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Draft A

200-IS-1 Operable Unit Pipeline System Waste Sites RFI/CMS/RI/FS Work Plan

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 *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*[1] (CERCLA) remedial investigation/feasibility (RI/FS) study activities to be performed in order to evaluate and select remedial alternatives for the 200-IS-1 Operable Unit (OU) pipeline system waste sites located within the Inner Area of the Central Plateau at the Hanford Site. Remedial actions for pipeline system waste sites are required to incorporate the *Resource Conservation and Recovery Act of 1976*[2] (RCRA) corrective action process and apply the RCRA closure process to pertinent treatment, storage, and disposal (TSD) units and associated ancillary equipment. Therefore, this Work Plan describes a coordinated approach to performing the RI/FS activities that ensures compliance with applicable elements of the RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) process and RCRA closure plan(s) pertaining to tank system ancillary equipment.

Remedial actions for pipeline system waste sites will be coordinated among the geographic area OUs and Single-Shell Tank (SST) system waste management areas (WMAs). Cleanup levels for the Inner Area will be established to be consistent with the reasonably foreseeable future land use and ensure protection of potential future users, ecological receptors, and groundwater.

Scope—The scope of this Work Plan includes more than 300 waste sites currently identified as being associated with inactive, buried process-waste transfer pipeline systems. These pipeline systems are integral to the facilities and liquid disposal waste sites located in the Inner Area. The 200-IS-1 OU pipeline system includes pipeline waste sites, pipeline component waste sites (e.g., diversion boxes, catch tanks, valve pits, vaults, and control structures), and associated waste sites that are the result of unplanned leaks and spills to the soil originating from the pipelines or pipeline components. This Work Plan does not apply to active or inactive noncontaminated utilities such as raw or potable water lines, utility lines, inert gas lines, and sanitary sewer, storm water, or active process-waste pipelines.

[1] *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq. Available at: http://uscode.house.gov/download/pls/42C103.txt.

[2] *Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq. Available at: http://www.epa.gov/epawaste/inforesources/online/index.htm.

The regulatory framework for the 200-IS-1 OU waste sites addresses: (1) past-practice sites under CERCLA remedial action and RCRA corrective action requirements, and (2) RCRA TSD ancillary equipment associated with the tank farm's SST system TSD unit that is located outside of WMAs under both CERCLA remedial action requirements and RCRA closure requirements.

The 200-IS-1 OU currently includes three RCRA TSD units: (1) the CX Tank System (Tanks 241-CX-70, 241-CX-71, and 241-CX-72); (2) the Hexone Storage and Treatment Facility (Tanks 276-S-141 and 276-S-142); and (3) the 241-Z Treatment and Storage Tanks (Tanks 241-Z-D-4, 241-Z-D-5, 241-Z-D-7, and 241-D-8; 241-Z Sump; and 241-Z Tank Pit). Both the 241-CX Tank System and the Hexone Storage and Treatment Facility have RCRA TSD Closure Plans (DOE/RL-2008-51[3] and DOE/RL-2009-112[4]). The Washington State Department of Ecology (Ecology) accepted the 241-Z Treatment and Storage Tanks as RCRA clean closed on February 22, 2007 (072317[5]). Closeout actions to satisfy CERCLA requirements will also be addressed as appropriate for these RCRA TSD units within the 200-IS-1 OU.

Basis for Work Plan—The U.S. Department of Energy's (DOE) vision for cleaning up nearly 194 km^2 (75 mi^2) of the Central Plateau involves making cleanup decisions to achieve the following goals:

- Protect groundwater, workers, the public, and the environment from exposure to radiological and chemical contamination.
- Reduce the area of the Central Plateau that will require continued management.
- Comply with applicable and relevant regulations that direct cleanup.

[3] DOE/RL-2008-51, 2009, *241-CX Tank System Closure Plan*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www2.hanford.gov/arpir/?content=findpage&AKey=0095783.

[4] DOE/RL-2009-112, 2010, *Hexone Storage and Treatment Facility Closure Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=0084307.

[5] 072317, 2007, "Letter 07-AMCP-0062 dated December 20, 2006, from Mr. Keith A. Klein, United States Department of Energy (USDOE) to Ms. Jane A. Hedges, Washington State Department of Ecology, Nuclear Waste Program, *Closure Certification for the 241-Z Treatment and Storage Tanks*," (letter to Keith A. Klein, U.S. Department of Energy, from Rick Bond, Washington State Department of Ecology), February 22. Available at: http://www5.hanford.gov/arpir/?content=findpage&AKey=DA04508161.

In 2010, the DOE, Ecology, and the U.S. Environmental Protection Agency (EPA), also known as the Tri-Parties, agreed to reorganize the OUs to achieve cleanup decisions on the Central Plateau. Accordingly, the Tri-Parties modified the structure of the 200-IS-1 OU to fit the new geographically based OUs. Table ES-1 summarizes the future cleanup decisions with respect to pipeline system waste sites within the Central Plateau Inner Area.

Table ES-1. Central Plateau Inner Area Pipeline System Waste Site Alignment by Operable Unit or Key Facility

Operable Unit or Key Facility[a]	Alignment of Waste Sites	Lead Agency	Document Process	Decision Document
200-IS-1 OU	Past-practice pipeline waste sites, pipeline component waste sites, and associated UPR waste sites in the West and East Inner Areas[b]	Ecology	RCRA and CERCLA	Corrective Action Decision/Record of Decision (ROD)
	RCRA TSD pipeline waste sites and pipeline component waste sites in the West and East Inner Areas[b]			Hanford Facility RCRA Permit (WA7890008967, 2007)
Reduction Oxidation Canyon (200-CR-1) OU and U Plant Canyon Facility[c]	Past-practice and RCRA TSD pipeline waste sites, pipeline component waste sites, and associated UPR waste sites located within the Canyon OU or facility remediation areas	EPA	CERCLA	ROD
B Plant Canyon (200-CB-1) and Plutonium Uranium Extraction Canyon (200-CP-1) OUs, T Plant Canyon Facility[d]	Past-practice and RCRA TSD pipeline waste site, pipeline component waste sites, and associated UPR waste sites located within the Canyon OUs or facility remediation areas	Ecology	CERCLA	ROD
Tank Farm Waste Management Areas (WMAs)	Pipeline waste sites, pipeline component waste sites, and associated UPR waste sites located within the tank farm WMAs	Ecology	RCRA	Hanford Facility RCRA Permit (WA7890008967, 2007)

Table ES-1. Central Plateau Inner Area Pipeline System Waste Site Alignment by Operable Unit or Key Facility

Operable Unit or Key Facility[a]	Alignment of Waste Sites	Lead Agency	Document Process	Decision Document

Source: WA7890008967, 2007, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste*.

a. Key facilities are defined in Section 8 of Ecology et al., 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.

b. Excludes waste sites that are located within a Tank Farm WMA or a Canyon OU.

c. Includes waste sites within the footprint of the 221-U Facility engineered barrier.

d. T Plant Canyon is to be established as an OU in the future.

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
OU = operable unit
RCRA = *Resource Conservation and Recovery Act of 1976*
ROD = record of decision
TSD = treatment, storage, and disposal
UPR = unplanned release
WMA = waste management area

Work Plan Objectives—The objectives of this Work Plan are to: (1) summarize process knowledge and existing characterization data for pipeline system waste sites; (2) identify the information needed, data gaps, and tasks to be completed to support pipeline system waste site remedy decisions; (3) describe the potential remediation alternatives and the basis upon which they will be evaluated; and (4) describe how CERCLA and RCRA processes will be coordinated to ensure consistency in the remedy selection process for pipeline system waste sites that are subject to different regulatory requirements.

This Work Plan identifies the following tasks:

- Complete the inventory of inactive/process-waste pipelines and pipeline components as well as their structural and other physical characteristics. Additional subtasks include the reviewing and assembling the waste stream characteristics (including radiological and chemical constituents) associated with the 200-IS-1 OU waste sites; coordinating the waste site assignments with the respective canyon OUs, major facilities, and tank farm WMAs; and identifying vadose zone transport modeling methods and input parameter values.
- Organize waste site data to support baseline risk assessments (BRAs).

- Refine characterization cost estimates for post-CAD/ROD confirmation and verification sampling.
- Assess waste classification and potential waste disposal pathways.
- Prepare an RFI/CMS/RI/FS document (including TSD closure information to support permit modification).
- Prepare a Proposed Corrective Action Decision/Proposed Plan document.

The results of these tasks will serve as the technical basis for the decision documents that will include these pipeline system waste sites in the future. Based on waste site information assessments, characterization performed to date, and lessons learned from pipeline remediation activities performed along the River Corridor region of the Hanford Site, DOE is considering removal of potentially contaminated pipeline system waste sites that are shallower than a depth—to be determined by the Tri-Parties—that is protective of human and ecological receptors. Sampling will be performed post-CAD/ROD to confirm remedy decisions and support remedy design activities.

Integration with other Projects—Implementation of this Work Plan requires close coordination between the DOE Richland Operations Office (DOE-RL) Central Plateau Division projects and the DOE Office of River Protection, Tank Farm projects. In addition to the new waste site OUs established for the Inner Area (i.e., 200-WA-1, 200-EA-1, and the Canyon OUs), the primary groundwater OUs associated with pipeline system waste sites include 200-UP-1 and 200-ZP-1 in the 200 West Area, and 200-PO-1 and 200-BP-5 in the 200 East Area. Coordination with the groundwater OUs will be required should potential threats to groundwater from pipeline system waste sites be determined. Currently, no evidence suggests that the pipeline system or pipeline releases have contributed to the identified groundwater contamination plumes. Remediation of pipeline system waste sites located entirely in the Outer Area (i.e., 200-OA-1 and 200-CW-3 OUs) will be addressed in the Outer Area decision documents.

This Work Plan is organized as follows:

- **Chapter 1, Introduction**, presents the Work Plan scope and objectives.
- **Chapter 2, Background and Setting**, presents the physical setting for pipeline system waste sites, including information on geology, hydrogeology, and groundwater. This chapter provides a general description of the 200 Area process

facility operations, a description of the waste site types including pipelines, pipeline components, and releases (UPRs) associated with leaks and spills from these various structures. It also describes the waste streams associated with the pipeline system.

- **Chapter 3, Initial Evaluation**, presents site evaluation activities performed, characterization data collected to date, the conceptual contaminant distribution models for pipelines and pipeline components, potential constituents associated with pipeline system waste sites, current and future site conditions, human and ecological receptors, exposure pathways, and data available for use in the BRA.

- **Chapter 4, Work Plan Approach and Rationale**, presents the remediation approach and CERCLA and RCRA regulatory coordination, and identifies pipeline information needed to support CERCLA and RCRA decision documentation for the 200-IS-1 OU waste sites.

- **Chapter 5, Pipeline System Data Collection Tasks**, presents a summary of the tasks and information needed to support remedy selection for the 200-IS-1 OU waste sites.

- **Chapter 6, Project Schedule**, provides a schedule for completion of the Work Plan.

- **Chapter 7, Project Management Considerations**, presents the DOE-RL, regulatory agency oversight, and contractor organizations. This chapter also describes the coordination needed among established related projects and the processes for change control and dispute resolution.

- **Chapter 8, References**, provides complete citations for the documents referenced in this Work Plan.

The following appendices are included:

- **Appendix A**—Listing of Pipeline Systems and Associated Unplanned Release Waste Sites
- **Appendix B**—Site-Specific Information for Pipeline System Waste Sites
- **Appendix C**—Potential Applicable or Relevant and Appropriate Requirements

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Terms

amsl	above mean sea level
ARAR	applicable or relevant and appropriate requirement
ASTM	American Society for Testing and Materials
bgs	below ground surface
BRA	baseline risk assessment
CA	Contamination Area
CAD	corrective action decision
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CHPRC	CH2M HILL Plateau Remediation Company
CMI	corrective measures implementation
CMS	corrective measures study
COPC	contaminant of potential concern
COPEC	contaminant of potential ecological concern
CSM	conceptual site model
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CV/AA	cold vapor-atomic absorption
DCRT	double-contained receiver tank
DOE	U.S. Department of Energy
DOE-ORP	DOE Office of River Protection
DOE-RL	DOE Richland Operations Office
DPT	direct push technology
DQO	data quality objective
DST	Double-Shell Tank
Eco-SSLs	ecological soil screening levels
Ecology	Washington State Department of Ecology
EP toxic	extraction procedure toxicity
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment

ERDF	Environmental Restoration Disposal Facility
FS	feasibility study
FY	fiscal year
GC/MS	gas chromatography/mass spectrometry
GF/AA	graphite furnace/atomic absorption
GIS	geographic information system
Hanford Facility RCRA Permit	*Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste*
HEIS	Hanford Environmental Information System
HHE	human health and the environment
HHRA	human health risk assessment
HI	hazard index
HLW	high-level waste
HSTF	Hexone Storage and Treatment Facility
HWMA	Hazardous Waste Management Act (RCW 70.105)
IC	institutional control
ICP	inductively coupled plasma
ID	identification
IDF	Integrated Disposal Facility
IMUST	inactive miscellaneous underground storage tank
ITS	in-tank solidification
K_d	distribution coefficient
LAW	low-activity waste
LLW	low-level waste
LLWMA	Low-Level Waste Management Area
MNA	monitored natural attenuation
MTCA	Model Toxics Control Act
NCP	National Contingency Plan
NEPA	*National Environmental Policy Act of 1969*
NPL	National Priorities List

OU	operable unit
PCAD	proposed corrective action decision
PCB	polychlorinated biphenyl
PEF	particulate emission factor
PFP	Plutonium Finishing Plant
PNNL	Pacific Northwest National Laboratory
PP	proposed plan
PRC	Plateau Remediation Contractor
PRG	preliminary remediation goal
PUREX	Plutonium-Uranium Extraction (Plant or process)
QMap	Query Map
R-CPP	RCRA-CERCLA past practice
RAO	remedial action objective
RBSL	risk-based screening level
RCRA	*Resource Conservation and Recovery Act of 1976*
RD	remedial design
RD/RA WP	remedial design/remedial action work plan
RECUPLEX	Recovery of Uranium and Plutonium by Extraction (process)
REDOX	Reduction-Oxidation (Plant or process)
RfC	reference concentration
RfD	reference dose
RFI	RCRA facility investigation
RI	remedial investigation
ROD	record of decision
RSL	regional screening level
RTD	removal, treatment, and disposal
SAP	sampling and analysis plan
SEPA	*State Environmental Policy Act* (RCW 43.21C, "State Environmental Policy")
SF	slope factor

SIM	Soil Inventory Model
SLERA	screening level ecological risk assessment
SST	Single-Shell Tank
STTS	Supplemental Treatment Technology Site
TBC	to be considered
TEDF	Treated Effluent Disposal Facility
Tri-Parties	Ecology, EPA, and DOE
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TRU	transuranic
TSD	treatment, storage, and disposal
TWINS	Tank Waste Information Network System (database)
TWRWP	tank waste retrieval work plan
UO_3	Uranium Trioxide (Plant)
UPR	unplanned release
URMA	Underground Radioactive Material Area
VF	volatization factor
VOC	volatile organic compound
WIDS	Waste Information Data System (database)
WIR	Waste Incidental to Reprocessing
WMA	waste management area

1

1 Introduction

This 200-IS-1 Operable Unit (OU) Work Plan addresses 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 geographic region referred to as the Inner Area of the Central Plateau at the Hanford Site (Figure 1-1). This Work Plan also addresses the contaminated soil that is the result of unplanned releases (UPRs) from the pipeline and pipeline components.

This Work Plan describes the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) remedial investigation/feasibility study (RI/FS) activities for evaluating and selecting remedial actions for these waste sites. Remedy evaluation and selection will also be coordinated with the *Resource Conservation and Recovery Act of 1976* (RCRA) closure/permit modification process for pertinent treatment, storage, and disposal (TSD) units and associated ancillary equipment, and the RCRA corrective action process for releases to soil. Therefore, this Work Plan describes elements of the RCRA facility investigation/corrective measures study (RFI/CMS) process for solid waste management units, including releases to soil, and RCRA closure plan(s) pertaining to tank system ancillary equipment.

The U.S. Department of Energy (DOE) will prepare the decision documentation to satisfy requirements under CERCLA and RCW 70.105, "Public Health and Safety," "Hazardous Waste Management," also known as the Washington State Hazardous Waste Management Act (HWMA). The HWMA and the corresponding regulations in WAC 173-303, "Dangerous Waste Regulations," implement Washington's federally authorized program under RCRA.

For purposes of this Work Plan, the pipeline and pipeline component hardware are collectively referred to as pipeline systems (Figure 1-2). The 200-IS-1 OU consists of pipeline waste sites, pipeline component waste sites, and associated UPR waste sites. Remedial actions for the 200-IS-1 OU waste sites will be coordinated with the other OUs and Single-Shell Tank (SST) system waste management areas (WMAs) within the Central Plateau Inner Area (Figure 1-3). The tank farm WMAs consist of specific groupings of SST farms.

1.1 Scope and Objectives

This Work Plan describes the information needed and activities that will be conducted to support remedy evaluation and remedy selection for more than 300 pipeline, pipeline component, and associated UPR waste sites within the Central Plateau Inner Area. The Inner Area pipeline systems addressed in this Work Plan were used to transport process-waste from the separations facilities to the SSTs and Double-Shell Tanks (DSTs), control or divert flow to liquid disposal waste sites, and transfer high-activity wastes between the SST WMAs. Associated UPR waste sites are the result of a leak(s) and other types of releases from the pipeline systems to the surrounding soil. This Work Plan does not apply to noncontaminated utilities such as raw or potable water lines, utility lines, inert gas lines, sanitary sewer, storm water, or active pipelines. This Work Plan also does not apply to pipelines that were once used for waste conveyance but have since been removed (e.g., those used for short periods time for overground transfer of liquid waste and subsequently disposed). Remediation of the pipeline systems located entirely in the Outer Area (i.e., 200-OA-1 and 200-CW-3 OUs) will be addressed in the Outer Area decision documents.

Locations of the waste sites within the scope of this Work Plan are shown in Figures 1-4, 1-5, and 1-6, and in a larger and more legible format in Plates 1, 2, and 3 on the enclosed compact disc. Plate 1 (Figure 1-4) depicts locations of pipeline systems and associated UPR waste sites within the Inner Area and tracked within the Waste Information Data System (WIDS). Plate 2 (Figure 1-5) and Plate 3 (Figure 1-6) are more detailed maps of the waste sites in the East and West Inner Areas, respectively.

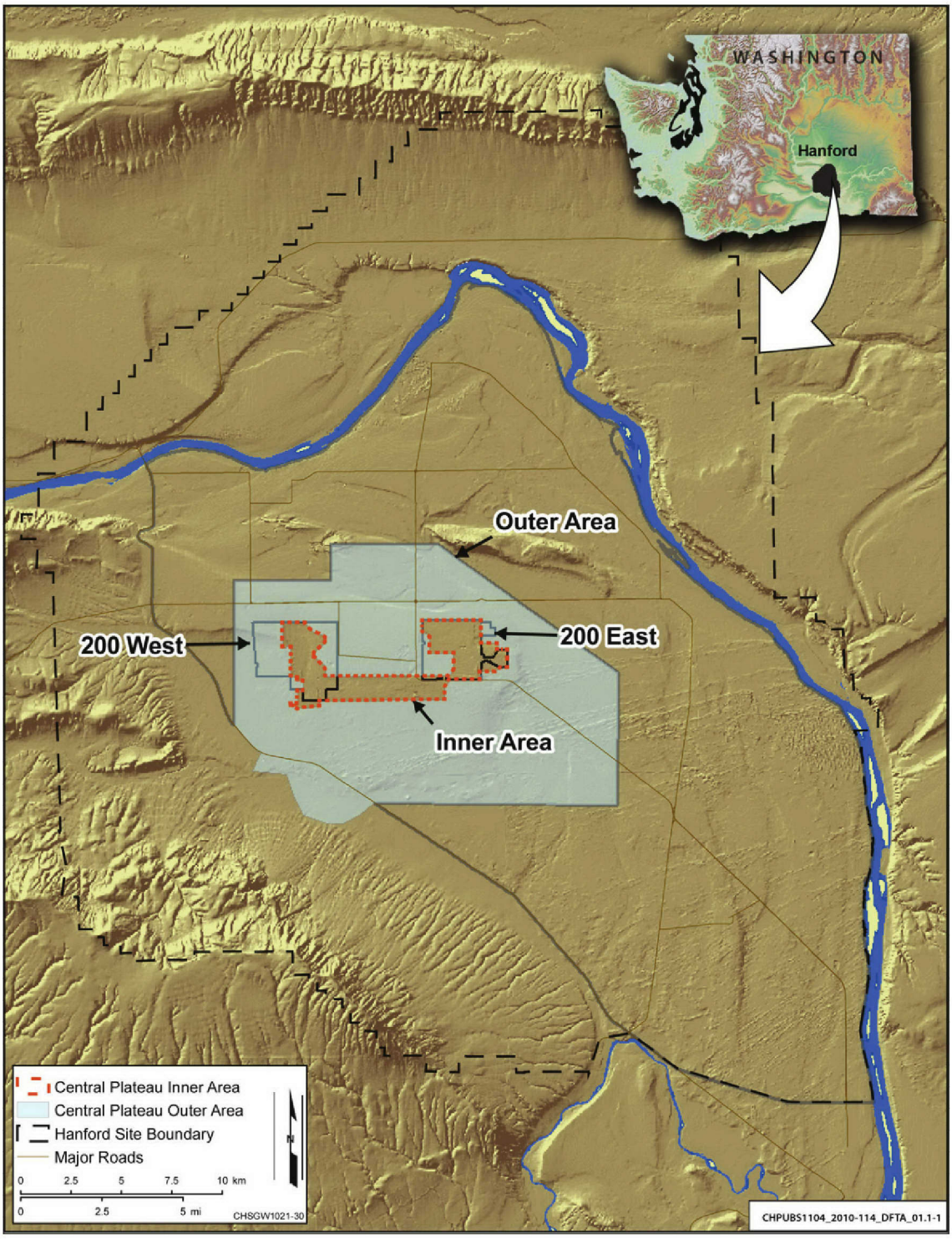

Figure 1-1. Hanford Site

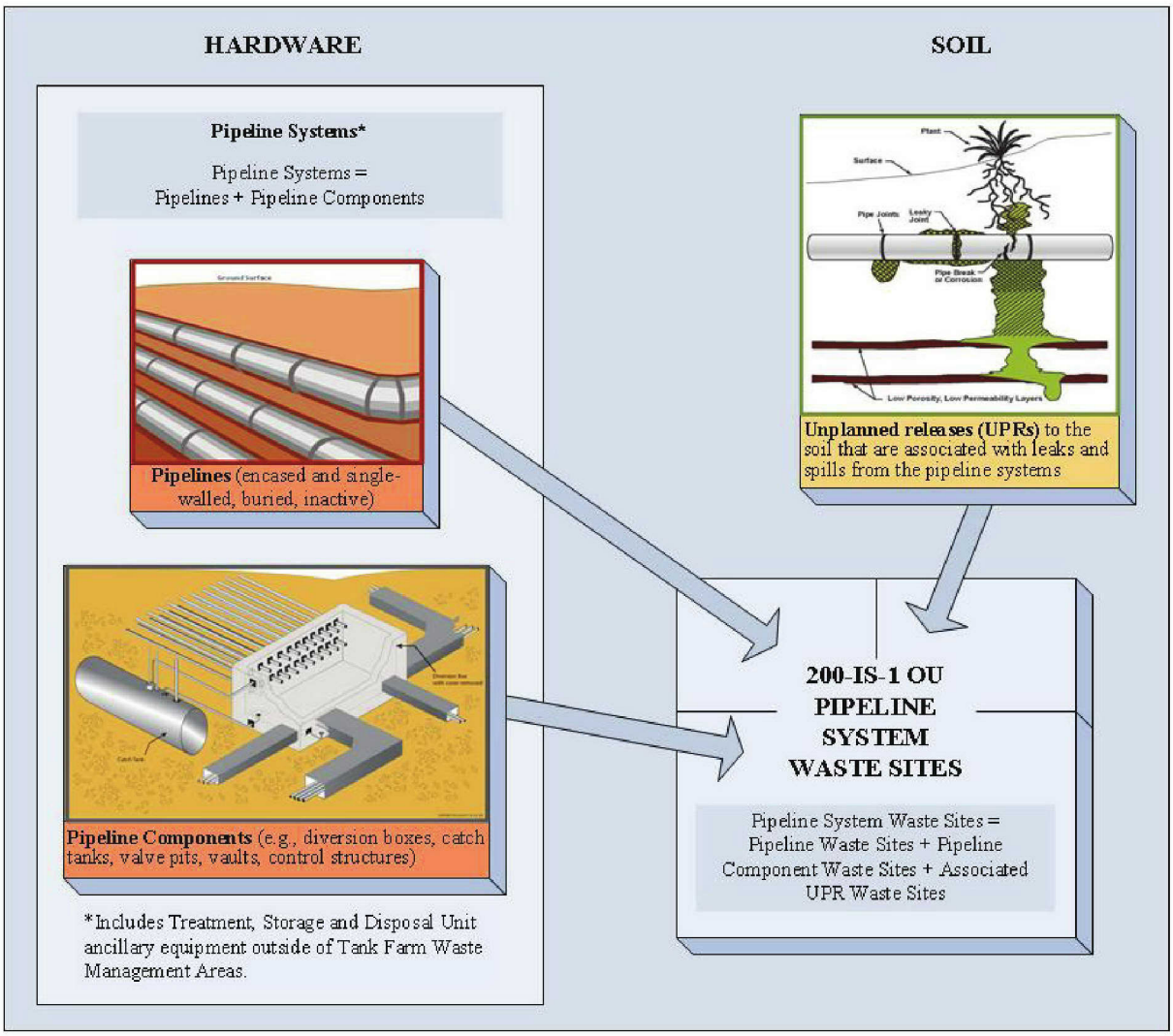

Figure 1-2. 200-IS-1 Operable Unit Work Plan Nomenclature

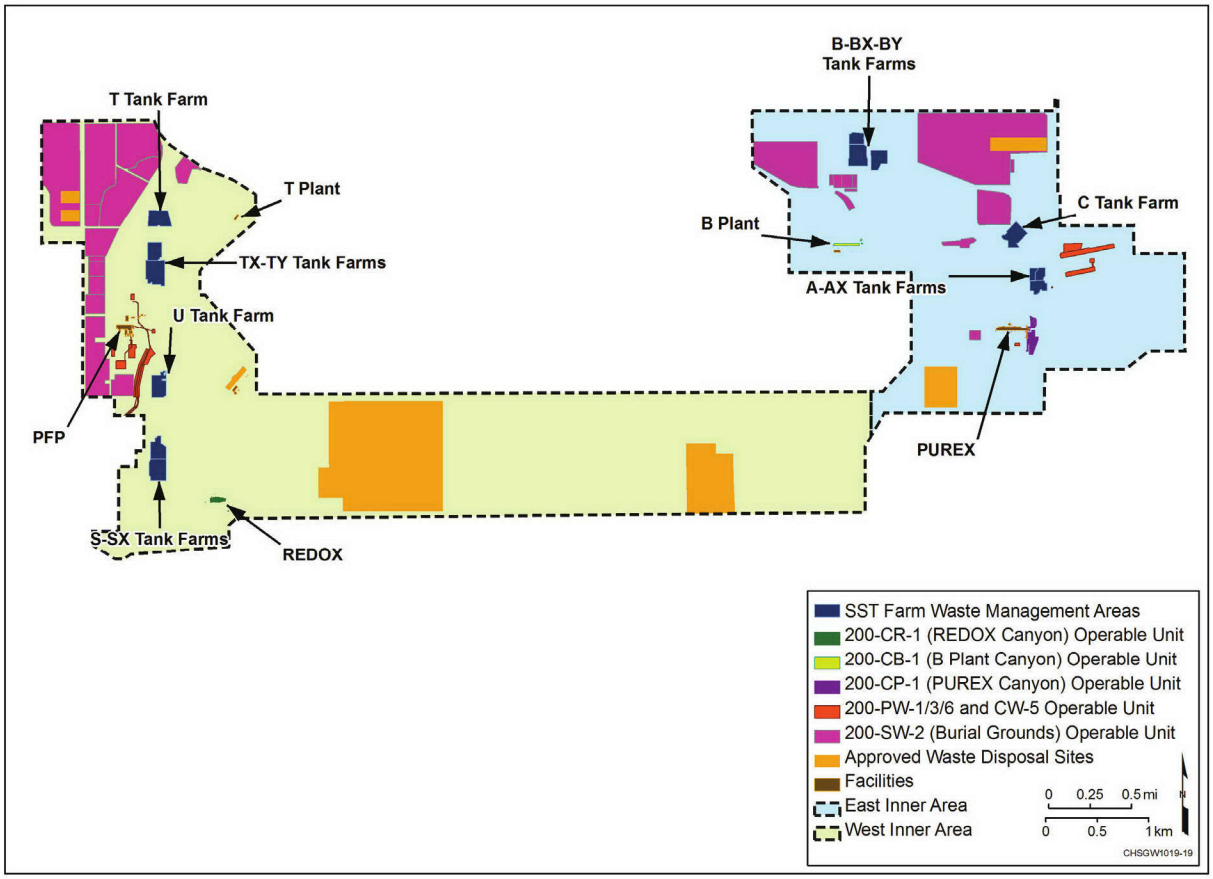

Figure 1-3. Central Plateau Inner Area

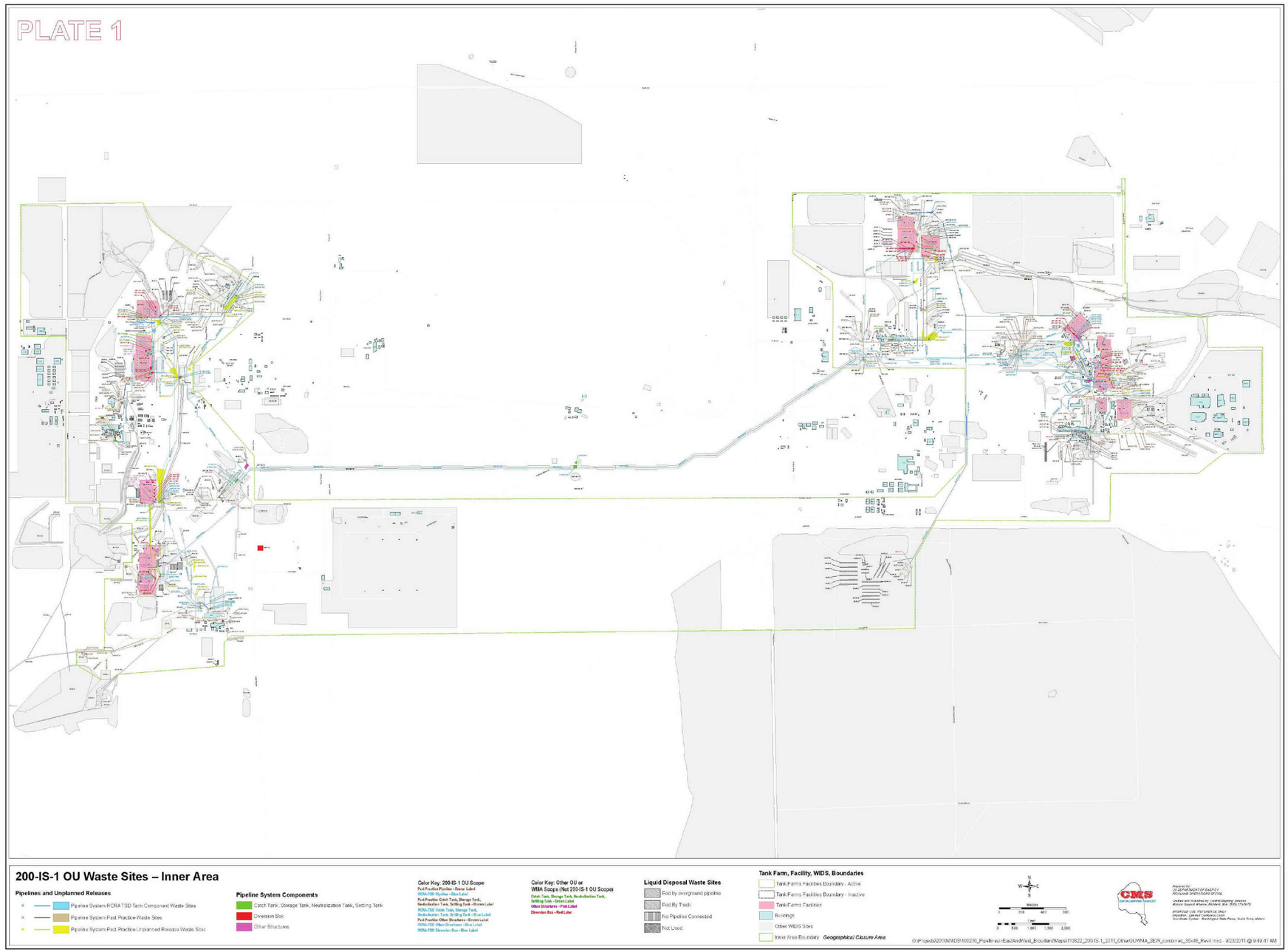

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Figure 1-4. 200-IS-1 Operable Unit Pipeline System Waste Sites in the Central Plateau Inner Area

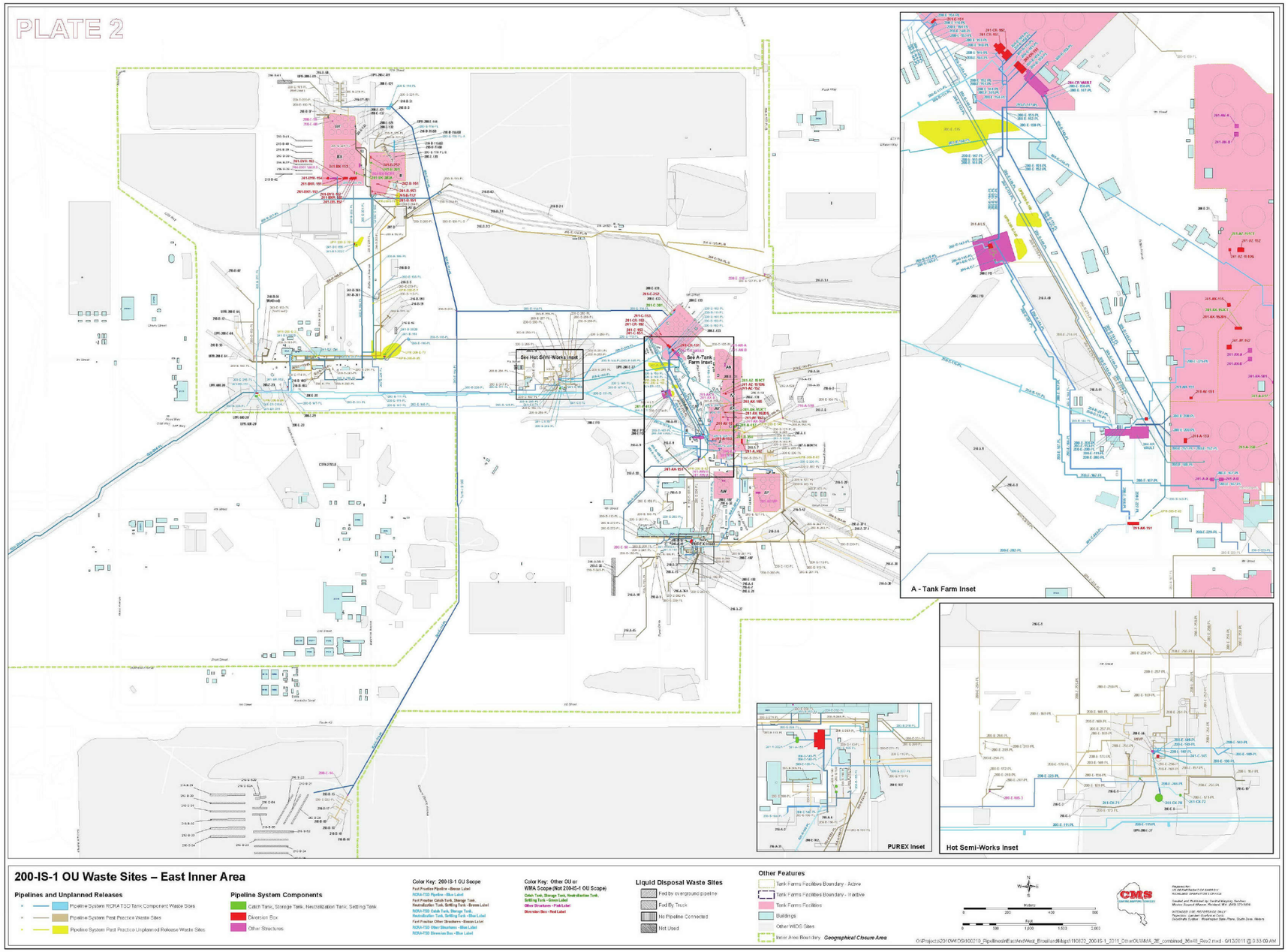

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Figure 1-5. 200-IS-1 Operable Unit Pipeline System Waste Sites in the East Inner Area

PLATE 3

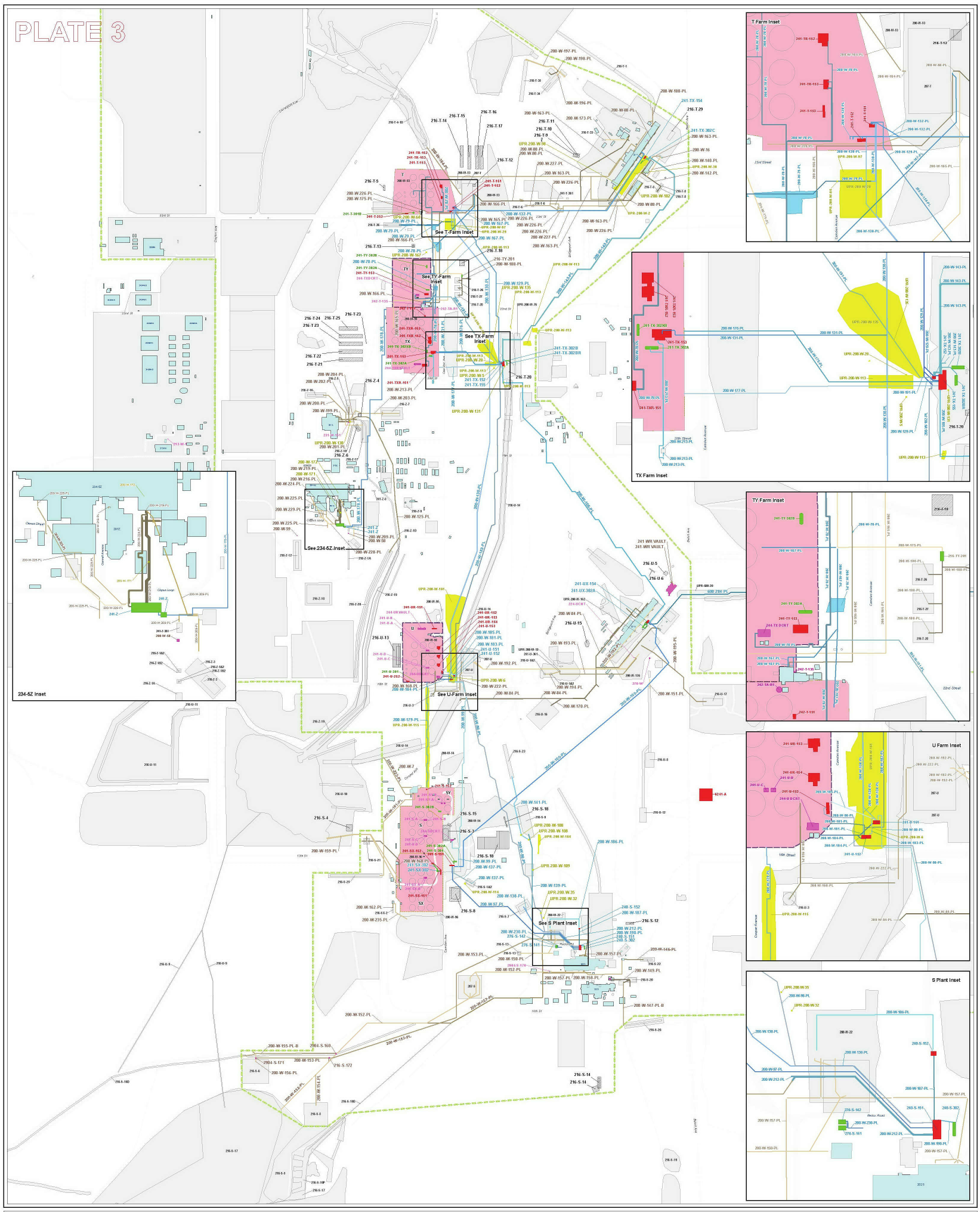

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Figure 1-6. Current Pipeline Systems Identified in the West Inner Area

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The waste sites addressed by this Work Plan include the 200-IS-1 OU waste sites currently identified in Appendix C of the *Hanford Federal Facility Agreement and Consent Order Action Plan* (Ecology et al., 1989b), also known as the Tri-Party Agreement Action Plan, and pipelines, pipeline components, and associated UPR soil waste sites not currently assigned to a specific OU but listed in WIDS. Some of the waste sites that comprise items 1 and 2 include SST system ancillary equipment listed in the SST system Part A Form (WA7890008967, 2011, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 13 for the Treatment, Storage, and Disposal of Dangerous Waste*) of the Hanford Facility RCRA Permit (WA7890008967, 2007, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste*). The SST system ancillary equipment, included within the scope of this Work Plan, is located outside the SST WMAs.

In 2010, the DOE, the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology), also known as the Tri-Parties, agreed to reorganize the OUs in order to achieve geographically-based cleanup decisions on the Central Plateau. To support geographically-based cleanup, it is necessary to align the pipeline system waste sites with their associated facilities and disposal sites. Accordingly, Table 1-1 summarizes the alignment of pipeline system waste sites with respect to future cleanup decisions for the OUs and WMAs within the Central Plateau Inner Area. Appendix A of this Work Plan contains the current listing of pipeline system waste sites, organized by geographic location in either the east or west Inner Areas.

Table 1-1. Central Plateau Inner Area Pipeline System Waste Site Alignment by Operable Unit or Key Facility

Operable Unit or Key Facility[a]	Alignment of Waste Sites	Lead Agency	Document Process	Decision Document
200-IS-1 OU	Past-practice pipeline waste sites, pipeline component waste sites, and associated UPR waste sites in the West and East Inner Areas[b]	Ecology	RCRA and CERCLA	Corrective Action Decision/ Record of Decision (ROD)
	RCRA TSD pipeline waste sites and pipeline component waste sites in the West and East Inner Areas[b]			Hanford Facility RCRA Permit (WA7890008967, 2007)
Reduction Oxidation (REDOX) Canyon (200-CR-1) OU and U Plant Canyon (200-CU-1) Facility[c]	Past-practice and RCRA TSD pipeline waste sites, pipeline component waste sites, and associated UPR waste sites located within a Canyon OU or facility remediation areas	EPA	CERCLA	ROD
B Plant Canyon (200-CB-1) and Plutonium Uranium Extraction (PUREX) Canyon (200-CP-1) OUs, T Plant Canyon Facility[d]	Past-practice and RCRA TSD pipeline waste sites, pipeline component waste sites, and associated UPR waste sites located within a Canyon OU or facility remediation areas	Ecology	CERCLA	ROD

Table 1-1. Central Plateau Inner Area Pipeline System Waste Site Alignment by Operable Unit or Key Facility

Operable Unit or Key Facility[a]	Alignment of Waste Sites	Lead Agency	Document Process	Decision Document
Tank Farm WMAs	Pipeline waste sites, pipeline component waste sites, and associated UPR waste sites located within the tank farm WMAs	Ecology	RCRA	Hanford Facility RCRA Permit (WA7890008967, 2007)

Source: WA7890008967, 2007, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste.*

a. Key facilities are defined in Section 8 of the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989a).

b. Excludes waste sites that are located within a tank farm WMA or a Canyon OU.

c. Includes waste sites within the footprint of the 221-U Facility engineered barrier.

d. T Plant Canyon to be established as an OU in the future.

CERCLA= *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
OU = operable unit
RCRA = *Resource Conservation and Recovery Act of 1976*
ROD = record of decision
TSD = treatment, storage, and disposal
UPR = unplanned release
WMA = waste management area

The primary objectives of this Work Plan include the following:

- Summarize process knowledge and existing characterization data for pipeline system waste sites.
- Identify the information needed, data gaps, and tasks to be completed to support pipeline system waste site remedy decisions.
- Describe the potential remediation alternatives and the basis upon which they will be evaluated.
- Describe how CERCLA and RCRA processes will be coordinated to ensure consistency in the remedy selection process for 200-IS-1 OU pipeline system waste sites that are subject to different regulatory requirements.

The tasks described in this Work Plan include data gathering to support the assessment of existing and future risks associated with the 200-IS-1 OU pipeline system waste sites, the development and evaluation of remedial alternatives, and remedy decisions. Tasks to be performed include:

- Collecting data for pipeline systems and associated UPR waste sites
  - Defining inventory, structural characteristics, and other physical attributes of pipeline system waste sites

  - Assembling pipeline system and associated UPR waste stream characteristics
  - Coordinating pipeline system waste site assignments with 200-IS-1 OU and the respective canyon OUs (e.g., Plutonium-Uranium Extraction [PUREX] Plant, B Plant, and Reduction-Oxidation [REDOX]) and canyon facilities (U Plant and T Plant), and tanks farm WMAs
- Identifying vadose zone transport model and input parameter values for pipeline system waste sites
- Organizing waste site data/information to support Inner Areas baseline risk assessments (BRAs)
- Assessing waste classification in accordance with DOE O 435.1, *Radioactive Waste Management*, and potential waste disposal pathways
- Preparing the RFI/CMS/RI/FS document, including TSD closure information to support permit modification
- Preparing the proposed corrective action decision/proposed plan (PCAD/PP) document

This Work Plan presents an approach for streamlining the remedial decision process. As the pipeline systems extend over 100 miles and include a variety of pipelines, pipeline components and associated UPRs, DOE believes it would be impractical to conduct extensive field characterization for the 200-IS-1 OU waste sites to support the RFI/CMS/RI/FS process before a remedy decision is made. This position is based on: (1) the vast geographical extent of the pipeline systems and the inability to collect a statistically representative data set that would reduce all uncertainty and ensure a complete determination of the nature and extent of contamination, and (2) available process knowledge and existing characterization data that can be assembled to support remedy decisions. DOE has therefore included in this Work Plan an approach to streamline remedial decisions whereby additional characterization will be conducted in conjunction with the remedial actions. Under this approach, post-corrective action decision/record of decision (CAD/ROD) characterization will be performed during pipeline and pipeline component removals in order to confirm the actual risks. The post-CAD/ROD characterization data will be evaluated to determine if removal of additional pipeline system waste sites is warranted. If it is determined that the pipelines and pipeline components do not represent a risk to human health and the environment (HHE), the CAD/ROD could be modified to reflect that no further removal is necessary. Section 4 of this Work Plan presents additional detail on the characterization approach and rationale for the waste sites.

1.2 Integration Activities

The two key remedy integration objectives are: (1) implement a consistent approach for making remedial decisions for pipeline systems, and (2) complete remediation on a geographic implementation area basis. The pipeline system wastes sites on the Central Plateau transect several geographic cleanup areas, which include OUs in the Inner and Outer Areas and tank farm WMAs. In some cases, a waste site transects more than one OU or tank farm WMA. Within the Inner Area, there are also operating TSD facilities with associated ancillary equipment.

This Work Plan presents the methodology that will be used to conduct the alternative evaluations that will support the remedial action decision process for the 200-IS-1 OU pipeline system waste sites. As part of this process, pipeline system waste sites will be identified, based on proximity,

for reassignment into the Canyon OUs or tank farm WMAs. This process will involve the identification and reassignment of portions of the pipeline system to the OU or tank farm WMA with which it should be associated. The newly assigned portion of the pipeline system waste site will be given a unique waste site code in WIDS that will designate its association with its respective OU or WMA. The information gathering tasks and activities presented in this Work Plan will support subsequent remedial decisions for each Canyon OU or WMA.

Additional integration will occur post-CAD/ROD. Remediation of pipeline system waste sites will be executed through approved corrective measure implementation and remedial design/remedial action work plan (CMI/RD/RA WP) and sampling and analysis plan (SAP) documents and coordinated among geographic closure implementation areas within the Inner Area. The geographic closure implementation areas are envisioned to be regions centered around the major canyon facilities, groupings of landfills, and other waste site types for the purposes of efficiently and effectively managing the execution of remediation activities among the Inner Area OUs. While the concept of geographic closure has been embraced by the Tri-Parties, DOE is still working on delineating the specific geographic boundaries for the implementation areas. Figure 1-7 depicts the current concept for geographic closure implementation areas for the Inner Area. While the specific sequence of cleanup by geographic closure implementation areas has yet to be finalized, facilities with a current and continuing mission (e.g., T Plant) will be sequenced later than the other areas (e.g., U Plant and B Plant).

1.3 RCRA and CERCLA Regulatory Processes

The 200-IS-1 OU includes wastes sites that are RCRA TSD ancillary equipment as well as RCRA-CERCLA past-practice waste sites. The RCRA-CERCLA past practice (R-CPP) waste sites will be remediated through the agreed-to processes and activities described in Section 7 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b). Coordination of closure requirements for RCRA TSD ancillary equipment and remedial action requirements for the R-CPP waste sites will be defined and agreed to between the Tri-Parties to optimize cleanup of the 200-IS-1 OU and ensure compliance with applicable regulatory requirements.

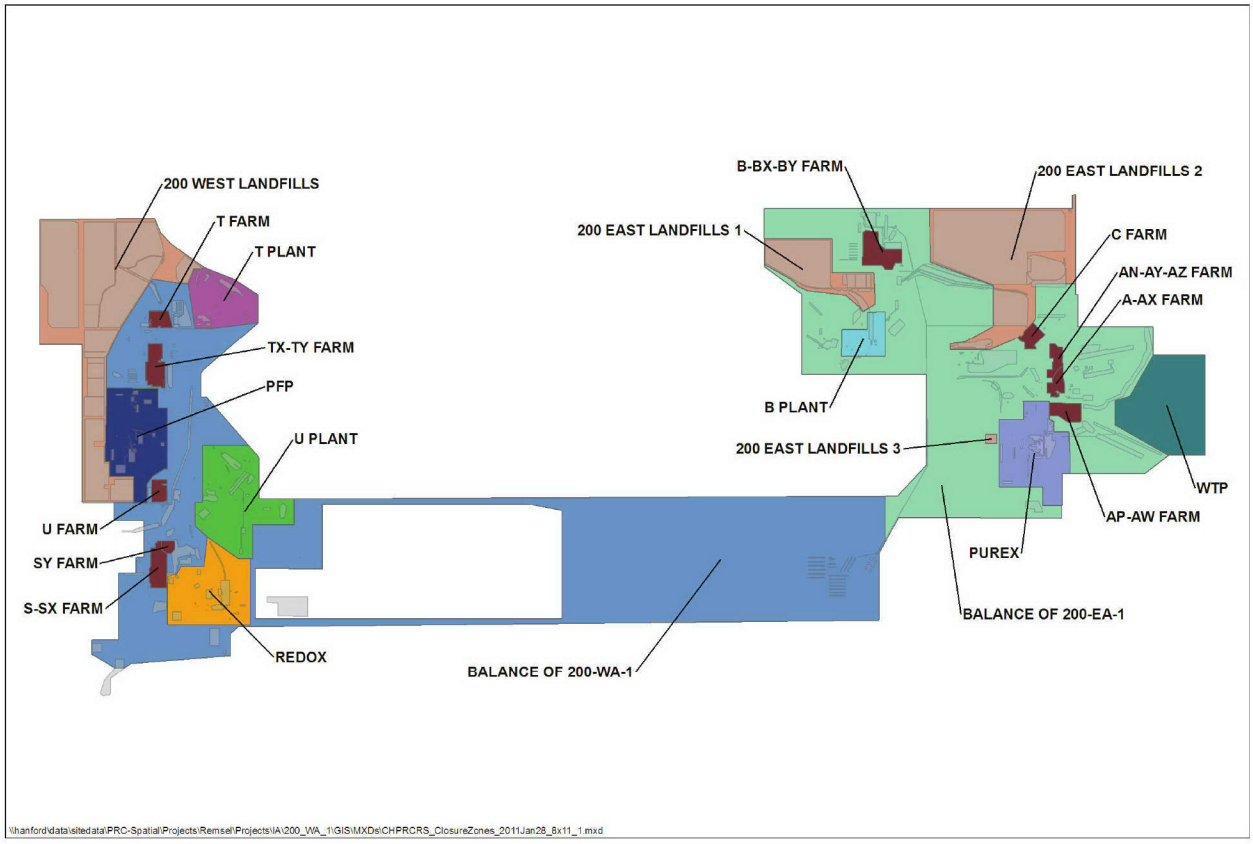


Figure 1-7. Conceptual Geographic Closure Implementation Areas for the Inner Area

1.3.1 RCRA TSD Closure and Corrective Action Coordination with CERCLA RI/FS Evaluations

RCRA TSD ancillary equipment closure actions and corrective action requirements for releases to soil that are associated with TSD ancillary equipment will be performed in accordance with requirements described by Ecology in the Hanford Facility RCRA Permit (WA7890008967, 2007). RCRA TSD closure and corrective action requirements will be coordinated with the 200-IS-1 OU CERCLA RI/FS evaluations. Coordinating RCRA closure/corrective actions and CERCLA remedial actions allows for the streamlining of cleanup decisions that will meet both TSD closure and remedial action requirements. A coordinated approach to achieving RCRA and CERCLA regulatory requirements will facilitate reaching consistent remedy decisions and align the timing of decisions under the two regulatory processes. Remedial design and implementation activities will thus be consistent and can be concurrently performed for both past-practice and TSD pipeline system waste sites within the same geographic cleanup area. In order to provide further optimization of remedy selection and implementation, pipeline system wastes sites that are within the canyons and tanks farms remediation areas will be addressed as part of the respective Canyon OUs remedies or tank farm WMA closure actions.

The Tri-Parties have developed a specific process for coordinating the regulatory authorities for CERCLA and RCRA within 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, describes the rationale for placing units in either a R-CPP or a CERCLA past-practice category for corrective action.

1.3.2 Interface between TSD Units and Past-Practice Units

In some cases at the Hanford Site, such as with the 200-IS-1 OU, TSD units are closely associated with past-practice units, either geographically or through similar processes and waste streams. Section 5.5 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b) describes the interface between TSD units and past-practice units. Section 5.5 defines the procedure to coordinate the TSD unit closure or permitting activity with the past-practice investigation and remediation activity to prevent overlap and duplication of work, thereby economically and efficiently addressing the contamination.

A single 200-IS-1 OU RFI/CMS/RI/FS document will be prepared. The information necessary for achieving RCRA closures/post closures and corrective actions within 200-IS-1 OU will be presented in the 200-IS-1 OU RFI/CMS/RI/FS document. R-CPP waste sites will be remediated through the processes and activities described in Section 7 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b).

The TSD closure portion(s) of the 200-IS-1 OU RFI/CMS/RI/FS will be structured such that RCRA closure requirements can be readily identified for a separate review/approval process and subsequent incorporation into the RCRA Permit through the modification process. No separate stand alone closure plan is anticipated.

A PCAD/PP will be available for public comment in parallel with the public comment period for the RCRA permit modification. Following the comment period on the proposed permit modification and the PCAD/PP, a CAD/ROD and RCRA permit modification will be issued.

The selected closure/post-closure activities, corrective and remedial actions, and associated design details for the TSD units and ancillary equipment waste sites in 200-IS-1 OU and the remedial actions for the non-TSD R-CPP waste sites will be presented as part of the CMI/RD/RA WP. The following proposed closure/post-closure and remedial activities will be contained in the CMI/RD/RA WP:

1. Address compliance with RCRA closure and corrective action performance standards and CERCLA remediation requirements.

2. Be consistent with requirements specified in the Hanford Facility RCRA permit (WA7890008967, 2007).

3. Coordinate with the recommended remedial action(s) for the R-CPP 200-IS-1 OU waste sites.

The SST system TSD ancillary equipment outside of the tank farm WMA in both the 200 West Inner Area and 200 East Inner Area will be closed in accordance with the detailed closure information that will be provided in the CMI/RD/RA WP to ensure consistency in the implementation of closure actions with the remedial decision documented in the CAD/ROD and permit.

If, at a later date, TSD units and/or ancillary equipment waste sites need to be deleted from or added to the scope of the 200-IS-1 OU, the CAD/ROD and permit will be modified to reflect these changes.

1.3.3 NEPA and SEPA Requirements

Under DOE O 451.1B, *National Environmental Policy Act Compliance Program*, Section 5.a. (13), DOE will: "…incorporate National Environmental Policy Act (NEPA) values, such as analysis of cumulative, off-site, ecological, and socioeconomic impacts, to the extent practicable,

in DOE documents prepared under the *Comprehensive Environmental Response, Compensation, and Liability Act.*" The "State Environmental Policy" (RCW 43.21C), also known as the *State Environmental Policy Act* (SEPA) is the State of Washington's regulation that describes activities that require a determination of significance or non-significance as part of the State approval and authorization process. This process allows for adopting other environmental documents in lieu of a State prepared document to support the determination. Ecology will make a decision during the development of the RFI/CMS/RI/FS if the information is going to be sufficient to make a determination on the TSD closure actions and to support a permit modification. The coordination of CERCLA remedial action and RCRA closure and corrective action processes will ensure that *National Environmental Policy Act of 1969* (NEPA) values addressing the potential environmental impacts of the actions are considered during the evaluation of remedial alternatives for the 200-IS-1 OU. The analysis of the environmental impacts will be documented in the RFI/CMS/RI/FS and, if necessary, the document will provide supplemental information to ensure NEPA values are properly considered.

1.3.4 DOE O 435.1 Waste Determination

DOE requires an assessment of the wastes in the 200-IS-1 OU pipeline system waste sites in order to determine if the pipeline system hardware and associated residual waste are suitable for near surface disposal on the Hanford Site or if they require removal and disposal and isolation at an off-site geologic repository. The steps to conduct this assessment at the Hanford Site are defined in DOE O 435.1. The Waste Incidental to Reprocessing (WIR) process described in the DOE O 435.1 identifies the criteria to be used to conduct this assessment and make the necessary determination. DOE will utilize the CERCLA process to document that it has met its obligations under DOE O 435.1.

1.4 Other RCRA TSD Tank Systems in the 200-IS-1 Operable Unit

The list of 200-IS-1 OU waste sites, identified in Appendix C of the Tri-Party Agreement Action Plan (Ecology et al., 1989b), also includes certain RCRA TSD tanks that are not part of the SST system:

- 241-CX Tank System (the 241-CX-70 Storage Tank, 241-CX-71 Neutralization Tank, and 241-CX-72 Storage Tank)
- Hexone Storage and Treatment Facility (HSTF) tanks (276-S-141 and 276-S-142 Hexone Storage Tanks)
- 241-Z Neutralization Tanks (241-Z-D-4, 241-Z-D-5, 241-Z-D-7, and 241-Z-D-8) and the 241-Z Sump and 241-Z Tank Pit

RCRA closure plans for the 241-CX Tank System and HSTF TSD tanks are presented in DOE/RL-2008-51, *241-CX Tank System Closure Plan*, and DOE/RL-2009-112, *Hexone Storage and Treatment Facility Closure Plan*. Pipelines that are ancillary equipment associated with these tanks are identified within the closure plans. Final closeout of these tanks and ancillary equipment will be documented as part of the 200-IS-1 OU remedial action.

The 241-Z Neutralization Tanks (241-Z-D-4, 241-Z-D-5, 241-Z-D-7, and 241-Z-D-8) 241-Z Sump, and 241-Z Tank Pit have been RCRA clean closed pursuant to DOE/RL-96-82, *Hanford Facility Dangerous Waste Closure Plan, 241-Z Treatment and Storage Tanks*. Closure certifications were provided to Ecology for the 241-Z Tank System and ancillary equipment (07-AMCP-0062, "Closure Certification for the 241-Z Treatment and Storage Tanks." Ecology's

letter accepting RCRA clean closure for the 241-Z TSD unit was received February 22, 2007 (072317, "Letter 07-AMCP-0062 dated December 20, 2006, from Mr. Keith A. Klein, United States Department of Energy (USDOE) to Ms. Jane A. Hedges, Washington State Department of Ecology, Nuclear Waste Program, *Closure Certification for the 241-Z Treatment and Storage Tanks*"). Closeout actions to satisfy CERCLA requirements will be addressed, as appropriate, for RCRA TSD units in the 200-IS-1 OU remedial action process.

2 Background and Setting

This chapter presents an overview of the 200 Area hydrogeology, environmental resources, and cultural resources. It provides the general characteristics of pipeline system waste sites. This chapter also includes a description of the waste generating operational processes and the process waste streams handled by pipeline systems. Information in this chapter has been compiled from a number of sources, the most significant of which are as follows:

- D&D-30262, *Data Quality Objectives Summary Report for the IS-1 Operable Unit Pipelines and Appurtenances*
- DOE/RL-98-28, *200 Areas Remedial Investigation/Feasibility Study Implementation Plan – Environmental Restoration Program*
- DOE/RL-96-81, *Waste Site Grouping Report for 200 Areas Soil Investigations*
- DOE/RL-2002-39, *Standardized Stratigraphic Nomenclature for Post-Ringold Formation Sediments Within the Central Pasco Basin*
- RPP-PLAN-41977, *Single-Shell Tank System Component Identification and Proposed Closure Strategy*
- Hanford Environmental Information System (HEIS)
- Tank Waste Information Network System (TWINS)
- WIDS

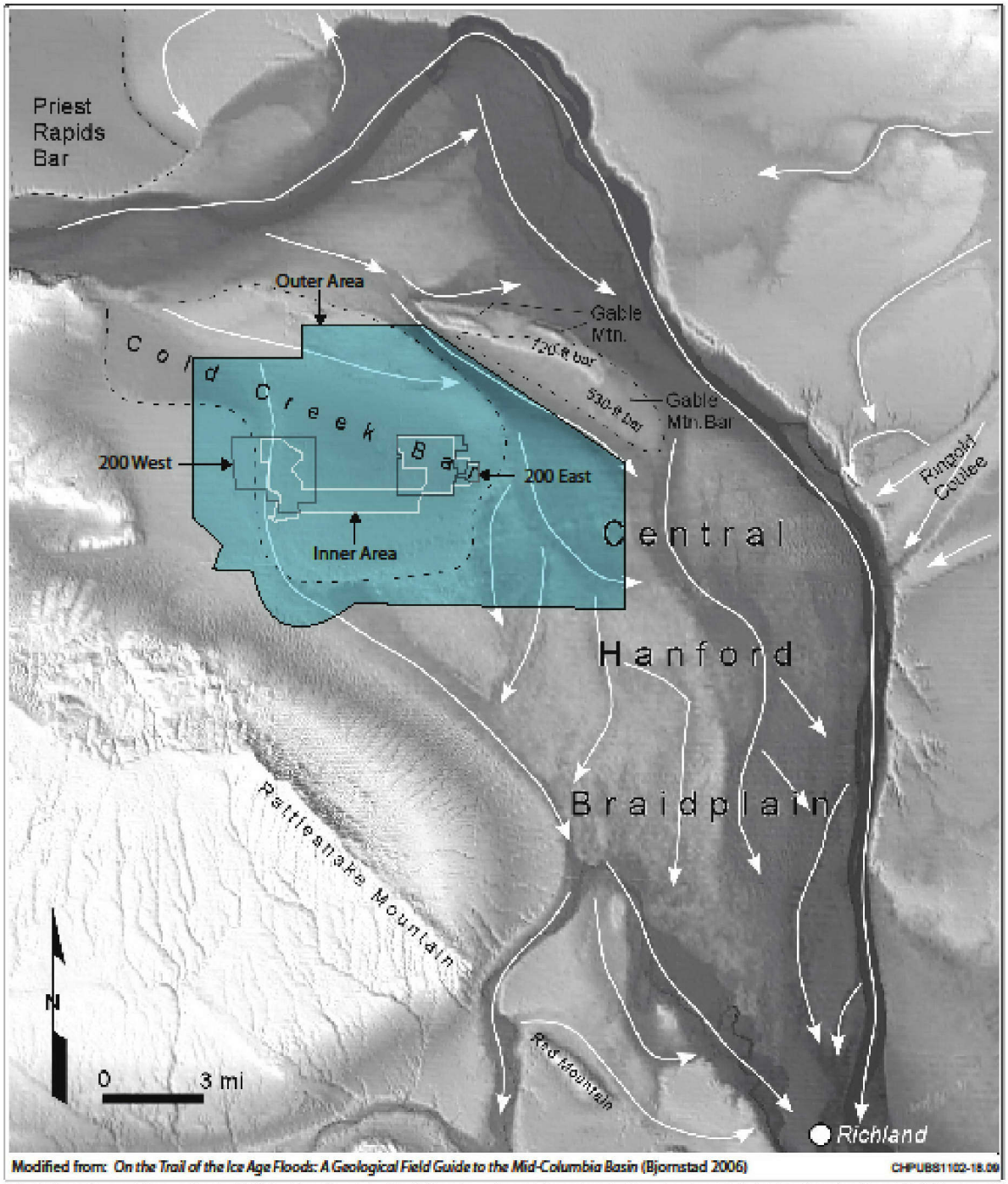
Appendix B provides additional site-specific information.

2.1 Summary of Hydrogeologic Conditions

This section summarizes the topography, geology, and hydrology associated with the 200 Area pipeline system waste sites. Along with DOE/RL-98-28, other documents cited provide additional information on the physical setting. Two reports published by Pacific Northwest National Laboratory (PNNL) provide detailed information on the hydrology of the 200 Area and vicinity, and include the geochemistry and conceptual groundwater flow models for the 200 East and 200 West Areas (PNNL-12261, *Revised Hydrogeology for the Suprabasalt Aquifer System, 200-East Area and Vicinity, Hanford Site, Washington*, and PNNL-13858, *Revised Hydrogeology for the Suprabasalt Aquifer System, 200-West Area and Vicinity, Hanford Site, Washington*). Additionally, hydrogeologic updates to these regions, incorporating new hydrogeologic and geophysical information, are provided in the most recent CERCLA RI/FS reports for the four groundwater OUs. These OUs are designated as 200-PO-1, 200-BP-5, 200-UP-1, and 200-ZP-1.

2.1.1 Topography

Pipeline system waste sites are located on the 19 km (12 mi) long Cold Creek Bar (Figure 2-1) within the 200 East and 200 West Areas (also referred to as the Central Plateau). The Cold Creek Bar developed during multiple, cataclysmic Ice Age floods that began 2.6 million years ago and ended between 10,000 to 15,000 years ago. The bar was created when the flood waters spread out and slowed down, causing deposition of sediment. Most of the 200 West Area and the southern half of the 200 East Area are situated on the Cold Creek Bar. Its upper surface lies up to several hundred feet above the surrounding plains. Flood deposits making up the bar are up to 100 m (328 ft) thick over the eastern end of the



Modified from Bjornstad, 2006, *On the Trail of the Ice Age Floods: A Geological Field Guide to the Mid-Columbia Basin*.

Figure 2-1. Cold Creek Bar and Network of Interconnected Flood Channels

bar near the 200 East Area. The Cold Creek Bar trends generally east-west with elevations between 197 and 225 m (646 to 738 ft) above mean sea level (amsl) (NAVD88, *North American Vertical Datum of 1988*). The plateau drops off rather steeply to the north and northwest into an ancestral flood channel(s) with elevation changes of between 15 and 30 m (49 and 98 ft). The plateau gently decreases in elevation to the south into the Cold Creek Valley and to the east toward the Columbia River. The northern half of

the 200 East Area lies on the sloping flank of the former flood channel(s). A secondary flood channel running south from the main channel bisects the 200 West Area. The buried ancestral Columbia River and/or paleo flood channels may provide preferential pathways for groundwater and contaminant movement where flood/river deposits incise older less permeable sediment.

