soil. The site is associated with the 241-S-110 tank. The site is inside the tank farm fence.
216-S-16D	216-S-16D, 202-S Swamp (New) and Ditch, 202-S Swamp #1, REDOX Pond #2, 216-S-24 Ditch	200-OA-1	
216-S-17	216-S-17, 202-S Swamp, 202-S REDOX Swamp, 216-S-1 REDOX Pond No. 1, REDOX Swamp, 216-S-1	200-CW-1	
16-S-172	216-S-172, 216-S-172 Weir Box and Control Structure, 2904-S-172 Weir, 216-S-172 Control Structure	Pipeline	
216-S-18	216-S-18, 241-SX Steam Cleaning Pit, 216-S-14 Steam Cleaning Pit	200-WA-1	
216-S-20	216-S-20, 216-SL-1&2 Crib, 216-SL-2	200-WA-1	
216-S-21	216-S-21, 216-SX-1, 216-SX-1 Cavern or Crib	200-DV-1	
216-S-22	216-S-22, 216-S-22 Crib	200-WA-1	
216-S-23	216-S-23, 216-S-23 Crib	200-WA-1	
216-S-25	216-S-25, 216-S-25 Crib	200-WA-1	
216-S-26	216-S-26, 216-S-19 Replacement Facility, 216-S-26 Crib	200-OA-1	
216-S-3	216-S-3, 216-S-5, 216-S-3 Crib	200-WA-1	The unit was located outside the 241-S Tank Farm east fence. In 1996, the eastern tank farm fence line was expanded. The crib is now inside the tank farm fence. The unit received condensate from the riser condensers on the 241-S-101 and 241-S-104 Tanks. This site is inactive. Physically located in 200 West Inner Area. Project team decision considering no site left behind. Carry forward to RI.
216-S-4	216-S-4, 216-S-7, 216-S-4 Sump or Crib, UN-216-W-1	200-WA-1	
216-S-5	216-S-5, 216-S-5 Cavern #1, 216-S-6 Crib, 216-S-9 (See Subsites)	200-WA-1	
216-S-6	216-S-6, 216-S-6 Cavern #2, 216-S-5 Crib, 216-S-13 Crib	200-WA-1	
216-S-7	216-S-7, 216-S-7 Crib, 216-S-15	200-WA-1	
216-S-8	216-S-8, Cold Aqueous Trench, Cold Aqueous Crib, 216-S-3, Unirradiated Uranium Waste Trench, Cold Aqueous Grave	200-WA-1	
216-S-9	216-S-9 Crib	200-DV-1	
216-SX-2	216-SX-2, 216-SX-2 Crib	200-WA-1	
216-T-1	216-T-1, 221-T Ditch, 221-T Trench, 216-T-1 Trench	200-OA-1	
216-T-10	216-T-10, Decontamination Trenches, Equipment Decontamination Area	200-WA-1	
216-T-11	216-T-11, Decontamination Trenches, Equipment Decontamination Area	200-WA-1	
216-T-12	216-T-12, 207-T Sludge Grave, 207-T Sludge Pit, 216-T-11	200-WA-1	
16-T-13	216-T-13, 269-W Regulated Garage, 269-W Decontamination Pit or Trench, 216-T-12, 269-W Regulated Garage Decontamination Pit	200-WA-1	
216-T-14	216-T-14, 241-T-1 Trench, 216-T-1 Grave, 216-T-13	200-DV-1	
216-T-15	216-T-15, 241-T-2 Trench, 241-T-2 Grave, 216-T-14, 216-T-15 Crib	200-DV-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
216-T-16	216-T-16, 241-T-3 Trench, 241-T-3 Grave, 216-T-15, 216-T-16 Crib	200-DV-1	
216-T-17	216-T-17, 241-T-4 Trench, 216-T-4 Grave, 216-T-16	200-DV-1	
216-T-18	216-T-18, Test Crib for 221-U Building, Scavenged TBP Waste, 216-T-17, 241-T-17 Crib	200-DV-1	
216-T-19	216-T-19, 241-TX-153 Crib and Tile Field, 216-TX-1, 241-TX-3, 216-T-19TF	200-DV-1	
216-T-2	216-T-2, 222-T-110 Dry Well, 222-T Reverse Well	200-WA-1	
216-T-20	216-T-20, 216-TX-2, 216-T-20 Crib, 241-TX-155 Contaminated Acid Grave	200-WA-1	
216-T-21	216-T-21, 241-TX-1 Trench, 216-TX-1 Grave, 216-TX-3	200-DV-1	
216-T-22	216-T-22, 241-TX-2 Trench, 216-TX-2 Grave, 216-TX-4	200-DV-1	
216-T-23	216-T-23, 241-TX-3 Trench, 216-TX-3 Grave, 216-TX-5, 241-TX-3 Grave	200-DV-1	
216-T-24	216-T-24, 241-TX-4 Trench, 216-TX-4 Grave, 216-TX-6	200-DV-1	
216-T-25	216-T-25, 241-TX-5 Trench, 216-TX-5 Grave, 216-TX-7	200-DV-1	
216-T-26	216-T-26, 216-TY-1 Cavern, 216-TY-1 Crib, 241-TX-1 Cavern, 216-TX-1 Crib	200-DV-1	
216-T-27	216-T-27, 216-TY-2 Cavern, 216-TY-2 Crib, 216-TX-2 Cavern, 216-TX-2 Crib	200-WA-1	
216-T-28	216-T-28, 216-TY-3 Cavern, 216-TY-3 Crib, 216-TX-3 Cavern, 216-TX-3 Crib	200-WA-1	
216-T-29	216-T-29, 291-T Sand Filter Sewer, 216-T-29 French Drain	200-WA-1	
216-T-3	216-T-3, 241-T-361-A Reverse Well, 361-T Reverse Well	200-DV-1	
216-T-31	216-T-31, 216-T-31 French Drain	200-WA-1	
216-T-32	216-T-32, 241-T #1 & 2 Cribs, 216-T-6	200-DV-1	
216-T-33	216-T-33, 216-T-33 Crib	200-WA-1	
216-T-34	216-T-34, 216-T-34 Crib	200-WA-1	
216-T-35	216-T-35, 216-T-35 Crib	200-WA-1	
216-T-36	216-T-36 Crib	200-WA-1	
216-T-4-1D	216-T-4-1D, 216-T-4 Ditch, 216-T-4 Swamp	200-WA-1	
216-T-4-2	216-T-4-2, 216-T-4-2 Ditch	200-SW-2	
216-T-4A	216-T-4A, 216-T-4 Swamp, 216-T-4-1 (P), 216-T-4-1 Pond	200-SW-2	
216-T-4B	216-T-4B, 216-T-4 New Pond, 216-T-4-2 (P), 216-T-4-2 Pond	200-SW-2	
216-T-5	216-T-5, 216-T-5 Grave, 216-T-12, 216-T-5 Trench, 241-T-5 Trench	200-DV-1	
216-T-6	216-T-6, 241-T-361 (1&2 Cribs), 216-T-5, 361-T-1&2 Cribs	200-DV-1	
216-T-7	216-T-7, 216-T-7TF, 216-T-7 Tile Field, 241-T-3 Tile Field	200-DV-1	
216-T-8	216-T-8, 222-T-1 & 2 Cribs	200-WA-1	
216-T-9	216-T-9, Decontamination Trenches, Equipment Decontamination Area	200-WA-1	
216-TY-201	216-TY-201, Supernatant Disposal Flush Tank, IMUST, Inactive Miscellaneous Underground Storage Tank	Pipeline	
216-U-1&2	216-U-1&2, 361-WR (Crib 2), 216-U-3, 216-UR #1&2 Cribs, 216-U-1 & 2, 216-U-1, 216-U-2	200-WA-1	
216-U-10	216-U-10, U Swamp, 216-U-1, 216-U-10 Pond, 231 Swamp	200-CW-1	
216-U-11	216-U-11, U Swamp Extension Ditch, 216-U-12, 216-U-11 Trench, 216-U-11 Ditch, 216-U-11 (Old Ditch), 216-U-11 (New Ditch)	200-CW-1	
216-U-12	216-U-12, 216-U-12 Crib	200-WA-1	
216-U-13	216-U-13, 216-U-13 Cribs, 216-U-13, Vehicle Steam Cleaning Pit	200-WA-1	
216-U-14	216-U-14, 216-U-14 Ditch, Laundry Ditch	200-WA-1	
216-U-15	216-U-15, UN-216-W-10, 388-U Tank Dumping, UPR-200-W-125, UN-200-W-158, U-152 Interface Crud Burial	200-WA-1	
216-U-16	216-U-16, UO3 Crib	200-WA-1	
216-U-17	216-U-17, 216-U-17 Crib	200-WA-1	
216-U-3	216-U-3, 216-U-11, 216-U-3 French Drain	200-WA-1	
216-U-4	216-U-4, 222-U Dry Well, 222-U-110 Dry Well, 216-U-2, 216-U-4 Dry Well	200-WA-1	
216-U-4A	216-U-4A, 216-U-4 Reverse Well Replacement French Drain, 216-U-4 Dry Well	200-WA-1	
216-U-4B	216-U-4B, 216-U-4B Dry Well, 216-U-4B French Drain	200-WA-1	
216-U-5	216-U-5, 216-U-4, 221-U Cold U Trench #2	200-WA-1	
216-U-6	216-U-6, U Facility Unirradiated Uranium Waste Trench, 221-U Cold U Trench, 216-U Cold U Trench #1, 216-U-5, 221-U Cold U Grave #1	200-WA-1	
216-U-7	216-U-7, 221-U Counting Box French Drain, 221-U Vessel Vent Blower Pit French Drain	200-WA-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
16-U-8	216-U-8, 216-WR-1,2,3 Cribs, 216-U-9	200-WA-1	
216-U-9	216-U-9, U Swamp-S Swamp Ditch, 216-U-6	200-CW-1	
216-W-LWC	216-W-LWC, 216-W-LC, Laundry Waste Crib, 216-W-LWC Crib, 216-W-1	200-OA-1	
216-Z-1&2	216-Z-1&2, 234-5 No. 1 Crib, 216-Z-7, 234-5 No. 2 Crib, 216-Z-1 & 2TF, 216-Z-1 and 216-Z-2 Cribs	200-PW-1	
216-Z-10	216-Z-10, 216-Z-2, 231-W Reverse Well, 231-W-151 Dry Well or Reverse Well, 231-Z Well, 299-W15-51, 231-W-150	200-PW-6	
216-Z-11	216-Z-11, 216-Z-11 Ditch, Z Plant Ditch	200-CW-5	
216-Z-12	216-Z-12, 241-Z-12 Crib	200-PW-1	
216-Z-13	216-Z-13, 234-5 Dry Well #1, 216-Z-13 Dry Well, Miscellaneous Stream #261, 216-Z-13 A and B	Other	Remove from RI consideration based on UIC evaluation.
216-Z-14	216-Z-14, 234-5 Dry Well #2, 216-Z-14 Dry Well, Miscellaneous Stream #262, 216-Z-14 A and B	Other	Remove from RI consideration based on UIC evaluation.
216-Z-15	216-Z-15, 234-5 Dry Well #3, 216-Z-15 Dry Well, Miscellaneous Stream #263	Other	Remove from RI consideration based on UIC evaluation.
216-Z-16	216-Z-16 Crib	200-WA-1	
216-Z-17	216-Z-17, 216-Z-17 Ditch	200-WA-1	
216-Z-18	216-Z-18, 216-Z-18 Crib	200-PW-1	
216-Z-19	216-Z-19, 216-U-10 Ditch, Z Plant Ditch, 216-Z-19 Ditch	200-CW-5	
216-Z-1A	216-Z-1A, 216-Z-1A Tile Field, 216-Z-7, 234-5 Tile Field, 216-Z-1AA, 216-Z-1AB, 216-Z-1AC	200-PW-1	
216-Z-1D	216-Z-1D, 216-Z-1, Drain Ditch to U Swamp, Z Plant Ditch	200-CW-5	
216-Z-20	216-Z-20, Z-19 Ditch Replacement Tile Field	200-CW-5	
216-Z-21	216-Z-21, 216-Z-21 Seepage Basin, PFP Cold Waste Pond	Other	This site is a large, unlined soil bermed depression. Constructed to receive PFP noncontact condensate and stormwater run-off. Received steam condensate with a waste category of nondangerous and nonradioactive. Project team decision considering validation of site classification of No Action. Removed from RI consideration.
216-Z-3	216-Z-3, 216-Z-3 Culvert, 216-Z-8, 234-5 No. 3 & 4 Cribs	200-PW-1	
216-Z-4	216-Z-4, 231-W-3 Pit, 231-W-3 Sump, 231-W-3 Crib, 216-Z-3, 216-Z-4 Crib	200-WA-1	
216-Z-5	216-Z-5, 231-W Sumps, 231-W-1 & 2 Cribs	200-PW-6	
216-Z-6	216-Z-6, 231-W-4 Crib, 231-Z-6, 216-W-4, 231-W Crib, 216-Z-4, 216-Z-6 & 6A Crib	200-WA-1	
216-Z-7	216-Z-7, 231-W Crib, 231-W Trench, 216-Z-6	200-WA-1	
216-Z-8	216-Z-8, 234-5 Recuplex French Drain, 216-Z-9, 216-Z-8 Crib	200-PW-6	
216-Z-9	216-Z-9, 216-Z-9 Crib and Support Structures, 216-Z-9 Cavern, 234-5 Recuplex Cavern, 216-Z-9 Covered Trench, 216-Z-9A, 216-Z-9B, 216-Z-9C	200-PW-1	
218-W-1	218-W-1, 200-W Area Dry Waste No. 001, Solid Waste Burial Ground #1	200-SW-2	
218-W-11	218-W-11, Regulated Storage Site	200-SW-2	
218-W-1A	218-W-1A, 200-W Area Industrial Waste Burial Ground #1, Equipment Burial Ground #1	200-SW-2	
218-W-2	218-W-2, 200-W Area Dry Waste No. 002, Dry Waste Burial Ground No. 2	200-SW-2	
218-W-2A	218-W-2A, Industrial Waste No. 02A, Equipment Burial Ground #2	200-SW-2	
218-W-3	218-W-3, Dry Waste No. 003	200-SW-2	
218-W-3A	218-W-3A, Dry Waste No. 003A	200-SW-2	
218-W-3AE	218-W-3AE, Industrial Waste No. 3AE, Dry Waste No. 3AE	200-SW-2	
218-W-4A	218-W-4A, Dry Waste No. 04A	200-SW-2	
218-W-4B	218-W-4B, Dry Waste No. 04B	200-SW-2	
218-W-4C	218-W-4C, Dry Waste No. 004C, 218-W-4C Annex	200-SW-2	
218-W-5	218-W-5, Dry Waste Burial Ground, Low-Level Radioactive Mixed Waste Burial Grounds	200-SW-2	
218-W-6	218-W-6 Burial Ground	200-OA-1	
218-W-7	218-W-7, 222-S Vault	200-CR-1	
218-W-8	218-W-8, 222-T Vault	200-WA-1	
218-W-9	218-W-9, Dry Waste Burial Ground No. 9, Non-TRU Dry Waste No. 009	200-WA-1	
219-S-101	219-S-101, 219-S-TK-101, TK-101 Crib Waste Receiver, 219-S, TK-101 Receiver Tank	Tank Farm	
19-S-102	219-S-102, 219-S-TK-102, 219-S Storage Tank 102, 219-S Primary Treatment Tank TK-102	Tank Farm	
19-S-103	219-S-103, 219-S-TK-103, 219-S Storage Tank 103, 219-S Backup Treatment Tank TK-103, 219-S-104, TK-104	Tank Farm	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
219-S-104	219-S-104, 219-S-TK-104, 219-S Storage Tank 104	Other	This site includes two tanks, Tank 103 and its replacement, Tank 104. Tank 104 began service in 1996. Tank 103 was removed from service, blanked off, and left in place in 1999. They are both monitored stainless steel treatment and transfer tanks resting in a belowgrade concrete vault at the 219-S Waste Handling Facility.
221-T CSTF	221-T CSTF, 221-T Containment System Test Facility, T Plant Laboratory, 221-T Head End	Other	Part of the 221-T Canyon. No evidence of cleanup but was part of Canyon. Cannot find the Procedural Closure Report of 221-T TSD: T-2-4. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Closed Out. Removed from RI consideration. http://www2.hanford.gov/arpir/?content=findpage&AKey=D199047751
221-T-11-R	221-T-11-R, 221-T-TK-11-R, Tank 11-R 221-T System, T Plant Complex	RCRA	Tank 221-T-11-R is a Type 347 stainless steel tank with piping connecting the unit to other tanks in the 221-T tank system. The tank is oval shaped with an open top and flat bottom. The tank is located in Cell 11R, near the center of the long axis of the 221-T canyon inside the canyon building. This site is still Active.
221-T-15-1	221-T-15-1, 221-T-TK-15-1, Tank 15-1 221-T System, T Plant Complex	RCRA	Tank 221-T-15-1 is a Type 347 stainless steel tank with piping connecting the unit to other tanks in the 221-T tank system. The tank has an open top, a flat bottom, and is oval in shape. The unit is located in Cell 15R, in the southern third of the 221-T canyon building. This site is located inside the canyon building and is still active.
221-T-5-6	221-T-5-6, 221-T-TK-5-6, Tank 5-6 221-T System, T Plant Complex	RCRA	Tank 221-T-5-6 is a Type 347 stainless steel tank with piping connecting the unit to other tanks in the 221-T tank system. The tank is cylindrical in shape. The tank is located in Cell 5L, in the northern third of the 221-T canyon. This site is still Active.
221-T-5-7	221-T-5-7, 221-T-TK-5-7, Tank 5-7 221-T System, T Plant Complex	RCRA	Tank 221-T-5-7 is a Type 347 stainless steel tank with piping connecting the unit to other tanks in the 221-T tank system. The tank is rectangular with a flat bottom. The tank is located in Cell 5R, in the northern third of the 221-T canyon. This site is still Active.
221-T-5-9	221-T-5-9, 221-T-TK-5-9, Tank 5-9 221-T System, T Plant Complex	RCRA	Tank 221-T-5-9 is a type 347 stainless steel tank with piping connecting the unit to other tanks in the 221-T tank system. The tank is cylindrical in shape. The tank is located in Cell 5L, in the northern third of the 221-T canyon. This site is still Active.
221-T-6-1	221-T-6-1, 221-T-TK-6-1, Tank 6-1 221-T System, T Plant Complex	RCRA	Tank 221-T-6-1 is a Type 347 stainless steel tank with piping connecting the unit to other tanks in the 221-T tank system. The tank is oval shaped and is partially enclosed. The tank is located in Cell 6L, in the northern third of the 221-T canyon. This site is still Active.
221-U	221-U, 221-U Canyon Building, 221-U Building, U Plant (See Subsites)	U Canyon	See page 16 of the U-Canyon ROD. This facility is named as part of the action to cover. Record of Decision 221-U Facility.
222-SD	222-SD, 222 SD, 222-S DMWSA, 222-S TSD Dangerous and Mixed Waste Storage Area	Tank Farm	
224-T	224-T, 224-T Canyon, Plutonium Concentration Facility	Other	This is a three story concrete building located southeast of 221-T and 48 m south of 222-T. Located just outside of the T-Complex area. This portion of the 224-T building is associated with the Bismuth-Phosphate plutonium processing of nuclear fuel at 221-T from 1944 to 1956. The pipeline from 224-T to 216-T-3 reverse well is sitecode 200-W-226-PL. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
224-U CNT	224-U CNT, 224-U Condensate Neutralization Tank, 224-U Process Condensate Neutralization Tank, Process Condensate Elementary Neutralization Unit, Tank TK-C-5, 224-U-TK-C-5	Other	The unit lies along the north wall of cell C, inside the 224-U Building, which is not directly attached to the canyon building. Located about 58 m from U-Canyon. The unit is part of a four tank system designed to neutralize UO3 Plant process condensate prior to disposal in the 216-U-17 Crib. This structure was used to pump phosphoric acid. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
224-U HWSA	224-U HWSA, 224-U Hazardous Waste Storage Area	Other	Was a paved pad that was used for 90 day storage. The pad has been removed and there was no evidence of any remaining wastes. Closed in compliance with WAC 173-303-630(10). Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
231-W-151	231-W-151, 231-W-151 Vault, 231-W-151-001 (Tank), 231-W-151-002 (Tank), 231-W-151 Sump, 231-Z-151 Sump, IMUST, Inactive Miscellaneous Underground Storage Tank (See Subsites)	200-WA-1	
232-Z	232-Z, 232-Z Building Foundation, 232-Z Waste Incineration Facility, 232-Z Incineration Facility, 232-Z Incinerator (See Subsites)	Other	The building was located adjacent to the south side of 2736-ZB, 40 m from HWSA. Demolished in 2006. The 232-Z Facility was built to remove plutonium from contaminated solid wastes by incineration and leaching in preparation for plutonium recovery. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
233-S	233-S, 233-S Plutonium Concentration Facility	Other	The facility was located about 3 m northwest of 202-S Building. The building was a reinforced concrete and structural steel assembly with corrugated steel and concrete walls. From 1978 to 1980, the facility was used as a demonstration project for decommissioning of contaminated facilities. Between 1963 and 1967, the facility was used to concentrate neptunium and plutonium nitrate solutions from REDOX. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
233-SA	233-SA, 233-SA Exhaust Filter Building	Other	one story structure that held two banks of double high-efficiency particulate air filters. The building has been demolished and foundation has been capped with concrete. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted(Proposed). Removed from RI consideration.
234-5Z HWSA	234-5Z HWSA, 234-5Z Hazardous Waste Storage Area	Other	The unit consists of a portable steel building, similar to a conex box, with no windows and three doors that open to three internal bays. The conex box is located on an asphalt pad. The site is an active 90 day Storage Pad being maintained on the "PHMC <90 Day Pad Inventory Report," listed as "PFP - East Pad." This method for managing active 90 day pads is in agreement with Section 2.0, "Scope," of TPA-MP-14, and thus tracking through WIDS is not necessary. However, once the site becomes inactive, the WIDS summary report will be updated. The 90 Day Storage Area and all dangerous wastes are managed in compliance with WAC 173-303-200(b)(i) and will be closed in compliance with WAC 173-303-630(10). Secondary containment is designed to minimize the impact of any releases due to container failure. No releases are known to have occurred. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
240-S-151	240-S-151, 240-S-151 Diversion Box	200-IS-1	
240-S-152	240-S-152, 240-S-152 Diversion Box	200-IS-1	
240-S-302	240-S-302, 240-S-302 Catch Tank, IMUST, Inactive Miscellaneous Underground Storage Tank, Line V556 and V557	Pipeline	
41-EW-151	241-EW-151, 241-EW-151 Vent Station Catch Tank, 241-EW-151 Vent Station, Vent Station, 200 Area East-West Vent Station	200-OA-1	
241-S-101	241-S-101, 241-S-TK-101	Tank Farm	
241-S-102	241-S-102, 241-S-TK-102	Tank Farm	
241-S-103	241-S-103, 241-S-TK-103	Tank Farm	
241-S-104	241-S-104, 241-S-TK-104	Tank Farm	
241-S-105	241-S-105, 241-S-TK-105	Tank Farm	
241-S-106	241-S-106, 241-S-TK-106	Tank Farm	
241-S-107	241-S-107, 241-S-TK-107	Tank Farm	
241-S-108	241-S-108, 241-S-TK-108	Tank Farm	
241-S-109	241-S-109, 241-S-TK-109	Tank Farm	
241-S-110	241-S-110, 241-S-TK-110	Tank Farm	
241-S-111	241-S-111, 241-S-TK-111	Tank Farm	
241-S-112	241-S-112, 241-S-TK-112	Tank Farm	
241-S-151	241-S-151, 241-S-151 Diversion Box	Tank Farm	
241-S-152	241-S-152, 241-S-152 Diversion Box	Tank Farm	
241-S-302A	241-S-302A; 241-S-302-A Catch Tank; IMUST; Inactive Miscellaneous Underground Storage Tank; Lines V542, V763, V764, and DR324	Tank Farm	
241-S-302B	241-S-302B, 241-S-302-B Catch Tank, IMUST, Inactive Miscellaneous Underground Storage Tank	Tank Farm	
241-S-304	241-S-304, 241-S-304 Catch Tank	Tank Farm	
241-S-A	241-S-A, 241-S-A Valve Pit, 241-S-A Diversion Box	Tank Farm	
241-S-B	241-S-B, 241-S-B Valve Pit, 241-S-B Diversion Box	Tank Farm	
241-S-C	241-S-C, 241-S-C Valve Pit, 241-S-C Diversion Box	Tank Farm	
241-S-D	241-S-D, 241-S-D Valve Pit, 241-S-D Diversion Box	Tank Farm	
241-SX-101	241-SX-101, 241-SX-TK-101	Tank Farm	
241-SX-102	241-SX-102, 241-SX-TK-102	Tank Farm	
241-SX-103	241-SX-103, 241-SX-TK-103	Tank Farm	
41-SX-104	241-SX-104, 241-SX-TK-104	Tank Farm	
41-SX-105	241-SX-105, 241-SX-TK-105	Tank Farm	
241-SX-106	241-SX-106, 241-SX-TK-106	Tank Farm	
241-SX-107	241-SX-107, 241-SX-TK-107	Tank Farm	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
241-SX-108	241-SX-108, 241-SX-TK-108	Tank Farm	
241-SX-109	241-SX-109, 241-SX-TK-109	Tank Farm	
241-SX-110	241-SX-110, 241-SX-TK-110	Tank Farm	
241-SX-111	241-SX-111, 241-SX-TK-111	Tank Farm	
241-SX-112	241-SX-112, 241-SX-TK-112	Tank Farm	
241-SX-113	241-SX-113, 241-SX-TK-113	Tank Farm	
241-SX-114	241-SX-114, 241-SX-TK-114	Tank Farm	
241-SX-115	241-SX-115, 241-SX-TK-115	Tank Farm	
241-SX-151	241-SX-151, 241-SX-151 Diversion Box	Tank Farm	Within tank farm boundaries.
241-SX-152	241-SX-152, 241-SX-152 Diversion Box, 241-SX-152 Transfer Box	Tank Farm	
241-SX-302	241-SX-302, 241-SX-302 Catch Tank, SX-304, IMUST, Inactive Miscellaneous Underground Storage Tank, Line V595	Pipeline	
241-SX-401	241-SX-401, 241-SX-401 Condenser Shielding Building, 241-SX-401 Waste Disposal Condenser House	Tank Farm	
241-SX-402	241-SX-402, 241-SX-402 Condenser Shielding Building, 241-SX-402 Waste Disposal Condenser House	Tank Farm	
241-SX-A	241-SX-A, 241-SX-A Diversion Box, 241-SX-A Valve Pit	Tank Farm	
241-SX-B	241-SX-B, 241-SX-B Diversion Box, 241-SX-B Valve Pit	Tank Farm	
241-SY-101	241-SY-101, 241-SY-TK-101	Tank Farm	
241-SY-102	241-SY-102, 241-SY-TK-102	Tank Farm	
241-SY-103	241-SY-103, 241-SY-TK-103	Tank Farm	
241-SY-A	241-SY-A, 241-SY-A Diversion Box, 241-SY-A Valve Pit	Tank Farm	Within tank farm boundaries.
241-SY-B	241-SY-B, 241-SY-B Diversion Box, 241-SY-B Valve Pit	Tank Farm	Within tank farm boundaries.
241-T-101	241-T-101, 241-T-TK-101	Tank Farm	
241-T-102	241-T-102, 241-T-TK-102	Tank Farm	
241-T-103	241-T-103, 241-T-TK-103	Tank Farm	
241-T-104	241-T-104, 241-T-TK-104	Tank Farm	
241-T-105	241-T-105, 241-T-TK-105	Tank Farm	
241-T-106	241-T-106, 241-T-TK-106	Tank Farm	
241-T-107	241-T-107, 241-T-TK-107	Tank Farm	
241-T-108	241-T-108, 241-T-TK-108	Tank Farm	
241-T-109	241-T-109, 241-T-TK-109	Tank Farm	
241-T-110	241-T-110, 241-T-TK-110	Tank Farm	
241-T-111	241-T-111, 241-T-TK-111	Tank Farm	
241-T-112	241-T-112, 241-T-TK-112	Tank Farm	
241-T-151	241-T-151, 241-T-151 Diversion Box	Tank Farm	
241-T-152	241-T-152, 241-T-152 Diversion Box	Tank Farm	
241-T-153	241-T-153, 241-T-153 Diversion Box	Tank Farm	
241-T-201	241-T-201, 241-T-TK-201	Tank Farm	
241-T-202	241-T-202, 241-T-TK-202	Tank Farm	
241-T-203	241-T-203, 241-T-TK-203	Tank Farm	
241-T-204	241-T-204, 241-T-TK-204	Tank Farm	
241-T-252	241-T-252, 241-T-252 Diversion Box	Tank Farm	
241-T-301B	241-T-301B, 241-T-301 Catch Tank, 241-T-301-B, 241-T-0301, IMUST, Inactive Miscellaneous Underground Storage Tank, Lines V664 and V727	Tank Farm	
241-T-302	241-T-302, 241-T-302 Catch Tank	Tank Farm	
241-T-361	241-T-361, 241-T-361 Settling Tank, 361-T-TANK, IMUST, Inactive Miscellaneous Underground Storage Tank	200-WA-1	
241-TR-152	241-TR-152, 241-TR-152 Diversion Box, Line 6053	Tank Farm	
241-TR-153	241-TR-153, 241-TR-153 Diversion Box, 241-TR-153 Booster Pump Pit, Line 6172	Tank Farm	
241-TX-101	241-TX-101, 241-TX-TK-101	Tank Farm	
241-TX-102	241-TX-102, 241-TX-TK-102	Tank Farm	
241-TX-103	241-TX-103, 241-TX-TK-103	Tank Farm	
241-TX-104	241-TX-104, 241-TX-TK-104	Tank Farm	
241-TX-105	241-TX-105, 241-TX-TK-105	Tank Farm	
241-TX-106	241-TX-106, 241-TX-TK-106	Tank Farm	
241-TX-107	241-TX-107, 241-TX-TK-107	Tank Farm	
241-TX-108	241-TX-108, 241-TX-TK-108	Tank Farm	
241-TX-109	241-TX-109, 241-TX-TK-109	Tank Farm	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
41-TX-110	241-TX-110, 241-TX-TK-110	Tank Farm	
241-TX-111	241-TX-111, 241-TX-TK-111	Tank Farm	
241-TX-112	241-TX-112, 241-TX-TK-112	Tank Farm	
241-TX-113	241-TX-113, 241-TX-TK-113	Tank Farm	
241-TX-114	241-TX-114, 241-TX-TK-114	Tank Farm	
241-TX-115	241-TX-115, 241-TX-TK-115	Tank Farm	
241-TX-116	241-TX-116, 241-TX-TK-116	Tank Farm	
241-TX-117	241-TX-117, 241-TX-TK-117	Tank Farm	
241-TX-118	241-TX-118, 241-TX-TK-118	Tank Farm	
241-TX-152	241-TX-152, 241-TX-152 Diversion Box	Pipeline	
241-TX-153	241-TX-153, 241-TX-153 Diversion Box	Pipeline	
241-TX-154	241-TX-154, 241-TX-154 Diversion Box	Pipeline	
241-TX-155	241-TX-155, 241-TX-155 Diversion Box	200-IS-1	
241-TX-302A	241-TX-302A, 241-TX-302-A Catch Tank, IMUST, Inactive Miscellaneous Underground Storage Tank, Lines V627 and V628	Pipeline	
241-TX-302B	241-TX-302B, 241-TX-302-B Catch Tank, IMUST, Inactive Miscellaneous Underground Storage Tank, Lines V414 and V415	Pipeline	
241-TX-302BR	241-TX-302BR, 241-TX-302BR Catch Tank, 241-TXR-302BR, IMUST, Inactive Miscellaneous Underground Storage Tank	Pipeline	
241-TX-302C	241-TX-302C, 241-TX-302-C Catch Tank, Lines V741 and V742	Pipeline	
241-TX-302XB	241-TX-302XB, 241-TX-302B Catch Tank, 241-TX-302-X, 241-TX-302-X (B), IMUST, Inactive Miscellaneous Underground Storage Tank	Tank Farm	
241-TXR-151	241-TXR-151, 241-TXR-151 Diversion Box, Line 7765	Tank Farm	
241-TXR-152	241-TXR-152, 241-TXR-152 Diversion Box, Line 7053	Tank Farm	
241-TXR-153	241-TXR-153, 241-TXR-153 Diversion Box, Line 7253	Tank Farm	
241-TY-101	241-TY-101, 241-TY-TK-101	Tank Farm	
241-TY-102	241-TY-102, 241-TY-TK-102	Tank Farm	
241-TY-103	241-TY-103, 241-TY-TK-103	Tank Farm	
241-TY-104	241-TY-104, 241-TY-TK-104	Tank Farm	
241-TY-105	241-TY-105, 241-TY-TK-105	Tank Farm	
241-TY-106	241-TY-106, 241-TY-TK-106	Tank Farm	
241-TY-153	241-TY-153, 241-TY-153 Diversion Box	Tank Farm	
241-TY-302A	241-TY-302A, 241-TY-302-A Catch Tank, IMUST, Inactive Miscellaneous Underground Storage Tank, Line V651	Tank Farm	
241-TY-302B	241-TY-302B, 241-TY-302-B Catch Tank, IMUST, Inactive Miscellaneous Underground Storage Tank	Tank Farm	
241-U-101	241-U-101, 241-U-TK-101	Tank Farm	
241-U-102	241-U-102, 241-U-TK-102	Tank Farm	
241-U-103	241-U-103, 241-U-TK-103	Tank Farm	
241-U-104	241-U-104, 241-U-TK-104	Tank Farm	
241-U-105	241-U-105, 241-U-TK-105	Tank Farm	
241-U-106	241-U-106, 241-U-TK-106	Tank Farm	
241-U-107	241-U-107, 241-U-TK-107	Tank Farm	
241-U-108	241-U-108, 241-U-TK-108	Tank Farm	
241-U-109	241-U-109, 241-U-TK-109	Tank Farm	
241-U-110	241-U-110, 241-U-TK-110	Tank Farm	
241-U-111	241-U-111, 241-U-TK-111	Tank Farm	
241-U-112	241-U-112, 241-U-TK-112	Tank Farm	
241-U-151	241-U-151, 241-U-151 Diversion Box	Pipeline	
241-U-152	241-U-152, 241-U-152 Diversion Box	Pipeline	
241-U-153	241-U-153, 241-U-153 Diversion Box	Tank Farm	
241-U-201	241-U-201, 241-U-TK-201	Tank Farm	
241-U-202	241-U-202, 241-U-TK-202	Tank Farm	
241-U-203	241-U-203, 241-U-TK-203	Tank Farm	
241-U-204	241-U-204, 241-U-TK-204	Tank Farm	
241-U-252	241-U-252, 241-U-252 Diversion Box	Tank Farm	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
241-U-301	241-U-301, 241-U-301B, V478	Tank Farm	The 241-U-301 structure consists of a catch tank and a pump pit directly above the catch tank. The catch tank is an unlined, reinforced concrete tank buried below grade to provide radiation shielding. The 241-U-301 Catch Tank is located within the 241-U Tank Farm, south of the 241-U-112 Tank and east of the 241-U-252 Diversion Box. The 214-U-301 Catch Tank collected overflow and leaks from Diversion Boxes 241-U-151 and 241-U-152. The catch tank is associated with the 241-U tank farm. This site is inactive.
241-U-361	241-U-361, 241-U-361 Settling Tank, 361-U-TANK, IMUST, Inactive Miscellaneous Underground Storage Tank	200-WA-1	
241-U-A	241-U-A, 241-U-A Diversion Box, 241-U-A Valve Pit	Tank Farm	
241-U-B	241-U-B, 241-U-B Diversion Box, 241-U-B Valve Pit	Tank Farm	
241-U-C	241-U-C, 241-U-C Diversion Box, 241-U-C Valve Pit	Tank Farm	
241-U-D	241-U-D, 241-U-D Diversion Box, 241-U-D Valve Pit	Tank Farm	
241-UR-151	241-UR-151, 241-UR-151 Diversion Box	Tank Farm	
241-UR-152	241-UR-152, 241-UR-152 Diversion Box, Line 5053	Tank Farm	
241-UR-153	241-UR-153, 241-UR-153 Diversion Box, Line 5253	Tank Farm	
241-UR-154	241-UR-154, 241-UR-154 Diversion Box, Line 5453	Tank Farm	
241-UX-154	241-UX-154, 241-UX-154 Diversion Box	Pipeline	
241-UX-302A	241-UX-302A, 241-U-302 Catch Tank, 241-UX-302 Catch Tank, 241-UX-302, Lines V380 and V381	Pipeline	
241-WR VAULT	241-WR VAULT, 241-WR Vault (Tanks -001 Through -009), 241-WR-01 Thru 09, 241-WR Diversion Station Vault, 244-WR Vault, 296-U-6 Stack, IMUST, Inactive Miscellaneous Underground Storage Tank (See Subsites)	Pipeline	
241-Z	241-Z, 241-Z Treatment and Storage Tanks, 241-Z Tank Farm, 241-Z Treatment and Storage System, 241-Z-D-4, 241-Z-D-5, 241-Z-D-7, 241-Z-D-8, 241-Z Sump, 241-Z Tank Pit	200-IS-1	
241-Z-361	241-Z-361, 241-Z-361 Settling Tank, IMUST, Inactive Miscellaneous Underground Storage Tank	200-PW-1	
241-Z-8	241-Z-8, 241-Z-TK-8, Silica Slurry Tank, 216-Z-8, IMUST, Inactive Miscellaneous Underground Storage Tank	200-PW-6	
242-S	242-S, 242-S Evaporator	Tank Farm	
242-T	242-T, 242-T Evaporator Facility, 241-T Evaporator	Other	The 242-T is a reinforced concrete and structural steel building. The facility consists of the 242-T building with the control room in the southeast portion, 242-TB and the 242-TA vault. The 242-TA vault is a concrete lined pit with a ground level steel cover. A 15,120 liter (4,000 gallon) receiver tank is inside the vault. This tank received Z Plant waste. The building is adjacent to the east side of the 241-TX/TY Tank Farm fence. The 242-T is associated with the 241-TX/TY tanks.
242-T-135	242-T-135, IMUST, Inactive Miscellaneous Underground Storage Tank	Tank Farm	The unit is a tank partially below grade, constructed of stainless steel. The area surrounding the tank is posted with Contamination Area and IMUST signs. The tank is located adjacent to the east wall of the 242-T Catch Tank Room and north of the 242-T Control Room. The 242-T buildings are located adjacent to the 241-TX Tank Farm, outside the fence.
242-T-151	242-T-151, 242-T-151 Diversion Box. Line V830	Tank Farm	This unit is located southeast of the 241-TX-116 Tank, inside the 241-TX Tank Farm. Located 2 m from 241-TX-116 Tank.
242-TA-R1	242-TA-R1, 242-TA, Receiver TK-Vault, 242-TA Receiver Tank Vault, Z Waste, Receiver Tank TK-R1, IMUST, Inactive Miscellaneous Underground Storage Tank	Tank Farm	The unit is located inside the 241-TX Tank Farm, adjacent to the southwest corner of the 242-T Building. Located 2 m north of 241-TX-116 Tank.
244-S DCRT	244-S DCRT, 244-S Double-Contained Receiver Tank, 244-S RT, 244-S Receiver Tank, 244-S Catch Station, 244-S-TK/SMP, Lines 5350 and 5351	Tank Farm	
244-TX DCRT	244-TX DCRT, 244-TX Double-Contained Receiver Tank, 244-TX RT, 244-TX Receiver Tank, 244-TX Receiver Vessel, 244-TX-TK/SMP	Tank Farm	
244-TXR VAULT	244-TXR VAULT, 244-TXR, 244-TXR Vault (Tanks TXR-001, -002, -003), IMUST, Inactive Miscellaneous Underground Storage Tank, 241-TXR-244 (See Subsites)	Tank Farm	
244-U DCRT	244-U DCRT, 244-U Double-Contained Receiver Tank, 244-U RT, 244-U Receiver Tank, 244-U Receiving Vault, 244-U-TK/SMP	Tank Farm	
244-U-2904	244-U-2904, 244-U Flush Pit	Other	The site is a building inside the 241-U tank farm fence. The building does not contain any radioactive or hazardous material. The postings on the 241-U Tank Farm fence include Contamination Area, Radiation Area, Radioactive Material, and Underground Radioactive Material Area signs. The flush pit is associated with the 244-U DCRT. The 244-U DCRT was never commissioned and hence has never seen any waste. The flush pit associated with this DCRT has never had any waste associated with it and is considered inactive. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.