Figure 2-2 shows the topography of the Central Plateau at the Hanford Site. The 200 West Area occupies a relatively flat area of the Cold Creek Bar that includes a possible secondary flood channel. Surface elevations range from approximately 200 to 220 m (656 to 722 ft) amsl (NAVD88), and the ground surface slopes gently to the southwest. The surface of the 200 East Area slopes gently to the northeast. Surface elevations in the 200 East Area range from approximately 180 m (590 ft) amsl (NAVD88) in the northeast corner of the area to about 230 m (755 ft) amsl (NAVD88) in the southeast corner of the area.

2.1.2 Geology

The Hanford Site is located in the Pasco Basin, one of several structural and topographic basins of the Columbia Plateau. Basalts of the Columbia River Basalt Group and a sequence of suprabasalt sediments underlie the 200 East and 200 West Areas. From oldest to youngest, the major geologic units present consist of the Elephant Mountain Member (basalt), and suprabasalt sediment consisting of the Ringold Formation, the Cold Creek unit, the Hanford formation, and surficial deposits. Figure 2-3 shows generalized stratigraphic and hydrostratigraphic columns and associated nomenclature used in the 200 Area. The following paragraphs describe the geologic units of interest.

Elephant Mountain Member. The Elephant Mountain Member is part of the Saddle Mountains Basalt, the uppermost formalized formation in the Columbia River Basalt Group and the uppermost basalt unit (i.e., bedrock) present beneath the 200 Area (DOE/RL-98-28, Appendix F). Except for a small area north of the 200 East Area—where it has been eroded away and the Pomona Member of the Saddle Mountains Basalt is exposed—the Elephant Mountain Member is laterally continuous throughout the 200 Area.

Ringold Formation. The Ringold Formation consists of an interstratified fluvial-lacustrine sequence of unconsolidated to semi-consolidated clay, silt, sand, and granule-to-cobble gravel deposited by the ancestral Columbia River (PNNL-12261 and PNNL-13858). These sediments (Figure 2-3) consist of four major units (from oldest to youngest): (1) the fluvial gravel and sand of unit 9 (basal coarse, Ringold unit A); (2) the buried soil horizons, overbank, and lake deposits of unit 8 (Ringold lower mud); (3) the fluvial sand and gravel of unit 5 (upper coarse, Ringold unit E); and (4) the lacustrine mud of unit 4 (upper fines, upper Ringold). Units 9 and 5 consist of a silty-sandy gravel with secondary lenses and interbeds of gravelly sand, sand, and muddy sands to silt and clay.

Unit 8 consists mainly of silt and clay. Unit 4 consists of silty overbank deposits and fluvial sand. Units 6 and 7 are not present beneath the 200 West and 200 East Areas (PNNL-12261 and PNNL-13858).

Cold Creek Unit. The Cold Creek unit is the recently standardized name applied to several post-Ringold Formation and pre-Hanford formation units present beneath the 200 East and 200 West Areas (DOE/RL-2002-39). The Cold Creek unit includes the formations formerly described as the Plio-Pleistocene unit, caliche (unit 3), early Palouse soil (unit 2), Pre-Missoula gravels, and sidestream alluvial facies. The Cold Creek unit has been divided into five lithofacies: (1) fine-grained, laminated to massive (fluvial-overbank and/or eolian deposits [unit 2], formerly called the early Palouse soil); (2) fine-to coarse-grained, calcium-carbonate cemented (calcic paleosol [unit 3], formerly called the caliche); (3) coarse-grained, multilithic (mainstream alluvium, formerly called the Pre-Missoula gravels); (4) coarse-grained, angular, basaltic (colluvium); and (5) coarse-grained, rounded, basaltic (side-stream alluvium, formerly called the side-stream alluvial facies) (DOE/RL-2002-39). Only the first three of these units are present within the Hanford Site Central Plateau, as depicted in Figure 2-3.

Hanford Formation. The Hanford formation (unit 1) is the informal stratigraphic name used to describe the Pleistocene cataclysmic flood deposits in the Pasco Basin (DOE/RL-2002-39). 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). The Hanford formation is divided into three main lithofacies: (1) interbedded sand- to silt-dominated (formerly called the Touchet Beds or the slackwater facies); (2) sand-dominated (formerly called the sand-dominated flood facies); and (3) gravel-dominated (formerly called the Pasco gravels), which have been subdivided further into 11 textural-structural lithofacies (DOE/RL-2002-39). Beneath the pipeline system waste sites, the Hanford formation includes all three facies. The gravel-dominated facies are cross-stratified, coarse-grained sands, and granule-to-boulder gravel. The gravel is uncemented and matrix-poor. The sand-dominated facies are well-stratified fine- to coarse-grained sand and granule gravel. Silt in these facies is variable and may be interbedded with the sand. Where the silt content is low, an open-framework texture is common.

Clastic dikes are common in the Hanford formation but are rare in the Ringold Formation (DOE/RL-98-28 and DOE/RL-2002-39). They appear as vertical to subvertical sediment-filled structures, especially within sand- and silt-dominated units.

The cataclysmic floodwaters that deposited sediments of the Hanford formation also locally reshaped the topography of the Pasco Basin. The floodwaters deposited a thick sand and gravel bar that constitutes the higher southern portion of the 200 Area, informally known as the 200 Area Plateau. In the waning stages of the last Ice Age, these floodwaters also eroded a channel north of the 200 Area in the area currently occupied by Gable Mountain Pond. These floodwaters removed all of the Ringold Formation from this area and deposited Hanford formation sediments directly over basalt.

Surficial Deposits. Surficial deposits include Holocene eolian sheets of sand that form a thin veneer over the Hanford formation across the site, except in localized areas where the deposits are absent. Surficial deposits consist of very fine- to medium-grained sand to occasionally silty sand. Silty deposits less than 1 m (approximately 3 ft) thick also have been documented at waste sites where fine-grained, wind-blown material has settled out through standing water over many years (DOE/RL-98-28, Appendix F).

2.1.3 Vadose Zone

The vadose zone is approximately 104 m (341 ft) thick in the southern section of the 200 East Area and thins to the north to as little as 0.3 m (1 ft) near West Lake, north of the 200 East Area. Vadose zone hydrostratigraphic units in the 200 Area include the Ringold Formation, Cold Creek unit, Hanford formation, and surficial deposits (see Figure 2-3). Geologic uplift associated with the formation of Gable Mountain and Gable Butte, along with paleo flood and ancestral Columbia River erosion, most likely removed much of the older sediment (i.e., Ringold) from the northern portion of the plateau near the Gable Mountain/Butte structure.

Because this erosion removed much of the Ringold Formation north of the central part of the 200 East Area, the vadose zone is predominantly composed of Hanford formation sediments between the northern part of the 200 Area and Gable Mountain. The Cold Creek unit may be present in a small area immediately above the basalt.

Geologic formations that generally confine or retard groundwater movement are present at or above the water table in this area. Basalt projects above the water table north of the 200 East Area (PNNL-12261), and the Ringold Formation unit 8 (Ringold lower mud) occurs at or above the water table east of the 200 East Area (PNNL-12261), northeast of the 200 West Area, and west of the 200 East Area (PNNL-13858).

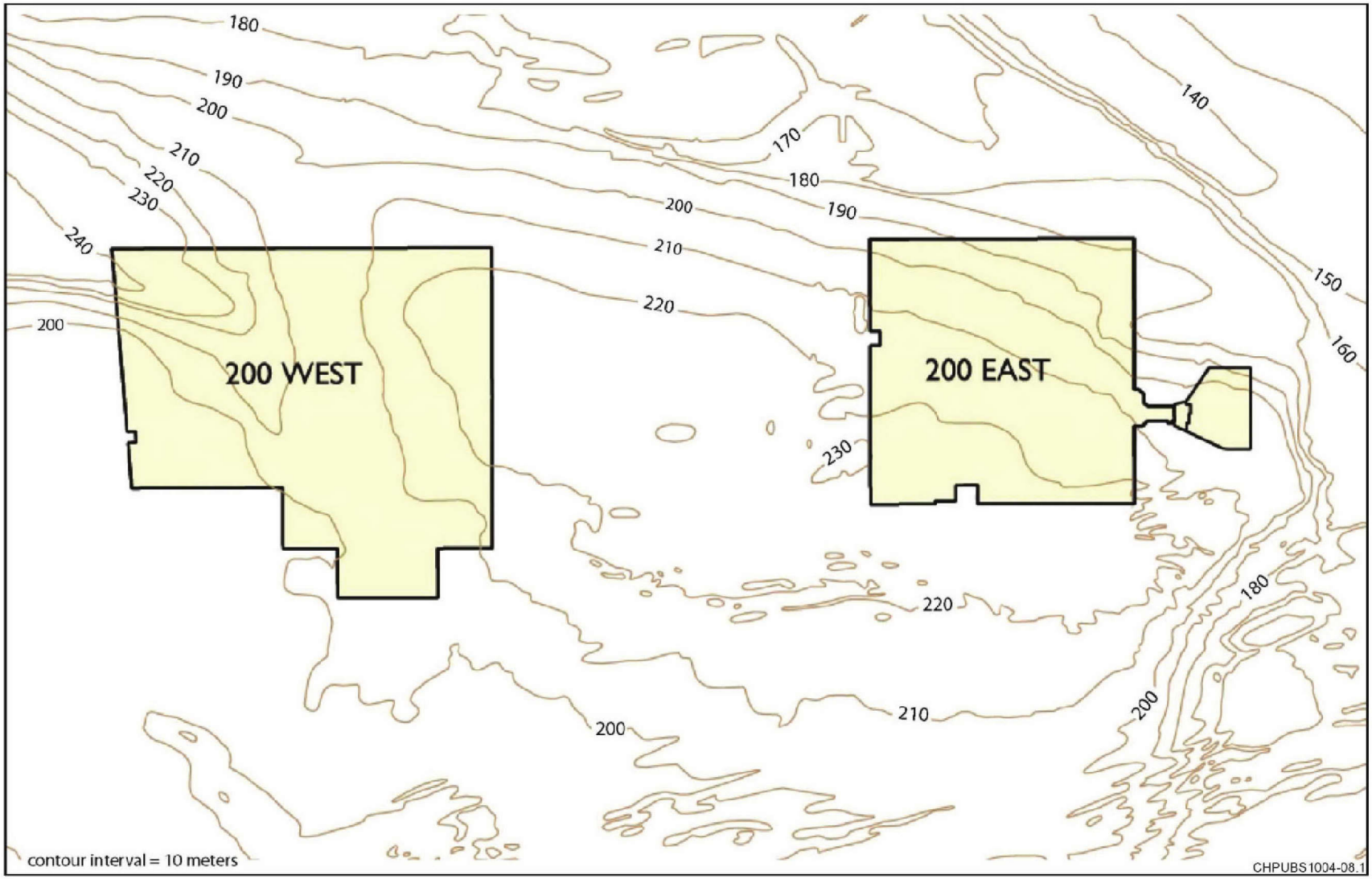
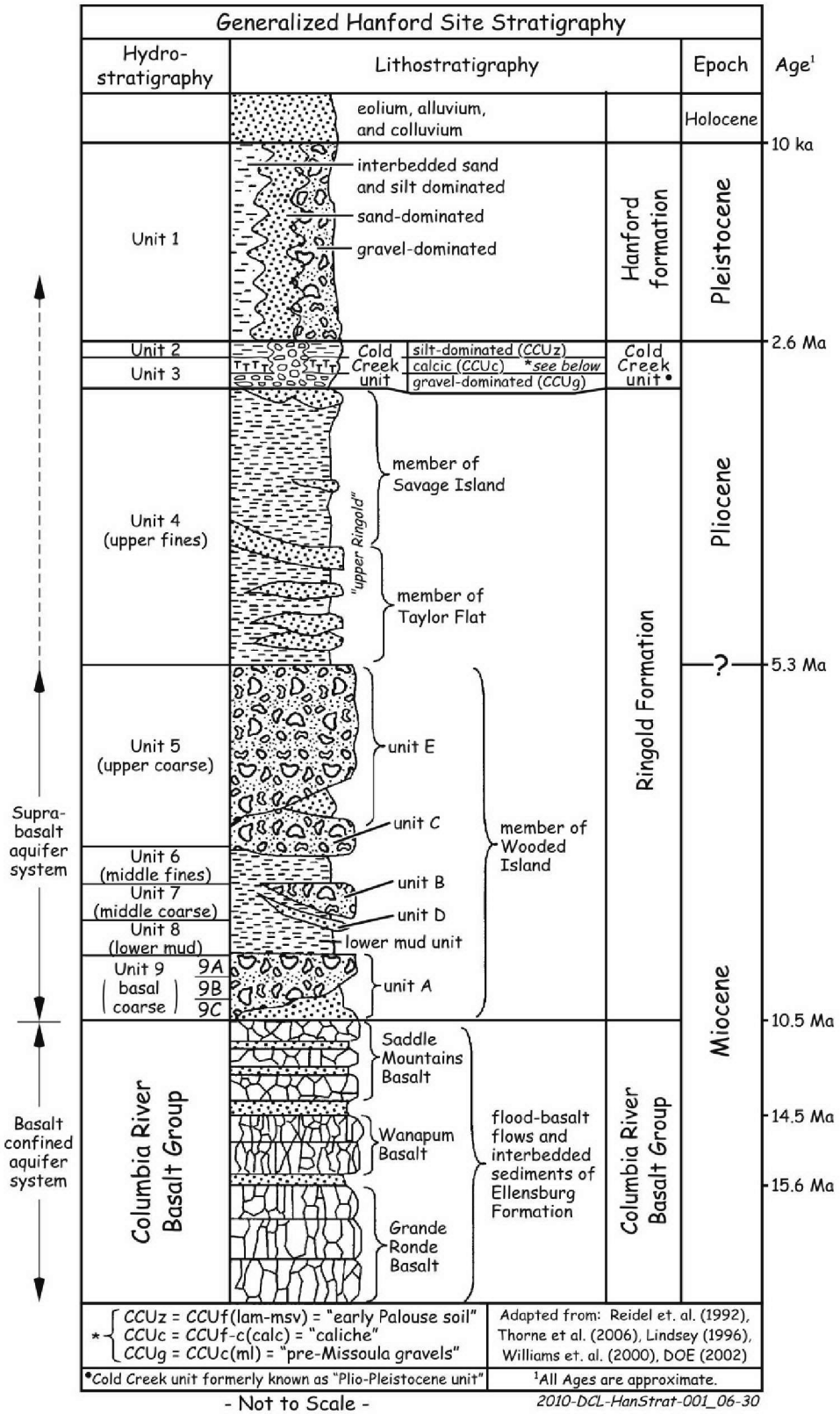


Figure 2-2. Topographic Map of the Central Plateau at the Hanford Site



Source: PNNL-18819, *Hanford Site Guidelines for Preparation and Presentation of Geologic Information*.

Figure 2-3. Generalized Stratigraphic and Hydrostratigraphic Column for the 200 Area

In the 200 West Area, the vadose zone thickness ranges from 40.2 to 102 m (132 to 335 ft). The Ringold Formation, Cold Creek unit, and Hanford formation comprise the vadose zone sediments. Erosion during cataclysmic flooding removed some of the Ringold Formation and the Cold Creek unit.

In the 200 West Area, the Cold Creek unit consists of fine sandy silt and carbonate cemented layers that are not continuous beneath the 200 East Area. Perched water historically has been documented above the Cold Creek unit at locations where this relatively low permeability unit persists in the 200 Area. While liquid waste disposal facilities were operating, localized areas of saturation or near saturation were created in the sediment column. With the reduction of artificial recharge in the 200 Area, the downward flux of liquid in the vadose zone beneath these waste sites has been decreasing. However, moisture content in the vadose zone is expected to remain elevated over pre-operational conditions for some time. As unsaturated conditions are reached, liquid flux at these disposal sites becomes increasingly less significant as a source of recharge and contaminant movement to groundwater. As part of ongoing facility operations, unanticipated releases (e.g., waterline failures) of sufficient volume could produce localized recharge of the unsaturated zone and potentially mobilize contaminants, if present in the affected soil zone. In the absence of artificial recharge, recharge from natural precipitation becomes the more dominant driving force for moving contamination remaining in the vadose zone to the groundwater.

2.1.4 Groundwater

The unconfined aquifer in the 200 Areas occurs within the Hanford formation, Cold Creek unit, or Ringold Formation, depending on location. The base of the unconfined aquifer is predominately the top of the Ringold Formation unit 8 (Ringold lower mud) in the 200 West Area, and is predominately the top of basalt (Elephant Mountain Member) in the 200 East Area.

Regionally, groundwater in the unconfined aquifer flows from recharge areas where the water table is higher (west of the Hanford Site) to areas where it is lower, near the Columbia River (DOE/RL-2010-11, *Hanford Site Groundwater Monitoring and Performance Report for 2009: Volumes 1 & 2*). Figure 2-4 presents a water table map for the Central Plateau Area, and shows water table elevations and general flow direction.

In the northern half of the 200 East Area, the water table primarily is present in the Hanford formation, except where basalt extends above the water table, resulting in the absence of the uppermost unconfined aquifer (PNNL-12261). In the north central portion of the 200 West Area, the water table occurs in the Cold Creek unit. Both east and west of the 200 East Area, the Ringold Formation unit 8 (Ringold lower mud) occurs at an elevation that results in the absence of the uppermost unconfined aquifer. In the central and southern sections of the 200 East Area, the water table is located near the contact between the Ringold Formation and the Hanford formation.

The water table elevation in the 200 East Area and vicinity ranges from approximately 121.90 to 122.18 m (400 to 401 ft) above sea level (NAVD88). Depth to groundwater in the 200 East Area and vicinity ranges from about 54 m (177 ft) below ground surface (bgs) near B Pond to about 104 m (341 ft) bgs to the south. Highly transmissive Hanford formation sediments are the cause of the flat water table in the 200 East Area (DOE/RL-2010-11). This makes it difficult to determine the groundwater flow direction. However, the configuration of contaminant plumes indicates that groundwater likely flows to the northwest in the northern half of the 200 East Area and to the east/southeast in the southern half of the 200 East Area (see Section 3.2.6). The flat water table hampers the identification of the specific location of the groundwater divide between the northern and southern sections.

Work has been ongoing to improve the accuracy of water level measurements in the 200 East Area to determine groundwater flow directions at two locations: Low-Level Waste Management Area 1

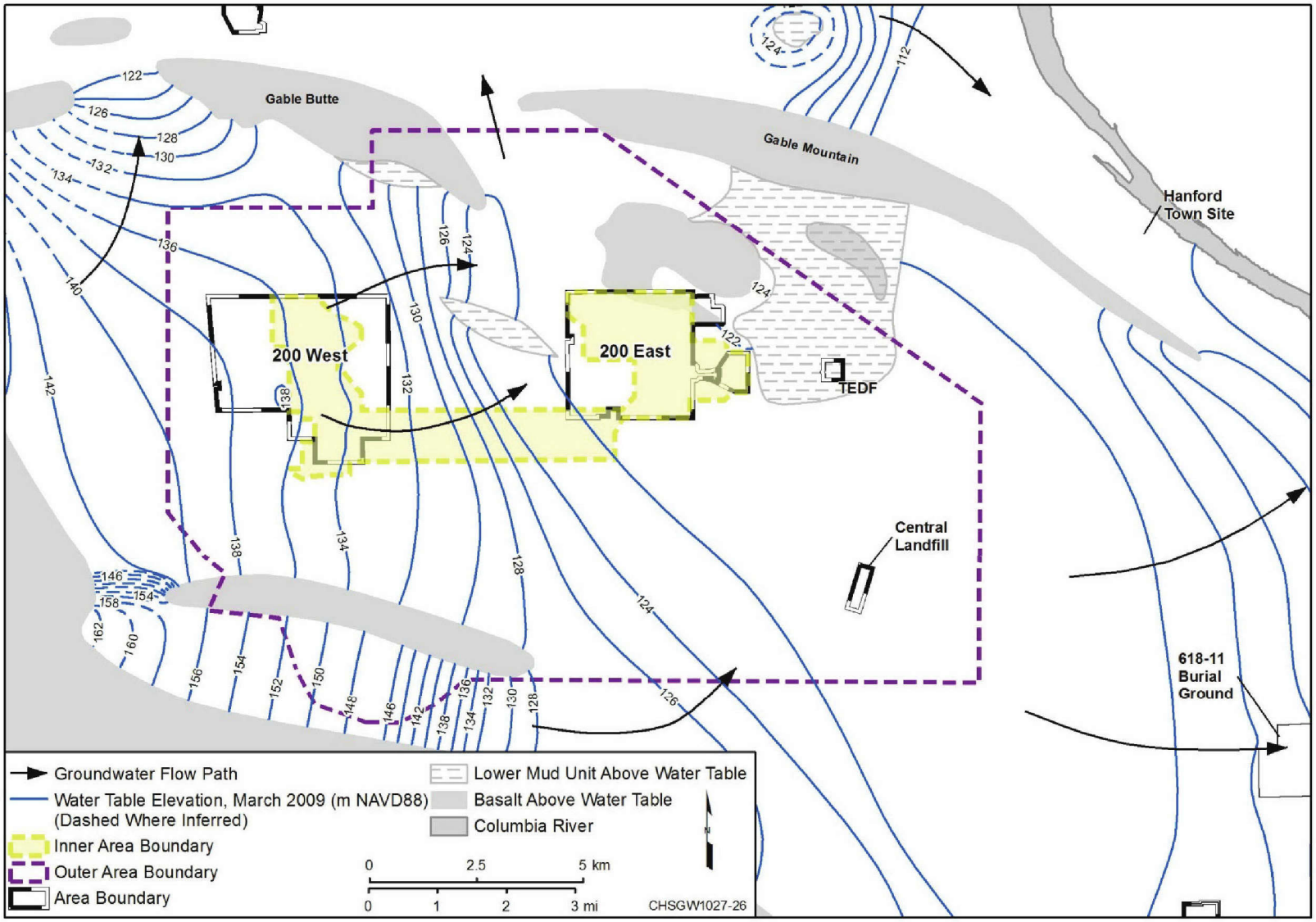
(LLWMA-1) in the northwestern portion of the 200 East Area, and the PUREX cribs/Integrated Disposal Facility (IDF) area in the southeast. Gyroscope and elevation surveys were performed to improve the accuracy of the water level elevation calculations. The gyroscope surveys were performed to correct for deviations of the wells from vertical, and casing elevation surveys were performed to a higher degree of accuracy than is normally performed. Water level measurements were collected using measuring tapes dedicated to this work. Trend-surface analysis was performed on the water level elevation measurements and assessed by a statistical test to identify whether the trend is significant.

Water level measurements collected at LLWMA-1 from September 2005 through June 2008, yielded results indicating a gradient direction between northwest and north. The average hydraulic gradient magnitude during this time was 8.2×10^{-6} m/m ($\pm 0.7 \times 10^{-6}$ m/m) and the average direction was north-northwest at 338 degrees azimuth (± 9 degrees). This interpretation agrees with the orientation of contaminant plumes emanating from nearby tank farm WMA B-BX-BY and the BY Cribs. However, during August, September, and October 2008, results indicated southerly flow directions. Conditions seemed stagnant until indications of a northern direction began again during April and May 2009, with a statistically significant northern direction indicated for July 2009. The months of July 2008 and January, February, and March 2009 indicate periods of transition between northern and southern flow. The flow reversal documented at LLWMA-1 appears to be a result of high Columbia River stage during the summer of 2008 combined with the lack of large volume discharges to the Treated Effluent Disposal Facility (TEDF) during that year. At the PUREX cribs/IDF area, water level measurements have been collected for this work since June 2008. The resulting hydraulic gradient directions range from northeast to south. The average groundwater flow direction was determined to be east at 80 (± 17) degrees with an average gradient of 2.0×10 m/m ($\pm 0.2 \times 10^{-5}$ m/m).

Because of the complex hydrogeologic conditions in the 200 East Area, significant uncertainty exists with respect to the actual groundwater flow directions and gradients (DOE/RL-2010-11). Since surface liquid discharges were terminated in the 200 East Area, the water table has been declining. The elevation of the water table declined in 2009 by an average of 0.09 m (0.3 ft) (DOE/RL-2010-11), which was greater than the decline of 0.01 m (0.03 ft) observed the previous year (DOE/RL-2008-66, *Hanford Site Groundwater Monitoring for Fiscal Year 2008*). Recently, short-term water table elevation increases over much of the 200 East Area have resulted from increased effluent discharges at TEDF (DOE/RL-2010-11).

Groundwater beneath the 200 West Area occurs primarily in the Ringold Formation. The water table elevation in the 200 West Area and vicinity ranges from approximately 132.41 m to 138.69 m (434.4 to 455 ft) above sea level (NAVD88). Depth to water varies from about 40.2 m (132 ft) bgs to greater than 102 m (335 ft) bgs. Groundwater flow direction is more definitive in this area and is predominately to the east. The surface elevation of the water table beneath the 200 West Area currently is declining at a rate of approximately 0.21 to 0.35 m/yr (0.69 to 1.15 ft/yr) (DOE/RL-2010-11).

Recharge to the unconfined aquifer within the 200 Area is primarily from artificial sources and, to a lesser extent, from natural precipitation. Estimates of recharge from precipitation are highly variable and locally range from 0 to a maximum of 10.2 cm/yr (0 to 4 in./yr) and are largely dependent on soil texture and the type and density of vegetation (PNNL-14702, *Vadose Zone Hydrogeology Data Package for the 2004 Composite Analysis*). According to PNL-5506, *Hanford Site Water Table Changes 1950 Through 1980: Data Observations and Evaluation*, 6.32×10^{11} L (1.67×10^{11} gal) of liquid wastes were discharged to the soil column in the 200 East and 200 West Areas between 1943 and 1980. Most sources of artificial recharge terminated in 1995. The artificial recharge that does continue largely is limited to liquid discharges from sanitary sewers, two state-approved land-disposal structures, approximately 300 active underground injection control wells, and 140 small-volume, uncontaminated miscellaneous liquid discharge streams. One of the approved land-disposal structures is the TEDF, a liquid waste disposal facility that receives treated liquid wastes from the 200 East and 200 West Area facilities.



Source: DOE/RL-2010-11, *Hanford Site Groundwater Monitoring and Performance Report for 2009: Volumes 1 & 2*

Figure 2-4. Water Table Elevation Map of the Central Plateau Area, March 2009

2.2 Environmental Resources

The Hanford Site has a mid-latitude semiarid climate. The terrestrial portions of the Site are characterized as a shrub-steppe ecosystem, composed of a shrub overstory and grass understory. The last free-flowing section of the Columbia River within the United States is located between Priest Rapids Dam and McNary Dam and flows through the Hanford Site, providing a habitat unique within the United States.

Only about 6 percent of Hanford Site land has been disturbed or is actively used by DOE for waste disposal and storage. Due to the long-standing management practices of DOE, most of the land is relatively undisturbed. Thus, the native terrestrial and aquatic ecological resources found on the Hanford Site are becoming increasingly rare and highly valuable as agriculture, industrial, and residential development continues to grow throughout the region.

The terrestrial setting at the Hanford Site is representative of the terrestrial environment. The vegetation of the Central Plateau uplands is characterized by native shrub-steppe, interspersed with large areas of disturbed ground dominated by annual grasses and forbs (PNL-6415, *Hanford Site National Environmental Policy Act (NEPA) Characterization*). Other disturbed areas of the Central Plateau are primarily nonvegetative gravel or asphalt, or sparsely covered with nonnative species.

The Hanford Site is also characterized as a cool desert and supports a biological community typical of this environment. The 200 West and East Areas are represented by a number of plant, mammal, bird, reptile, amphibian, and insect species, described in the following sections.

Further information regarding these environmental resources and other ecological characterizations are documented in reports written by The Nature Conservancy of Washington (Pabst, 1995, *Biodiversity Inventory and Analysis of the Hanford Site: 1994 Annual Report*; Soll and Soper, 1996, *Biodiversity Inventory and Analysis of the Hanford Site: 1995 Annual Report*; and Hall, 1998, *Biodiversity Inventory and Analysis of the Hanford Site: 1997 Annual Report*). Other sources include DOE/RL-96-32, *Hanford Site Biological Resources Management Plan*, and several PNNL reports (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-13487, *Hanford Site Ecological Quality Profile*; the Hanford Site Environmental Reports, issued annually by PNNL—the latest version is PNNL-19455, *Hanford Site Environmental Report for Calendar Year 2009*; and PNNL-13688, *Vascular Plants of the Hanford Site*).

2.2.1 Vegetation

The vegetation stands of the 200 West and East Areas are classified as an *Artemisia tridentata/Poa sandbergii - Bromus tectorum* community (PNL-2253, *Ecology of the 200 Area Plateau Waste Management Environs: A Status Report*), meaning that the dominant shrub is big sagebrush (*Artemisia tridentata*). The understory is dominated by the native Sandberg's bluegrass (*Poa sandbergii*) and the nonnative 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, occasionally, antelope bitterbrush (*Purshia tridentata*). Other native bunchgrasses that are typically present include bottlebrush squirreltail (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*), needle-and-thread (*Stipa commode*), and prairie junegrass (*Koeleria cristata*). Common and important herbaceous species include turpentine cymopteris (*Cymopteris terebinthinus*), globemallow (*Sphaeraica munroana)*, balsamroot (*Balsamorhiza careyana*), several milk vetch species (*Astragalus caricinus*, *A. sclerocarpus*, and *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 (*Erigeron poliospermus*, *E. Filifolius*, and *E. pumilus*). In all, well over 100 plant species have been documented to occur in native stands in the 200 Area.

Disturbed communities in the 200 Area are primarily the result of either mechanical disturbance or range fires. Mechanical disturbance, including construction activities, soil borrow areas, road clearings, and fire breaks, results in drastic changes to the plant community. This type of disturbance usually entails a complete loss of soil structure and total disruption of nutrient cycling. The principal colonizers of mechanically disturbed areas are the annual weeds 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. Unlike the native grasses, the other important shrubs, and many of the perennial herbaceous species, sagebrush is unable to resprout from rootstocks after being burned. 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 by cheatgrass, which is capable of quickly utilizing 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.

Prior to 1943, the vegetation in and around the ponds and ditches of the 200 Area was significantly different from that of the surrounding dryland areas. Several tree species were present, especially cottonwood (*Populus trichocarpa*) and willows (*Salix* spp.). A number of wetland species also were present including several sedges (*Carex* spp.), bulrushes (*Scirpus* spp.), cattails (*Typha latifolia* and *T. angustifolia*), and pond-weeds (*Potamogeton* spp.). However, most of this vegetation has died due to the cessation of effluent discharge and subsequent interim stabilization of the ponds and ditches.

2.2.2 Mammals

The largest mammal occurring in the 200 Area 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 but they primarily occupy the Arid Lands Ecology Reserve and private lands that adjoin the reserve to the south and west. They are occasionally seen on the 200 Area Plateau. Other mammal species common to the 200 Area include badgers (*Taxidea taxus*), coyotes (*Canis latrans*), black-tailed 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 encroaching into inactive burial grounds throughout the 200 Area. The majority of the 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 occur 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. 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.

2.2.3 Birds

Over 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 redtailed hawk (*Buteo jamaicensis*). Swainson's hawks (*Buteo swainsoni*) sometimes nest in the trees located at some of the army bunker sites that were 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 partridge (*Perdix perdix*) may be found in limited numbers. The only native game bird common to the 200 Area is the mourning dove (*Zenaida macroura*). 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 inhabit areas where there is running or standing water. However, many of these areas are becoming more scarce due to stabilization and remedial action cleanup activities.

2.2.4 Reptiles and Amphibians

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

2.2.5 Insects

There are hundreds of insect species that inhabit the 200 Area. Two of the most common groups of insects include several species of darkling beetles and grasshoppers. Other major groups of insects include bees, butterflies, and scarab beetles. Insects affect the surrounding plant community as well as serving as the prey base for many species of birds, reptiles, and mammals.

2.2.6 Threatened and Endangered Species within the 200 Area

The following discussion on threatened and endangered species within the 200 Area is found in DOE/EIS-0391, *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.*

No federal or state listed, threatened, or endangered species have been observed within, or in the immediate vicinity of the 200 Area; however, a number of other special status species have been found within these areas. Piper's daisy has been observed in and to the south of the Waste Treatment Plant (WTP), along the route of the 200 East Area underground transfer line, between the 200 East and

200 West Areas, and within the Supplemental Treatment Technology Site (STTS)-West. Stalked-pod milkvetch has been found in and south of the vicinity of the WTP and within both the STTS-East and -West to the southeast of U Plant. Another milkvetch species, crouching milkvetch (*Astragalus succumbens*), was observed within and to the south of the vicinity of the WTP, within the STTS-East, and between the 200 East and 200 West Areas.

Special status animal species that have been observed within the 200 Area include the sage sparrow, black-tailed jackrabbit, and loggerhead shrike. The sage sparrow has been found within the vicinity of the WTP, to the southeast of U Plant within the STTS-West, and between the 200 East and 200 West Areas. The black-tailed jackrabbit has been seen along the route of the 200 East Area underground transfer line and between the 200 East and 200 West Areas. The loggerhead shrike was observed to the southeast of U Plant within the STTS-West and between the 200 East and 200 West Areas. Finally, the long-billed curlew, a state monitored species, was observed along the route of the 200 East Area underground transfer line. Because of the importance of sagebrush habitat, many of these species could be present anywhere such habitat exists (Sackschewsky, 2003a, "Biological Review of the Tank Waste Retrieval, Treatment, and Disposal EIS Project, 200 E and W Areas, ECR #2003-200-044;" Sackschewsky, 2003b, "Supplemental Biological Review of the Tank Waste Retrieval, Treatment, and Disposal EIS Project, 200 E and W Areas, ECR #2003-200-044a;" and Sackschewsky and Downs, 2007, *Ecological Data in Support of the "Tank Closure and Waste Management Environmental Impact Statement" Part 2: "Results of Spring 2007 Field Surveys*). In addition to those animals observed within the 200 Area, the ferruginous hawk (*Buteo regalis*), loggerhead shrike, and burrowing owl have been observed nesting in the vicinity, and the block of habitat to the south provides some of Hanford Site's best sage sparrow habitat (DOE/EIS-0222-F, *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*).

2.2.7 Biological Intrusion

As the DOE moves forward with cleanup in the Central Plateau of the Hanford Site, information is needed to better define the depth to which remedial actions should be taken to be protective of HHE (i.e., the point of compliance). Biointrusion defines the site-specific biological active zone, which includes consideration of the depths soil invertebrates, burrowing animals, and plants intrude into the soil column. In an effort to quantify biointrusion on the Central Plateau, site-specific and literature-based studies were compiled and evaluated to define the applicable site-specific biological active zone for the Central Plateau (CHPRC-00651, *Evaluation of Biointrusion at the Hanford Site for Protection of Ecological Receptors*). These studies were acquired and reviewed, and data were extracted. Only primary data were used for this analysis. Considerable primary data are available describing depths to which ants, mammals, and plants may exploit the surface soil column at the Hanford Site and other comparable arid/semiarid shrub-steppe habitats. The maximum depth observed for ants was 270 cm (8.9 ft) bgs, with only trivial excavation below 244 cm (8 ft) bgs. Badgers are the deepest burrowing mammal at the Hanford Site, with maximum burrow depths of 230 cm (7.6 ft) bgs; all other mammals did not have burrow depths below 122 cm (4 ft) bgs. Shrubs are the deepest rooting group of plants, with rooting depths up to 300 cm (9.8 ft) bgs for antelope bitterbrush. Two of the most abundant shrub species (big sagebrush and grey rabbitbrush) did not have roots deeper than 250 cm (8.2 ft) bgs. The deepest rooted forb, Russian thistle, had a maximum root depth of 240 cm (7.87 ft) bgs. All other forbs and all grasses had maximum rooting depths of 200 cm (6.56 ft) bgs or less. Spatial and vertical distribution data were also reviewed for species exploiting the soil column to the deepest extent.

These data indicate that the biologically active soil zone in the Central Plateau at the Hanford Site does not exceed 300 cm (9.8 ft) bgs, the maximum rooting depth for the deepest rooting plant (antelope bitterbrush, a species with a very limited distribution in the Central Plateau). The maximum depth at which most other

plant and animal species occur, however, is substantially shallower. No mammals burrow to depths greater than 230 cm (7.6 ft) bgs. Although the maximum observed excavation by harvester ants (*Pogonomyrmex*) is 270 cm (8.9 ft) bgs, only a trivial volume of soil (0.0055 m^3 [0.2 ft^3] per ha) is excavated from depths below 150 cm (5 ft) bgs. The maximum rooting depths for all grasses, forbs, and the most abundant shrubs are 250 cm (8.2 ft) bgs or less, and at the maximum depth, only trace root biomass is present. Based on these data, a site-specific depth of 244 cm (8 ft) is proposed for the Hanford Site Central Plateau as the depth in soil below which it may be reasonably expected that contaminants do not pose a threat to terrestrial plants or animals, or otherwise be transported to locations that create potential exposure pathways. Available data indicate a very low likelihood of biota extending roots or burrowing below this depth.

2.3 Human and Cultural Resources

Comprehensive descriptions of cultural, archaeological, and historical resources associated with the Hanford Site are presented in PNL-6415, as are descriptions of the socioeconomics, visual resources, and other resources related to human activities.

2.4 Process Operations Descriptions and History

Between October 1943 and December 1963, nine plutonium reactors were built along the Columbia River. Operations began with the B Reactor in September 1944, followed in chronological order by D, F, H, DR, C, KW and KE, and N Reactors. The T Plant in the 200 West Area and the B Plant in the 200 East Area were built and used to chemically extract plutonium from irradiated fuel produced at the reactors. The 231-Z facility in the 200 West Area was constructed for plutonium purification (or isolation) and staging prior to shipment off-site. The Z-Plant Complex (now called the Plutonium Finishing Plant [PFP]) in the 200 West Area was built for purification of plutonium, conversion of the plutonium form, and staging prior to shipment off-site. The U Plant in the 200 West Area was used to recover uranium from tank waste generated from T and B Plant processing. The Uranium Trioxide (UO_3) Plant adjacent to U Plant was used to convert uranium to an oxide for shipment off-site. The REDOX Plant in 200 West Area and the PUREX Plant in 200 East Area were built to chemically extract both plutonium and uranium from the irradiated fuel produced at the reactors.

The waste streams handled by pipeline systems were associated with the processing facilities located in the 200 East and 200 West Areas. The primary processing and/or storage facilities that used the pipelines included the following:

- B Plant
- T Plant
- U Plant and UO_3 Plant
- REDOX Plant (S Plant)
- PUREX Plant (A Plant)
- Z Plant Complex
- Tank farms, evaporators (242-A), Hot Semiworks Facility (C Plant), and ancillary facilities (e.g., 224-T, 222-S Laboratory)

The 200 Area facilities pipeline systems transferred liquid waste streams associated with the following process operations:

- Bismuth phosphate/lanthanum fluoride
- Uranium Recovery Process, UO_3 operations, and scavenging operations

- REDOX process
- PUREX process
- Isotope (strontium/cesium) separations, recovery, and storage operations
- PFP operations, machining, and plutonium/americium scrap recovery processes (i.e., RECovery of Uranium and PLutonium by EXtraction process [RECUPLEX], Plutonium Reclamation Facility, and americium recovery)
- Tank waste evaporation/solidification operations

The waste streams generated from the various operations can be grouped into six categories that were transferred through the 200-IS-1 OU pipeline systems to various facilities and disposal sites. Sections 2.4.1. through 2.4.6 summarize these six categories.

2.4.1 Process Waste, Process Condensate, and Chemical Laboratory Waste Streams

The waste stream generated from recovery/regeneration is referred to as process waste. Process waste is low-level and/or hazardous waste that directly contacted radioactive material and may contain organic components that could enhance mobility. Process waste streams were derived from solvent recovery, ion-exchange regeneration, and ammonia scrubber distillation. The processing was done off-line of a plant's major processing system. Cold startup wastes usually were contaminated with uranium, whereas process wastes derived from fuel reprocessing tended to have a much more varied and equally concentrated inventory of contaminants.

Process condensate generally is water that was condensed from the closed process system that became contaminated from direct contact with radioactive and chemical materials. The condensates formed from the heating of the process chemicals and were removed in the vapor space of a dissolver or concentrator vessel, condensed off-line in a cooling vessel, treated as necessary, and discharged to the ground. The vaporized material mostly was water, but volatile chemicals and trace quantities of radionuclides were also removed. Common contaminants included tritium, iodine-129, cesium-137, strontium-90, ruthenium-106, technetium-99, uranium-238, plutonium-239/240, organics, nitrates, and a number of other inorganic components.

Each separation and concentration process in the 200 Area had an associated laboratory designed to monitor the processes. Laboratory waste streams generally were low in all radionuclides, although some have significant inventories of plutonium, uranium, and fission products. Sodium dichromate also is reported at several of the waste sites. Liquid volumes for the chemical laboratory waste streams (former 200-LW-1 and 200-LW-2 OU waste streams) were typically smaller than the other waste streams. Laboratory wastes differ from the process wastes only in the quantity of waste disposal. The laboratory waste group includes laboratory wastes commonly associated with the 222-Laboratory buildings at the B, T, U, and S Plants, where disposal sites received various liquid waste streams from laboratory operations. Laboratory waste/liquid disposal sites also exist at the PUREX and Z Plants.

These waste streams were routed from facilities to various liquid waste disposal sites, including cribs, trenches, tile fields, French drains, and injection wells.

2.4.2 Steam Condensate and Cooling Water Waste Streams

The steam condensate and cooling water waste streams were intended to be noncontact in character, in that they either came from noncontaminated parts of the plants or were separated from contaminated process solutions by pipeline or vessel walls. Large volumes of water were used to regulate the

temperature at various stages of the separations and concentration processes. A pipeline or vessel failure was necessary to contaminate the steam condensate or cooling water streams and sites.

Both the steam condensate and the cooling water waste streams were routed into a number of disposal sites, primarily based on geography and, to a lesser extent, on the potential differences in contaminants. Both of these two waste streams consisted predominately of water. The water would flow through a heat exchanger and then flow to a disposal site. Cooling water pipelines conveyed significant inventories of contaminants because of the large volumes of slightly contaminated wastes discharged.

These waste streams generally were routed from facilities to ditches, ponds, trenches, and cribs. Steam condensate waste streams from the solvent-extraction process plants were recognized as having a greater potential for becoming contaminated and were discharged to cribs instead of ditches and ponds.

2.4.3 Chemical Sewer Waste Streams

Chemical sewer wastes were generated at many of the separation/concentration processes. Early chemical sewer wastes were combined with the larger cooling water and steam condensate streams at the B, T, and U Plants. With the advent of REDOX, PUREX, and cesium/strontium recovery operations, separate chemical sewers and separate disposal sites were installed. Chemical sewer systems were designed to serve nonradioactive operations in plant areas such as operating galleys, service areas, aqueous makeup galleries, and maintenance areas. The plants discharged out-of-specification chemical batches, uncontaminated floor drain waste liquids, nonradiological process wastes, nonprocess steam condensates, uncontaminated vessel coil waste, and other miscellaneous waste streams into the chemical sewers.

Liquid disposal sites for chemical sewer waste streams likely received primarily dilute quantities of inorganic and/or organic chemicals. Radionuclide inventories at these disposal sites are very small to negligible, although several disposal sites have a uranium component (e.g., the 216-S-10 Ditch which received 215 kg of uranium in an inadvertent discharge). Further detail on the sampling activities conducted at these liquid disposal sites from November 1999 to April 2003 is available in DOE/RL-2004-17, *Remedial Investigation Report for the 200-CS-1 Chemical Sewer Group Operable Unit*. These waste streams became contaminated with low levels of radionuclides over time as coils that circulated steam and cooling water inside chemical process tanks developed pinholes and hairline cracks due to corrosive chemicals and high thermal gradients in these tanks. These minor defects usually did not lead to contamination of the steam and cooling water, because the pressure in the pipe coils was greater than the pressure in the process or condenser vessels; however, on occasions when pressure in the coils was reduced or suspended, minor leakage through the flaws led to waste stream contamination. Other accidental releases from causes such as operator error also have contributed to contamination of these waste streams (DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit*). The ditches and ponds receiving this category of waste have been designated as RCRA TSD units. This waste stream generally was routed from facilities to cribs, ditches, and ponds.

2.4.4 Miscellaneous Waste Streams

Miscellaneous waste consists of the remaining radioactive waste streams not encompassed by the major process operations. Miscellaneous waste streams cover a combination of moderate volume equipment decontamination and ventilation system wastes, plus small volume waste streams commonly disposed to French drains. These waste streams are varied in terms of sources such as vacuum pump seal water wastes, fan-bearing cooling water wastes, stack drainage, floor drainage from stack control rooms, and stack condensate drainage. No organic contaminants are documented in available inventory data; the inventories note only small quantities of inorganics.

Most miscellaneous waste streams are low in radionuclides and chemicals, except for higher inventories of uranium, plutonium, fission products, and occasional reports of sodium dichromate attributed to the PUREX Plant ventilation system. Equipment decontamination wastes are associated with the decontamination mission of T Plant. There is one equipment decontamination site each at the 202-S Plant Building and the U Tank Farm. Decontamination wastes are lightly contaminated, high-volume streams, but are expected to be accompanied by detergents or cleaning agents that may have mobilized the contaminants.

The liquid waste generally was routed a relatively short distance from the facilities to cribs, trenches, French drains, and injection wells.

2.4.5 Tank/Scavenged Waste Streams

Tank and scavenged wastes generally are defined as liquids discharged directly from the high-activity SST tank farms, or as treated high-activity tank wastes. These waste types generally are characterized as relatively small volume when compared to cooling water volumes.

These waste streams generally were routed between tank farms, between facilities and tank farms, or from tank farms to cribs, trenches, French drains, and injection wells.

2.4.6 Tank Farm Waste Streams

Tank farm waste streams included radioactive waste from both the processing facilities and from tank-to-tank transfers. Constituents in tank waste transfers included sodium hydroxide, sodium salts of nitrate, nitrite, carbonate, aluminate, oxalate, sulfate and phosphate, and hydrous oxides of metals such as aluminum, iron, bismuth, lanthanum, and manganese. Heavy metals, including mercury, chromium, and lead, were likely present in tank waste transfers. Radioactive components included strontium, cesium, uranium, plutonium, thorium, technetium, iodine, and americium.

2.5 Waste Site Descriptions

This section provides a general description of the waste sites addressed by this Work Plan. The types and approximate numbers of 200-IS-1 OU waste sites, as listed in Appendix A and further described in this section, can be summarized as follows:

- Pipeline Waste Sites (224)
- Pipeline Component Waste Sites
  - Diversion Boxes (17)
  - Diverter Stations/Receiving Vaults (2)
  - Catch Tanks/Vent Station/Double-Contained Receiver Tank (DCRT) (27)
  - Valve Pits (11)
- UPR Waste Sites (38)

2.5.1 Pipelines

A complex network of pipelines was required to handle the different waste streams associated with processing operations and waste transfers in the Inner Area. WIDS has designated waste site identification numbers for most of the pipelines outside the tank farms, but not for the complete Inner Area pipeline network. A pipeline waste site (as identified in WIDS) can consist of a single pipeline or of multiple pipelines. Figure 2-5 illustrates how multiple individual pipelines may be encompassed by one WIDS waste site code.

In association with the processes performed by the plants in the Central Plateau area, the extensive network of pipelines transferred liquid process wastes from the separations facilities to the SSTs and DSTs, evaporators, and effluent-discharge waste sites. Most often during historical plant operations, the disposal or storage destination for a particular liquid waste stream was determined by chemical characteristics and radiological activity levels. Waste stream characteristics (e.g., corrosiveness, acidity, radiological activity) were considered during design of the pipeline network that was constructed at the Hanford Site. The waste stream's storage or disposal destination (e.g., tanks, cribs, trenches) determined whether the effluent needed to be transferred through pipelines under pressure or could flow by gravity. Materials selected for constructing pipelines depended on the anticipated waste stream's composition and characteristics. Although a number of materials were used for construction of pipelines, most pipelines with process waste streams, with the exception of some of the tank farm waste transfer pipelines, were direct-buried in the ground without the use of additional exterior encasements. The initial tank farm waste transfer pipelines installed in 1944 to 1945 were also direct-buried pipelines; some laid on concrete slabs. Subsequently, pipelines installed in the tank farms were concrete trench encased or pipe-in-pipe encased.

Figure 2-6 shows a generalized cross-sectional view of the burial characteristics of a single direct-buried pipeline. Figure 2-7 shows a generalized cross-sectional view of a pipe-in-pipe encased pipeline and of a concrete trench encased pipeline. The burial depth of pipelines varied with surface topographic conditions in the area. For the gravity flow lines, the burial depth and gradient along the pipe run was sufficient to permit the liquids to free flow. Sections 2.5.1.1 through 2.5.1.6 present the general attributes of pipelines (e.g., material composition, construction characteristics) associated with each waste stream. Table 2-1 summarizes the general physical attributes of the pipelines for each waste stream.

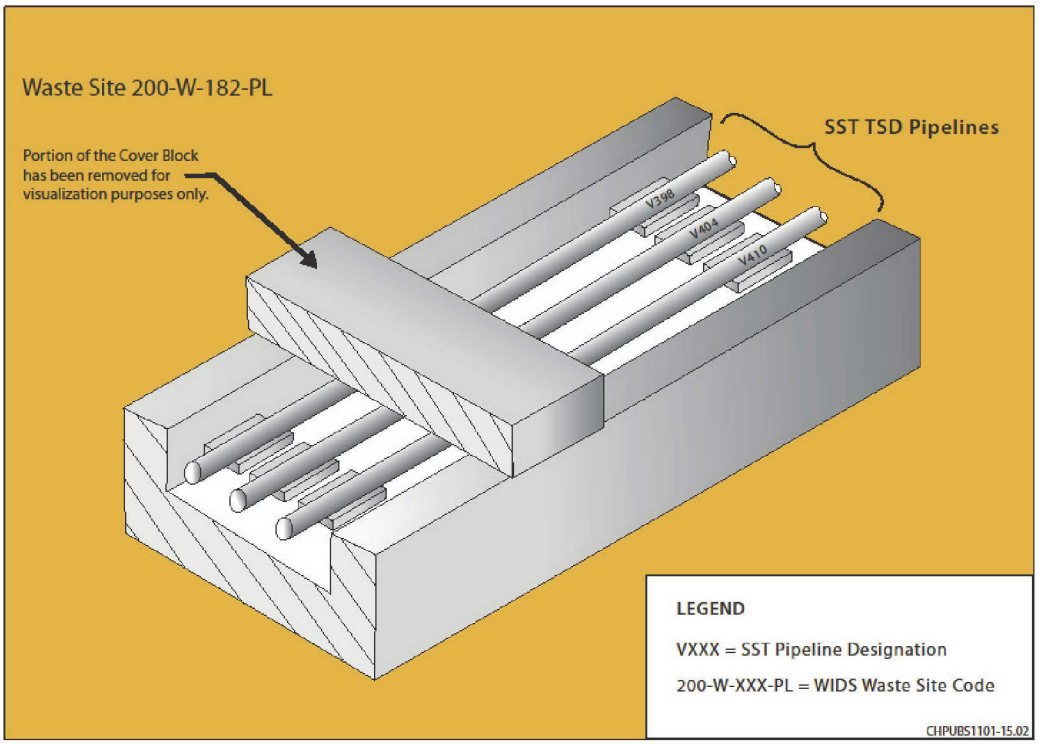


Figure 2-5. Schematic of Multiple Pipelines Encompassed by One WIDS Waste Site Code

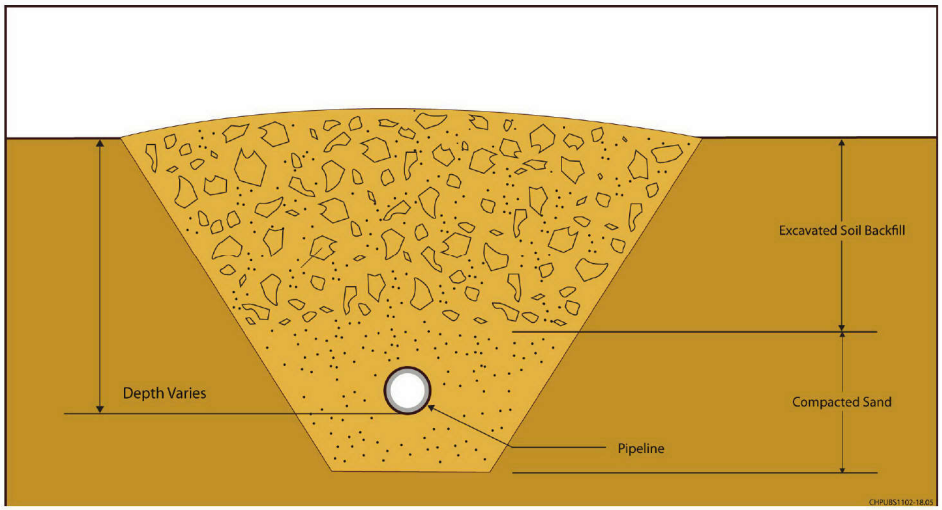


Figure 2-6. Schematic of Cross-Sectional View of a Direct-Buried Single Pipeline

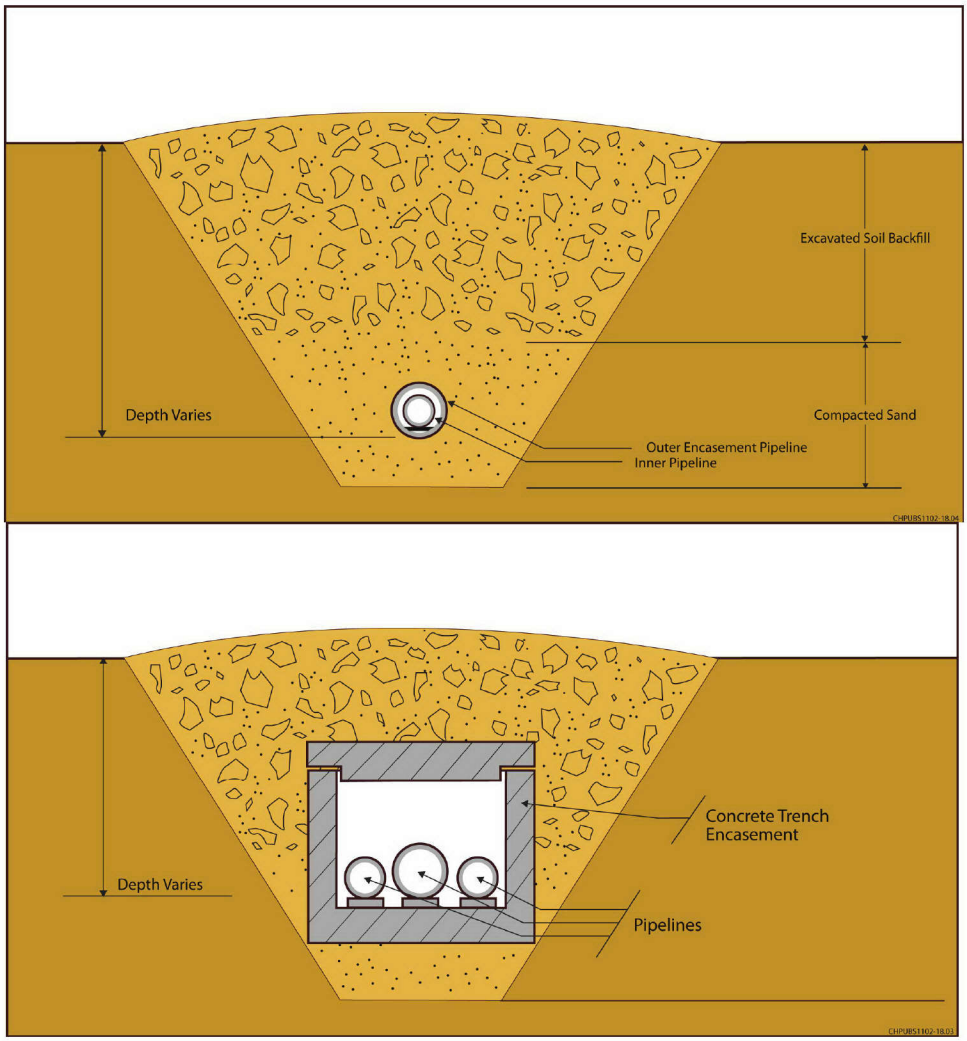


Figure 2-7. Schematic of Cross-Sectional View of Encased Pipelines

2.5.1.1 Process Condensate, Process Waste, and Chemical Laboratory Waste Streams Pipeline Attributes

Pipelines that carried waste fluids (including process condensate, process waste, and chemical laboratory waste) are located throughout the 200 East and 200 West Areas and are associated with all of the processing facilities operations. Nonpressurized gravity flow transferred the wastes.

Pipeline materials used to transfer the waste streams vary. They include carbon steel, stainless steel, fiberglass reinforced epoxy, vitrified clay, and corrugated galvanized steel (corrugated metal). Available information indicates that pipeline diameters range from approximately 2.5 to 41 cm (1 to 16 in.).

2.5.1.2 Steam Condensate and Cooling Water Streams Pipeline Attributes

These pipelines carried process fluids that consist of cooling water and steam condensate and are located throughout the 200 Area. All of the primary 200 Area processing facilities used them.

Pipeline composition varies and includes carbon steel, stainless steel, vitrified clay, reinforced concrete, corrugated metal, and cast iron. The sizes of the pipelines associated with these waste streams are larger because of the need to handle larger volume flows. Pipe diameters range from 10.2 to 107 cm (4 to 42 in.). These pipelines transferred fluids using nonpressurized gravity flow.

2.5.1.3 Chemical Sewer Waste Streams Pipeline Attributes

These pipelines are located in both the 200 East and the 200 West Areas and are associated with the A Plant (PUREX), B Plant, and S Plant (REDOX) facilities. Process fluids carried by these lines consisted of chemical sewer waste and were acidic in nature.

The pipeline compositions include carbon steel, stainless steel, vitrified clay, and corrugated metal. Large pipelines were often used for this waste stream to handle high-volume flows. Pipe diameters range from 7.6 to 122 cm (3 to 48 in.). These pipelines handled nonpressurized gravity flow liquids.

2.5.1.4 Miscellaneous Waste Streams Pipeline Attributes

These pipelines occur throughout the 200 Area. Process fluids transferred in these pipelines consisted of miscellaneous waste streams.

The pipeline compositions are currently known to include only vitrified clay and black steel. Pipeline diameters range from approximately 10.2 to 20.3 cm (4 to 8 in.). These pipelines generally were operated as nonpressurized, gravity-flow lines.

2.5.1.5 Tank/Scavenged Waste Streams Pipeline Attributes

Pipelines that carried tank waste and scavenged waste are located in both the 200 East and the 200 West Areas and are associated with the B Plant, Hot Semiworks, T Plant, and U Plant facilities.

The current knowledge is that pipeline materials include only carbon steel and stainless steel. The available information about pipeline diameters indicate a range from approximately 5.1 to 35.6 cm (2 to 14 in.). Waste streams were either transferred by gravitational flow or pumped under pressure.

2.5.1.6 Tank Farm Waste Transfers Waste Streams Pipeline Attributes

Tank farm pipelines consist of a variety of pipelines including slurry lines, supernatant lines, cross-site lines, and jet pump transfer lines. Generally, pipelines are made of carbon steel and joined by butt welding. The original pipelines installed in 1944 to 1945 were stainless steel tubing. Pipelines used to transfer high-level/high-activity wastes initially were direct-buried. Failures in these pipelines occurred in the 1940s; subsequent construction involved placement in concrete or pipe-in-pipe encasements.

Table 2-1. General Attributes of Pipelines for Each Process Waste Stream

Process Waste Streams	Former Process Waste OUs	Physical Attributes		Applicable 200 Area Facilities
		Pipeline Material Types Included[a]	Pipeline Diameters[a]	
Process Condensate, Process Waste, and Chemical Laboratory Waste	200-PW-1/2/3/4/5/6, 200-LW-1/2	Vitrified clay, stainless steel, corrugated galvanized steel, carbon steel, and fiberglass-reinforced epoxy	2.5 to 40.6 cm (1 to16 in.)	All
Steam Condensate and Cooling Water	200-CW-1/2/3/4/5, 200-SC-1	Vitrified clay, stainless steel, carbon steel, reinforced concrete, corrugated metal, and cast iron	10.2 to 106.7 cm (4 to 42 in.)	All
Chemical-Sewer Waste	200-CS-1	Vitrified clay, stainless steel, carbon steel, and corrugated metal	7.6 to 121.9 cm (3 to 48 in.)	A Plant (PUREX), B Plant, and S Plant (REDOX)
Miscellaneous Waste	200-MW-1	Vitrified clay and black steel	10.2 to 20.3cm (4 to 8 in.)	All
Tank/Scavenged Waste	200-TW-1/2	Stainless steel and carbon steel	5.1 to 35.6 cm (2 to 14 in.)	B Plant, Hot Semiworks, T Plant
Tank Farm Waste Transfers	Tank Farms	Carbon steel, stainless steel, vitrified clay[b], and fiberglass-reinforced thermosetting resin[b]	2.5 to 25.4 cm (1 to 10 in.) (Note: The A, AX, AY, AZ, and SX Tank Farms also contain 50.8 and 61.0 cm [20 and 24 in.] diameter carbon steel pipelines used for vapor headers.)	All

a. The pipeline materials and diameters listed are based on the current level of review of engineering drawings. This list may be revised as additional information is compiled and evaluated.

b. These pipeline material types transferred lower concentrations of radionuclides than typically were transferred in tank farms carbon or stainless steel pipelines.

PUREX = Plutonium-Uranium Extraction (Plant)

REDOX = Reduction-Oxidation (Plant)

The encasements extended between pipeline components, such as diversion boxes. They were designed so that any liquids lost because of leaks or pipeline failures would be routed to a drain in the bottom of a diversion box that conveyed the release to a catch tank.

2.5.2 Pipeline Components

The following section provides a general description of the major pipeline component waste sites, which include diversion boxes, diverter stations, catch tanks, valve pits, and DCRTs.

2.5.2.1 Diversion Boxes

Diversion boxes are large, reinforced-concrete structures that generally were constructed below grade with removable concrete cover block lids. Waste transfer pipelines are connected inside the diversion box by installing a jumper between connecting nozzles. Diversion boxes provided a flexible method of redirecting the liquid waste flow path to various locations in the 200 East and 200 West Areas. They also provided containment for leaks in transfer pipelines (which drain back to the boxes via concrete or pipe-in-pipe encasements) and leaks at jumper-nozzle connections. Figure 2-8 shows the general configuration of a typical diversion box and catch tank. Several sets of pipelines entered and exited the diversion box at different levels through the diversion box walls. Each pipe had a special end fitting, or jumper, that permitted the secure attachment of either flexible or solid pipelines.

Jumper connections were made manually using remote equipment. Each jumper was fabricated to custom fit to the desired pair of incoming or outgoing pipelines. To assist with gravity flow, pipelines coming in from the facility were generally located at a higher level than pipelines leading to the tank farms. Connections could be routed for flow in either direction, because several of the separations processes retrieved wastes from the tank farms, and transferred the material to the facility.

Diversion boxes varied in size but typically were constructed 5.2 to 6.1 m (17 to 20 ft) deep, by 1.8 to 3.05 m (6 to 10 ft) wide, by 7.6 to 12.2 m (25 to 40 ft) long. All but the uppermost portion of a diversion box is below ground. Each diversion box is covered with a series of thick-stepped cover blocks, 30.5 to 35.6 cm (12 to 14 in.) thick, that prevented ready migration of contaminants out of the box. Cover blocks were removed when a routing change was required.

Connecting pipelines were either direct-buried or encased up to the outside wall of the diversion box. There they joined a pre-installed pipeline that penetrated the box wall. Catch tanks were installed at an elevation below that of the floor of the diversion box. They collected liquid wastes that spilled in the box when routings were changed, thereby containing the release. The jumpers are thought to have been allowed to drain onto the floor when the connection was broken, leading to internal contamination of the box.

2.5.2.2 Diverter Stations/Receiving Vaults

Diverter stations were used to allow waste streams coming into the diverter station to be routed to various waste receiving tanks in the tank farms. Waste was piped into small diverter tanks located in individual cells. Then, the waste was routed through the use of an adjustable spout on the bottom of the diverter tank, which directed it out of the diverter tank to one of several exit pipe nozzles. Each of the diverter station cells have floor drains, which lead to the common catch tank or sump located directly below the diverter stations. Figure 2-9 illustrates a typical diverter station.