Site Code	Site Name	Applicable OU Assignment or Disposition[i]	Comments/Notes
44-UR VAULT	244-UR VAULT, 244-UR Vault, (Tanks -001 Through -004), IMUST, Inactive Miscellaneous Underground Storage Tank, Lines 5764 and 5765 (See Subsites)	Tank Farm	
2607-FSN	2607-FSN, 609A Building Septic Tank 2607-FSN, 6607-4, 6607-04	200-OA-1	
2607-W1	2607-W1	200-OA-1	
2607-W10	2607-W10, Septic Servicing 278-WA, MO-281 and MO-438	200-OA-1	
2607-W11	2607-W11, Septic Servicing MO-720	200-OA-1	
2607-W12	2607-W12, Septic Servicing MO-721 and MO-743	200-OA-1	
2607-W13	2607-W13, Construction Trailers Septic, JA Jones/Kaiser Construction Trailers Septic	Other	The septic tank is supposed to be located north of 19th Street and west of Beloit Ave., in the Construction Trailer area. Since there is so little information about this septic tank, the WIDS site will stay in the Discovery classification status until a determination is made that the septic tank exists. Physically located in 200 West Inner Area. Remove from RI consideration based on Discovery Classification.
2607-W14	2607-W14, WRAP Facility Septic, 2336 Bldg. Septic	Other	The 2607-W14 septic system is located east of the 2336 building. It is south of 23rd Street and west of Dayton Ave., located within WRAP. Layout and Utility Plan: H-2-313741. This site is active. Remove from RI consideration based on site activity.
2607-W16	2607-W16, 200 West Area Regional Wastewater System, Large Onsite Sewer System (LOSS)	200-OA-1	
2607-W2	2607-W2	200-OA-1	
2607-W3	2607-W3	Other	Properly abandoned and sampled. Results found no contamination. No Action Proposed for reclassification/recategorization out of WA-1. Remove from RI consideration.
2607-W4	2607-W4, T Plant Septic Tank and Drain Field	Other	Does not contain hazardous or radioactive waste with potential human health risk. Remove from RI consideration.
2607-W5	2607-W5, Septic Tank and Drain Field	Other	Does not contain hazardous or radioactive waste with potential human health risk. Remove from RI consideration.
2607-W6	2607-W6	Other	Remove from RI consideration based on site activity.
2607-W7	2607-W7, Septic Tank	Other	Does not contain hazardous or radioactive waste with potential human health risk. Remove from RI consideration.
2607-W8	2607-W8	200-WA-1	
2607-W9	2607-W9, 2707-SX Septic Tank	Other	Does not contain hazardous or radioactive waste with potential human health risk. Remove from RI consideration.
2607-WA	2607-WA	Other	This unit lies southwest of the19th Street and Camden Avenue intersection and north of the Z Plant trailers MO-011, MO-244, MO-249, and MO-250. Septic system consisting of two separate septic tanks. Does not contain any radioactive or dangerous material. Site category is nondangerous/nonradioactive. This site is active. Remove from RI consideration based on site activity.
2607-WB	2607-WB, 2607-WB Septic System	Other	The septic system was abandoned per the requirements of Washington Administrative Code 246-272-1851 . All septage inside the tanks was removed, and the empty tanks were filled to eliminate void spaces. Per an agreement with the Washington Department of Health, the septic system lids were left in place. Only DOE approvals are needed for septic system closeout. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Closed Out. Removed from RI consideration. https://xiprod.ri.gov/businessobjects/enterprise115/InfoView/scripts/documentXML.aspx?token=&cmdP1=untitled*29115437*0***&cmd=askPromptView&cmdBlock=all&cmdP2=lsS%2540type%3dsite%26lsS%2540id%3d3901%26sViewer%3dactx
2607-WC	2607-WC, 2607-WC Septic System	Other	Does not contain hazardous or radioactive waste with potential human health risk. Remove from RI consideration.
2607-WL	2607-WL, 2607-WL Septic System	200-OA-1	
2607-WT	2607-WT, 241-T-601 Control Bldg. Tile Field	Tank Farm	The septic system is located west of the 242-T Evaporator inside the tank farm fence. It is between the 241-TX and the 241-TY Tank Farms. Remove from RI consideration.
2607-WTX	2607-WTX	Other	On the boundary of TX tank farm. This unit lies southwest (outside) of the 241-TX Tank Farm. The 2607-WTX Septic Tank is associated with the 241-TX Tank Farm and the former 241-TXR Control House. Remove from RI consideration.
2607-WUT	2607-WUT	Other	No CERCLA constituents
2607-WWA	2607-WWA, 2607-WWA Septic System	200-OA-1	
2607-WZ	2607-WZ	Other	
2607-Z	2607-Z	Other	Properly abandoned and sampled. Results found no contamination. No Action Proposed for reclassification/recategorization out of WA-1. Remove from RI consideration.
2607-Z1	2607-Z1, Septic Tank and Drainfield	Other	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
2607-Z8	2607-Z8	Other	It is believed that this septic system does not exist. 1. No drawings have been found that show this septic system. 2. All descriptions of this system can be traced back to a single document, the "Hanford Site Waste Management Units Report" (Cramer, 1987). This document does not list references, so its sources of information cannot be verified. Based on the experience of the WIDS staff, this document has enough errors in it that it should not be relied upon as the sole source of information. 3. In 1996, a comprehensive list of active and inactive 200 Area septic systems was documented in the "200 & 600 Area Sanitary Waste Water Master Plan." The 2607-Z8 septic system is not included in that document. 4. The 234-5Z building was serviced by two septic systems, 2607-Z and 2607-Z1, until 1999. The building was then connected to a new regional system. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Remove from RI consideration.
270-W	270-W, 270-W Tank, 270-W Neutralization Tank, IMUST, Inactive Miscellaneous Underground Storage Tank	200-WA-1	
2711-S	2711-S, 2711-S Stack Monitoring Building	Other	The 2711-S Building is an isolated, inactive wooden structure. The structure is old and of questionable integrity. The building is adjacent to the 291-S Air Sampler and the 291-S-1 Stack about 50 m northeast of 202-S. The building is currently used for equipment and lead shielding storage. The building contains a motor, pump, and instrumentation for the 291-S-1 Stack Sampling Building and supports stack monitoring activities. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
2718-S	2718-S, 2718-S Sand Filter Monitor, 2718-S Sand Filter Sampler, 2718-S Filter Monitoring Building	Other	The facility is located about 7 m off the southwestern corner of the 291-S Sand Filter, east of the 202-S Building. The building is currently used for equipment and lead storage. Previously, the building was used for storage and ventilation system (sand filter) performance monitoring. This site is active. Physically located in 200 West Inner Area. Remove from RI consideration based on site activity.
271-U	271-U, 271-U Office Building, 271-U Building	U Canyon	See page 16 of the U-Canyon ROD. This facility is named as part of the action to cover. Record of Decision 221-U Facility.
2727-S	2727-S, 2727-S Nonradioactive Dangerous Waste Storage Facility, 2727-S NRDWS Facility	Other	Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Closed Out. Remove from RI consideration. http://www2.hanford.gov/arpir/?content=findpage&AKey=D196008984
2727-WA	2727-WA, 2727-WA SRE Sodium Storage Building	Other	The 2727-WA building was constructed to store sodium from the Sodium Reactor Experiment (SRE) reactor. The unit is a prefabricated Butler-type metal building with a concrete floor. All of the SRE sodium storage containers have been removed. The building's maximum process design capacity for container storage was 132,000 liters (35,000 gallons). When used for sodium storage, the containers were stored on noncombustible pallets and occupied approximately one quarter of the floor space in the building. There were no documented releases and there is no potential for future releases since the sodium has been removed from the site. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Closed Out. Remove from RI consideration. http://www2.hanford.gov/arpir/?content=findpage&AKey=D199047751
276-S	276-S, 276-S Solvent Handling Facility, 276-S Solvent Facility	Other	The building is located north of the 211-S Tanks and south of the 276-S-141 and 276-S-142 Hexone Tanks about 24m northwest of 202-S. The 276-S Facility provided for the storage and treatment of REDOX process solvent (methyl isobutyl ketone). This sit is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
276-S-141	276-S-141, 276-S-TK-141, 276-S-306A, 276-S-141 Solvent Storage Tank, Tank 276-141, Hexone Storage Tank, 244-SX-15, IMUST, Inactive Miscellaneous Underground Storage Tank	200-IS-1	
276-S-142	276-S-142, 276-S-TK-142, 276-S-306B, 276-S-142 Solvent Storage Tank, Tank 276-142, Hexone Storage Tank, 244-SX-15, IMUST, Inactive Miscellaneous Underground Storage Tank	200-IS-1	
276-U	276-U, 276-U Solvent Handling Facility, 276-U Solvent Facility, 276-U Solvent Recovery Facility	U Canyon	
2904-S-160	2904-S-160, 2904-S-160 Control Structure, 2904-S-160 Weir	Pipeline	
2904-S-170	2904-S-170, 2904-S-170 Weir Box, 2904-S-170 Control Structure	200-CR-1	
2904-S-171	2904-S-171, 2904-S-171 Weir Box, 2904-S-171 Control Structure, 216-S-171	Pipeline	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
2904-SA	2904-SA, 2904-SA Cooling Water Sampler Building, 2904-SA Sample Building	Other	The building is located about 50 m southwest of the 202-S canyon facility, near the southwest corner of the 211-S tank farm. The sample shack was built to provide sampling of process waste from the REDOX facility prior to being routed through the 2904-S-170 Weir to liquid waste disposal sites. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
291-S	291-S, 291-S Fan Control Building, 291-S Fan House, 291-S Fan and Filter Building	Other	This fan house contains three steam powered turbine blowers. The equipment was radioactive. Unit category was TBD. These sites are still active, so there are no forms that are signed saying they are rejected. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted (Proposed). Remove from RI consideration.
291-S-1	291-S-1, 291-S-1 Stack, REDOX Process and Canyon Exhaust	Other	Was categorized radioactive with solid process effluent, with unit category TBD. These sites are still active, so there are no forms that are signed saying they are rejected. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted (Proposed). Remove from RI consideration.
291-U	291-U, 291-U Fan Control House	U Canyon	See page 16 of the U-Canyon ROD. This facility is named as part of the action to cover. Record of Decision 221-U Facility.
291-U-1	291-U-1, 291-U-1 Stack, 291-U Stack	U Canyon	See page 16 of the U-Canyon ROD. This facility is named as part of the action to cover. Record of Decision 221-U Facility.
292-S	292-S, 292-S Fan and Filter Building	Other	The site is east of the 202-S Building, 5 m east of 291-S building, and 47 m from REDOX. The unit is a concrete building, 3.4 meters (11 feet) high. Most of the concrete is 25.4 centimeters (10 inches) thick. An exhaust jet is located beneath the unit. Provided housing for the jets for the Reduction Oxidation (REDOX) process vessel vent systems. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
292-U	292-U, 292-U Stack Monitoring Station, 291-U Stack Exhaust Monitoring Building	U Canyon	See page 16 of the U-Canyon ROD. This facility is named as part of the action to cover. Record of Decision 221-U Facility.
293-S	293-S, 293-S Offgas Treatment Facility, 293-S Off Gas Treatment, 293-S Off-Gas Treatment and Recovery	Other	The site is located east of the 202-S Building, 6 m south of 291-S building, which is 47 m from 202-S. The building extends 3.7 meters (12 feet) below grade to 9 meters (30 feet) above grade and is constructed of reinforced concrete. The main floor houses the absorption towers with a pipe valve pit in the basement. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
296-S-1	296-S-1, 296-S-1 Stack	Other	This unit is a stack that is attached to the outside of the south wall of the service portion of the south pipe gallery of 202-S. Is consolidated with 202-S. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Remove from RI consideration.
296-S-12	296-S-12, 296-S-12 Stacks	Other	This site consists of stacks located on the roof of the 276-S building and waste site and completely within the site boundaries. The waste at the 296-S-12 site is the same as that found at 276-S. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Remove from RI consideration.
296-S-13	296-S-13, 222-S Stack	Other	Associated with the 222-S Laboratory. Located 82 m from REDOX. The stack originates on the second floor of 222-S and is approximately 2 meters (7 feet) in diameter by 16 meters (52 feet) tall. The stack was removed from service in 1978 when 296-S-21 was placed in service. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
296-S-16	296-S-16, 219-S Stack	Other	This stack was built to exhaust filtered air from the 219-S Building vault and waste tanks. 19 m from 222-S building. The stack is approximately 10 centimeters (4 inches) in diameter by 2.7 meters (7 feet) high. Air is exhausted from the 219-S waste tanks through a de-mister (TK-105) and a single stage of High-Efficiency Particulate Air (HEPA) filtration prior to discharge through the stack to the atmosphere. This site is active. Physically located in 200 West Inner Area. Remove from RI consideration based on site activity.
96-S-2	296-S-2, REDOX North Sample Gallery, Hoods Ventilation and PR Cage, 296-S-2 Stack	Other	The stack is located on the outside north wall of the 202-S Building. The stack is consolidated into the 202-S building. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Remove from RI consideration.

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
296-S-21	296-S-21, 222-S Stack	Other	The site is located on the southeast corner of the 222-S Laboratory. 19 m from 222-S building. The stack is approximately 2 meters (6.5 feet) in diameter by 11.6 meters (38 feet) tall. Air is exhausted from the 222-S Laboratory rooms, hoods, gloveboxes, and hot cells through the 222-SB or 222-SE Filter Buildings prior to discharge through the stack to the atmosphere. This site is active. Physically located in 200 West Inner Area. Remove from RI consideration based on site activity.
296-S-4	296-S-4, REDOX Decontamination Room, Regulated Shop, Regulated Tool Room, Low-Level Decontamination Sink and Special Work Permit Lobby Vent	Other	The stack is located on the outside east wall of 202-S building. The Stack is consolidated with the 202-S building. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
296-S-6	296-S-6, 296-S-6 Stack, REDOX Silo Ventilation	Other	The stack is located on the roof in the northeast corner of 202-S. The stack is consolidated with 202-S Building. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
296-S-7	296-S-7, 296-S-7E, 296-S-7W, REDOX Product Building (233-S) Ventilation, Dual Stacks, 296-S-7 East and West Stacks	Other	The stacks were located on the outside north wall of the 233-SA building. Used to exhaust filtered air from the 233-S Building. They are associated with the 233-SA Building. The 233-SA building was demolished in 2003, the foundation has been capped, and stacks no longer exist. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted (Proposed). Removed from RI consideration.
296-U-10	296-U-10, 296-U-10 Stack	U Canyon	Discharge stack on top of 271-U building. 271-U building is included in the U Canyon ROD. Record of Decision 221-U Facility. See page 16 of the U-Canyon ROD. This facility is named as part of the action to cover.
600-148	600-148, ERDF, Environmental Restoration Disposal Facility	ERDF	
600-215	600-215, 6265A 90-Day Waste Accumulation Area	200-OA-1	
600-235	600-235, Buried Lead Sheathed Telephone Cables	200-OA-1	
600-236	600-236, Soilcell 607 Site, Petroleum Contaminated Soil, Bioremediation Site	200-OA-1	
600-256	600-256, Atmospheric Dispersion Modeling Towers, Ethylene Glycol Release	200-OA-1	
600-260	600-260, Roped Off Area Near Meteorological Tower	200-OA-1	
600-261	600-261, Standard Gauge Railroad Track, 601 Structures	Other	The site consists of the railroad track system on the Hanford site (beginning at Horn Rapids road and proceeding North). The section from Horn Rapids Road to Energy Northwest is still active. The rest is inactive. This site does not include any radioactive unplanned releases that may have affected portions of the track during Hanford operations. The documented radioactive releases are separate WIDS entries. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted (Proposed). Removed from RI consideration.
600-269-PL	600-269-PL, Cross Site Transfer Line Replacement, New Cross-Site Transfer Line, Lines SNL-3150 and 3160	200-OA-1	
600-284-PL	600-284-PL; Old Cross Site Transfer Line; Original Cross Site Transfer Pipeline; Piping Associated with UPR-600-20, Cross Site Transfer Line; Lines V360, V361, V362, V363, V364, and V366; Cross Site Transfer Pipeline	200-OA-1	
600-291-PL	600-291-PL, 200 Area Treated Effluent Disposal Facility Pipeline, TEDF Line	200-OA-1	
600-292-PL	600-292-PL, State Approved Land Disposal Site Pipeline, SALDS Pipeline	200-OA-1	
600-336	600-336, 609-G Septic Tank and Tile Field, 6607-3, 6607-03	200-OA-1	
600-37	600-37, Brown's Wells, Johnson's Wells	200-OA-1	
600-70	600-70, Solid Waste Management Unit (SWMU) #2 - Miscellaneous Solid Waste	200-WA-1	
616-WS-1	616-WS-1, 616 NRDWSF French Drain	200-OA-1	
622-1	622-1, Construction and Demolition Debris	Other	All material has been removed and the site has been sampled for radioactivity, asbestos, and organics. The site is no longer marked or posted. Site contained construction and demolition debris. All of the debris was removed and segregated based on contamination. Nothing hazardous was noted. Waste consisted of barrels, drums, buckets, and cans. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
622-R ST	622-R ST, 622-R Septic Tank, 622-R Atmospheric Physics Laboratory Septic Tank, 6607-02, 6607-2	200-OA-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
6241-A	6241-A, 6241-A Diversion Box	Pipeline	6241-A is a booster station for the new cross site transfer pipeline. The building is a radiological facility. The site is located southeast of 221-U, east of Beloit Avenue, between 13th and 16th Streets. The main structure (room 105) is an underground building with the top of the roof approximately 0.75 meter (2.5 feet) above finish grade. This structure houses two booster pumps and is designed for maintenance access on an infrequent basis. This site is active. Data Package will determine OU designation.
6241-V	6241-V, 6241-V Vent Station	Other	Active site
6607-18	6607-18, 609-G and MO292 Septic System	200-OA-1	
6607-5	6607-5, 616 Building Septic System, 6607-05	200-OA-1	
6607-9	6607-9, Septic Tank 6607-9 Large On-Site Sewage System, Project W-011H, 6607-09	200-OA-1	
RMWSF	RMWSF; Radioactive Mixed Waste Storage Facility; Hanford Central Waste Complex; 2401W, 2402W, 2402WB, 2402WC, 2402WD, 2402WE, 2402WF, 2402WG, 2402WH, 2402WI, 2402WJ, 2402WK, 2402WL, 2403WA, 2403WB, 2403WC, 2403WD, 2404WA, 2404WB, 2404WC	200-OA-1	
TRUSAF	TRUSAF, 224-T TRUSAF, Transuranic Assay Facility	Other	The building is a RCRA compliant storage unit occupying 2/3 of the 224-T building and adjacent outdoor areas. One third of the building (224-T Canyon) was sealed off in 1975. The storage capacity is 2,000 55-gallon drums (110,000 gallons). Access to the building is restricted with a locked, chain link fence. The building is not within the T-Complex. This site is inactive. WIDS designation as N/A. Physically located in 200 West Inner Area. Remove from RI consideration based on WIDS designation as N/A.
UPR-200-E-13	UPR-200-E-13, Overflow from 216-A-4, UN-200-E-13, UPR-200-E-15	East	
UPR-200-W-10	UPR-200-W-10, UN-200-W-10, Contamination Spread at 203-S UNH Tanks	Other	The site consisted of an area around the 203-S Uranium Nitrate Hexahydrate (UNH) tanks. The 203-S facility area has been decommissioned and surface stabilized (see 200-W-22). It is currently posted with Underground Radioactive Material signs. The release is not separately marked or posted. Consolidated into 200-W-22. Removed from RI consideration based on Consolidated classification.
UPR-200-W-100	UPR-200-W-100, UN-216-W-8, 105-TX to 118-TX Process Line Leak, UN-200-W-100	Tank Farm	Within tank farm boundaries.
UPR-200-W-101	UPR-200-W-101, UN-216-W-9, 221-U Acid Spill R-1 Through R-9, UN-200-W-101	200-WA-1	
UPR-200-W-102	UPR-200-W-102, UN-216-W-12, UN-200-W-102, 224-T Underground Line Leak	Pipeline	
UPR-200-W-103	UPR-200-W-103, 216-Z-18 Line Break, UN-216-W-13, UN-200-W-103, Pipe Line Leak	200-WA-1	
UPR-200-W-104	UPR-200-W-104, UN-216-W-14, 216-U-10 Pond Leach Trench, U Pond Fingers	200-OA-1	
UPR-200-W-105	UPR-200-W-105, UN-216-W-15, 216-U-10 Pond Leach Trench	200-OA-1	
UPR-200-W-106	UPR-200-W-106, UN-216-W-16, 216-U-10 Pond Leach Trench	200-OA-1	
UPR-200-W-107	UPR-200-W-107, UN-216-W-17, 216-U-10 Pond Flood Plain	200-CW-1	Consolidated with 216-U-10 Pond. The UPR is completely within the pond wastes site boundaries. 216-U-10 pond contained mixed process effluent; the UPR also consisted of mixed process effluent. Consolidated with 216-U-10 pond and 200-CW-1 OU (in App. C).
UPR-200-W-108	UPR-200-W-108, Line Leak at 216-S-9 Crib, UN-216-W-18, UN-200-W-108	Pipeline	
UPR-200-W-109	UPR-200-W-109, Waste Line Leak Near 218-W-9, UN-216-W-19, UN-200-W-109	Pipeline	
UPR-200-W-11	UPR-200-W-11, 218-W-1 Burial Ground Fire, UN-200-W-11, UPR-200-W-16	Other	Not mapped, contained within 218-W-1 Burial Ground. Was a duplicate of UPR-200-W-16, which is the correct location, and contained radioactive chemicals. UPR-200-W-16 is mapped and completely contained within the 218-W-1 Burial Ground site. The burial ground contained mixed debris and has radionuclides present. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-110	UPR-200-W-110, Contaminated Soil from 216-Z-1, UN-216-W-20 Spoil Trench	200-CW-5	
UPR-200-W-111	UPR-200-W-111, Sludge Trench at 207-U, UN-216-W-21	200-WA-1	
UPR-200-W-112	UPR-200-W-112, Sludge Trench at 207-U, UN-216-W-22	200-WA-1	
UPR-200-W-113	UPR-200-W-113, Soil Contamination East of 241-TX, UN-216-W-23, Contamination Areas Around 241-TX-155 Diversion Box, UN-200-W-113	Pipeline	
UPR-200-W-114	UPR-200-W-114, UN-216-W-24, Ground Contamination East of 241-SX Tank Farm, UN-200-W-114	Pipeline	
UPR-200-W-115	UPR-200-W-115, UN-216-W-25, Ground Contamination Above Transfer Line Along Cooper Street	Pipeline	
UPR-200-W-116	UPR-200-W-116, UN-216-W-26, Ground Contamination North of 202-S, UN-200-W-116	200-WA-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
UPR-200-W-117	UPR-200-W-117, Railroad Track Contamination, 221-U Railroad Cut Contamination, UN-216-W-27, UN-200-W-117	200-WA-1	
UPR-200-W-118	UPR-200-W-118, Contamination at 211-U, UN-216-W-28, UN-200-W-118	200-WA-1	
UPR-200-W-12	UPR-200-W-12, Ground Contamination Near 242-T	Other	Consolidated with the 200-W-94 tank farm. UPR is completely within the boundaries of the tank farm site. The UPR contained radioactive process effluent as does 200-W-94. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-123	UPR-200-W-123, 204-S Unloading Facility Frozen Discharge Line, UN-200-W-123	Other	Is completely within the boundary of and consolidated with 200-W-22. Contaminated ground beneath the tank car from this release was cleaned up. The 204-S unloading station (where this release occurred) was decontaminated and dismantled in 1983 and covered with clean backfill. Associated with 204-S building near 202-S REDOX. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-125	UPR-200-W-125, 216-U-15, UN-200-W-125, UN-216-W-10	Other	Duplicate of 216-U-15, material dumped in a hole and covered, not mapped. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-126	UPR-200-W-126, Contamination Release Inside 241-TX Tank Farm	Tank Farm	
UPR-200-W-127	UPR-200-W-127, Liquid Release from 242-S Evaporator to the Ground, UN-200-W-127	Tank Farm	Within tank farm boundaries.
UPR-200-W-128	UPR-200-W-128, Contamination Release Inside 241-U Tank Farm	Tank Farm	
UPR-200-W-129	UPR-200-W-129, Contamination Release Inside 241-TX Tank Farm	Tank Farm	
UPR-200-W-13	UPR-200-W-13, Liquid Release from REDOX to 207-S and 216-S-17 Pond, UN-200-W-13	Other	Consolidated with the 207-S Retention Basin, UPR is in the middle and within the boundaries of the 207-S site. The UPR was a release of radioactive steam condensate; the 207-S Retention basin also received Steam Condensate and mixed effluent waste from the 202-S Building. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-130	UPR-200-W-130, Line Leak at 231-W-151 Sump, UN-200-W-130	Pipeline	
UPR-200-W-131	UPR-200-W-131, Release from 241-TX-155	Pipeline	
UPR-200-W-132	UPR-200-W-132, UN-200-W-132, 241-UR-151 Diversion Box Release	Tank Farm	Within tank farm boundaries.
UPR-200-W-134	UPR-200-W-134, Improper Drum Burial at 218-W-3A	Other	UPR is completely contained within the boundaries of 218-W-3A burial ground. UPR release of plutonium and uranium, and the burial ground contains radioactive soil. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-135	UPR-200-W-135, Release from 241-TX-155, UN-200-W-135	Pipeline	
UPR-200-W-137	UPR-200-W-137, 218-W-7, UN-200-W-137	Other	The UPR was consolidated with the 218-W-7 vault. The UPR released dry package waste, which the vault already received and contained. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-138	UPR-200-W-138, 221-U Vessel Vent Blower Pit French Drain, UN-216-W-11, UN-200-W-138, UN-200-W-22, UPR-200-W-22	200-WA-1	
UPR-200-W-14	UPR-200-W-14, Waste Line Leak at 242-T Evaporator, UN-200-W-14	200-WA-1	
UPR-200-W-140	UPR-200-W-140, 241-SX-107 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-141	UPR-200-W-141, 241-SX-108 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-142	UPR-200-W-142, 241-SX-109 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-143	UPR-200-W-143, 241-SX-111 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-144	UPR-200-W-144, 241-SX-112 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-145	UPR-200-W-145, 241-SX-113 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-146	UPR-200-W-146, 241-SX-115 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-147	UPR-200-W-147, 241-T-103 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-148	UPR-200-W-148, 241-T-106 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-149	UPR-200-W-149, 241-TX-107 Leak	Tank Farm	Within tank farm boundaries.