Diverter stations are generally structured as a rectangular two-tier, reinforced-concrete vault constructed below grade. A pump pit and diverter pit comprise the upper tier. The pump pit houses a submersible pump, jumpers, and other ancillary equipment. It serves as secondary containment to the transfer pipelines and directs any leakage (such as transfer waste, rainwater, and snowmelt) into the catch tank vault. The diverter cell provides only gravity flow from the vessels forward. Thus, waste would flow in one direction only

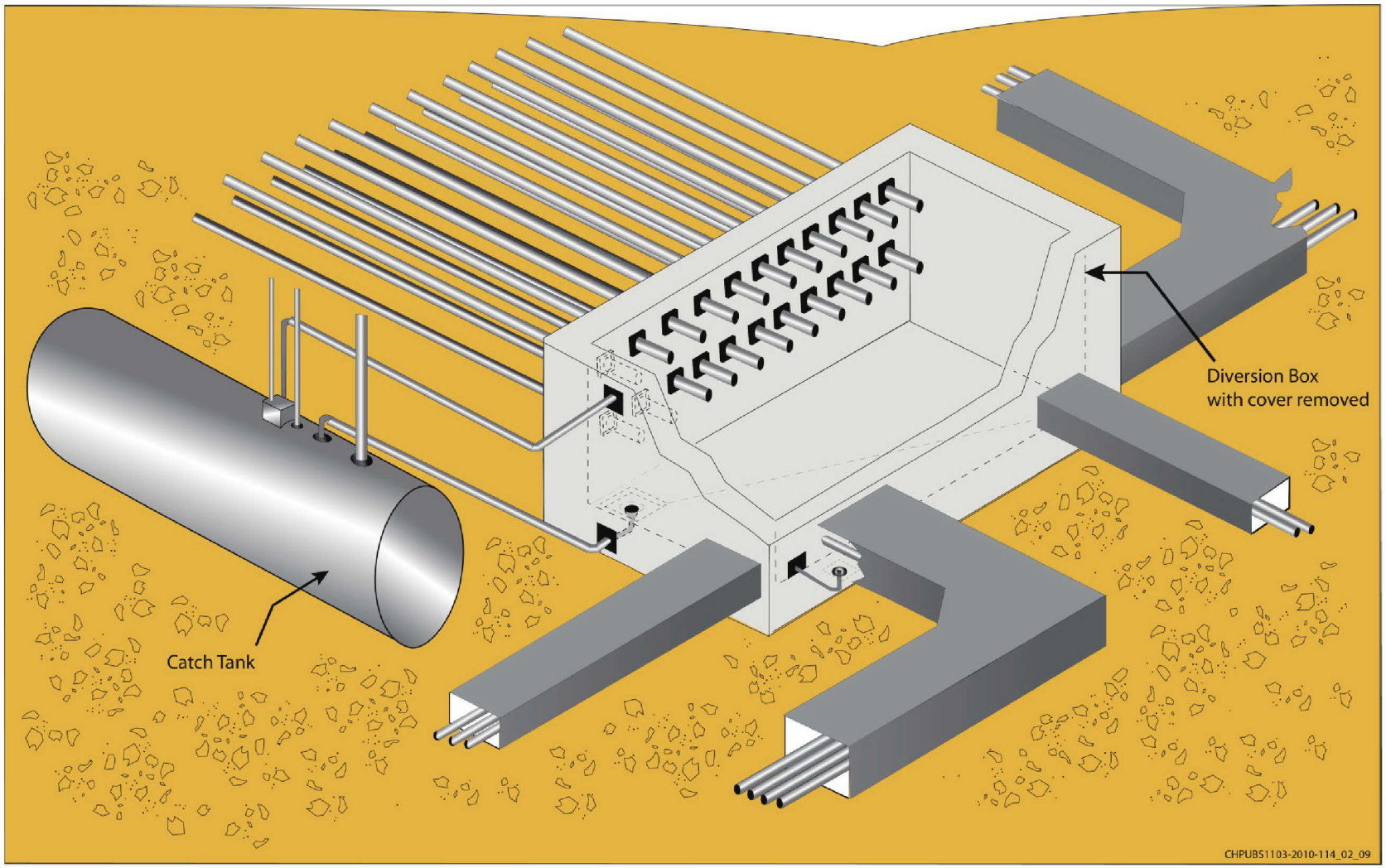


Figure 2-8. Schematic of a Typical Diversion Box and Catch Tank

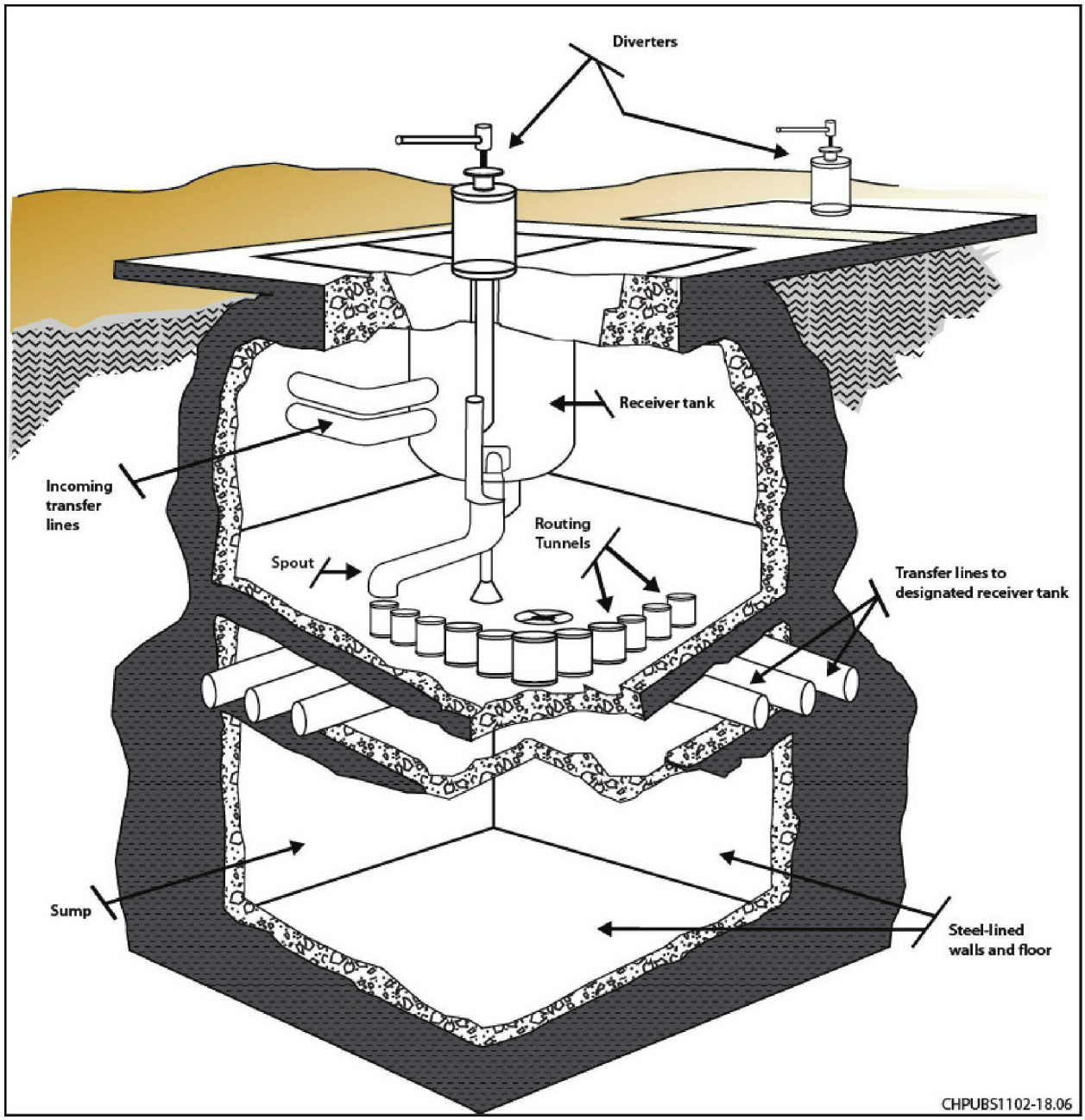


Figure 2-9. Schematic of a Diverter Station

The lower compartment, designated as the catch tank vault or sump, served as the main reservoir for temporary waste storage. The catch tank vault or sump also accepts drainage from its overhead pump pit and diverter pit, and from leaks or spills. Receiving vaults are reinforced concrete, multi-cell, two-level structures consisting of shielded enclosures housing waste processing equipment. The upper and lower cells were separated by cover blocks with recessed lifting bails. Tanks and tank sumps are contained within the lower cells. Upper cells contained piping and equipment. There was an extensive network of pipelines that were integral elements of vaults. The vaults operated to collect, clarify, and allow physical and chemical modification of waste before transfer to other system components. Vault tank storage capacities range from 1,000 to 50,000 gal. Typically, a vault contains four tanks. Figure 2-10 illustrates a typical receiving vault.

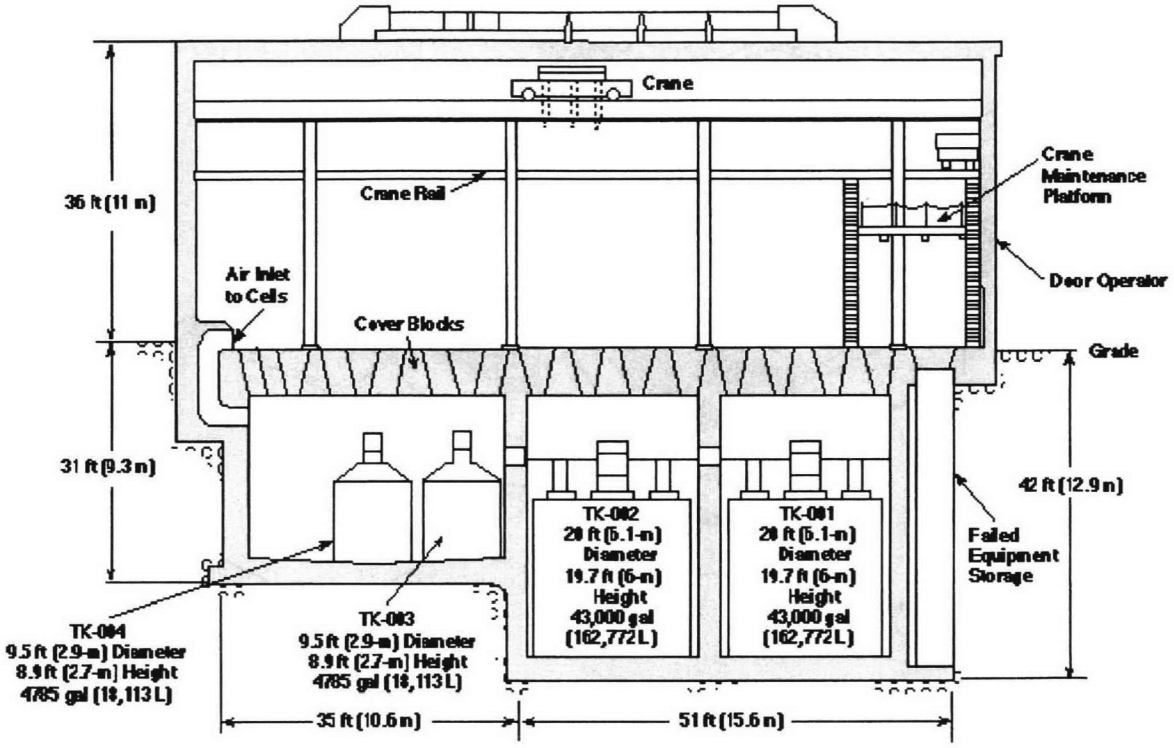


Figure 2-10. Schematic of a Receiving Vault

2.5.2.3 Catch Tanks

Catch tanks (Figure 2-8) were built in conjunction with diversion boxes to contain high-activity wastes spilled during changes in pipeline routings. The tanks are direct-buried, underground storage tanks, generally constructed of carbon steel. Sump pits in the diversion box collected the liquid and were connected by pipelines to the catch tank. With the advent of encased pipelines, leaks were anticipated, and a provision was made to collect the liquid released from the encasement pipeline into the nearest downgradient catch tank. In some cases, a catch tank served more than one diversion box, particularly around tank farms. The catch tanks were usually located within 15.2 m (50 ft) of the diversion box. Catch tanks could be emptied to diversion boxes through an underground pump-out pipeline. Each catch tank is equipped with a liquid level sensor and a pump-pit leak indicator. Activation of the leak detection alarm causes a shutdown of transfer operations. Only a few of the catch tanks have liquid level monitoring

devices that are connected to the surveillance automated control system. Some of the catch tanks and miscellaneous underground storage tanks are not monitored.

Catch tanks range between 2.1 and 2.7 m (7 and 9 ft) in diameter and 7.6 to 10.7 m (25 to 35 ft) long, with storage capacities of between 30,283 to 45,425 L (8,000 to 12,000 gal). Catch tank designs changed as new diversion boxes were added to manage waste streams. Catch tanks were located at depths of 7.6 to 10.7 m (25 to 35 ft), considerably deeper than the floor of the diversion box, and were designed to provide complete drainage of a leak or spill. A series of risers extended to above the ground surface and were used to monitor liquid levels, collect samples, pump out tank contents, and permit chemical additions. Steam jets or in-tank pumps were added later with pipelines that led back to the diversion box for ready transfer to the facility or tank farm. Some catch tanks have been replaced because of leaks or vessel failure.

2.5.2.4 Valve Pits

A valve pit, sometimes referred to as a control structure, is a belowground, reinforced-concrete structure used to route wastes between pipelines leading to two or more waste sites. For a very long crib (up to 427 m [1,400 ft]), valve pits were also used to more evenly distribute flow over both halves of the crib. These structures were most commonly associated with pipelines that relied on gravity flow of waste streams that discharged to cribs, ponds, or ditches. Valve pits have been used to direct process liquids encompassing the waste streams discussed in this Work Plan.

For some pits/boxes, pipelines passed through the structure with no open flow. Intersecting pipes were connected at "T" or union fittings. Valves were installed in pipelines and were opened or closed to change flow routings. Other valve pits/control structures were designed to allow open wastewater flow within the pit. The incoming pipeline terminated at the edge of the pit/box, and water then flowed through the box before exiting at another pipeline. Changes in routing were accomplished through a series of moveable dams, or stop logs, as well as slide gates that covered the opening of the receiving pipe. Valve and gate handles were extended through the pit/box cover to permit remote operation.

Valve pits generally were smaller structures than diversion boxes. Sizes ranged up to 3.05 by 4.6 m (10 by 15 ft) at the surface. They were constructed to depths up to 3.7 to 4.6 m (12 to 15 ft), depending on the depth of the buried pipeline. These structures usually carried a "216-" series prefix and a designation that was associated with the waste site to which the flow was directed. The interiors of the valve pits/control structures could be accessed through hatches in the cover. Figure 2-11 shows a typical control structure.

2.5.2.5 Double-Contained Receiver Tanks

A DCRT typically consists of an underground concrete structure that contains a filter pit, pump pit, instrument pit, flush pit, and vault in which a receiver tank is installed. A DCRT, together with its related equipment, could function as an interim short-term storage facility for liquid wastes pumped from other storage sites or facilities, or be used to route wastes. Some DCRTs were also referred to as "lift stations" and were located in a low point in a transfer pipeline. Figure 2-12 shows a typical DCRT.

2.5.3 Unplanned Releases

The UPRs associated with pipeline systems occurred due to leaks and spills from pipelines, diversion boxes, valve pits, and other pipeline components. In many cases, UPRs were detected during mass balance transfer checks (through leak detection systems), or when liquid waste surfaced. In the areas of some pipelines, radiologically contaminated deep-rooted vegetation has been found, indicating potential subsurface releases.

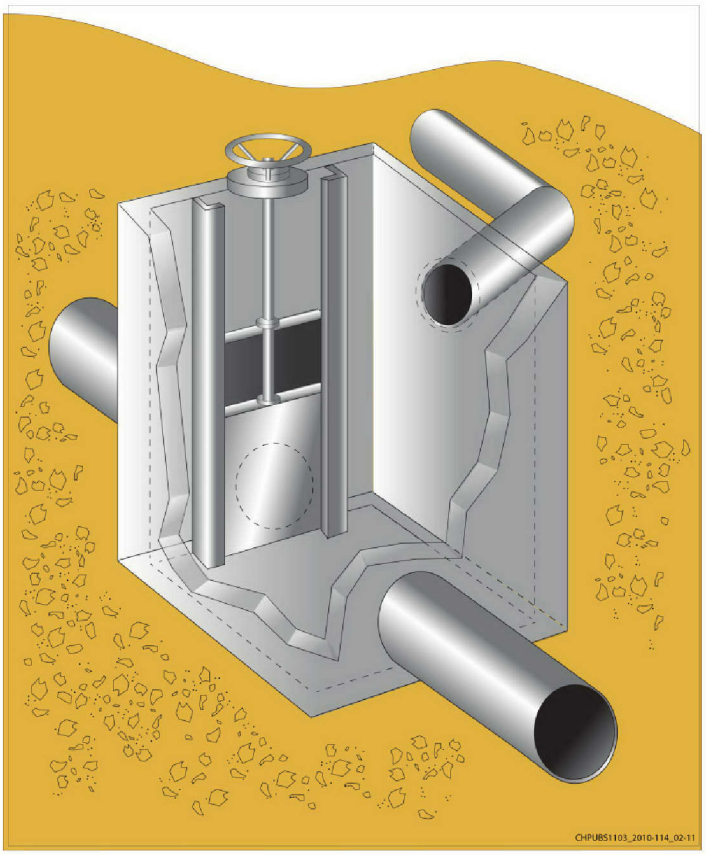


Figure 2-11. Schematic of a Control Structure

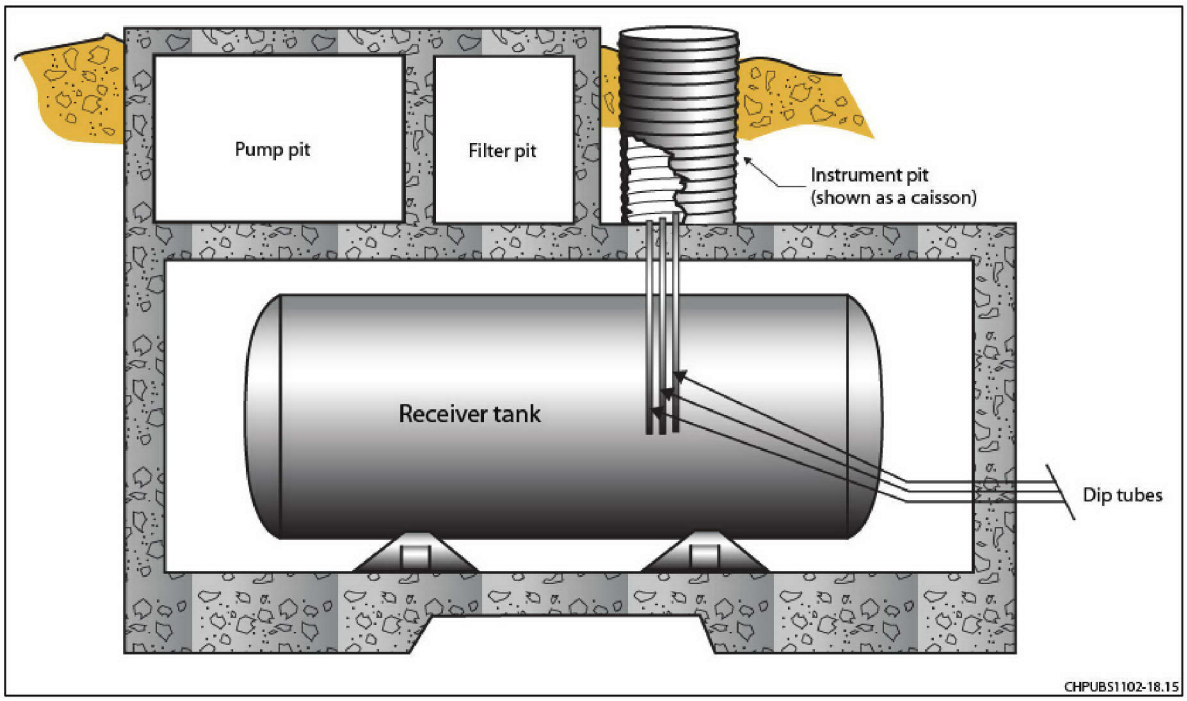


Figure 2-12. Schematic of Double-Contained Receiver Tank Structure

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3 Initial Evaluation

This chapter presents an overview of the pipeline systems and associated UPRs that have been evaluated or characterized to date. Based on the existing process knowledge and field characterization information, conceptual contaminant distribution models for pipeline system waste sites were developed and are presented herein. A preliminary list of constituents that have a potential to be associated with the pipeline system waste sites is also provided. This chapter also describes the current and reasonably anticipated future use for land and groundwater, human and ecological receptors, exposure pathways, general approach for the BRA and data inputs to be used for the pipeline system portion of the BRA.

3.1 Sources of Pipeline System Residual Waste Information

Numerous sources contribute to the estimated composition of primary radionuclides and nonradiological constituents that may potentially reside as residual waste inside the pipelines and pipeline components or potentially have been released to the vadose zone. Chapter 2 discussed the process operations and waste streams generated at the 200 Area facilities and handled by the pipeline systems. The following sources provide information on the characteristics and composition of waste that was transferred through the various pipeline systems:

- 03-ED-096, "Environmental Impact Statement (EIS) for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks (SST) at the Hanford Site, Richland, Washington"
- Aggregate area management study reports for the 200 Area:
  - DOE/RL-92-05, *B Plant Source Aggregate Area Management Study Report*
  - DOE/RL-91-52, *U Plant Source Aggregate Area Management Study Report*
  - DOE/RL-92-04, *PUREX Plant Source Aggregate Area Management Study Report*
  - DOE/RL-91-60, *S Plant Source Aggregate Area Management Study Report*
  - DOE/RL-92-18, *Semiworks Source Aggregate Area Management Study Report*
  - DOE/RL-91-58, *Z Plant Source Aggregate Area Management Study Report*
  - DOE/RL-91-61, *T Plant Source Aggregate Area Management Study Report*
- DOE/RL-88-30, *Hanford Site Waste Management Units Report*
- DOE/RL-98-28
- DOE/RL-96-81
- DOE/RL-2009-131, *Annual Summary of the Integrated Disposal Facility Performance Assessment 2009*
- DOE/RL-2009-132, *Annual Status Report (FY 2009): Composite Analysis of Low-Level Waste Disposal in the Central Plateau at the Hanford Site*
- DOE/RL-2009-134, *Annual Review of the 200 West and 200 East Area Performance Assessments (January 1, 2009 – September 30, 2009)*
- HEIS
- OSD-T-151-00015, *Operating Specifications for Miscellaneous Facilities*

- RPP-8050, *Lower Flammability Limit Calculations for Catch Tanks, DST Annuli, Waste Transfer-Associated Structures, and Double-Contained Receiver Tanks in Tank Farms at the Hanford Site*
- RPP-11866, *Technical Basis for the Operating Specifications for Miscellaneous Facilities*
- RPP-13033, *Tank Farms Documented Safety Analysis*
- RPP-16922, *Environmental Specification Requirements*
- RPP-25113, *Residual Waste Inventories in the Plugged and Abandoned Pipelines at the Hanford Site*
- RPP-26744, *Hanford Soil Inventory Model, Rev. 1*
- RPP-PLAN-41977, *Single-Shell Tank System Component Identification and Proposed Closure Strategy*RPP-RPT-29878, *Catch Tank Level Trend Assessment*
- RPP-RPT-31148, *Composite Liquid Mitigation Report*
- RPP-RPT-42231, *Summary of Twenty-Five Miscellaneous Tanks Associated with the Single-Shell Tank System*Tanks Farms Video Library (an organized collection of remote inspection videos of diversion boxes, catch tanks, encased pipeline, and other relevant structures)
- TWINS
- WHC-EP-0182-70, *Tank Farm Surveillance and Waste Status Summary Report for January 1994*
- WHC-EP-0287, *Waste Stream Characterization Report*
  - Volume 1, "Summary"
  - Volume 2, "Effluent Streams"
  - Volume 3, "Receiving Sites"
  - Volume 4, "Procedures"
- WHC-EP-0342, *Hanford Site Stream-Specific Reports*
  - Addendum 1, *300 Area Process Wastewater Stream-Specific Report*
  - Addendum 2, *PUREX Plant Chemical Sewer Stream-Specific Report*
  - Addendum 3, *N Reactor Effluent Stream-Specific Report*
  - Addendum 4, *163N Demineralization Plant Wastewater Stream-Specific Report*
  - Addendum 5, *PUREX Plant Steam Condensate Stream-Specific Report*
  - Addendum 6, *B Plant Chemical Sewer Stream-Specific Report*
  - Addendum 7, *UO_3/U-Plant Wastewater Stream-Specific Report*
  - Addendum 8, *Plutonium Finishing Plant Wastewater Stream-Specific Report*
  - Addendum 9, *S Plant Wastewater Stream-Specific Report*
  - Addendum 10, *T Plant Wastewater Stream-Specific Report*
  - Addendum 11, *2724-W Laundry Wastewater Stream-Specific Report*
  - Addendum 12, *PUREX Plant Process Condensate Stream-Specific Report*
  - Addendum 13, *222-S Laboratory Watewater Stream-Specific Report*
  - Addendum 14, *PUREX Plant Ammonia Scrubber Condensate Stream-Specific Report*

  - Addendum 15, *242-A Evaporator Process Condensate Stream-Specific Report*
  - Addendum 16, *B Plant Steam Condensate Stream-Specific Report*
  - Addendum 17, *B Plant Process Condensate Stream-Specific Report*
  - Addendum 18, *2101-M Laboratory Wastewater Stream-Specific Report*
  - Addendum 19, *UO_3 Plant Process Condensate Stream-Specific Report*
  - Addendum 20, *PUREX Plant Cooling Water Stream-Specific Report*
  - Addendum 21, *242-A Evaporator Cooling Water Stream-Specific Report*
  - Addendum 22, *B Plant Cooling Water Stream-Specific Report*
  - Addendum 23, *241-A Tank Farm Cooling Water Stream-Specific Report*
  - Addendum 24, *284-E Powerplant Wastewater Stream-Specific Report*
  - Addendum 25, *244-AR Vault Cooling Water Stream-Specific Report*
  - Addendum 26, *242-A Evaporator Steam Condensate Stream-Specific Report*
  - Addendum 27, *284-W Powerplant Wastewater Stream-Specific Report*
  - Addendum 28, *400 Area Secondary Cooling Water Stream-Specific Report*
  - Addendum 29, *242-S Evaporator Steam Condensate Stream-Specific Report*
  - Addendum 30, *241-AY/AZ Tank Farms Steam Condensate Stream-Specific Report*
  - Addendum 31, *209-E Laboratory Reflector Water Stream-Specific Report*
  - Addendum 32, *T Plant Laboratory Wastewater Stream-Specific Report*
  - Addendum 33, *183-D Filter Backwash Wastewater Stream-Specific Report*
- WHC-EP-0560, *Miscellaneous Underground Radioactive Waste Tanks*
- WHC-SD-EN-ES-040, *Engineering Study of 50 Miscellaneous Inactive Underground Radioactive Waste Tanks Located at the Hanford Site, Washington*
- WHC-SD-WM-HA-001, *Preliminary Hazards Analysis of the Miscellaneous Underground Storage Tanks*
- WIDS

The level of detail provided in historical documentation concerning the radionuclide and nonradiological waste inventory that was transferred or stored during active operations varies. Three sources (RPP-26744, DOE/RL-98-28, and WIDS) provide rough order-of-magnitude estimates of the waste inventory.

An in-depth waste stream evaluation was completed during the late 1980s (WHC-EP-0287). Each waste stream evaluation that was documented in WHC-EP-0287 included a list of chemicals used or stored at the waste generating facilities, process flow sheets, a schematic showing the pipeline routing used for the liquid effluents and identification of those operational buildings, which contributed effluent and were part of the evaluation. Additionally, this report also included discharge flow data, historical results of routine operational sampling and analysis of radioactive constituents, and the detailed characterization results associated with targeted samples collected from each stream for both nonradiological and radionuclide constituents. The evaluations included a process operations review to identify the sources of the chemicals and radionuclides and the process practices that produced them. Potential sources included process feeds, make-up water, essential chemicals, treatment chemicals, laboratory chemicals, maintenance activities, janitorial products, backflows from vessel ventilation, surface runoff, and residual contamination. The list of liquid effluent streams that were the subject of this evaluation and have detailed process information and analytical characterization data are shown in Table 3-1. The associated liquid disposal waste sites that received the process streams through the pipeline systems are also identified on

Table 3-1. An overview of the characterization approach used for the effluent waste stream evaluation is provided in the following section.

During this period, in addition to the annual reports that were prepared to summarize the types and quantities of effluents released to the environment, a liquid effluent analytical characterization program was undertaken to enhance available information. This evaluation resulted in publication of detailed analytical summaries for 33 effluent waste streams generated at the Hanford site (WHC-EP-0342).

WHC-SD-EN-ES-040 provides additional information on waste transfers and on wastes composition that resides in catch tanks and other inactive miscellaneous underground storage tanks (IMUSTs). In addition, other supporting data available that indicate the composition of constituents that were transferred through pipeline system are the analytical results for the samples collected at liquid effluent disposal sites (e.g., cribs, trenches, French drains, injection wells, ponds, and tank farms) that received the waste streams.

3.2 Previous Investigation, Monitoring, and Remediation Activities

This section provides an overview of the characterization activities that have been conducted for pipeline system waste sites, including characterization information obtained from process-waste stream (i.e., effluent stream) sampling, pipeline interior surveys and removal activities completed to date. The information presented in this chapter includes a summary of the results of a geophysical logging completed adjacent to pipelines in fiscal year (FY) 2008 and older data that was obtained as part of previous investigations associated with liquid waste disposal sites. This older characterization data (including radionuclide activities and chemical constituent concentrations) is available for some of the waste disposal sites to which the pipeline systems discharged effluent. The process-waste stream and liquid waste disposal waste site characterization results indicate the potential constituents that would be present if residual waste (e.g., scale, sludge, and/or sediment) remains in the pipeline systems. Chapter 5 includes a Work Plan task to assemble and evaluate effluent waste stream characterization information and disposal waste site analytical data associated with the pipeline systems. This section of the Work Plan also provides an overview of the current delineation of contaminant plumes in groundwater underlying the pipeline system waste sites in the Central Plateau Inner Area.

Table 3-1. List of Liquid Effluent Streams with Characterization Data

Liquid Effluent Streams Evaluated	Associated Disposal Site	Constituents Analyzed	
		Radionuclides	Chemicals
West Inner Area			
284-W Powerplant wastewater	200-W Powerhouse Pond	No	Yes
2724-W Landry wastewater	216-W-LWC crib	Yes	Yes
UO_3 Plant process condensate	216-U-17 crib	Yes	Yes
UO_3/U Plants wastewater	216-U-14 ditch	Yes	Yes
Plutonium Finishing Plant wastewater	216-Z-20 crib	Yes	Yes
S Plant wastewater	216-S-10 ditch/pond	Yes	Yes
T Plant wastewater	216-T-4-2 ditch	No	Yes
222-S Laboratory wastewater	216-S-26 crib	Yes	Yes

Table 3-1. List of Liquid Effluent Streams with Characterization Data

Liquid Effluent Streams Evaluated	Associated Disposal Site	Constituents Analyzed	
		Radionuclides	Chemicals
242-S Evaporator steam condensate	216-U-14 ditch	Yes	Yes
T Plant wastewater	216-T-1 ditch	No	Yes
East Inner Area			
PUREX chemical sewer	216-A-29 ditch/216-B-3 pond system	Yes	Yes
PUREX stream condensate	216-A-30/216-A-37 cribs	Yes	Yes
PUREX cooling water	216-B-3 pond system	Yes	Yes
PUREX process condensate	216-A-45 crib	Yes	Yes
PUREX ammonia scrubber condensate	Double-shell tanks	Yes	Yes
B Plant chemical sewer	261-B-63 trench	Yes	Yes
B Plant cooling water	216-B-3 pond system	Yes	Yes
B Plant steam condensate	216-B-55 crib	Yes	Yes
B Plant process condensate	Double-shell tanks	Yes	Yes
242-A Evaporator process condensate	216-A-37-1 crib	Yes	Yes
242-A Evaporator cooling water	216-B-3 pond system	Yes	Yes
242-A Evaporator steam condensate	216-B-3 pond system	Yes	Yes
241-A Tank Farm cooling water	216-B-3 pond system	Yes	Yes
244-AR Vault cooling water	216-B-3 pond system	Yes	Yes
241-AY/AZ Tank Farm steam condensate	Double-shell tanks	Yes	Yes
209-E Laboratory reflector water	216-C-7 crib	No	Yes
284-E Powerhouse wastewater	216-B-3 pond system	No	Yes

PUREX = Plutonium-Uranium Extraction (Plant or process)
UO_3 = Uranium Trioxide (Plant)

3.2.1 Characterization of Facility Process-Waste Streams Handled by Pipeline System

During the mid- to late 1980s, an initiative was completed that documented the discharge history and characterize selected waste streams on the Hanford site. The initiation of this effort is described in WHC-EP-0275, *Liquid Effluent Study Project Plan*. A portion of the study (WHC-EP-0342) consisted of characterizing 33 key liquid effluent streams (Table 3-1). The characterization results are presented in 33 separate addenda reports (WHC-EP-0342). The information associated with each addendum includes detailed analytical data for each effluent stream. In most cases, a broad-based analytical data set was collected during the October 1989 through March 1990 period for 24 of the 33 effluent streams. Routine operational process data collected prior to October 1989 were used to characterize the remaining nine

effluent streams. Representative samples of the discharges, as described in the Waste Stream Characterization Report (WHC-EP-0287), were obtained for this evaluation. The samples were typically collected downstream of contributors. Any failure to obtain such downstream samples was addressed in each stream-specific addendum report (WHC-EP-0342). The sampling, sample preservation, chain-of-custody, and documentation procedures employed were in accordance with SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. A matrix table is provided in each stream specific addendum report (WHC-EP-342) stating which analyses were performed for each set of samples. Trip blanks and transfer blanks, in most cases, were also prepared and submitted to the contract laboratory.

Samples were collected for some streams at several locations due to the physical layout and multiple operating configurations. The sample locations and configurations are specified in each stream-specific addendum (WHC-EP-0342). The same locations were used for samples collected before and after October 1989, with one exception, the PUREX Plant process condensate (WHC-EP-0342, Addendum 12). The analytical methods employed for radionuclide and chemical analyses are listed in Tables 3-2 and 3-3, respectively.

Table 3-2. Description of Radionuclide Analytical Methods for the 200 Areas Waste Streams

Description of Method	Radionuclide(s)
Low-level alpha and beta in water samples	Alpha, beta
Separation of plutonium and americium by ion exchange	Plutonium-238, -239, -240, and Americium-241
Tritium analysis by liquid scintillation counting	Tritium
Determination of promethium-147 in effluent water samples by solvent extraction and liquid scintillation counting	Promethium-147
Determination of techneium-99 by solvent extraction and liquid scintillation	Technetium-99
Determination of iodine-129 by liquid-liquid extraction and gamma energy analysis	Iodine-129
Uranium by laser fluorometry	Uranium (Total)
High-level strontium-89, -90 in aqueous samples	Strontium-89, -90
Fast analysis for strontium-89, -90 in aqueous samples	Strontium-89, -90
Determination of iodine-129 waste tank sample	I-129

Table 3-3. Chemical Analysis Methods

Analytical Method	Analyte	Reference	Method
Alkalinity (Method B)	Alkalinity	ASTM (1986)	D1067B
Ammonium	Ammonium	APHA et al. (1985)	417E
Arsenic	Arsenic	SW-846	7060
Coliform bacteria	Coliform	SW-846	9132 or 9131
Cyanide	Cyanide	SW-846	9010
Fluoride (ion-specific electrode)	Fluoride (low detection level)	ASTM (1986)	D1179-80-B
Fluorometric titration	Uranium	ASTM (1986)	D2907-83
GC/MS-direct injection	Volatile substances[a]	SW-846	8240
GC/MS-semivolatile organics	Extractable organics (acid-base neutral)	SW-846	8270
GC/MS-volatile organics	Volatile organics	SW-846	8240
GC/MS-volatile organics	Volatile organics-blank	SW-846	8240
GC/MS-volatile organics	Volatile organics-trip blank	SW-846	8240
Gross alpha	Alpha	EPA-680/4-75/001	680/4-75/001
Gross beta	Beta	EPA-680/4-75/001	680/4-75/001
ICP metals	Cations[b]	SW-846	6010
ICP metals (EP toxic)	Cations[b] (EP toxic)	SW-846	1310/6010
Ion chromatography	Anions[c]	SW-846	600/4-84/017
Lead (GF/AA)	Lead	SW-846	7421
Mercury (CV/AA, EP toxic)	Mercury (EP toxic)	SW-846	7470
Mercury (CV/AA)	Mercury	SW-846	7470
Pensky-Martens test	Ignitability	SW-846	1010

Table 3-3. Chemical Analysis Methods

Analytical Method	Analyte	Reference	Method
Radium total	Radium total	ASTM (1986)	D2460
Reactivity	Reactivity[d]	SW-846	
Selenium	Selenium	SW-846	7740
Sulfide	Sulfide	SW-846	9030
Suspended solids	Suspended solids	APHA et al. (1985)	209B
Thallium	Thallium	SW-846	7841
Total carbon	Total carbon	SW-846	9060
Total organic carbon	Total organic carbon	APHA et al. (1985)	505
Total organic halogen	Total organic halogen	SW-846	9020
Total dissolved solids	Total dissolved solids	APHA et al. (1985)	209B

Sources:

APHA/AWWA/WPCF, *Standard Methods for the Examination of Water and Wastewater*.

ASTM, 1986 Annual Book of ASTM Standards.

EPA-680/4-75/001, *Handbook of Radiochemical Analytical Methods, National Environmental Research Center.*

SW-846, 1986, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*.

a. Direct sample injection into a GC/MS with subsequent analysis by method 8240 (SW-846).

b. Cations include aluminum, antimony, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lithium, magnesium, manganese, molybdenum, nickel, potassium, silicon, sliver, sodium, strontium, tin, titanium, vanadium, zinc, and zirconium.

c. Anions include bromide, chloride, fluoride, nitrate, phosphate, and sulfate.

d. The reactivity test is described in SW-846, Sections 7.3.3.2 and 7.3.3.3.

CV/AA = cold vapor/atomic absorption

EP toxic = extraction procedure toxicity

GC/MS = gas chromatography/mass spectrometry

GF/AA = graphite furnace/atomic absorption

ICP = inductively coupled plasma

The following methods were adopted, as needed:

- Other EPA methods (e.g., alpha counting)
- Standard analytical methods (e.g., suspended solids)
- ASTM method(s) (e.g., fluoride by ion-specific electrode)
- Contract laboratory methods (e.g., direct aqueous injection by gas chromatography)

3.2.2 Characterization of Tank Farm Waste Streams Handled by Pipeline Systems

The characteristics of waste transfers through the pipeline systems connected to SSTs and DSTs have been described in various documents. Initial description of waste types and volumes required under RCRA are presented in the *Hanford Site Waste Management Units Report* (Cramer, 1987). The report, published in May 1987, provides information responsive to Section 3004(u) of RCRA and contains mention of the EPA's request for information and the Government Accountability Office recommendation for the report. The report provides a comprehensive inventory of the types of waste management units including relevant surplus facilities on the Hanford Site, regardless of waste handled or regulatory authority. Due to the comprehensive nature of the report, the listing of waste sites is more expansive than that required by Section 3004(u) of RCRA.

In addition, RPP-RPT-42231 presents information on tanks including analytical sample data that were collected during interim stabilization activities. The following reports provide additional information on these tanks, including assessments of chemical and nuclear safety issues and hazards analysis:

- Letter 9456550, "Safety Issue Resolution Strategy Plan for Inactive Miscellaneous Underground Storage Tanks (WHC-EP-0775)"
- WHC-EP-0560
- WHC-SD-EN-ES-040
- WHC-SD-WM-HA-001
- RPP-RPT-29878

3.2.3 Characterization Results of Soil Contamination Associated with Pipeline Systems

A compilation and review of previously collected characterization data that was directed specifically to evaluate the pipeline system waste sites is summarized in this section. These remedial investigations were primarily focused on characterization of liquid waste disposal sites, but some of the studies also included evaluations of the pipelines that connected to the disposal waste sites. Table B-3 (Appendix B) provides a listing of many of the documents that were reviewed and summarizes the pipeline characterization data collected as part of these investigations. This section also provides additional details regarding other information presented in Tables B-1 and B-2 (Appendix B) as well as other data that were obtained from WIDS.

In 2008, as part of a pipeline characterization effort, direct push technology (DPT) boreholes were drilled to evaluate subsurface soil conditions along selected pipelines, including areas of soil contamination and UPR waste sites that had previously been identified. Seven pipeline waste sites located in the 200 East Area (Figure 3-1) and four pipeline waste sites located in the 200 West Area (Figure 3-2) were investigated. Seventy-one DPT boreholes were geophysically logged using spectral gamma, passive neutron, and neutron moisture logging systems (SGW-39648, *Summary Report: Direct Push Technology Boreholes for Geophysical Logging, 200-IS-I Operable Unit, FY 2008*).

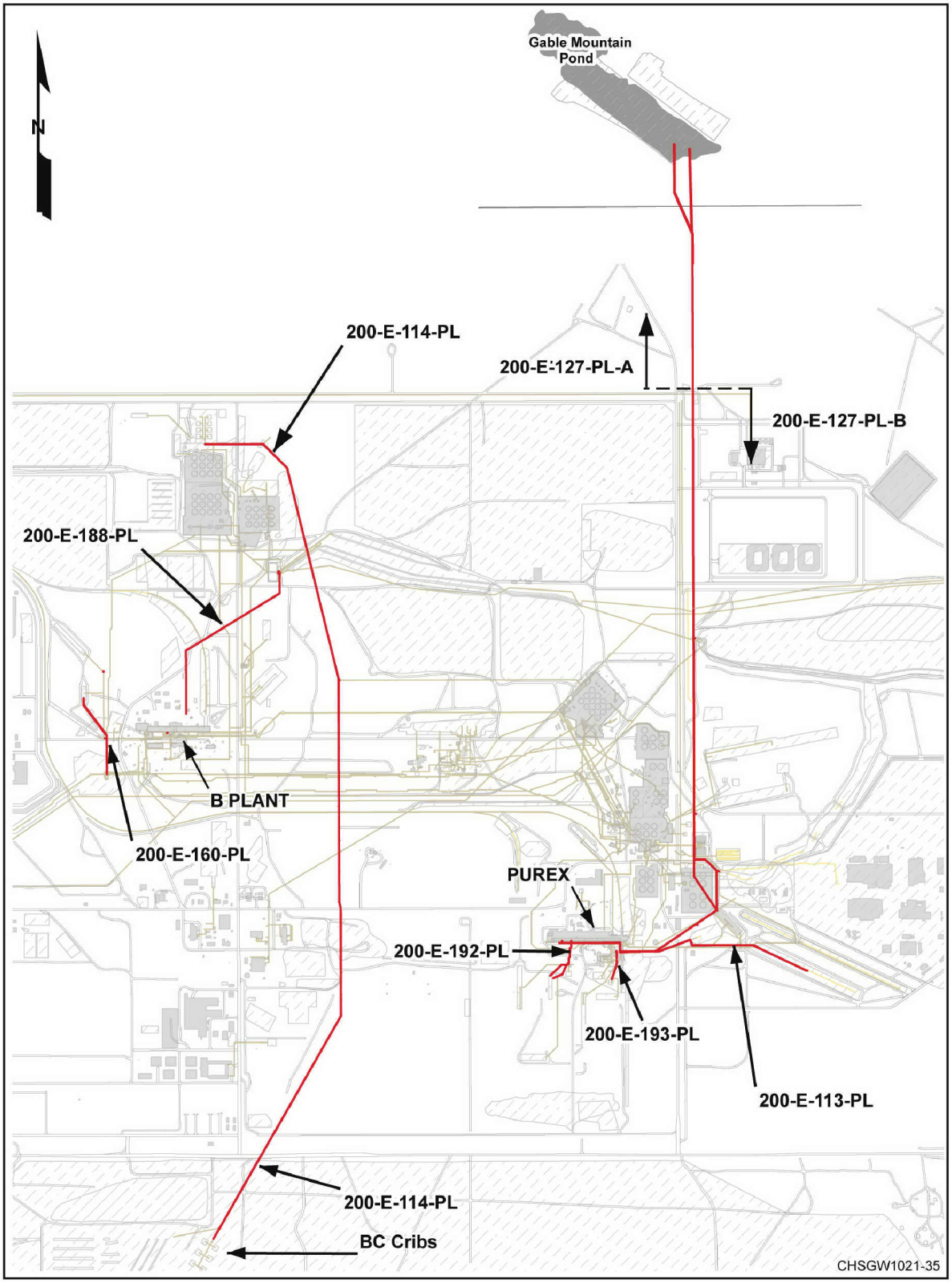


Figure 3-1. Locations of Pipelines Investigated by DPT Borehole Geophysical Logging in the 200 East Area

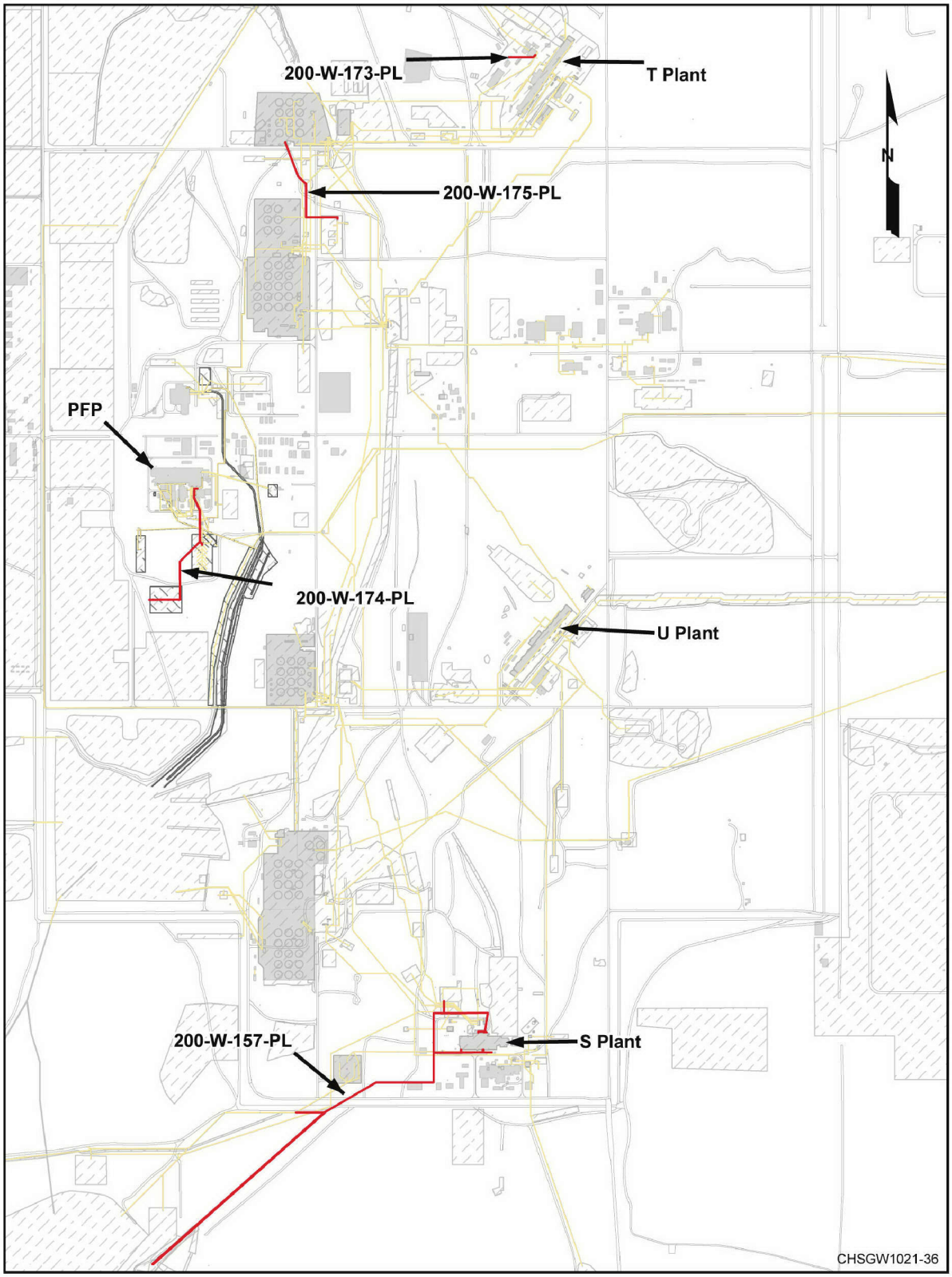


Figure 3-2. Locations of Pipelines Investigated by DPT Borehole Geophysical Logging in the 200 West Area

Nineteen of the DPT boreholes had readings of elevated gamma radiation above background levels (in this instance, any reading approximately twice background levels or greater than 5 pCi/g equivalent radium) associated with nine of the pipelines investigated. No anomalous neutron activity was detected. Table 3-4 summarizes the gamma logging results as reported for equivalent cesium-137 concentrations. Figures 3-3 and 3-4 present vertical profiles of the subsurface gamma logging response for the 19 boreholes that had anomalous activity. The profiles indicate the pipeline construction material and burial depth, the distance between boreholes with respect to each pipeline, and the log response for each pair of boreholes installed. These gamma logging results indicate the vertical distribution of soil contamination is generally primarily limited to an area immediately adjacent to the pipeline, with a vertical extent that is most often less than 1 m (3 ft).

Some surface soil characterization data is also available at locations where associated UPR waste sites or areas of soil contamination have been identified on the surface along a pipeline, and the release was known or believed to be caused by a pipeline leak or failure. Historical characterization activities have generally been limited to surface radiological surveys, noting the maximum radiological instrument counts and observations concerning the media contaminated (i.e., vegetation or soil). The following sections summarize the existing characterization information for pipeline system waste sites and associated areas of soil contamination. This information is organized and presented with reference to the process-waste streams carried by the pipeline.

3.2.3.1 Characterization Information for Process Condensate and Process-Waste Pipelines

One WIDS waste site associated with process condensate and process-waste streams was investigated in 1994 and another four sites were investigated in 2008. In 1994, characterization activities above and next to pipeline waste site 200-W-42 (note: 200-W-42 lacks the "-PL" suffix generally seen in pipeline WIDS codes as it was named prior to the naming convention for pipeline waste sites) were undertaken as part of the former 200-UP-2 OU limited field investigation (DOE/RL-95-13, *Limited Field Investigation for the 200-UP-2 Operable Unit*). Pipeline waste site 200-W-42 consisted of a vitrified clay pipe that connected the 221-U Plant to the 216-U-8 and 216-U-12 Cribs (Figure 3-5). The limited field investigation examined the surface soil contamination and uptake of radionuclides and metals by vegetation at the 216-U-8 Crib. UPR-200-W-163 was identified in 1995 as an area of contaminated vegetation growing along the vitrified clay pipeline (Figure 3-5).

The investigation included collection of 23 surface and near surface soil samples to depths of 2 to 4 m (7 to 12 ft). These sample depths correlate to the approximate depth range along the top of the pipeline. The samples were collected west of Beloit Avenue and north of the 216-U-8 Crib. Surface soil samples collected during the 200-W-42 investigation typically showed background levels of activity for analyzed constituents. The highest levels of contamination were detected in the subsurface near the vitrified clay pipeline. However, many constituents were distributed throughout the 4 m (12 ft) depth being investigated. The data also indicated that minor lateral spreading had occurred (no more than 0.9 to 1.5 m [3 to 5 ft]). The radionuclides and their maximum concentrations detected were americium-241 at 426 pCi/g, cesium-137 at 49,100 pCi/g, plutonium-239/240 at 70.6 pCi/g, and strontium-90 at 1,380 pCi/g. The highest strontium activity was detected in a vegetation sample.

Table 3-4. Pipeline Waste Site Geophysical Logging Results

Waste Stream	Pipelines Waste Sites Investigated	Pipe Construction	Depth to Bottom of Pipe (bgs)	Number of Boreholes Logged	Number of Boreholes with Detections	Borehole ID with Detection	Depth of Detection (bgs)	Cesium-137 Concentration (pCi/g)	Logging Completion Depth (bgs)
Process Condensate and Process—Waste Chemical Laboratory Waste	200-E-192-PL-2	20.3 cm (8 in.) vitrified clay and stainless steel	9.1 m (30 ft)	4	0	None	NA	NA	NA
	200-E-192-PL-1		9.1 m (30 ft)	4	1	C6583	8.5 m (28 ft)	70	10.4 m (34 ft)
	200-E-160-PL	15.2 cm (6 in.) stainless steel	4.3 m (14 ft)	4	1	C6594	4.4 m (14.5 ft)	38	7.6 m (25 ft)
	200-W-174-PL	5.1 to 7.6 cm (2 to 3 in.) stainless steel	3 to 4 m (10 to 13 ft)	6	0	None	NA	NA	NA
Steam Condensate and Cooling Water	200-E-113-PL	40.6 cm (16 in.) steel	3 to 4.6 m (10 to 15 ft)	4	1	C6650	2 m (6.5 ft)	12	6.1 m (20 ft)
	200-E-127-PL	91.4 to 106.7 cm (36 to 42 in.) corrugated metal	2.1 m (7 ft)	4	2	C6697	1.7 m (5.5 ft)	100	5.5 m (18 ft)
							2 m (6.5 ft)	80	
						C6698	2 m (6.5 ft)	30	5.6 m (18.5 ft)
Chemical Sewer Waste	200-E-188-PL	38.1 cm (15 in.) vitrified clay	2.4 to 3 m (8 to 10 ft)	4	2	C6606	2.7 to 2.9 m (9 to 9.5 ft)	12[a]	7.6 m (25 ft)
						C6607	3.4 to 3.5 m (11 to 11.5 ft)	16[a]	
	200-W-157-PL	30.5 cm (12 in.) vitrified clay	4.6 to 5.2 m (15 to 17 ft)	4	0	None	NA	NA	

Table 3-4. Pipeline Waste Site Geophysical Logging Results

Waste Stream	Pipelines Waste Sites Investigated	Pipe Construction	Depth to Bottom of Pipe (bgs)	Number of Boreholes Logged	Number of Boreholes with Detections	Borehole ID with Detection	Depth of Detection (bgs)	Cesium-137 Concentration (pCi/g)	Logging Completion Depth (bgs)
Miscellaneous Waste	200-W-173-PL	20.3 cm (8 in.) vitrified clay	2.4 m (8 ft)	6	1	C6612	2.6 m (8.5 ft)	20[b]	5.8 m (19 ft)
	200-E-193-PL	15.2 cm (6 in.) vitrified clay		8	6	C6615	2.7 m (9 ft)	100	5.2 m (17 ft)
							2.9 m (9.5 ft)	90	
							4.7 m (15.5 ft)	11	
						C6617	0.3 to 3.7 m (1 to 13.5 ft)	12 to 28	7.6 m (25 ft)
						C6618	0.3 to 3.7 m (1 to 12 ft)	10 to 32	7.6 m (25 ft)
			3.0 m (10 ft)			C6619	4.6 m (15 ft)	22[b]	6.1 m (20 ft)
						C6621	2.0 m (6.5 ft)	150	5.2 m (17 ft)
						C6622	0.6 to 1.4 m (2 to 4.5 ft)	12 to 18	7.0 m (23 ft)
							4.1 to 4.3 m (13.5 to 14 ft)	12 to 18	
							4.6 m (15 ft)	150	

Table 3-4. Pipeline Waste Site Geophysical Logging Results

Waste Stream	Pipelines Waste Sites Investigated	Pipe Construction	Depth to Bottom of Pipe (bgs)	Number of Boreholes Logged	Number of Boreholes with Detections	Borehole ID with Detection	Depth of Detection (bgs)	Cesium-137 Concentration (pCi/g)	Logging Completion Depth (bgs)
							4.7 m (15.5 ft)	70	
							4.9 m (16 ft)	70	
Tank/ Scavenged Waste	200-W-175-PL	7.6 cm (3 in.) steel	1.5 m (5 ft)	10	1	C6623	1.4 m (4.5 ft)	18[b]	7.6 m (25 ft)
	200-E-114-PL	Two 10.1 cm (4 in.) carbon steel pipes in parallel	0.9 to 1.5 m (3 to 5 ft)	13	4	C6633	0.8 m (2.5 ft)	12	1.8 m (6 ft)
						C6639	2 m (6.5 ft)	3,000	7.6 m (25 ft)
						C6640	0.8 m (2.5 ft)	1,900	2.7 m (9 ft)
							1.5 m (5 ft)	1,000	
							1.8 m (6 ft)	500	
						C6850	0.5 m (1.5 ft)	60	7.6 m (25 ft)

a. Possible strontium-90.

b. Cesium not confirmed.

bgs = below ground surface

ID = identification

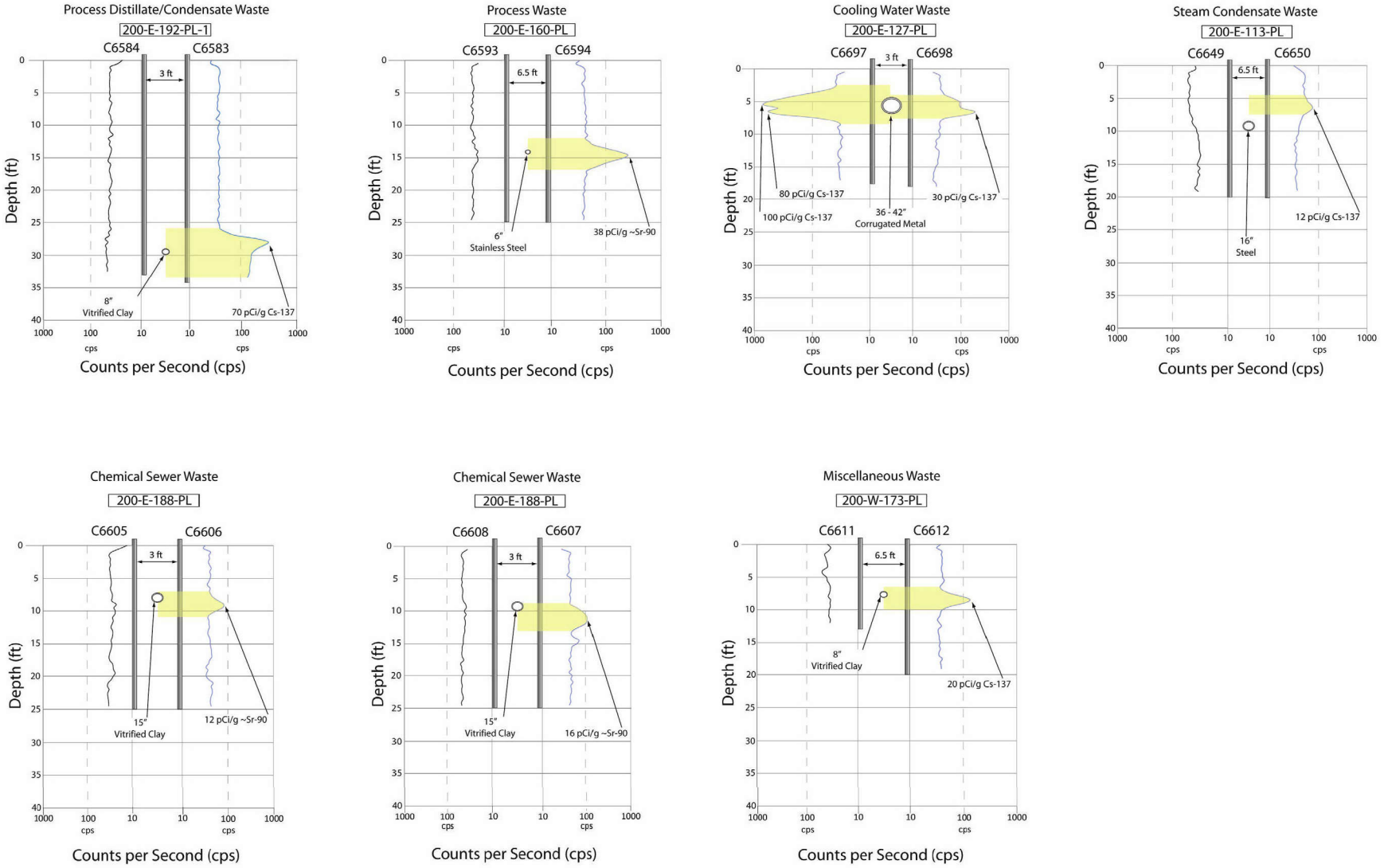


Figure 3-3. Total Gamma Log Responses for Detections along 200-E-192-PL, 200-E-160-PL, 200-E-127-PL, 200-E-113-PL, and 200-W-173-PL

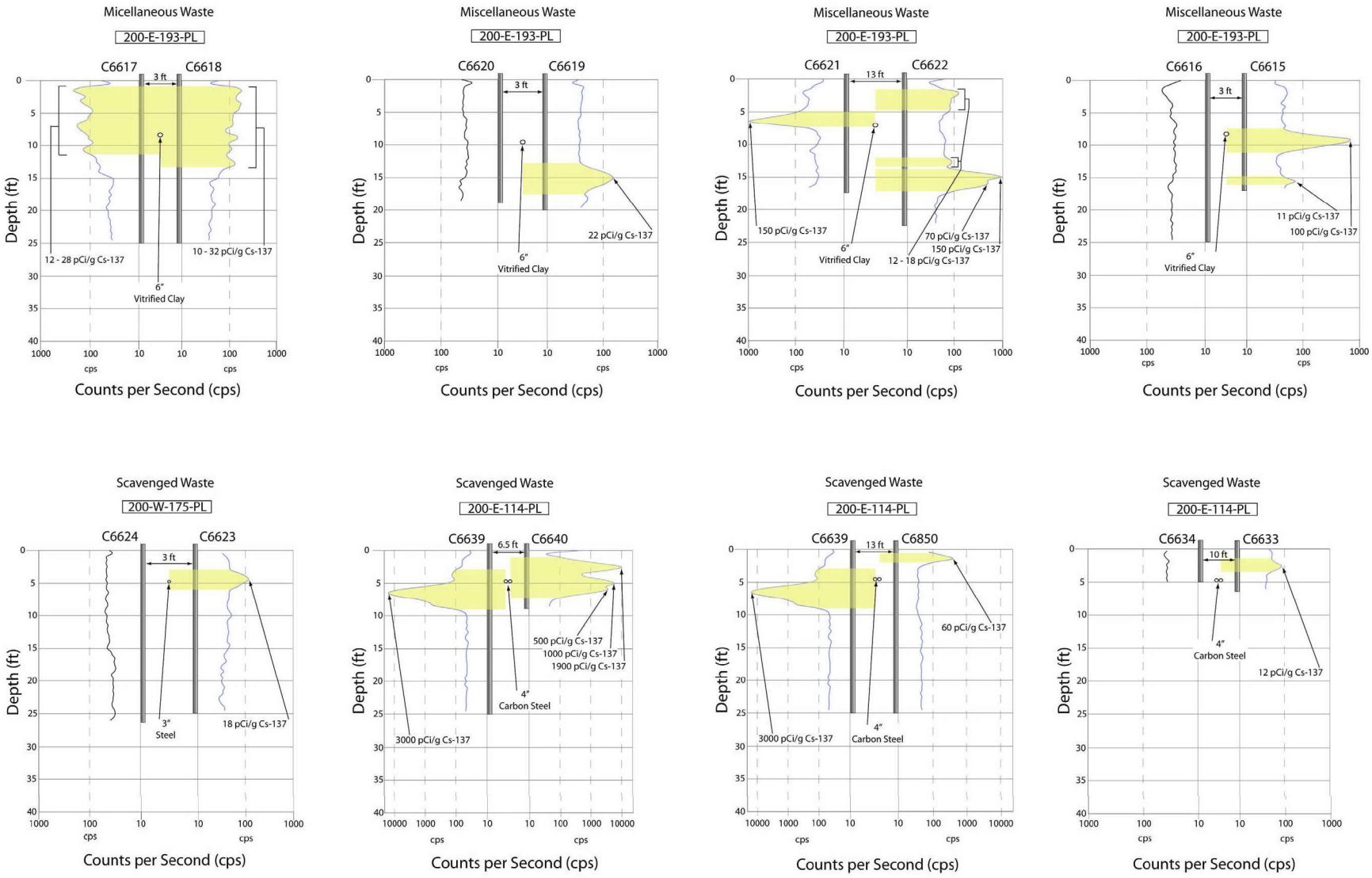


Figure 3-4. Total Gamma Log Responses for Detections along 200-E-193-PL, 200-W-175-PL, 200-E-127-PL, and 200-E-114-PL

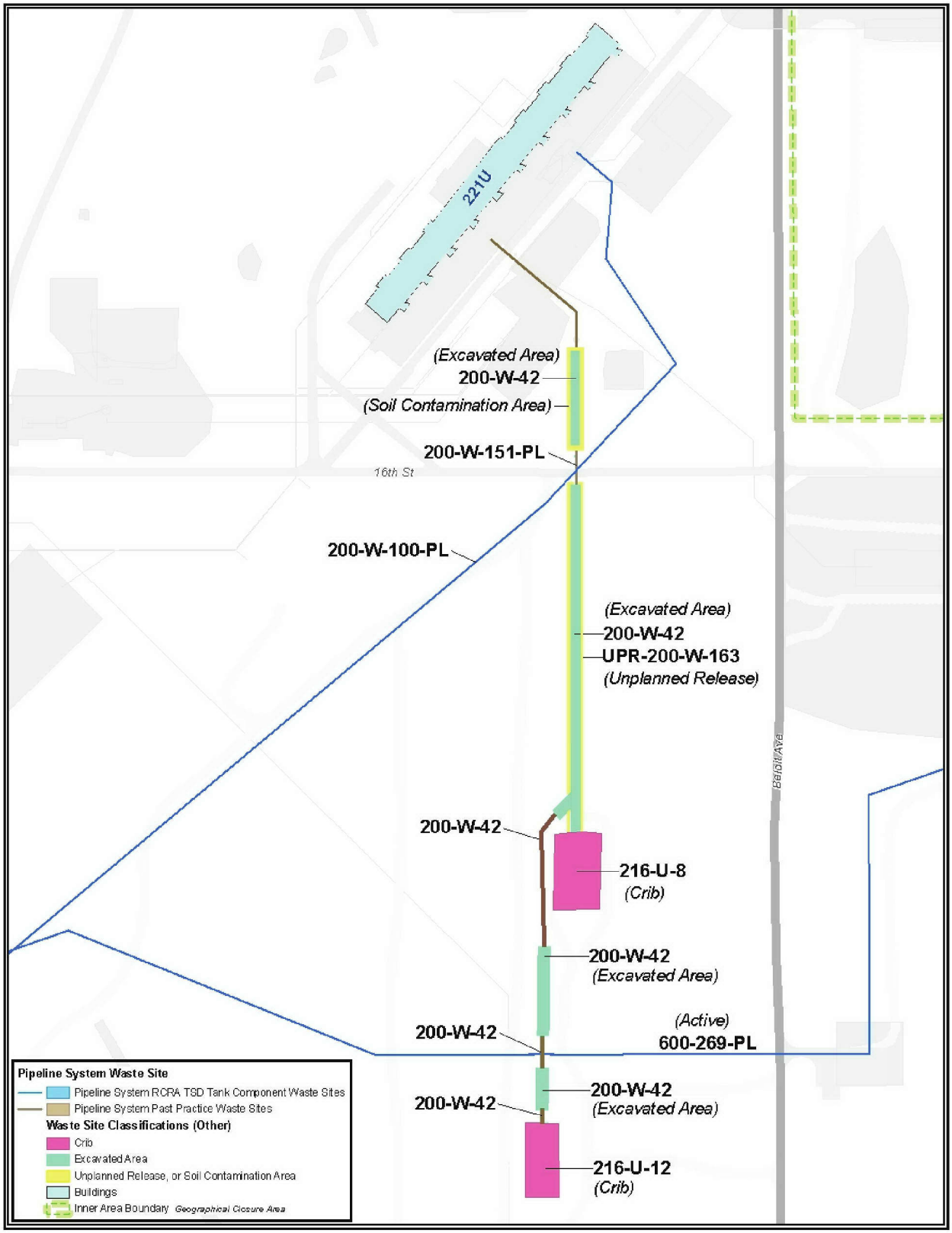


Figure 3-5. Location Map Showing Features Associated with 200-W-42

For the four WIDS pipeline sites investigated in 2008, 18 DPT boreholes were drilled adjacent to these waste sites to evaluate potential subsurface soil contamination. Two of the four waste sites had geophysical logging results with equivalent cesium-137 levels greater than background (Table 3-4).

Pipeline waste site 200-E-192-PL, located south of the PUREX Plant, is made up of two separate pipelines. One pipeline (subsite code 200-E-192-PL-1) is a 20.3 cm (8 in.) diameter vitrified clay pipe that extends from the Proportional Sampler Pit 4 to the northern end of the 216-A-10 Crib, where it connects to the center-crib distribution pipeline (Figure 3-6). The second pipeline (subsite code 200-E-192-PL-2) is a 20.3 cm (8 in.) diameter stainless steel pipe that extends from the Proportional Sampler Pit 4 to the northeastern side of the 216-A-10 Crib, where it connects to a second distribution pipeline, east of the center crib distribution pipeline (Figure 3-6). Waste subsite 200-E-192-PL-1, originally installed in 1956, collapsed in 1962 and was subsequently replaced with subsite 200-E-192-PL-2.

Waste site 200-E-192-PL carried waste from the PUREX 202-A Canyon Building, a waste classified as acidic (pH 1.0 to 2.5) process distillate/condensate discharge that was generated from two product concentrators. Constituents found in the 216-A-10 Crib, which passed through the 200-E-192-PL, include plutonium-238, plutonium-239/240, americium-241, cesium-137, uranium-238, strontium-90, tritium, oil and grease, tributyl phosphate, and a few volatile organic compounds (VOCs) (SGW-39648). One of the four DPT boreholes (C6583) (Figure 3-6) installed adjacent to this waste site had elevated cesium-137 concentrations (Table 3-4 and Figure 3-3).

Pipeline waste site 200-E-160-PL consists of a 15.2 (6 in.) diameter stainless steel pipeline connected to a 15.2 cm (6 in.) diameter vitrified clay pipe buried 4.3 m (14 ft) bgs. The stainless steel portion extends from the 270-E-1 Tank, connects to the vitrified clay portion of the pipeline, and runs to the 216-B-12 Crib (Figure 3-7). The waste stream carried by waste site 200-E-160-PL to the 216-B-12 Crib included plutonium-239/240, americium-241, cesium-137, uranium-238, strontium-90, tritium, total uranium, and several nonradiological constituents (including potassium, nitrate, sodium, and phosphate) (RPP-26744). In 2008, in an effort to characterize the subsurface soil contamination along this pipeline, a series of four DPT boreholes were logged (Figure 3-7). Borehole C6594 was the only DPT borehole to report elevated gamma radiation levels (Table 3-4 and Figure 3-3).

Pipeline waste site 200-W-174-PL had no detectable measurements above background levels in any of the DPT boreholes logged (Table 3-4). This waste site consists of two 5.08 cm (2 in.) diameter stainless steel pipelines that run parallel to each other, extending from the 234-5Z Facility to the 216-Z-1A Tile Field and the 216-Z-18 Crib (Figures 3-8a and 3-8b).

Pipeline waste site 200-W-208-PL is the likely source of contamination found near Z Plant Diversion Box # 2 (200-W-59) (Figure 3-9). Waste site 200-W-208-PL is a vitrified clay pipeline that is routed through the diversion box. This diversion box directed the flow of process-waste from the 241-Z-361 Settling Tank to the 216-Z-12 Crib. The contamination is thought to be from the unsealed joints of the vitrified clay pipeline that extend from the south side of the diversion box to the crib. Characterization activities were performed near the diversion box in 1976. Four shallow wells (299-W-18-151, 299-W-18-154, 299-W-18-155, and 299-W-18-156) were drilled between the 216-Z-12 Crib and the 200-W-59 Diversion Box to evaluate the near surface soils. All of the wells showed plutonium contamination activity at approximately 5 m (9.8 ft). The *Report on Plutonium Mining Activities at 216-Z-9 Enclosed Trench* (RHO-ST-21) states that engineering drawings did not specify seals to be used for the butted vitrified clay pipeline connections between the diversion box and the crib. The report also indicates that the vitrified clay pipeline sections were 3 m (9.8 ft) long. The log for Well 299-W-18-156 reported contamination at 5.3 to 5.5 m (17.5 to 18 ft) bgs. This well is approximately 3.7 m (12 ft) to the west of the 200-W-59 Diversion Box and is the closest of the four wells drilled.