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
UPR-200-W-15	UPR-200-W-15, Liquid Release from REDOX to 207-S and 216-S-17 Pond, UN-200-W-15	Other	Consolidated with the 207-S Retention Basin; UPR is within the boundaries of the 207-S site. The UPR was a release of radioactive steam condensate. The 207-S Retention Basin also received Steam Condensate and mixed effluent waste from the 202-S building. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-150	UPR-200-W-150, 241-TY-103 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-151	UPR-200-W-151, 241-TY-104 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-152	UPR-200-W-152, 241-TY-105 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-153	UPR-200-W-153, 241-TY-106 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-154	UPR-200-W-154, 241-U-101 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-155	UPR-200-W-155, 241-U-104 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-156	UPR-200-W-156, 241-U-110 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-157	UPR-200-W-157, 241-U-112 Leak	Tank Farm	Within tank farm boundaries.
UPR-200-W-159	UPR-200-W-159, Caustic Spill at Plutonium Finishing Plant, UN-200-W-159	Other	The soil was removed, packaged, and disposed of offsite. The site is not marked or posted and cannot be located but is associated with the PFP. Sodium hydroxide is not stable in the environment and converts to sodium carbonate. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-16	UPR-200-W-16, Fire at 218-W-1 Burial Ground	Other	This UPR is a duplicate of the occurrence described in UPR-200-W-11 and is consolidated into 218-W-1 Burial Ground. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-160	UPR-200-W-160, Line Break at 241-TX-302C, UPR-200-W-38, UPR-200-W-40, 216-T-30	Pipeline	**Consolidated Duplicate** of UPR-200-W-38/40.
UPR-200-W-161	UPR-200-W-161, UN-216-W-35, UN-200-W-161, Large Area East of 241-U Tank Farm	Pipeline	
UPR-200-W-162	UPR-200-W-162, Contaminated Area on East Side of 221-U, UN-216-W-37	200-WA-1	
UPR-200-W-163	UPR-200-W-163, Contaminated Vegetation at the 216-U-8 Pipeline (200-W-42-PL), UN-216-W-33	Other	The release site is located in the soil above the pipeline from the 224-U building to the 216-U-8 Crib. Posted Underground Radioactive Material Area signs are located on the northern and southern sides of 16th Street. The pipeline is west of Beloit Ave. UPR-200-W-163 is associated with the vitrified clay pipeline (200-W-42-PL) connecting the 216-U-8 Crib to the 224-U Building. The posted area over the pipeline on the northern side of 16th Street was stabilized in October 2001. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-164	UPR-200-W-164, Overhead UNH Line Leak, UN-216-W-29	Pipeline	
UPR-200-W-165	UPR-200-W-165, Contamination Area East of 241-S, UN-216-W-30	Other	Proposed for reclassification/recategorization out of WA-1. Remove from RI consideration.
UPR-200-W-166	UPR-200-W-166, Contamination Migration from 241-T Tank Farm, UN-216-W-31	200-WA-1	
UPR-200-W-167	UPR-200-W-167, Contamination Migration from 241-TY, UN-216-W-32	Pipeline	
UPR-200-W-17	UPR-200-W-17, UN-200-W-17, Contamination Spread from 241-TX-106 Pump Removal	Tank Farm	
UPR-200-W-19	UPR-200-W-19, 241-U-361 Overflow, UN-200-W-19	200-WA-1	
UPR-200-W-2	UPR-200-W-2, UN-200-W-2, Underground Waste Line Leak	Pipeline	
UPR-200-W-20	UPR-200-W-20, UN-200-W-20, Spread of Contamination from a Diversion Box	200-WA-1	
UPR-200-W-21	UPR-200-W-21, UN-200-W-21, UN-216-W-36, Process Line Cave-in at 241-TX-154 Diversion Box	Pipeline	Occurred next to T Canyon at the same time as UPR-200-W-38. Associated with the 241-TX-154 Diversion Box.
UPR-200-W-23	UPR-200-W-23, Waste Box Fire at 234-5Z, UN-200-W-23	Other	Release occurred in 1953; cannot locate; PFP demolition compounds the futility of locating any trace of it. Proposed for reclassification/recategorization out of WA-1. Remove from RI consideration.
UPR-200-W-24	UPR-200-W-24, Release from the 244-UR Vault, UN-200-W-24	Other	Contamination spread from the 244-UR vault, outside the site boundaries to the 207-U Retention Basin. Consolidated with 200-W-95. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
PR-200-W-26	UPR-200-W-26, Contamination Spread During Burial Operation	Other	UPR is completely contained within the 218-W-4A waste site but the consolidation says that the site is probably consolidated with 218-W-1A site. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
UPR-200-W-27	UPR-200-W-27, Transfer Line Leak at 23rd and Camden, UN-200-W-27, UN-216-W-5, Duplicate of UPR-200-W-29	Pipeline	**Consolidated Duplicate** of UPR-200-W-29, **not mapped.**
UPR-200-W-28	UPR-200-W-28, Release from 241-TX-155 Diversion Box, UN-200-W-28	Pipeline	
UPR-200-W-29	UPR-200-W-29, Transfer Line Leak, UN-200-W-29, UPR-200-W-27, UN-200-W-27, UN-216-W-5, 23rd and Camden Line Break	Pipeline	
UPR-200-W-3	UPR-200-W-3, Railroad Contamination, UN-200-W-3	200-WA-1	
UPR-200-W-30	UPR-200-W-30, 216-S-12, UN-200-W-30	Other	Duplicate of 216-S-12; not mapped. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-32	UPR-200-W-32, UNH Transfer Line Break, UN-200-W-32	Pipeline	
UPR-200-W-33	UPR-200-W-33, Ground Contamination at 224-U, UN-200-W-33	200-WA-1	
UPR-200-W-35	UPR-200-W-35, Ground Contamination Near UNH Process Line, UN-200-W-35, REDOX to 224-U UNH Line Leak	Pipeline	
UPR-200-W-36	UPR-200-W-36, Groundwater Contamination at 216-S-1 and 216-S-2	200-WA-1	
UPR-200-W-37	UPR-200-W-37, Contaminated Boxes Found in a Burn Pit (Z Plant Burn Pit)	Other	UPR is completely contained within the 218-W-4C site boundaries. This UPR is accounted for in the 218-W-4C classification form. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-38	UPR-200-W-38, Line Break at 241-TX-302C, UPR-200-W-160, UPR-200-W-40, UN-200-W-38, 216-T-30	Pipeline	
UPR-200-W-39	UPR-200-W-39, UN-200-W-39, 224-U Buried Contamination Trench	200-WA-1	
UPR-200-W-4	UPR-200-W-4, Railroad Contamination, UN-200-W-4	200-WA-1	
UPR-200-W-40	UPR-200-W-40, Line Break Near 241-TX-154, UPR-200-W-38, UPR-200-W-160, 216-T-30, UN-200-W-40	Pipeline	Consolidated Duplicate of UPR-200-W-38; adjacent to T plant.
UPR-200-W-41	UPR-200-W-41, Railroad Contamination, UN-200-W-41, REDOX Railroad Cut Contamination	200-WA-1	
UPR-200-W-42	UPR-200-W-42, Contamination found at 2706-S, UN-200-W-42	Other	UPR-200-W-42 is completely contained within UPR-200-W-41. UPR-200-W-42 is consolidated and accounted for on the WIDS report for UPR-200-W-41. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-43	UPR-200-W-43, Contaminated Blacktop East of 233-S, UN-200-W-43	200-CR-1	
UPR-200-W-44	UPR-200-W-44, Railroad Track Contamination, UN-200-W-44	Other	Release occurred in 1957; states that a significant amount of soil was removed following the spill. No exact location on the RR track can be documented. A visual and radiological search was conducted along the entire RR track in 2004 and they could not find it. Proposed for reclassification/recategorization out of WA-1.
UPR-200-W-45	UPR-200-W-45, Burial Box Collapse	Other	The release is no longer able to be visually identified, not marked or posted. It is assumed to be associated with 218-W-2A burial ground. This was an airborne release caused by a bucket of dirt that was dropped on the burial box lid, and a cloud of contamination was released and spread outside of the burial ground. Personnel and equipment were decontaminated . Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration. http://www2.hanford.gov/arpir/?content=findpage&AKey=D7271491
UPR-200-W-46	UPR-200-W-46, Contaminated Railroad Track, H-2 Centrifuge Burial, UN-200-W-46	200-WA-1	
UPR-200-W-48	UPR-200-W-48, Contaminated Railroad Track Near 221-U, UN-200-W-48	Other	Release occurred in 1958. The Occurrence Report says a "temporary" zone was established, which indicates they intended to clean it up soon. The location on Bridgeport Ave is not marked or posted now and was not marked or posted in 1998. BHI recommended a rad survey and to do surveillances only every 5 years. Proposed for reclassification/recategorization out of WA-1. Remove from RI consideration.
UPR-200-W-49	UPR-200-W-49, Contamination Southeast of 241-SX, UN-200-W-49	Tank Farm	The 241-SX Tank Farm is currently surrounded with a chain link fence posted with various radiological warning signs. The unplanned release located outside the tank farm fence, as described in 1958, is not marked or posted. Consolidated into 200-W-95, adopted by Tank Farm. On the boundary of TX tank farm.
UPR-200-W-5	UPR-200-W-5, Overflow at 241-TX-155, UN-200-W-5	Pipeline	
UPR-200-W-50	UPR-200-W-50, UN-200-W-50, Contamination Spread from 241-SX-114	Tank Farm	Not in tank farm boundary but associated with the 241-SX Tank Farm and UPR-200-W-114.
UPR-200-W-51	UPR-200-W-51, Release from 241-S Diversion Box, UN-200-W-51, UPR-200-W-52	200-WA-1	
UPR-200-W-52	UPR-200-W-52, Release from 241-S Diversion Box, UN-200-W-52	Other	Completely contained within the boundaries of 207-S and is a duplicate of UPR-200-W-51. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
UPR-200-W-53	UPR-200-W-53, Burial Box Collapse	Other	This UPR was consolidated into 218-W-2A and is completely contained within its boundaries and is accounted for on the WIDS report. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-55	UPR-200-W-55, Uranium Powder Spill at 224-U, UN-200-W-55	Other	The debris pile is visible and does not contain any CERCLA regulated material. Proposed for reclassification/recategorization out of WA-1. Remove from RI consideration.
UPR-200-W-56	UPR-200-W-56, Contamination at the REDOX Column Carrier Trench, UN-200-W-56	200-CR-1	
UPR-200-W-57	UPR-200-W-57, UPR-200-E-120 (error in area number assignment), UN-200-W-57, 233-S Fire	200-CR-1	
UPR-200-W-58	UPR-200-W-58, Railroad Track Contamination, UN-200-W-58	200-OA-1	
UPR-200-W-6	UPR-200-W-6, UN-200-W-6, Contamination Spread from 241-U-151 and 241-U-152 Diversion Boxes	Pipeline	
UPR-200-W-60	UPR-200-W-60, Railroad Contamination, UN-200-W-60	200-WA-1	
UPR-200-W-61	UPR-200-W-61, REDOX Ground Contamination, UN-200-W-61	200-CR-1	
UPR-200-W-62	UPR-200-W-62, UN-200-W-62, Line Leak at 23rd and Camden, UN-216-W-5, Duplicate of UPR-200-W-97	Pipeline	**Consolidated Duplicate** of UPR-200-W-97, **not mapped.**
UPR-200-W-63	UPR-200-W-63, Road Contamination Along the South Shoulder of 23rd Street, UN-200-W-63	200-WA-1	
UPR-200-W-64	UPR-200-W-64, Road Contamination at 23rd and Camden, UN-200-W-64	Pipeline	
UPR-200-W-65	UPR-200-W-65, Contamination in the T-Plant Railroad Cut, UN-200-W-65	200-WA-1	
UPR-200-W-67	UPR-200-W-67, Contamination Near 2706-T, UN-200-W-67	200-WA-1	
UPR-200-W-68	UPR-200-W-68, Road Contamination, UN-200-W-68	Other	The release is not physically marked or posted. The vehicle and roadway were decontaminated. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-69	UPR-200-W-69, Railroad Contamination, UN-200-W-69	Other	The site is associated with 200-W-22. The contaminated soil was taken to a 200W burial ground. A site walk down was conducted for surveillance purposes and led to the release from radiation zone status. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-7	UPR-200-W-7, Contamination Spread from the 241-T-151 and 241-T-152 Diversion Boxes, UN-200-W-7	Tank Farm	Within tank farm boundaries consolidated with 200-W-93; Contaminated Soil at 241-T Tank Farm.
UPR-200-W-70	UPR-200-W-70, Contamination Found at the 200 West Burning Ground East of Beloit Ave.	200-OA-1	
UPR-200-W-71	UPR-200-W-71, UN-200-W-71, Contamination Spread from 16th Street to Dayton Ave.	200-WA-1	
UPR-200-W-72	UPR-200-W-72, Contamination at 218-W-4A	Other	This UPR is consolidated with 218-W-4A and completely within its boundaries and is accounted for on the WIDS report. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-73	UPR-200-W-73, Contaminated Railroad Track at 221-T, UN-200-W-73	200-WA-1	
UPR-200-W-74	UPR-200-W-74, Overground Line Leak at 241-Z, UN-200-W-74	Other	The site is a small area where flush solution from decontamination of a cooling waste effluent header was being pumped. Alpha contamination was found and cleaned up. The area is no longer marked or posted. The contaminated solids were picked up and packaged for burial. Overground line leak located on 200-W-224-PL. Remove from RI consideration.
UPR-200-W-75	UPR-200-W-75, Contamination Spread at 241-Z, UN-200-W-75	Other	The contaminated soil was removed and the site can no longer be located. The release occurred inside a larger area related to a later unplanned release (UPR-200-W-79). After the second release, the site was again decontaminated. It is associated with UPR-200-W-79: map shows two different locations though. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-76	UPR-200-W-76, UN-200-W-76, Contamination Found at 241-TX-155	200-WA-1	
UPR-200-W-77	UPR-200-W-77, Contaminated Coyote Feces, UN-200-W-77	200-OA-1	
UPR-200-W-78	UPR-200-W-78, UO3 Powder Spill at 224-U, UN-200-W-78	200-WA-1	
UPR-200-W-79	UPR-200-W-79, Contamination Spread at 241-Z, UN-200-W-79	Other	UPR is consolidated with 241-Z waste site but is not within the boundaries of the site. 241-Z does, though, claim this UPR as consolidated on the WIDS Report. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-8	UPR-200-W-8, UN-200-W-8, 200-W-5, Old Burial/Burning Pit, U-Plant Burning Pit/Burial Ground	200-OA-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
UPR-200-W-80	UPR-200-W-80, UN-200-W-80, 241-S/SX Contamination Migration	Tank Farm	Associated with the 241-SX tank farms; contamination migration outside the boundaries of the farm.
UPR-200-W-81	UPR-200-W-81, UN-200-W-81, Contamination Specks in 241-S/SX	Tank Farm	Within tank farm boundaries.
UPR-200-W-82	UPR-200-W-82, UN-200-W-82, Contamination Spread at 240-S-151	200-WA-1	
UPR-200-W-83	UPR-200-W-83, Radioactive Spill Near 204-S Radiation Zone, UN-216-W-82, UN-200-W-83	Other	This UPR is consolidated with 200-W-22 and is completely within its boundaries. UPR-200-W-84 is accounted for on the WIDS report for 200-W-22. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-84	UPR-200-W-84, Ground Contamination During Burial Operation at 218-W-3A	Other	This UPR is consolidated with 218-W-3A burial ground and is completely within its boundaries. This UPR is accounted for in the WIDS report for 218-W-3A. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-85	UPR-200-W-85, Radioactive Spill from Multipurpose Transfer Box, UN-216-W-85, UN-200-W-85	Other	In 1982, the contamination was cleaned up at the 2706-T pad area. A new building has been placed on top of this cement pad. The concrete pad was sealed with an epoxy coating. Associated with 2706-T building and railroad tracks. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-86	UPR-200-W-86, Contaminated Pigeon Feces at 221-U and 204-S, UN-200-W-86, UN-216-W-86	Other	No marking or postings identify this UPR. The release is mainly associated with the 204-S facility and 221-U. Contaminated pigeon feces were found with readings of background levels or less than detectable. Site walk downs and surveys have been conducted and no contamination has been found since. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-87	UPR-200-W-87, UN-216-W-87, Radioactive Spill from 219-S Filter Housing, UN-200-W-87	Other	Contained within the boundaries of 219-S High Efficiency Filter housing. The release was on the ground of the 219-S building. In 2002, a new concrete pad was installed and there was no dose measurable readings during the digging for the pad's construction. Associated with 219-S filter housing near 222-S canyon. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration.
UPR-200-W-88	UPR-200-W-88, Radioactive Spill from Uranyl Nitrate (UNH) Trailer, UN-216-W-88, UN-200-W-88	200-OA-1	
UPR-200-W-89	UPR-200-W-89, Radioactive Contamination Southwest of 236-Z Building, UN-216-W-89, UN-200-W-89	Other	The spill site is not marked or posted. The spill was decontaminated and released by April 4th, 5 days after the spill. Radioactive contamination was removed to background levels. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Not Accepted. Removed from RI consideration.
UPR-200-W-90	UPR-200-W-90, Radioactive Contamination South of 236-Z Building, UN-216-N-90, UN-200-W-90	Other	Radioactive contamination was immediately removed to background levels. The release was to six personnel moving contaminated equipment. This UPR is associated with the 234-5Z and 236-Z buildings.
UPR-200-W-91	UPR-200-W-91, Radioactive Contamination Near 234-5Z Building, UN-216-W-91, UN-200-W-91	Other	Not currently marked or posted. The final decontamination record could not be found. This UPR is associated with the 234-5Z building. Decontaminated to 2,000 disintegrations per minute. We need to try and find the clean up report. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Rejected. Removed from RI consideration. http://www2.hanford.gov/arpir/?content=findpage&AKey=D7271514
UPR-200-W-95	UPR-200-W-95, UN-216-W-2, 207-S Retention Basin	Other	This site is completely located within the boundaries of 207-S. This UPR is recognized in the 207-S WIDS report. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.
UPR-200-W-96	UPR-200-W-96, UN-216-W-4, 233-S Floor Overflow, 233-SA Floor Overflow	200-CR-1	
UPR-200-W-97	UPR-200-W-97, Transfer Line Leak, UN-216-W-5, UN-200-W-97	Pipeline	
UPR-200-W-98	UPR-200-W-98, UN-216-W-6, 221-T Waste Line Break at R-19, UN-200-W-98	Pipeline	
UPR-200-W-99	UPR-200-W-99, UN-216-W-7, 241-153-TX Diversion Box Contamination Spread, UN-200-W-99	200-WA-1	
UPR-600-20	UPR-600-20, UN-216-E-41, Old Cross Site Transfer Line Surface Contamination	200-OA-1	

Site Code	Site Name	Applicable OU Assignment or Disposition[1]	Comments/Notes
WRAP	WRAP, Waste Receiving and Processing Facility	Other	This site is operational. WRAP Module 1 is a large metal frame structure. Module 2B is still in development. The WRAP Facility will be located west of Dayton Avenue, north of Twenty-Second Street, and south of Twenty-Third Street. Structures associated with this unit include the Radioactive Mixed Waste Storage Facility, the rest of the Central Waste Complex, and the process equipment that will be located in WRAP. This site is active. Remove from RI consideration based on site activity. http://www7.rl.gov/rapidweb/ENVPRO-RCRA/docs/181/docs/Part%20III_OU-06_CWC_Part%20A%20Form_2008-09-22.pdf?CFID=5973366&CFTOKEN=12310332&jsessionid=5a303853080cd80331f314782f7061683b5a
Z PLANT BP	Z PLANT BP, Z Plant Burning Pit, Z Plant Burn Pit	Other	This site is completely located within the boundaries of 218-W-4C. Burn pit was excavated during construction of the burial ground. Physically located in 200 West Inner Area. Project team decision considering validation of site classification of Consolidated. Removed from RI consideration.

1 "Other" designation is a category for sites that were not assigned to a specific OU for a variety of reasons (e.g., unable to locate sites, removed from RI consideration, never received waste, consolidated with another site, etc.) as noted.

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Appendix B

Waste Site Supporting Information

This appendix contains and overview of supporting waste site information consisting of historical waste streams from operating facilities, availability of analytical and geophysical data, indications of historical groundwater impacts, and a preliminary screening of remedial technologies.

Contents

B1 References B-47

Tables

Table B-1. T Plant Waste Streams and Disposition to Waste Sites in 200 West Area B-1
Table B-2. PFP Waste Streams and Disposition to Waste Sites in 200 West Area B-4
Table B-3. U Plant Waste Streams and Disposition to Waste Sites in 200 West Area B-5
Table B-4. REDOX Plant Waste Streams and Disposition to Waste Sites in 200 West Area B-7
Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites B-11
Table B-6. Summary of 200-WA-1/200-BC-1 OU Waste Sites with Direct Analytical Data and/or Site-Specific Geophysical Survey Data* B-25
Table B-7. Summary of Waste Sites with Apparent Historical Groundwater Impacts B-29
Table B-8. Preliminary Screening of Remedial Technologies for Vadose Zone Remediation of Radionuclides, Hexavalent Chromium, Other Metals, and Organic Compounds—Hanford 200 West Area B-31

Terms

bgs	below ground surface
COPC	contaminant of potential concern
DNA	data needs assessment
EE/CA	environmental evaluation/cost analysis
ERDF	Environmental Restoration Disposal Facility
ET	evapotranspiration barriers
GHG	greenhouse gas
HEIS	Hanford Environmental Information System
IMUST	Inactive Miscellaneous Underground Storage Tank
ISGR	In Situ Gaseous Reduction
MNA	monitored natural attenuation
N/A	not available
NCP	"National Oil and Hazardous Substances Pollution Contingency Plan"
O&M	operations and maintenance
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PFP	Plutonium Finishing Plant
PRTR	Plutonium Recycle Test Reactor
R&D	Research and Development
RCRA	*Resource Conservation and Recovery Act of 1976*
REDOX	Reduction-Oxidation Plant
RI/FS	remedial investigation/feasibility study
RTD	removal, treatment, and disposal
TBP	tributyl phosphate
TRU	transuranic
UNH	uranyl nitrate
WIPP	Waste Isolation Pilot Plant

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Table B-1. T Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)[d]	Receiving Waste Site	Comment
Coating Removal Waste (221-T)	NaOH $NaNO_3$ NaA_lO_2 Na_2SiO_3 $NaNO_2$	4,700 gal per 1.5 metric tons of fuel	Tank Farm	This was an alkaline waste stream.
Metal Dissolution (221-T)	NO_x Xe I_2		To Stack	Released to atmosphere.
Metal Waste (221-T)	UNH (uranyl nitrate hexahydrate) Fission products HNO_3 H_2SO_4 H_3PO_4 $NaNO_3$ NaOH Na_2CO_3	5,700 gal per 1.5 metric tons of fuel	Tank Farm	This waste stream contained most of the residual uranium from the irradiated fuel. This was an acidic waste stream that was made alkaline before transfer to the tank farm.
First Cycle Waste (221-T)	$CaPO_4$ $Zr_3(PO_4)_2$ H_3PO_4 HNO_3 $BiPO_4$ $Fe_2(SO_4)_3$ $Cr(NO_3)_3$ $(NH_4)_2SO_4$ $(NH_4)_2SiF_6$ $NaNO_3$ NH_4NO_3 $Pu(NO_3)_4$ Fission products NaOH	4,700 gal per 1.5 metric tons of fuel	Tank Farm	This acidic waste stream was made alkaline before transfer to the tank farm.

Table B-1. T Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)[d]	Receiving Waste Site	Comment
Second Cycle Waste (221-T)	H_3PO_4 HNO_3 $BiPO_4$ $Fe_2(SO_4)_3$ $Cr(NO_3)_3$ $(NH_4)_2SO_4$ $(NH_4)_2SiF_6$ $NaNO_3$ NH_4NO_3 Fission products NaOH	3,600 gal per 1.5 metric tons of fuel	Tank Farm[a]	This acidic waste stream was made alkaline before transfer to the tank farm. As tank farms became full and tank space for waste was limited, this waste stream was discharged to selected cribs and trenches.
Plutonium Concentration Waste (224-T)	H_3PO_4 HNO_3 LaF_3 $BiPO_4$ KOH $Cr(NO_3)_3$ $NaNO_3$ KNO_3 HF KF $H_2C_2O_4.2H_2O$ $Mn(NO_3)_2$ NH_4NO_3 $Pu(NO_3)_4$ Fission products NaOH	24,000 to 31,000 L/day (6,340 to 8,200 gal/day)	From 1945 to 1946, to 216-T-3 Reverse Well[b] via 241-T-361 Settling Tank. After 1946, to 216-T-6 Crib[b] via 241-T-361 Settling Tank.	This acidic waste stream was made alkaline before transfer to the settling tank and 216-T-6 crib..
Cell Drainage (221-T and 224-T)	Any of the materials in the waste streams above	Not a routine release	Tank Farm or, from 1945 to 1946, to 216-T-3 Reverse Well[b] via 241-T-361 Settling Tank. After 1946, to 216-T-6 Crib[b] via 241-T-361 Settling Tank.	A high-suspended solid waste stream.

Table B-1. T Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)[d]	Receiving Waste Site	Comment
Cooling Water and Steam Condensate	Water	About 26.8 million L (7.1 million gal/day)	216-T-4-1 Pond/Swamp via 207-T Retention Basin, then to 216-T-4-1D ditch; later to 216-T-4-2 Ditch.[c]	This waste stream could become radiologically contaminated during system upset/equipment failure episodes. Waste stream could be held up in retention basis, but there was no diversion capability.
Chemical Sewer Waste (221-T and 224-T)	Any of the nonradioactive materials listed above	Not a routine release	216-T-4-1 Pond/Swamp via 207-T Retention Basin, then to 216-T-4-1D ditch; later to 216-T-4-2 Ditch.[c]	
222-T Process Control Laboratory Waste	Liquid waste containing any of the materials listed above	About 1,000 to 3,000 L/day (260 to 800 gal/day)	To 216-T-2 Reverse Well (1945 to 1950) and later to 216-T-8 Crib (1950 to 1951).	Reverse well estimated to have received 2.6 Ci of fission products and 600 mg of plutonium per month for approximately 60 months; expect similar discharge to crib for approximately 12 months.

a. The waste tank farms (e.g., 241-T, -TX, and TY) received high-level waste from T Plant; however, they are assigned to RCRA waste management areas and are not further assessed in this 200-WA-1 OU RI/FS.

b. Waste sites 216-T-3 Reverse Well and 216-T-6 Crib are assigned to the 200-DV-1 OU and are not further assessed in this 200-WA-1 OU RI/FS.

c. Waste site 216-T-4-2 Ditch is assigned to the 200-SW-2 OU and is not further assessed in this 200-WA-1 OU RI/FS.

d. Additional information on rates and volumes of discharge can be found in Appendices D and H.

Table B-2. PFP Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)**	Receiving Waste Site	Comment
Plutonium Isolation Process Wastes from 231-Z Building	$La(NO_3)_2$ KNO_3 $(NH_4)_2SO_4$ $(NH_4)_2SO_3$ HNO_3 H_2SO_4 H_2O_2 $NaNO_3$ $KMnO_4$ Fission products $Pu(NO_3)_4$	Variable flow, ranging from 400 L/day to 43,000 L/day (106 gal/day to 11,300 gal/day).	Transferred to 231-W-151 tank for pH adjustment prior to discharge to cribs: • 216-Z-10* (1945) • 216-Z-4 (1945) • 216-Z-5* (1945 to 1947) • 216-Z-6 (1945) • 216-Z-7 (1947 to 1967)	This waste stream was primarily composed of water jet effluent from the process cell vacuum system, and evaporator/condenser overhead condensate streams. The waste stream was acidic and was made alkaline before discharge to cribs. Some of the waste was recycled back to Pu concentration operations at 224-T and 224-B.
Emergency Blower Condensate	Water (steam condensate)	Discharge only when steam-powered blowers were used.	216-Z-13 and 216-Z-14 French drains	
Ventilation Evaporative Cooler Condensate	Water	Discharge when evaporative cooler is in service.	216-Z-15 French drain	
234-5-Z Complex Steam Condensate and Cooling Water	Water		Transferred to 207-Z Retention Basin	This waste stream could become contaminated during upset conditions or equipment failure.
Metallurgy Laboratory Waste Water (231-Z Building)	Water Plutonium		216-Z-16 Crib 216-Z-17 Crib	The 216-Z-16 and 216-Z-17 Cribs received discharge of cooling water that had passed through the glove boxes and hoods within 231-Z Building.

* Waste sites 216-Z-5 Crib and 216-Z-10 Reverse Well are assigned to the 200-PW-6 OU and are not assessed further in this 200-WA-1 OU RI/FS.

** Additional information on rates and volumes of discharge can be found in Appendices D and H.

Table B-3. U Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)[c]	Receiving Waste Site	Comment
Cooling Water and Steam Condensate	Water		216-U-10 Pond via 207-U Retention Basin* and 216-U-14 Ditch. Later, 216-U-16 Crib via 207-U Retention Basin.	This stream could become contaminated during periods of system upset or equipment failure. The 207-U Retention Basin offered hold-up capacity, but no diversion capability.
271-U and 224-U Chemical Sewer	Any of the nonradioactive chemicals used in the tributyl phosphate (TBP) process. This includes: • HNO_3 • NaOH • Na_2SO_4 • $CaCO_3$ • H_2NSO_3H • $Fe(SO_4)$. $(NH_4)_2SO_4.6H_2O$ • TBP • NPH (Kerosene range hydrocarbons)	Not a routine discharge	216-U-10 Pond via 207-U Retention Basin and 216-U-14 Ditch.	
Process Condensate from 221-U, 224-U, and 224-UA	Water HNO_3 $CaCO_3$ F^- NO_3^- PO_4^{-3} Na^+ K^+ TBP NPH (kerosene-range hydrocarbons) Fission products Uranium	Variable, ranged from 1,000 L/day to 132,000 L/day (260 to 35,000 gal/day)	216-U-8 Crib via 270-W Neutralization Tank (1952 to 1960). 216-B-12 Crib[b] via 270-E Neutralization Tank[b] (1952 to 1960). 216-U-12 Crib (1960 to 1988). 216-U-17 Crib via 224-U-CNT (1988 to 1994).	This acidic waste stream was initially pH-adjusted to near neutral by passing through a limestone bed prior to discharge to 216-U-8 and 216-B-12 Cribs. Later, it was discharged in its original acid condition to 216-U-12 Crib. During final years of operation, the stream was again adjusted to near neutral pH before discharge to216-U-17 Crib.