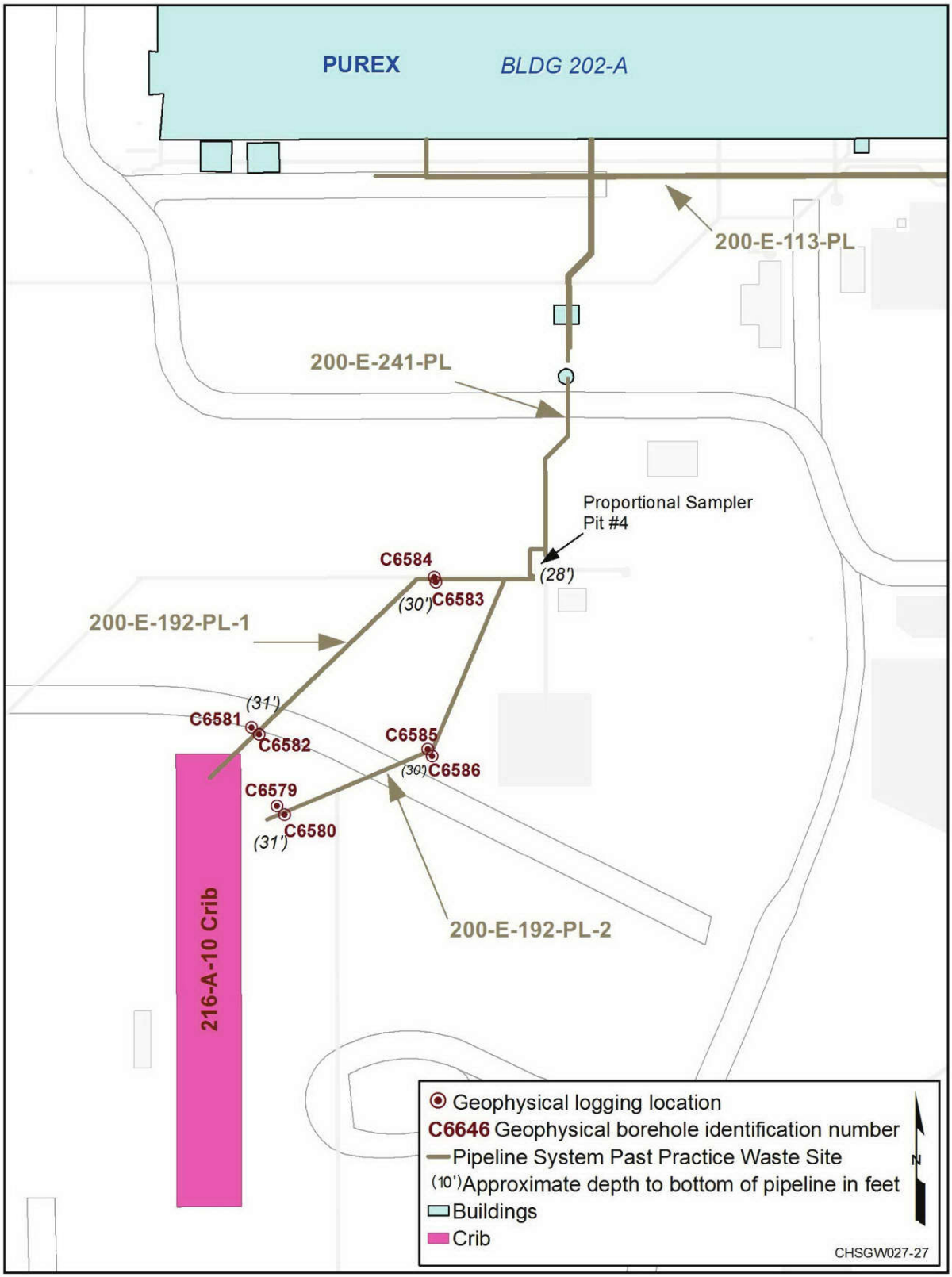


Figure 3-6. Pipeline 200-E-192-PL Borehole Locations

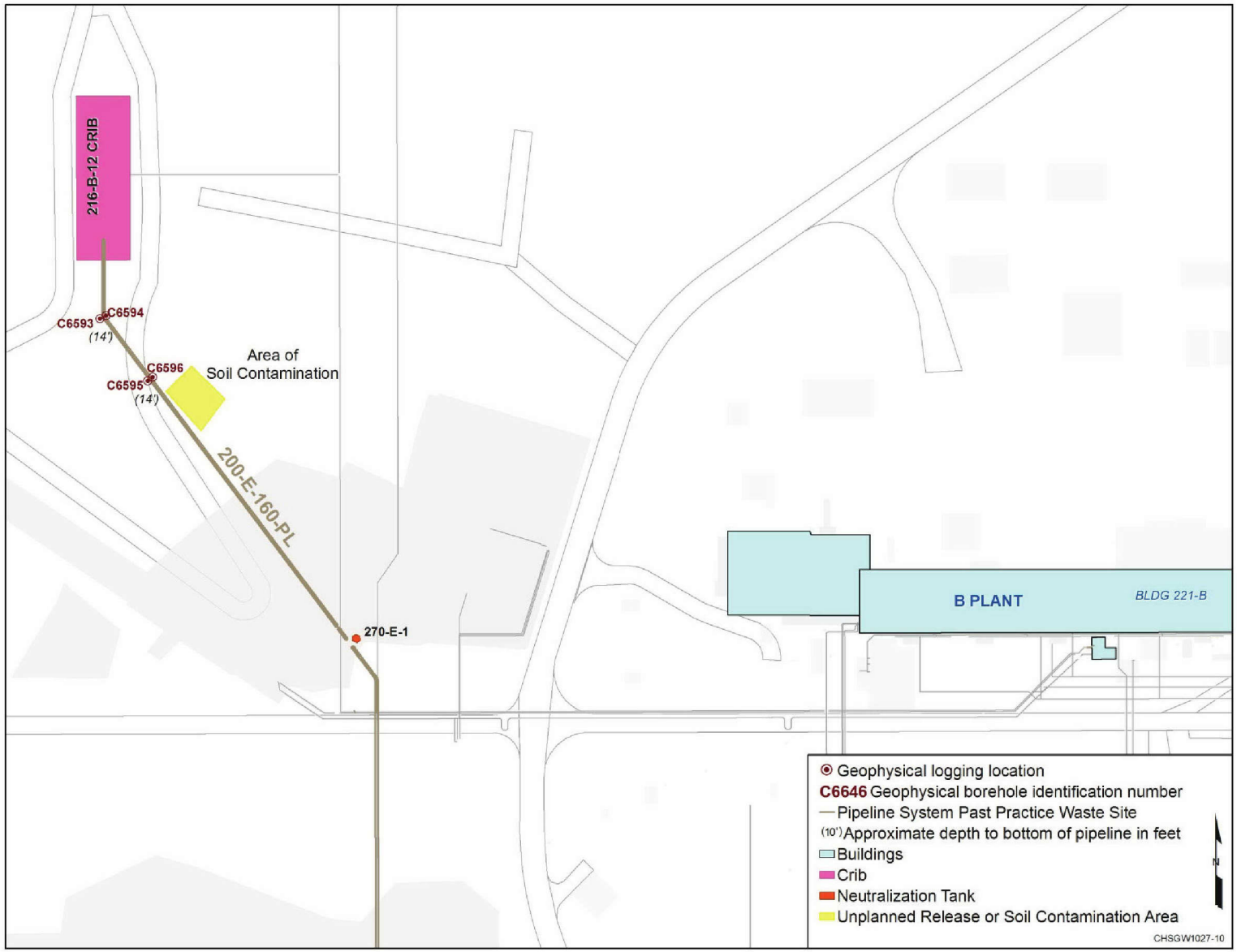


Figure 3-7. Pipeline 200-E-160-PL Borehole Locations

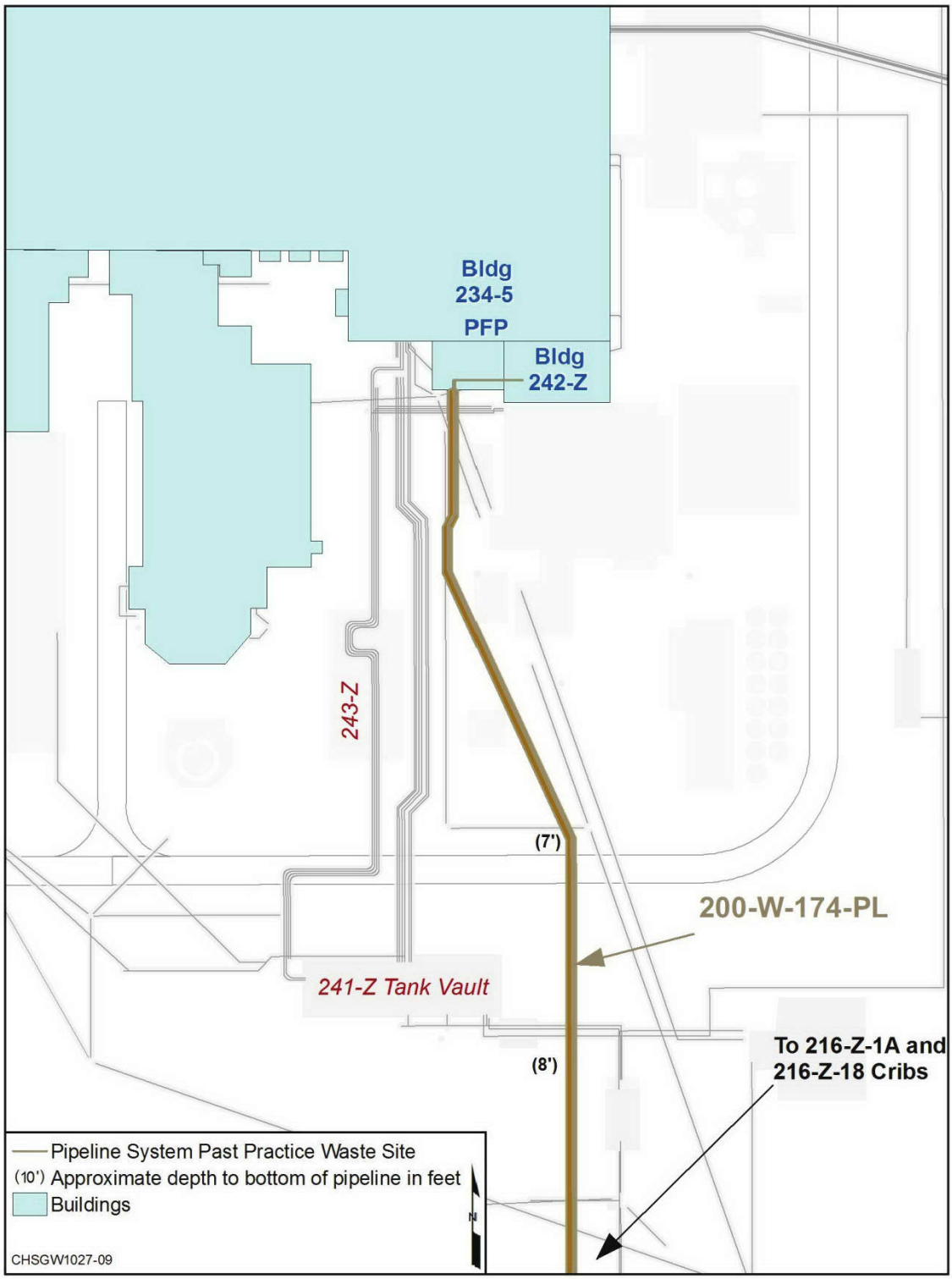


Figure 3-8a. Pipeline 200-W-174-PL Borehole Locations (Northern Segment)

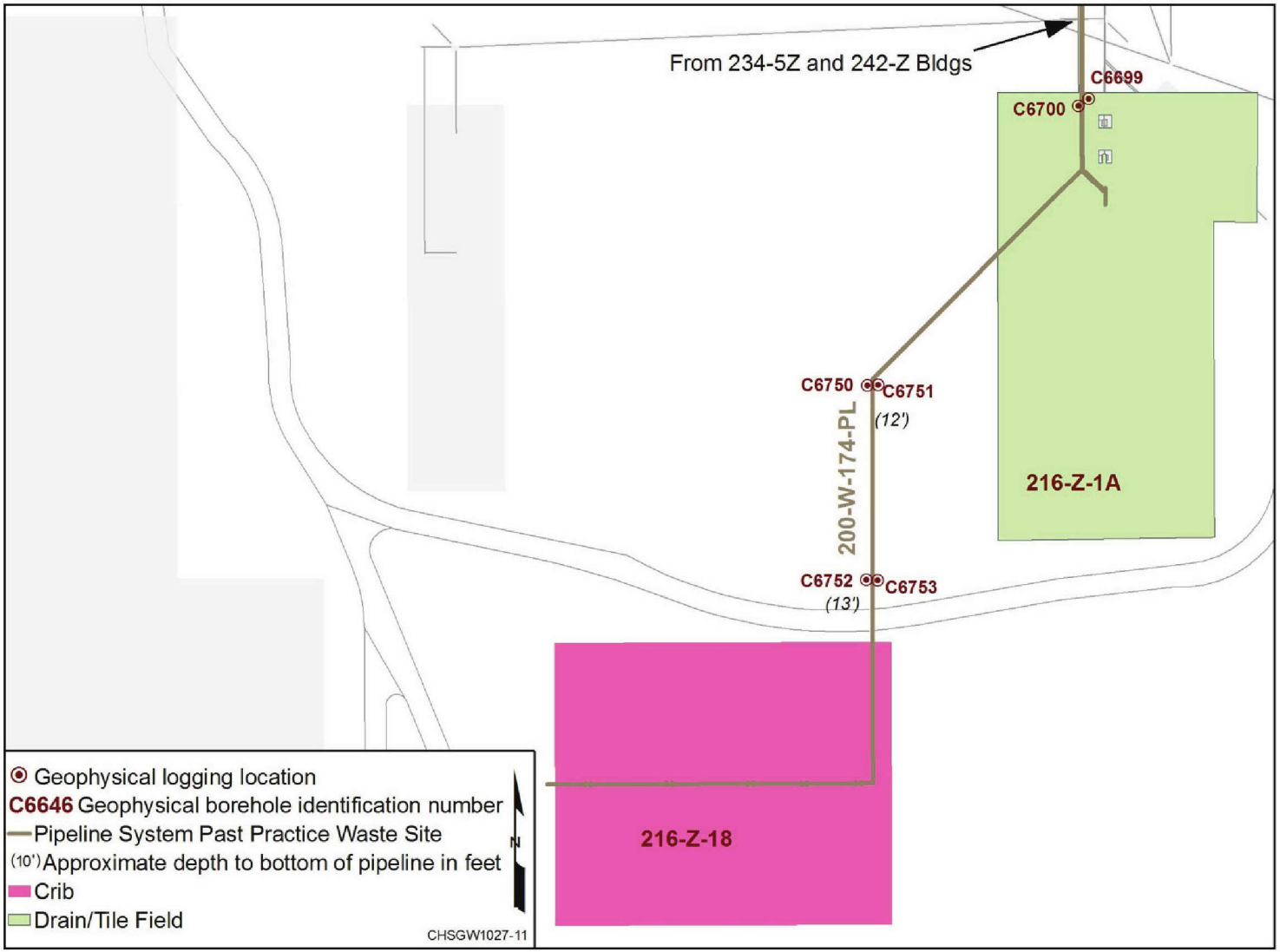


Figure 3-8b. Pipeline 200-W-174-PL Borehole Locations (Southern Segment)

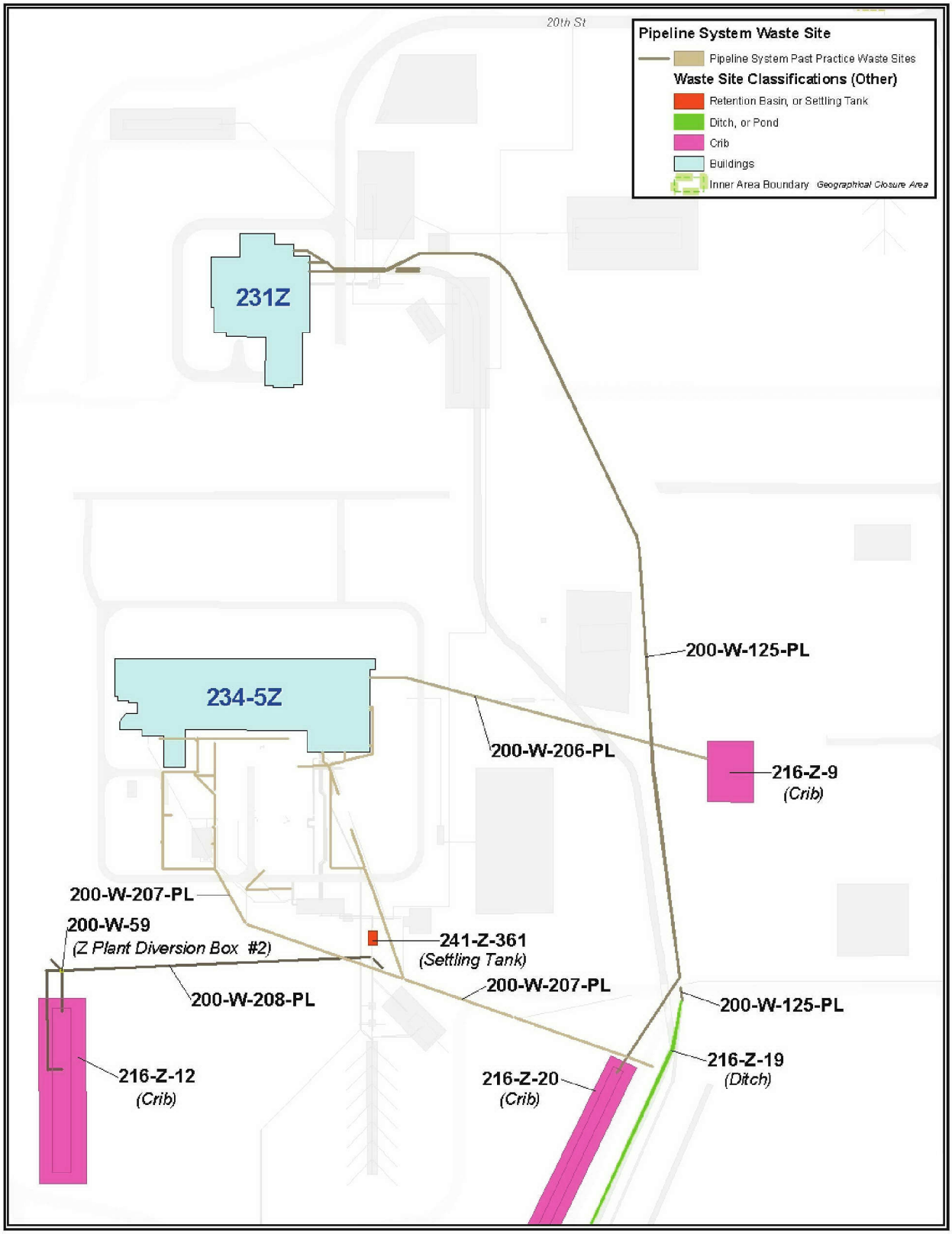


Figure 3-9. Location Map Showing Features Associated with 200-W-208-PL, 200-W-206-PL, 200-W-125-PL, and 200-W-207-PL

3.2.3.2 Characterization Information for Steam Condensate and Cooling Water Pipelines

Six WIDS pipeline waste sites related to steam condensate and cooling water stream have associated UPRs or areas of soil contamination along their paths that are known or believed to be caused by pipeline leakage. In 2008, two of the six waste sites had DPT boreholes installed for geophysical logging (Table 3-4).

Three small areas of soil contamination are located above pipeline waste site 200-E-127-PL (this includes waste sites 200-E-127-PL-A and 200-E-127-PL-B), which extends from the PUREX Plant to the 216-A-25 (Gable Mountain Pond) waste site (Figure 3-10). In these areas, the pipeline consists of a 91.4 or 106.7 cm (36 or 42 in.) diameter corrugated metal pipe. The depth bgs to the bottom of the pipeline (the invert depth) ranges from approximately 1.8 to 2.3 m (6 to 7.5 ft) near the contamination. Little information is available about these areas, except that records in WIDS indicate that radiologically contaminated tumbleweeds were present in these areas at one time. The three areas are outside and to the north of the 810 Gate. Because of the contaminated vegetation, these areas have been surface stabilized. Two areas are posted as Contamination Areas (CAs), and the third is posted as an Underground Radioactive Material Area (URMA).

Four DPT boreholes were drilled adjacent to 200-E-127-PL in 2008 to provide further characterization of previously detected contamination at the surface (Figure 3-10). Boreholes C6697 and C6698 both had cesium-137 concentrations above background levels (Table 3-4 and Figure 3-3).

Two areas of soil contamination had been located along pipeline waste site 200-E-113-PL from the PUREX Plant to the 216-A-6 and 216-A-30 Cribs (Figure 3-11). In these areas, the pipeline consists of a 40.6 cm (16 in.) diameter steel pipe. The larger area occupies an area of approximately 21 m^2 (230 ft^2) and is located further from the 216-A-30 Crib. The smaller area is only a few meters square and is next to the 216-A-42C Valve Box near the 216-A-30 Crib. Both areas are surface stabilized and posted as CAs. The maximum surface radiological survey count obtained for these two areas was 1,050 c/min beta/gamma in October 2000, measured on a growing tumbleweed (Radiation Survey Report SS256115, *Vegetation Growth Above Posted Pipeline Associated with 216-A-42C and 216-A-30 Crib*).

Four DPT boreholes were drilled near the 216-A-30 Crib for the 200-E-113-PL to evaluate potential subsurface contamination (Figure 3-11). Of the four locations, only Borehole C6650 had detections with a cesium-137 concentration above background (Figure 3-3).

Three areas of soil contamination are located along pipeline waste site 200-W-79-PL from the 241-T-151 Diversion Box to the 216-T-36 Crib (Figure 3-12). In the areas of the contamination, this pipeline consists of a 10.2 cm (4 in.) diameter vitrified clay pipe. The depth below ground surface to the bottom of the pipeline ranges from approximately 2.4 to 2.9 m (8 to 9.5 ft) near the contamination. The two areas of soil contamination nearest the crib are roughly rectangular, while the third area is further from the crib and is irregular in shape. A portion of this third area is the result of contaminated vegetation built up along a fence, and this area is not considered related to the pipeline. The size of these areas of soil contamination, including the unrelated portion of the third area, is approximately 1,580 m^2 (17,000 ft^2). The three areas of soil contamination are surface stabilized and posted as URMAs. The maximum surface radiological survey count measured on rabbitbrush in these CAs was 80,100 c/min beta/gamma in August 1998. The ground surface and several anthills also were surveyed along portions of the pipeline route in these areas (Radiation Survey Report SS248978, *Survey of Underground Transfer Lines*). The instrument counts for the anthills were at background. The maximum ground surface reading was 4,100 c/min beta/gamma.

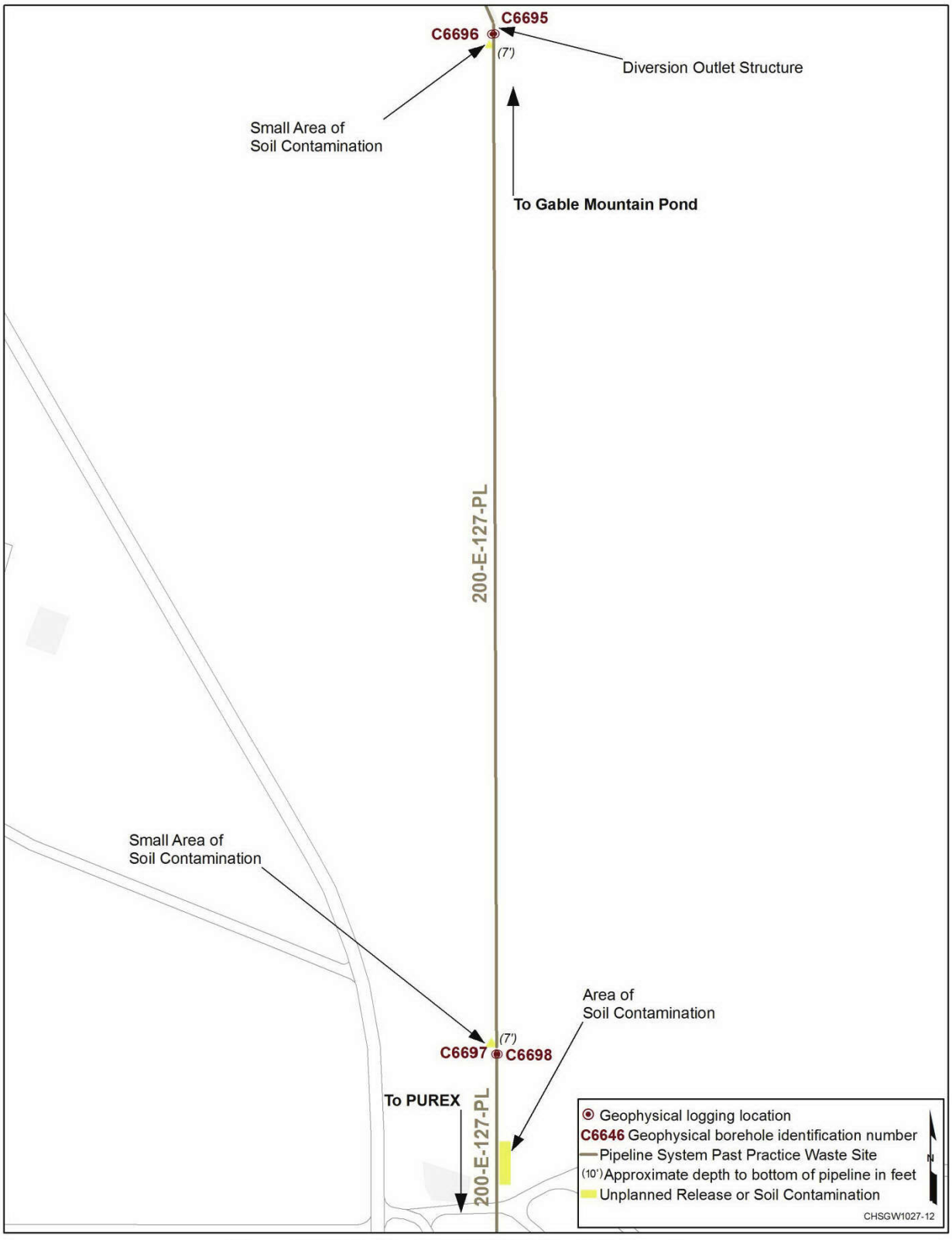


Figure 3-10. Pipeline 200-E-127-PL Borehole Locations

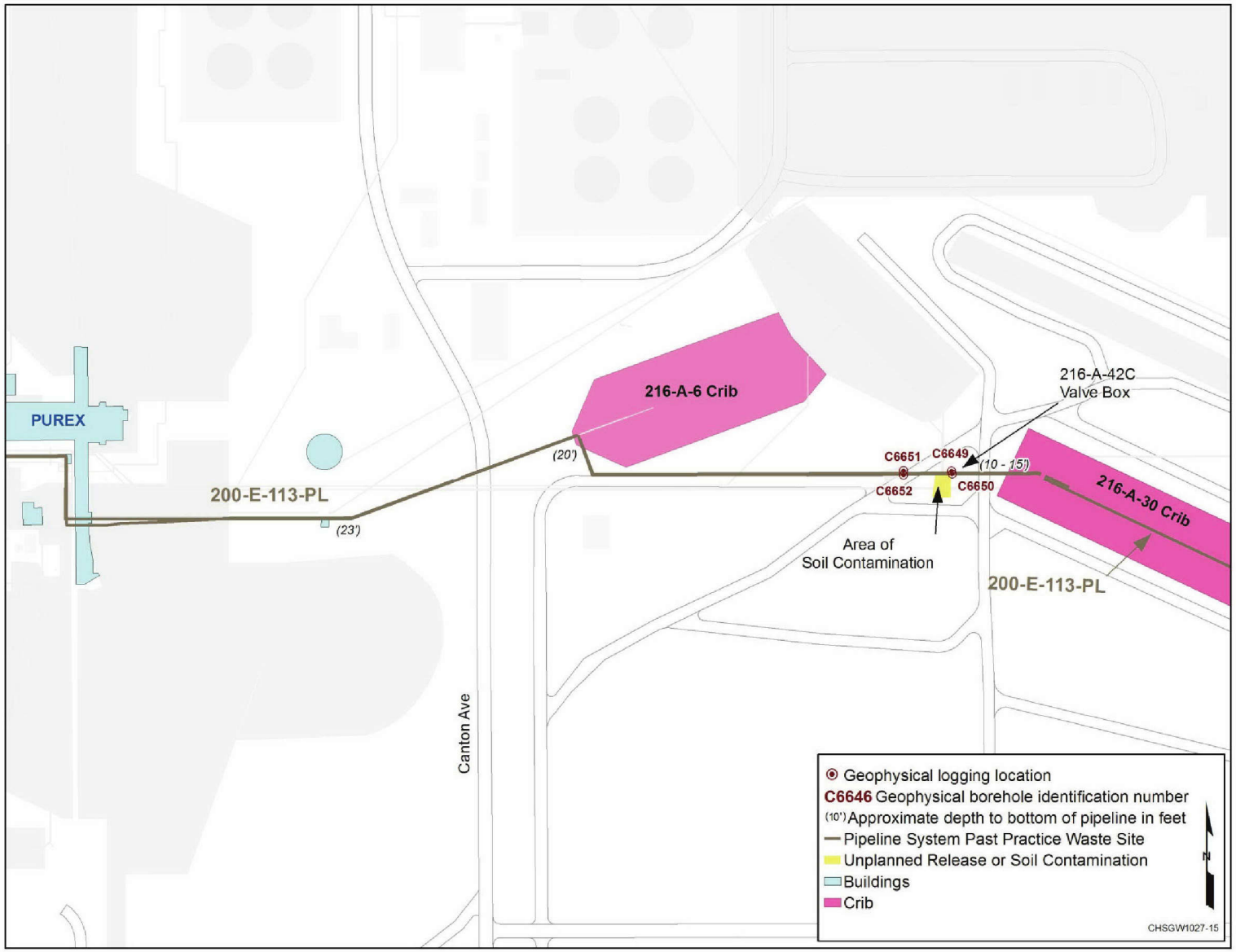


Figure 3-11. Pipeline 200-E-113-PL Borehole Locations

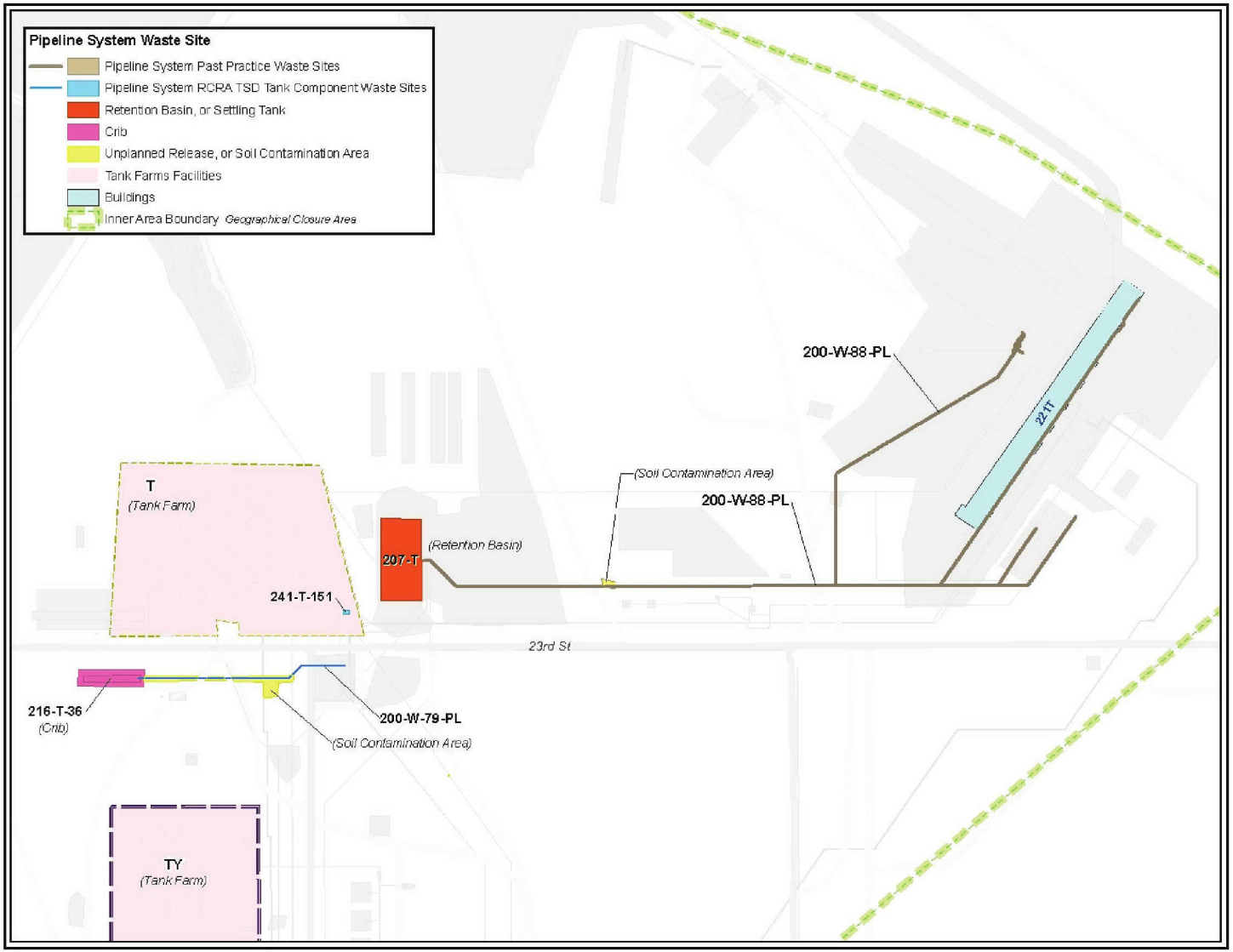


Figure 3-12. Location Map Showing Features Associated with 200-W-79-PL and 200-W-88-PL

An approximately 465 m^2 (5,000 ft^2) area of soil contamination (UPR-200-E-79) is located along pipeline waste site 200-E-264-PL that extends from the 242-B Evaporator to the 207-B Retention Basin (Figure 3-13). In this area, the pipeline consists of a 10.2 cm (4 in.) diameter cast iron pipe. Depth of the pipeline below ground surface is uncertain. The UPR was created when five leaks were detected in the pipeline in June 1953. The maximum surface radiological survey count for this area of soil contamination was 2,500 c/min (approximately 7,000 pCi/g) (WIDS). It was estimated that approximately 10 Ci of mixed fission products (primarily cesium-137) were discharged into the soil in this area (RHO-CD-673, *Handbook 200 Areas Waste Sites*). The area has been surface stabilized and is currently posted as a URMA.

Two UPR waste sites (UPR-200-E-80 and UPR-200-E-1) are located along pipeline waste site 200-E-112-PL (Figure 3-13). This pipeline extends from the 221-B Plant Canyon Building to the 207-B Retention Basin. Both UPR waste sites are near the 221-B Canyon Building. In this area, the pipeline consists of a 61 cm (24 in.) diameter cast iron pipe. Depth to the bottom of the pipeline is estimated to be approximately 3.05 m (10 ft) bgs. According to WIDS, the first release, UPR-200-E-80, occurred in June 1946 when the line failed. A portion of the ground surface above the line caved in and the dose rate measured at the surface was 400 Rad/hr. About 10 Ci of fission products (primarily cesium-137) were estimated to have been released into the soil. A second release site, UPR-200-E-1, was identified in September 1946, located approximately 24 m (80 ft) from the June 1946 leak; the newer UPR was assumed to have resulted from liquid migration from the June leak. Surface radiation survey results are not reported for this second leak, but WIDS indicates that the area was covered with enough soil to reduce surface contamination readings to 2 mRad/hr. The area is posted with radiation warning signs.

One area of soil contamination (approximately 56 m^2 [600 ft^2]) has been identified along pipeline waste site 200-W-88-PL between the 221-T Canyon Building and the 207-T Retention Basin (Figure 3-12). The soil CA is adjacent to a manhole associated with the pipeline. In this area, the pipeline consists of a 61 cm (24 in.) diameter vitrified clay pipe. The depth of the pipeline below ground surface is uncertain. The area is posted with an URMA sign. WIDS does not include any radiological survey data describing the conditions inside the posted area, or when it was posted.

3.2.3.3 Characterization Information for Chemical Sewer Waste Pipelines

One pipeline waste site related to chemical sewer waste streams has associated areas of soil contamination along its length that are known to be caused by leaks. Three areas of soil contamination are located along pipeline waste site 200-E-188-PL that extends from B Plant to the 207-B Retention Basin (Figure 3-14). The pipeline consists of a 38.1 cm (15 in.) diameter vitrified clay pipe. All three areas are surface stabilized and posted as URMAs. The maximum surface radiological survey count for these areas was 1,200 c/min beta/gamma in August 2000, obtained for a tumbleweed fragment (Radiation Survey Report SS255613, *Survey of Transfer Line Northeast of B Plant to 207-B*).

According to RHO-CD-1010, *B Plant Chemical Sewer System Upgrade*, and WHC-EP-0342, Addendum 6, pipeline leakage was documented in the 1970s and 1980s related to the 200-E-188-PL waste site and associated lines. The leakage was discovered while excavating in the area. Based on a subsequent leak test, it was estimated that approximately 1,136,000 million L/day (300,000 gal/day) may have been leaking into the vadose zone; however, the duration or volume of the actual leak was not estimated or cited. The releases were assumed to be occurring primarily along the feeder and collector pipelines. Major portions of chemical sewer system pipelines were relined in 1985.

In 2008, four DPT boreholes were drilled to characterize potential soil contamination associated with 200-E-188-PL (Figure 3-14). Boreholes C6606 and C6607 both had elevated cesium-137 (possibly strontium-90) concentrations (Table 3-4 and Figure 3-3).

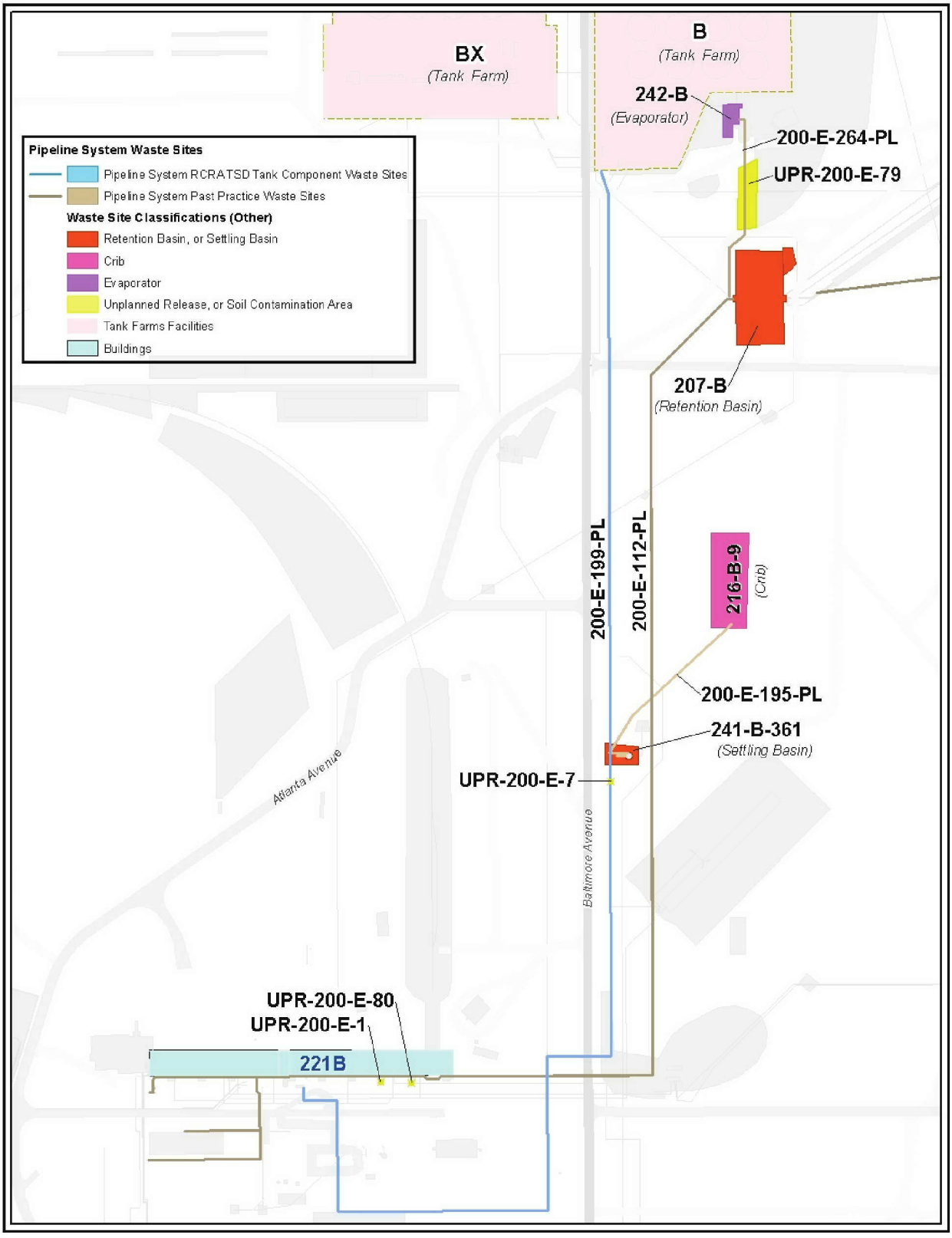


Figure 3-13. Location Map Showing Features Associated with 200-E-264-PL, 200-E-112-PL, 200-E-199-PL, and 200-E-195-PL

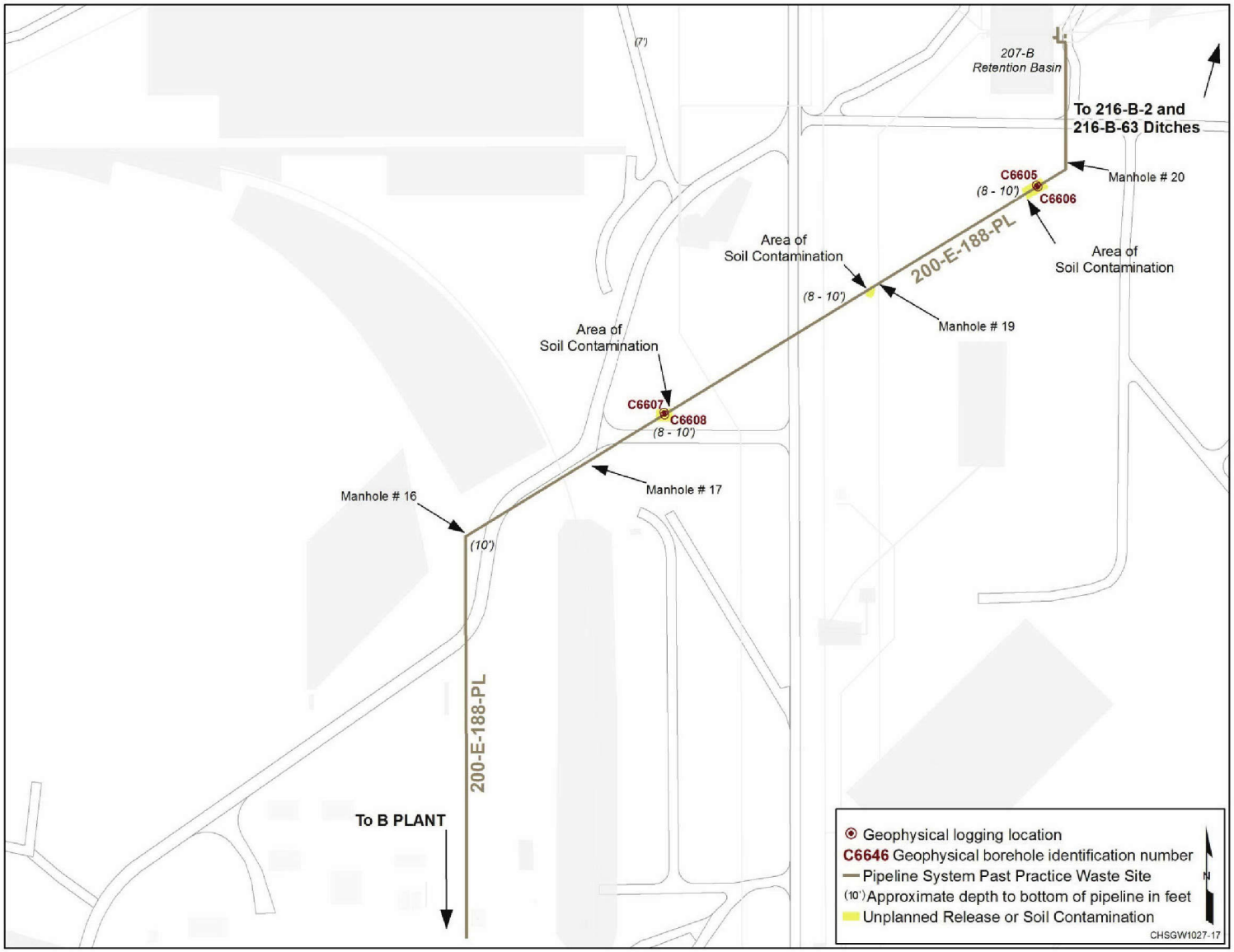


Figure 3-14. Pipeline 200-E-188-PL Borehole Locations

Four DPT boreholes were drilled adjacent to pipeline waste site 200-W-157-PL (Figure 3-15). None of the DPT boreholes had elevated cesium-137 detections (Table 3-4). This pipeline (also known as the REDOX Chemical Sewer) is a 30.5 cm (12 in.) diameter vitrified clay pipe that connects to manhole number 3, southwest of 202-S, and carried waste to the 216-S-10 Ditch.

3.2.3.4 Characterization information for Miscellaneous Waste Pipelines

Two pipelines associated with miscellaneous waste streams had a series of DPT boreholes drilled in 2008 to characterize potential subsurface soil contamination. Pipeline waste site 200-W-173-PL consists of an 20.3 cm (8 in.) diameter vitrified clay pipe running from the 2706-T Building to the 216-T-33 Crib, and was used to carry decontamination water (Figure 3-16). The decontamination water contained chemical and radionuclide constituents, including americium-241, plutonium-239/240, cesium-137, strontium-90, chromium, nitrate, oil and grease, polychlorinated biphenyls (PCB-1254, PCB-1260), and some VOCs. In 2008, six DPT boreholes were drilled adjacent to this pipeline to characterize potential subsurface soil contamination (Figure 3-16). Logging results from one of these DPT boreholes (C6612) showed an elevated cesium-137 concentration (Table 3-4 and Figure 3-3).

Pipeline waste site 200-E-193-PL is a 15.2 cm (6 in.) diameter vitrified clay pipe that carried sump waste from the 293-A Building, laboratory cell drainage from the 202-A Building, and drainage from the 291-A-1 Stack to the 216-A-21 Crib. To evaluate subsurface radiological contamination along the pipeline, eight DPT boreholes were drilled (Figure 3-17). Six of the eight DPT boreholes logged reported elevated cesium-137 levels (Table 3-4 and Figure 3-4).

3.2.3.5 Characterization Information for Tank/Scavenged Waste Pipelines

Two pipelines related to tank/scavenged waste streams have associated UPRs or areas of soil contamination along them that are suspected to be caused by leaks. Two areas of soil contamination are located along bends near the north end of pipeline waste site 200-E-114-PL (Figure 3-18a). This waste site extends from the BY Tank Farm to the 216-B-51 French Drain and to the BC Cribs Area (Figure 3-18b). In these areas, two 10.2 cm (4 in.) diameter steel pipes comprise the distribution pipeline system. The depth from ground surface to the bottom of the pipelines is approximately 0.6 to 0.9 m (2 to 3 ft). The larger area of soil contamination is approximately 418 m^2 (4,500 ft^2) and is located near the connection from the main pipeline to the 216-B-51 French Drain (Figure 3-18a). The second area is at the next bend to the south along the line and is approximately 260 m^2 (2,800 ft^2). The maximum radiological survey count for these two areas was 8,050 c/min beta/gamma in October 2000, obtained for a tumbleweed (Radiation Survey Report SS253960, *Survey of B Plant Transfer Line*, and Radiation Survey Report SS256142, *Vegetation Growth in Posted CA Associated with UPR-200-E-144*). A later survey in May 2002 reported 72,500 c/min from a location in the second area (Radiation Survey Report SS261107, *Assessment Survey in a Posted CA South of 12th Street*). Both areas are surface stabilized and posted as URMA.

In 2008, 13 DPT boreholes were drilled along waste site 200-E-114-PL to characterize subsurface contamination potentially associated with the contamination discussed above (Figures 3-18a and 3-18b). Logging results for four of the DPT boreholes showed elevated cesium-137 levels (Table 3-4 and Figure 3-4).

Another UPR (UPR-200-E-7) is associated with pipe V204, which is within the 200-E-199-PL pipe trench (Figure 3-13). At the 241-B-361 Settling Basin, pipe V204 becomes pipeline waste site 200-E-195-PL and extends to the 216-B-9 Crib. WIDS indicates that this area of soil contamination was created in 1954 when leakage from pipe V204 led to a cave-in. The pipeline consists of a 8.9 cm (3.5 in.) diameter stainless steel pipe. An estimated 18,930 L (5,000 gal) of liquid leaked into the soil. The maximum surface dose rate observed was 1.7 Rad/hr within a 2.8 m^2 (30 ft^2) area. According to WIDS, the cave-in was filled in and marked, but its exact location no longer can be determined.

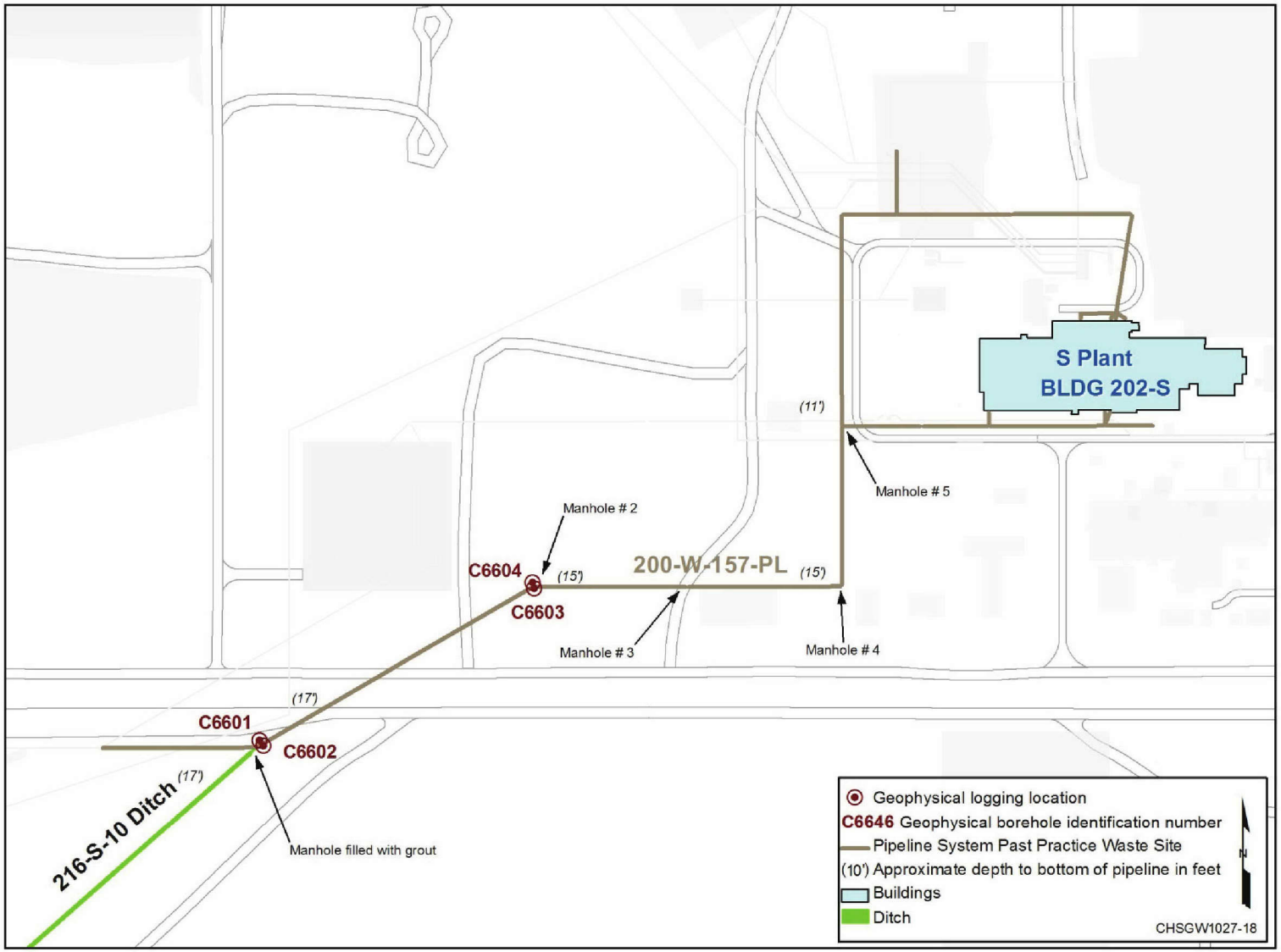


Figure 3-15. Pipeline 200-W-157-PL Borehole Locations

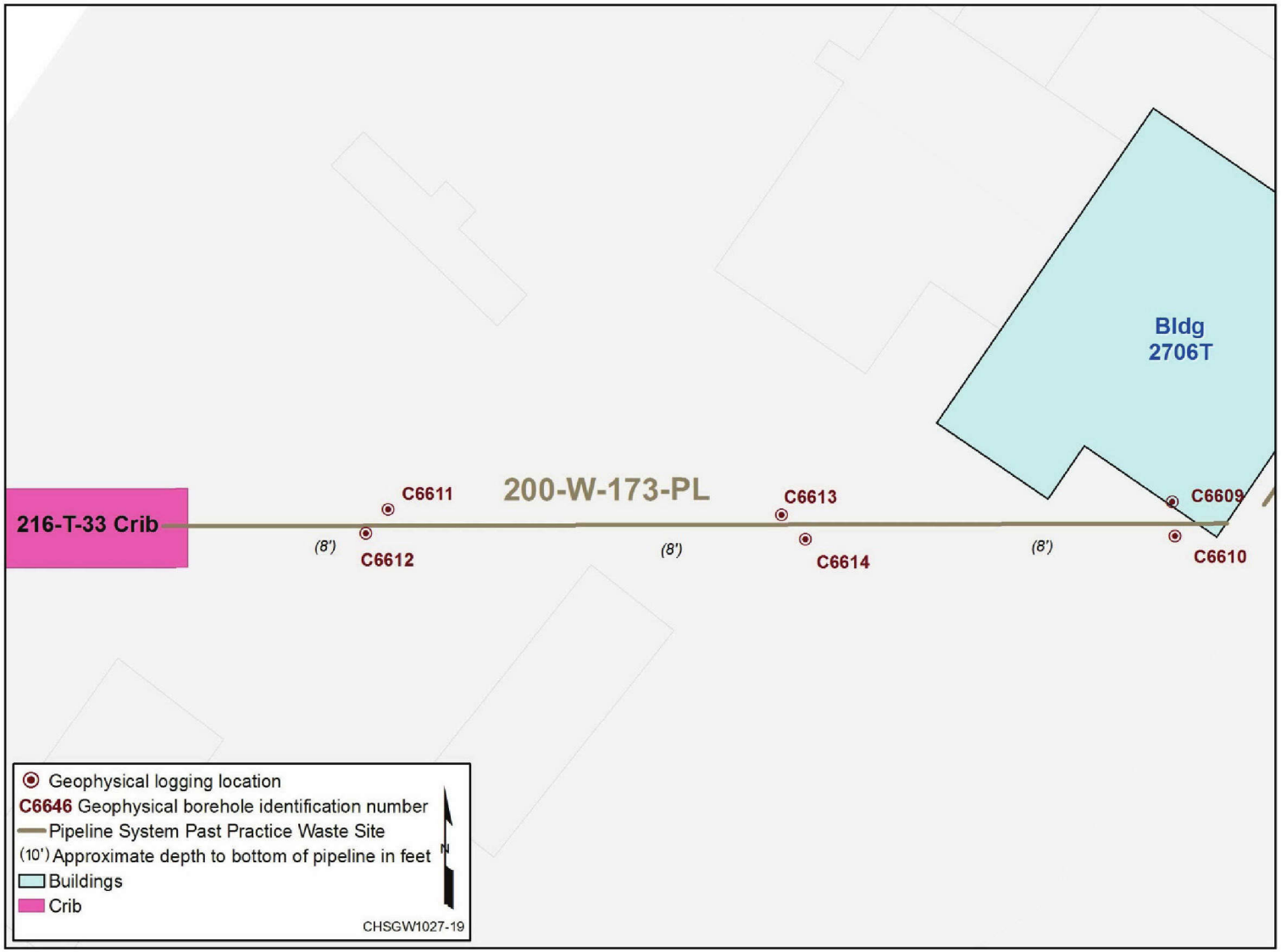


Figure 3-16. Pipeline 200-W-173-PL Borehole Locations

Ten DPT boreholes were drilled and logged in 2008 in an effort to characterize potential subsurface radiological contamination along pipeline waste site 200-W-175-PL (Figure 3-19). Only one of the ten DPT boreholes logged, C6623, showed elevated cesium-137 levels (Table 3-4 and Figure 3-4). This waste site consists of 7.6, 8.9, and 10.2 cm (3, 3.5, and 4 in.) diameter steel pipelines that extend from the southern portion of the T Tank Farm, at the 241-T-112 Tank, to the northern end of the 241-TY-201 Flush Tank, where the associated waste effluent was subsequently sent to the 216-T-26 Crib.

3.2.3.6 Characterization Information for Tank Farm Waste Transfer Pipeline Systems

Pipeline failures both outside and inside of the tank farms have resulted in the release of high-activity waste streams into the vadose zone. Many of these failures were reported in the period from 1945 through 1950, when direct buried pipelines were used to transfer tank farm waste. In most cases, the release location was stabilized with gravel, asphalt, or shotcrete cover, and little characterization was undertaken.

The *Single-Shell Tank Waste Management Area C Pipeline Feasibility Evaluation* (RPP-PLAN-47559) presents a summary of SST characterization experience at the Hanford Site, and of previous residual waste volume estimates that may exist in SST pipelines.

While there is little history of pipeline sampling and analysis, known releases of liquid wastes from pipelines and associated components are documented through UPR reports. Each UPR has a formal report associated with it that is retrievable from WIDS. Tables B-1 and B-2 (Appendix B) includes information on UPRs associated with tank farm pipeline systems located outside of the tank farms that have been identified as waste sites within WIDS.

Some UPR descriptions indicated that ground subsidence occurred over a failed pipeline and that liquids were observed pooling or moving over the ground surface. With the conversion to encasing transfer pipelines in covered concrete trenches, leaks to the vadose zone became less common. This design collected liquid releases inside the encasement and drained the liquid to a downgradient diversion box and catch tank.

A number of UPRs are associated with diversion boxes and catch tanks. Significant opportunities exist for releases at these sites because of the operations required to change routings inside the diversion boxes. Many of the UPRs that are located around diversion boxes occurred when cover blocks were removed, which exposed the interior to winds and the atmosphere, and speck contamination was released and deposited on the ground surface. In some cases, equipment removed from a diversion box or catch tank spread contamination to the ground. In a few cases, a failed jumper or misrouting of a jumper flooded a diversion box or catch tank and resulted in a spill to the ground surface. Multiple releases have occurred in the vicinity of diversion box 241-TX-155 (Figure 3-20). A release from pipeline 200-W-191-PL (UPR-200-W-135), which is connected to 241-TX-155, occurred in 1954 resulting in liquid appearing at the surface. The dose rate from the leaking effluent was 5 Rad/hr at a distance of 1 m (3 ft). It is estimated to be 300 Rad/hr at a distance of 10 cm (4 in.). UPR-200-W-76 is the result of leaks to the soil around 241-TX-155 and subsequent animal intrusion that created a large area of contaminated rabbit fecal pellets around the diversion box. WIDS indicates radioisotopic analyses on an individual rabbit pellets revealed 18.6 microCuries of cesium-137 per gram of sample and 2.63 microCuries of strontium-90 per gram of sample. Pipeline connection leaks at the exterior of the diversion box are suspected to be the cause of other soil contamination identified in this area (UPR-200-W-113). Several of the catch tanks that are associated with diversion boxes have been replaced because of unspecified failures.

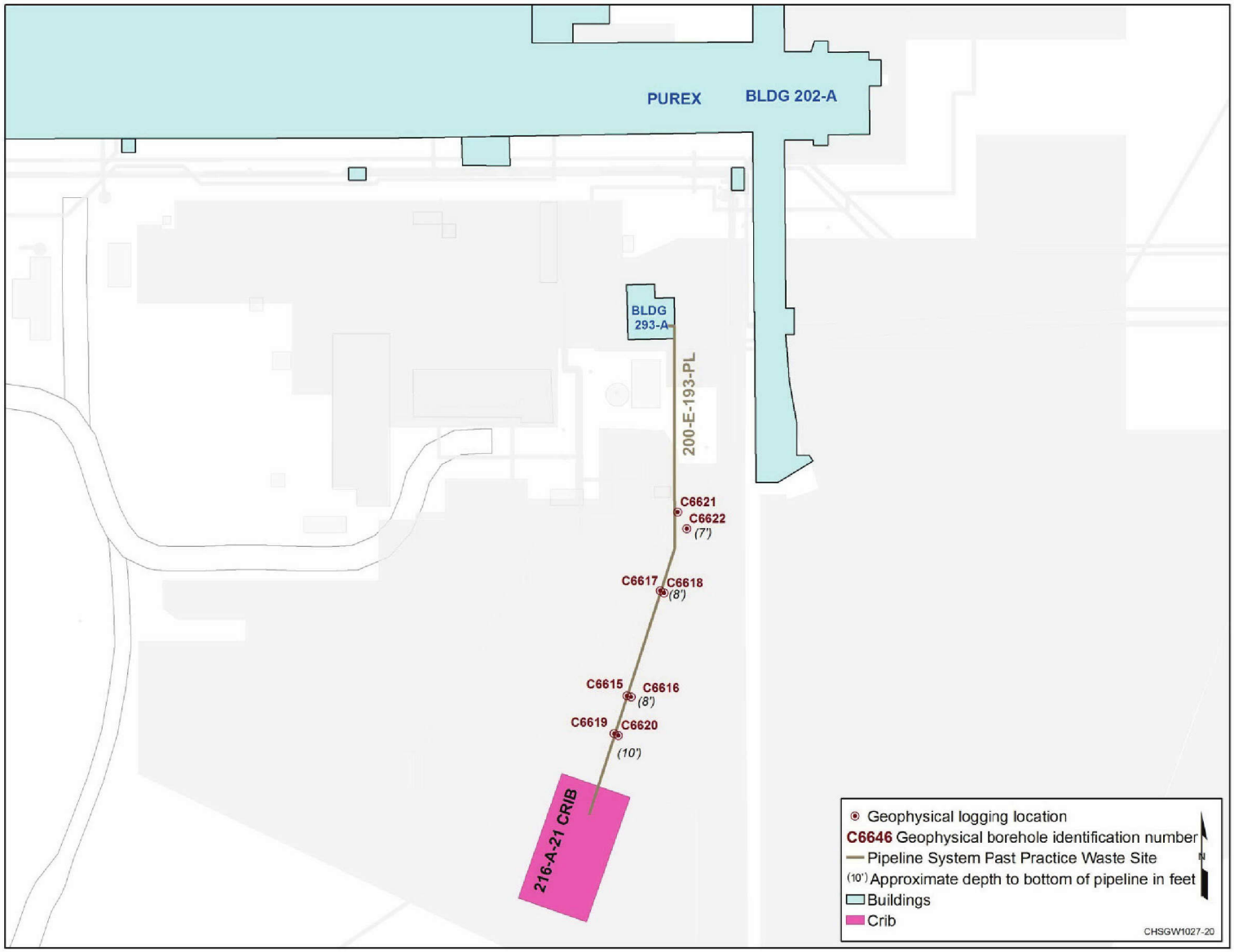


Figure 3-17. Pipeline 200-E-193-PL Borehole Locations

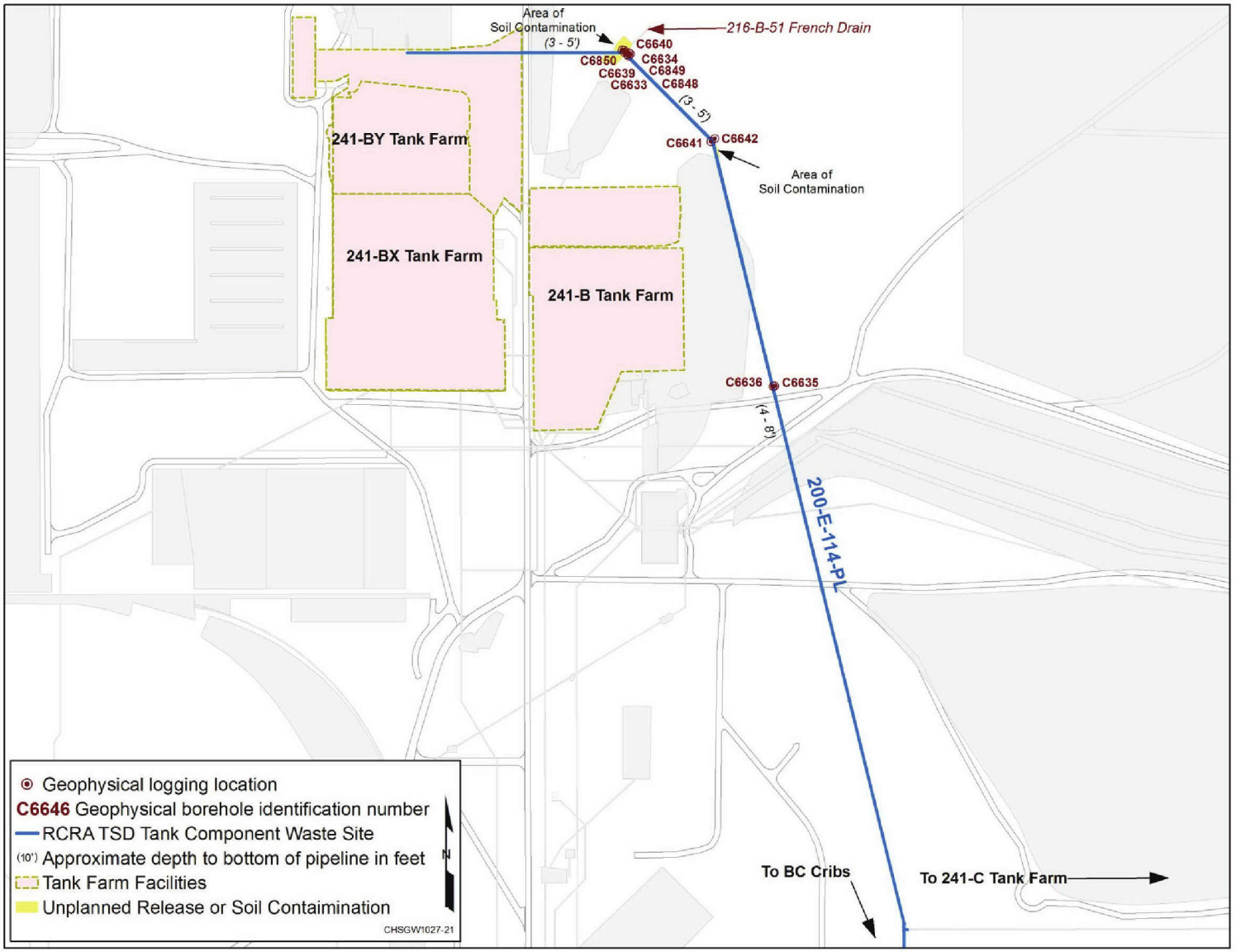


Figure 3-18a. Pipeline 200-E-114-PL Borehole Locations (Northern Segment)

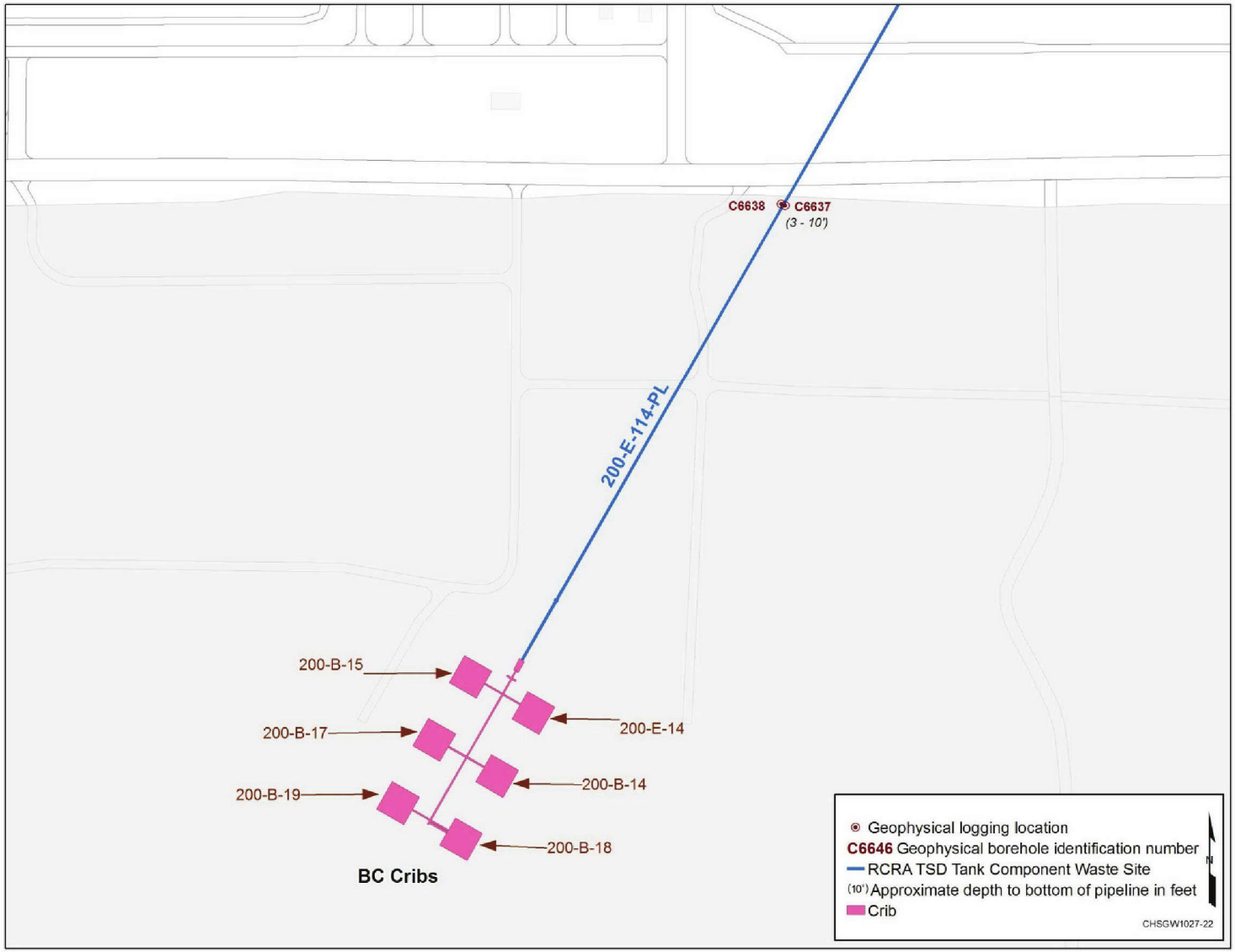


Figure 3-18b. Pipeline 200-E-114-PL Borehole Locations (Southern Segment)

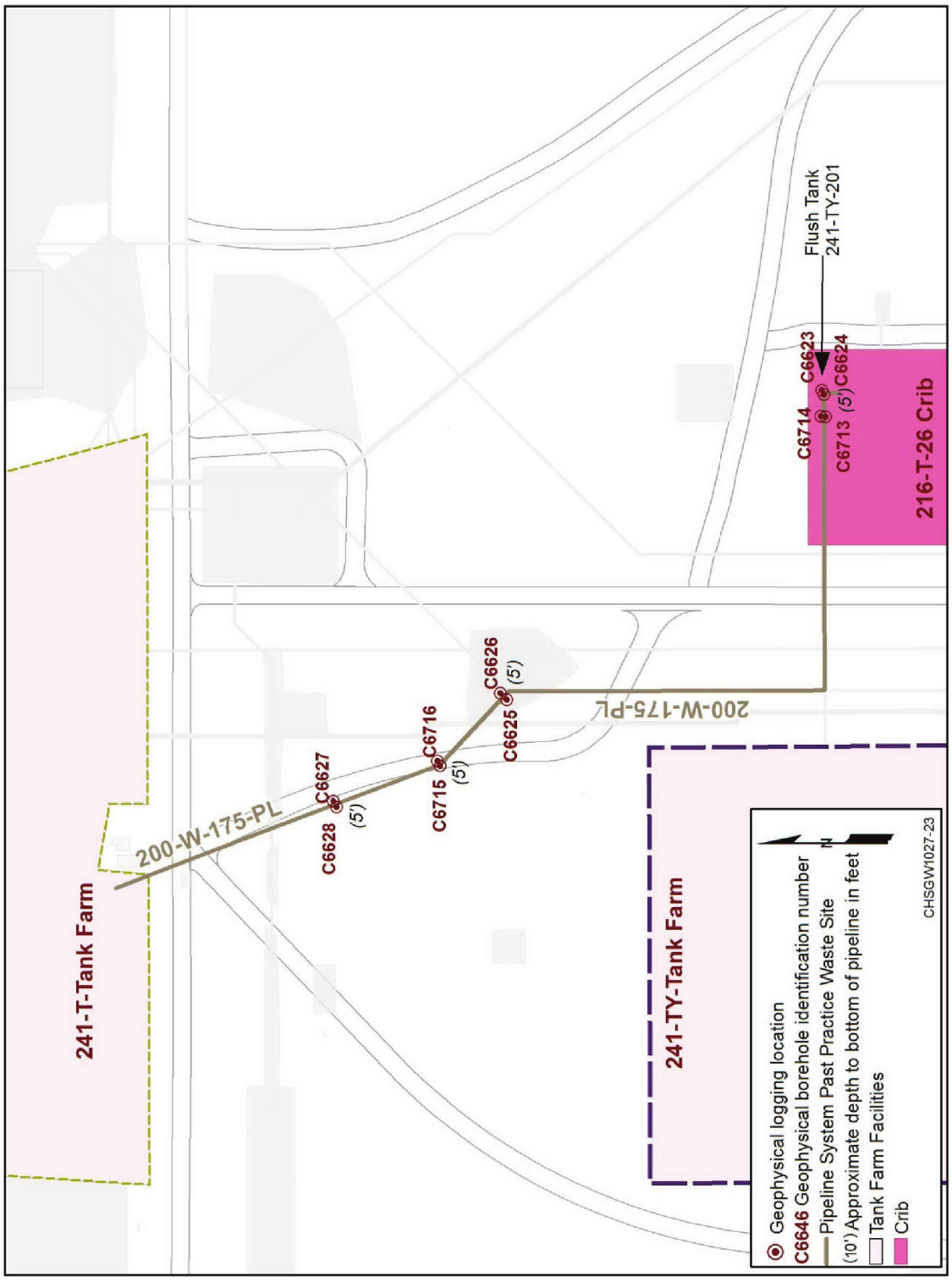


Figure 3-19. Pipeline 200-W-175-PL Borehole Locations

A review of the WIDS database for pipeline system UPRs associated with tank farms indicates that although extensive surface contamination has been identified, with the exception of a few UPRs (located inside the C and B-BX-BY Tank Farms and not associated with this Work Plan), the volume of waste that has been released from these tank farm pipelines and pipeline components is a small fraction of the total volume of releases that have occurred in and around the tank farms. In a few cases, follow-up site characterization of UPRs was conducted and provided some idea of contamination and waste distribution. General information pertaining to characterization results for the UPRs associated with the tank farm pipelines and pipeline components located outside the WMAs is presented in the WIDS database and is summarized in Tables B-1 and B-2 (Appendix B).

The following is a summary of two types of UPRs that are associated with the tank farm pipelines. These two UPRs had characterization work performed to better define the nature and extent of pipeline releases.

UPR-200-E-86 represents a 1969 pipeline joint leak assumed to be associated pipeline waste site 200-E-153-PL (Figure 3-21). Drilling in 1970 was conducted to determine the nature and extent of contaminant distribution following failure of the high-activity waste pipeline (ARH-1945, *B Plant Ion Exchange Feed Line Leak*). In 1971 and 1972, 14 shallow boreholes were drilled to assess the soils adjacent to and beneath UPR-200-E-86. Contamination was reported for three of these boreholes according to Metz, 1972, "PSS Line Leak (Line No. 812)," and RHO-CD-673. Elevated readings for cesium in the vadose zone were reported from 0.3 to 5.5 m (1 to 18 ft) bgs. One of the boreholes was terminated at 1.8 m (6 ft) because of radiation exposure. The leak was approximately 65,809 L (17,385 gal) containing 25,000 Ci of cesium-137. The 1972 study to define the extent of contamination found no elevated readings below 6.1 m (20 ft) and estimated that within the area investigated, approximately 36.8 m^3 (1,300 ft^3) of contaminated soil was present. Based on the volume of the release, the total extent of subsurface contamination may not have been determined. The site is marked by concrete AC 540 marker posts at each corner. WIDS states that the surface has been covered with grout and is posted with URMA signs.

UPR-600-20 represents UPRs that are associated with encased pipeline waste site 600-284-PL (the old cross-site transfer line) (Figure 3-22). The contamination seems to have resulted from root penetration into the encasement and from test or swab risers. Characterization activities were conducted around the 241-EW-151 Vent Station in 1988 when a routine quarterly survey detected contamination outside of an established CA (80322-88-090, "Surface Contamination Investigation Report, Cross Country Waste Transfer Line"). Laboratory analyses revealed 1,000 to 230,000 pCi/g of cesium-137, while field instruments indicated 100 to 27,000 pCi/g of strontium-90 in soil samples. Sagebrush samples contained 32 to 53 pCi/g of cesium-137 and 2,700 to 37,000 pCi/g of strontium-90. A drilling program was undertaken to determine if the piping encasement had leaked. Field investigations included two auger borings at each of four selected sites. One of the boring pairs was drilled along the centerline to the top of the encasement. A second hole was offset to miss the encasement and was drilled to a depth below the encasement. Continuous split-spoon soil samples were taken and analyzed for radionuclides, but none were found. It was concluded that the encasement had not leaked, and that the roots of sagebrush growing next to the encasement had penetrated to the interior of the encasement.

3.2.4 Pipeline Interior Characterization Information

In general, pipeline interiors have not been radiologically surveyed, sampled, or viewed with remote video cameras. The pipelines that have had interior characterization performed include waste sites 200-W-42 (which discharged to the 216-U-8 Crib) (Figure 3-5), 200-W-206-PL (which discharged to the 216-Z-9 Crib) (Figure 3-9), and 200-W-125-PL and 200-W-207-PL (both of which discharged into the Z Ditches) (Figure 3-9).

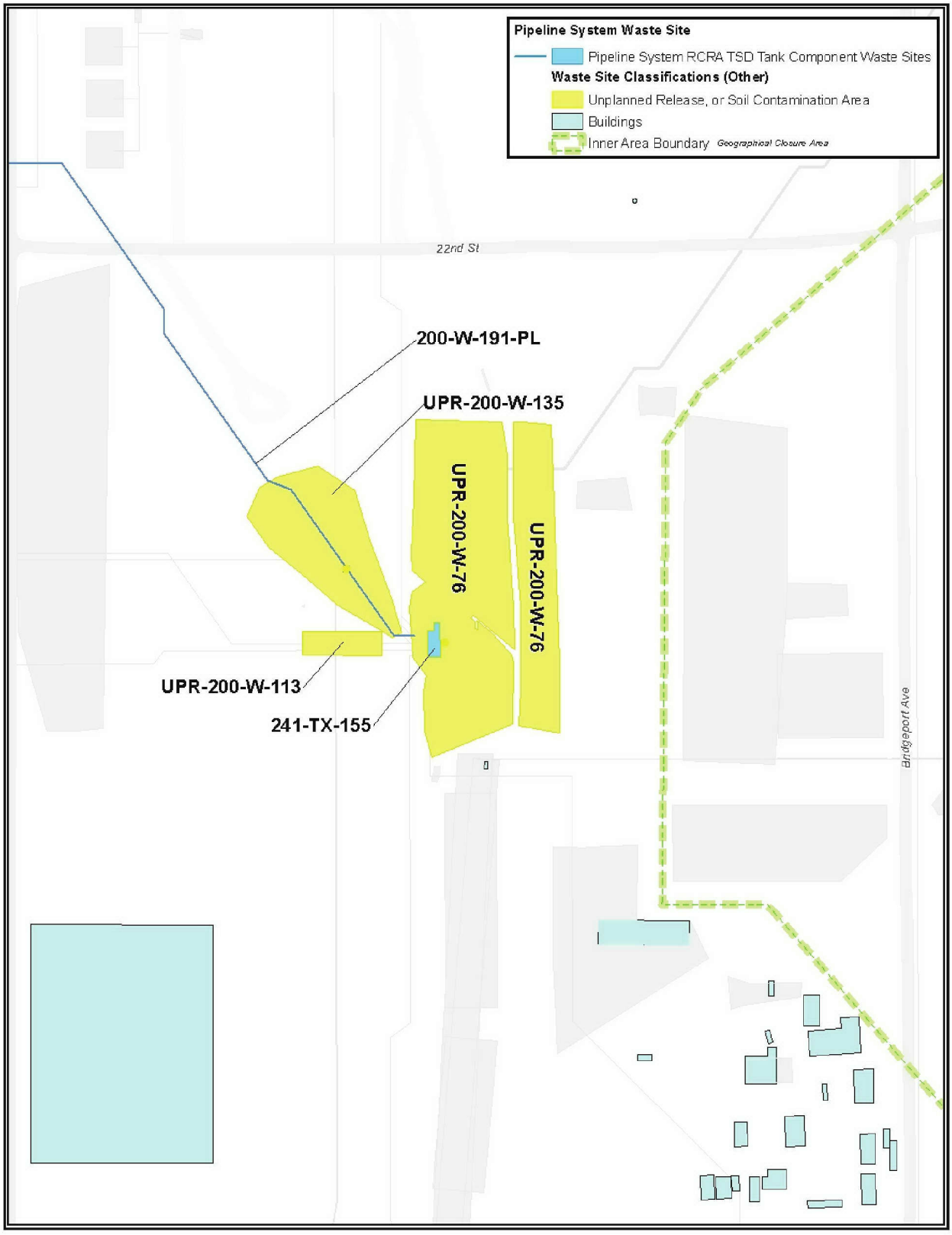


Figure 3-20. Location Map Showing Features Associated with Diversion Box 241-TX-155 and 200-W-191-PL

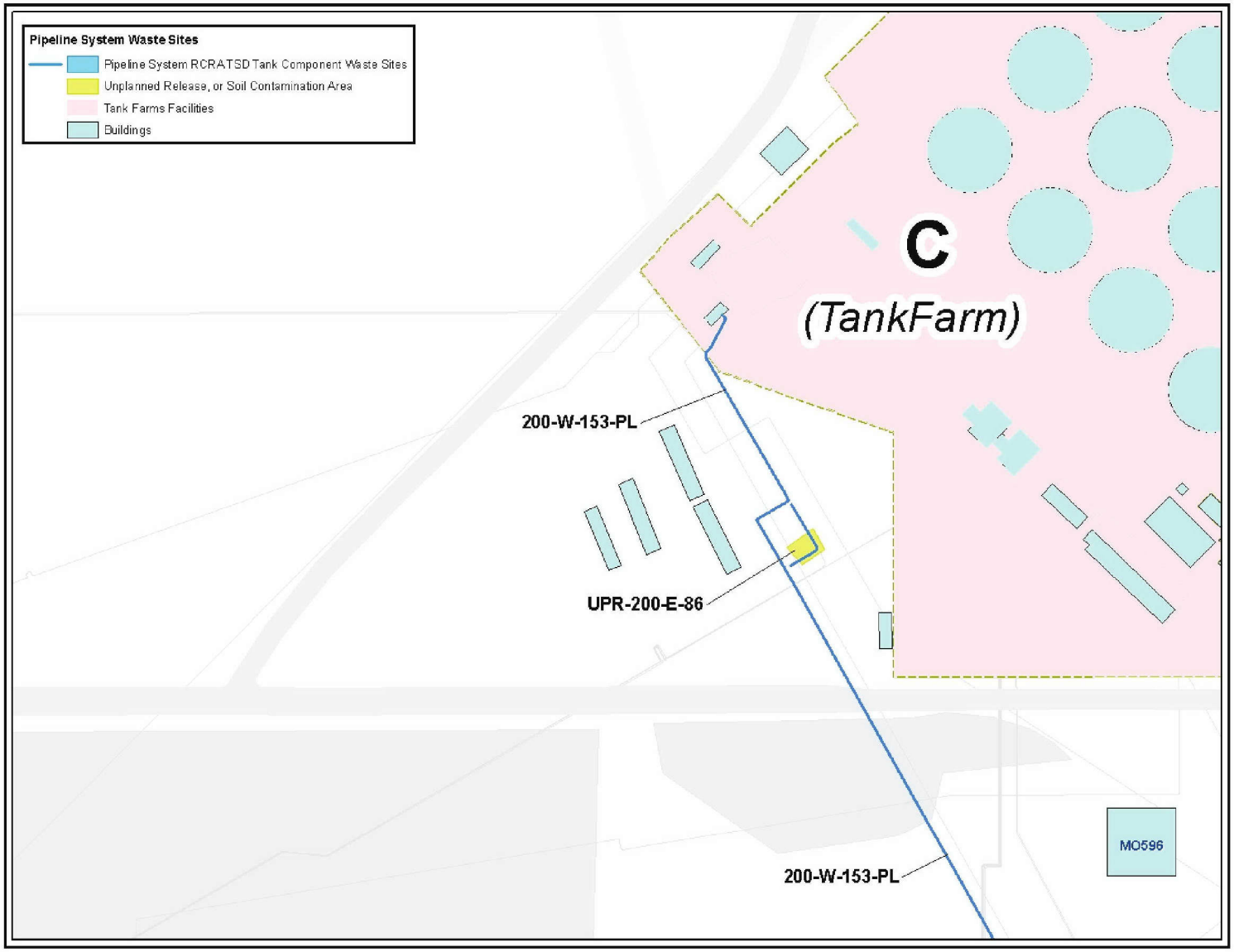


Figure 3-21. Location Map Showing Features Associated with 200-E-153-PL

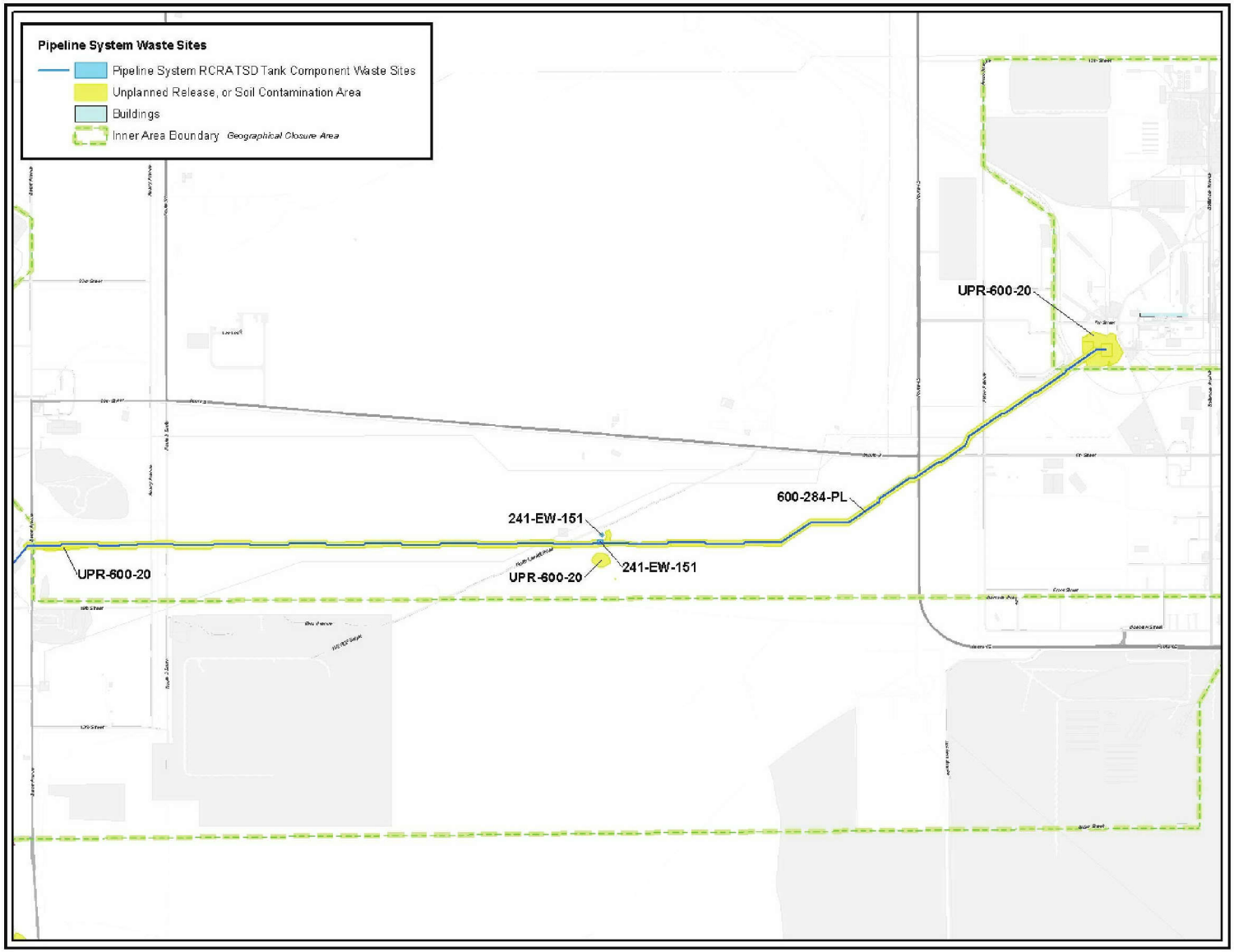


Figure 3-22. Location Map Showing Features Associated with 600-284-PL

3.2.4.1 Pipeline Waste Site 200-W-42

As part of a limited field investigation (DOE/RL-95-13), an integrity investigation was conducted on pipeline waste site 200-W-42 to determine the potential for the vitrified clay pipeline to have leaked, causing soil contamination. The investigation consisted of surveying sections of pipeline with an in-line video camera. The survey was conducted in two locations, one north of the 216-U-8 Crib and the other west of the 216-U-8 Crib, where the pipeline leads to the 216-U-12 Crib (Figure 3-5). The pipeline integrity investigation showed that in the northern section of the pipeline many of the joints were dislodged, allowing silty, sandy material to enter the pipeline. The degree of dislodgment varied from minor to very serious. The section of the pipeline located west of the 216-U-8 Crib was shown to be in good condition and the joints were sound. Later (during installation of a nearby replacement pipeline), a portion of 200-W-42 near the 216-U-12 Crib was cut. No smearable contamination was found inside the pipeline. Most of 200-W-42 has since been removed (Figure 3-5).

3.2.4.2 Pipeline Waste Site 200-W-206-PL

An in-line video survey was conducted on 3.2 cm (1 ¼ in) diameter stainless steel effluent pipes 840 and 840D which comprises 200-W-206-PL (WHC-SD-NR-ER-103, *Final Report for the Remote CCTV Survey of Abandoned Process Effluent Drain Lines 840 and 840D in Support of the 200 West Area Carbon Tetrachloride ERA*). The recovery process performed at the PFP RECUPLEX facility was the source of the majority of the organic and radioactive waste discharged through 200-W-206-PL (drain lines 840 and 840D) from the 234-5Z Building into the 216-Z-9 crib (Figure 3-9). The organic waste generated from the process was an aqueous stream containing carbon tetrachloride at levels equivalent to its solubility in water (approximately 0.08 percent). Occasionally, solvent itself was discharged directly to the disposal facilities when found to be contaminated or to have degraded to an unusable condition.

Video information was obtained from line 840D for a distance of approximately 106 m (348 ft) and 19.2 m (63 ft) for line 840. The examination of these carbon tetrachloride lines was discontinued for personnel safety reasons due to high levels of radiological contamination encountered in line 840. Cameras and cabling, along with the fiberglass pushrods, were subsequently left in the pipelines. No pipe breaks or major cracks were noted in either line. However, both lines exhibited areas of severe pitting and corrosion throughout the length examined. Whitish material or "salt cake," debris, and sludge-like deposits where intermittently encountered within these lines.

3.2.4.3 Pipeline Waste Sites 200-W-125-PL and 200-W-207-PL

Interior sampling and analysis has been performed for waste sites 200-W-125-PL and 200-W-207-PL (Figure 3-9). These pipelines emptied into the Z Ditches: one pipeline originated from the 231-Z Plutonium Isolation Facility (200-W-125-PL) and the other from the 234-5Z Plutonium Finishing Plant (200-W-207-PL). Available information for these pipelines was obtained from DOE/RL-2003-11, *Remedial Investigation for the 200-CW-5 U Pond/Z Ditches Cooling Water Group, the 200-CW-2 S Pond and Ditches Cooling Water Group, the 200-CW-4 T Pond and Ditches Cooling Water Group, and the 200-SC-1 Steam Condensate Group Operable Units*. As part of the RI, in situ gamma measurements and smear samples were collected. The gamma measurements were collected by lowering a sodium iodide gamma detector within 15.2 cm (6 in.) of the bottom of selected pipeline manholes. The smear samples were obtained by affixing two smear pads on either side of a foam paintbrush that was attached to the end of an extendable metal pole. Swipes were made in both directions across the bottom of the pipeline and manhole. The condition of each pipeline was documented with a video camera. Air sampling and VOC and radiation monitoring were performed for the entire length of the investigation.

The smear samples were analyzed for 17 radionuclides. In both instances, 14 radionuclides were undetected. For the pipeline from the 231-Z Plutonium Isolation Facility to the Z Ditches

(200-W-125-PL), 23.5 pCi/sample of plutonium-238, 1,210 pCi/sample of plutonium-239, and 226 and 813 pCi/sample of americium-241 were detected. For the pipeline from the 234-5Z Plutonium Finishing Plant to the Z Ditches (200-W-207-PL), 2.45 pCi/sample of plutonium-238, 94.6 pCi/sample of plutonium-239, and 19.5 and 23.5 pCi/sample of americium-241 were detected.

3.2.5 Pipeline Waste Site Removals

At present, portions of two pipeline waste sites (200-W-147-PL-A and 200-W-42) have been removed within the Central Plateau industrial area under CERCLA authority. Removal of the 200-W-147-PL-A pipeline waste site (located in the 200-OA-1 OU) was initiated in FY 2011 and continues at the time of this writing (Figure 3-23). The 200-W-42 removal action involved excavating approximately 305 linear m (1,000 linear ft) of 15.2 cm (6 in.) diameter vitrified clay pipe that comprised pipeline waste site 200-W-42 (Figure 3-5). This pipeline carried process-waste from the U Plant facility to disposal cribs. The excavation of the pipeline was performed in two phases. Phase 1 included removal of the pipeline from the 216-U-12 Crib to the 216-U-8 Crib. In Phase 2, excavation proceeded from the 216-U-8 Crib toward the 221-U Building. The removal of waste site 200-W-42 commenced in January 2006 and stopped in September 2006. Results of the pipeline removal action included the following:

- Little to no contamination was encountered during Phase 1. Contaminants detected included cesium-137 and uranium metal.
- Heavily contaminated areas from the 216-U-8 Crib to south of 16th Street were encountered in Phase 2.
- Minor areas of contamination were encountered from north of 16th Street to the U Plant termination point.
- One area along the pipeline showed extensive lateral contamination. Major constituents present were cesium, uranium, and nitrate.

Additionally, miles of shallow pipelines (e.g., depths less than 3 m [9.8 ft]) in Hanford's 100 Area and 300 Area have been removed in recent years. For many of the pipelines that were initially believed to non-threatening to HHE, subsequent characterization indicated that the majority of the results exceeded contaminant levels that would allow the pipelines to remain in-place. Consequently, cost efficiencies could have been realized by initially performing removals rather than characterizing first, failing to meet cleanup levels, and then performing retrieval.

3.2.6 Groundwater Monitoring

Groundwater routinely is monitored site-wide. More than 600 monitoring wells are sampled annually to characterize groundwater flow, groundwater contamination, and the extent of contamination. Annual reports (for example, DOE/RL-2010-11) provide the results of groundwater monitoring. These reports also summarize groundwater remediation and vadose zone characterization activities conducted on the Hanford Site as part of other projects.

This section summarizes the groundwater contaminant conditions beneath the 200 Area and vicinity, derived primarily from DOE/RL-2010-11. Figures 3-24 and 3-25 show the major radiological and nonradiological groundwater contaminant plumes in the 200 East and 200 West Inner Areas.

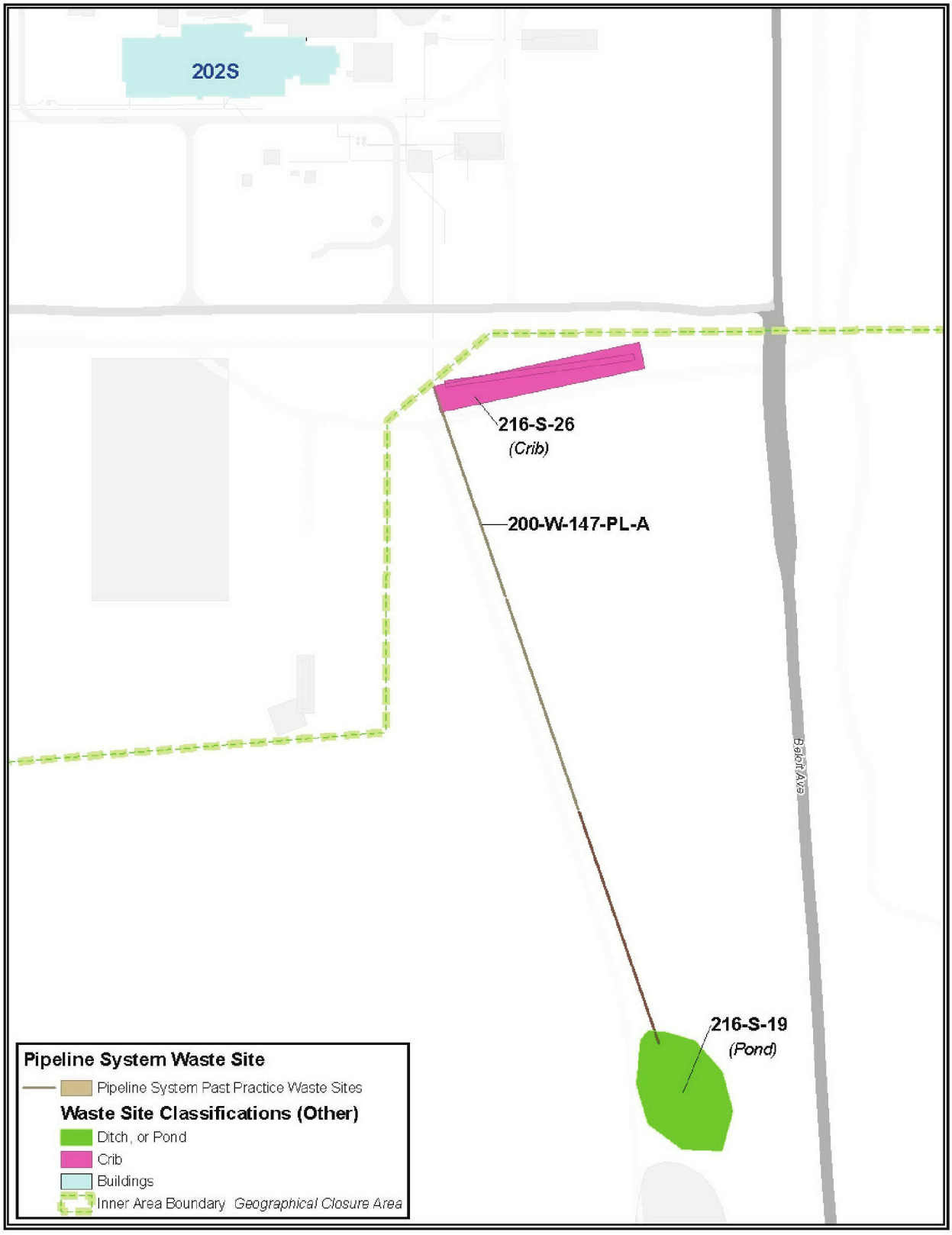
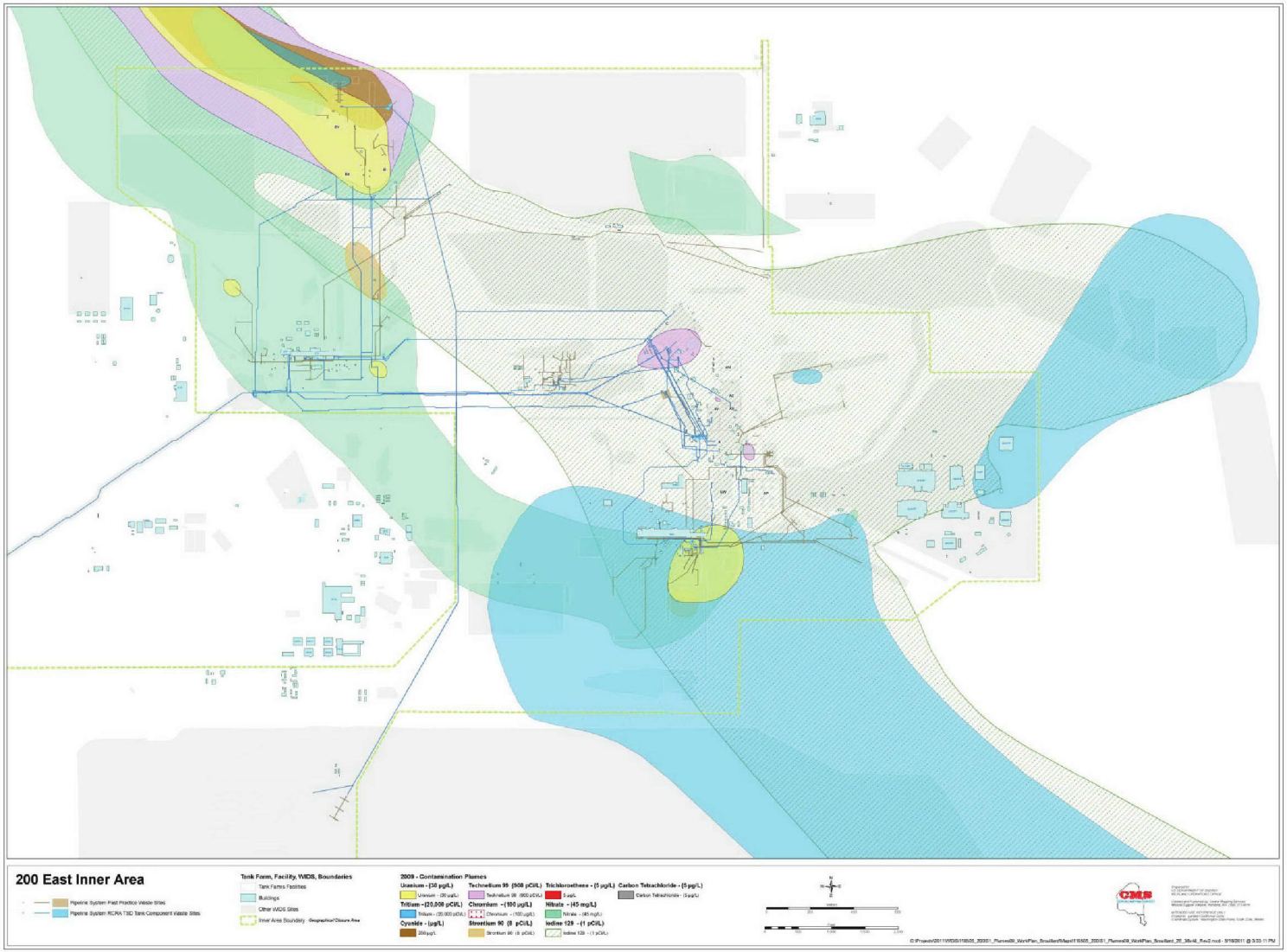
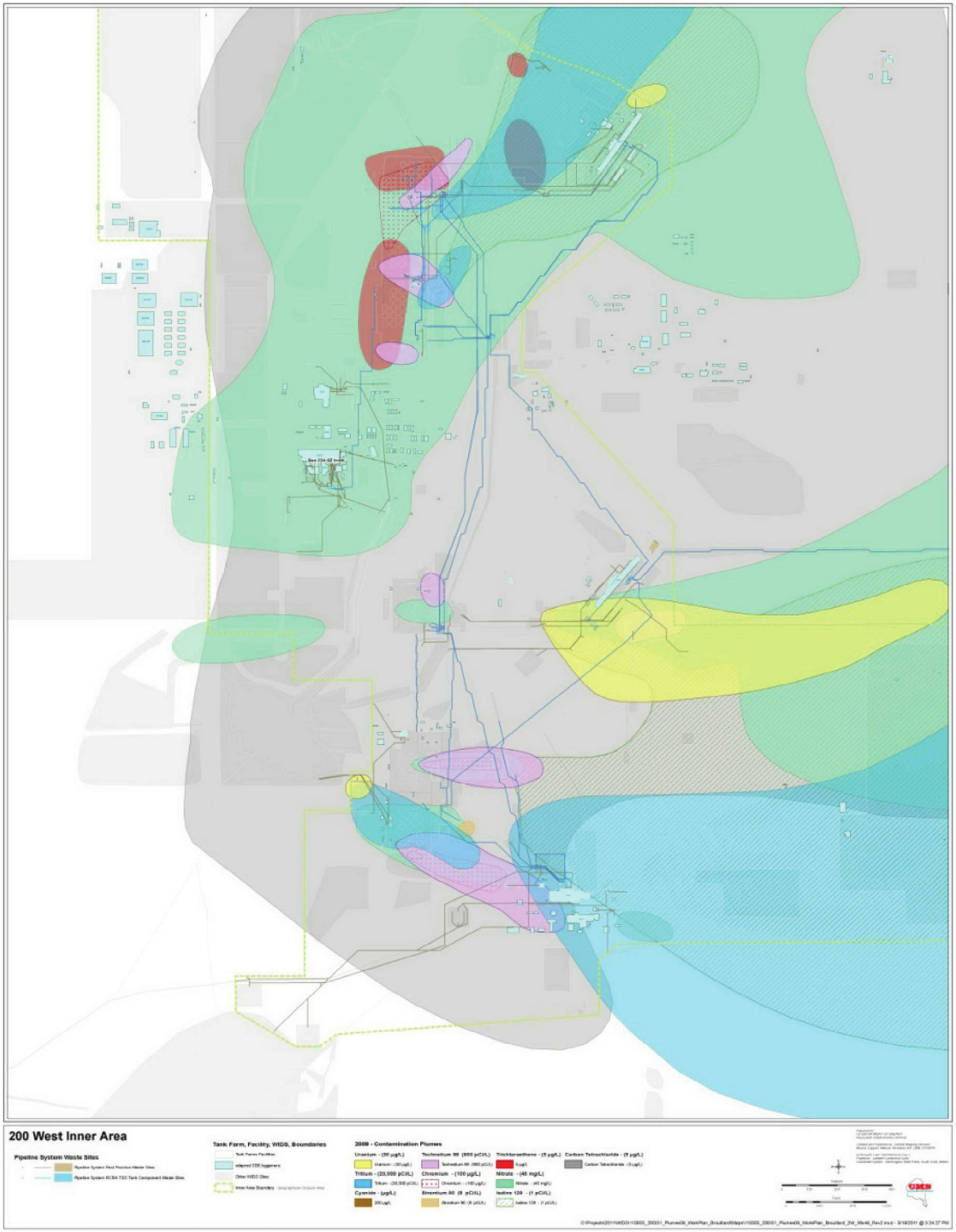


Figure 3-23. Location Map Showing Features Associated with 200-W-147-PL-A



Source: DOE/RL-2010-11, *Hanford Site Groundwater and Performance Report for 2009: Volumes 1 & 2.*

Figure 3-24. Groundwater Contaminant Plume in the East Inner Area



Source: DOE/RL-2010-11, *Hanford Site Groundwater and Performance Report for 2009: Volumes 1 & 2.*

Figure 3-25. Groundwater Contaminant Plume in the West Inner Area

Some of the source areas for these groundwater plumes have been identified as a result of RCRA and the *Atomic Energy Act of 1954* groundwater monitoring programs, as well as RIs completed for the soil waste sites in the 200 Area and the tank farms investigations. Characterization studies completed in conjunction with the groundwater OUs also have resulted in determination of additional sources for some plumes. The groundwater OUs have the primary responsibility for characterization of groundwater conditions and the identification and delineation of the contaminant plumes.

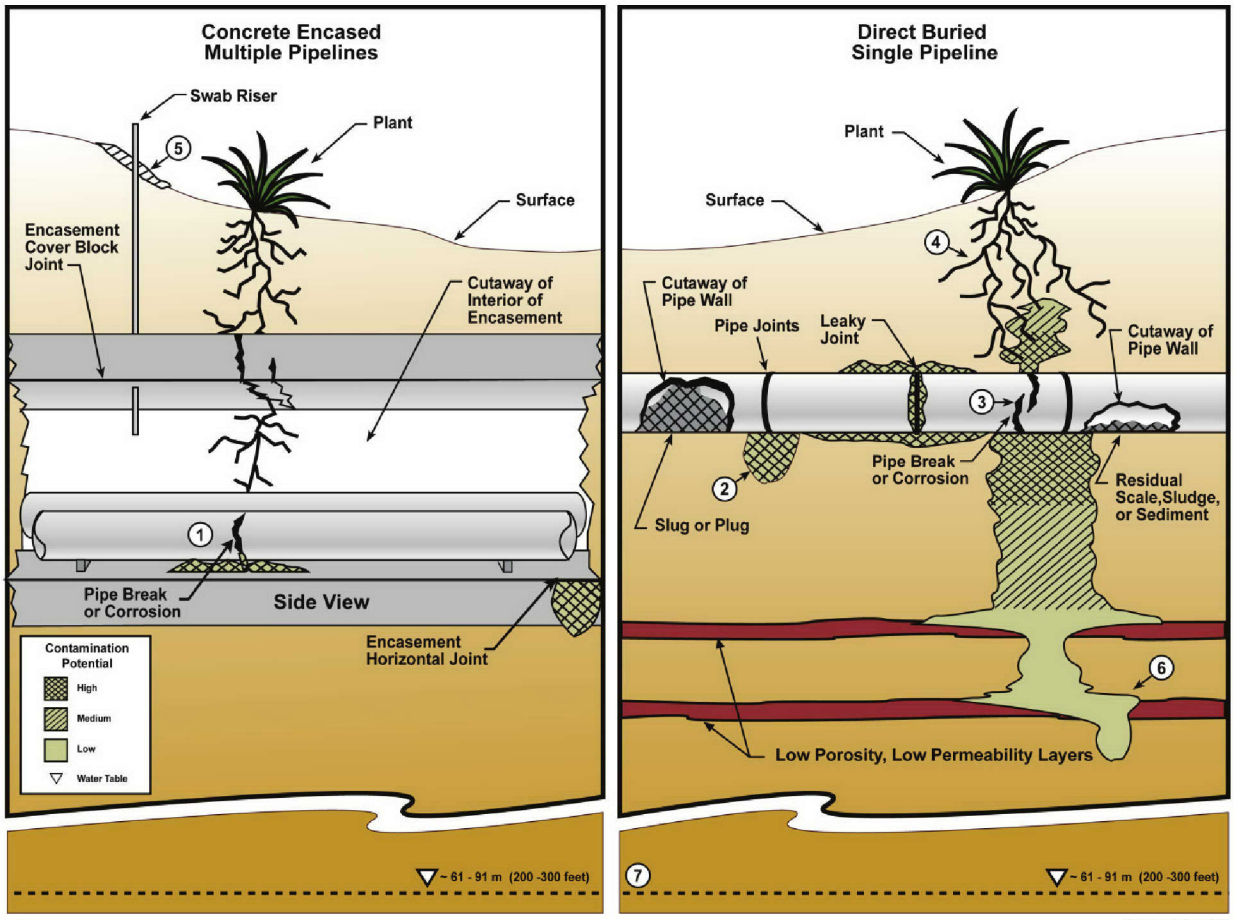
At this time, there is neither current data nor evidence to suggest that the pipeline systems or releases from them have contributed to the identified groundwater contamination plumes. Groundwater contamination is more closely associated with large liquid discharge sites.

In the northern part of the 200 East Area and vicinity, contaminants identified in groundwater include tritium, uranium, iodine-129, technetium-99, cobalt-60, cyanide, strontium-90, cesium-137, plutonium-239/240, chromium, and nitrate (DOE/RL-2010-11). In the 200 East Area of the Central Plateau, contaminant plumes containing tritium, nitrate, iodine-129, strontium-90, and technetium-99 have been identified (DOE/RL-2010-11). Other contaminants detected include arsenic, manganese, vanadium, and cobalt-60 (DOE/RL-2003-04, *Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit*, and DOE/RL-2010-11). Figure 3-24 shows known plumes for carbon tetrachloride, chromium, cyanide, iodine-129, nitrate, strontium-90, technetium-99, trichloroethylene, tritium, and uranium.

In the northern and central parts of the 200 West Area, contaminant plumes containing carbon tetrachloride, chloroform, trichloroethene, nitrate, chromium, fluoride, tritium, iodine-129, technetium-99, and uranium are present (Figure 3-25). In the southern portion of the 200 West Area, plumes containing technetium-99, chromium, uranium, tritium, iodine-129, nitrate, and carbon tetrachloride have been delineated (DOE/RL-2010-11). In the 200 West Area, groundwater sampling results have shown the presence of trichloroethene and chloroform, metals (for example, cadmium and arsenic), anions, ammonium ion, ammonia, cyanide, sulfide, cresols, phenols, total petroleum hydrocarbons (kerosene range), beta emitters (carbon-14 and selenium-79), alpha emitters (neptunium-237 and protactinium-231), and gamma emitters (cesium-137 and cobalt-60) (DOE/RL-2010-11; DOE/RL-92-76, *Remedial Investigation/Feasibility Study Work Plan for the 200-UP-1 Groundwater Operable Unit*).

3.3 Nature and Extent of Contamination

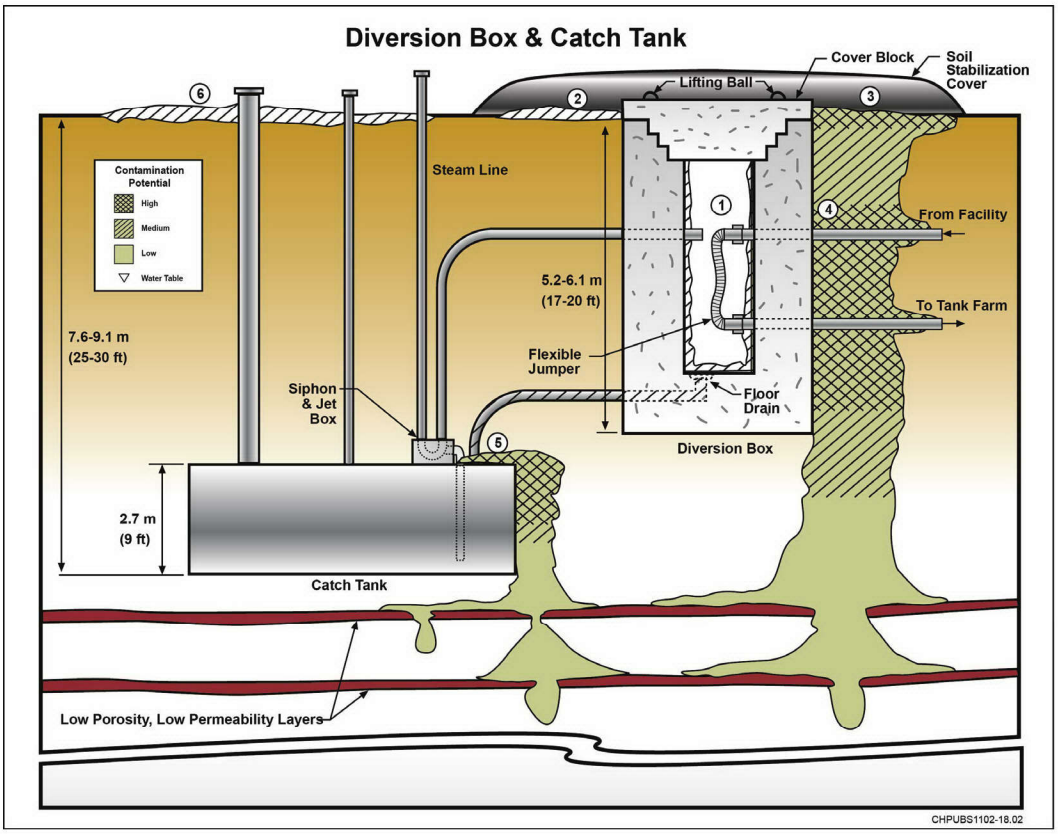
This section describes the current assessment of the nature and extent of soil contamination associated with the pipeline systems. Information pertaining to contaminant sources, release mechanisms, and transport media was considered during development of the conceptual contaminant distribution models for pipelines and pipeline components. Figure 3-26 provides a conceptual contaminant distribution model for encased and direct-buried pipelines. Figure 3-27 shows the conceptual contaminant distribution model for a waste transfer diversion box and catch tank. These models will support an evaluation of the potential risk to HHE. Section 3.6 discusses potential impacts to HHE and includes a conceptual exposure pathway model that indicates potential exposure routes and receptors.



Notes:

1. Pipeline leaks have occurred within some concrete encasements. Process liquids that are released may accumulate and pool in the bottom of the encasement.
2. Pipe connection locations such as joints and fittings are susceptible to leakage. The releases are characterized as low volume leaks and most likely are attributed to faulty or degraded seals, joints, or fittings. The effluent and contaminants move according to the permeability of surrounding soils at various points of release. Low mobility contaminants such as cesium and plutonium sorb near points of release, and concentrations decrease with depth.
3. Fractures, cracks, and breaks are more prevalent in some pipelines such as those constructed of vitrified clay. Pipe breakage may have occurred in some cases as the result of loading and differential settling of surrounding soils. Larger breaks where flow was under pressure may have resulted in releases that extend both above and below the pipeline into surrounding soil.
4. Contamination extends above the pipeline to the surface in some places because of uptake by vegetation (or possible animal intrusion).
5. Surficial dispersion of contaminants may occur around some swab risers, caused by vent releases or sampling activities.
6. Mobile contaminants such as nitrate and tritium migrate with the moisture front to greater depths.
7. Process fluids and contaminants may or may not pose a potential threat to groundwater, depending on the volume of releases.

Figure 3-26. Conceptual Contaminant Distribution Model for Buried Process-Waste Pipelines



Notes:

1. Leaks into the interior of the diversion box occur when jumper connections are changed or during a misrouting. Although most of the spill drains to the catch tank, some contamination remains on the interior floor or sides of the box.

2. During routing change outs or maintenance activities, cover blocks are removed, exposing the diversion box interior to the environment. Winds, remote handling activities, and removal of equipment generate UPRs on the ground surface around the structure. This is the most common type of UPR at these structures and usually is stabilized with a cover of clean soil. Vegetation uptake or animal activities may remobilize the contamination.

3. During a misrouting, in some cases, waste liquids fill the diversion box and flow onto the ground around the structure. The liquid drains into the vadose zone, and contaminants are distributed according to respective distribution coefficient (K_d) values, chemistry of the solution, volume of the release, and soil characteristics. Relatively immobile contaminants such as plutonium and cesium remain close to the point of release; mobile contaminants such as technetium-99 and nitrate migrate with the moisture front. This type of UPR is very rare for these structures. The contaminated soil is covered with clean soil, shotcrete, or asphalt.

4. Pipe connections may fail at the diversion box exterior wall. Liquid is released to the soil column below ground and flows away from the break. Depending on the volume of the release, liquid flow may induce localized ground subsidence, with contaminated liquids emerging at the ground surface or in the depression (not shown). Contaminants are retained in the soil column according to respective K_d values, chemistry of the solution, and soil characteristics. Immobile contaminants such as plutonium and cesium generally remain close to the point of release; mobile contaminants such as technetium-99 and nitrate migrate with the moisture front. The area of surface contamination is covered with clean soil, shotcrete, asphalt, or other material.

5. Failure at a pipe fitting, or failure of the tank itself, leads to a loss of waste to the subsurface. The volume of waste lost is assumed to be low, because most releases to catch tanks are assumed to be the sum of multiple jumper contents lost when routings were broken. Liquids move down through the vadose zone, while contaminants are retained in the soil according to respective K_d values, chemistry of the solution, and soil characteristics. Relatively immobile contaminants such as plutonium and cesium remain close to the point of release; mobile contaminants such as technetium-99 and nitrate migrate with the moisture front. This type of failure is rare, but several replacement catch tanks have been installed at diversion boxes.

6. Surface releases around catch tank risers occur primarily when access to the tank is required for liquid level measurement, sampling, or pumping. Opening the system to the environment allows vapors to escape or wind to mobilize contaminants in the riser. Sampling devices and pumps lowered into the tank to remove liquids entrain contaminants to the surface when removed, and contaminants are scattered by leaks, drips, or wind. Rarely, overflows at diversion box/catch tank pairs lead to releases through catch tank risers. Liquids move down through the vadose zone, while contaminants are retained in the soil according to respective K_d values and soil characteristics. Relatively immobile contaminants such as plutonium and cesium remain close to the point of release; mobile contaminants such as technetium-99 and nitrate migrate with the moisture front. Releases are covered with clean soil to prevent spread of the radionuclides.

Figure 3-27. Conceptual Contaminant Distribution Model for a Diversion Box and Catch Tank

Based on historical investigations for waste sites on the Central Plateau, the following general assumptions are included with the conceptual contaminant distribution models for the process-waste pipelines and pipeline components:

- Residual waste material inside pipelines and pipeline components, if present, may occur as scale, corrosion products, sludge, and/or sediment. Residual levels of contamination are expected to be related to the waste stream characteristics and pipeline materials. Pipeline materials such as vitrified clay may have more readily sorbed waste stream constituents.
- Operations data substantiate the assumption that waste transfer lines, particularly tank farm system pipelines, were flushed as an integral component of waste transfers. In some cases, flushing was conducted both before and after waste transfers. These data would indicate that there would not be large volumes of high-activity waste and high concentrations of nonradiological waste in any residual waste in these pipelines.
- Plugged lines are not extensive within the waste transfer pipeline system. Plugged waste transfer lines were either replaced or taken out of service. In some cases, efforts were taken to unplug lines to maintain their service.
- The primary contaminant constituents are radionuclides including uranium, cesium-137, strontium-90, plutonium-239/240, technetium-99, and tritium, and the nonradionuclides including nitrate, chromium, cyanide, carbon tetrachloride, and sulfate.
- Contaminants such as cesium-137, strontium-90, and the plutonium isotopes have high K_d and, therefore, normally sorb strongly onto shallow zone Hanford Site sediments. These less mobile contaminants should be detected near points of release in the vadose zone. Contaminants with low K_d values (e.g., nitrate, technetium-99, and tritium) are not readily adsorbed on soil particles and migrate to greater depth within the vadose zone.
- Both vertical migration and lateral spreading of liquids and contaminants may have occurred into surrounding soil at release points. The extent of migration or spreading will be dependent on a number of factors, including volume of liquid released and local hydrogeologic conditions.
- Mobile contaminants may or may not have reached groundwater. The volume of contaminated liquid that may have been released at points of leakage is generally unknown. For pipelines and pipeline components where inadvertent liquid releases to the surrounding soil have occurred, the contaminant distribution may be limited to the shallow vadose zone soil interval or could extend to a deeper depth. Liquid releases at pipeline failure locations may display simple or complex concentration distributions within the impacted vadose zone area, depending on the characteristics of the waste stream and the physical composition and chemistry of the soil.

3.4 Development of Constituents List for Pipeline Systems

A master list of constituents associated with the process-waste pipeline systems has been developed based upon the current state of knowledge. The constituent list, as presented in Table 3-5, is based on a number of sources. These include historical operational process information; engineering studies sampling; characterization information from liquid waste disposal sites that once received waste through the process pipeline system (i.e., cribs, ponds, ditches, and tank farms); the Tank Farm's Best Basis Inventory, which is documented in TWINS; and characterization information from UPRs that are associated with failed or leaking pipeline systems in the 200 West and 200 East Areas. To develop the master list, a comprehensive

constituent list was reviewed using the exclusion rationale presented in D&D-30262 and sampling results from Tank Farm's SST WMA C RFI characterization results documented in HEIS.

The process-waste streams changed over time as processes in the 200 Area facilities changed. Disposal pathways for the waste streams were appropriately routed based upon the perceived risk posed by each waste stream. High-activity liquid waste streams that had a high potential risk were transferred to the SST system. Lower activity liquid waste streams with moderate potential risk were discharged below ground in cribs. Waste streams with the lowest expected activity were discharged to the surface ditch and pond disposal facilities. Certain waste streams were also discharged into tanks to allow for the higher-activity solids to settle, and the liquid supernatant would then be discharged into a crib. By defining these disposal pathways and reviewing data from the disposal endpoint, it is possible to develop a knowledge base for characterizing the pipeline systems.

Based on waste stream characteristics developed in the data quality objective (DQO) report (D&D-30262), constituent lists were prepared for facility process-waste stream pipelines and the tank farm process-waste transfer lines. Although the waste streams share some common attributes and compositional similarities, sufficient differences warranted the development of separate lists, as discussed in the following sections.

3.4.1 Constituents List for Facilities Process-Waste Pipeline Systems

Numerous characterization investigations have been conducted to date to determine contaminant levels at the process-waste disposal sites that received liquid effluent generated by the facilities in the Inner Area of the Central Plateau. The DQO process was conducted in conjunction with these waste site investigations to determine the list of constituents that would require analyses at these waste sites. During development of a DQO summary report for the UPR Waste Group (formerly 200-UR-1 OU), the constituent lists that had been prepared for the liquid waste disposal sites were compiled, reviewed, and refined into one comprehensive list. Because this comprehensive list encompasses the constituents identified for the former 200 Area process-waste stream based OUs, it was determined to be well suited for use in evaluating process-waste pipeline systems, because the pipeline systems have been in contact with the same waste streams received by the disposal sites. This list encompasses all constituents that are considered the primary target analytes for the laboratory analysis needed to characterize the facilities process-waste pipeline systems. Several additional analytes have been included with the original list at the request of Ecology. Table 3-5 summarizes the facilities process-waste pipeline systems constituent list.

As presented in Chapter 2, waste stream characteristics varied within and between facilities, depending on the stage or phase of the extraction or recovery process. Waste streams were generated as the result of both direct process operations (i.e., plutonium and uranium extraction) and indirect, noncontact operations (i.e., steam condensate and cooling water). Therefore, not all of the constituents identified in Table 3-5 are assumed to occur in every waste stream handled by the facilities process-waste pipeline systems.

Table 3-5. Constituents List for Facilities Process-Waste and Tank Farm Waste Transfer Pipeline Systems

Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)	Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)
Radionuclide Constituents					
Antimony-125		X	Niobium-94[a]	X	
Americium-241	X	X	Plutonium-238	X	X
Carbon-14	X	X	Plutonium-239/240	X	X
Cesium-137	X	X	Plutonium-241		X
Cobalt-60	X	X	Selenium-79		X
Curium-242		X	Strontium-90	X	X
Curium-243		X	Technetium-99	X	X
Curium-244		X	Thorium-228		X
Europium-152	X	X	Thorium-230		X
Europium-154	X	X	Thorium-232		X
Europium-155	X	X	Tritium	X	X
Neptunium-237	X	X	Uranium-233/234	X	X
Nickel-63	X	X	Uranium-235/236	X	X
Iodine-129		X	Uranium-238	X	X
Neptunium-237		X			
Chemical Constituents—Metals					
Aluminum		X	Manganese		X
Antimony	X	X	Mercury	X	X
Arsenic	X	X	Nickel	X	X
Barium	X	X	Selenium	X	X

Table 3-5. Constituents List for Facilities Process-Waste and Tank Farm Waste Transfer Pipeline Systems

Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)	Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)
Beryllium	X	X	Silver	X	X
Cadmium	X	X	Strontium		X
Chromium	X	X	Selenium	X	X
Cobalt		X	Thallium		X
Hexavalent Chromium	X	X	Uranium	X	X
Copper	X	X	Vanadium	X	X
Iron		X	Zinc	X	X
Lead	X	X			
Chemical Constituents—Other Inorganics and Organic Cations					
Ammonia (NH_3) or Ammonium (NH_4)		X	Glycolate*	X	X
Acetate		X	Nitrate	X	X
Chloride		X	Nitrite	X	X
Cyanide	X	X	Nitrogen in Nitrate/Nitrite	X	X
Fluoride	X	X	Oxalate	X	X
Formate*	X	X	Sulfate	X	X
Ferrocyanide		X	Sulfide		X

Table 3-5. Constituents List for Facilities Process-Waste and Tank Farm Waste Transfer Pipeline Systems

Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)	Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)
Chemical Constituents—Volatile Organics					
Acetone	X	X	Methyl ethyl ketone	X	
Acetonitrile	X	X	Methyl isobutyl ketone	X	X
Benzene	X	X	Perchloroethylene	X	
n-Butyl Benzene	X		Tetrahydrofuran	X	
1-Butanol (n-butyl alcohol)	X		Toluene	X	X
Carbon Tetrachloride	X	X	1,1,1 Trichloroethane	X	X
Chlorobenzene	X	X	1,1,2 Trichloroethane	X	X
cis-1,2-dichloroethylene	X		1,1,2,2-Tetrachloroethene		X
Cyclohexane	X		1,1,2,2-Tetrachloroethane		X
1,1-dichloroethane	X		*trans*-1,2-dichlorotheylene	X	
1,2-dichloroethane	X	X	Tetrachloroethylene	X	X
1,1-dichloroethylene	X	X	Trichloroethylene	X	X
Dichloromethane (methylene chloride)	X	X	Vinyl chloride	X	X
Ethylbenzene	X	X	Xylene (incl. m-, o-, p-)	X	X
Carbon Disulfide		X	Trichloro-1,2,2-trifluoroethane; 1,1,2-		X
Halogenated hydrocarbons	X		Butanol; n- (n-butyl alcohol)		X
Hexane	X		Isobutyl alcohol (Isobutanol)		X

Table 3-5. Constituents List for Facilities Process-Waste and Tank Farm Waste Transfer Pipeline Systems

Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)	Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)
Chloroform (Trichloromethane)		X	Trichlorofluoromethane		X
Dichloropropene; 1,3,- (trans-)		X	1,1,2-Trichloro-1,2,2-trifluoroethane		X
Ethyl Acetate		X	Nitropopane		X
Ethyl Ether		X			
Chemical Constituents—Semivolatile Organics[d]					
AMSCO[b] tributyl phosphate dilutant	X	X	Normal paraffin hydrocarbon	X	
Cyclohexanone	X	X	Polyaromatic hydrocarbons	X	
Diesel fuel[c]	X		Paint thinner	X	
Dodecane	X		Phenol	X	
Hydraulic fluids (greases)	X		Polychlorinated biphenyls (and associated World Health Organization congeners)	X	
Kerosene	X		Shell E-2342 (naphthalene and paraffin)	X	
Naphthylamine	X	X	Soltrol-170 ($C_{10}H_{22}$ to C_6 to H_{34}; purified kerosene)	X	
Dibutylphosphate*	X	X	Tributyl phosphate and derivatives (mono, bi)	X	X
Monobutylphosphate*	X	X	Nitrophenol; o-		X
Acrylic acid*		X	Nitroso-di-n-propylamine; N-		X

Table 3-5. Constituents List for Facilities Process-Waste and Tank Farm Waste Transfer Pipeline Systems

Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)	Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)
Hexachloroethane		X	Napthalene		X
Acenaphthene		X	1,2,4-Trichlorobenzene		X
Bis-2-ethylhexyl phthalate (Dioctylphthalate)		X	Nitrosomorpholine; N-		X
Butylbenzylphthalate		X	Pyrene		X
Butadiene;1,3-*		X	Pyridine		X
Chlorophenol; 2-		X	Trichlorophenol; 2,4,5-		X
Cresol; m + p (3- and 4-Methylphenol)		X	Trichlorophenol; 2,4,6-		X
Cresol; o- (2-Methylphenol)		X	Benzo (a) anthracene*		X
Cresylic acid (cresol, mixed isomers)		X	Benzo (b) fluorathene*		X
Dibutylphthalate (Di-n-butylphthalate)		X	Benzo (k) fluorathene*		X
Di-n-octylphthalate		X	Benzo (a) pyrene*		X
Dichlorobenzene; 1,2- (ortho-)		X	Chrysene*		X
Dinitrotoluene; 2,4-		X	Dibenzo (ab) anthracene*		X
Ethoxyethanol; 2-		X	Indeno (123-cd) pyrene*		X
Fluoranthene		X	Aroclor 1016**		X
Hexachlorobutadiene		X	Aroclor 1221**		X

Table 3-5. Constituents List for Facilities Process-Waste and Tank Farm Waste Transfer Pipeline Systems

Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)	Constituent	Facilities Process-Waste Pipeline System (Low Activity)	Tank Farm Pipeline System (High Activity)
Methylphenol; 4-Chloro-3- (p-Chloro-m-cresol)		X	Aroclor 1232**		X
N-Nitrosomethyl amine*		X	Aroclor 1242**		X
N-Nitrosomethylethyl amine*		X	Aroclor 1248**		X
Trimethylamine*		X	Aroclor 1254**		X
Nitrobenzene		X	Aroclor 1260**		X

a. Applicable to Plutonium Finishing Plant area only.

b. Allen Maintenance Supply Company, Inc.

c. Analyzed as total petroleum hydrocarbons-diesel range; other total petroleum hydrocarbon analyses will include gasoline range.

d. Trademarks and registered trademarks are the property of their respective owners. Product names mentioned are listed for contaminant potential only; such listing does not imply ownership and does not constitute endorsement.

* Added to list as requested by the Washington State Department of Ecology (chelators or extractants used in processes).

** Aroclor is an expired trademark. “Aroclor is a polychlorinated biphenyl (PCB) mixture produced from approximately 1930 to 1979. It is one of the most commonly known trade names for PCB mixtures. There are many types of Aroclors and each has a distinguishing suffix number that indicates the degree of chlorination. The numbering standard for the different Aroclors is as follows: The first two digits generally refer to the number of carbon atoms in the phenyl rings (for PCBs this is 12), the second two numbers indicate the percentage of chlorine by mass in the mixture. For example, the name Aroclor 1254 means that the mixture contains approximately 54% chlorine by weight.” Source: EPA, 2011, “Aroclor and Other PCB Mixtures.”