Table B-3. U Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)[c]	Receiving Waste Site	Comment
Solvent Cleanup Waste from 276-U	Water HNO_3 $CaCO_3$ F^- NO_3^- PO_4^{-3} Na^+ K^+ TBP NPH (kerosene-range hydrocarbons) Fission products Uranium	Average discharge 8,000 L/day (2,100 gal/day)	216-U-1 and 216-U-2 Cribs via 241-U-361 Settling Tank. 216-U-15 Trench.	A single release of unrecoverable solvent was made to 216-U-15 Trench.
Laboratory Waste from 222-U	The laboratory streams likely contained any and all process constituents.	Totals of 3.0E+05 L (7.9E+05 gal, 5.45E+05 L (1.44+05 gal), and 3.3+04E+04 L (8.7E+03 gal)	216-U-4 Reverse Well (1947 to 1955). 216-U-4A French Drain (1955 to 1970). 216-U-4B (1960 to 1970).	Relatively low volumes.
221-U Uranium Recovery Cold Start Waste	Uranium recovery process chemicals with unirradiated uranium and no fission products.		216-U-5 Trench and 216-U-6 Trench.	
221-U High Level Uranium Recovery Waste	Uranium recovery process chemicals, bismuth phosphate process chemicals, fission products.		Returned to tank farms via 241-WR Vault through underground pipelines.	The volume of waste returned to the tank farms was approximately equal to the volume of uranium recovery process feed stock initially removed from the tanks.

a. 207-U Retention Basin was demolished in 2010 and is not considered further in this 200-WA-1 RI/FS.

b. 216-B-12 Crib and 207-E Neutralization Tank are assigned to the 200-EA-1 OU and are not further evaluated in this 200-WA-1 OU RI/FS.

c. Additional information on rates and volumes of discharge can be found in Appendices D and H.

Table B-4. REDOX Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)*	Receiving Waste Site	Comment
Cooling Water and Steam Condensate	Water	About 1.9E+06 to 1.1E+07 L/day (5E+05 to 2.9E+06 gal/day)	Initially, 216-S-17 Pond via 207-S Retention Basin. Later, 216-S-5 Crib and 216-S-6 Crib via 207-S Retention Basin. Then to 216-S-16 Ditch and Pond with diversion of off-normal flows to 216-S-6 Crib.	This stream became grossly contaminated during equipment failure on numerous occasions, resulting in contamination of 207-S Retention Basin and 216-S-17 Pond. 207-S Retention Basin offered hold-up capacity, but no diversion capability. When 216-S-5 and -S-6 Cribs were found to be unable to handle the stream flow, S-5 Crib was abandoned. The stream was sent to the new 216-S-16 Ditch and Pond with 216-S-6 Crib maintained for diversion of contaminated water.
202-S Chemical Sewer	Any of the nonradioactive chemicals used in the REDOX process. This includes: • HNO_3 • NaOH • Mn • $NaNO_2$ • $NaNO_3$ • Aluminum Nitrate Nonahydrate (ANN) • Hexone (MIBK) • $NaAlO_2$ • $Na_2Cr_20_7$	Not a routine discharge	216-S-17 Pond via 207-S Retention Basin. Later, 216-S-10 Ditch.	

Table B-4. REDOX Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)*	Receiving Waste Site	Comment
Process Condensate from 202-S	Water HNO_3 NaOH Mn $NaNO_2$ $NaNO_3$ ANN Hexone (MIBK) $NaAlO_2$ Fission products Uranium	About 61,000 L/day (16,000 gal/day)	216-S-1 and -2 Cribs (1952 to 1956). 216-S-7 Crib (1956 to 1965). 216-S-9 Crib (1965 to 1969). 216-S-23 Crib (1969 to 1972).	These cribs were used sequentially to receive process condensate from 202-S Building.
Solvent Cleanup Waste from 276-S	Water HNO_3 NaOH Mn $NaNO_2$ $NaNO_3$ ANN Hexone (MIBK) $NaAlO_2$ Fission products Uranium	About 700 L/day (180 gal/day)	216-S-13 Crib.	Waste generated in batch process from cleanup of solvent phase; about 3,600 gal of waste per 10,000 gal of solvent processed.
Combined High Level Waste	Water HNO_3 NaOH Mn $NaNO_2$ $NaNO_3$ ANN Hexone (MIBK) $NaAlO_2$ Fission products Uranium	39,700 L/day (10,500 gal/day)	241-S Tank Farm. Later to 241-SX and 241-SY Tank Farms.	This waste stream included cladding removal waste, fuel dissolution waste, and separation waste. The waste stream contained an average of 23.6 Ci/gal of combined beta and gamma emitters and 17 g/gal of plutonium.
Laboratory Waste from 222-S and 300 Area	The laboratory streams likely contained any and all process constituents.	18,750 L/day (5,000 gal/day)	216-S-20 Crib via 207-SL Retention Basin.	This waste stream is suspected to be the source of 1,4-Dioxane detected in groundwater downgadient of 216-S-20 Crib.

Table B-4. REDOX Plant Waste Streams and Disposition to Waste Sites in 200 West Area

Waste Stream	Composition	Volume (Rate or Total)*	Receiving Waste Site	Comment
Acid Recovery Waste from 293-S	Acid recovery waste was likely primarily nitric acid in water with some fission products.	About 27 L/day (7 gal/day)	216-S-22 Crib.	
Steam Condensate from 242-T Waste Evaporator	Steam condensate occasionally contaminated by tank waste constituents and fission products.		216-S-25 Crib.	216-S-25 Crib also received groundwater remediation waste water from initial response to uranium contamination in vicinity of 216-U-1 and U-2 Cribs.
Condensate Waste Water from Tank Riser Condensers at 241-S-101 and 241-S-104 Tanks	This stream likely contained water, tritium, some entrained fission products, and other waste constituents.		216-S-3 Crib and 216-S-4 Crib.	
Cold Startup Waste from 222-S	All of the nonradioactive REDOX process chemicals, with unirradiated uranium and no fission products.		216-S-8 Trench (aqueous inorganic startup waste). 216-S-14 Trench (contaminated organic startup waste).	
291-S Stack Flush Wastewater	Fission products, water.		216-S-12 Trench.	This site received a single discharge of wastewater used to flush the REDOX main stack in 1954.
Equipment Decontamination Wastewater	Steam condensate, water, fission products, and REDOX process chemicals.		218-S-18 Pit.	The pit was exhumed in 1972 and subsequently used to bury contaminated surface soil from the vicinity of 241-S Tank Farm.

* Additional information on rates and volumes of discharge can be found in Appendices D and H.

Note: The waste tank farms (e.g., 241-S, -SX, and –SY) received high-level waste from the REDOX plant; however, they are assigned to RCRA waste management areas and are not further assessed in this 200-WA-1 OU RI/FS.

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Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
200-E-14	200-E-14, 216-BC-201 Siphon Tank, 216-B-201, Inactive Miscellaneous Underground Storage Tank (IMUST)	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Underground Storage Tank	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Candidate for RTD[1]	No	Balance of Inner Area 200W
200-W-1	200-W-1, REDOX Mud Pit West	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Drilling Mud	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	REDOX
200-W-101	200-W-101, Contaminated Material West of 216-S-12 Crib	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Contaminated Debris	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	REDOX
200-W-106	200-W-106, Soil Contamination Area Adjacent to 200-W-55	Not defined	S Plant Vicinity	Surface Contamination Site	Shallow Contaminated Soil	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-11	200-W-11, Concrete Foundation South of 241-S, S-Farm Foundation and Dump Site	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Debris	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	Balance of Inner Area 200W
200-W-12	200-W-12, 201-W Soil Mound and Plastic Pipe	Not defined	U Plant Vicinity	Surface Contamination Site	Debris	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-127	200-W-127, Surface Stabilized Area East of UPR-200-W-29/ UPR-200-W-97 (UN-216-W-5)	T Plant Operations	T Plant Vicinity	Surface Contamination Site	Possible Leak from Underground Transfer Line	Liquid Process Waste	No	Candidate for RTD	No	Balance of Inner Area 200W
200-W-128	200-W-128, Underground Radioactive Material Area East of 218-W-4A	Burial Ground Operations	T Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate for RTD	No	2W Landfill 1
200-W-13	200-W-13, 2713-WB Green Hut Complex	Not defined	T Plant Vicinity	Surface Contamination Site	Radiological- and Petroleum-Contaminated Soil	Solid Waste	No	Candidate for RTD	No	Balance of Inner Area 200W
200-W-136	200-W-136, Underground Radioactive Material Area Including 222-U Building Foundation, Demolished 203-U Area and Contaminated Soil	U Plant Operations	U Plant Vicinity	Structures and Foundations	Soil and Foundations Contaminated by Process Solutions	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling ≤4.6 m (15 ft) bgs	U Plant
200-W-14	200-W-14, 200 West Heavy Equipment Storage Area	Not defined	T Plant Vicinity	Surface Contamination Site	Petroleum-Contaminated Soil	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	Balance of Inner Area 200W

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
200-W-15	200-W-15, S Plant Project W-087 Hexone Discovery	S Plant Operations	S Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Hexone Solvent	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling ≤10 m (33 ft) bgs	REDOX
200-W-2	200-W-2, REDOX Berms West	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Disturbed Soil	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	REDOX
200-W-21	200-W-21, 204-T Unloading Station, T Plant Waste Railcar Unloading Facility, Unloading Station 1, and Unloading Station 2	300 Area Operations	T Plant Vicinity	Surface Contamination Site	Consolidated Liquid Waste from 340 Building	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	T Plant
200-W-22	200-W-22, 203-S/204-S/205-S Stabilized Area	S Plant UNH Cleanup	S Plant Vicinity	Structures and Foundations	UNH Solutions, Ion Exchange Regeneration Solutions	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	REDOX
200-W-231	200-W-231, Temporary Facilities Construction Trailer Septic Tank and Tile Field	241-TY Tank Farm Construction	T Plant Vicinity	Septic Tank and Drain Field	Sanitary Waste and Possible X-ray Film Development Chemicals	Sanitary Wastewater	No	Candidate for RTD	No	Balance of Inner Area 200W
200-W-42	200-W-42, U Plant Radioactive Process Sewer from 221-U to 216-U-8 and 216-U-12 Cribs, 200-W-42-PL	U Plant Operations	U Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Process Condensate from 224-U and 221-U	Liquid Process Waste	No	Adequate Characterization –RTD completed under TCRA (still need regulators to agree on soil cleanup values using the graded approach)	No	U Plant
200-W-53	200-W-53, UPR-200-W-166, UN-216-W-31	241-T Tank Farm Operations	S Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	Balance of Inner Area 200W
200-W-54	200-W-54, Contamination Migration from 241-SX Tank Farm	241-SX Tank Farm	S Plant Vicinity	Surface Contamination Site	Animal Feces, Contaminated Specks, Contaminated Plants	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-6	200-W-6, 200-W Painter Shop Paint Solvent Disposal Area	200-West Operations	T Plant Vicinity	Surface Contamination Site	Paint Solvent Contaminated Soil	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-63	200-W-63, Contaminated Concrete Pad	Not defined	T Plant Vicinity	Structures and Foundations	Contaminated Concrete Slab	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-67	200-W-67, Contaminated Soil at the Corner of Cooper and 16th Street	241-U Tank Farm Operations	U Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
200-W-71	200-W-71, Undocumented Trench, Undocumented Burn Pit	Not defined	U Plant Vicinity	Surface Contamination Site	Burned Debris	Solid Waste	No	Adequate Characterization[3]	No	U Plant
200-W-75	200-W-75, Radiological Logging System (RLS) Calibration Silos	S Plant Operations	S Plant Vicinity	Underground Storage Tank	Sealed Radioactive Sources in Soil-Filled Tank	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	REDOX
200-W-77	200-W-77, Posted Contamination Area East of 216-U-14 Ditch	Not defined	U Plant Vicinity	Surface Contamination Site	Contaminated Specks and Tumbleweeds	Airborne Particulate Deposition	No	Candidate for RTD	No	U Plant
200-W-80	200-W-80, Stabilized Contaminated Soil Area Southwest of T Plant, Mound of Contaminated Soil Southwest of T Plant	Not defined	T Plant Vicinity	Surface Contamination Site	Debris	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	T Plant
200-W-81	200-W-81, Contaminated Tumbleweed Fragments along Railroad Track East of 218-W-3AE	Burial Ground Operations	T Plant Vicinity	Surface Contamination Site	Contaminated Soil and Tumbleweeds	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	2W Landfill 1
200-W-82	200-W-82; Risers East of 216-TY-201 and 216-T-26, 216-T-27, and 216-T-28 Cribs; Crib Unloading Station	300 Area Operations	T Plant Vicinity	Structures and Foundations	Concrete and Pipe Risers Contaminated with Liquid Waste from 340 Building	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-83	200-W-83, Contamination Area North of 2727W	Not defined	U Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate For RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-85	200-W-85, Soil Contamination Area East of 2727 W	Not defined	U Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
200-W-86	200-W-86, Contamination Area Around Light Pole	Not defined	U Plant Vicinity	Surface Contamination Site	Contaminated Soil	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	U Plant
200-W-87	200-W-87, Unplanned Release on Chemical Spur Railroad Track Northwest of 221-U Plant	Not defined	U Plant Vicinity	Surface Contamination Site	No Documented Release, Site is Erroneous	Solid Waste	No	Adequate Characterization	No	U Plant
200-W-89	200-W-89, 252-U, U Plant Electrical Substation, C8S17 Substation, U-Cat Substation	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Contaminated Specks on Equipment that No Longer Exists	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
200-W-9	200-W-9, Project W291 Excavation VCP Contamination	T Plant Operations	T Plant Vicinity	Cribs, Trenches and Pipe Leaks	Leaking Process Sewer Contaminated Soil	Liquid Process Waste	No	Candidate for RTD[3]	No	T Plant

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
200-W-90	200-W-90, Underground Radioactive Material Areas Posted Along 23rd Street in 200 West Area	241-U Tank Farm Operations	U Plant Vicinity	Surface Contamination Site	High-Level Tank Waste	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
200-W-92	200-W-92, Contaminated Mound of Soil and Debris, Soil Mound West of 241-TY Tank Farm	Not defined	T Plant Vicinity	Surface Contamination Site	Debris and Contaminated Soil	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	Balance of Inner Area 200W
207-S	207-S, REDOX Retention Basin, 207-S Retention Basin	S Plant Operations	S Plant Vicinity	Retention Basin	Cooling Water/Steam Condensate	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	No	REDOX
207-T	207-T, T Plant Retention Basin, 207-T Retention Basin	T Plant Operations	T Plant Vicinity	Retention Basin	Cooling Water/Steam Condensate/Chemical Sewer	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	No	Balance of Inner Area 200W
207-Z	207-Z, 207-Z Retention Basin, 241-Z Retention Basin, 241-ZRB, 241-Z-RB	Plutonium Finishing Plant Operations	Z Plant Vicinity	Retention Basin	Cooling Water/Steam Condensate	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	No	PFP
216-B-14	216-B-14, 216-BC-1 Crib	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Process Waste Crib	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Adequate Characterization	No	Balance of Inner Area 200W
216-B-15	216-B-15, 216-BC-2 Crib	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Process Waste Crib	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-14	No	Balance of Inner Area 200W
216-B-16	216-B-16, 216-BC-3 Crib	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Process Waste Crib	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-14	No	Balance of Inner Area 200W
216-B-17	216-B-17, 216-BC-4 Crib	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Process Waste Crib	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-14	No	Balance of Inner Area 200W
216-B-18	216-B-18, 216-BC-5 Crib	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Process Waste Crib	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-14	No	Balance of Inner Area 200W
216-B-19	216-B-19, 216-BC-6 Crib	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Process Waste Crib	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-14	No	Balance of Inner Area 200W
216-B-20	216-B-20, 216-BC-7 Trench, 216-B-20 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-21	216-B-21, 216-BC-8 Trench, 216-B-21 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-22	216-B-22, 216-BC-9 Trench, 216-B-22 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-23	216-B-23, 216-BC-10 Trench, 216-B-23 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-24	216-B-24, 216-BC-11 Trench,	High-Level Tank	BC Cribs and	Cribs, Trenches, and	Scavenged Tank Waste	Liquid	No	Comparable to 216-B-26	No	Balance of Inner

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
	216-B-24 Trench	Waste Scavenging	Trenches	Pipe Leaks	Supernatant	Process Waste				Area 200W
216-B-25	216-B-25, 216-BC-12 Trench, 216-B-25 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-26	216-B-26, 216-BC-13 Trench, 216-B-26 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Adequate Characterization	No	Balance of Inner Area 200W
216-B-27	216-B-27, 216-BC-14 Trench, 216-B-27 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-28	216-B-28, 216-BC-15 Trench, 216-B-28 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-29	216-B-29, 216-BC-16 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-30	216-B-30, 216-BC-17 Trench, 216-B-30 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-31	216-B-31, 216-BC-18 Trench, 216-B-31 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-32	216-B-32, 216-BC-19 Trench, 216-B-32 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-33	216-B-33, 216-BC-20 Trench, 216-B-33 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-34	216-B-34, 216-BC-21 Trench	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-52	216-B-52, 216-B-52 Trench, 216-BC-22	High-Level Tank Waste Scavenging	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Scavenged Tank Waste Supernatant	Liquid Process Waste	No	Comparable to 216-B-26	No	Balance of Inner Area 200W
216-B-53A	216-B-53A, 216-B-53A Trench, PRTR Trench	300 Area Laboratory, R&D	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Accumulated Waste from 304 Building	Liquid Process Waste	No	Adequate Characterization	No	Balance of Inner Area 200W
216-B-53B	216-B-53B, 216-B-53 Trench, 216-B-53B Trench	300 Area Reactor Operations	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	PRTR Decontamination Solution	Liquid Process Waste	No	Comparable to 216-B-53A	No	Balance of Inner Area 200W
216-B-54	216-B-54, 216-B-54 Trench	300 Area Laboratory, R&D	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Accumulated Waste from 304 Building	Liquid Process Waste	No	Comparable to 216-B-58	No	Balance of Inner Area 200W
216-B-58	216-B-58, 216-B-58 Trench, 216-B-59 Crib	300 Area Laboratory, R&D	BC Cribs and Trenches	Cribs, Trenches, and Pipe Leaks	Accumulated Waste from 304 Building	Liquid Process Waste	No	Adequate Characterization	No	Balance of Inner Area 200W
216-S-1&2	216-S-1&2, 216-S-5 Crib, 216-S-1&2	S Plant Operations	S Plant Vicinity	Process Waste Crib	Process Condensate and Cell Drainage	Liquid Process Waste	Yes	Planned Characterization Not Completed	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	REDOX

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
216-S-12	216-S-12, UPR-200-W-30, 291-S Stack Wash Sump, REDOX Stack Flush Trench	S Plant Operations	S Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Exhaust Stack Flush Water	Process Waste Water	Yes	Site Not Characterized	Soil Sampling ≤33 m (100 ft) bgs	REDOX
216-S-14	216-S-14, Buried Contaminated Hexone, Cold Organic Trench or Grave, 216-S-4 Burial Contaminated Hexone	S Plant Operations	S Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Spent Hexone Solvent	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling ≤33 m (100 ft) bgs	REDOX
216-S-18	216-S-18, 241-SX Steam Cleaning Pit, 216-S-14 Steam Cleaning Pit	S Plant Operations	S Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Vehicle Decontamination Water	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	Balance of Inner Area 200W
216-S-20	216-S-20, 216-SL-1&2 Crib, 216-SL-2	222-S Laboratory Operation and 300 Area	S Plant Vicinity	Process Waste Crib	Liquid Waste from Analytical Laboratory	Liquid Process Waste	No	Adequate Characterization	No	REDOX
216-S-22	216-S-22, 216-S-22 Crib	293-S Building Acid Recovery	S Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Liquid Waste from Recovered Nitric Acid and Sodium Hydroxide	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	REDOX
216-S-23	216-S-23 Crib	S Plant Operations	S Plant Vicinity	Process Waste Crib	Process Condensate and Cell Drainage	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	REDOX
216-S-25	216-S-25 Crib	S Plant Operations	S Plant Vicinity	Process Waste Crib	Process Condensate and Effluent	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	REDOX
216-S-3	216-S-3, 216-S-5, 216-S-3 Crib		S Plant Vicinity	Cribs, Trenches, and Pipe Leaks			Yes	Site Not Characterized	Soil Sampling ≤33 m (100 ft) bgs	Balance of Inner Area 200W
216-S-4	216-S-4, 216-S-7, 216-S-4 Sump or Crib, UN-216-W-1	241-S Tank Farm Tank Vapor Condensation	S Plant Vicinity	Injection Wells and French Drains	Tank Farm Vapor Condensate	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	Outside Current Inner Area Boundary
216-S-5	216-S-5, 216-S-5 Cavern #1, 216-S-6 Crib, 216-S-9 (See Subsites)	S Plant Operations	S Plant Vicinity	Cooling Water/Steam Condensate/Chemical Sewer, Cribs, and Ditches	Contaminated Cooling Water and Steam Condensate	Process Waste Water	Conditional	Comparable to 216-S-6	Comparable to 216-S-6	Balance of Inner Area 200W
216-S-6	216-S-6, 216-S-6 Cavern #2, 216-S-5 Crib, 216-S-13 Crib	S Plant Operations	S Plant Vicinity	Cooling Water/Steam Condensate/Chemical Sewer, Cribs, and Ditches	Contaminated Cooling Water and Steam Condensate	Process Waste Water	Yes	Previous Characterization Not Complete	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	Balance of Inner Area 200W

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
216-S-7	216-S-7, 216-S-7 Crib, 216-S-15	S Plant Operations	S Plant Vicinity	Process Waste Crib	Process Condensate and Cell Drainage	Liquid Process Waste	No	Adequate Characterization	No	REDOX
216-S-8	216-S-8, Cold Aqueous Trench, Cold Aqueous Crib, 216-S-3, Unirradiated Uranium Waste Trench, Cold Aqueous Grave	S Plant Operations	S Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Start-up Waste, Unirradiated Uranium	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	REDOX
216-SX-2	216-SX-2, 216-SX-2 Crib	241-SX Tank Farm Operations	S Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Air Compressor Condensate/Blow Down	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA	No	Balance of Inner Area 200W
216-T-10	216-T-10, Decontamination Trenches, Equipment Decontamination Area	Equipment Decontamination	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Vehicle Decontamination Water	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	T Plant
216-T-11	216-T-11, Decontamination Trenches, Equipment Decontamination Area	Equipment Decontamination	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Vehicle Decontamination Water	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	T Plant
216-T-12	216-T-12, 207-T Sludge Grave, 207-T Sludge Pit, 216-T-11	T Plant Operations	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Sludge from Bottom of 207-T Retention Basin	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	No	Balance of Inner Area 200W
216-T-13	216-T-13, 269-W Regulated Garage, 269-W Decontamination Pit or Trench, 216-T-12, 269-W Regulated Garage Decontamination Pit	Equipment Decontamination	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Vehicle Decontamination Water	Process Waste Water	No	Candidate for RTD[3]	No	Balance of Inner Area 200W
216-T-2	216-T-2, 222-T-110 Dry Well, 222-T Reverse Well	222-T Process Control Laboratory	T Plant Vicinity	Injection Wells and French Drains	Analytical Laboratory Waste	Liquid Process Waste	No	Candidate for RTD[3]	No	T Plant
216-T-20	216-T-20, 216-TX-2, 216-T-20 Crib, 241-TX-155 Contaminated Acid Grave	Uranium Recovery Operations	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Contaminated 60% Nitric Acid	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA[3]	No	Balance of Inner Area 200W
216-T-27	216-T-27, 216-TY-2 Cavern, 216-TY-2 Crib, 216-TX-2 Cavern, 216-TX-2 Crib	300 Area Operations	T Plant Vicinity	Process Waste Crib	Consolidated Liquid Waste from 340 Building	Liquid Process Waste	No	Comparable to 216-T-28	No	Balance of Inner Area 200W
216-T-28	216-T-28, 216-TY-3 Cavern, 216-TY-3 Crib, 216-TX-3 Cavern, 216-TX-3 Crib	300 Area Operations	T Plant Vicinity	Process Waste Crib	Consolidated Liquid Waste from 340 Building	Liquid Process Waste	No	Adequate Characterization	No	Balance of Inner Area 200W
216-T-29	216-T-29, 291-T Sand Filter Sewer, 216-T-29 French Drain	T Plant Operations	T Plant Vicinity	Injection Wells and French Drains	221-T Ventilation System Condensate	Liquid Process Waste	No	Candidate for RTD[3]	No	T Plant
216-T-31	216-T-31, 216-T-31 French Drain	241-TX Tank Farm Operations	T Plant Vicinity	Injection Wells and French Drains	Contaminated Steam Condensate	Process Waste Water	No	Candidate for RTD[3]	Site was Previously Exhumed	Balance of Inner Area 200W