3.4.2 Constituents List for Tank Farm Pipeline System

Two DQO processes have been completed that identify the constituents list for sampling residual process-waste remaining in the SST tank farms following waste retrieval (*Single Shell Tank Component Closure Data Quality Objectives* [RPP-23403]) and for sampling the vadose zone for contamination in and around tank farm WMA C (*Data Quality Objectives Report Phase 2 Characterization of Waste Management Area C RCRA Field Investigation/Corrective Measures Study* [RPP-RPT-38152]). The first DQO (RPP-23403) was developed so that data would be collected during the waste retrieval process to support the component closure activities for all SSTs and to cover all sampling and analytical activities for that purpose. The second, Phase 2 DQO (RPP-RPT-38152), addresses vadose zone sampling and analysis and characterization actions associated with ancillary equipment within and around Tank Farm WMA C. Both DQOs utilized a comprehensive approach based on the use of analytical methods to ensure that the wide range of constituents potentially present in SSTs would be addressed. The Phase 2 DQO (RPP-RPT-38152) also identified an approach to further evaluate and potentially eliminate certain constituents (organic compounds and PCBs) for the target list of analytes being tested. Ongoing SST waste retrieval projects continue to provide data on waste characteristics in the SSTs, and analytical results from the vadose zone field investigations within and around tank farms identify constituents that have been released to the environment in and around Tank Farm WMA C. The constituent lists in these DQO reports, along with the results from these characterization efforts, have been used to define the tank farm pipeline system constituent list for this Work Plan.

Table 3-5 shows radionuclide, inorganic, and organic constituents identified for the tank farm pipeline system. Not all of the tank farm constituents listed are assumed to occur in every waste stream handled by the tank farm waste transfer pipelines.

3.5 Potential Applicable or Relevant and Appropriate Requirements

A preliminary identification of potential applicable or relevant and appropriate requirements (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. Detailed information on identifying and complying with ARARs is contained in EPA/540/G-89/006, *CERCLA Compliance with Other Laws Manual; Interim Final.*

Appendix C provides a table of potential ARARs and TBC material for the pipeline systems and associated UPRs.

3.6 Baseline Risk Assessment

The purposes of a BRA are to assess potential risks associated with residual contamination at a waste 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.

Clarification of the BRA role in developing Superfund remedial alternatives and supporting risk management decisions is provided in Clay, 1991, "Role of Baseline Risk Assessment in Superfund Remedy Selection Decisions." This directive states that the BRA is part of the remedial investigation. It further states:

> *…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 ground water or surface water, releasing to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain" (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.*

3.6.1 Baseline Risk Assessment—General Approach

The following sections provide a brief description of the methodologies that will be used for the human health risk assessments (HHRAs) and ecological risk assessments (ERAs). Subsequent sections describe BRA components that are common to the Inner Area OUs as well as BRA components specific to pipeline systems.

3.6.1.1 Human Health Risk Assessment Approach

The HHRA methodology under CERCLA is a four-step process: hazard identification, exposure assessment, toxicity assessment, and risk characterization. In addition, Ecology requires application of the risk-based methodology described in WAC 173-340, "Model Toxics Control Act—Cleanup," also known as the Model Toxics Control Act (MTCA). A brief description of each step is provided:

- In the *hazard identification*, environmental monitoring data are evaluated, contaminants of potential concern (COPCs) are selected for inclusion in the quantitative risk assessment, and the rationale for their selection is documented.

- In the *exposure assessment*, the human population, or groups of individuals potentially exposed to COPCs (i.e., potential human receptors), are characterized. From the many potential pathways of exposure, pathways applicable to potential receptors at the site are identified. The concentrations of COPCs in relevant media (e.g., soil) are converted to intakes, taking into account rates of contact (e.g., ingestion rates) and absorption rates of different COPCs. The magnitude, frequency, and duration of these exposures are then integrated to obtain estimates of daily intakes over a specified period of time (e.g., lifetime, less-than-lifetime).

- In the *toxicity assessment*, the relationship between extent of exposure and potential adverse health effects is estimated for each COPC. Chemical-specific toxicity values (i.e., cancer slope factors (SFs) for chemical carcinogens and radionuclides, inhalation unit risks for chemical carcinogens, and reference doses (RfDs) or reference concentrations (RfCs) for noncarcinogens), are presented along with a discussion of their scientific basis and derivation. The toxicity assessment will present EPA-published toxicity values for the assessment of noncarcinogens and carcinogens for all constituents identified as COPCs in the HHRA for which such values are available. These values and the sources for each will be presented in the BRA. An uncertainty related to toxicity values is that for some COPCs, toxicity values are not readily available. This could potentially result in an underreporting of cumulative risks or noncancer hazards.

- *Risk characterization* integrates the results of the toxicity assessment and the exposure assessment to derive quantitative estimates of human health risk, including the risks of cancer and potential for adverse health effects from noncarcinogens. The major uncertainties and limitations associated with the estimates of risk and their potential effects on the risk results are presented in this section. The risk characterization will present cumulative risks for complete exposure pathways for each receptor assessed in the BRA. Cumulative risks will be compared to EPA's target risk range of 10^{-6} to 10^{-4} for carcinogens and the threshold hazard index (HI) of 1.0.

Human health risks also will be assessed with methods based on procedures described in the MTCA. The MTCA procedures are derived from EPA/540/1-89/002, *Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part A): Interim Final*. The specific risk assessment guidance documents utilized for the Inner Area HHRA are included in the bulleted list. Along with the exposure scenarios, described in the following sections, which will be evaluated using the methodology based on CERCLA guidance, human health risks for non radionuclide COPCs in soil also will be assessed using Method B (WAC 173-340-740) for the BRA and Method C (WAC 173-340-745) standards for final cleanup levels. 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. Non-cancer effects both for individual and multiple COPCs will be evaluated by comparison with an HI of 1.0. Cancer risks evaluated using Method C will be compared to a target cancer risk of 10^{-5} and an HI of 1.0 for both individual and multiple COPCs (WAC 173-340-700(5)(b)).

The HHRAs for the Inner Area will be based on CERCLA guidance, including the following:

- EPA/540/1-89/002
- OSWER Directive 9285.6-03, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance – "Standard Default Exposure Factors" (Interim Final)*
- EPA/540/R/99/005, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*
- EPA/600/P-95/002Fb, *Exposure Factors Handbook*, Volumes I, II, and III
- EPA, 2010a, "Preliminary Remediation Goals for Radionuclides"
- EPA, 2010b, "Regional Screening Levels for Chemical Contaminants at Superfund Sites"
- OSWER 9285.6-07P, *Role of Background in the CERCLA Cleanup Program*
- OSWER Directive 9285.6-10, *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*
- EPA/600/R-07-038, 2007, *ProUCL Version 4.0 User Guide*

3.6.1.2 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 for stakeholder input on the evaluation of interim findings and refinement of the technical approach. The approach will also be consistent with WAC 173-340-7490, "Terrestrial Ecological Evaluation Procedures," and DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.*

The approach will incorporate concepts discussed in EPA/540/F-01/014 and EPA 120/R-07/001, *Framework for Metals Risk Assessment.* 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 ecological risk-based concentrations that are available at the time the risk assessment is submitted (see Section 3.6.2.6 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 both guide future actions that will be used in the FS process and will help select preliminary remediation goals (PRGs) from the available ecological risk-based concentrations. The following will be addressed as part of the ecological screening:

- The uncertainties associated with the available ecological risk-based concentrations in soil.
- The uncertainties associated with available exposure characterization data.
- The potential impacts of making remedial decisions based on existing ecological risk-based concentrations and available exposure characterization data.

Upon completion of the screening level ecological risk assessment (SLERA), Steps 1 and 2 of the EPA's eight-step process for ERA, the need for refining the values and exposure characterization data through collection of additional data is identified. The baseline ERA and characterization (Step 7) would further evaluate potential ecological risk from contaminants of potential ecological concern (COPECs) identified in the baseline problem formulation (Step 3) including the use of additional Hanford Site-specific data and the development of PRGs as needed (Steps 4 through 6). Risk management recommendations are discussed in Step 8 with input from risk managers.

3.6.1.3 Protection of Groundwater Evaluation Approach

The assessment of the potential for contaminants to migrate to groundwater will be conducted using a graded approach that is currently under development and will be further detailed in the RFI/CMS/RI/FS report and summarized in the BRAs. At the current stage of development, the graded approach for assessment of groundwater protection comprises two tiers. The first tier uses "screening levels" as thresholds for determining if further evaluation of an analyte is warranted for the groundwater protection pathway. The second tier uses PRGs as comparison criteria. 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 vadose zone that exceed the groundwater protection PRGs will be carried forward to the CMS/FSs for remedial alternatives analysis. The graded approach and model inputs/outputs will be provided in the RFI/CMS/RI/FS report and summarized in the BRAs.

3.6.2 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 included in the BRAs are described in the following sections.

3.6.2.1 Land and Groundwater Use

Current and reasonably anticipated future uses for land and groundwater in the Inner Area OUs are discussed in the following sections. Land and groundwater use information is applied as appropriate in conjunction with the identification of potential exposure routes and receptors.

Current and Reasonably Anticipated Future Land Use. As the lead agency for CERCLA cleanup of the Hanford Site and, in accordance with "Executive Order 12580: Superfund Implementation" (52 FR 2923), DOE has exercised its responsibility to determine reasonably anticipated future land use as input to the CERCLA process. Two documents provide the basis for DOE's determination of reasonably anticipated future land use for CERCLA decision making: DOE/EIS-0222-F, *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*, and the corresponding ROD, 64 FR 61615, "Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)."

Key elements of 64 FR 61615 relating to the Central Plateau include the following:

- "The Central Plateau (200 Areas) geographic area will be designated Industrial-Exclusive. An Industrial-Exclusive land-use designation will allow for continued Waste Management operations within the Central Plateau geographic area consistent with past NEPA, CERCLA, and RCRA commitments that have established numerous waste management treatment, storage and disposal facilities such as, low-level waste burial grounds, hazardous wastes burial grounds, transuranic (TRU) treatment and storage facilities, liquid wastes treatment, storage and disposal facilities, separation facilities, isotopic separation facilities, vitrification facilities, etc. This designation will also allow expansion of existing facilities or development of new compatible facilities. Designating the Central Plateau as Industrial-Exclusive will be consistent with the Hanford Future Site Working Group's 1992 recommendations, current DOE management practice, other governments' recommendations, and many public stakeholder values throughout the region."
- "The Industrial-Exclusive land use designation indicates an area suitable and desirable for treatment, storage, and disposal of hazardous, dangerous, radioactive, and nonradioactive wastes and related activities."

In accordance with CERCLA requirements, cleanup levels will be established commensurate with the potential future use to ensure protection of potential future users and ecological receptors. Cleanup levels

for waste sites within the Inner Area will be established recognizing permanent federal ownership and control, consistent with the reasonably anticipated future industrial land use.

Current and Reasonably Anticipated Future Groundwater Use. Groundwater beneath the Central Plateau is currently contaminated, and administrative controls prevent withdrawal of groundwater for human consumption. Under current site use conditions, no complete human or ecological exposure pathways to groundwater exist. Two groundwater wells located in the 200 East Area (Wells 299-E28-11 and 299-E-28-15) are available for industrial purposes to serve as a source of emergency backup cooling water for cesium capsules stored in the Waste Encapsulation Storage Facility near B Plant (DOE/RL-2004-56, *2004 Site Wide Institutional Controls Annual Assessment Report for Hanford CERCLA Response Actions*). Regardless of current or future land use designations, groundwater beneath the Central Plateau is not anticipated to become a future source of drinking water until cleanup criteria are met and groundwater is restored to its highest beneficial use.

3.6.2.2 Inner Area Human Receptors

Human receptors in the Inner Area are organized to represent: (1) a resident living in the Inner Area under hypothetical unrestricted land use which is the premise used in the BRA, (2) an industrial worker, the construction worker and the trespasser under the reasonably anticipated future land use of industrial, and (3) Tribal and subsistence farmer receptors under a hypothetical unrestricted land use are assessed to inform decision makers and stakeholders.

The following subsections describe the human receptor populations and exposure scenarios that will be evaluated in the HHRA portion of the BRA for the Inner Area. These scenarios and their uses in the RFI/CMS/RI/FS are summarized in Table 3-6. The potentially complete exposure pathways associated with these scenarios is summarized in Table 3-7. The exposure factors that will be used to estimate potential exposures for these scenarios will be drawn from appropriate guidance, including the EPA guidance documents identified in Section 3.6.1.1. These exposure factors will be discussed with the regulatory agencies prior to initiating the HHRA.

Table 3-6. Summary of Human Exposure Scenarios

Exposure Scenario	Role in the RFI/CMS/RI/FS
Residential Scenario	Used to help identify the basis for action. Developed using standard default assumptions in EPA guidance. MTCA Method B standards also will be used to evaluate risks associated with this scenario.
Industrial Worker	Used to calculate PRGs (scenario used in Alternative Evaluation); PRGs for nonradionuclides will be MTCA Method C standards. Includes maintenance and surveillance activities which reflect a reasonably anticipated future land use for the Central Plateau Inner Area.
Trespasser	Used to calculate PRGs for use in alternatives evaluation. Used to inform stakeholders during PCAD/PP development.
Construction Worker	Used to calculate PRGs for use in alternatives evaluation. Used to inform stakeholders during PCAD/PP development. Assumptions also address potential risks to a well driller.

Table 3-6. Summary of Human Exposure Scenarios

Exposure Scenario	Role in the RFI/CMS/RI/FS
Confederated Tribes of the Umatilla Indian Reservation Tribal Scenario	Used to inform decision makers during alternatives evaluation; used to inform stakeholders during PCAD/PP development.
Yakama Nation Tribal Scenario	Used to inform decision makers during alternatives evaluation; used to inform stakeholders during PCAD/PP development.

EPA = U.S. Environmental Protection Agency
MTCA = Model Toxics Control Act
PCAD = proposed corrective action decision
PP = proposed plan
PRG = preliminary remediation goal

Resident. A residential scenario represents the baseline risk to evaluate the no action alternative in the CMS/FS, in which the future use is assumed to be unrestricted. Inclusion of a residential scenario in a BRA is consistent with EPA and DOE guidance provided in EH-231-014/1292, *Use of Institutional Controls in a CERCLA Baseline Risk Assessment*, and is intended to provide an estimate of the reasonable maximum exposure, or "true" baseline risk, associated with a waste site in the absence of any remedial action or control (institutional or otherwise).

Industrial Worker. Industrial workers represent the human population more likely to be exposed to contaminants in soil within the Central Plateau Inner Area under the current and reasonably anticipated future land use described in Section 3.6.2.1. In addition to being evaluated in the HHRA, the industrial worker scenario also will provide the basis for development of PRGs for use in the alternatives analysis. The industrial worker scenario could encompass a range of activities; the depth in soil that this individual comes into contact with contaminants will depend on what activities are performed. This exposure scenario assumes that drinking water is obtained from a source other than groundwater beneath the site.

Construction Worker. Authorized construction workers could potentially be exposed to contaminants during construction activities in shallow zone soils within the Inner Area of the Central Plateau. The construction worker exposure scenario assumes that exposure to shallow zone soil occurs while performing short-term work activities such as trenching or excavation. A special construction activity included in this scenario is well drilling. Well drilling could result in exposure to contaminants in the soil from deeper depths. Separate assumptions for a well driller will not be developed. The construction worker scenario will be used to assess risks to a well driller, using exposure point concentrations from deeper soils as appropriate. This exposure scenario assumes that drinking water is obtained from a source other than groundwater beneath the site. The construction worker scenario will be used to inform decision makers during the alternatives analysis, and may be used as appropriate for the development of PRGs.

Trespasser. With this scenario, an individual is assumed to trespass into the Central Plateau Inner Area, and is potentially exposed to contaminated surface soil engaging in unauthorized off-road activities such as dirt-bike riding, mountain biking or hiking. This exposure scenario assumes that drinking water is obtained from a source other than groundwater beneath the site. The trespasser scenario will be used to inform decision makers during the alternatives analysis, and will be used as appropriate for the development of PRGs.

Table 3-7. Potentially Complete Exposure Pathways for Human Exposure Scenarios

Exposure Scenario Description	Complete Exposure Pathways For Each Media																
	Direct Contact with Soil						Groundwater (Future Leaching from Soil)[a]				Plant (Garden Produce)[c]	Plant (Wild Plants)	Beef[c]	Milk[c]	Poultry and Eggs[c]	Wild Game	Fish
	Ingestion	Vapor Inhalation	Dust Inhalation	Dermal Contact	External Exposure		Ingestion	Sweat Lodge, Inhalation[b]	Sweat Lodge, Dermal[b]		Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion
Residential Scenario (EPA default reasonable maximum exposure scenario)	x	x	x	x (non-rad)	x (rad)						x (rad)						
Unrestricted Use (residential)—non-rad (MTCA)[d]	x																
Industrial Worker—non-rad (MTCA)[e]	x																
Industrial Worker—rad	x		x		x												
Trespasser	x	x	x	x (non-rad)	x (rad)												
Construction Worker	x	x	x	x (non-rad)	x (rad)												
Confederated Tribes of the Umatilla Indian Reservation Tribal Scenario	x	x	x	x (non-rad)	x (rad)		x	x	x		x (rad)		x (rad)				

Table 3-7. Potentially Complete Exposure Pathways for Human Exposure Scenarios

Exposure Scenario Description	Complete Exposure Pathways For Each Media																
	Direct Contact with Soil						Groundwater (Future Leaching from Soil)[a]				Plant (Garden Produce)[c]	Plant (Wild Plants)	Beef[c]	Milk[c]	Poultry and Eggs[c]	Wild Game	Fish
	Ingestion	Vapor Inhalation	Dust Inhalation	Dermal Contact	External Exposure		Ingestion	Sweat Lodge, Inhalation[b]	Sweat Lodge, Dermal[b]		Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion	Ingestion
Yakama Nation Tribal Scenario	x	x	x	x (non-rad)	x (rad)		x	x	x		x (rad)		x (rad)	x (rad)			
Non-Resident Tribal Scenario	x		x	x (non-rad)	x (rad)												

Notes:

x - pathway is potentially complete for both radionuclides and non-radioactive contaminants and included in quantitative evaluation of human health risks.

x (non-rad) - pathway is potentially complete for non-radioactive contaminants and included in quantitative evaluation of human health risks.

x (rad) - pathway is potentially complete for radionuclides and included in quantitative evaluation of human health risks.

A blank cell indicates this pathway is considered to be incomplete.

a. For these scenarios, pathways associated with groundwater are assumed to occur as a result of leaching of contaminants from soil to groundwater. Exposure to contaminants through groundwater is assumed to occur at some point in the future, depending on the travel time for contaminants in soil.

b. Inhalation and dermal exposure pathways associated with use of groundwater in sweat lodges are discussed further in risk assessments conducted for the groundwater operable units (200-PO-1, DOE/RL-2009-85; 200-UP-1, DOE/RL-2009-122). The need to evaluate these pathways quantitatively for contaminants that could migrate from soil to groundwater will be addressed further in the risk assessment section of the 200-IS-1 OU *RFI/CMS/RI/FS* and in the Inner Area baseline risk assessments.

c. Exposure to contaminants from ingestion of garden produce, meat and milk raised in waste sites (under a subsistence farmer residential scenario) could occur from uptake of contaminants from soil through the food chain, and from uptake of contaminants in irrigation water applied to soil; it is assumed that contaminants occur in irrigation water through leaching from soil. Exposure through irrigation water is assumed to occur at some point in the future, depending on the travel time for contaminants in soil.

d. The Unrestricted Use (residential) - non-rad (MTCA) describes the scenario used to assess risks associated with direct contact with soil in accordance with WAC 173-340-740(3)(b)(iii)(B); in addition, Method B provides for concentrations in soil protective of groundwater as described in WAC 173-340-740(3)(b)(iii)(A).

e. The Industrial Worker - non-rad (MTCA) describes the scenario used to assess risks associated with direct contact with soil in accordance with WAC 173-340-745(5)(b)(iii)(B); in addition, Method C provides for concentrations in soil protective of groundwater as described in WAC 173-340-745(5)(b)(iii)(A).

Tribal Use Scenarios. Several local and regional Tribes have ancestral ties to the Hanford Reach of the Columbia River and surrounding lands. DOE has requested that each Tribe provide an exposure scenario that reflects their traditional activities. At this time, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have provided scenarios (Harris, 2008, *Application of the CTUIR Traditional Lifeways Exposure Scenario in Hanford Risk Assessments*; Harris and Harper, 2004, *Exposure Scenario for CTUIR Traditional Subsistence Lifeways*) and the Yakama Nation (Ridolfi, 2007, *Yakama Nation Exposure Scenario for Hanford Site Risk Assessment*). The Tribal scenarios are based on the assumption that a resident lives on a waste site in the future and receives exposure by direct contact with the soil and through garden-raised vegetables, and consumption of meat and milk from livestock raised onsite.

Both the CTUIR and Yakama Nation exposure scenarios include an exposure scenario from consumption of wild game. However, exposure from consumption of wild game is not included in the evaluation of the incremental risk contribution from the 200-IS-1 OU to the two Inner Area BRAs because the waste sites are considered too small to support foraging wild game. The CTUIR and Yakama Nation scenarios also include assumptions to estimate potential exposure from the consumption of fish and sweat lodge use. For purposes of this risk assessment, both exposure pathways are considered incomplete and are not evaluated.

3.6.2.3 Potential Ecological Receptor Populations

The vegetation of the Central Plateau uplands is characterized by native shrub-steppe, interspersed with large areas of disturbed ground dominated by annual grasses and forbs (PNNL-13745). Other disturbed areas of the Central Plateau are primarily nonvegetated gravel or asphalt, or sparsely covered with nonnative species. Most Central Plateau waste sites are nonvegetated gravel or asphalt and are treated with herbicide to prevent the uptake of underground contamination by deep-rooting plants. However, some waste sites are sparsely vegetated with nonnative annual species, and some have been stabilized and seeded with nonnative wheatgrasses.

The disturbed ground habitat of the Central Plateau provides little to no vegetative cover and low diversity of plant species. Overall animal diversity is usually low; however, transplanted trees associated with ponds and ditches, and structures and fences associated with buildings, attract bird species that are less common in other habitat types (e.g., Say's phoebe [*Sayornis saya*], western kingbird [*Tyranus verticalis*], and hawks). Mammals associated with these buildings and facilities include cottontails, house mice (*Mus musculus*), Norway rats (*Rattus norvegicus*), and various bat species (DOE/RL-2001-54, *Central Plateau Ecological Evaluation*).

Figure 3-28 presents the food web model for the Central Plateau in the habitat described above and based upon previous investigations as documented in previous reports for the Central Plateau (described in DOE/RL-2007-50). The figure portrays the feeding guilds found in the Central Plateau and the specific receptors that will be used to represent potential exposure to all members of those feeding guilds. Many of these receptors are the same as those that have been described previously for the Central Plateau (DOE/RL-2007-50). The representative receptor species selected for the following trophic guilds are:

- Herbivorous birds—California quail (*Callipepla californica*)
- Herbivorous mammals—Great Basin pocket mouse (*Perognathus parvus*)
- Insectivorous birds—killdeer (*Charadrius vociferus*)
- Insectivorous mammals—northern grasshopper mouse (*Onychomys leucogaster*)
- Omnivorous birds—western meadowlark (*Sturnella neglecta*)
- Omnivorous mammals—deer mouse (*Peromyscus maniculatus*)

- Carnivorous birds (raptors)—red tailed hawk (*Buteo jamaicensis*)
- Carnivorous mammals—badger (*Taxidea taxus*)

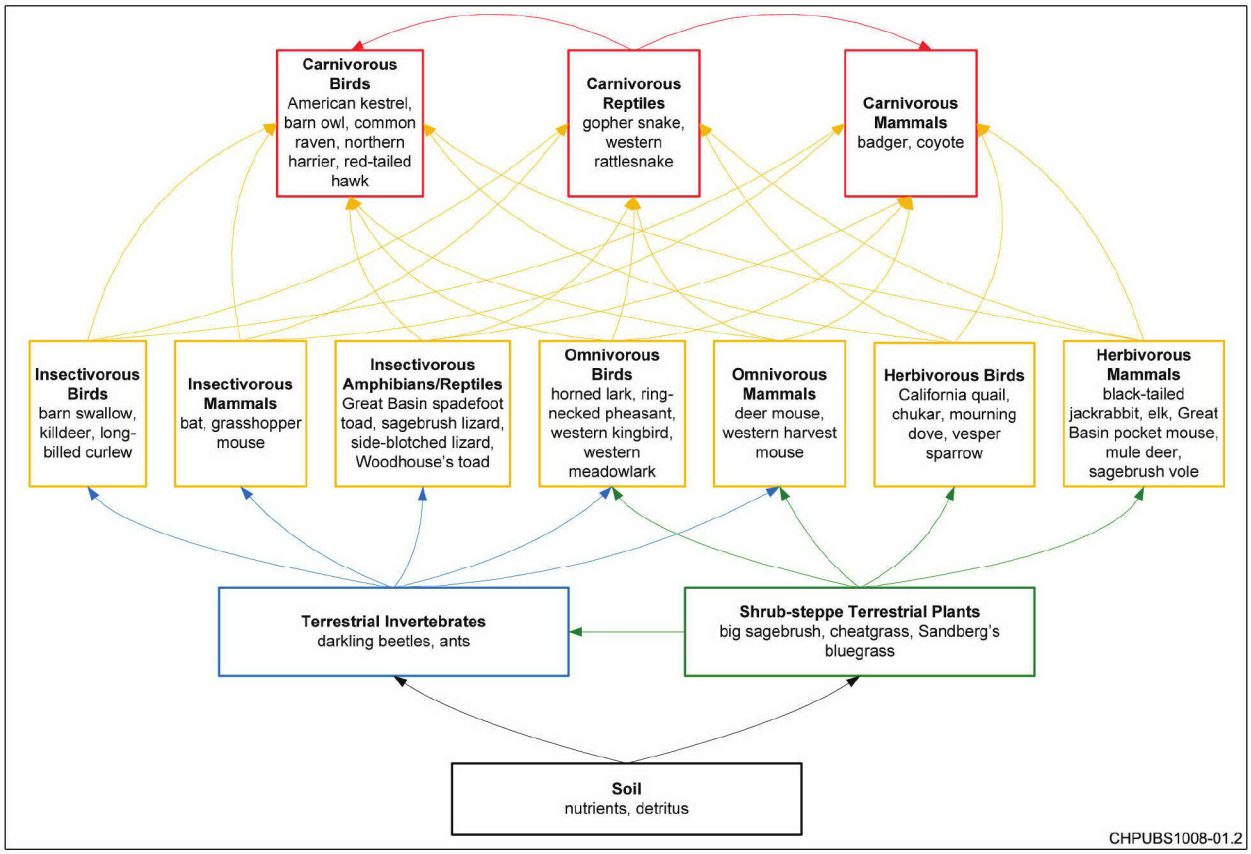
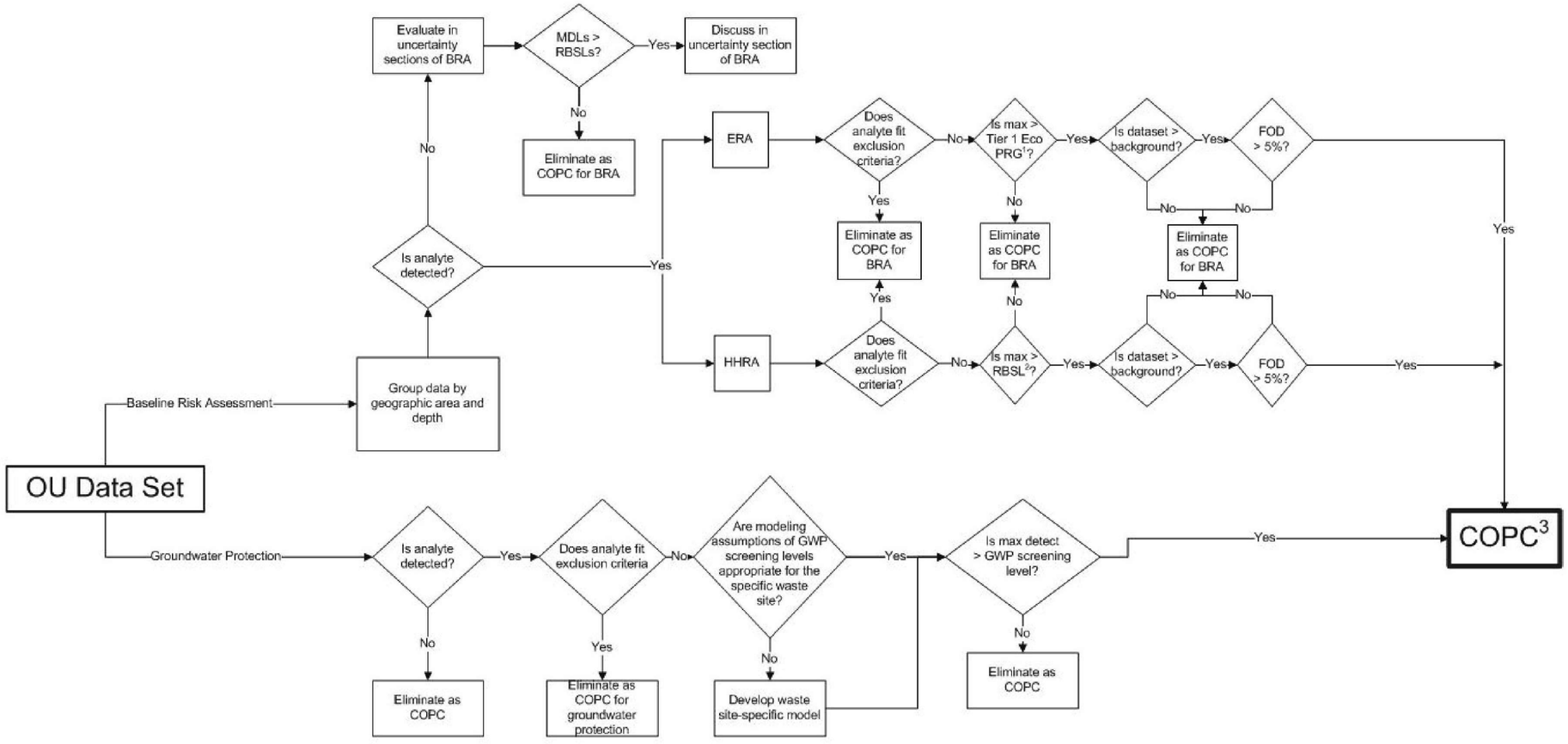


Figure 3-28. Inner Area Terrestrial Food Web

3.6.2.4 Identification of Contaminants of Potential Concern

This section presents a summary of the process that will be used in the Inner Area RFI/CMS/RI/FS and BRA reports to identify COPCs. This term, COPC, is typically used to describe those contaminants present or potentially present at a waste site at concentrations that may potentially pose risk to HHE. For the Inner Area, the term COPC is used to describe a list of contaminants that will be used for various evaluations in the RFI/CMS/RI/FS and BRA reports. The COPCs are identified by a comparison of the analytical data against appropriate screening levels, as well as other steps that are used to identify analytes that are potentially related to Hanford practices/processes. Figure 3-29 presents a highly generalized process for identification of COPCs for both the HHRAs, ERAs, and groundwater protection.



Acronyms:
BRA = baseline risk assessment
COPC = contaminant of potential concern
CSM = conceptual site model
ERA = ecological risk assessment
FOD = frequency of detection
GWP = groundwater protection
HHRA = human health risk assessment
MDL = method detection level
OU = Operable Unit
RBSL = risk-based screening level
RCRA = Resource Conservation and Recovery Act
RI = remedial investigation
TSD = treatment storage and disposal

Notes:
1) Tier 1 Eco PRGs are Washington Department of Ecology and EPA screening values.
2) RBSLs are EPA residential Screening Levels.
3) Additional COPCs may be added based upon review of process knowledge, CSMs, or RCRA TSD lists.

Figure 3-29. Identification of Contaminants of Potential Concern for Purposes of Preliminary Remediation Goal Development

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The general steps for identifying COPCs are as follows:

- Available analytical data and process or historical information will be reviewed to identify the range of contaminants potentially present in the pipeline areas. These data sources are described further in Sections 3.1 and 3.2. A preliminary list of the contaminants potentially present is shown in Table 3-5.

- The preliminary list of contaminants will be compared with lists of contaminants maintained by regulatory agencies to determine if they should be carried further into the process of identifying COPCs. These lists include the list of contaminants for which EPA has developed regional screening levels (RSLs) (EPA, 2010b) or radionuclide PRGs (EPA, 2010a), or for which Ecology has developed cleanup levels under MTCA, in Ecology, 2009, "Cleanup Levels and Risk Calculations." A contaminant that does not fall on one of these lists has no toxicity values available for it, and is not carried forward into the quantitative risk assessment. Contaminants found on these agency lists will be further evaluated in the COPC identification process.

- Analytical data that are available will be reviewed to determine if this contaminant has been detected; contaminants that have never been detected will be retained for development of PRGs; these will be discussed as uncertainties in the risk assessment, and will be retained for future use in the remedial response process as appropriate, but will not be carried through the risk assessment and RFI/CMS/RI/FS processes.

- Contaminants that have been detected will be further screened to identify COPCs. Contaminants that meet the following exclusion criteria may not be carried into the risk assessment:

  - 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

  - Radionuclides with half-lives less than 3 years and, upon decay, produce no significant daughter products (with the exception of short-lived daughter products that are in the decay chain of a long-lived parent radionuclide)

- Maximum concentrations will be compared with risk-based screening levels (RBSLs). Description of the RBSLs for human health risks, ecological risks and groundwater protection are described respectively in Sections 3.6.2.5, 3.6.2.6, and 3.6.2.7, respectively. Contaminants with maximum concentrations less than all RBSLs may not be carried into the risk assessment.

- The maximum detected concentrations for each detected analyte are compared against background vadose zone concentrations consistent with EPA/600/R-07/038 and Ecology guidance documents (WAC 173-340-709, "Methods for Defining Background Concentrations"). Further discussion of available background data and background comparison methods is presented below. Contaminants with maximum concentrations less than background concentrations may not be carried into the risk assessment.

- For contaminants that are not detected in a media, the maximum detection limit will be compared with the RBSLs; if the maximum detection limit is less than RBSLs, that contaminant may not be carried into the risk assessment.

Contaminants that are carried into the risk assessment will be evaluated further, as discussed in Sections 3.6.2.5, 3.6.2.6, and 3.6.2.7.

Evaluation of Background Concentrations in Soil. Background concentration data in soil are available for a variety of analytes (both radionuclide and nonradionuclide) and are contained in the following reports:

- DOE/RL 92-24, Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes
- DOE/RL-95-55, *Hanford Site Background: Evaluation of Existing Soil Radionuclides Data*

DOE/RL-96-12, *Hanford Site Background: Part 2, Soil Background for Radionuclides* For most analytes, background values were selected from a Hanford Site-specific background data set. Where Hanford Site-specific background data are not available for a constituent, Washington State average values (either Yakima basin or state-wide) are used. The WAC 173-340-709 indicates that chemical soil background shall be defined as, "for lognormally distributed data, … the true upper 90th percentile or four times the true 50th percentile, whichever is lower." Consistent with the regulation for assigning background values for chemical analytes, the 90th percentile value is also used for radionuclides for the background comparison step in the evaluation of groundwater protection.

Contaminants that are retained as COPCs may be further evaluated using a background statistical test. A background statistical test may be appropriate if the waste site data set contains at least eight samples, or a background threshold value as described in EPA/600/R-07/038, 2010, *ProUCL Version 4.00.05 User Guide (Draft)*, if the waste site data set contains less than eight samples. The hypothesis test will be evaluated in accordance with EPA guidance (OSWER Directive 9285.6-07P, *Role of Background in the CERCLA Cleanup Program*, and EPA 540-R-01-003, *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites*). If the results of the statistical test indicate that an analyte represents background conditions, this analyte may be eliminated as a COPC. For the background threshold test, maximum detected concentrations at a waste site are compared to a background threshold value. If the maximum detected concentration is less than the background threshold value, the analyte may be eliminated as a COPC.

3.6.2.5 Evaluation of Human Health Risks

The HHRA will be based on COPCs identified as described previously in Section 3.6.2.4. RBSLs that will be used in that COPC identification process will include radionuclide PRGs for a residential scenario provided by EPA (EPA, 2010a) and RSLs or Method B Standards for chemical contaminants.[1]

Potential exposures through the complete exposure pathways will be estimated using the methods summarized below. These methods will be consistent with EPA/540/1-89/002 guidelines, and other regulatory guidance as appropriate.

- Direct contact exposures, including soil ingestion and dermal (skin) contact with soil, will be estimated using exposure factors that describe the amounts of soil an individual may come into contact with.

- External exposure to radionuclides in soil will be estimated based on the frequency and duration of time spent over the contaminated area. For residential scenarios, which include a portion of time indoors, a gamma shielding factor will be used to account for the reduction in external exposure while indoors.

- Estimating inhalation exposures from contaminants in soil first require calculation of the corresponding concentration in air using either a particulate emission factor (PEF) for nonvolatile contaminants or volatilization factor (VF) for volatile contaminants. Modeling is performed to

[1] Noncarcinogens will be compared to the RSLs or Method B standards divided by 10, representing a hazard quotient of 0.1.

calculate PEFs and VFs. The concentration in air is then combined with exposure factors (inhalation rate, exposure time, and frequency and duration of exposure) to calculate inhalation exposures.

- Those scenarios involving ingestion of produce or ingestion of meat and milk first involve estimating concentrations in biota (i.e., fruits, vegetables, meat, or milk) from concentrations in soil using bioaccumulation factors. The concentrations in biota are then combined with exposure factors, specifically ingestion rates for produce, meat and milk, to calculate exposures through food ingestion pathways.

These estimated exposures will then be combined with toxicity values developed by EPA. Estimated exposures to carcinogenic COPCs will be multiplied by cancer SFs to calculate lifetime cancer risks. Estimated exposures to noncarcinogenic COPCs will be divided by RfDs or inhalation RfCs to calculate non-cancer hazard quotients and HIs. Toxicity values will be selected based on the recommended hierarchy described in EPA's guidance, "Human Health Toxicity Values in Superfund Risk Assessments" (Cook, 2003). Cancer SFs for radionuclides will be obtained from the EPA Health Effects Assessment Summary Tables for radionuclides (EPA, 2001).

3.6.2.6 Evaluation of Ecological Risk

The ERA will be based on COPCs identified as described previously in Section 3.6.2.4. RBSLs that will be used in that COPC identification process will include generic screening levels provided in CHPRC-00784, *Soil Based Tier 1 Preliminary Remedial Goals for Ecological Receptors at the Central Plateau Area, Hanford.*

Ecological risks would be evaluated for the waste sites in the 200-IS-1 OU using sampling and analytical data that are currently available. Those waste sites where the information available includes radiological survey data, historical information, or inventory information, but may be lacking sampling and analytical data, will be evaluated qualitatively; for example, the potential for ecological exposure will be evaluated taking into consideration the potential for complete exposure pathways or the proximity of ecological receptors.

A tiered framework has been devised to develop ecological PRGs that will be applied to upland environments across the Hanford Site (CHPRC-00784). This tiered framework describes a general process for progression to increasingly more biologically realistic and site-specific ecological values for use as PRGs in ERAs and RFI/CMS/RI/FSs. Higher tiers reflect increasing complexity and greater investment of time and resources. Higher tiers also reflect more refined characterization of ecological risks, which may be important in cleanup decision making. Central to the concept of a systematic, informed progression is an iterative process (i.e., cycles) of decision making involving evaluation of existing information, deliberation, data collection, and communication. All of these steps should be focused on the following decisions:

- Whether or not the ecological risk-based concentrations at the current tier are sufficient to be used as an ecological PRG and support cleanup decision making (a process for exiting the tiered approach is available at each tier)

- If the information available at the current tier is determined to be insufficient for use in developing an ecological PRG, whether or not progression to a higher tier of refinement would sufficiently reduce uncertainties to warrant the additional effort

These tiers are described as follows:

- **Generic Screening Levels.** Generic screening levels for plants, soil invertebrates, birds, and mammals are obtained from existing published and accepted sources: DOE-STD-1153-2002; the EPA Ecological Soil Screening Levels (Eco-SSLs);" WAC 173-349, Table 749-3, "Ecological Indicator Soil Concentrations (mg/kg) for Protection of Terrestrial Plants and Animals;" the Oak Ridge National Laboratory screening level benchmarks (ORNL, 2011). Generic screening levels are not specific to the Hanford Site; rather, they represent conservative, literature-based screening values. Because of their inherent conservatism, generic screening levels are intended to differentiate between contaminants that clearly present no risk and those for which additional evaluation may be warranted.

- **Tier 1 Values.** Tier 1 ecological risk-based concentration values are developed to reflect Hanford-specific conditions using information obtained from the literature. The Tier 1 values are calculated for bird and mammal species found at the Hanford Site. Exposure factors, such as food and soil ingestion rates, were derived for Hanford-specific wildlife from a review of the literature. Concentrations in food items were calculated with bioaccumulation models drawn primarily from EPA's Eco-SSL guidance.

- **Tier 2 Values.** Tier 2 values are calculated for the same bird and mammal species found at the Hanford Site and used to develop Tier 1 values. They incorporate additional Hanford Site-specific information; in particular, bioaccumulation models based food chains present at the Hanford Site (e.g., arthropods in soil). In addition, these bioaccumulation models incorporate soil and tissue data collected from the site.

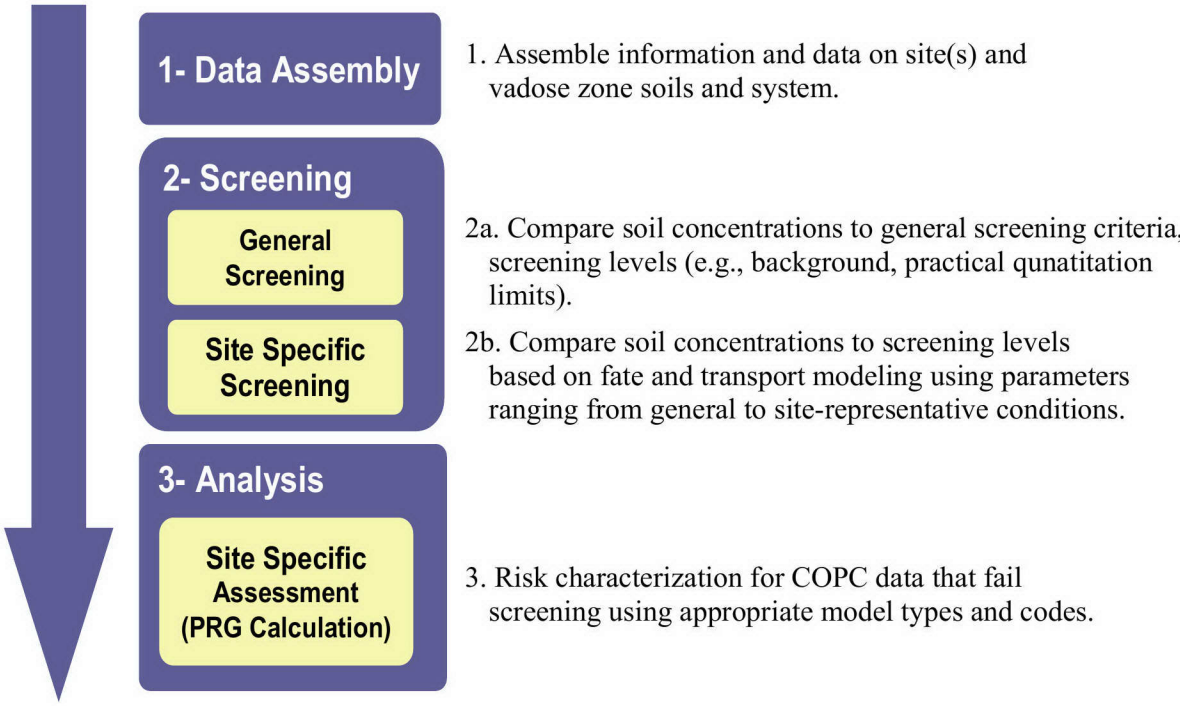
- **Tier 3 Values.** Tier 3 values represent waste site-specific or location-specific PRGs, based on data (e.g., bioaccumulation sampling, bioassays, and exposure factors) collected for specific locations at the Hanford Site. Development of Tier 3 values would involve development of separate SAPs and field sampling plans to support data collection. Tier 3 values would be the most refined and would be developed on an as needed basis to address specific receptor contaminant issues for which existing data are inadequate to reduce uncertainty about ecological risks. There are no plans for development of Tier 3 values for use as ecological PRGs for 200-IS-1 OU waste sites.

3.6.2.7 Evaluation of Groundwater Protection

For each waste site that has available analytical data, an evaluation of groundwater protection will be conducted on a waste site-basis. All detected analytes from the available sampled depths within the vadose zone will be compared to background soil concentrations and screening levels, following the comparison and exclusion process presented in Figure 3-30.

Graded Approach for the Determination and Use of Soil Levels Protective of Groundwater

The graded approach for the determination and use of soil levels protective of groundwater is based on the framework in DOE-STD-1153-2002 and applied to the graded approach for risk-based applications. Figure 3-31 is a summary of the graded approach (DOE-STD-1153-2002) adapted for groundwater protection applications for the Hanford Site. The Hanford Site graded approach for the determination and use of soil levels protective of groundwater involves the following three main steps as shown in Figure 3-30.



Modified from DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota.*

Figure 3-30. Adaptation of the Graded Approach for Risk Assessment Applications to Groundwater Protection at the Hanford Site

The three steps in this graded approach are summarized as follows:

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, as well as all available information that contribute to the conceptual site model (CSM).

2. **Screening.** The second step in the graded approach 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 and/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.

3. **Site-Specific Analysis: Risk Characterization.** The third step in the graded approach process, which includes the determination of PRGs, involves a single characterization of the risk as a final product of the risk assessment (EPA-100-B-00-002, *Risk Characterization Handbook*). 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 and/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).

Implementation of the steps in the graded approach for groundwater protection is described in DOE/RL-2011-50, *Regulatory Basis and Implementation of a Graded Approach to Evaluation of Groundwater Protection*. Details for the modeling assumptions, implementation, and results for every step of the graded approach will be provided at a later date.

3.6.3 Baseline Risk Assessment Inputs

In addition to defining the elements of the BRA, there will be specific inputs to the BRA for the 200-IS-1 OU. OU specific input information includes: preliminary CSMs, and information on the nature and extent of known contamination. The following sections identify the inputs that are specific for the 200-IS-1 OU waste sites. Input specific information for the other OUs will be defined in their respective work plans.

3.6.4 Specific Baseline Risk Assessment Inputs for Pipeline Systems

Specific inputs to be used for the BRAs for the pipeline system waste sites within the Inner Area are discussed in the following sections.

3.6.4.1 Preliminary Conceptual Exposure Model

This section presents the preliminary conceptual exposure model for the 200-IS-1 OU waste sites that 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 current and reasonably anticipated future land use.

Contaminant Sources. The sources of contamination from the pipeline system waste sites are liquid waste that exists as residuals present in the pipelines and associated pipeline components, and releases to surrounding soils from pipelines, diversion boxes, tanks, and associated structures. Releases to the vadose zone occurred through UPRs (leaks and pipeline failures).

Therefore, contaminated sources include the physical equipment and hardware of the pipeline systems and the contaminated soil near the pipeline systems. Releases to the environment from the primary contaminant sources have contaminated surface soils and subsurface soils around the pipeline systems at discrete locations. These are secondary sources that can spread contaminants through the environment by infiltration, resuspension of contaminated soil, volatilization, biotic uptake, leaching, and external radiation. The transport of contaminants in the vadose zone is predominantly driven by infiltration (i.e., residual effluent moisture and natural recharge). In certain instances following a liquid release from a pipeline or structure, the contaminants continued to move through the vadose zone for an undetermined period of time depending upon the waste characteristics and characteristics of the soil. Based upon current information, with a few exceptions, the leaks and failures from pipeline systems have resulted in very small volumes of contaminated soil.

Exposure Pathways for Human Receptors. An exposure pathway describes a mechanism by which a population or individual may be exposed to chemicals present at a site. A completed exposure pathway requires the following four components:

- A source and mechanism of chemical release to the environment
- An environmental transport medium for the released chemical
- A point of potential human contact with the contaminated medium

- A human exposure route at the point of exposure

All four components must exist for an exposure pathway to be complete and for exposure to occur. Incomplete exposure pathways do not result in actual human exposure and are not included in the exposure assessment and resulting risk characterization. The human exposure pathways for the pipeline system waste sites presented in Table 3-7 were identified for evaluation in the BRA in a manner consistent with EPA guidance (EPA, 2010b) for conducting HHRAs under CERCLA. Figure 3-31 illustrates this process. The release mechanisms for the pipelines and pipeline component waste sites in the BRA apply a conservative approach based on a no action configuration (i.e. waste is not removed, treated or stabilized) and the entire waste volume has been released to the environment.

Exposure Pathways for Ecological Receptors. With consideration of the ecological setting, land use, and COPEC release mechanisms for the 200-IS-1 OU wastes sites, incidental soil ingestion and ingestion of contaminated food items are the predominant exposure pathways for terrestrial receptors for the Inner Area. All other exposure pathways were considered incomplete or insignificant. Figure 3-32 displays the ecological exposure pathways considered most plausible for the Inner Area. These pathways include:

- Potential current and future direct contact of vegetation with constituents in surface soil as defined by the standard point of compliance in WAC 173-340
- Potential current or future direct contact with, or ingestion of, surface soil by terrestrial invertebrates (e.g., beetles and ants)
- Uptake by plants and soil biota
- Direct contact with, or ingestion of, surface soil by terrestrial avian and mammalian wildlife that may use the Inner Area
- Dietary exposure to COPECs bioaccumulated in food items (e.g., plants or prey) and subsequently consumed by terrestrial avian and mammalian wildlife that may forage within the Inner Area
- Exposure to emissions from radionuclides bioaccumulated and retained within the tissues of plants, terrestrial invertebrates, and terrestrial wildlife resident in the Inner Area
- External exposure of plants, terrestrial invertebrates, and terrestrial wildlife resident in the Inner Area to radiation from radionuclides in soil

The media of concern with respect to the evaluation of ecological receptors is soil. The SLERA for the 200-IS-1 OU waste sites will identify the depth in soil to which potentially complete exposure pathways could be present to terrestrial plants and animals. The SLERA will also identify the depth of the biologically active zone for these waste sites. In general, the biologically active zone within the Central Plateau is 3.05 m (10 ft) or shallower (CHPRC-00651). This information will be used in the FS to identify a point of compliance for protection of ecological receptors in accordance with WAC 173-340-7490(4)(a). This code allows for a conditional point of compliance that is set at the depth of the biologically active soil zone. A conditional point of compliance with institutional controls (ICs) may be used at a site to prevent excavation of deeper soil. The point of compliance is one of the criteria for determining when a site requires no further evaluation under the terrestrial ecological evaluation procedure. Under WAC 173-340-7491(1)(a), “Exclusions from a Terrestrial Ecological Evaluation,” no further action is required if soil contaminated with hazardous substances is, or will be, located below the point of compliance established under WAC 173-340-7490(4).

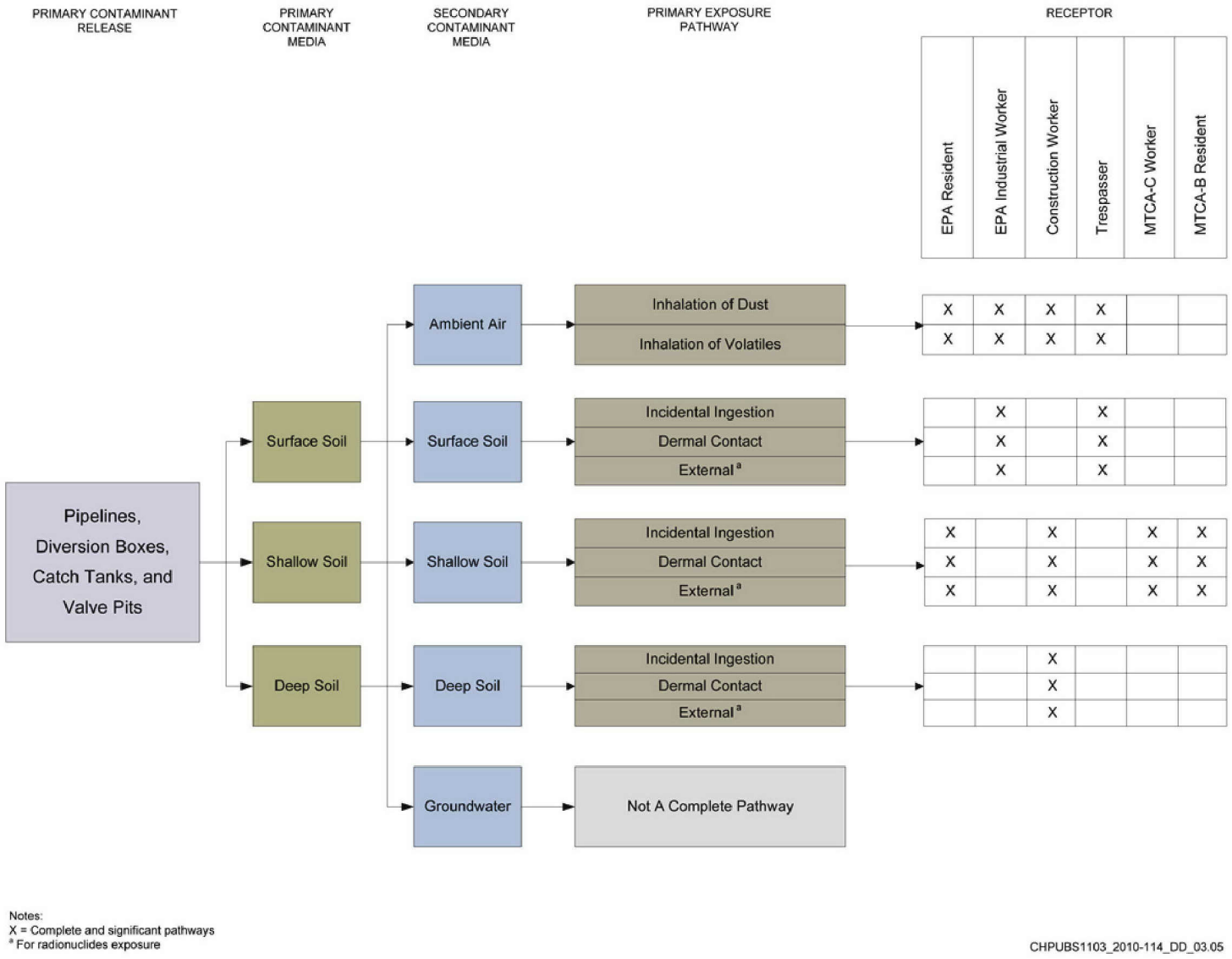


Figure 3-31. Pipeline System Human Health Risk Assessment Conceptual Exposure Model Diagram

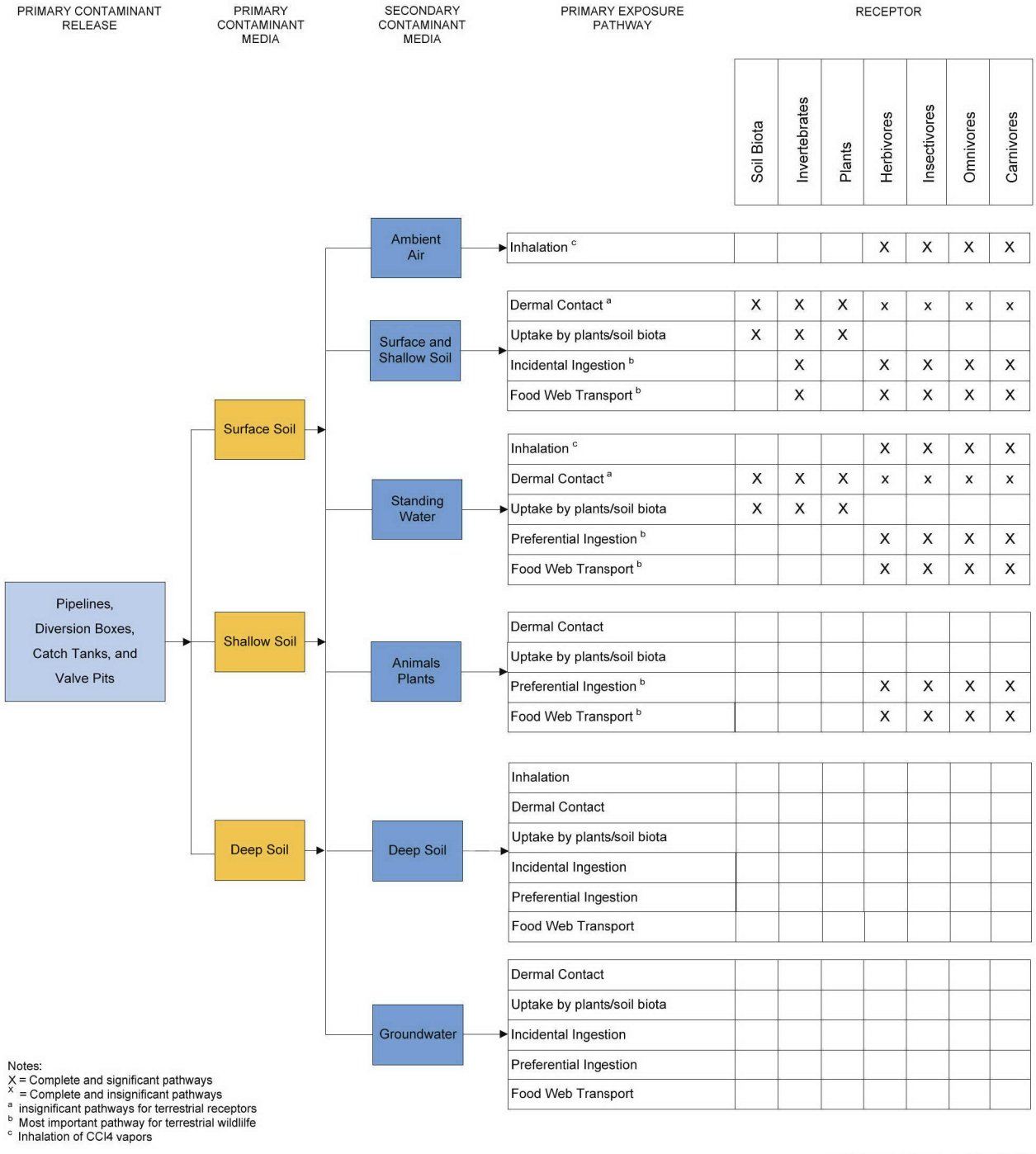


Figure 3-32. Conceptual Ecological Exposure Model for Upland Habitats in the Central Plateau

3.6.4.2 Data Inputs to Pipeline System Waste Sites BRA

For the pipeline systems waste sites BRA, COPCs will be identified and concentrations of COPCs associated with the waste sites will be estimated from available information (e.g., process knowledge, waste inventories, waste volume estimates, and representative sample data from disposal sites). These COPCs and estimated concentrations for radionuclides and chemicals will be used in the human health and ecological risk calculations.

As described in Section 3.2.3, the pipeline systems are segregated into the following categories:

- Process condensate and process-waste
- Steam condensate and cooling water
- Chemical sewer waste
- Miscellaneous waste
- Tank/scavenged waste
- Tank farm waste transfer

The categories represent the range of waste types that can be associated with the pipeline systems, for which constituent lists have been identified (see Section 3.4), and estimated concentrations will be developed for the BRA and CMS/FS alternatives development and evaluation. Each category of waste was carried from the source (e.g., steam condensate/cooling water pipelines originating at the PUREX plant) to a disposal site (e.g., some steam condensate/cooling water pipelines from the PUREX plant end at the 216-A-6 and 216-A-30 Cribs). Section 3.2 describes the linkages between sources of waste streams and "endpoint" disposal sites. Because the waste transported through these different pipeline systems varied, they potentially may present a different risk level to HHE.

The "endpoint" disposal sites can be grouped into the following three categories based on the relative activity of the waste that was sent to them:

- Lower activity waste disposal sites—ditches, trenches, ponds, French drains, retention basins
- Moderate activity waste disposal sites—cribs
- High activity waste disposal sites—tank farms

In order to evaluate potential risks to human and ecological receptors from the pipeline system waste sites in the BRA (e.g., conditions if no remedial action were to occur), COPCs and exposure point concentrations representative of soil around the pipelines are needed. For the BRA, it is assumed that characterization data from the "endpoint" liquid waste disposal sites are a conservative representation of contaminated soil around the pipelines under baseline conditions. Baseline conditions are described as the situation where pipelines are left in place and they deteriorate over time. As pipeline systems deteriorate, material may be released to the surrounding soil and other secondary environmental media as shown in the conceptual exposure model figures.

The primary source of data for estimating concentrations of radionuclides and chemicals that may remain in the vadose zone will be characterization data for the three levels of waste disposal sites described above. In addition, inputs on residual waste inventories and concentrations in the pipelines and associated components as well as potential waste characteristics of disposal sites and known UPRs will be compiled. Some of the data sources used to estimate concentration data for the BRA include:

- Liquid disposal site characterization data (ARH-1562, *200 East and North Areas Radioactive Liquid Waste Disposal Sites*, and HEIS data)

- DOE/EIS-0391, *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*
- RPP-PLAN-47559, *Single-Shell Tank Waste Management Area C Pipeline Feasibility Evaluation*
- RPP-15043, *Single-Shell Tank System Description*
- RPP-25113, *Residual Waste Inventories in the Plugged and Abandoned Pipelines at the Hanford Site*
- DOE/ORP-2005-01, 2006, *Initial Single-Shell Tank System Performance Assessment for the Hanford Site*
- RPP-26744
- Best Basis Inventory as documented in TWINS
- WIDS
- H-2 drawings
- Process knowledge reports (e.g., aggregate area management study reports for the 200 Areas; see Section 3.1 for listing of references)

These supplemental data sources on physical characteristics and operation protocols, waste inventories, and residual waste volumes will be also be used to evaluate the need for action in the BRA. The uncertainties associated with the use of estimated concentration data for human health and ecological risk calculations will be discussed in the BRA.

3.7 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 HHE 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 CMS/FS. These PRGs may be later modified during development of the CMS/FS and based on results of the BRA. The BRA clarifies 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 BRA), 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, "National Oil and Hazardous Substances Pollution Contingency Plan"), henceforth referred to as NCP. The CMS/FS will develop and evaluate a range of alternatives, including No Action. In order for the alternatives to be considered viable, they must be compliant with ARARs and demonstrate that they are protective of HHE.

3.7.1 Human Health Preliminary Remediation Goals

PRGs for protection of human health will be developed using the exposure scenarios (i.e., the Industrial Worker, Trespasser and Construction Worker scenarios) that reflect the reasonably anticipated future land use in the Central Plateau Inner Area. These PRGs for radionuclides and carcinogenic non-radioactive contaminants will be based on EPA target cancer risk range of 1×10^{-6} to 1×10^{-4}. PRGs for noncarcinogenic contaminants will be based on a non-cancer HI of 1. In addition to these scenarios,

Method C standards will be identified for use as PRGs. As discussed previously in Section 3.6.1.1, Method C standards are based on a target cancer risk level of 1×10^{-5} for carcinogenic contaminants and a non-cancer HI of 1 for noncarcinogenic contaminants.

3.7.2 Ecological Preliminary Remediation Goals

As described previously in Section 3.6.1.2, a tiered framework has been devised to develop ecological PRGs that will be applied to upland environments across the Hanford Site (CHPRC-00784). This tiered framework describes a general process for progression to increasingly more biologically realistic and site specific ecological values for use as PRGs in RFI/CMS/RI/FS. Selection of the specific values for ecological PRGs will take into consideration the results and the uncertainties in the ERA.

3.8 Preliminary Remedial Action Objectives

Section 300.430(e)(2)(i) of the NCP specifies that remedial action objectives (RAOs) be developed specifying 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 CMS/FS. The RAOs will be finalized and documented in the CAD/ROD.

The RAOs, which are 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.
- RAO 4—Prevent adverse impacts to cultural resources and threatened and endangered species, and minimize wildlife habitat disruption.

3.9 Documenting Baseline Risks for West and East Inner Areas

The previous sections define methodology and inputs for conducting the BRA. The results of the BRA will be documented in two reports: the BRA for the West Inner Area and the BRA for the East Inner Area. The two reports will document the risks associated with the waste sites in the West and East Areas of the Inner Area, provide documentation of the need for taking cleanup actions and provide a comparative basis to risks across the waste sites. The BRAs for the Inner Area will address both human health and ecological risk 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 3-8 identifies the OU inputs that will be included in the West Inner Area and East Inner Area BRAs. 200-IS-1 OU waste sites within these areas will be included in the BRAs.

These two documents will be published as stand alone reports that will support the development of the RI/FS or RFI/CMS/RI/FS reports for the OUs in each geographic area.

Table 3-8. Operable Units Addressed in the West and East Inner Area Baseline Risk Assessments

West Inner Area	East Inner Area
200-IS-1 OU (west area waste sites only)	200-IS-1 OU (east area waste sites only)
200 WA-1 OU/200-BC-1	200 EA-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)

PUREX = Pluntonium-Uranium Extraction (Plant)
REDOX = Reduction-Oxidation (Plant)

3.10 Preliminary Remedial Alternatives

There are five alternative actions potentially available for remediating and closing pipeline system waste sites:

- No action
- Monitored natural attenuation (MNA)
  - ICs and MNA
- Removal, treatment, and disposal (RTD). This action includes the physical excavation of the pipeline system waste sites or potentially portions of the waste sites. In addition, subsequent activities would include stabilization of the removed pipelines and pipeline components, as needed, backfilling of the excavation, and disposal at the Environmental Restoration Disposal Facility (ERDF) or other authorized facility. RTD can have the following variations:
  - Removal and disposal
  - Removal with ex situ treatment and disposal
- Treatment
  - In Situ Treatment. In situ treatment includes actions such as grout filling of pipelines and pipeline components. Also within this category of action is the possibility of pipeline residual waste extraction, which could include flushing and hydraulically activated pipeline pigging. Pipeline pigging would involve the introduction of various media that would push or pull the residual waste through the pipeline.
- Containment under a planned barrier
  - Remain in place under a planned barrier (Canyons and Tank Farms)
  - Leave pipeline system under a planned barrier.

Two principal categories of remedial actions currently are identified: (1) those actions that require removal, and (2) those that entail in-place remedies. In-place remedies may include maintaining an existing surface conditions with ICs, in situ treatment (stabilization), or barrier placement for pipelines systems in close proximity to other nearby waste sites that have identified barrier placement as their

remedy (currently, the U Plant Canyon). The following section present some additional perspective and considerations associated with the preliminary listing of the remedy options as they apply to pipeline system waste sites.

3.10.1 No Action

The NCP (40 CFR 300) requires that a No Action alternative be evaluated as a baseline for comparison with other remedial alternatives. The No Action alternative represents a situation where no legal restrictions, access controls, or active remedial measures are applied to the site. No action implies allowing the waste sites to remain in their current configuration, thus, being affected by natural processes only. No maintenance or other activities will be instituted or continued. Selecting the No Action alternative will require that a waste site pose no unacceptable threat to HHE.

3.10.2 Monitored Natural Attenuation

Under this alternative, the existing surface conditions over the pipeline system waste sites are maintained and/or augmented as needed to be protective for ecological receptors and the direct-contact pathway for humans and to provide for protecting groundwater. In addition, ICs will be required that mitigate contaminant exposure. Radioactive contaminants remaining below grade are allowed to decay in place (i.e., to attenuate naturally), thereby reducing risk until remediation goals are met. This alternative may be preferable in the following circumstances:

- For contaminants (such as short-lived radionuclides) that naturally attenuate and are not mobile in the environment
- For contaminants that may be mobile but attenuate/decay before impacting the environment
- When the cost to remediate does not gain a comparable amount of risk reduction
- When the cost for active remediation (e.g., remove and dispose, capping) is prohibitive

For sites having a clean soil cover with a depth less than the human health and ecological point of compliance, more stringent ICs (e.g., physical and legal barriers, biological monitoring, removal of deeply rooted plants, and control of deep burrowing animals) will need to be implemented.

Natural attenuation relies on natural processes to lower contaminant concentrations until cleanup levels are met. MNA includes sampling and/or environmental monitoring, consistent with EPA/540/R-99/006, *Radiation Risk Assessment at CERCLA Sites: Q&A*, to verify that contaminants are attenuating as expected and to ensure that contaminants remain isolated (e.g., will not lead to degradation of groundwater or be released to air or biota). Attenuation monitoring activities could include monitoring the vadose zone using geophysical logging methods or groundwater monitoring to verify that natural attenuation processes are effective. Monitoring groundwater may be required near sites with mobile contaminants left in place to verify that groundwater is not being threatened or impacted.