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
216-T-33	216-T-33, 216-T-33 Crib	2706-T Equipment Decontamination	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Vehicle Decontamination Water	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	No	T Plant
216-T-34	216-T-34, 216-T-34 Crib	300 Area Operations	T Plant Vicinity	Process Waste Crib	Consolidated Liquid Waste from 340 Building	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	T Plant
216-T-35	216-T-35, 216-T-35 Crib	300 Area Operations	T Plant Vicinity	Process Waste Crib	Consolidated Liquid Waste from 340 Building	Liquid Process Waste	Conditional	Comparable to 216-T-34	Comparable to 216-T-34	T Plant
216-T-36	216-T-36 Crib	T Plant/U Plant/ 2706-T Operations	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Decontamination Solutions from T Plant/ U Plant/2706-T	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	Balance of Inner Area 200W
216-T-4-1D	216-T-4-1D, 216-T-4 Ditch, 216-T-4 Swamp	T Plant Operations/242-T Evaporator	T Plant Vicinity	Cooling Water/Steam Condensate/Chemical Sewer, Cribs, and Ditches	Cooling Water/Steam Condensate/Chemical Sewer	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	No	Balance of Inner Area 200W
216-T-8	216-T-8, 222-T-1&2 Cribs	222-T Process Control Laboratory	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Analytical Laboratory Waste	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	T Plant
216-T-9	216-T-9, Decontamination Trenches, Equipment Decontamination Area	Equipment Decontamination	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Vehicle Decontamination Water	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	T Plant
216-U-1&2	216-U-1&2, 361-WR (Crib 2), 216-U-3, 216-UR #1&2 Cribs, 216-U-1&2, 216-U-1, 216-U-2	U Plant Operations	U Plant Vicinity	Process Waste Crib	Solvent Cleanup Waste from 221-U	Liquid Process Waste	Conditional	Comparable to 216-U-8 and/or 216-U-12	Comparable to 216-U-8 and/or 216-U-12	U Plant
216-U-12	216-U-12, 216-U-12 Crib	U Plant Operations	U Plant Vicinity	Process Waste Crib	Acidic Process Condensate from 224-U	Liquid Process Waste	Yes	Previous Characterization Not Complete	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	U Plant
216-U-13	216-U-13, 216-U-13 Cribs, 216-U-13, Vehicle Steam Cleaning Pit	U Plant Operations	U Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Vehicle Decontamination Water	Process Waste Water	No	Candidate for RTD[3]	No	Balance of Inner Area 200W
216-U-14	216-U-14, 216-U-14 Ditch, Laundry Ditch	U Plant Operations	U Plant Vicinity	Cooling Water/Steam Condensate/Chemical Sewer, Cribs, and Ditches	Cooling Water/Steam Condensate/Chemical Sewer	Process Waste Water	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	No	Balance of Inner Area 200W
216-U-15	216-U-15, UN-216-W-10, 388-U Tank Dumping, UPR-200-W-125, UN-200-W-158, U-152 Interface Crud Burial	U Plant Operations	U Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Contaminated Off-Spec TBP/Kerosene Solvent	Liquid Process Waste	Yes	Previous Characterization Not Complete	Soil Sampling ≤4.6M (15ft) bgs	U Plant

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
216-U-16	216-U-16, UO3 Crib	U Plant Operations	U Plant Vicinity	Cooling Water/Steam Condensate/Chemical Sewer, Cribs, and Ditches	Cooling Water/Steam Condensate/Chemical Sewer	Process Waste Water	No	Adequate Characterization	No	U Plant
216-U-17	216-U-17, 216-U-17 Crib	U Plant Operations	U Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Neutralized Process Condensate from 224-U	Liquid Process Waste	No	Adequate Characterization	No	U Plant
216-U-3	216-U-3, 216-U-11, 216-U-3 French Drain	241-U Tank Farm Operations	U Plant Vicinity	Injection Wells and French Drains	Tank Farm Vapor Condensate	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA[3]	EE/CA Recommended Confirmatory Sampling	Balance of Inner Area 200W
216-U-4	216-U-4, 222-U Dry Well, 222-U-110 Dry Well, 216-U-2, 216-U-4 Dry Well	222-U Process Control Laboratory	U Plant Vicinity	Injection Wells and French Drains	Analytical Laboratory Waste	Liquid Process Waste	No	Adequate Characterization	No	U Plant
216-U-4A	216-U-4A, 216-U-4 Reverse Well Replacement French Drain, 216-U-4 Dry Well	222-U Process Control Laboratory	U Plant Vicinity	Injection Wells and French Drains	Analytical Laboratory Waste	Liquid Process Waste	No	Adequate Characterization	No	U Plant
216-U-4B	216-U-4B, 216-U-4B Dry Well, 216-U-4B French Drain	222-U Process Control Laboratory	U Plant Vicinity	Injection Wells and French Drains	Analytical Laboratory Waste	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
216-U-5	216-U-5, 216-U-4, 221-U Cold U Trench #2	U Plant Startup	U Plant Vicinity	Process Waste Crib	TBP Process Cold Start-up with Unirradiated Uranium	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
216-U-6	216-U-6, U Facility Unirradiated Uranium Waste Trench, 221-U Cold U Trench, 216-U Cold U Trench #1, 216-U-5, 221-U Cold U Grave #1	U Plant Startup	U Plant Vicinity	Process Waste Crib	TBP Process Cold Start-up with Unirradiated Uranium	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
216-U-7	216-U-7, 221-U Counting Box French Drain, 221-U Vessel Vent Blower Pit French Drain	U Plant Operations	U Plant Vicinity	Injection Wells and French Drains	Acidic Process Condensate	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling ≤4.6M (15ft) bgs	U Plant
216-U-8	216-U-8, 216-WR-1,2,3 Cribs, 216-U-9	U Plant Operations	U Plant Vicinity	Process Waste Crib	Neutralized Process Condensate from 224-U and 221-U	Liquid Process Waste	Yes	Previous Characterization Not Complete[4]	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	U Plant
216-Z-16	216-Z-16 Crib	231-Z Metallurgical Lab Operations	Z Plant Vicinity	Process Waste Crib	Plutonium-Contaminated Wastewater	Liquid Process Waste	Yes	Site Not Characterized	Soil Sampling to Groundwater ≈75 m (246 ft) bgs	PFP
216-Z-17	216-Z-17, 216-Z-17 Ditch	231-Z Metallurgical Lab Operations	Z Plant Vicinity	Process Waste Crib	Plutonium-Contaminated Wastewater	Liquid Process Waste	Conditional	Comparable to 216-Z-16	Comparable to 216-Z-16	PFP

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
216-Z-4	216-Z-4, 231-W-3 Pit, 231-W-3 Sump, 231-W-3 Crib, 216-Z-3, 216-Z-4 Crib	231-Z Plutonium Isolation Operations	Z Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Neutralized Evaporator Condensate and Vacuum Jet Water	Liquid Process Waste	Conditional	Comparable to 216-Z-7	Comparable to 216-Z-7	PFP
216-Z-6	216-Z-6, 231-W-4 Crib, 231-Z-6, 216-W-4, 231-W Crib, 216-Z-4, 216-Z-6 & 6A Crib	231-Z Plutonium Isolation Operations	Z Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Neutralized Evaporator Condensate and Vacuum Jet Water	Liquid Process Waste	Conditional	Comparable to 216-Z-7	Comparable to 216-Z-7	PFP
216-Z-7	216-Z-7, 231-W Crib, 231-W Trench, 216-Z-6	231-Z Plutonium Isolation Operations	Z Plant Vicinity	Process Waste Crib	Neutralized Evaporator Condensate and Vacuum Jet Water	Liquid Process Waste	Yes	Planned Characterization Not Completed	Geophysical Logging of Existing Wells	PFP
218-W-8	218-W-8, 222-T Vault	222-T Process Control Laboratory	T Plant Vicinity	Underground Storage Tank	Radioactive Solid and Containerized Liquid Wastes	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA[1]	No	T Plant
218-W-9	218-W-9, Dry Waste Burial Ground No. 9, Non-TRU Dry Waste No. 009	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Shallow Debris and Process Condensate from Crib Pipeline Leak	Solid Waste	No	Candidate for RTD	EE/CA Recommended Confirmatory Sampling	REDOX
231-W-151	231-W-151, 231-W-151 Vault, 231-W-151-001 (Tank), 231-W-151-002 (Tank), 231-W-151 Sump, 231-Z-151 Sump, IMUST, Inactive Miscellaneous Underground Storage Tank (See Subsites)	231-Z Plutonium Isolation Operations	Z Plant Vicinity	Underground Storage Tank	Acidic Evaporator Condensate and Vacuum Jet Water	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	PFP
241-T-361	241-T-361, 241-T-361 Settling Tank, 361-T-TANK, IMUST, Inactive Miscellaneous Underground Storage Tank	T Plant Operations	T Plant Vicinity	Underground Storage Tank	Precipitated Radioactive Process Waste Solids	Solid Waste	No	Candidate for RTD[3]	No	T Plant
241-U-361	241-U-361, 241-U-361 Settling Tank, 361-U-TANK, IMUST, Inactive Miscellaneous Underground Storage Tank	U Plant Operations	U Plant Vicinity	Underground Storage Tank	Precipitated Radioactive Process Waste Solids	Solid Waste	No	Adequate Characterization	No	U Plant
2607-W8	2607-W8	231-Z Building Operations	Z Plant Vicinity	Septic Tank and Drain Field	Sanitary Waste	Sanitary Wastewater	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	PFP
270-W	270-W, 270-W Tank, 270-W Neutralization Tank, IMUST, Inactive Miscellaneous Underground Storage Tank	U Plant Operations	U Plant Vicinity	Underground Storage Tank	Acidic Process Condensate from 224-U	Liquid Process Waste	No	Candidate for RTD[1]	No	U Plant

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
600-70	600-70, Solid Waste Management Unit (SWMU) #2—Miscellaneous Solid Waste	S Plant Construction	S Plant Vicinity	Surface Contamination Site	Shallow Debris	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	ERDF
UPR-200-W-101	UPR-200-W-101, UN-216-W-9, 221-U Acid Spill R-1 through R-9, UN-200-W-101	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Recovered Nitric Acid	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	U Plant
UPR-200-W-103	UPR-200-W-103, 216-Z-18 Line Break, UN-216-W-13, UN-200-W-103, Pipe Line Leak	236-Z Building Operations	Z Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Process Waste Bound for 216-Z-18 Crib	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA	No	PFP
UPR-200-W-111	UPR-200-W-111, Sludge Trench at 207-U, UN-216-W-21	U Plant Operations	U Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Sludge from Bottom of 207-U Retention Basin	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA	No	Balance of Inner Area 200W
UPR-200-W-112	UPR-200-W-112, Sludge Trench at 207-U, UN-216-W-22	U Plant Operations	U Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Sludge from Bottom of 207-U Retention Basin	Solid Waste	No	Candidate for RTD—Evaluated under 200-MG-2 EE/CA	No	Balance of Inner Area 200W
UPR-200-W-116	UPR-200-W-116, UN-216-W-26, Ground Contamination North of 202-S, UN-200-W-116	203-S UNH Operations	S Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	REDOX
UPR-200-W-117	UPR-200-W-117, Railroad Track Contamination, 221-U Railroad Cut Contamination, UN-216-W-27, UN-200-W-117	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Process Chemicals/ Fission Products	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
UPR-200-W-118	UPR-200-W-118, Contamination at 211-U, UN-216-W-28, UN-200-W-118	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Recovered Nitric Acid	Liquid Process Waste	No	Adequate Characterization	No	U Plant
UPR-200-W-138	UPR-200-W-138, 221-U Vessel Vent Blower Pit French Drain, UN-216-W-11, UN-200-W-138, UN-200-W-22, UPR-200-W-22	U Plant Operations	U Plant Vicinity	Surface Contamination Site	No Release to the Environment	Liquid Process Waste	No	Candidate for RTD	No	U Plant
UPR-200-W-14	UPR-200-W-14, Waste Line Leak at 242-T Evaporator, UN-200-W-14	242-T Evaporator Operations	T Plant Vicinity	Cribs, Trenches, and Pipe Leaks	Contaminated Steam Condensate	Process Waste Water	No	Candidate for RTD[3]	No	Balance of Inner Area 200W
UPR-200-W-162	UPR-200-W-162, Contaminated Area on East Side of 221-U, UN-216-W-37	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate for RTD	No	U Plant
UPR-200-W-166	UPR-200-W-166, Contamination Migration from 241-T Tank Farm, UN-216-W-31	241-T Tank Farm Operations	S Plant Vicinity	Surface Contamination Site	Contaminated Soil and Tumbleweeds	Airborne Particulate Deposition	No	Candidate for RTD	No	Balance of Inner Area 200W

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
UPR-200-W-19	UPR-200-W-19, 241-U-361 Overflow, UN-200-W-19	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Solvent Cleanup Waste from 221-U	Liquid Process Waste	No	Adequate Characterization	No	U Plant
UPR-200-W-20	UPR-200-W-20, UN-200-W-20, Spread of Contamination from a Diversion Box		S Plant Vicinity	Surface Contamination Site			No	Candidate for RTD[3]	No	Balance of Inner Area 200W
UPR-200-W-3	UPR-200-W-3, Railroad Contamination, UN-200-W-3	T Plant Operations	T Plant Vicinity	Surface Contamination Site	Nonspecified Waste	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	T Plant
UPR-200-W-33	UPR-200-W-33, Ground Contamination at 224-U, UN-200-W-33	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Acidic Process Condensate from 224-U	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
UPR-200-W-36	UPR-200-W-36, Groundwater Contamination at 216-S-1&2	S Plant Operations	S Plant Vicinity	Effluent from 216-S-1&2 Cribs Discharged to Groundwater through Failed Well Casing	Process Condensate and Cell Drainage	Liquid Process Waste	Conditional	Comparable/Contiguous with 216-S-1&2	No	REDOX
UPR-200-W-39	UPR-200-W-39, UN-200-W-39, 224-U Buried Contamination Trench	U Plant Operations	U Plant Vicinity	Surface Contamination Site	UNH Solution from 224-U	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	U Plant
UPR-200-W-4	UPR-200-W-4, Railroad Contamination, UN-200-W-4	T Plant Operations	T Plant Vicinity	Surface Contamination Site	Nonspecified Waste—Speck Contamination along Railroad Track	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	T Plant
UPR-200-W-41	UPR-200-W-41, Railroad Contamination, UN-200-W-41, REDOX Railroad Cut Contamination	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Drips and Leaks from Containers on Train cars	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	REDOX
UPR-200-W-46	UPR-200-W-46, Contaminated Railroad Track, H-2 Centrifuge Burial, UN-200-W-46	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Drips and Leaks from Containers on Train Cars	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	REDOX
UPR-200-W-51	UPR-200-W-51, Release from 241-S Diversion Box, UN-200-W-51, UPR-200-W-52	S Plant Operations	S Plant Vicinity	Surface Contamination Site	Contaminated Specks	Airborne Particulate Deposition	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	S-SX Farm
UPR-200-W-60	UPR-200-W-60, Railroad Contamination, UN-200-W-60	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Contaminated Shielding Water	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-UW-1 FS/PP	No	U Plant
UPR-200-W-63	UPR-200-W-63, Road Contamination along the South Shoulder of 23rd Street, UN-200-W-63	241-TX Tank Farm Operations	T Plant Vicinity	Surface Contamination Site	Waste Dripped from Diversion Box Jumper	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	Balance of Inner Area 200W

Table B-5. 200-WA-1/200-BC-1 RI Work Plan Waste Sites

Site Code	Site Name	Associated Plant Operations	DNA Geographic/ Operational Unit	Waste Site Type	Waste	Primary Source Types	Outstanding Data Need?	Decision Basis (preliminary for RI/FS data need purposes)[2]	Data Need	Geographic Closure Zone
UPR-200-W-65	UPR-200-W-65, Contamination in the T-Plant Railroad Cut, UN-200-W-65	T Plant Operations	T Plant Vicinity	Surface Contamination Site	Nonspecified Waste—Speck Contamination along Railroad Track	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	T Plant
UPR-200-W-67	UPR-200-W-67, Contamination Near 2706-T, UN-200-W-67	2706 T Operations	T Plant Vicinity	Surface Contamination Site	Nonspecified Waste Dripped from Equipment	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	T Plant
UPR-200-W-71	UPR-200-W-71, UN-200-W-71, Contamination Spread from 16th Street to Dayton Avenue	241-U Tank Farm Operations	U Plant Vicinity	Surface Contamination Site	High-Level Tank Waste	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	EE/CA Recommended Confirmatory Sampling	2W Landfill 1
UPR-200-W-73	UPR-200-W-73, Contaminated Railroad Track at 221-T, UN-200-W-73	T Plant Operations	T Plant Vicinity	Surface Contamination Site	Nonspecified Waste—Speck Contamination along Railroad Track	Liquid Process Waste	No	Candidate for RTD—Evaluated under 200-MG-1 EE/CA	No	T Plant
UPR-200-W-76	UPR-200-W-76, UN-200-W-76, Contamination Found at 241-TX-155	TX Tank Farm Operations	T Plant Vicinity	Surface Contamination Site	Tank Waste—Contaminated Soil and Rabbit Droppings	Liquid Process Waste	No	Candidate for RTD	No	Balance of Inner Area 200W
UPR-200-W-78	UPR-200-W-78, UO3 Powder Spill at 224-U, UN-200-W-78	U Plant Operations	U Plant Vicinity	Surface Contamination Site	Uranium Trioxide Powder	Liquid Process Waste	No	Adequate Characterization	No	U Plant
UPR-200-W-82	UPR-200-W-82, UN-200-W-82, Contamination Spread at 240-S-151		S Plant Vicinity	Surface Contamination Site			No	Candidate for RTD	No	REDOX
UPR-200-W-99	UPR-200-W-99, UN-216-W-7, 241-153-TX Diversion Box Contamination Spread, UN-200-W-99	241-TX Tank Farm Operations	S Plant Vicinity	Surface Contamination Site	Contaminated Soil	Airborne Particulate Deposition	No	Candidate for RTD	No	Balance of Inner Area 200W

Sources:

DOE/RL-2003-23, *Focused Feasibility Study for the 200-UW-1 Operable Unit.*

DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites.*

DOE/RL-2008-45, *Engineering Evaluation/Cost Analysis for the 200-MG-2 Operable Unit Waste Sites.*

1. Underground Storage Tank.

2. Table B-6 provides additional types of characterization data (e.g., groundwater, soil, and geophysical logging) to support the decision basis.

3. May require additional evaluation in RI/FS.

4. Surface geophysics (HRR) and shallow boreholes have been completed for this crib. An approved SAP exists for two deep boreholes that will be approximately 75 m bgs (approximately 15-20 ft into unconfined aquifer) for this crib and one proposed for the 216-U-12 crib to be completed during the RI/FS stage.

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Table B-6. Summary of 200-WA-1/200-BC-1 OU Waste Sites with Direct Analytical Data and/or Site-Specific Geophysical Survey Data*

Site	Site Type	Soil	Geophysical Logging	Groundwater	Other
Geographical Area: 200-BC-1 OU (200 BC Cribs and Trenches)					
216-B-14	High-Volume Waste Crib	X	X	X	
216-B-15	High-Volume Waste Crib		X	X	
216-B-16	High-Volume Waste Crib		X	X	
216-B-17	High-Volume Waste Crib	X	X	X	
216-B-18	High-Volume Waste Crib		X	X	
216-B-19	High-Volume Waste Crib	X	X	X	
216-B-20	Medium-Volume Waste Trench		X	X	
216-B-21	Medium-Volume Waste Trench		X	X	
216-B-22	Medium-Volume Waste Trench		X	X	
216-B-23	Medium-Volume Waste Trench		X	X	
216-B-24	Medium-Volume Waste Trench		X	X	
216-B-25	Medium-Volume Waste Trench		X	X	
216-B-26	Medium-Volume Waste Trench	X	X	X	
216-B-27	Medium-Volume Waste Trench		X		
216-B-28	Medium-Volume Waste Trench		X	X	
216-B-29	Medium-Volume Waste Trench		X	X	
216-B-30	Medium-Volume Waste Trench		X		
216-B-31	Medium-Volume Waste		X	X	

Table B-6. Summary of 200-WA-1/200-BC-1 OU Waste Sites with Direct Analytical Data and/or Site-Specific Geophysical Survey Data*

Site	Site Type	Soil	Geophysical Logging	Groundwater	Other
	Trench				
216-B-32	Medium-Volume Waste Trench		X	X	
216-B-33	Medium-Volume Waste Trench	X	X		
216-B-34	Medium-Volume Waste Trench	X	X	X	
216-B-52	Medium-Volume Waste Trench	X	X	X	
216-B-53A	Low-Volume Waste Trench		X		
216-B-53B	Low-Volume Waste Trench		X		
216-B-58	Low-Volume Waste Trench	X	X	X	
Geographical Area: S Plant Vicinity					
200-W-54	Surface Contamination	X	X	X	
216-S-1&2	High-Volume Waste Crib		X	X	
216-S-5	High-Volume Cooling Water Crib	X	X	X	
216-S-6	High-Volume Cooling Water Crib	X	X	X	
216-S-7	High-Volume Waste Crib	X	X	X	
216-S-8	High-Volume Waste Crib	X	X	X	
216-S-20	High-Volume Waste Crib	X	X	X	
216-S-22	High-Volume Waste Crib		X	X	
216-S-23	High-Volume Waste Crib		X	X	
216-S-25	High-Volume Waste Crib	X	X	X	

Table B-6. Summary of 200-WA-1/200-BC-1 OU Waste Sites with Direct Analytical Data and/or Site-Specific Geophysical Survey Data*

Site	Site Type	Soil	Geophysical Logging	Groundwater	Other
UPR-200-W-36	High-volume Waste Crib		X		
216-S-14	Low-Volume Waste Trench	X	X		
UPR-200-W-165	Surface Contamination	X			
Geographical Area: T Plant Vicinity					
216-T-4-1D	High-Volume Cooling Water Ditch	X	X	X	
216-T-13	Low-Volume Crib	X			
216-T-27	High-Volume Waste Crib		X		
216-T-28	High-Volume Waste Crib	X	X	X	
216-T-33	Low-Volume Crib	X	X	X	
216-T-34	High-Volume Waste Crib		X	X	
216-T-35	High-Volume Waste Crib		X	X	
216-T-36	Moderate-Volume Waste Crib	X	X	X	
UPR-200-W-99	Surface Contamination	X	X	X	
241-T-361	Underground Storage Tank		X	X	X
Geographical Area: U Plant Vicinity					
216-U-1&2	High-Volume Waste Crib	X	X	X	
216-U-3	Injection Wells/French Drains	X	X		
216-U-4	Injection Wells/French Drains	X		X	
216-U-8	High-Volume Waste Crib	X	X	X	

Table B-6. Summary of 200-WA-1/200-BC-1 OU Waste Sites with Direct Analytical Data and/or Site-Specific Geophysical Survey Data*

Site	Site Type	Soil	Geophysical Logging	Groundwater	Other
216-U-12	High-Volume Waste Crib	X	X	X	
216-U-13	Low-Volume Trench		X	X	
216-U-14	High-Volume Cooling Water Ditch	X	X	X	
216-U-16	High-Volume Cooling Water Crib	X	X	X	
216-U-17	Moderate-Volume Waste Crib	X	X	X	
UPR-200-W-19	Surface Contamination	X	X	X	
200-W-42	Low-Volume Leak	X			
241-U-361	Underground Storage Tank	X	X	X	X
200-W-71				X	
200-W-89	Surface Contamination			X	
Geographical Area: Z Plant Vicinity					
216-Z-7	High-Volume Waste Crib	X	X	X	
216-Z-16	High-Volume Waste Crib		X	X	
216-Z-17	High-Volume Waste Crib		X		

Note: The presence of data does not indicate detection of contaminants.

* This table is a summary of available information. For specific data and references on individual waste sites, consult Appendix D, Waste Site Descriptions and Appendix H, Data Needs Assessment Checklists. A summary of all data sources for each waste site is also included in Appendix E.

Table B-7. Summary of Waste Sites with Apparent Historical Groundwater Impacts

Waste Site	Selected Target Analytes Detected in Historic Groundwater Samples						
	Cs-137	Sr-90	Co-60	Tritium	Nitrate	Chromium	Tc-99
216-T-33*		X		X	X	X	X
226-T-34	X	X	X	X	X	Not Measured	Not Measured
216-T-35	X	X	X	X	X	Not Measured	Not Measured
216-T-28	X	X	X	X	X	X	X
216-Z-7	X	X	X		X		
216-Z-16	X	X	X	X	X	X	X
216-U-1&2	X	X	X	X	X		X
216-U-14		X	X		X		
216-U-16	X	X	X		X		X
216-U-8		X	X	X	X	X	
216-U-12	X	X	X		X		
216-S-1&2	X	X	X	X	X		
216-S-7	X	X	X	X	X		
216-S-6	X	X	X		X		
216-S-5	X	X	X		X		
216-S-20	X	X	X	X	X	X	X
216-S-22	X	X	X		X		
216-S-23	X	X	X	X	X		X
216-S-25	X	X	X	X	X		X
216-B-14		X			X		
216-B-15		X			X		
215-B-16		X			X		
216-B-17		X			X		
216-B-18	X	X			X		X
216-B-19		X			X		
216-B-20*	X	X	X		X		
216-B-21*	X	X	X		X		
216-B-22*		X			X		

Note: Based on Historical Groundwater Monitoring Data in HEIS.

* Available data indicate, but are not conclusive, that observed groundwater contamination originated from this waste site.

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Table B-8. Preliminary Screening of Remedial Technologies for Vadose Zone Remediation of Radionuclides, Hexavalent Chromium, Other Metals, and Organic Compounds—Hanford 200 West Area

General Response Actions	Remedial Technology	Technology Process Option	COPC Applicability[a]	Depth Range[b]	Description	Effectiveness	Implementability	Relative Capital Cost	Relative O&M Cost	Sustainability[c]	Retained/ Not Retained	Screening Comment
No Action	No Action	No Action	All	Shallow/ Deep	No further actions to address contamination. Source areas and residual contaminants in the vadose zone are left untreated.	Low No remedial actions are taken, but effectiveness could be high if risk was previously mitigated.	High No administrative or technical implementability challenges are associated with this option because no actions are required.	Low No associated cost.	Low No associated cost.	Moderate/High Continued impact to soil resources.	Retained	Retained per the NCP.
Confirmatory Sampling	Confirmatory Sampling	Confirmatory Sampling	All	Shallow/ Deep	Sampling and analysis will be conducted to confirm that COPCs are not present at concentrations above cleanup criteria. Includes conducting radiological and geophysical (as appropriate) surveys in the initial site investigation as appropriate, to support the selection of sampling locations.	Low No additional remedial actions are taken; however, effectiveness could be high if risk was previously mitigated, or COPCs do not exceed cleanup criteria.	High Applicable to sites where prior cleanup activities have been performed, but insufficient data are currently available to close out the waste site. Low implementability on sites where sampling and analysis show concentrations above cleanup criteria.	Shallow – Low/Deep - High	Low No associated cost.	Moderate/High Action limited to sampling.	Retained	
MNA	MNA	MNA	Radionuclides with reasonable half-lives. Select organic compounds, select metals.	Shallow/ Deep	Contaminants in the vadose zone are allowed to attenuate over time from natural biological processes, chemical processes, radioactive decay, and/or flushing from surface water infiltration. Rates of flushing must be low enough that groundwater standards are not exceeded. Involves ongoing monitoring to verify attenuation processes are occurring. If site is well characterized, the graded approach to modeling could be applied. Contingency measures are developed if attenuation is not adequate to control the risks. Typically combined with other technologies that manage the source areas and mitigate exposure.	Low/Moderate Effectiveness of MNA is driven by the state of the existing site-specific intrinsic processes, given that under MNA, natural processes are not enhanced. Effectiveness is evaluated and documented through long-term monitoring and evaluation of geochemical conditions. Contaminant leaching into groundwater may be an acceptable component of the vadose zone remedy, if the resultant dissolved contaminant concentrations still meet the groundwater cleanup criteria.	High No administrative or technical implementability challenges are associated with this option.	Low/Moderate	Low	Moderate/High Continued impact to soil resources.	Retained	Retained as a possible component of alternatives.

Table B-8. Preliminary Screening of Remedial Technologies for Vadose Zone Remediation of Radionuclides, Hexavalent Chromium, Other Metals, and Organic Compounds—Hanford 200 West Area

General Response Actions	Remedial Technology	Technology Process Option	COPC Applicability[a]	Depth Range[b]	Description	Effectiveness	Implementability	Relative Capital Cost	Relative O&M Cost	Sustainability[c]	Retained/ Not Retained	Screening Comment
Removal	Excavation	Standard Excavation	All	Shallow	Shallow soil in identified source areas is removed using conventional construction equipment. Excavation limited to a maximum depth of approximately 6 m [20 ft] bgs. Excavated soil is segregated (automated or laboratory based) to determine disposal or treatment requirements.	High Shallow sources removed.	High Shallow excavation is typically straightforward. A permit is required for excavation in the 100, 200, and 300Areas and the Hanford Reach National Monument.	Moderate/High	Low to none No associated cost.	Moderate/High Waste generation if excavated soil is disposed of; GHG and energy for excavation equipment.	Retained	Retained as potential component of remedy.
		Deep Excavation	All	Shallow/ Deep	Soil is removed from a depth greater than approximately 6 m [20 ft] bgs. Deep excavation would require implementation of more complex technologies such as large lay back for open-pit type excavation. Alternatively, use of shoring. Excavated soil is segregated (automated or laboratory based) to determine disposal or treatment requirements.	High Locations of the deep sources will be difficult to identify, meaning large areas would have to excavated to depth to ensure that the deep sources were removed.	Low/Moderate Shoring may be difficult with cobbles and boulders. Significant safety issues with very deep excavations. A permit is required for excavation in the 100, 200, and 300Areas and the Hanford Reach National Monument.	High	Low to none No associated cost.	Moderate/High Waste generation if excavated soil is disposed of; GHG and energy for excavation equipment.	Retained	Retained as potential component of remedy.
Ex Situ Treatment and Processing, and Onsite Backfilling	Ex Situ Treatment and Processing[d]	Solidification/ Stabilization	Mobile to semimobile contaminants (technetium-99, chromium(VI), strontium-90, and uranium)	Depends on excavation method.	Contaminants are physically bound or enclosed within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization). Agents include soluble phosphates, pozzolan/ portland cement, and polyethylene extrusion. The stabilized mass is returned to its original location, capped to shed water and prevent weathering, and the locale is engineered to withstand seismic activity.	Moderate Effective at immobilizing contaminants in excavated material. However, the stabilized mass must be protected from weathering and seismic activity for long-term durability.	High Well-established technology. Site-specific studies need to be completed to evaluate equipment required and appropriate cement agents. Significant health and safety concerns.	High	Low No associated cost.	Low GHG and energy used for production and delivery of reagent, and for transport and mixing.	Not Retained*	Screened out in favor of disposal in the ERDF. Additional handling of the excavated soil will significantly increase costs and increase the potential for industrial accidents and contaminant exposure, which could pose considerable risk to workers.

Table B-8. Preliminary Screening of Remedial Technologies for Vadose Zone Remediation of Radionuclides, Hexavalent Chromium, Other Metals, and Organic Compounds—Hanford 200 West Area

General Response Actions	Remedial Technology	Technology Process Option	COPC Applicability[a]	Depth Range[b]	Description	Effectiveness	Implementability	Relative Capital Cost	Relative O&M Cost	Sustainability[c]	Retained/ Not Retained	Screening Comment
		Soil Washing	Chromium(VI), technetium-99, nitrate and, possibly, uranium	Depends on excavation method.	Consists of size separation of highly contaminated soil fractions (fines) from minimally contaminated soil fractions (coarse), followed by mechanical abrasion or washing to remove surface contamination.	Low/Moderate Effectiveness is driven by the binding processes that exist between the contaminants and the soil particles (adsorbed or precipitated). Effectiveness is variable based on the nature of the COPC. Pilot testing at the Hanford Site suggests many contaminants strongly sorb to all soil types. Pilot test is necessary for chromium(VI).	Moderate/High Conventional aggregate washing and screening technology are used to separate soil particles by size fraction. Contaminated soils and water are disposed of or further treated. Soils that meet cleanup criteria (remediated coarse soil) can be returned to the site. Mechanically intense.	Moderate	Low No associated cost.	Moderate Additional resource impact (water used in process); GHG and energy for process and additional treatment required (of contaminated fines and water).	Not Retained	Not proven for Hanford soils; mechanically intense.
		Vitrification	All	Depends on excavation method.	Thermal treatment process that converts excavated soil and other materials into stable crystalline substances.	High Heavy metals and radionuclides are incorporated into the crystalline structure, which is generally resistant to leaching.	Low High complexity of equipment required. Ex situ joule heating vitrification uses furnaces that have evolved from the glass industry. Implementability is higher than for in situ application given use of proven technology (furnaces).	High	Low No associated cost.	Low GHG and energy for heat generation. High energy requirements to sustain required heat.	Not Retained*	Very complex technology, safety concerns with implementation.
		Thermal Desorption	Organics	Depends on excavation method.	Direct application of heat to soil piles to increase the temperature of soil and destroy or volatilize organic compounds. A vapor cover and vacuum system is needed to transport volatilized water and organics to the gas treatment system. Also completed using mechanical systems (e.g., rotary drum).	High Technology can achieve rapid removal/destruction of a mix of volatile and semivolatile organics at low residual levels.	Low Equipment readily available and commonly used but can be mechanically complex.	High	Low No associated cost.	Low GHG and energy for production of heat vapor treatment.	Not Retained*	Very complex and challenging to implement.
Disposal	Disposal	Backfill Treated Soil	All	Shallow/ Deep	Excavation and ex situ treatment followed by onsite disposal (backfill).	High Contaminated material has been treated by ex situ technologies.	High Excavated and treated soil will need to be compared to cleanup criteria to verify backfill is appropriate.	Low/Moderate	Low No associated cost.	Moderate GHG and energy for backfill.	Retained	
		Onsite Landfill	All	Shallow/ Deep	Disposal of excavated soil at ERDF. Treatment performed at the facility as required to meet land disposal restrictions.	High	High Implementability limited by COPC concentrations and onsite landfill requirements.	Low/Moderate	Low No associated cost.	Low/Moderate GHG and energy for transport.	Retained	

Table B-8. Preliminary Screening of Remedial Technologies for Vadose Zone Remediation of Radionuclides, Hexavalent Chromium, Other Metals, and Organic Compounds—Hanford 200 West Area

General Response Actions	Remedial Technology	Technology Process Option	COPC Applicability[a]	Depth Range[b]	Description	Effectiveness	Implementability	Relative Capital Cost	Relative O&M Cost	Sustainability[c]	Retained/ Not Retained	Screening Comment
		Offsite Landfill	All	Shallow/ Deep	Disposal of excavated soil at offsite landfill.	High Contaminated material has been treated by ex situ technologies.	High Implementability limited by COPC concentrations and offsite landfill requirements.	Moderate	Low No associated cost.	Low GHG and energy for transport.	Retained	Liability concerns over off site landfills.
		Offsite Repository (WIPP)	TRU waste	Shallow/ Deep	TRU waste is soil and debris containing alpha-emitting TRU radionuclides having half-lives greater than 20 years at concentrations greater than or equal to 100 nCi/g at the time of assay. TRU radionuclides include elements with atomic numbers greater than 92 such as neptunium, plutonium, americium, and curium. TRU waste must be packaged and shipped to the WIPP in Carlsbad, New Mexico.	High	High Implementable, but it is an offsite activity, so substantial administrative requirements apply. Work must be coordinated through the Hanford Transuranic Waste Certification Program.	High	Low No associated cost.	High GHG and energy for transport.	Retained	May not be applicable to this geographic area but retained as a contingent remedial technology.
In Situ Treatment												
In Situ Treatment via Reagent—Reagent Approach												
Physical/Chemical/Biological—Solidification/Stabilization			Mobile COCs to semimobile radionuclides, other metals, and organics	Shallow	Contaminants are physically bound or enclosed within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization). Agents include soluble phosphates, pozzolan/ portland cement, and polyethylene extrusion. Typically, only used for organics when the COPC exists as a free phase hydrocarbon to reduce mobility.	Low/Moderate There is debate about the long-term durability of the monolith and whether it is, in fact, permanent. Potential for exposure still exists.	Moderate Depends on delivery method.	Moderate	Low Assuming monolith is permanent.	Low/Moderate GHG and energy for production and delivery of substrate/ reagent.	Retained	Straightforward and proven option. Retained for strontium-90 and other PCOCs if applicable.

Table B-8. Preliminary Screening of Remedial Technologies for Vadose Zone Remediation of Radionuclides, Hexavalent Chromium, Other Metals, and Organic Compounds—Hanford 200 West Area

General Response Actions	Remedial Technology	Technology Process Option	COPC Applicability[a]	Depth Range[b]	Description	Effectiveness	Implementability	Relative Capital Cost	Relative O&M Cost	Sustainability[c]	Retained/ Not Retained	Screening Comment
Physical/Chemical/Biological—Chemical Treatment			Chromium(VI), technetium-99, uranium, and strontium-90	Shallow/ Deep	Chemical reductant (e.g., calcium polysulfide, hydrogen sulfide gas, ferrous sulfate, ZV iron, etc.) and/or sequestration agent (e.g., phosphate, calcite, etc.) is applied to the subsurface to treat contaminants within the vadose zone. Chemical can be combined with solidification/stabilization or other treatment mechanisms.	Moderate Chemical reductants are instantly reactive, which requires overloading to maintain reactive strength at depth. Reduction of technetium-99 and uranium is potentially reversible.	Low/High Depends on delivery method. Localized temporary generation of secondary byproducts may occur. May temporarily mobilize COPCs (in first pore volume) toward groundwater. Handling chemical reductants is a health and safety concern.	Low/Moderate	Moderate	Moderate GHG and energy for production and delivery of chemical agent.	Retained	
Physical/Chemical/Biological—In Situ Chemical Oxidation			Organics	Shallow/ Deep	Subsurface delivery of chemical oxidant (e.g., hydrogen peroxide, ozone, permanganate, persulfate, percarbonate) to degrade organic COPCs. Oxidants cause chemical destruction of toxic organic chemicals. Petroleum hydrocarbons and PAHs can be treated with a variety of oxidants (including peroxide, percarbonate, persulfate, and ozone); however, limited case studies demonstrate the successful treatment of PCBs with in situ chemical oxidation. Ozone is the most likely oxidant.	Moderate Effectiveness is a function of oxidant distribution and contact. Injection of ozone a possible alternative, but more complex than bioventing alone. Multiple applications may be required to achieve complete treatment.	Low/Moderate Chemical oxidants can be delivered using soil mixing, horizontal injections wells, or vertical injection wells.	Moderate	Low/High O&M costs would be low assuming complete treatment can be achieved with a single application; high O&M costs if multiple applications are required to achieve treatment.	Moderate GHG and energy for production and delivery of substrate/reagent ; waste generation from soil cuttings.	Not Retained*	More challenging to implement compared to bioventing.
Physical/Chemical/Biological—Surface Bioremediation (Land Farming)			Organics	Shallow	Surface bioremediation involves tilling the soil and adding moisture and an amendment to stimulate natural degradation at shallow depths of 0.0 to 1.2 m (0 to 4 ft) bgs. Organic compounds are degraded by indigenous or inoculated microorganisms. May also be supplemented by additions of fertilizer.	Low/Moderate Surface bioremediation is effective for remediating low-level residual petroleum hydrocarbons in conjunction with source removal. PAHs and PCBs are more difficult to degrade. Effectiveness can be hindered by nonuniform amendment distribution, lack of appropriate microorganisms, or nonoptimal moisture and temperature.	Low Tilling equipment limits achievable treatment depth. Implementation is challenging in gravelly/ cobbly lithologies. Maintaining appropriate temperature and moisture conditions is more challenging for surface treatment.	Low/Moderate	Low	Moderate GHG and energy for production and delivery of substrate/reagent .	Retained	Potentially applicable to small volumes of petroleum contaminated soil.

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Physical/Chemical/Biological— Biological Treatment			Chromium(VI), technetium-99, uranium, and nitrate	Shallow/ Deep	Biological carbon source (e.g., molasses, sodium lactate, emulsified oil, etc.) is applied to the subsurface to treat contaminants within the vadose zone.	Moderate/High Carbon source follows source release pathways. Biological reductants are activated by microbial activity, so reactive strength is maintained over relatively longer distances. Reduction of technetium-99 and uranium is potentially reversible.	Low/High Depends on delivery method. Localized temporary generation of secondary byproducts may occur. May temporarily mobilize COPCs (in first pore volume) toward groundwater.	Low/Moderate	Moderate	Moderate GHG and energy for production and delivery of substrate. Depends on which substrate is used.	Retained	
Physical/Chemical/Biological— Combined Chemical/Biological Treatment			Chromium(VI), technetium-99, uranium, and nitrate	Shallow/ Deep	Chemical reductant (e.g., calcium polysulfide, hydrogen sulfide gas, ferrous sulfate, ZV iron, etc.) and biological carbon source (e.g., molasses, sodium lactate, emulsified oil, etc.) are combined and applied to the subsurface to treat contaminants within vadose zone.	Moderate/High Amendments follow source release pathways. Combined chemical and biological treatment might improve performance. Reduction of technetium-99 and uranium is potentially reversible.	Low/High Depends on delivery method. Localized temporary generation of secondary byproducts may occur. May temporarily mobilize COPCs (in first pore volume) toward groundwater. Handling chemical reductants is a health and safety concern.	Low/Moderate	Moderate	Moderate GHG and energy for production and delivery of substrate/reagent . Depends on which substrate is used.	Retained	
Physical/Chemical/Biological— Gaseous Ammonia Injection			Mobile COPCs	Shallow/ Deep	One of a number of possible gaseous reagents that are being investigated, along with In Situ Gaseous Reduction (ISGR). It involves the injection of ammonia gas to increase pH to dissolve silica. The pH naturally decreases to ambient conditions over time and aluminosilicate minerals precipitate and possibly coat and immobilize various contaminants.	Unknown Effectiveness is being studied as part of a laboratory-scale investigation.	Unknown Implementation is unknown at a full-scale level.	Unknown Technology evaluation has been limited to laboratory tests.	Unknown Technology evaluation has been limited to laboratory tests.	Unknown GHG emissions from injection activities.	Retained	Evaluation of results from the ongoing treatability study is needed prior to making a decision regarding its full-scale use at the Hanford Site. This technology could be evaluated as a remedial alternative at a later date.

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Physical/Chemical/Biological—Bioventing			Organics	Shallow/ Deep	Process that stimulates the natural biodegradation of aerobically degradable compounds in soil by providing oxygen to existing soil microorganisms. Bioventing uses low air flow rates to provide only enough oxygen to sustain microbial activity.	Low/Moderate Technology is proven for remediating soils contaminated by petroleum hydrocarbons but is less effective for PAHs, and not effective for PCBs. Effectiveness can be limited by extremely low soil moisture content, which would limit biodegradation.	High Applied using horizontal or vertical wells.	Moderate	Low	Moderate GHG and energy for installation of delivery mechanism and delivery of air; waste generation from soil cuttings.	Retained	Retained for petroleum hydrocarbons and PAHs.
Physical/Chemical/Biological—Reductive Dechlorination Using ZV Metals and Bioremediation			PCBs	Shallow/ Deep	ZV metals have the potential to reductively dechlorinate PCBs. Metals include iron, palladium, and other combinations. The contaminated soil and the metals are mixed in some fashion to allow the reactions to occur. Bioremediation, via the addition of an organic substrate, is a very similar process and can be combined with ZV metal addition.	Unknown Very few published testing results are available.	Moderate Could be implemented by soil mixing with conventional excavation equipment if the contamination is shallow.	High	Low No associated cost.	Unknown	Not Retained*	Several laboratory and field-scale demonstrations have been conducted to evaluate the performance of using nano-scale ZV iron for PCB dechlorination. The effectiveness of this treatment technology is considered to be poorly known, given the limited availability of published testing results and/or conflicting technology demonstration data. Reductive dechlorination using ZV metals and bioremediation is not a proven technology and was not retained for further consideration. More field studies must be conducted to test methods of bioaugmentation and biostimulation for PCB dechlorinators.

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In Situ Treatment (cont.)												
In Situ Treatment via Reagent—Delivery Method												
ISGR with Chemical Reductant or Biological Substrate			Chromium(VI), technetium-99, uranium, and nitrate	Shallow/ Deep	A gaseous mixture of chemical reductants (e.g., hydrogen sulfide) or biological substrate (e.g., butane) is injected into and drawn through the vadose zone to reduce chromium(VI), technetium-99, and uranium. Research is underway to evaluate other reagents to immobilize contaminants.	Unknown Soil heterogeneity will result in preferential flow and limit treatment effectiveness of lower permeability soil.	Unknown Vapor extraction wells are installed aroundinjection well at a radial spacing of approximately 4.6 m (15 ft)—large numbers of wells are required. Because of health and safety risks, monitoring and emergency response plan are required for transporting, storing, and handling.	High	Unknown	Unknown GHG emissions from injection activities.	Not Retained*	Evaluation of results from the ongoing treatability study is needed prior to making a decision regarding its full-scale use at the Hanford Site. This technology could be evaluated as a remedial alternative at a later date.
Mixing with Conventional Excavation Equipment			N/A[d]	Shallow	Use of conventional excavation equipment (backhoes, excavators, front-end loaders, etc.) to mix amendments into the soil.	High Agents are uniformly mixed with soil column, providing good contact and reaction between COPC and chemical.	High Simple technology. Dust mitigation techniques will need to be implemented to control/prevent mechanical dispersion of contaminants.	Low/Moderate	Low No associated cost.	Low/Moderate GHG emissions from diesel or gasoline burning engines.	Not Retained*	Not retained in favor of surface infiltration. Could be retained if shallow mobile contaminants are identified in the future.
Deep Soil Mixing (Vertical/Horizontal)			N/A[d]	Shallow/ Deep	Large mixing augers (1.5 to 3 m [5 to 10 ft] in diameter) or horizontally rotating heads are used to blend and homogenize reactants with soil. The reactants may be chemical reductants, biological substrate, or solidification/stabilization agents.	High Chemical agents are uniformly mixed with soil column, providing good contact and reaction between COPC and chemical. Cement or clay can also be mixed with the chemical slurry to reduce the hydraulic conductivity and leachability of the soil.	Low Implementation will be more challenging in gravelly/ cobbly lithologies. Although deep soil mixing has been performed to depths of 30 m (100 ft) bgs, most field applications have been limited to approximately 15 m (50 ft) bgs.	High	Low No associated cost.	Low/Moderate GHG emissions from diesel or gasoline burning engines.	Not Retained*	Deep soil mixing implementability will be limited by site conditions and required depth of treatment.
Foam Delivery of Reagents			N/A[d]	Shallow/ Deep	Injection of a foam into the vadose zone. The foam is a mixture of a surfactant solution to create the foam, and a reagent, such as calcium polysulfide. The foam increases the horizontal migration of the reagent away from the injection well.	Unknown Technology evaluation has been limited to laboratory column tests. The stability of the foam, which will dictate the well spacing, is unknown, as is the ability of the foam to permeate a large volume of the vadose zone.	Unknown Technology evaluation has been limited to laboratory column tests.	Unknown Technology evaluation has been limited to laboratory column tests.	Unknown Technology evaluation has been limited to laboratory column tests.	Unknown	Not Retained*	Evaluation of results from the ongoing treatability study is needed prior to making a decision regarding its full-scale use at the Hanford Site. This technology could be evaluated as a remedial alternative at a later date.

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General Response Actions	Remedial Technology	Technology Process Option	COPC Applicability[a]	Depth Range[b]	Description	Effectiveness	Implementability	Relative Capital Cost	Relative O&M Cost	Sustainability[c]	Retained/ Not Retained	Screening Comment
Gas Delivery of Reagents			N/A[d]	Shallow/ Deep	A gaseous mixture of chemical reagent is injected into and drawn through the vadose zone to reduce mobile COPCs.	Unknown Soil heterogeneity will result in preferential flow and limit treatment effectiveness of lower permeability soil.	Unknown Vapor extraction wells are installed around injection well at a radial spacing of approximately 4.6 m (15 ft)—large numbers of wells are required. Because of health and safety risks, monitoring and emergency response plan are required for transporting, storing, and handling.	High	Unknown	Unknown GHG emissions from injection activities.	Not Retained*	Evaluation of results from the ongoing treatability study is needed prior to making a decision regarding its full-scale use at the Hanford Site. This technology could be evaluated as a remedial alternative at a later date.
Injection Wells (Horizontal)			N/A[d]	Shallow/ Deep	Delivery of amendments using horizontal wells. Wells are installed using horizontal drilling techniques.	Moderate Effectiveness can be hindered by nonuniform amendment distribution. Soil heterogeneity will result in preferential flow and limit treatment effectiveness of lower permeability soil. Multiple injections could be required.	Low Implementation is challenging in gravelly/ cobbly lithologies. Lithology would also pose issues with maintaining target depth and alignment with horizontal drilling. A pilot test of this technology encountered significant implementation challenges.	Moderate/High	Low	Moderate GHG emissions from well installation, development, and injection activities; waste generation from soil cuttings.	Not Retained*	Testing at the Hanford Site has not been successful.
Injection Wells (Vertical)			N/A[d]	Shallow/ Deep	Delivery of amendments using conventional vertical wells.	Low Effectiveness can be hindered by nonuniform amendment distribution. Distribution of liquid amendments is highly ineffective because of gravelly/cobbly lithology. Better distribution would likely be obtained with gaseous amendment. Radius of influence could be low.	Moderate Radius of influence likely to be low with conventional liquid reagents requiring large number of injection wells, because of gravelly/cobbly lithology.	Moderate/High	Low	Moderate GHG emissions from well installation, development, and injection activities; waste generation from soil cuttings.	Retained for saturated zone	Not retained for vadose zone soils. Not adequate for distribution of liquid substrate. Retained for bioventing.
Jet Grouting			N/A[d]	Shallow/ Deep	High-pressure injection of reactive slurry into soil to hydraulically mix the soil with the slurry. Fluidization of the soil is preferred. Jet grouting can also be completed using super permeating molten wax by heating the soil and injecting the wax, resulting in an impermeable material.	Low While jet grouting is capable of reaching the required treatment depth, jet grouting is not likely to achieve effective distribution in this formation because of gravel/cobbles. Currently being pilot tested at 100-N for shallower and more limited application.	Low/Moderate Implementation will be more challenging in gravelly/ cobbly lithologies. Jet grouting has been performed to as deep as 91 m (300 ft) bgs.	High Limited radius of influence would make jet grouting cost-prohibitive over a large area.	Low	Moderate GHG emissions from injection activities.	Not Retained*	Not retained. Could be considered in the future if technology develops. Currently, jet grouting has potentially limited effectiveness.