3.10.3 Removal, Treatment, and Disposal

Remedial alternatives will be evaluated that involve different combinations of RTD actions, depending on site conditions. Consideration of radionuclide composition and activity, remediation worker exposure hazards, and available disposal pathways will have a significant influence on remedy selection.

Excavation of pipeline system waste sites generally is accomplished with conventional earthmoving equipment, such as backhoes, long-reach excavators, and front-end loaders. However, because of the physical constraints and highly radioactive environment associated with the Hanford Site pipeline systems, these standard technologies may or may not be implementable.

Several types of excavation equipment that may be effective and implementable for removals are:

- Conventional excavation equipment
- Vacuum systems
- Remotely operated excavation equipment
- Excavation support technologies

The Occupation Safety and Health Administration requires that any excavation not made entirely in stable rock or that is greater than 1.5 m (5 ft) in depth be provided with an adequate excavation support (protective) system to protect workers from cave-ins. Protective systems for use in excavations 6 m (20 ft) or less in depth shall be designed and constructed in accordance with the requirements set forth in 29 CFR 1926.652, "Safety and Health Regulations for Construction," "Requirements for Protective Systems." Protective systems for use in excavations more than 6 m (20) ft in depth must be designed by a registered professional engineer in accordance with 29 CFR 1926.652(b) and (c).

The following conditions must be evaluated before a protective system is selected:

- Depth of excavation required
- Length of time the excavation will be open
- Presence of subsurface and aboveground infrastructure, including buildings, tanks, vaults, diversion boxes, valve pits, pipe encasements, piping, drywells, power lines, and trees
- Physical characteristics of soil
- Surcharge loading including spoil pile, material storage, and equipment size
- Construction accessibility
- Worker safety

Several types of excavation support technologies that may be effective and implementable for the 200-IS-1 OU waste sites include:

- Sloping and benching
- Shoring
- Reinforced concrete drilled shafts
- Injected grout curtain walls
- Slurry walls

Removal activities will involve excavation of waste sites to a specified depth. Treatment may include ex-situ operations. Treatment technologies involving in situ stabilization or post-removal stabilization will be considered as part of the initial technology evaluation and screening. Additional discussion on the application of these potential actions follows.

3.10.3.1 Removal and Disposal

Pipeline systems and soil with contaminant concentrations above the PRGs may be removed using conventional techniques and will be disposed of at ERDF, or at an offsite facility if elevated levels of TRU are involved. The depth and volume of soil removed largely will depend on which categories of PRGs are exceeded. For example, if human health direct contact PRGs or ecological PRGs are exceeded, contaminated soil will be removed to a prescribed depth. The remedial alternative evaluation approach

presented in Chapter 4 will be used to determine whether potentially contaminated pipeline system waste sites extending deeper than the prescribed depth for protection of human health and ecological receptors will be removed to protect groundwater.

During remedy implementation, the extent of removal of contaminated soil will be guided by the observational approach. The observational approach is a method of planning, designing, and implementing a remedial action that relies on information (e.g., samples) collected during remediation to guide the direction and scope of the activity. Data collected are used to assess the extent of contamination and to make real-time decisions in the field. Targeted (or hot spot) removals could be considered under this alternative if contamination is localized in only a portion of a waste site.

Radioactive waste will require special handling protocols. Remote controlled equipment and containment structures may be necessary if removal involve high-activity waste. Excavation using the observational approach does not require that the precise extent of contamination be known before excavation; rather, the extent of contamination is assessed as the excavation proceeds, and the extent of remediation is adjusted accordingly. In this alternative, soils will be removed until the cleanup levels are achieved to a prescribed depth. In some cases, deeper depths of removal, as agreed upon among the Tri-Parties, may be required if removal of an engineered structure is required. If previously unanticipated contamination above the PRGs is discovered, the extent of remediation may be increased following consultation with the Tri-Parties. A decision to excavate to a greater depth to protect groundwater (i.e., if required to meet groundwater maximum contaminant levels) will depend on factors such as worker safety issues, the cost of further remediation, amount of risk reduction achieved, volume of soil generated, availability of disposal facility capacity, impacts on cultural and ecological resources, logistics and interference with other onsite activities/structures, and implementability of the excavation for the deeper contamination.

3.10.3.2 Removal with Ex Situ Treatment and Disposal

Low-level radioactive waste and/or hazardous waste are acceptable for disposal at the ERDF in accordance with the waste acceptance criteria (WHC-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*). For certain removal activities involving moderate- or high-activity radiological or mixed waste, ex situ treatment may be required to meet waste acceptance and disposal requirements. For these wastes, treatment technologies will be identified and screened in the context of preparing the waste for disposal.

3.10.4 In Situ Treatment

This remedial alternative may be applicable to pipeline system waste sites that have sorbed contaminants (e.g., vitrified clay pipeline) or that have accumulated a significant buildup of scale or other residual material that would be difficult to remove. Leaking pipelines also may have a localized accumulation of contaminated soil concentrated near the release location. A currently identified, in situ treatment technology consists of grout injection/pumping into a pipeline, pipeline component and/or the surrounding soil. For grouting, chemical bonding agents can be mixed with the grout and used to stabilize local contamination. There are several reasons that grouting pipeline systems may be needed, including:

- Void space filling to prevent or minimize landfill barrier subsidence
- Eliminating preferential pathways
- Stabilizing residual waste for risk reduction

Certain pipeline segments where the constructed materials have shown no tendency to sorb chemical constituents (e.g., stainless steel pipelines) may require application of a decontamination procedure only. Flushing of residual constituents (e.g., liquids, sediments, and/or sludge) to remove contaminants and eliminate future exposure concerns will be evaluated only for pipelines with confirmed integrity so there

is no risk of residual waste being released into the environment. An alternative to flush that will be considered includes hydraulically activated pipeline pigging.

3.10.5 Containment under a Planned Barrier

Evaluation of remedial alternatives for pipeline system waste sites will consider their geographic association with the structures/facilities that will have, or are anticipated to have, engineered surface barriers as a remedy, such as the Canyons. Focused remedial alternatives will be considered for areas where the use of a barrier may be proposed for remedial actions that will be undertaken to remediate facilities (SST Farm Systems, Canyon facilities, and/or other waste sites). These alternatives may also serve to remediate pipeline system waste sites that are co-located under the barrier. The final disposition of pipeline system waste sites in proximity to these facilities will be made in association with remedial decisions for WMA or Canyon OU.

3.10.6 Removal of Pipeline System Waste Sites Versus Pre-ROD Characterization

DOE and Ecology have agreed to utilize a conservative approach to the remediation of pipeline system waste sites and have expressed an initial preference to remove potentially contaminated pipeline and pipeline component waste sites to a pre-agreed upon depth. This approach is based upon protection of the direct contact human and ecological receptors associated with the reasonably anticipated future land use (i.e., industrial-exclusive with ICs). This approach would also apply to contamination in the soil (associated UPRs) that is within the same pre-agreed upon depth. The rationale for the specified depth will be presented in the 200-IS-1 OU RFI/CMS/RI/FS document. For the vadose zone contamination deeper than the depth to be protective of human and ecological receptors, the RFI/CMS/RI/FS will also evaluate if there is a potential threat to groundwater. If a threat to groundwater is identified, additional alternative remedies will be evaluated.

This approach will streamline the remedy selection process by avoiding costly and time consuming investigation in an attempt to justify leaving the near-surface pipeline system waste sites in place. DOE believes that with the reasonably foreseeable land use of the Inner Area being Industrial, the depth to protect human and ecological receptors can be less than 4.6 m (15 ft) with ICs. Removal of near-surface 200-IS-1 OU pipeline system waste sites occurring within a prescribed depth <4.6 m (15 ft) as a post-ROD remedy would be preferable to attempting to trying to characterize these waste sites.

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4 Work Plan Approach and Rationale

This chapter describes the approach for coordinating the CERCLA and RCRA regulatory requirements for the 200-IS-1 OU. It also provides the approach for the screening and evaluation of the remediation alternatives. The information needs for pipeline system waste sites and the field data collection to be performed during remedy implementation are also identified. The regulatory approach presented in this Work Plan is compliant with implementation of the CERCLA process as well as the RCRA closure and corrective action processes. The preliminary alternatives described in Chapter 3 will be evaluated and compared against CERCLA screening criteria in the 200-IS-1 OU RFI/CMS/RI/FS document.

A decision logic has been developed to identify the initial remediation criteria to be used for the evaluation of more than 160.9 km (100 mi) of pipeline, various pipeline components, and associated UPRs in the Inner Area. Because of the vast expanse of the 200-IS-1 OU pipeline system, it would be impractical to conduct an extensive field characterization program that would reduce all uncertainty and ensure a complete determination of the nature and extent of contamination before a remedy decision is made. The remedial evaluation process can move forward using existing characterization data and process information. Therefore, DOE proposes a streamlined approach for making remedial decisions for the 200-IS-1 OU.

Remedy selections will be made using existing information. Confirmatory and verification sampling and characterization will be conducted in conjunction with the implementation of remedial actions. The post-CAD/ROD confirmatory characterization data obtained from waste site remediation removals will be evaluated to determine if the waste site aligns with the CSM used in the CMS/FS for remedy selection. If it is determined that the confirmatory sampling data for the waste site does not support the remedy selection CSM, the waste site would then be "plugged in" to a different, more appropriate CSM and its associated remedy. Portions of those 200-IS-1 OU pipeline system waste sites that are in the immediate proximity of a Canyon OU or tank farm WMA will be re-assigned to those facilities to optimize remedy and closure decisions.

4.1 Approach to Coordinating Regulatory Requirements

R-CPP waste sites will be remediated through the agreed to processes and activities described in Section 7 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b). Coordination of closure requirements, for the 200-IS-1 waste sites that are RCRA TSD ancillary equipment, and remedial action requirements, for the remaining 200-IS-1 OU waste sites, will be defined and agreed to between the Tri-Parties. This will optimize cleanup of the 200-IS-1 OU and ensure compliance with all applicable requirements.

4.1.1 RCRA TSD Closure and Corrective Action Coordination with CERCLA RI/FS Evaluations

RCRA TSD ancillary equipment closure actions and corrective action requirements for releases to soil that are associated with TSD ancillary equipment will be performed in accordance with requirements described by Ecology in the Hanford Facility RCRA Permit (WA7890008967, 2007). RCRA TSD closure and corrective action requirements will be coordinated with the 200-IS-1 OU CERCLA RI/FS evaluations. Coordinating RCRA closure/corrective actions and CERCLA remedial actions allows for the streamlining of cleanup options to meet both TSD closure and remedial action requirements (Figure 4-1). This approach to achieving regulatory requirements will facilitate reaching consistent remedy decisions and coordinating the timing of decisions under the two regulatory processes of RCRA and CERCLA. Thereby, the remedial design and implementation activities will be consistent and can be concurrently performed for both past-practice and TSD pipeline systems within the same geographic cleanup area. To optimize remedy selection and implementation further, those segments of pipelines and pipeline

components that are within canyons and tanks farms remediation areas will be addressed as part of the respective Canyon OUs remedies or tank farm WMA closure actions.

The Tri-Party Agreement (Ecology et al., 1989a) states that the integration of RCRA corrective action and CERCLA remedial action activities should be conducted whenever practicable. As stated in the Tri-Party Agreement (Ecology et al., 1989a), Part One, Article IV:

> *...the Parties intend to integrate DOE's CERCLA response obligations and RCRA corrective action obligations which relate to the release(s) of hazardous substances, hazardous wastes, pollutants and contaminants covered by this Agreement. Therefore, the Parties intend that activities covered by Part Three of this Agreement will achieve compliance with CERCLA 42 U.S.C. Section 9601 et seq.; will satisfy the corrective action requirements of the HWMA, Sections 3004(u) and (v) of RCRA, 42 USC Section 6924(u) and (v), for a RCRA permit, and Section 3008(h), 42 U.S.C. Section 6928(h); and will meet or exceed all applicable or relevant and appropriate federal and state requirements to the extent required by Section 121 of CERCLA, 42 U.S.C. Section 9621.*

The Tri-Parties have developed a specific process for integrating the regulatory authorities for CERCLA and RCRA in Section 5.0, Interface of Regulatory Authorities, of the Tri-Party Agreement Action Plan (Ecology et al., 1989b). Section 5.4 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b), Management of Past-Practice Units, describes the rationale for placing units in either a RCRA-CERCLA or a CERCLA past-practice category for corrective action; it is stated that:

> *Section 121 of CERCLA, with provision for waivers in a limited number of circumstances, requires that remedial actions attain a degree of cleanup that meets "applicable or relevant and appropriate Federal and State environmental requirements" (ARAR). Accordingly, (1) all State-only hazardous wastes will be addressed under CERCLA, and (2) RCRA standards for cleanup or TSD requirements (as well as other applicable or relevant and appropriate Federal and State regulations) will be met under a CERCLA action (See Section 7.5 for further discussion of cleanup requirements). This eliminates many discrepancies between the two programs.*

This Section of the Action Plan goes on to state:

> *The R-CPP authority will generally be used for operable units that contain significant TSD units and/or lower priority past-practice units.*

The 200-IS-1 OU includes a large number of TSD units and/or low priority past-practice units; therefore, this OU will be addressed under the R-CPP provisions of the Hanford Facility RCRA Permit (WA7890008967, 2007).

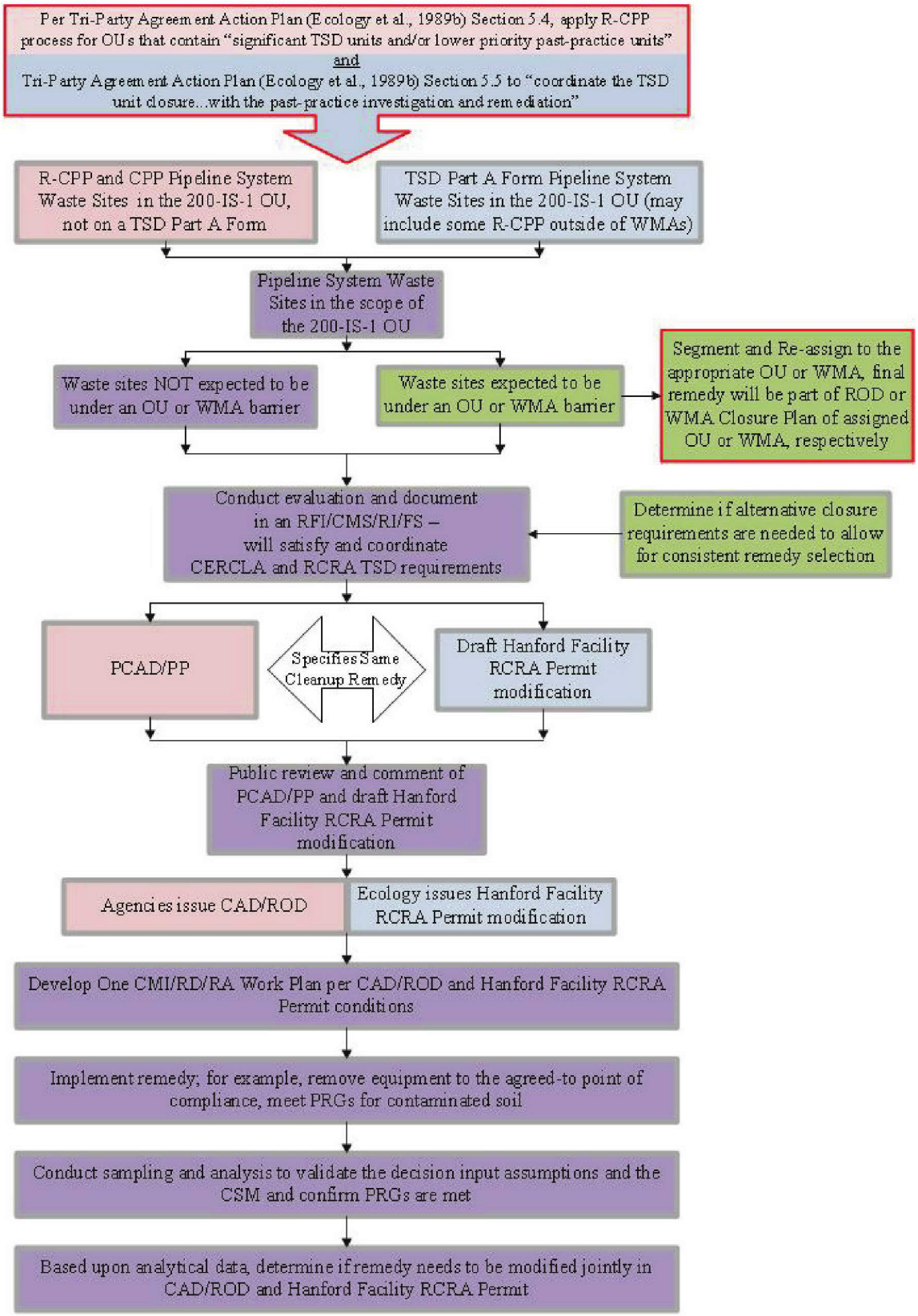

Figure 4-1. 200-IS-1 Operable Unit Proposed Remediation Process

4.1.2 Interface between TSD Units and Past-Practice Units

In some cases at the Hanford Site, such as with the 200-IS-1 OU, TSD units are closely associated with past-practice units, either geographically or through similar processes and waste streams. Section 5.5 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b) describes the interface between TSD units and past-practice units. This section defines the process for coordinating the TSD unit closure or permitting activity with the past-practice investigation and remediation activity to prevent overlap and duplication of work, thereby economically and efficiently addressing the contamination.

A single 200-IS-1 OU RFI/CMS/RI/FS document will be prepared. The information necessary for performing RCRA closures/post closures and corrective actions within the 200-IS-1 OU will be presented in the 200-IS-1 RFI/CMS/RI/FS document. R-CPP waste sites will be remediated through the processes described in Section 7 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b).

The TSD closure portion(s) of the 200-IS-1 OU RFI/CMS/RI/FS will be structured so that RCRA closure requirements can be readily identified for a separate review/approval process and for subsequent incorporation into the RCRA Permit through the modification process. A separate, stand-alone closure plan is not anticipated.

The PCAD/PP would be available for public comment in parallel with the public comment period for the RCRA permit modification. Following the comment period on the proposed permit modification and the PCAD/PP, the CAD/ROD and RCRA permit modification will be issued.

The selected closure/post closure activities, corrective and remedial actions, and associated design details for both the TSD units and the non-TSD R-CPP waste sites in the 200-IS-1 OU will be presented as part of the CMI/RD/RA WP. The proposed closure/post closure and remedial activities contained in the CMI/RD/RA WP will:

- Address compliance with RCRA closure performance standards, RCRA corrective action, and CERCLA remediation requirements
- Be consistent with requirements specified in the Hanford Facility RCRA permit (WA7890008967, 2007)
- Provide for coordination of the recommended closure/post-closure activities and remedial action(s)

The SST System TSD ancillary equipment outside of the tank farm WMA in both the 200 West Inner Area and 200 East Inner Area will be closed following the detailed closure information in the CMI/RD/RA WP to ensure consistency in the implementation of closure actions with the remedial decision documented in the CAD/ROD and RCRA permit.

If TSD units need to be deleted from or added to the scope of the 200-IS-1 OU at a later date, the CAD/ROD and RCRA permit would be modified to reflect these changes.

4.1.3 NEPA and SEPA Requirements

Under DOE's CERCLA NEPA policy, DOE relies on the CERCLA process for review of actions to be taken under CERCLA (i.e., no separate NEPA document or NEPA process is ordinarily required). SEPA (RCW 43.21C) is the State of Washington's regulation that describes activities requiring determination of significance or non-significance as part of the State approval and authorization process. This process allows for adopting other environmental documents in lieu of a State-prepared document to support the determination of significance or non-significance. Ecology will make a decision during development of the RFI/CMS/RI/FS as to whether the information is going to be sufficient to make a determination on the

TSD closure actions and to support a permit modification. The coordination of CERCLA remediation and RCRA closure and corrective action processes to be used for the 200-IS-1 OU provides for the integration of NEPA values. NEPA documents the potential environmental impacts of the actions that are considered in the remedy evaluation process. If necessary, the content of the RFI/CMS/RI/FS document will provide supplemental information to ensure compliance with NEPA.

4.1.4 DOE O 435.1 Waste Determination

DOE requires assessment of the wastes in the 200-IS-1 OU pipeline system waste sites to determine if the pipelines, pipeline components, and associated residual waste are suitable for near-surface disposal on the Hanford Site, or for disposal at an offsite geologic repository. The steps to conduct this assessment at the Hanford Site are defined in DOE O 435.1. The WIR process described in DOE O 435.1 identifies the criteria to be used to conduct this assessment and make the necessary determination. DOE will utilize the CERCLA process to document that it has met its obligations under DOE O 435.1. The CERCLA BRA process discussed in Chapter 3 will be followed and will include all receptor pathways to complete the DOE O 435.1 analysis.

Information concerning the process waste streams that were conveyed through the pipeline systems will be assessed to determine if the waste stream meets the definition of high-level waste (HLW). Data to support this assessment will be identified and assembled during the development of the RFI/RI data package for the 200-IS-1 OU. Available process history information and existing characterization information on the 200-IS-1 OU pipeline system process waste streams and residual waste will be used in the assessment.

Some residual waste and associated pipelines and pipeline components may be eliminated by the determination because they are found not to be HLW. For any pipelines that may have potentially conveyed HLW, WIR Citation Process would be used to establish the waste classification and suitability for disposal. The historic process information would be used to justify the applicability of the WIR Citation Process. Remaining pipelines and pipeline components with radiological residual waste will be identified as either low-level waste (LLW), low-activity waste (LAW), or TRU waste. LLW and LAW would be candidates for near-surface disposal on the Hanford Site, as identified and included in the remedial alternative evaluations.

4.2 Alternative Evaluation and TSD Closure Performance Standards

Chapter 3 of this Work Plan presented a preliminary list of remedial alternatives for the 200-IS-1 OU pipeline system waste sites. An RFI/RI data package will be prepared as a product of this Work Plan (further described in Section 4.3) to provide information that includes the burial depth of pipelines and pipeline components. Those waste sites that are within a prescribed and agreed-upon depth will be candidates for removal. The alternative evaluation will be documented in the 200-IS-1 OU RFI/CMS/RI/FS. Information presented in the pipeline system RFI/RI data package will also be used to support post-decision CMI/RD/RA WP implementation and confirmatory sampling characterization. The data package will include the information needed to complete the pipeline remedial alternative logic (Section 4.2.3.2), and results will be integrated into the 200-IS-1 OU CMS/FS and PCAD/PP.

The technical and regulatory approach to complete the remedial alternative evaluation and remedy selection process addresses the two types of pipeline system waste sites that collectively make up the 200-IS-1 OU:

1. The pipeline system wastes sites associated with process operations facilities and liquid waste disposal sites that will be addressed through the CERCLA process (for radionuclide and nonradiological constituents)

2. The tank farm ancillary equipment and associated UPRs located outside of the tank farm WMAs that are part of the SST waste transfer system that will be addressed through both the CERCLA process (for radionuclide constituents) and RCRA corrective action (WAC 173-303-640, "Dangerous Waste Regulations," "Tank Systems") and TSD closure processes (for nonradiological constituents)

The radiological and nonradiological constituents that are associated with these two types of pipeline system waste sites are discussed in Chapter 3.

4.2.1 R-CPP Alternative Evaluation using CERCLA Criteria

Remedial alternatives will be evaluated against the following CERCLA criteria (40 CFR 300.430(e)(9)(iii), "Remedial Investigation/Feasibility Study and Selection of Remedy"):

- Threshold criteria:
  - Overall protection of HHE
  - Compliance with ARARs
- Balancing criteria:
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume through treatment
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying criteria:
  - State acceptance
  - Community acceptance

All remedial alternatives being evaluated must meet the first two threshold criteria. The five balancing criteria are used to assist in the selection of the most appropriate remedial alternative. The threshold and balancing criteria are presented in the PCAD/PP, which are submitted for public review. The two modifying criteria are then used, following public comments on the PCAD/PP, to help finalize the selection of a remedial alternative. The modifying criteria, along with threshold and balancing criteria, are documented in a CAD/ROD. As indicated previously, the RCRA corrective action process to address RCRA past-practice releases will be satisfied through the CERCLA process.

4.2.2 TSD Closure Alternative Evaluation Using RCRA Performance Standards

The 200-IS-1 OU RFI/CMS/RI/FS document will address the RCRA closure performance standards (WAC 173-303-610(2), "Closure and Post-Closure") for the SST System TSD ancillary equipment waste sites and align remedial alternatives with the RCRA closure requirements. These standards require closure of TSD unit components in a manner that achieves the following objectives:

- Minimize the need for further maintenance.
- Control, minimize, or eliminate, to the extent necessary, to protect HHE, post-closure escape of dangerous waste, dangerous waste constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, groundwater, or the atmosphere.
- Return the land to the appearance and use of surrounding land areas to the degree possible, given the nature of the previous dangerous waste activity.

Where closure requirements specify removal or decontamination of dangerous wastes, waste residues, or equipment, soils, or other materials containing or contaminated with dangerous wastes or waste residue, then removal or decontamination must ensure that the levels of dangerous waste or dangerous waste constituents or residues do not exceed cleanup levels and/or closure standards.

4.2.3 Remedial Alternative Screening and Assumption for Alternative Development and Evaluation

All waste sites will be evaluated through the CERCLA process using a coordinated approach that is responsive to RCRA corrective action and supports TSD closure requirements. Sections 4.2.1 and 4.2.2 present the processes to complete these evaluations. This coordinated approach will streamline and optimize the remedial alternative evaluation, decision making, and closure of pipeline system waste sites associated with the 200 Area facilities process operations and the tank farms waste transfer operations.

As part of the development of alternatives, DOE will define one or more alternatives based upon the following assumptions:

- Clean closure would remove all 200-IS-1 OU hardware, including the removal of associated contaminated soil, to a depth of 4.6 m (15 ft), or until PRG concentrations are achieved.
- Removal of pipeline system waste sites to a depth of about 3 m (10 ft).

In the CMS/FS, DOE will present a rationale for an alternative point of compliance based upon the following:

  - Site-specific work on the biologically active zone and biointrusion information for the Central Plateau on the Hanford Site
  - A depth of protection for the industrial worker in the Inner Area under the reasonably anticipated industrial land use and the application of ICs, which is expected to be consistent with the ecological protection depth
  - Available characterization and remediation experience
  - Radiological logging data, collected as part of the characterization completed for the process operations facility pipelines (SGW-39648), indicates that a removal alternative would be appropriate for many of the pipelines evaluated that where within a depth of about 3 m (10 ft)
  - Experience gained in the 100 Area remediation processes which supports a bias for removal

4.2.3.1 Approach to Vadose Zone Transport Modeling

A vadose zone transport model, approved by the Tri-Parties, will be used to assess potential threats to groundwater that would result from residual waste that may be present within the pipeline or pipeline components. In addition, specific conditions have been documented, which are associated with pipeline failures that have led to UPRs. These situations include accelerated corrosion due to a lack of cathodic protections, joint failure due to connecting incompatible piping, accelerated corrosion due to accumulation of caustic or acidic residuals, and use of certain piping materials that are prone to leaking (vitrified clay pipe). Information concerning the known pipeline failures, along with information on plugged pipelines, will be reviewed and used as a basis to evaluate the balance of the pipeline systems for similar conditions and to identify locations with high potential for a release to have occurred. As part of the pipeline system RFI/RI data package, these locations or sections of pipeline will be identified as candidates for further characterization during remedy implementation. To confirm and update contaminant assumptions, validate the transport modeling input parameters, and ensure that the

remediation decision is protective, confirmatory characterization will be performed as pipelines and pipeline components are removed during remedy implementation. These data will be evaluated to determine whether additional removal of pipelines, pipeline components, and/or soil is warranted. The requirements for remedial action characterization will be specified in the CMI/RD/RA WP document.

4.2.3.2 Pipeline System Remedial Alternative Logic

A remedial alternative logic has been developed that focuses on breaking the receptor exposure pathways and reducing risk (Figure 4-2). Process waste stream information, together with pipeline systems attributes, will be used to identify those pipelines, pipeline components, and associated soils that would likely pose an anticipated risk to human or ecological receptors. Using this approach, an initial remedy preference will be identified for each pipeline, pipeline component, and associated UPR and then further refined (if needed) as part of the CMS/FS alternative analysis. The potential remedial alternatives to be evaluated in the CMS/FS are discussed in Section 3.9. During subsequent remedial action implementation (i.e., post-CAD/ROD), confirmatory sampling results will be used to validate the decision input assumptions and the CSM.

Based upon the anticipated and known configuration of contamination, pipeline component waste sites would have focused characterization as part of post-CAD/ROD remedy implementation. Inspections, characterization, and potential remedial actions for these waste sites are organized into the following types, based on their physical attributes and the anticipated configuration of waste:

- **Diversion Boxes.** Based upon process knowledge, residual waste in diversion boxes will be contaminated pipes and jumpers. Contamination within the interior of the diversion box will be encountered, but retrievable quantities of process waste are not expected because releases for the most part would have drained through the sump pit in the bottom of the box to a catch tank. Prior to remediation of a diversion box, a visual inspection would be conducted to support remedial design and implementation.

- **Catch Tanks.** Catch tanks were periodically pumped out, and some have been interim stabilized. Free liquids have been removed, but solids/sludges remain in some tanks. Other tanks have accumulated sand and rain water that infiltrated through diversion boxes or other means. As part of remedial design, a tank waste retrieval work plan (TWRWP) will be prepared that will define residual waste sampling requirements, evaluation of waste retrieval technologies, and retrieval deployment. Based upon the sample results, a final disposal pathway for the retrieved residual wastes will be defined. Following retrieval, it is anticipated that catch tanks would be remediated in association with the diversion box and associated piping.

- **Diverter Stations/Vaults.** Diverter stations/vaults would be inspected, sampled, and remediated in the same manner as diversion boxes and catch tanks.

- **Double-Contained Receiver Tanks.** DCRTs would be inspected, sampled, and remediated in the same manner as diversion boxes and associated catch tanks.

- **Valve Pits.** Valve pits/boxes would be inspected, sampled, and remediated as part of the pipeline remediation.

- **Other Control Structures.** Other control structures include weirs, distribution boxes, and seal pots. These other control structures would be inspected, sampled, and remediated as part of the associated pipeline remediation.

Figure 4-2 presents the remedial alternative logic for identifying preferred remedial alternatives for the pipeline system waste sites. Both pipeline systems hardware and surrounding soils are addressed within this framework.

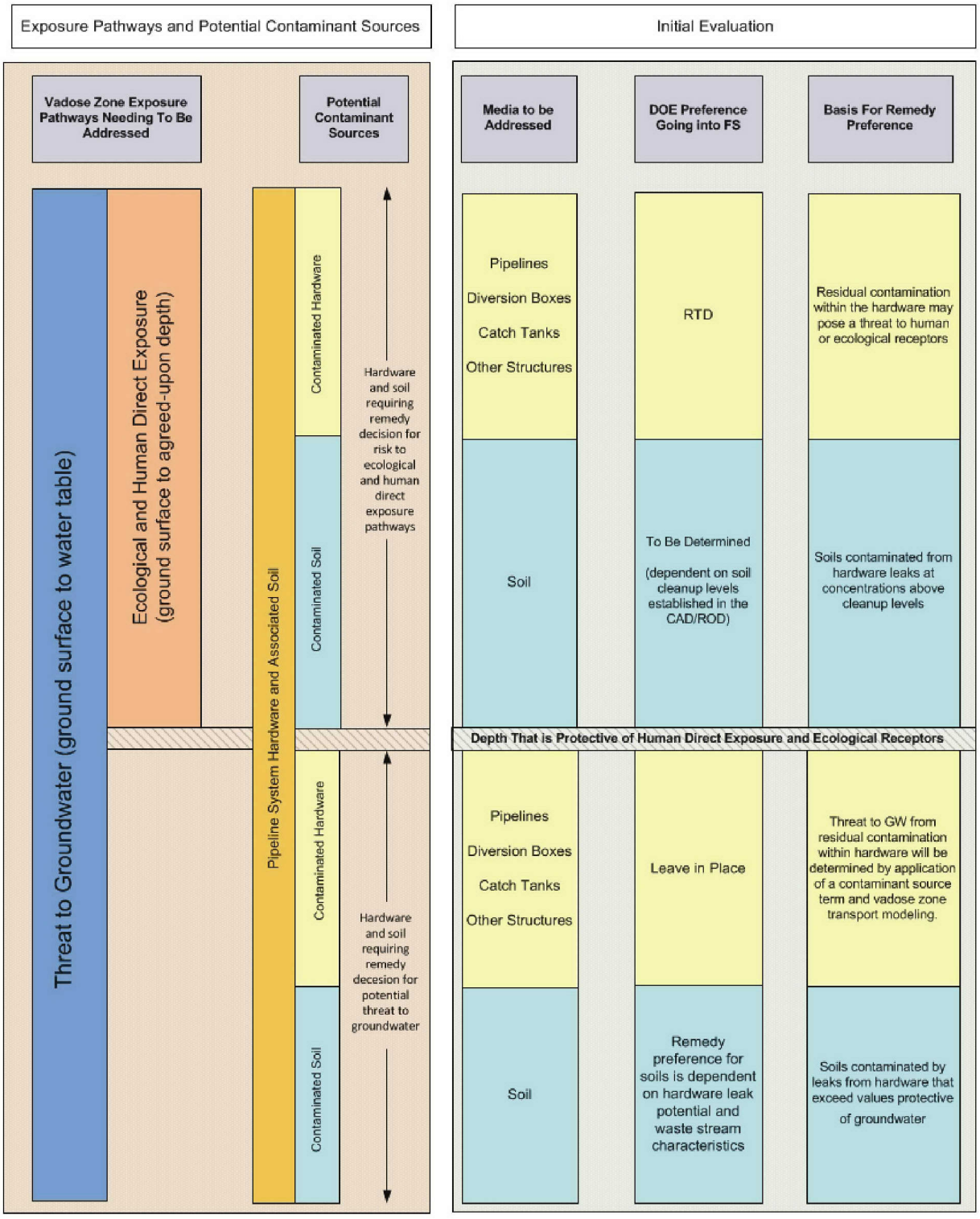

Figure 4-2. Pipeline System Waste Sites Remedial Alternative Logic

The logic indicates the general criteria to be used in identifying pipeline systems and soil waste site remedial alternative preferences. The following information gathering tasks and evaluations will be completed to support this remedial alternative logic:

- Defining the waste stream characteristics (radiological and chemical constituents) associated with each pipeline system waste site
- Determining pipeline and pipeline component construction materials
- Determining if the burial depth of a pipeline or pipeline component is within the human health direct exposure or ecological exposure pathway depth range
- Determining if residual contamination in a pipeline, pipeline component, or potential prior leaks to surrounding soil could pose a threat to groundwater
- Determining if the entire pipeline/pipeline component or a portion of a pipeline/pipeline component will likely be under the footprint of a protective barrier (for the purposes of assignment to SST WMAs or Canyon OUs)

This information, which will support the evaluation of pipeline system waste sites, will be presented in the pipeline system RFI/RI data package and used as input to alternative development and evaluation in the CMS/FS. In addition to being used for the alternatives evaluation, the information will also support the subsequent development of the CMI/RD/RA WP documents.

4.3 Information Needs for Pipeline Systems

In order to complete the pipeline system RFI/RI data package and the remedial alternative evaluations, additional information on the construction and operation of the pipeline systems is needed. Additional information needs and activities to be completed include the following:

- An inventory of the location, number, size, and length of the pipelines and pipeline components occurring within the Inner Area of the Central Plateau.
- The burial depth of each pipeline and pipeline component.
- Structural characteristics and other physical attributes of pipeline systems that may influence leak potential.
- The process waste streams that were handled by each pipeline and pipeline component.
- Analytical results for sampling completed at the liquid discharge sites (including ponds, cribs, ditches, and tanks) that are connected to the pipelines.
- Residual waste volume, concentration, and inventory information for the SST pipeline system that has been developed as part of the closure planning for tank farm WMAs and associated performance assessments.
- Clear definition of the applicable waste classification and waste disposal pathways for pipeline system equipment and hardware.
- Identification of the vadose zone transport model to be used and establishment of input parameters for the model application. The vadose zone transport model will be used to determine the potential threats to groundwater if residual waste remains within a pipeline system waste site.

4.3.1 DQO Process for Post-ROD Confirmatory and Verification Sampling Cost Estimating

Concurrent with the preparation of the RFI/CMS/RI//FS, DOE will utilize the DQO process to ensure that cost estimates developed for post-CAD/ROD remedial alternatives, including confirmatory and verification sampling, meet EPA CERCLA cost estimating requirements (EPA 540-R-00-002, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*). This guidance specifies that cost estimates of remedial alternative activities provided in FS reports should clearly present the following information:

- Expected accuracy range of the cost estimate (e.g., -30 to +50 percent for detailed analysis of alternatives)
- Source references for quantity and unit cost information
- Contingency to account for possible cost overruns
- Basis for applied contingency
- Costs for professional and technical services
- Period of present value analysis (e.g., 50 years)
- Basis for period of present value analysis (e.g., time required to achieve RAOs)
- Discount rate used in present value analysis (e.g., 7 percent)
- Basis for discount rate used in present value analysis (e.g., per EPA policy)
- Major assumptions and sources of uncertainty in the overall estimate
- Analysis of sensitivity of cost estimate to uncertain factors
- Logical and organized presentation of cost estimate summaries and detailed backup information

The confirmatory and verification sampling cost estimate DQO process will utilize the existing 200-IS-1 DQO report (D&D-30262) to define the DQOs in this activity.

4.3.2 Information Uses

The information gathered and evaluations completed in conjunction with use of the remedial alternative logic (Figure 4-2) will be presented in a pipeline system RFI/RI data package. The locations of pipelines and pipeline components that are buried at depths within the human health direct exposure and ecological exposure pathways will be identified. To complete the CMS/FS, the burial depth of the pipelines is a primary characteristic to be used for developing one or more removal alternatives.

It is likely that portions of protective barrier systems designed for adjacent wastes sites, facilities or WMAs (e.g., Canyon facilities and tank farm WMAs) will overlie some 200-IS-1 OU waste sites. The locations of those pipeline system waste sites that will likely be within the effective footprint of a planned protective barrier system will be defined. If a pipeline system waste site only partially occurs within a Canyon OU or tank farm WMA, it will be segmented. A modified WIDS waste site code will be assigned to each segment. For those pipeline system waste sites considered to be part of a canyon facility or tank farm WMA, the remedial decision will be made as part of the facility or WMA decision process and not as part of the 200-IS-1 OU.

Existing information concerning the process waste streams handled by each pipeline and pipeline component, the pipeline or pipeline component configuration (i.e., layout and routing), and any

contaminants detected at associated process stream receiving waste site, will be compiled and used in the remediation decision approach.

Contaminant source terms for residual waste that may be associated with each of the pipeline system hardware types (i.e., pipelines, diversion boxes, and catch tanks) will be developed using the information gathered for the pipeline system RFI/RI data package. These contaminant source terms will be used to conduct a variety of evaluations. One evaluation will determine risk posed by source releases to direct exposure pathways for human and ecological receptors, which will be derived through risk calculations. Another evaluation will determine the threat to groundwater through using vadose zone transport modeling. Potential input parameters, used for the vadose zone transport model and the potential threats to groundwater analysis, will include the following pipeline or pipeline component features, as applicable: diameter, depth, dimensions, location, process wastes handled, and assumed mass and concentration (e.g., Ci/kg, pCi/g, or mg/kg) of residual contaminants.

Source terms will be developed and applied as appropriate to those waste sites that handled similar process waste streams. For purposes of vadose zone transport modeling and analyzing potential threats to groundwater, direct discharge to the soil (i.e., no long-term or prolonged containment of waste) will be assumed as the potential release mechanism for contaminants. Physical attributes, such as structure type (e.g., catch tank, diversion box, valve pit, or pipeline), known or potential residual waste content, depth, size, and materials of construction will be used in the CMS/FS alternative evaluation. An additional use of source term and process history information is for assessment of potential waste classification determinations and associated waste disposal pathways for pipeline system hardware that may be removed as part of remediation implementation.

The extent of contamination in the surrounding soil due to releases from pipeline and pipeline component waste sites will be evaluated during the removal process and documented. Confirmatory sampling results will be obtained during waste site remediation activities to validate CMS/FS assumptions and the CSM.

4.3.3 Information Sources

For most of the process waste pipeline systems, information is available concerning size, burial depth, location, construction design, type of waste received or distributed through the pipeline or pipeline component, and regulatory status (i.e., past-practice versus TSD). This information currently resides in multiple databases, documents, reports, maps, and construction drawings. Information will be collected at the Hanford Site from readily accessible sources.

Information sources used to identify pipeline system waste sites that are considered part of the 200-IS-1 OU included Appendix C of the Tri-Party Agreement Action Plan, WIDS, tank farm pipeline databases, the SST System Part A Form (WA7890008967, 2010), and RPP-PLAN-41977. Additional information sources to be reviewed for pipeline systems are Hanford Site construction drawings.

Process waste stream information will be obtained from WIDS, existing process waste stream OU and SST tank system documents, the Soil Inventory Model (SIM), and TWINS. Process facility waste stream information, the tank farm Best Basis Inventory, and tank retrieval sampling data will be used for the contaminant mass and concentration assumptions needed as source term input in the vadose zone transport model and to support alternative cost estimates.

The location, configuration, and other pipeline system physical attributes data that are required will be collected from historical facility maps, construction drawings, and the WIDS database. The WIDS waste site data repository for pipeline system information is tied to MapMax, a geographic information system (GIS) attribute database. MapMax contains physical attribute information such as geographic location coordinate data, pipeline segment lengths, construction materials, and pipeline invert elevations.

Hanford's GIS-based Intranet geospatial map portal, known as QMap (for Query Map), displays pipeline locations and selected attribute information. QMap enables computer access and search capabilities for viewing locations of waste site pipelines and pipeline components. Within WIDS and QMap, pipeline system waste sites are accounted for by assignment of a WIDS site code. Site codes will be utilized to track pipeline system inventory and attribute data. Information will be extracted from the WIDS and MapMax databases for incorporation into the pipeline systems data package. Tank Farms TSD unit Part A Permit application forms, TSD closure strategies/plans, facility remediation boundaries, Inner Area OU boundaries, and existing agency/company agreements (if any), will be used to delineate pipeline system remedy implementation responsibilities.

4.4 Documentation of Remedy Selection

Proposed remedies for pipeline system waste sites will be presented in the 200-IS-1 OU PCAD/PP document. The PCAD/PP will present the proposed remedial decisions for 200-IS-1 OU waste sites, including the TSD ancillary equipment outside the WMAs in both the West Inner Area and East Inner Areas. Remedial decisions for past-practice and TSD pipeline system waste sites assigned to the Canyon OUs and tank farm WMAs will be addressed by those decision/selection processes, respectively.

A draft modification of the Hanford Facility RCRA Permit (WA7890008967, 2007) will also be developed, with unit-specific permit conditions for RCRA past-practice pipeline system waste sites and the applicable SST System RCRA TSD ancillary equipment waste sites. RCRA TSD unit-specific conditions will be identified in the CMS/FS. As such, the proposed permit modification will be prepared to implement unit-specific closure actions.

The PCAD/PP and proposed permit modification will undergo public review and comment, respectively. The public will be given an opportunity to review and comment on the proposed permit conditions and the PPs. Supporting documents, including the CMS/FS/RFI/RI, will be made available to the public for review. Public meetings/hearings would be held during the comment period to provide information on the proposed action and permit modification and to solicit public comment.

After the public comment period for the PP has ended, responses to public comments will be developed, and the 200-IS-1 OU CAD/ROD will be prepared. If necessary, revisions to the proposed Permit modification will be made based upon public comments.

The CAD/ROD will include content allowing for use of a "plug in" approach as well as evaluation of the applicability of a contingent or alternate remedy. The CAD/ROD will identify remedies based on the site characteristics and the waste site CSM. If it is determined that a new waste site is to be added that is sufficiently similar to, or comparable with waste sites for which the alternatives have already been developed and analyzed, then the new site will be assigned into that group's remedial decision. Confirmatory sampling may be required to determine whether a particular waste site fits the comparable site criteria. The "plug in" approach eliminates the time and cost required to produce multiple, redundant site-specific RFI/CMS/RI//FS documents or CAD/ROD modifications.

4.5 Remedy Implementation

After issuing the 200-IS-1 OU CAD/ROD, a CMI/RD/RA WP will be developed (Figure 4-1). The CMI/RD/RA WP will contain the required information concerning design and implementation of the selected remedies and closure actions, confirmatory and verification sampling of waste sites, and RCRA TSD units and ancillary equipment closure requirements which will support a proposed permit modification. Before remediation begins, data necessary for the remedial design will be obtained. As part of this activity, DQOs will be established and SAPs will be prepared to support final design and implementation requirements,

including confirmatory and verification sampling and analysis. A TWRWP will be developed to support the catch tank and other IMUST data collection that will be used in selecting the appropriate residual waste retrieval technology.

The CMI/RD/RA WP will contain an integrated schedule of remediation activities and will satisfy the requirements for a past-practice CMI Work Plan and subsequent RD reports, if needed. The CMI/RD/RA WP, along with proposed Tri-Party Agreement milestones, will be submitted 180 days after the CAD/ROD is signed. Remediation activities will be designed to ensure integration and coordination of Inner Area cleanup activities. Following completion of the remediation/closure, closeout activities will be performed as specified in the CMI/RD/RA WP, and the Hanford Facility RCRA Permit (WA7890008967, 2007).

The RCRA closure activities and schedules will be defined in the modified Hanford Facility RCRA Permit. Certification of closure, in accordance with WAC 173-303-610(6), will be performed after cleanup and closure actions are complete.

4.5.1 Data Collection During Remedy Implementation

Data collection during the remediation of pipeline system components will be specifically identified in the CMI/RD/RA WP and would include the following activities:

- Radiological screening of soil that is excavated to reach and remove buried pipeline and pipeline components
- Radiological screening of the exposed exterior of structures
- Visual inspections of the interior of pipelines and pipeline components, to the extent practical, either by personnel inspection or by remote video equipment
- Sampling and analysis of pipeline and pipeline component residual wastes

Catch tank and other IMUST waste will be characterized as part of any residual waste retrieval prior to final remediation of the tank. Retrieval planning would be developed as part of the CMI/RD/RA WP.

During the pipeline system remediation, field investigation reports will be prepared to document the activities performed and information collected. Reports will include observations made on the integrity of the pipeline systems, the quantities and types of samples collected and associated HEIS database numbers, and laboratory and field sampling results.

The field investigation reports will include an assessment of the risks the 200-IS-1 pipeline system waste sites pose to humans through direct contact, the risks to ecological receptors, and the threat to groundwater. Based on the findings, one of the following determinations will be made:

- Residual waste in pipeline system waste sites does not pose a threat to HHE through direct contact, and no further removal is required.
- Residual waste in certain pipeline system waste sites poses a threat to HHE through direct contact, and further remedial actions may be required for those pipelines.
- Residual waste in pipeline system waste sites does not pose a threat to HHE through direct contact, but does pose a threat to groundwater. Additional evaluation will be performed, as required, to determine the correct remedial action to protect groundwater.

The purpose of the remedy implementation sampling and analysis is to assess the risk from residual waste in the pipelines.

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5 200-IS-1 Operable Unit Tasks

This chapter describes the tasks and information needed to support remedy evaluation and selection for the 200-IS-1 OU pipeline system waste sites in the Inner Area. The information on pipeline system waste sites will be used to complete the RFI/CMS/RI/FS for the 200-IS-1 OU and support other Inner Area OU decision documents.

The information collected will be used to aid in the application of the remedial alternative logic discussed in Chapter 4. Physical attributes of the pipeline system waste sites will also be used when generating remediation alternative cost estimates. Select pipeline system attributes, along with existing waste site characteristics, will be used to establish source-term and input-parameter assumptions used for vadose zone transport modeling. This information and the modeling output will be used to determine potential threats to groundwater due to pipeline system waste sites.

As described in Chapter 4, a pipeline system RFI/RI data package will be assembled that will consist of the following:

- Pipeline system and associated UPR attributes and existing waste characteristics information assembled to support remedial alternative analysis and cost estimates in the RFI/CMS/RI/FS
- Information used to support assignment of select pipeline system waste sites for incorporation into other Inner Area OUs (i.e., Canyon OUs) or tank farm WMAs
- Information for use in evaluating pipeline system waste sites below human health direct and ecological exposure depths:
  - Establishing vadose zone modeling input parameters
  - Applying vadose zone modeling to detemine potential threats to groundwater
  - Assembling and evaluating pipeline leak potential information

Based on existing waste site information and data, along with DOE's preference to remove potentially contaminated pipeline system waste sites, additional field characterization is not identified as a data need to support remediation alternative evaluations and remedy decisions. However, confirmatory sampling of pipeline system waste sites will be conducted and documented during remedy implementation.

5.1 Task 1—Data Collection for Pipeline System Waste Sites

This section summarizes data collection, evaluation, and interpretation activities specifically related to pipeline systems and associated UPRs. The following primary activities are included:

- Completing the collection of pipeline system information (e.g., location, number, size, length, depth, material construction, and process waste stream handled)
- Identifying pipeline system waste sites that are candidates for assignment to other Inner Area OUs (i.e., Canyons) or tank farm WMAs
- Updating the contaminant distribution models for pipeline systems based on existing data
- Assessing contaminant fate and transport
- Evaluating risks

Information summaries and results of the assessments and evaluations will be provided to the appropriate Inner Area OUs. The activities that need to be completed to support remedial alternative evaluations and decisions for these waste sites are summarized in the following subsections.

5.1.1 Define Inventory, Structural Characteristics, and Other Physical Attributes of Pipeline System Waste Sites

An inventory of the pipelines and pipeline components occurring within the Inner Area (outside of the tank farm WMAs) will be assembled. Information concerning the physical attributes of the pipeline systems, such as pipeline routing, pipeline component location, construction materials (e.g., stainless steel; vitrified clay pipe; corrugated metal; carbon steel; reinforced concrete; cast iron; and welded, threaded, or sealed joints), and dimensions (e.g., depth, size, length, width, and wall thickness) will be gathered to support the development of the remediation costs presented with the remedial alternatives analyses.

Information will be compiled from engineering design drawings and surface elevation data. The majority of the pipeline system waste sites have been mapped; their locations are identified in WIDS and displayed in QMap. Some of the engineering design drawing information, including some pipeline elevations, has already been gathered and is stored in the MapMax pipeline attribute database. Current surface elevation data will be assembled, and calculations will be performed to establish the depth of pipeline burial.

Within WIDS and QMap, pipeline system waste sites are accounted for by assignment of a WIDS site code. These sites codes will be utilized when compiling and organizing pipeline system inventory and attribute data. Available data will be extracted from the WIDS and MapMax databases for incorporation into the RFI/CMS/RI/FS document. Required physical attribute information that is not available through WIDS and MapMax will be collected from Hanford Site sources, such as engineering design drawings. In addition, data quality checks will be made by accessing and reviewing the native documents, including the engineering design drawings, historic operational procedures, and job controls for operating the pipeline systems, as necessary.

5.1.2 Assemble Pipeline System Waste Stream Characteristics

This activity focuses on assembling existing information on the waste characteristics of the process effluent carried by the pipeline system waste sites. Targeted information to be compiled includes the following:

- Pipeline system history included in existing databases, released reports and studies, and readily available operational logs and memos
- The initial and subsequent uses of the various pipelines, including the evolution of waste processing campaigns and additional facilities constructed to support changing Hanford Site mission objectives
- Waste transfers into and out of process facilities and TSD facilities, including waste origin, routing configurations, and waste characteristic information (i.e., radiological and chemical process waste stream information and analytical data) for the pipeline systems and associated UPRs
- Residual waste volume, concentration, and inventory information for the related SST pipeline systems that has been developed as part of the closure planning for tank farm WMAs and associated performance assessments
- Operational procedures for conducting waste transfers, including pre-transfer and post-transfer procedures (e.g., running hot water to warm up the lines and flushing the lines post-transfer) and monitoring of these operations

- History concerning the termination of the use of the pipeline systems and their current status and condition

Waste stream data are available in several different databases. SIM and TWINS serve as primary data sources. The quality of the records and the potential for and benefit of additional record searches and evaluations will be assessed as part of this activity. Relevant information will be extracted, compiled, and presented in association with each pipeline system waste site.

Characterization data are available for many of the liquid waste disposal sites and tank farms that received process waste streams through the pipeline systems. Waste site characterization data available for key disposal sites are from previously completed investigations and studies. This existing characterization data will be compiled, and waste characterization data will be extrapolated to associated pipeline system waste sites, as appropriate. Waste site contaminant characteristic data will be utilized when applying the pipeline system remedial alternative logic.

5.1.3 Coordinate Pipeline System and Associated Unplanned Release Waste Sites Assignments with the Respective Canyon Operable Units and Tank Farm Waste Management Areas

Remedial action activities will be coordinated and implemented within the Inner Area OUs. Boundaries will be defined to distinguish responsibilities for remedial actions where pipeline system waste sites extend across Canyon OU and tank farm WMA boundaries. Waste sites will be identified as TSD ancillary equipment or past-practice waste sites, and if they are likely to be located under a protective barrier from an adjacent waste site (e.g., canyon or tank farm WMA). To facilitate coordination of responsibilities for pipeline system and associated UPR waste sites that extend from one remedy area into another, a boundary will be established to define the areas in which implementation of remedies will occur. Once boundaries are established, the Canyon OUs and tank farm WMAs will be assigned specific elements of the pipeline system waste sites which will be transferred to be evaluated in those remedial decisions and closure actions.

5.1.4 Identify Vadose Zone Transport Model and Input Parameter Values for Pipeline System Waste Sites

Pipeline system waste sites that are buried deeper than the human and ecological exposure pathways will be evaluated to determine if residual waste contents or known releases could pose a threat to groundwater. Vadose zone transport modeling utilized for liquid waste disposal waste sites will be modified as appropriate for use on the pipeline system waste sites. Modeling input parameter assumptions applicable to pipeline system waste sites will be established. Application of the transport model will be defined, and specific source term assumptions will be outlined. Source term assumptions to be developed will include defining contaminants of concern, concentration values, release volumes, and release areas. Results from the transport model will support the alternatives remedy evaluation and serve as input to remedy selection for individual pipeline system waste sites.

5.2 Task 2—Organize Waste Site Data and Information to Support Inner Area Baseline Risk Assessments

Information from Task 1 will be organized according to waste site and furnished to the Inner Area BRAs through the RFI/RI data package. This information will be reflected in the West and East Inner Area BRA documents. The information will also be used to support updates to existing WIDS waste sites and assignments to Appendix C of the Tri-Party Agreement Action Plan (Ecology et al., 1989b), in accordance with RL-TPA-90-0001, *Tri-Party Agreement Handbook Management Procedures*.

5.3 Task 3—Assess Waste Classification and Potential Waste Disposal Pathways

Information identified and assembled from Task 1 will be used to assess if the process waste stream that was conveyed through the pipeline system meets the definition of HLW. Available process history information and existing characterization information on the 200-IS-1 OU pipeline system process waste streams and residual waste will be assessed to make this determination.

Some residual waste and the associated pipelines and pipeline components may be eliminated by the determination because they are found not to be HLW. For any pipeline or pipeline components that may have potentially conveyed HLW, the WIR Citation Process would be used to establish the waste classification and suitability for disposal. The historic process information would be used to justify the applicability of the WIR Citation Process. Remaining pipeline systems with radiological residual waste will be identified as either LLW, LAW, or TRU waste. LLW and LAW would be candidates for near-surface disposal on the Hanford Site. These waste classification and suitability for disposal results will be utilized in the remedial alternative evaluations.

5.4 Task 4—Prepare Draft RFI/CMS/RI/FS Document Including TSD Closure Information to Support Permit Modification

A RFI/CMS/RI/FS report will be prepared that addresses the pipeline system waste sites within the 200-IS-1 OU. As discussed in Chapter 4, the DQO process will be used to support development of cost estimates for the post-ROD confirmatory and verification sampling. The RFI/CMS/ RI/FS will be transmitted as a Draft A version to Ecology for review per the respective milestone date identified in the Tri-Party Agreement Action Plan (Ecology et al., 1989b). Following the disposition of review comments, a Revision 0 version of the RFI/CMS/RI/FS document will be issued for use as the guiding document for completing the RFI/CMS/RI/FS and to support the PCAD/PP.

5.5 Task 5—Prepare PCAD/PP

The PCAD/PP document will be prepared for all waste sites included within the 200-IS-1 OU. This document will be transmitted as a Draft A version to Ecology for review per the respective milestone date identified in the Tri-Party Agreement Action Plan (Ecology et al., 1989b). Following the disposition of review comments, a Revision 0 version of the PCAD/PP document will be issued for use as a supporting document to the 200-IS-1 CAD/ROD.

6 Project Schedule

Table 6-1 provides the project schedule for completion of this Work Plan. This schedule was prepared using time periods outlined in the Tri-Party Agreement (Ecology et al., 1989a).

Table 6-1. Project Schedule for the 200-IS-1 Operable Unit

Activity	Duration or Finish Date
Submit Revised RFI/CMS/RI/FS Work Plan for 200-IS-1 OU, Draft A, to Ecology	12/31/11[a]
Ecology Review Work Plan	2 months[b]
Comment Resolution and Issue Final Work Plan to Ecology for Signature	3 months[c]
Submit RFI/CMS/RI/FS Report, Draft A, and PCAD/PP Document, Draft A, for the 200-IS-1 OU to Ecology[e]	30 months[d,e]

a. Satisfies Tri-Party Agreement, Milestone M-05-90, due on December 31, 2011 (Ecology et al., 1989a).

b. Target duration; assumes Ecology completes Work Plan review within 60 days.

c. Target duration; assumes resolution of Ecology's comments within a two-month period, and finalization of the Work Plan in a one-month period.

d. Includes waste classification, as appropriate, per DOE M 435.1-1, Radioactive Waste Management Manual.

e. Assumes completion of Draft A of the noted reports by December 31, 2016.

CMS = corrective measures study
Ecology = Washington State Department of Ecology
FS = feasibility study
OU = operable unit
PCAD = proposed corrective action decision
PP = proposed plan
RFI = RCRA facility investigation
RI = remedial investigation

Interim milestones may be designated under the Tri-Party Agreement (Ecology et al., 1989a) and established through negotiations among the Tri-Parties per Section 11.6 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b). For such milestones, a Class II change form would be submitted to Ecology to request the addition of any interim milestones. Any updates to the project schedule or associated milestones will be discussed at the monthly unit managers' meeting prior to implementation.

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7 Project Management Considerations

This chapter discusses project organization, project coordination, change control, and the dispute resolution processes in place while completing pipeline system data collection tasks described in Chapter 5. Issues are to be resolved at the lowest possible level, with higher levels of project oversight/support engaged, as required. Project management for pipeline system waste sites, once aligned to their respective OUs or WMAs, will be addressed by the respective OU management structure/organization and processes.

7.1 Project Organization

The DOE Richland Operations Office (DOE-RL) is responsible for cleanup on the Central Plateau. The DOE-RL contractor implements cleanup for DOE-RL and is responsible for planning, coordinating, and executing pipeline systems data collection activities. The DOE Office of River Protection (DOE-ORP) is responsible for the SST system and the SST portions of the Hanford Facility RCRA Permit (WA7890008967, 2007).

For the purposes of the Work Plan activities, the period of time addressed by the project organization extends to the point in time when the tasks described in Chapter 5 are completed. Figure 7-1 illustrates the project organization structure for completion of these tasks.

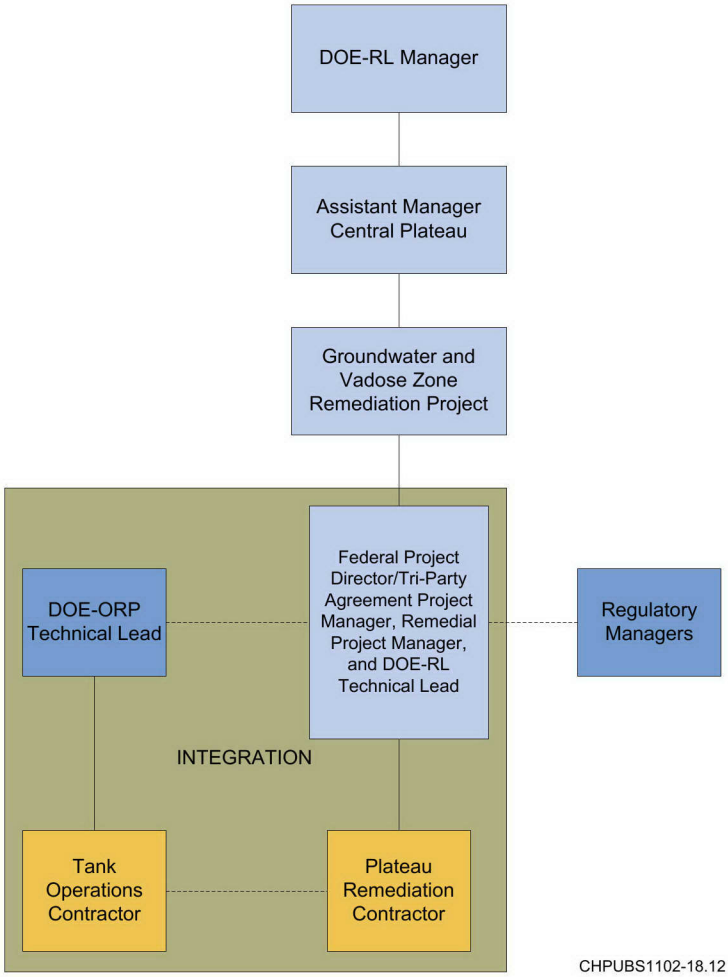

Figure 7-1. Project Organization

7.1.1 DOE-RL Project Organization

The DOE-RL Groundwater and Vadose Zone Remediation Project is responsible for completing the RFI/CMS/RI/FS process for the 200-IS-1 OU pipeline system waste sites. 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 (PRC) to perform the data collection tasks for the pipeline systems. The federal Project Director also is responsible for obtaining regulatory approval of the Work Plan. DOE-RL technical leads are responsible for day-to-day oversight of contractors performing pipeline system data collection tasks, working with the PRC, and integrating with DOE-ORP and the regulatory agencies to identify and work through issues associated with the alignment of waste sites. The technical leads also provide technical input to the DOE-RL federal Project Director.

7.1.2 Regulatory Agencies Oversight Organizations

The project managers from the regulatory agencies are responsible for working with DOE-RL to resolve issues associated with the alignment of waste sites and approve the Work Plan in accordance with Article XVI of the Tri-Party Agreement (Ecology et al., 1989a). Both EPA and Ecology will have assigned project managers who are responsible for overseeing various pipeline system related field activities, as documented in the respective OU's FS and CMS/FS documents.

7.1.3 Contractor Organization

Pipeline system data collection activities in support of the CMS/FS process are conducted by the CH2M HILL Plateau Remediation Company (CHPRC) under CHPRC Plateau Remediation Contract DE-AC06-08RL14788. DOE-RL oversight of the work performed by CHPRC is provided through the Groundwater and Vadose Zone Remediation Project's federal Project Director and the Assistant Manager for the Central Plateau.

At the direction of DOE-RL and through integration with DOE-ORP, CHPRC will coordinate with the Tank Operations Contractor, as appropriate.

7.2 Project Coordination and Documentation

Coordination among EPA or Ecology, the lead agency (DOE), and the contractors is essential for successful execution of pipeline system waste site alignment activities. 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

Changes that impact Appendix C of the Tri-Party Agreement Action Plan (Ecology et al., 1989b) 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 is documented.

Dispute resolution is handled in accordance with Article XVI of the Tri-Party Agreement (Ecology et al., 1989a). The Tri-Parties are to make reasonable attempts to resolve 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 formal

dispute resolution processes, outlined in Articles VIII or XXVI of the Tri-Party Agreement (Ecology et al., 1989a), are used.

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Appendix A

Listing of Pipeline Systems and Associated Unplanned Release Waste Sites

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Terms

DCRT	double-contained receiver tank
HSVP	Hot Semiworks Valve Pit
IMUST	inactive miscellaneous underground storage tank
OU	operable unit
PUREX	Plutonium-Uranium Extraction (Plant or process)
REDOX	Reduction-Oxidation (Plant or process)
SST	single-shell tank
TSD	treatment, storage, and disposal
UNH	uranyl nitrate hexahydrate
UPR	unplanned release
VCP	vitrified clay pipeline
VP	valve pit
WIDS	Waste Information Data System (database)
WMA	waste management area

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A1 Introduction

The waste site grouping report (DOE/RL-96-81, *Waste Site Grouping for 200 Areas Soil Investigations*) provided the initial description of sites to be included in the 200-IS-1 operable unit (OU). This grouping included structures used in the transfer of high-activity liquid wastes from separations plants to tank farms, reprocessing facilities, and evaporators. The waste sites associated with the 200-IS-1 OU, comprised primarily of pipeline components (e.g., catch tanks, diversion boxes, and control structures) and associated unplanned releases (UPRs) from high-activity waste transfer operations outside the tank farm waste management areas (WMAs), were further identified and discussed in Appendix G of the Implementation Plan (DOE/RL-98-28, *200 Areas Remedial Investigation/Feasibility Study Implementation Plan – Environmental Restoration Program*). Seventy-nine waste sites are listed as part of the 200-IS-1 OU in Appendix C of the *Hanford Federal Facility Agreement and Consent Order Action Plan*, henceforth, the Tri-Party Agreement Action Plan (Ecology et al., 1989b), as of October 26, 2010. Waste site types identified in Appendix C of the Tri-Party Agreement Action Plan (Ecology et al., 1989b) currently consist of one pipeline, 46 pipeline components (e.g., diversion boxes, catch tanks, valve pits, and weir boxes), and 32 UPRs.

This appendix contains two tables listing the pipeline system and associated UPR waste sites located geographically either in the 200 East Area or 200 West Area. Table A-1 lists pipeline system and associated UPR waste sites included in Waste Information Data System (WIDS) that are candidates for inclusion as part of one of the East Inner Area OUs for remedial alternative documentation and remedy implementation. Table A-2 indicates those pipeline system and associated UPR waste sites listed in the WIDS database that are candidates for inclusion with one of the West Inner Area OUs or facilities for remedial alternatives evaluation and selection, and remedy implementation. Tables A-1 and A-2 also identify those waste sites that are classified as TSDs because the waste side code includes a pipeline or pipeline component that is listed in the Single-Shell Tank (SST) System Part A Form (WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste*) or other closure plans. Waste sites containing SST system *Resource Conservation and Recovery Act of 1976* TSD ancillary equipment located outside the tank farm WMAs are identified. Figure A-1 illustrates how multiple individual pipelines listed in the SST system Part A Form (WA7890008967, 2010) may be encompassed by one WIDS waste site code.

Waste sites that are currently considered within the scope of this Work Plan are identified on Tables A-1 and A-2. Approximately 250 of the sites have no OU designation within WIDS as of September 2011. Assignment of pipelines, pipeline components, and associated UPR wastes sites currently in WIDS will be made to the appropriate OUs per agreements reached between the U.S. Department of Energy, the Washington State Department of Ecology, and the U.S. Environmental Protection Agency. OU assignments will include the 200-IS-1 OU, canyon OUs, and WMAs. The *Hanford Federal Facility Agreement and Consent Order*, henceforth, the Tri-Party Agreement (Ecology et al., 1989a) and RL-TPA-90-0001, *Tri-Party Agreement Handbook Management Procedures*, 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 Tri-Party Agreement Action Plan (Ecology et al., 1989b) to include newly assigned pipeline system and associated UPR waste sites.

Some pipeline system waste sites listed in this appendix will have future OU assignment decisions based on specific conditions. OU status for the T Plant Canyon has not been designated at this time because the facility is still operational. Pipeline waste site assignments to the T Plant Canyon will occur when the OU is established. Those pipeline waste sites that have been identified for remedial action in the 200-PW-1/3/6 OU and 200-CW-5 OU feasibility study documents will need to be assigned to the

associated OU. Assignment of pipeline system waste sites to the canyon OUs will be influenced by the dimensions of the barrier selected for the canyon and the portion of pipeline system waste site that is located within the effective area of the cover.