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Surface Infiltration			N/A[d]	Shallow/ Deep	Reagent is applied to the ground surface to treat contaminants within the vadose zone. Surface infiltration can be done through drip irrigation and shallow basin systems. Systems are generally designed to be 30.48 cm (12 in.) below the surface and covered to be protected.	Moderate/High Amendments follow source release pathways. Distribution not likely to be uniform.	High Surface infiltration systems are simple to install and accessible for O&M.	Low/Moderate	Low	Low Limited infrastructure. GHG emissions from production and delivery of substrate.	Retained	Retained for liquid substrates.
Void Filing/Grouting			N/A[d]	N/A (Pipelines)	Grouting for solidification of buried wastes. Void grouting is considered for filling large voids, specifically pipelines.	High Established and commonly used technology for removing voids in pipelines and old landfills/buried waste	High Established and commonly used technology for removing voids in pipelines and old landfills/buried wastes. Pipe branch lines/breaks need to be identified.Lanfills require geophysics to identify void space in waste,	Low	Low No associated cost.	Moderate GHG and energy for production and delivery of grout used.	Retained	Retained for pipelines and waste sites (e.g. cribs with timbers) where an engineered barrier is selected and future subsidence can occur..
Physical/Chemical/Biological Desiccation			All	Shallow/ Deep	Remediation by injecting hot dry air and withdrawing moist air from soil, immobilizing contaminants by preventing their aqueous-phase transport.	Unknown A treatability test for this technology will be conducted for waste sites in the Central Plateau contaminated with technetium-99. Theoretically, desiccation would reduce moisture content in the vadose zone. Reduction of COPC migration would be effective until the soil is re-wetted. The technology is not effective in the long term without concurrent infiltration control (e.g. construction of an engineered surface barrier).	Unknown Implementation requires installation of injection and extraction wells, which are proven technologies. However, there is uncertainty related with the number of wells, well spacing, and well configuration details required for optimal field/full-scale implementation. Would also require implementation of infiltration control.	High	Unknown	Moderate GHG and energy for air injection.	Not Retained*	Evaluation of results from the ongoing treatability study is needed prior to making a decision regarding its full-scale use at the Hanford Site. This technology could be evaluated as a remedial alternative at a later date.
Physical/Chemical/Biological			Organics	Shallow/	Direct application of heat	High	Low	High	Low	Low	Not	Mechanically complex;

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In Situ Thermal Desorption				Deep	(e.g., using electrical heater elements, injection of hot air, steam, or hot water, radio frequency, etc.) to increase the temperature of soil and destroy or volatilize organic compounds. VOC capture required.	Technology can achieve rapid removal/destruction of a mix of volatile and semivolatile organics, and achieve low residual concentrations.	Technology is applied using vertical drilling methods and requires a spacing of 1.5 to 3.0 m (5 to 10 ft). Recovery of COPC vapors will require soil vapor extraction network and vapor barrier over entire treatment area.		No associated cost.	GHG and energy for production of heat and vapor recovery; waste generation from soil cuttings.	Retained*	challenging to implement.
Physical/Chemical/Biological In Situ Vitrification			All	Shallow/ Deep	Thermal treatment process that converts soil and other materials into stable crystalline substances. Contaminants are incorporated into the glass structure, which is generally strong, durable, and resistant to leaching.	High Heavy metals and radionuclides are retained within the treated soil, which is generally resistant to leaching.	Low High complexity of equipment required. Process uses an electric current to melt soil or other earthen materials at extremely high temperatures (1,600 to 2,000 °C [2,900 to 3,650 °F]). It is important to also account for safety considerations from exposure to high heat.	High	Low No associated cost.	Low GHG and energy for heat generation. High energy requirements to sustain required heat.	Not Retained*	Very complex and challenging to implement.
Physical/Chemical/Biological Electrokinetics			Anionic contaminants (chromium(VI), technetium-99, iodine-129, fluoride, uranium and, possibly, cyanide)	Shallow/ Deep	Current is applied using electrodes to encourage desorption of contaminants from media.	Low Effectiveness is limited by the solubility of the COPCs, soil moisture content, and areas of poor electrical conductivity. Not likely to be effective for coarse soil conditions relevant in the vadose zone.	Low Extraction of concentrated contaminant could pose risk to workers. Equipment is complex, which might present implementability challenges in finding contractors.	High	Low No associated cost.	Low GHG and energy for heat generation. High energy requirements to sustain required heat.	Not Retained*	Not retained because sufficient soil moisture is required to allow for ions to flow.
Physical/Chemical/Biological In Situ Flushing			Contaminants with high to moderate solubility in water (chromium(VI), technetium-99, and nitrate)	Shallow/ Deep	Clean or treated water is applied to the ground surface or in infiltration trenches to flush contaminants out of the vadose zone to the water table, where it would be captured/treated.	Moderate Water follows source release pathways, but contaminants that remain in adsorbed phase will not be treated. May create a larger groundwater problem if the groundwater capture is not effective.	High Drip irrigation system or trenches are simple to install and accessible for O&M.	Low/Moderate	Low	Low GHG and energy for installation.	Retained	

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Physical/Chemical/Biological Phytoremediation			Bioavailable metals and organics	Shallow	Phytoremediation uses plants and their associated rhizospheric microorganisms to remove, degrade, or contain contaminants.	Low Phytoremediation is only effective when plants are active; thus, the technology is not effective during the winter. Phytoremediation only treats soils to the approximate depth of the plant roots and is only appropriate for low concentrations of contaminants. It is a slow process that is applied over long time frames of years or decades. Many metals and radionuclides are only taken up by the plants and not transformed to innocuous forms.	Moderate Involves large land requirements, and considerable work would be required to make a plot of land at the Hanford Site suitable for plant growth. If used to treat contaminants that are merely taken up and not transformed to innocuous forms, plants would need to be disposed of elsewhere to avoid ultimately returning the contaminants back to the soils they came from. Concerns about contaminants in the plants entering the food chain may need to be addressed.	Low	Low	High GHG and energy for installation. Implementation of phytoremediation could lead to a GHG reduction credit.	Not Retained*	Phytoremediation would only be effective for low concentrations of contaminants in shallow soils over long periods, and many metals and radionuclides would accumulate in the plants and would not actually be treated, posing risks to ecological receptors.
Containment												
Surface Barriers												
Maintain Existing Soil Cover with Monitored Natural Attenuation (MNA)			All	Shallow/ Deep	The existing soil cover on a waste site is maintained and/or augmented as needed to provide protection from intrusion by biological receptors. Existing soil covers include soil stabilization covers and clean overburden.	Moderate Does not reduce contamination. Effective in supporting mitigation of potential for direct contact with residual contaminants if consistently well-implemented for duration of elevated risk. Relies on natural attenuation to decrease contaminant concentrations to levels protective of human health and the environment.	High Applicable only on sites with existing soil covers. Simple to implement but requires maintenance and periodic monitoring throughout the attenuation period. Restrictions on future land use would be necessary.	Low No associated cost; system in place.	Low	Moderate Continued impact to soil resources.	Retained	Retained if used in conjunction with MNA
Hanford Barrier			All	Shallow/ Deep	A nine-layer barrier with a total thickness of 4.5 m (11.8 ft). Designed to be impermeable to prevent surface water infiltration through the vadose zone and limit contaminant leaching to groundwater. Will also prevent direct contact with contaminants.	Moderate/High Leaching of near-surface source COPCs will be controlled, but residual COPCs in capillary fringe and deeper vadose zone pore water will continue to affect groundwater because of water table fluctuation.	High Most ET surface barriers are simple to construct, however the 9-layered Hanford Barrier construction is complex. Biointrusion will need to be considered as part of the barrier/cap design and is in the Hanford Barrier.	High	Low	Moderate GHG and energy for installation. Continued impact to soil resources.	Not Retained*	Installation of large number of layers makes this technology difficult to implement. It has very few advantages over the ET barrier in comparison to cost.

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Modified RCRA Subtitle C and/or D Barrier			All	Shallow/ Deep	Modified RCRA Subtitle C barriers are designed for hazardous waste, Category 3 and Category 1 (mixed) low-level waste. Modified RCRA Subtitle D barriers are designed for nonradiological and nonhazardous solid waste, or Category 1 low-level waste where hazardous constituents are not present. Various modifications to a RCRA C barrier designed to be site-specific. Number of layers can vary from four to seven. Modified RCRA D is composed of approximately four layers with a relative thickness of 0.9 m (2.9 ft). Barriers are generally designed to be impermeable to prevent surface water infiltration through the vadose zone and limit contaminant leaching to groundwater. May also prevent direct contact with contaminants.	Moderate/High Leaching of near-surface source COPCs will be controlled, but residual COPCs in capillary fringe and deeper vadose zone pore water will continue to affect groundwater because of water table fluctuation. Prevention of direct contact will depend on specific design.	Low Most ET surface barriers are simple to construct, however the 9-layered Hanford Barrier construction is complex. Biointrusion will need to be considered as part of the barrier/cap design and is in the Hanford Barrier..	High	Low	Moderate GHG and energy for installation. Continued impact to soil resources.	Not Retained	Modified RCRA barriers have been demonstrated to fail in arid and semi-arid environments, as well as some humid climates. The smectitic clays will shrink and crack when dry and can allow significant quantities of precipitation to infiltrate through the cracks down into the underlying waste. In addition, man-made materials in RCRA barriers can have a limited life prior to failure.
Asphalt/Concrete Cap			All	Shallow/ Deep	Barriers used around structures to remain in place (e.g., reactors) in the short-term (75 years) to promote drainage, prevent infiltration into possible sources below the reactors, and prevent exposure to contaminated soil.	High For increased effectiveness, barrier needs to be properly sealed, given that asphalt and concrete are permeable. High effectiveness in the short-term.	High No technical or administrative challenges. Simple to construct.	Low	Low	Moderate GHG and energy for installation. Continued impact to soil resources.	Retained	Potential component of alternatives. May be applicable for small areas requiring short term effectiveness.

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Vegetative Cap (ET Cap)			All	Shallow/ Deep	There are two types of evapotranspiration (ET) barriers: a monofill ET and capillary barrier. Both barriers function on the premise of minimizing (<2mm) or stopping water from percolating through the engineered barrier through the processes of evaporation and transpiration. Barrier thickness and associated soil moisture storage capacity must take into account the local current and future climatic conditions. The barrier functions as a giant sponge soaking up the water and minimizing or preventing percolation. The monofill ET layer consists of a single layer whereas the capillary layers consists of a fine-grained soil layer overlying a relatively coarse-grained soil layer. The distinct textural interface in capillary ET barriers between the fine and coarse soil layers creates a capillary break, which functionally increases the water-holding capacity of the fine-grained soil layer. Pea gravel should be blended into the surface approximately 100 cm of the ET barrier to mitigate future erosion. See EPA, Fact Sheet on Evapotranspiration Cover Systems for Waste Containment (EPA-542-F-11-001) for additional information on ET barriers (provide link)	Low/Moderate Leaching of near-surface source COPCs will decrease once grasses have become established, but residual COPCs in capillary fringe and deeper vadose zone pore water may continue to affect groundwater because of water table fluctuation. Prevention of direct contact will depend on specific design.. See SGW-34095 for further detail.	High Vegetative cap readily installed. Biointrusion will need to be considered as part of the barrier/cap design. If the depth of waste is less than 15', a bio-barrier will be needed (biobarriers in arid/semiarid zones often consist of a cobble layer)	Low	Low	High GHG and energy for installation.	Retained	In arid and semi-arid environments ET barriers are preferred over modified RCRA barriers due to superior performance, limited maintenance, costs and barrier life expectancy. Capillary barriers should not be used in areas susceptible to subsidence.

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Horizontal Subsurface Barriers												
Jet Grouting, Soil Freezing, or Wire Saw Barriers			All	Shallow/ Deep	Barriers placed beneath the contaminated zone to limit further migration. Jet grouting is as discussed above at one specific depth. Soil freezing involves placement of cooling media distribution systems into the subsurface to freeze a soil layer below the contamination. Wire saw barrier involves cutting a thin horizontal trench that is filled with grout using a diamond wire saw. The saw is placed in an excavation around the soil mass to be contained.	Low Significant uncertainty on the completeness of the barrier with all methods.	Low All methods would be difficult or impossible to implement at the Hanford Site because of the gravels and cobbles and the depths required.	High	Low	Low Large amount of waste would be generated during installation and GHG and energy for installation.	Not Retained*	Not implementable.
Compaction												
Dynamic Compaction			All	Shallow/ Deep	Dynamic compaction is used for consolidation of soils and buried wastes and can be used to minimize the potential subsidence for a subsequent barrier. The process involves dropping a weight from a predetermined height onto the area to be compacted or the use of heavy equipment..	Moderate/High Effective at removing void spaces and compacting surface soil, where voids exist around buried waste. Not effective for native soils. Not effective for treatment of hazardous wastes.	High Simple and widely used technology.	Low	Low No associated cost.	Low/Moderate GHG and energy for installation. Continued impact to soil resources.	Retained	Retained for waste sites that may require construction of an engineered barrier that could be prone to future subsidence (e.g., cribs).

Source: DOE/RL-2001-41, *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions*.

a. Indicates the contaminants that can be addressed by a technology based on geochemical properties. A COPC Applicability of "All" indicates implementation of a technology is not dependent on the nature of a chemical.

b. Depth range is based on practical limitations of implementing the given technology

c. Sustainability rating based on: E = energy use, GHG = air pollution and greenhouse gas emissions reduction, Water = water use and resource impacts, Waste = Reduce, reuse, and recycle waste, Eco = protect land and ecosystems.

d. Dependent on reagent approach.

e. Ex situ treatment does not include treatment done for ultimate disposal at the ERDF. Treatment performed at the ERDF or the site as required to meet disposal restrictions is assumed to be part of the "disposal to onsite landfill" process option. N/A = not applicable

* Additional details on technologies not retained will be provided in an appendix to the RI/FS report.

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B1 References

DOE/RL-2003-23, 2005, *Focused Feasibility Study for the 200-UW-1 Operable Unit*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=D7944638. http://www5.hanford.gov/arpir/?content=findpage&AKey=D7944918. http://www5.hanford.gov/arpir/?content=findpage&AKey=D7950655.

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Appendix C

Map Plates

Contents

Plate C-1. **200-WA-1/200-BC-1 Remedial Investigation Work Plan Waste Sites**

Plate C-2. **200-WA-1/200-BC-1 Waste Sites Where Cs-137 Concentrations Have Been Detected in Groundwater**

Plate C-3. **200-WA-1/200-BC-1 Waste Sites Where Sr-90 Concentrations Have Been Detected in Groundwater**

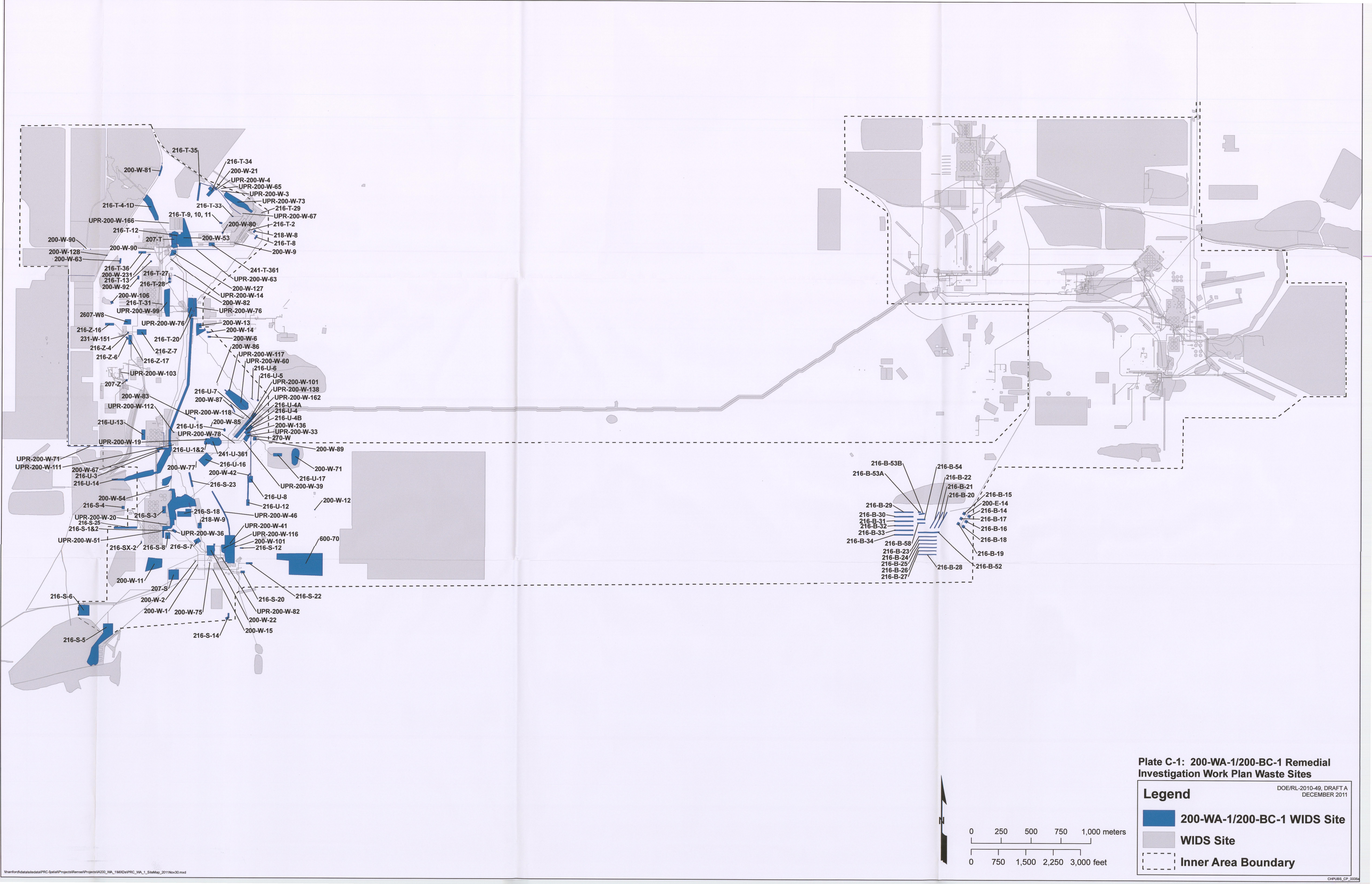

Plate C-1: 200-WA-1/200-BC-1 Remedial Investigation Work Plan Waste Sites

DOE/RL-2010-49, DRAFT A
DECEMBER 2011

Legend

- 200-WA-1/200-BC-1 WIDS Site
- WIDS Site
- Inner Area Boundary

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Plate C-2: 200-WA-1/200-BC-1 Sites With Historical Cs-137 Groundwater Impacts

DOE/RL-2010-49, DRAFT A
DECEMBER 2011

Legend

- Monitoring Well with Cs-137 Detections
- 200-WA-1/200-BC-1 WIDS Sites with historical Cs-137 groundwater impacts
- 200-WA-1/200-BC-1 WIDS Site
- WIDS Site
- Inner Area Boundary

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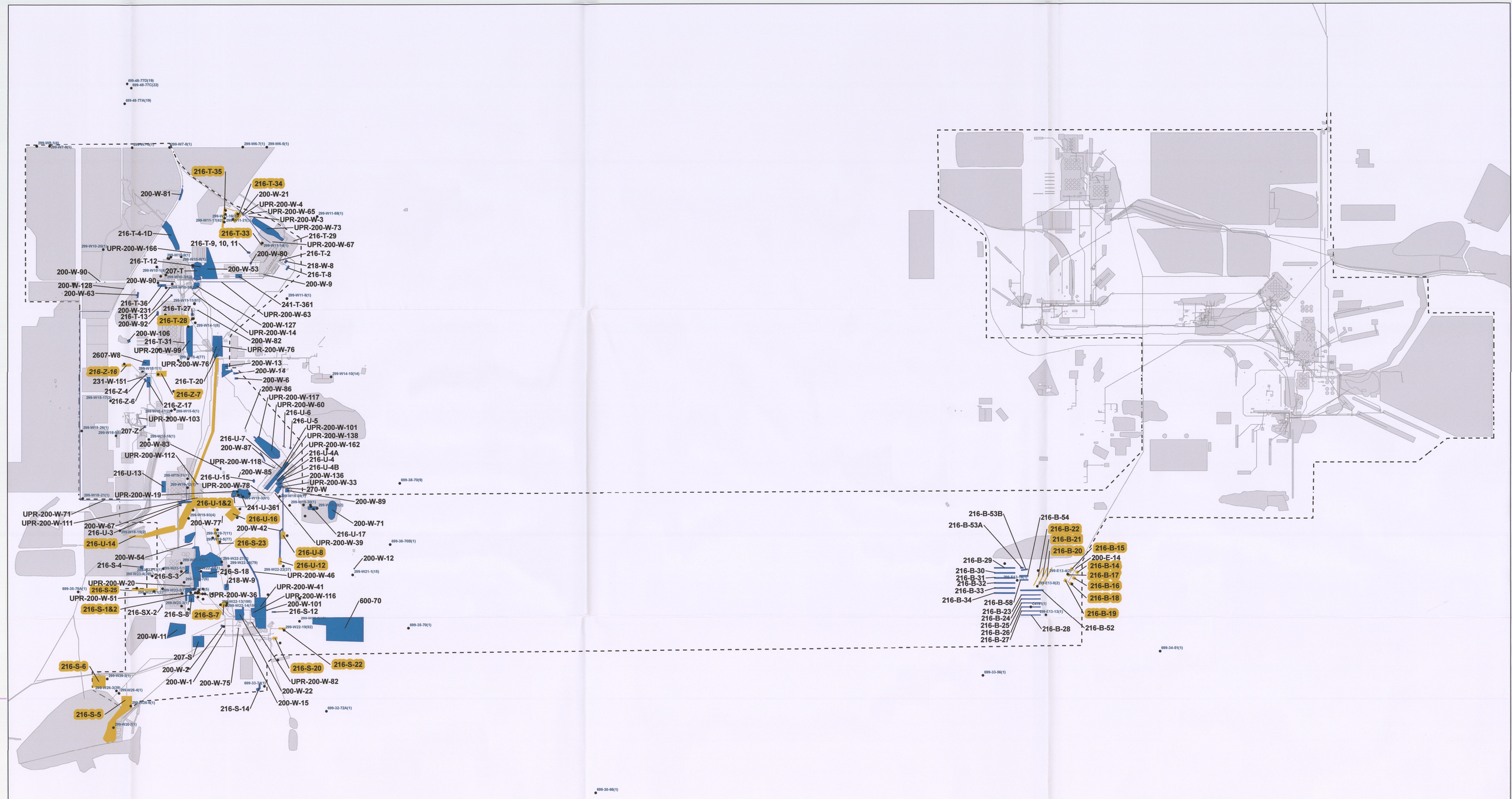

Plate C-3: 200-WA-1/200-BC-1 Sites With Historical Sr-90 Groundwater Impacts

DOE/RL-2010-49, DRAFT A
DECEMBER 2011

Legend

- Monitoring Well with Sr-90 Detections
- 200-WA-1/200-BC-1 WIDS Sites with historical Sr-90 groundwater impacts
- 200-WA-1/200-BC-1 WIDS Site
- WIDS Site
- Inner Area Boundary

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