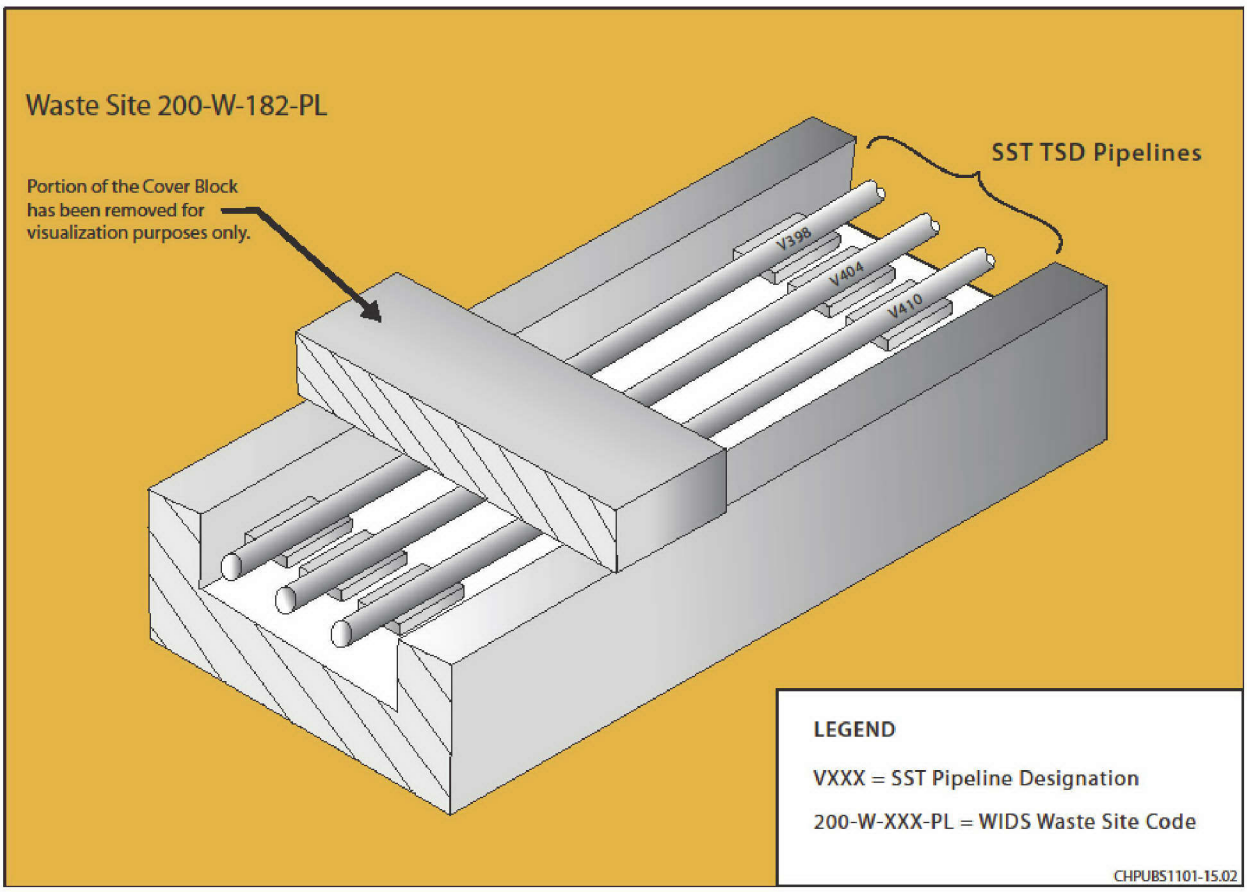

Figure A-1. Schematic of Encased Tank Farm Waste Site with Multiple Single-Shell Tank System Pipelines

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
1	200-E-111-PL	200-E-111-PL; Encased Pipeline from 241-ER-151 Diversion Box to 241-C Tank Farm and 244-AR Vault; 3-38 Encasement; Lines 108/V837/8618/8653/8901PAS, 809, 818, V836, and V834	Encased Tank Farm Pipeline	SST
2	200-E-112-PL	200-E-112-PL; B Plant Process Sewer, 2904-E-1, Pipeline from B Plant to 207-B Retention Basin, 24 in. VP Line (see Subsites)	Radioactive Process Sewer	
3	200-E-113-PL	200-E-113-PL; Pipeline from PUREX to 216-A-6 and 216-A-30 Crib, 216-A-42C Valve Box, Line 8824	Process Sewer	
4	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)	Radioactive Process Sewer	SST
5	200-E-116-PL	200-E-116-PL; Pipelines from 241-B-154 Diversion Box to 241-C-151 and 241-C-152 Diversion Boxes; Direct Buried Pipelines V111/V210/V130, 8902, and V122	Direct Buried Tank Farm Pipeline	SST
6	200-E-126-PL-B	200-E-126-PL; Underground Pipeline from 207-B to 216-B-3 Ditch (see Subsites)	Radioactive Process Sewer	
7	200-E-127-PL-B	200-E-127-PL; PUREX Cooling Water Line, Pipeline from PUREX to Gable and B Ponds (216-A-25 and 216-B-3), Line 1601	Radioactive Process Sewer	
8	200-E-135	200-E-135, Contamination Area South of 241-C Tank Farm	Unplanned Release	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
9	200-E-143-PL	200-E-143-PL; Tank Farm Transfer Lines 4101, 4102, 4103, 4104, 4105, 4106, 4107/V033, 4017, 4018, and 8656; Encased Transfer Line from 241-AX-151 Diversion Box to 241-A Tank Farms and 244-CR Vault in 241-C Tank Farm	Encased Tank Farm Pipeline	SST
10	200-E-144-PL	200-E-144-PL; Tank Farm Transfer Line 4012, Transfer Line 4013 (A-4013); Encased Transfer Line from 241-CR-152 and 241-CR-153 to 241-AX-151; Lines 4006 and 4007 from 244-AR Vault to 241-AX-151	Encased Tank Farm Pipeline	SST
11	200-E-145-PL	200-E-145-PL; Interplant Transfer Line, Tank Farm Transfer Line V228; Transfer Pipeline from 241-CR-153 to 241-ER-153, 241-ER-152 and 241-ER-151	Encased Tank Farm Pipeline	SST
12	200-E-147-PL	200-E-147-PL; Interplant Transfer Line, Tank Farm Transfer Line PAS-244, Transfer Line from 244-CR-TK-003 to 241-ER-153	Direct Buried Tank Farm Pipeline	SST
13	200-E-148-PL	200-E-148-PL; Tank Farm Transfer Line V109, Direct Buried Transfer Line from 241-C-151 to 241-A-01A	Direct Buried Tank Farm Pipeline	SST
14	200-E-149-PL	200-E-149-PL; Tank Farm Transfer Line V175, Direct Buried Transfer Line from 241-C-252 to 201-C Hot Semi Works, Tank Farm Pipeline	Direct Buried Tank Farm Pipeline	SST
15	200-E-150-PL	200-E-150-PL; Tank Farm Transfer Line 8900, Direct Buried Transfer Line from 244-CR-TK-003 to 201-C Hot Semi Works Valve Box, Tank Farm Pipeline	Direct Buried Tank Farm Pipeline	SST

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
16	200-E-151-PL	200-E-151-PL; Tank Farm Transfer Line V050, Direct Buried Transfer Line from 241-C-104 to 241-A-152, Tank Farm Pipeline	Direct Buried Tank Farm Pipeline	SST
17	200-E-152-PL	200-E-152-PL; Tank Farm Transfer Line V051, Direct Buried Transfer Line from 241-C-104 to 241-A-152, Tank Farm Pipeline	Direct Buried Tank Farm Pipeline	SST
18	200-E-153-PL	200-E-153-PL; Tank Farm Transfer Line V108/812, Direct Buried Transfer Line from 241-C-151 to 244-AR-TK-002, Tank Farm Pipeline	Direct Buried Tank Farm Pipeline	SST
19	200-E-154-PL	200-E-154-PL; Tank Farm Transfer Line V113, Direct Buried Transfer Line from 241-C-151 to 241-AX-01A, Tank Farm Pipeline	Direct Buried Tank Farm Pipeline	SST
20	200-E-155-PL	200-E-155-PL; Pipeline from 241-C Fence to Radioactive Process Sewer Line 2904-CR-1	Radioactive Process Sewer	
21	200-E-156-PL	200-E-156-PL; 216-C-1 Pipelines, Pipelines from 201-C to 216-C-1	Radioactive Process Sewer	
22	200-E-157-PL	200-E-157-PL; 216-C-10 Pipeline, Pipeline from 201-C to 216-C-10 Crib (see Subsites)	Radioactive Process Sewer	
23	200-E-158-PL	200-E-158-PL; 216-A-1 Pipeline, Pipeline from Sample Pit #3 to 216-A-1 Crib	Radioactive Process Sewer	
24	200-E-159-PL	200-E-159-PL; Pipeline from 203-A to 216-A-22, Pipeline from 203-A to 216-A-28 Crib, Pipeline from UNH Truck Apron to 216-A-22 (see Subsites)	Radioactive Process Sewer	
25	200-E-160-PL	200-E-160-PL; Pipeline from 270-E-1 to 216-B-12 Crib, V219	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
26	200-E-161-PL	200-E-161-PL; Pipeline from 221-BB to 216-B-55 Crib, V841	Radioactive Process Sewer	
27	200-E-162-PL	200-E-162-PL; Pipeline from 221-BB to 216-B-62 Crib, V842, Lateral Line to 216-B-12 Crib #2 (see Subsites)	Radioactive Process Sewer	
28	200-E-163-PL	200-E-163-PL; Pipeline from BCS Diverting Pit to 216-B-64 Retention Basin	Radioactive Process Sewer	
29	200-E-164-PL	200-E-164-PL; Pipeline to 216-A-8 Crib, Pipeline Between the 216-A-8 Control Structure and the 216-A-508 Control Structure	Radioactive Process Sewer	
30	200-E-165-PL	200-E-165-PL; Pipeline to 216-A-24 Crib (see Subsites)	Radioactive Process Sewer	
31	200-E-166-PL	200-E-166-PL; Pipeline to 216-A-34 Ditch	Radioactive Process Sewer	
32	200-E-167-PL	200-E-167-PL; Underground Pipelines from 244-A Lift Station to 241-A-A and 241-A-B Valve Pits, Lines SN-215 and SN-216	Encased Tank Farm Pipeline	SST
33	200-E-168-PL	200-E-168-PL; Underground Pipeline to 216-A-3	Radioactive Process Sewer	
34	200-E-169-PL	200-E-169-PL; Pipeline to the 216-C-3 Crib	Radioactive Process Sewer	
35	200-E-170-PL	200-E-170-PL; Pipeline from 276-C to 216-C-4 Crib	Radioactive Process Sewer	
36	200-E-171-PL	200-E-171-PL; Pipeline to the 216-C-6 Crib	Radioactive Process Sewer	
37	200-E-172-PL	200-E-172-PL; Pipeline from 209-E to the 216-C-7 Crib	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
38	200-E-173-PL	200-E-173-PL; Pipeline from 241-CX-71 to 216-C-5 Crib	Radioactive Process Sewer	
39	200-E-174-PL	200-E-174-PL; 216-B-10 (A&B) Pipeline, Pipeline from 221-BC and 222-B to 216-B-10 A&B Cribs (see Subsites)	Radioactive Process Sewer	
40	200-E-175-PL	200-E-175-PL; Pipeline from 292-B to 216-B-10 A&B	Radioactive Process Sewer	
41	200-E-176-PL-A	200-E-176-PL-A; Pipeline from 242-B to 216-B-11-A&B, Portion of pipeline outside the 241-B fence	Direct Buried Tank Farm Pipeline	SST
42	200-E-177-PL	200-E-177-PL; Pipeline Rerouting Waste from 216-B-8 Crib Pipeline to 216-B-11A&B Reverse Wells	Radioactive Process Sewer	
43	200-E-178-PL	200-E-178-PL; Pipeline from Tank 241-B-110 to 216-B-8 Crib and Tile Field	Radioactive Process Sewer	
44	200-E-179	200-E-179, R-13 Catch Tank, Catch Tank in 216-B-10 A&B Pipeline (see site code 200-E-174-PL)	Catch Tank	
45	200-E-180-PL	200-E-180-PL, 216-B-57 Crib Pipeline	Radioactive Process Sewer	
46	200-E-181-PL	200-E-181-PL, 216-B-61 Crib Pipeline	Process Sewer	
47	200-E-182-PL	200-E-182-PL, 216-A-7 Crib Pipeline	Radioactive Process Sewer	
48	200-E-183-PL	200-E-183-PL, Pipelines from 241-A-151 Diversion Box to 216-A-2, Lines V010 and V011	Radioactive Process Sewer	SST
49	200-E-184-PL	200-E-184-PL, 216-A-2 Crib Pipelines, V010, V011	Radioactive Process Sewer	SST
50	200-E-185-PL	200-E-185-PL, 216-A-4 Crib Pipelines, V014, V016	Radioactive Process Sewer	SST

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
51	200-E-186-PL	200-E-186-PL, 216-A-31 Crib Pipelines, V010, V011	Radioactive Process Sewer	SST
52	200-E-187-PL	200-E-187-PL; Chemical Sewer from 202-A to 216-A-29 Ditch; PUREX Chemical Sewer Lines 8819, 5802, and 5701	Radioactive Process Sewer	
53	200-E-188-PL	200-E-188-PL; B Plant Chemical Sewer (BCE) Line, 2904-E-2, 15 in. VP Line	Radioactive Process Sewer	
54	200-E-189	200-E-189, 216-A-TK-1 Carbonate Neutralization Tank	Neutralization Tank	
55	200-E-190	200-E-190, 216-A-TK-2 Catch Tank	Catch Tank	
56	200-E-191-PL	200-E-191-PL; 216-B-63 Pipeline, Pipeline from Valve Pit to 216-B-63 Ditch	Radioactive Process Sewer	
57	200-E-192-PL	200-E-192-PL, 216-A-10 Pipelines (see Subsites), Lines from Sample Pit 4 to 216-A-10 Crib	Radioactive Process Sewer	
58	200-E-193-PL	200-E-193-PL, 216-A-21 Crib Pipeline, Line X015	Radioactive Process Sewer	
59	200-E-194-PL	200-E-194-PL, 216-A-32 Crib Pipeline	Radioactive Process Sewer	
60	200-E-195-PL	200-E-195-PL; 241-B-361 Settling Tank and 216-B-9 Crib Pipelines, Line V204 (see Subsites)	Radioactive Process Sewer	SST
61	200-E-196-PL	200-E-196-PL; Lines T167 and T022; Stainless Steel Line to 216-A-4, 216-A-21 and 216-A-27 Cribs	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
62	200-E-198-PL	200-E-198-PL; Encased Tank Farm Pipeline from 241-BX-154 Diversion to 241-BX-155 Diversion Box; Lines V282, V283, V284, and V285	Encased Tank Farm Pipeline	SST
63	200-E-199-PL	200-E-199-PL; Tank Farm Lines from 241-B-154 Diversion Box to 241-B Tank Farm; Lines V204, V206, V208, V209, V211, V213, V215, and V285	Direct Buried Tank Farm Pipeline	SST
64	200-E-200-PL	200-E-200-PL; Pipelines from 244-AR Vault to 241-AY-152 and 241-A-153 Diversion Boxes; Lines 801, 802, 806, and 805	Direct Buried Tank Farm Pipeline	SST
65	200-E-201-PL	200-E-201-PL; Transfer Lines from 241-BX-155 to Diversion Boxes in 241-B Tank Farm, Lines V315 and V319	Direct Buried Tank Farm Pipeline	SST
66	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	Direct Buried Tank Farm Pipeline	SST
67	200-E-203-PL	200-E-203-PL; Pipeline from 241-BYR-154 Diversion Box to 216-B-2-2 Ditch, Line 9712	Radioactive Process Sewer	SST
68	200-E-204-PL	200-E-204-PL; Pipeline to 216-B-2-1 and 216-B-2-2 Ditches (see Subsites)	Radioactive Process Sewer	
69	200-E-205-PL	200-E-205-PL, 216-B-2-3 Ditch Pipelines (see Subsites)	Radioactive Process Sewer	
70	200-E-206-PL	200-E-206-PL; Lines V716, V717, and V718/817; Double Pipes from 244-AR Vault to 241-AR-151 Diversion Box	Direct Buried Tank Farm Pipeline	SST

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
71	200-E-207-PL	200-E-207-PL; Encased Transfer Line from 241-A-151 Diversion Box to 241-A-152 Diversion Box; Lines V004, V005, V006, V007, and V008	Encased Tank Farm Pipeline	SST
72	200-E-209-PL	200-E-209-PL; Pipeline from 272-BB to 200-E-25 Dry Well	Radioactive Process Sewer	
73	200-E-213-PL	200-E-213-PL; Transfer Lines from 221-B to 241-B-154 Diversion Box; Lines V200, V329, V330, V331, V332, V333, and V334	Direct Buried Tank Farm Pipeline	SST
74	200-E-214-PL	200-E-214-PL; Pipeline to 200-E-55 French Drain, Pipeline from 291-B Sand Filter to French Drain	Radioactive Process Sewer	
75	200-E-215-PL	200-E-215-PL; Transfer Line Between 241-ER-151 Diversion Box and 241-ER-152 Diversion Box, Line V229	Direct Buried Tank Farm Pipeline	SST
76	200-E-217-PL	200-E-217-PL; Encased Transfer Line from 241-ER-151 Diversion Box to 241-BX Tank Farm; Lines 9808, 9653, 9719, and V225 (see Subsites)	Encased Tank Farm Pipeline	SST
77	200-E-218-PL	200-E-218-PL; Transfer Lines Between 241-A-151 Diversion Box and 241-AW Tank Farm; Lines V021, V022, and V023	Direct Buried Tank Farm Pipeline	SST
78	200-E-219-PL	200-E-219-PL; BY Crib Distribution Pipelines; Pipelines from 216-BY-201 Flush Tank to 216-B-43, 216-B-44, 216-B-45, 216-B-46, 216-B-47, 216-B-48, 216-B-49, and 216-B-50 Cribs (see Subsites)	Radioactive Process Sewer	
79	200-E-220-PL	200-E-220-PL; Pipeline from 241-BY Tank Farm to 216-BY-201 Flush Tank and Monitoring Pit (see Subsites)	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
80	200-E-221-PL	200-E-221-PL; Pipeline to 216-B-51 French Drain, BC Crib Pipeline Drain Line	Radioactive Process Sewer	
81	200-E-222-PL	200-E-222-PL; Distribution Pipelines from 216-BC-201 Siphon Tank to BC Cribs (see Subsites)	Radioactive Process Sewer	
82	200-E-223	200-E-223, BC Pipeline Valve Pit, 200-E-114-PL Valve Pit	Valve Pit	
83	200-E-224-PL	200-E-224-PL; 241-A-151 Diversion Box Drain Line to 241-A-302A Catch Tank, Line V027	Encased Tank Farm Pipeline	SST
84	200-E-225-PL	200-E-225-PL; Transfer Line from 241-AR-151 Diversion Box to 241-AY-102 Tank, Line V720	Direct Buried Tank Farm Pipeline	SST
85	200-E-226-PL	200-E-226-PL; Transfer Line from 221-B to 241-C-154, Promethium Transfer Line, V743	Direct Buried Tank Farm Pipeline	SST
86	200-E-227-PL	200-E-227-PL; Transfer Lines Between 244-AR Vault Facility and 241-AX-151 Diversion Box; Lines 4005/810, 4015/814, and 4019/817	Encased Tank Farm Pipeline	SST
87	200-E-228-PL	200-E-228-PL; Drain Lines from 241-ER-151 Diversion Box to 241-ER-311 and 241-ER-311A Catch Tanks; Lines V224, V226, and V226-1 (see Subsites)	Direct Buried Tank Farm Pipeline	SST
88	200-E-229-PL	200-E-229-PL; Transfer Line Between Tank 241-AP-102 and 241-A-B Valve Pit, Line SN-650	Direct Buried Tank Farm Pipeline	SST
89	200-E-230-PL	200-E-230-PL; Pipeline from 292-B to 216-B-4 Reverse Well	Radioactive Process Sewer	
90	200-E-231-PL	200-E-231-PL; 216-A-45 Crib Pipeline	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
91	200-E-232-PL	200-E-232-PL; Pipeline from 207-A Basins to 216-A-30 and 216-A-37-1 Cribs (see Subsites)	Radioactive Process Sewer	
92	200-E-233-PL	200-E-233-PL; Pipeline from 216-A-30 Crib Distribution Box to the 216-A-37-2 Crib Distribution Box	Radioactive Process Sewer	
93	200-E-234-PL	200-E-234-PL; Pipelines from 242-A Evaporator Building to the 207-A Basins; Lines 300, 501, 505, and 557 (see Subsites)	Radioactive Process Sewer	
94	200-E-235-PL	200-E-235-PL; 207-A North Basin Distribution Lines; Lines 501,502, 503, 504, 506, and 507	Radioactive Process Sewer	
95	200-E-236-PL	200-E-236-PL; 207-A South Basin Distribution Lines; Lines 557, 558, 559, 560, 562, and 563	Radioactive Process Sewer	
96	200-E-238-PL	200-E-238-PL; Pipeline from 206-A to 216-A-9 Crib	Radioactive Process Sewer	
97	200-E-239-PL	200-E-239-PL; Pipeline from 216-A-5 Sample Pit 4 to 216-A-5 Crib	Radioactive Process Sewer	
98	200-E-240-PL	200-E-240-PL; Pipeline from Valve Pit West of Sample Pit 4 to the 216-A-38-1 Crib	Radioactive Process Sewer	
99	200-E-241-PL	200-E-241-PL; Pipeline from 200-E-58 Neutralization Tank to the 216-A-5 Sample Pit 4, Lines 7717 and 7718 (see Subsites)	Radioactive Process Sewer	
100	200-E-242-PL	200-E-242-PL; Pipeline from 216-A-5 Sample Pit 4 to 216-A-15 French Drain	Radioactive Process Sewer	
101	200-E-243-PL	200-E-243-PL; Pipeline to the 216-B-13 French Drain	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
102	200-E-244-PL	200-E-244-PL; Pipeline from 201-C Valve Pit to 241-CX-70	Radioactive Process Sewer	TSD
103	200-E-245-PL	200-E-245-PL; Pipeline from 201-C Hot Shop to 241-CX-71	Radioactive Process Sewer	TSD
104	200-E-246-PL	200-E-246-PL; Pipeline from 201-C Valve Pit to 241-CX-72	Radioactive Process Sewer	TSD
105	200-E-247-PL	200-E-247-PL; Pipelines to the 209-E-WS-2 French Drain (see Subsites)	Radioactive Process Sewer	
106	200-E-248-PL	200-E-248-PL; Pipelines to the 209-E-WS-3 Valve Pit (see Subsites)	Radioactive Process Sewer	
107	200-E-249-PL	200-E-249-PL; Pipelines to 200-E-4 French Drain (see Subsites)	Process Sewer	
108	200-E-250-PL	200-E-250-PL; Pipeline from 2704-C to 2704-C-WS-1 Quench Tank	Radioactive Process Sewer	
109	200-E-251-PL	200-E-251-PL; Pipeline from 291-C Stack to 216-C-2 Reverse Well	Radioactive Process Sewer	
110	200-E-252-PL	200-E-252-PL; Pipeline from 291-C Air Filter Building to 216-C-2 Reverse Well	Radioactive Process Sewer	
111	200-E-253-PL	200-E-253-PL; Pipeline from 202-A to 216-A-36A and 216-A-36B Cribs	Radioactive Process Sewer	
112	200-E-254-PL	200-E-254-PL; Pipeline from 209-E to 216-C-9 Pond	Radioactive Process Sewer	
113	200-E-255-PL	200-E-255-PL; Pipeline Connecting 216-C-9 Pond to Pipeline 200-E-169-PL	Radioactive Process Sewer	
114	200-E-256-PL	200-E-256-PL; Pipelines from 201-C (South Side) to 216-C-9 Pond	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
115	200-E-257-PL	200-E-257-PL; Pipeline from 201-C (East Side) to 216-C-9 Pond	Radioactive Process Sewer	
116	200-E-258-PL	200-E-258-PL; 216-C-9 Pond Lobe Distribution Piping	Radioactive Process Sewer	
117	200-E-259-PL	200-E-259-PL; Pipeline from 291-C Fan House to 216-C-9 Pond	Radioactive Process Sewer	
118	200-E-260-PL	200-E-260-PL; Steam Condensate By-Pass Line from PUREX to 216-A-30, Line 8824A	Radioactive Process Sewer	
119	200-E-261-PL	200-E-261-PL; Effluent Recycle Line from 216-A-42 Basin to PUREX	Radioactive Process Sewer	
120	200-E-262-PL	200-E-262-PL; Pipelines Associated with 216-A-42 Basin, 216-A-42A Pump Station, 216-A-42B Valve Box and 216-A-42C Diversion Box	Radioactive Process Sewer	
121	200-E-263-PL	200-E-263-PL; 216-A-42 Basin Pipeline to 216-A-42C Diversion Box	Radioactive Process Sewer	
122	200-E-264-PL	200-E-264-PL; Pipeline from 242-B Evaporator Building to 207-B Retention Basin	Radioactive Process Sewer	
123	200-E-265-PL	200-E-265-PL; 241-BY and 241-BX Tank Farm Cooling Water Pipeline to 207-B Retention Basin (see Subsites)	Radioactive Process Sewer	
124	200-E-266-PL	200-E-266-PL; Pipeline from PUREX Trap Pit #1 to 216-A-11 French Drain	Radioactive Process Sewer	
125	200-E-267-PL	200-E-267-PL; Pipeline from PUREX Trap Pit #3 to 216-A-12 French Drain	Radioactive Process Sewer	
126	200-E-268-PL	200-E-268-PL; Pipeline from PUREX Vacuum Cleaner Filter Box to 216-A-14 French Drain, Line T073	Radioactive Process Sewer	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
127	200-E-269-PL	200-E-269-PL; Pipeline from 291-A Fan Building to 216-A-33 French Drain	Radioactive Process Sewer	
128	200-E-270-PL	200-E-270-PL; Pipeline from 291-A Fan Control House to 216-A-26 and 216-A-26A French Drains, Line T022	Radioactive Process Sewer	
129	200-E-271-PL	200-E-271-PL; PUREX Cooling Water Header Pipeline, Line 8823	Radioactive Process Sewer	
130	200-E-272-PL	200-E-272-PL; Pipeline to 216-A-35 French Drain	Radioactive Process Sewer	
131	200-E-273-PL	200-E-273-PL; Pipeline to 216-A-13 French Drain (see Subsites)	Radioactive Process Sewer	
132	200-E-274-PL	200-E-274-PL; Pipeline from 244-A Lift Station to 216-A-40 Basin, Line 323	Radioactive Process Sewer	
133	200-E-275-PL	200-E-275-PL; Cooling Water Pipeline to 216-A-40 Basin, Line 815	Radioactive Process Sewer	
134	200-E-276-PL	200-E-276-PL; 216-A-41 Crib Pipeline	Radioactive Process Sewer	
135	200-E-277-PL	200-E-277-PL; 216-B-59 and 216-B-59B Pipelines (see Subsites)	Radioactive Process Sewer	
136	200-E-279-PL	200-E-279-PL; Pipeline from 241-B-361 Settling Tank to 216-B-5 Reverse Well	Radioactive Process Sewer	
137	200-E-281-PL	200-E-281-PL; Pipeline from 241-B Tank Farm to 216-B-7A and 216-B-7B Cribs, Line V306	Radioactive Process Sewer	
138	200-E-282-PL	200-E-282-PL; Process Waste Lines from 202-A to 241-AX-151 Diversion Box; Lines 4001, 4002, 4003, and 4004	Encased Tank Farm Pipeline	SST

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
139	200-E-283-PL	200-E-283-PL; Pipeline from 242-A Bldg to 200-E-127-PL (to Gable and B Ponds)	Radioactive Process Sewer	
140	200-E-285	200-E-285, 216-A-8 Sample Pit, Sample Pit 2, 216-A-8 Control Structure	Control Structure	
141	216-A-508	216-A-508, Control Structure for 216-A-8 Crib, 216-A-8 Distribution Box	Control Structure	
142	216-A-524	216-A-524, 216-A-524 Control Structure, 216-A 524 Weir, 216-A-24 Control Structure	Control Structure	
143	241-A-151	241-A-151, 241-A-151 Diversion Box	Diversion Box	SST
144	241-A-302A	241-A-302A, 241-A-302-A Catch Tank, Line V028	Catch Tank	SST
145	241-A-302B	241-A-302B, 241-A-302-B Catch Tank, IMUST, V062	Catch Tank	SST
146	241-AR-151	241-AR-151, 241-AR-151 Diversion Box	Diversion Box	SST
147	241-B-154	241-B-154, 241-B-154 Diversion Box	Diversion Box	SST
148	241-B-302B	241-B-302B, 241-B-302-B Catch Tank, 241-B-302, Line V217	Catch Tank	SST
149	241-BX-154	241-BX-154, 241-BX-154 Diversion Box	Diversion Box	SST
150	241-BX-155	241-BX-155, 241-BX-155 Diversion Box	Diversion Box	SST
151	241-BX-302B	241-BX-302B, 241-BX-302-B Catch Tank, IMUST, Line V288	Catch Tank	SST

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
152	241-BX-302C	241-BX-302C, 241-BX-302-C Catch Tank, IMUST, Line V322	Catch Tank	SST
153	241-C-154	241-C-154, 241-C-154 Diversion Box	Diversion Box	SST
154	241-CX-70	241-CX-70, 241-CX-TK-70 Tank, Strontium Hot Semi-Works, IMUST	Storage Tank	TSD
155	241-CX-71	241-CX-71, 241-CX-TK-71, 241-CX Neutralization Tank, Strontium Hot Semi-Works, IMUST	Neutralization Tank	TSD
156	241-CX-72	241-CX-72, 241-CX-TK-72 Vault and Tank, 241-CX-72 Waste Self Concentrator, Strontium Hot Semi-Works, IMUST	Storage Tank	TSD
157	241-ER-151	241-ER-151, 241-ER-151 Diversion Box	Diversion Box	SST
158	241-ER-152	241-ER-152, 241-ER-152 Diversion Box, Line DR311	Diversion Box	SST
159	241-ER-153	241-ER-153, 241-ER-153 Diversion Box	Diversion Box	SST
160	241-ER-311	241-ER-311, 241-ER-311 Catch Tank, 241-ER-311A Replacement Tank	Catch Tank	SST
161	241-ER-311A	241-ER-311A, 241-ER-311A Catch Tank, Old 241-ER-311, Original 241-ER-311 Catch Tank, IMUST	Catch Tank	SST
162	241-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	Catch Tank	SST
163	244-A CT	244-A CT, 244-A Catch Tank, 244-A RT, 244-A Receiver Tank, 244-A DCRT, 244-A-TK/SMP	Catch Tank	SST

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
164	244-A LS	244-A LS, 244-A Lift Station, 244-AR Lift Station, 244-AR LS, SN-232, SN-233, SN-234 (see Subsites)	Control Structure	
165	244-AR VAULT	244-AR VAULT, 244-AR Vault	Receiving Vault	SST
166	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	Encased Tank Farm Pipeline	SST
167	HSVP	HSVP, 201-C Diversion Box, Semiworks Valve Pit, 201-C Valve Box	Valve Pit	
168	UPR-200-E-3	UPR-200-E-3, Line Leak from 221-B to 241-BX-154, UN-200-E-3	Unplanned Release	
169	UPR-200-E-7	UPR-200-E-7, UN-200-E-7, Cave-In Near 216-B-9 (241-B-361 Crib), Pipeline Leak	Unplanned Release	
170	UPR-200-E-18	UPR-200-E-18, Contamination Release at the 216-A-8 Sampler Pit, UN-200-E-18	Unplanned Release	
171	UPR-200-E-42	UPR-200-E-42, 241-AX-151 Release, UN-200-E-42	Unplanned Release	
172	UPR-200-E-45	UPR-200-E-45, UN-200-E-45, Contamination Spread from the 241-B-154 Diversion Box	Unplanned Release	
173	UPR-200-E-67	UPR-200-E-67, UN-216-E-67, Excavation of Radioactively Contaminated Pipe Encasement (V004, V005, V006, V007,V008) UN-200-E-67	Unplanned Release	

Table A-1. Listing of Waste Sites Located Geographically in East Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
174	UPR-200-E-77	UPR-200-E-77, UN-216-E-5, 241-B-154 Diversion Box Ground Contamination, UN-200-E-77	Unplanned Release	
175	UPR-200-E-78	UPR-200-E-78, UN-216-E-6, 241-BX-155 Diversion Box Ground Contamination, UN-200-E-78	Unplanned Release	
176	UPR-200-E-79	UPR-200-E-79, UN-216-E-7, 242-B to 207-B Line Break, UN-200-E-79, 200-E-264-PL Break	Unplanned Release	
177	UPR-200-E-84	UPR-200-E-84, 241-ER-151 Catch Tank Leak (241-ER-311A), UN-200-E-84, UN-216-E-12	Unplanned Release	
178	UPR-200-E-100	UPR-200-E-100, Radioactive Contamination Near 244-A Lift Station, UN-216-E-100, UN-216-E-29, UN-200-E-100	Unplanned Release	
179	UPR-200-E-145	UPR-200-E-145, W049H Green Soil, VCP Leak	Unplanned Release	

DCRT = double-contained received tank
HSVP = Hot Semiworks Valve Pit
IMUST = inactive miscellaneous underground storage tank
PUREX = Plutonium-Uranium Extraction (Plant or process)
SST = single-shell tank
TSD = treatment, storage, and disposal
UNH = uranyl nitrate hexahydrate
VCP = vitrified clay pipeline
VP = valve pit

1
2

1

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
1	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	Catch Tank	
2	200-W-16	200-W-16, 292-T Underground Tanks, IMUST, 292-TK-1, 292-TK-2	Storage Tank	
3	200-W-58	200-W-58, Z-Plant Diversion Box #1	Valve Pit	
4	200-W-59	200-W-59, Z-Plant Diversion Box #2	Valve Pit	
5	200-W-78-PL	200-W-78-PL; Pipeline Between 241-TX/TY and 241-T Tank Farms; Lines 6012, 6025, 7624, and 7630	Encased Tank Farm Pipeline	SST
6	200-W-79-PL	200-W-79-PL; 216-T-36 Crib Pipeline, V663	Radioactive Process Sewer	SST
7	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)	Process Sewer	
8	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)	Radioactive Process Sewer	
9	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	Encased Tank Farm Pipeline	SST
10	200-W-98-PL	200-W-98-PL; Encased Pipeline from 240-S-151 to 241-U-153 Diversion Box; V458, V459, and V460	Encased Tank Farm Pipeline	SST
11	200-W-99-PL	200-W-99-PL; Encased Pipeline from 241-U-151 to 241-S-151 Diversion Boxes, Lines V455 and V456	Encased Tank Farm Pipeline	SST

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
12	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	Encased Tank Farm Pipeline	SST
13	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	Encased Tank Farm Pipeline	SST
14	200-W-125-PL	200-W-125-PL, 216-Z-1 Ditch Replacement Pipeline (see Subsites)	Radioactive Process Sewer	
15	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	Encased Tank Farm Pipeline	SST
16	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	Direct Buried Tank Farm Pipeline	SST
17	200-W-131-PL	200-W-131-PL; V601, Spur to 241-TX Tank Farm	Direct Buried Tank Farm Pipeline	SST
18	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	Direct Buried Tank Farm Pipeline	SST
19	200-W-137-PL	200-W-137-PL; Pipeline from 241-S-151 Diversion Box to 216-S-1 & 2 Cribs, Line V533	Radioactive Process Sewer	SST
20	200-W-138-PL	200-W-138-PL; Pipeline from 240-S-151 to 216-S-7 Crib, V547	Radioactive Process Sewer	SST
21	200-W-139-PL	200-W-139-PL; Pipeline from 200-W-138-PL to 216-S-9 Crib, V547	Radioactive Process Sewer	SST
22	200-W-140-PL	200-W-140-PL, Pipeline from 292-T (200-W-40)	Radioactive Process Sewer	

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
23	200-W-141-PL	200-W-141-PL; Pipeline Connecting 200-W-139-PL to 216-S-23 Crib, V547	Radioactive Process Sewer	SST
24	200-W-142-PL	200-W-142-PL, Pipeline from 222-T to 216-T-8 Crib	Radioactive Process Sewer	
25	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	Encased Tank Farm Pipeline	SST
26	200-W-146-PL	200-W-146-PL, 216-S-22 Crib Pipeline	Radioactive Process Sewer	
27	200-W-147-PL-B	200-W-147-PL; Pipeline from 207-SL to 216-S-19 Pond	Radioactive Process Sewer	
28	200-W-149-PL	200-W-149-PL; Pipelines Related to 216-S-20 Crib (see Subsites)	Radioactive Process Sewer	
29	200-W-150-PL	200-W-150-PL; Pipelines Associated with 216-S-13 Crib (see Subsites)	Radioactive Process Sewer	
30	200-W-151-PL	200-W-151-PL; 200-W-42 Pipe Remaining under 16th Street	Radioactive Process Sewer	
31	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	Radioactive Process Sewer	
32	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)	Radioactive Process Sewer	
33	200-W-154-PL	200-W-154-PL; Pipeline from 200-W-152-PL to 216-S-5 Crib	Radioactive Process Sewer	
34	200-W-155-PL-B	200-W-155-PL; Pipeline from 2904-S-160 Control Structure to 216-S-16 Ditch	Radioactive Process Sewer	
35	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	Radioactive Process Sewer	

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
36	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)	Process Sewer	
37	200-W-158-PL	200-W-158-PL; Pipeline from 293-S to 200-W-152-PL	Process Sewer	
38	200-W-159-PL	200-W-159-PL; Cooling Water Lines from 241-SX-401 and 241-SX-402 to 216-U-10 Pond	Radioactive Process Sewer	
39	200-W-160-PL	200-W-160-PL; Pipeline from 241-SX-401 and 241-SX-402 to 216-S-21 Crib	Radioactive Process Sewer	
40	200-W-161-PL	200-W-161-PL; Pipeline from 242-S to 216-S-25 Crib, Line 557	Radioactive Process Sewer	
41	200-W-162-PL	200-W-162-PL; Pipeline from 241-SX-701 to 216-SX-2 Crib	Radioactive Process Sewer	
42	200-W-163-PL	200-W-163-PL; T Plant Process Sewer, 18 in. 221-T Process Sewer Pipeline (see Subsites)	Radioactive Process Sewer	
43	200-W-164-PL	200-W-164-PL; Pipeline from 207-T Retention Basin to the 216-T-4 Ditch	Radioactive Process Sewer	
44	200-W-165-PL	200-W-165-PL; Pipeline from Tank 241-TX-112 to 207-T Retention Basin	Radioactive Process Sewer	
45	200-W-166-PL	200-W-166-PL; Pipeline from 242-T Evaporator Building to the 207-T Retention Basin	Radioactive Process Sewer	
46	200-W-167-PL	200-W-167-PL; Pipeline from 242-T Evaporator to 207-T Retention Basin	Radioactive Process Sewer	SST
47	200-W-168-PL	200-W-168-PL; 216-U-3 Crib and 216-U-14 Ditch Pipelines (see Subsites)	Radioactive Process Sewer	
48	200-W-170-PL	200-W-170-PL; 216-U-16 Crib Pipeline	Radioactive Process Sewer	

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
49	200-W-171	200-W-171; Leak from 234-5Z Pipe Trench to 241-Z Tank D-6, 200-W-219-PL Leak	Unplanned Release	
50	200-W-172	200-W-172; Liquid Leaking from Drain Laterals below 234-5Z Floor Slab	Unplanned Release	
51	200-W-173-PL	200-W-173-PL; 216-T-33 Crib Pipeline, Pipeline from 2706-T to 216-T-33 Crib	Radioactive Process Sewer	
52	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	Radioactive Process Sewer	
53	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	Encased Tank Farm Pipeline	SST
54	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	Direct Buried Tank Farm Pipeline	SST
55	200-W-178-PL	200-W-178-PL; Pipeline from 241-Z to 244-TX DCRT, Lines HSW-202 and HSW-203	Direct Buried Tank Farm Pipeline	SST
56	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	Direct Buried Tank Farm Pipeline	SST
57	200-W-180-PL	200-W-180-PL; Pipelines from 221-T to 216-T-1 Ditch (see Subsites)	Radioactive Process Sewer	
58	200-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	Direct Buried Tank Farm Pipeline	SST

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
59	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	Encased Tank Farm Pipeline	SST
60	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	Direct Buried Tank Farm Pipeline	SST
61	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	Direct Buried Tank Farm Pipeline	SST
62	200-W-185-PL	200-W-185-PL; Transfer Lines Between 241-U-151 and 241-U-153 Diversion Boxes; Lines V-450 and V-451	Direct Buried Tank Farm Pipeline	SST
63	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	Encased Tank Farm Pipeline	SST
64	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	Encased Tank Farm Pipeline	SST
65	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)	Radioactive Process Sewer	
66	200-W-190-PL	200-W-190-PL; Discharge Line from 240-S-151 Diversion Box to 240-S-302 Catch Tank, Line V554	Direct Buried Tank Farm Pipeline	SST
67	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	Encased Tank Farm Pipeline	SST

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
68	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)	Radioactive Process Sewer	
69	200-W-193-PL	200-W-193-PL; Pipeline from 224-U to 241-U-361 Settling Tank	Radioactive Process Sewer	
70	200-W-194-PL	200-W-194-PL; Pipeline from 241-U-361 Settling Tank to 216-U-1 and 216-U-2 Cribs	Radioactive Process Sewer	
71	200-W-195-PL	200-W-195-PL; Pipeline from U Plant to 216-U-17 Crib	Radioactive Process Sewer	
72	200-W-196-PL	200-W-196-PL; Pipelines from Railcar Unloading Stations to 216-T-34 Crib	Radioactive Process Sewer	
73	200-W-197-PL	200-W-197-PL; Pipelines from Railcar Unloading Stations to 216-T-35 Crib	Radioactive Process Sewer	
74	200-W-198-PL	200-W-198-PL; Pipelines from Truck Unloading Station to 216-T-34 and 216-T-35 Cribs	Radioactive Process Sewer	
75	200-W-199-PL	200-W-199-PL; Pipelines from Building 231-Z to 231-W-151 Vault	Radioactive Process Sewer	
76	200-W-200-PL	200-W-200-PL; 216-Z-16 Crib Pipeline	Radioactive Process Sewer	
77	200-W-201-PL	200-W-201-PL; 216-Z-17 Crib Pipeline	Radioactive Process Sewer	
78	200-W-202-PL	200-W-202-PL; Pipeline from 231-W-151 to 216-Z-5 Crib (see Subsites)	Radioactive Process Sewer	
79	200-W-203-PL	200-W-203-PL; Pipeline from 231-W-151 Vault to 216-Z-7 Crib	Radioactive Process Sewer	
80	200-W-204-PL	200-W-204-PL; Pipeline from 231-W-151 Vault to 216-Z-10 Reverse Well	Radioactive Process Sewer	
81	200-W-209-PL	200-W-209-PL; 207-Z Pipelines (see Subsites)	Radioactive Process Sewer	

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
82	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	Encased Tank Farm Pipeline	SST
83	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)	Radioactive Process Sewer	SST
84	200-W-216-PL	200-W-216-PL; Pipelines from 291-Z to 216-Z-15 French Drain	Radioactive Process Sewer	
85	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	Radioactive Process Sewer	
86	200-W-222-PL	200-W-222-PL; 207-U Retention Basin Outlet Pipeline to the 216-U-14 Ditch	Radioactive Process Sewer	
87	200-W-223-PL	200-W-223-PL; Pipeline from 242-S Evaporator to 216-U-14 Ditch	Radioactive Process Sewer	
88	200-W-224-PL	200-W-224-PL; Pipeline from 234-5Z and 236-Z to West Side of 241-Z (see Subsites)	Radioactive Process Sewer	
89	200-W-225-PL	200-W-225-PL; PFP Six Inch Condensate Line Connecting to Process Sewer	Radioactive Process Sewer	
90	200-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	Radioactive Process Sewer	
91	200-W-227-PL	200-W-227-PL; Pipeline from 221-T Separations Facility to 216-T-6 Crib	Radioactive Process Sewer	
92	200-W-228-PL	200-W-228-PL; Pipeline from 232-Z to 241-Z, 3 in. Contaminated Waste Line	Radioactive Process Sewer	

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
93	200-W-229-PL	200-W-229-PL; Pipeline from 2736-ZB to 241-Z	Radioactive Process Sewer	
94	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)	Radioactive Process Sewer	TSD
95	200-W-235-PL	200-W-235-PL; Pipeline from 241-SX-701 Building to S Pit; 200-W-162-PL Replacement Pipeline	Process Sewer	
96	216-S-172	216-S-172, 216-S-172 Weir Box and Control Structure, 2904-S-172 Weir, 216-S-172 Control Structure	Control Structure	
97	216-TY-201	216-TY-201, Supernatant Disposal Flush Tank, IMUST	Settling Tank	
98	240-S-151	240-S-151, 240-S-151 Diversion Box	Diversion Box	SST
99	240-S-152	240-S-152, 240-S-152 Diversion Box	Diversion Box	SST
100	240-S-302	240-S-302, 240-S-302 Catch Tank, IMUST, Line V556 and V557	Catch Tank	SST
101	241-SX-302	241-SX-302, 241-SX-302 Catch Tank, SX-304, IMUST, Line V595	Catch Tank	SST
102	241-TX-152	241-TX-152, 241-TX-152 Diversion Box	Diversion Box	SST
103	241-TX-154	241-TX-154, 241-TX-154 Diversion Box	Diversion Box	SST
104	241-TX-155	241-TX-155, 241-TX-155 Diversion Box	Diversion Box	SST
105	241-TX-302B	241-TX-302B, 241-TX-302-B Catch Tank, IMUST, Lines V414 and V415	Catch Tank	SST
106	241-TX-302BR	241-TX-302BR, 241-TX-302BR Catch Tank, 241-TXR-302BR, IMUST	Catch Tank	SST
107	241-TX-302C	241-TX-302C, 241-TX-302-C Catch Tank, Lines V741 and V742	Catch Tank	SST

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
108	241-U-151	241-U-151, 241-U-151 Diversion Box	Diversion Box	SST
109	241-U-152	241-U-152, 241-U-152 Diversion Box	Diversion Box	SST
110	241-UX-154	241-UX-154, 241-UX-154 Diversion Box	Diversion Box	SST
111	241-UX-302A	241-UX-302A, 241-U-302 Catch Tank, 241-UX-302 Catch Tank, 241-UX-302, Lines V380 and V381	Catch Tank	SST
112	241-WR VAULT	241-WR VAULT; 241-WR Vault (Tanks -001 through -009), 241-WR-01 Through 09, 241-WR Diversion Station Vault, 244-WR Vault, 296-U-6 Stack, IMUST (see Subsites)	Receiving Vault	
113	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	Neutralization Tank	TSD
114	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	Storage Tank	TSD
115	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	Storage Tank	TSD
116	2904-S-160	2904-S-160, 2904-S-160 Control Structure, 2904-S-160 Weir	Control Structure	
117	2904-S-171	2904-S-171, 2904-S-171 Weir Box, 2904-S-171 Control Structure, 216-S-171	Control Structure	
118	UPR-200-W-2	UPR-200-W-2; UN-200-W-2, Underground Waste Line Leak	Unplanned Release	

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
119	UPR-200-W-5	UPR-200-W-5; Overflow at 241-TX-155, UN-200-W-5	Unplanned Release	
120	UPR-200-W-6	UPR-200-W-6; UN-200-W-6, Contamination Spread from 241-U-151 and 241-U-152 Diversion Boxes	Unplanned Release	
121	UPR-200-W-28	UPR-200-W-28; Release from 241-TX-155 Diversion Box, UN-200-W-28	Unplanned Release	
122	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	Unplanned Release	
123	UPR-200-W-32	UPR-200-W-32; UNH Transfer Line Break, UN-200-W-32	Unplanned Release	
124	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	Unplanned Release	
125	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	Unplanned Release	
126	UPR-200-W-64	UPR-200-W-64; Road Contamination at 23rd and Camden, UN-200-W-64	Unplanned Release	
127	UPR-200-W-97	UPR-200-W-97; Transfer Line Leak, UN-216-W-5, UN-200-W-97	Unplanned Release	
128	UPR-200-W-98	UPR-200-W-98; UN-216-W-6, 221-T Waste Line Break at R-19, UN-200-W-98	Unplanned Release	
129	UPR-200-W-102	UPR-200-W-102; UN-216-W-12, UN-200-W-102, 224-T Underground Line Leak	Unplanned Release	
130	UPR-200-W-108	UPR-200-W-108; Line Leak at 216-S-9 Crib, UN-216-W-18, UN-200-W-108	Unplanned Release	

Table A-2. Listing of Waste Sites Located Geographically in West Inner Area

Count	Site Code	Site Name	Site Type	Part of Waste Site is Identified in TSD (SST = SST System Part A; TSD = Other TSD Units)
131	UPR-200-W-109	UPR-200-W-109; Waste Line Leak Near 218-W-9, UN-216-W-19, UN-200-W-109	Unplanned Release	
132	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	Unplanned Release	
133	UPR-200-W-114	UPR-200-W-114; UN-216-W-24, Ground Contamination East of 241-SX Tank Farm, UN-200-W-114	Unplanned Release	
134	UPR-200-W-115	UPR-200-W-115; UN-216-W-25, Ground Contamination above Transfer Line Along Cooper Street	Unplanned Release	
135	UPR-200-W-130	UPR-200-W-130; Line Leak at 231-W-151 Sump, UN-200-W-130	Unplanned Release	
136	UPR-200-W-131	UPR-200-W-131; Release from 241-TX-155	Unplanned Release	
137	UPR-200-W-135	UPR-200-W-135; Release from 241-TX-155, UN-200-W-135	Unplanned Release	
138	UPR-200-W-161	UPR-200-W-161; UN-216-W-35, UN-200-W-161, Large Area East of 241-U Tank Farm	Unplanned Release	
139	UPR-200-W-164	UPR-200-W-164; Overhead UNH Line Leak, UN-216-W-29	Unplanned Release	
140	UPR-200-W-167	UPR-200-W-167; Contamination Migration from 241-TY, UN-216-W-32	Unplanned Release	

DCRT = double-contained receiver tank
IMUST = inactive miscellaneous underground strorage tank
REDOX = Reduction-Oxidation (Plant or process)
SST = single-shell tank
TSD = treatment, storage, and disposal
UNH = uranyl nitrate hexahydrate
UPR = unplanned release
VCP = vitrified clay pipeline

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Appendix B

Site-Specific Information for Pipeline System Waste Sites

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Terms

bgs	below ground surface
CA	contaminated area
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COB	cleanout box
CS	carbon steel
DCRT	double contained receiver tank
DOE	U.S. Department of Energy
DPT	direct push technology
HSVP	Hot Semiworks Valve Pit
IMUST	inactive miscellaneous underground storage tank
ISVAC	integrated soil, vegetation, and animal control
ITS	in-tank solidification
LERF	Liquid Effluent Retention Facility
MSCM	mobile surface contamination monitor
OU	operable unit
PAS	PUREX acid sludge
PFP	Plutonium Finishing Plant
PUREX	Plutonium-Uranium Extraction (Plant or process)
QMap	Query Map
RARA	radiation area remedial action
RB	retention basin
RCRA	*Resource Conservation and Recovery Act of 1976*
RECUPLEX	Recovery of Uranium and Plutonium by Extraction (Plant or process)
REDOX	Reduction-Oxidation (Plant or process)
RI	remedial investigation
SS	stainless steel
TBD	to be determined
TEDF	Treated Effluent Disposal Facility

TSD	treatment, storage, and disposal
UNH	uranyl nitrate hexahydrate
UPR	unplanned release
URM	underground radioactive material
VCP	vitrified clay pipeline
WIDS	Waste Information Data System

B1 Introduction

This appendix contains three tables that provide summary information concerning pipeline system waste site attributes and previous characterization activities that have been completed. The information presented in these tables supported development of this Work Plan. Table B-1 summarizes selected content available in the Waste Information Data System (WIDS) for those pipeline system waste sites that are located in the East Inner Area. Table B-2 summarizes selected information provided in WIDS for those pipeline system waste sites that are located in the West Inner Area. Table B-3 summarizes information compiled from previous investigations that focused on liquid disposal waste sites, but also included some portion of the evaluation that concerned an associated pipeline(s). For the disposal sites listed in Table B-3, identification of the associated pipeline waste site codes, pipe materials, pipe diameters, and pipeline routings are indicated. Preliminary data gathering was started as part of the Work Plan development.

Although incomplete at this time, Table B-3 provides an example of the type of pipeline attribute information that will be further expanded as part of the completion of the pipeline system data package. Some content presented in Table B-3 may not be consistent or comparable with the more current information presented in Tables B-1 and B-2, since the derivation and intended use of the information are different.

B1.1 Pipeline Length Information

Tables B-1 and B-2 include preliminary information concerning waste site and pipeline lengths and pipeline depth of burial. The waste site lengths shown are approximate and were derived using the Query Map (QMap) on-screen measurement tool available when viewing waste sites. The waste site lengths provided do not include the portion of the pipeline waste site that is present within a ditch, trench, crib, and/or other disposal waste site that is connected to the pipeline. For pipeline waste sites connected to tank farms, the portion of the pipeline waste site inside of the tank farm fence (as shown on QMap) was not included in the waste site length. The cumulative pipeline lengths were taken directly from WIDS and are derived from the geospatial database in the ArcGIS system associated with QMap. Cumulative values include the length of all pipelines associated with the waste site code (see Figure A-1 in Appendix A). The cumulative length values were not adjusted to exclude the portions of a pipeline that are present within a disposal waste site or that extend inside of a tank farm fence.

B1.2 Pipeline Depth Information

Determination of the approximate depth of burial of pipeline waste sites was started during the development of this Work Plan, but it is incomplete. This evaluation is identified as a task to be determined (TBD) as part of the 200-IS-1 data package. The information collected to date is presented in Table B-2.

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Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
1	200-E-111-PL	200-E-111-PL, encased pipeline from 241-ER-151 Diversion Box to C Tank Farm, and 244-AR Vault, 3-38 encasement, V108/V837/8618/8653/8901PAS	The encased pipeline runs eastward from the 241-ER-151 Diversion Box, south of 7th Street, and branches off in two directions (forming a "Y") at a point southeast of the 216-C-10 Crib. From the "Y," it branches to the C Tank Farm and the 244-AR Vault.	1952	Waste transfer encasement connected to the 241-ER-151 Diversion Box, 241-ER-152 Diversion Box, 241-CR-151, C Tank Farm, and the 244-AR Vault.	The site is an underground piping encasement that contains three 7.6 cm (3 in.) diameter, SS waste transfer pipelines, numbered "V108," "8618," and "8653," which run from the 241-ER-151 Diversion Box through a "Y" that branches to the C Tank Farm and the 244-AR Vault. The section from the "Y" junction to the 244-AR Vault contains two 7.5 cm (3 in.) pipelines numbered "809," and "818." There is a posted CA on top of the line at the "Y" junction where the line branches to the C Tank Farm and the 244-AR Vault. The entire length of the pipeline is marked with steel fence posts and posted as a URM area. The ground surface above the pipeline is bare in spots; other sections are vegetated with crested wheatgrass, tumbleweeds, and native grass species.	Tank Farm Process Piping	UPR-200-E-86	Waste Site Length: 4,204 m (13,793 ft) Cumulative Pipeline Length: 9,167 m (30,076 ft) Pipeline Depth: TBD ft	Not available	May 2000 rad survey found growing tumbleweeds at swab riser; contamination levels measured up to 2,000 dpm beta/gamma.
2	200-E-112-PL	200-E-112-PL, B Plant Process Sewer, 2904-E-1, Pipeline from B Plant to 207-B Retention Basin, 24-in. VP Line	The underground pipeline connect B Plant and the 207-B Retention Basin. It extends eastward from the southeast corner of B Plant, then turns northward, connecting to the west side of the 207-B Retention Basin.	Not specified	The process sewers are associated with 221-B (B Plant) and the 207-B Retention Basin	The site is the 61cm (24 in.) diameter vitrified clay underground process sewer from B Plant to the 207-B Retention Basin. The pipeline is also known as 2904-E-1. B Plant routinely discharged process effluent containing small amounts of radioactivity to the 207-B Retention Basin via an underground process sewer pipeline. On several occasions large unplanned amounts of radioactive material were released to the underground sewer lines. The pipelines are marked above ground with steel posts and marked as URM/Pipeline. Access manholes are located at intervals along the length of the pipelines. Vegetation over the pipelines consists of grass and tumbleweeds, with several areas of bare soils.	Radioactive Process Sewer	UPR-200-E-32	Waste Site Length: 1,238 m (4,062 ft) Cumulative Pipeline Length: 2,127 m (6,977 ft) Pipeline Depth: TBD ft	TBD	In 1963, a coil leak developed and released ~ 30 curies of Ce-144 into the process sewer.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
3	200-E-113-PL	200-E-113-PL, Pipeline from PUREX to 216-A-6, and 216-A-30 Cribs, 216-A-42C Valve Box, Line 8824	The site extends in an easterly direction from the southeast end of the PUREX plant to the 216-A-6 and 216-A-30 Cribs.	Not specified	Associated with the PUREX facility, the 216-A-6 Crib, the 216-A-42 Retention Basin and the 216-A-42C Valve Box	The pipeline is an underground 40.6 cm (16 in.) diameter CS pipeline that extends from the PUREX Plant to a distribution box located on the west side of the 216-A-6 Crib, and continues eastward to the 216-A-30 Crib. This pipeline transported steam condensate waste from the PUREX facility to the 216-A-30 Crib via Distribution Box 1. The effluent from this line had the capability of being sent to the 216-A-6 Crib or the 216-A-30 Crib. From 1961 to 1966 the 216-A-6 and 216-A-30 Cribs operated in parallel. After the 216-A-6 Crib was abandoned in 1970, all the effluent in this pipeline was diverted to the 216-A-30 Crib. The distribution box was filled with concrete in 1995. The effluent was monitored for radionuclides with an in-line monitoring system. If concentrations exceeded the discharge limits, and alarm was sounded in the dispatcher's office, a verification sample was collected and the stream automatically diverted to the 216-A-42 Retention Basin. The pipeline is marked with steel fencing and posted as URM and Pipeline over its entire length. The 216-A-42C Valve Box is located on the pipeline, inside a domed cover.	Process Sewer	None	Waste Site Length: 883 m (2,897 ft) Cumulative Pipeline Length: 1,916 m (6,285 ft) Pipeline Depth: TBD ft	TBD	In 2008, Geophysical Logging of DPT hole C6650 showed detections of Cs-137 above background.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
4	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	The pipeline begins north of the 241-BY Tank Farm at the 216-BY-201 Flush Tank. It extends eastward to a point between the 216-B-8 Crib, and the 216-B-51 French Drain. The pipeline turns southward and connects to a valve pit. A portion of the line diverts from the valve pit to the 241-C Tank Farm. Another portion of pipeline continues south and connects to the 216-BC-201 Siphon Tank in the BC Cribs and Trenches area. The BC Cribs and Trenches are located south of 200 East Area, south of Route 4 South.	Not specified	The pipeline is associated with the 241-BY Tank Farm, 241-C Tank Farm, the BC Cribs, and Trenches, 200-E-221-PL (to 216-B-51), and the 200-E-223 Valve Pit.	The pipeline is constructed of two parallel, 10.2 cm (4 in.) diameter CS pipes buried in the same soil trench. Encasements were constructed at areas where the pipeline crosses under roadways. In the 1980's, approximately 6 hectares (15 acres) of property, located east of Baltimore Avenue and north of 241-B Tank Farm, was posted a large Soil Contamination Area. It was known as UPR-200-E-144 (alias UN-216-E-44). A portion of this pipeline is located within the area formerly known as UPR-200-E-144. In 1992, the entire 6 hectare (15 acre) unplanned release area was released from radiological control. This was accomplished by scraping the contaminated soil into a pile and placing it on top of the 216-B-7 A&B, and 216-B-11 A&B Cribs. The pile of soil and the cribs were covered with clean dirt and reposted with URM signs. Soil samples were collected and radiological surveys the area was done. When the project was completed in 1992, no radiological posting existed north of the 216-B-7 A&B, and 216-B-11 A&B Cribs. The Contamination Areas on this pipeline were identified after the UPR-200-E-144 remedial action and is not considered to be part of that unplanned release.	Radioactive Process Sewer	None	Waste Site Length: 4,743 m (15,561 ft) Cumulative Pipeline Length: 9,295 m (30,497 ft) Pipeline Depth: TBD ft	TBD	In February 2000, they found growing contaminated vegetation on the underground pipeline northeast of 241-B Tank Farm, approximately 27 m (90 ft) southeast of the 216-B-51 French Drain. The maximum contamination levels identified was 2,000 counts per minute beta/gamma.
5	200-E-116-PL	200-E-116-PL, pipelines from 241-B-154 Diversion Box to 241-C-151, and 241-C-152 Diversion Boxes, direct buried pipeline, V111/V210/V130	The site is located north of and runs parallel to 7th Street, between B Plant and the C Tank Farm in 200 East Area.	Not specified	B Plant, 241-B-154 Diversion Box, 241-C-151 Diversion Box, 241-C-152 Diversion Box, and C Tank Farm.	The pipeline is posted as "Underground Radioactive Pipeline," which extends from the 241-B-154 Diversion Box to the 241-C-151, and 241-C-152 Diversion Boxes. Vegetation over the pipeline has been crushed by vehicle traffic. An area located just north of the 241-B-154 Diversion Box was posted as a High CA in September 2000, but was covered with a biobarrier and gravel in February 2001. It is now a rectangular posted URM area over a portion of the pipeline. Another area of contamination was found on this pipeline in June 2001. This area was covered with gravel and posted as a URM in August 2001.	Tank Farm Process Piping	UPR-200-E-82	Waste Site Length: 1,425 m (4,675 ft) Cumulative Pipeline Length: 2,575 m (8,448 ft) Pipeline Depth: TBD ft	Radioactive mixed waste.	In September 2000, rad survey revealed contamination levels to 50,000 cpm. In June 2001, rad survey found contamination levels in vegetation adjacent to the area with up to 50,000 cpm.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
6	200-E-126-PL (includes 200-E-126-PL-B)	200-E-126-PL, Underground Pipeline from 207-B to 216-B-3 Ditch	The pipeline extends eastward from the 207-B Retention Basin, to Diverter Station #2. The pipeline splits into two branches east of Diverter Station #2. A portion of pipeline extends from Diverter #2 to the 216-B-3 ditches. A branch of pipeline extends eastward from Diverter Station #2 and runs to Diverter Station #3. A separate section of corrugated metal pipe connects the southeast corner of the 216-B-3A Lobe to the northwest corner of the 216-B-3C lobe.	Not specified	The site is associated with Diverter Stations #2 and Diverter Station #3 as well as the 207-B Retention Basin, B Plant, PUREX and the 200 East Powerhouse. Portions of the original pipeline were re-used to feed the TEDF system (600-291-PL).	Due to the restructuring of OUs, as described in the Tentative Agreement for Central Plateau Cleanup, this pipeline has been split into segments (200-E-126-PL-A, and 200-E-126-PL-B). The waste site was originally described as an underground pipeline from 207-B Retention Basin to the 216-B-3A, 216-B-3B, and 216-B-3C Ponds. The portion of pipeline east of Canton Avenue (that fed the B Pond lobes) is being excluded from this site description because it is being re-used to feed the TEDF and is active. The pipeline from 207-B to Diverter Station #2 is constructed of 55.9 cm (22 in.) diameter plastic pipe. The pipeline east of Diverter Station #2 splits into two pipelines. The southern part extends from Diverter Station #2 to the head end of the 216-B-3 ditches. It is constructed of 53 3 cm (21 in.) diameter vitrified clay pipe. The northern part extends from Diverter Station #2 to Diverter Station #3 and is constructed of 61.0 cm (24 in.) diameter corrugated metal pipe. The pipelines are marked with steel posts and URM Pipeline signs. A piece of 76.2 cm (30 in.) diameter corrugated metal pipe connects the southeast corner of 216-B-3A Pond to the northeast corner of 216-B-3C Pond. It is considered part of this waste site because it is associated with pond effluent distribution and is not part of the TEDF system.	Radioactive Process Sewer	None	Waste Site Length: 2,796 m (9,173 ft) Cumulative Pipeline Length: 3,155 m (10,350 ft) Pipeline Depth: TBD ft	TBD	In 2010, a 2 × 2 ft area of contaminated soil was posted with SCA signs. A maximum of 10,000 cpm was detected.
7	200-E-127-PL (includes 200-E-127-PL-B)	200-E-127-PL, PUREX Cooling Water Line, Pipeline from PUREX to Gable and B-Ponds (216-A-25, and 216-B-3), Line 1601	The pipeline extends northward, along the east side of 200 East Area. It begins at the PUREX facility and the 216-A-42 Retention Basin. It continues northward to the 216-A-25 Pond (Gable Mountain Pond). A portion of the pipeline extends between the 241-A-201 Emergency Cooling Water storage tanks and the 216-A-42 Diverter Station.	Not specified	The pipeline is associated with the PUREX, B Plant and the 242-A Evaporator facilities and 216-A-25 (Gable Mountain Pond), Diverter Structure #3, 241-A-201 Emergency Cooling Water Storage Tanks, 216-A-42 Basin, 200-E-127-PL-A, and 200-E-127-PL-B.	Due to the restructuring of OUs, as described in the Tentative Agreement for Central Plateau Cleanup, this pipeline has been split into segments (see 200-E-127-PL-A, and 200-E-127-PL-B). The majority of the pipeline is constructed of large diameter corrugated metal pipe. The 91.4 cm (36 in.) diameter corrugated metal pipe enlarges to 106.7 cm (42 in.) diameter corrugated metal pipe at Manhole #8 (north of B Pond). The pipeline is marked with steel posts and URM Pipeline signs. Near the 810 gate, an area of growing contaminated vegetation was stabilized with biobarrier and posted with URM Area signs. A portion of the pipeline is under the LERF berm.	Radioactive Process Sewer	None	Waste Site Length: 4,045 m (13,270 ft) Cumulative Pipeline Length: 4,385 m (14,387 ft) Pipeline Depth: TBD ft	TBD	In 2008, Geophysical Logging of DPT hole C6697 and C6698 showed detections of Cs-137 above background.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
8	200-E-135	200-E-135, Contamination Area South of C Tank Farm	The site is located south of 7th Street and southwest of the C Tank Farm.	Not specified	One direct-buried 12 in. cooling water pipeline is known to be in area; other sources are likely.	An abandoned, aboveground steam pipe is located inside the posted area. The DynCorp, Inc. ISVAC group submitted this CA as a Discovery Site because of growing contaminated vegetation. Growing contaminated vegetation usually suggests the presence of an underground pipeline. The drawings reviewed found one 30.5 cm (12 in.) diameter "Direct Buried" cooling water line near where one of the tumbleweeds was found. The line passes through the eastern end of the posted CA. It may be a contributing source of contamination. However, the large size of the posted area indicates that other sources (currently unknown) are likely. In September 2000, three growing contaminated tumbleweeds were found inside the posted area. The maximum contamination level was 1,000 c/min above background. All of the contaminated weeds were detached from the ground and removed by the DynCorp, Inc. ISVAC group in September 2000. An assessment survey was performed in April 2002 and found maximum direct readings of 5,000 and 100,000 c/min inside the posted area. In July 2002, the area was surface stabilized and down posted to a URM.	Unplanned Release	None	Dimensions: 102.4 × 50 m (336 × 164 ft); irregular	Not available	April 2002: maximum direct readings up to 100,000 cpm.
9	200-E-143-PL	200-E-143-PL; Tank Farm Transfer Lines 4101, 4102, 4103, 4104, 4105, 4106, 4107/V033, 4017, 4018, and 8656; Encased Transfer Line from 241-AX-151 Diversion Box to 241-A Tank Farms; 244-CR Vault in 241-C Tank Farm	The concrete encased transfer line extends from the 241-AX-151 Diverter Station, near the corner of Route 4, and Buffalo Avenue to 244-CR Vault, 241-C Tank Farm.	Not specified	Associated with 241-AX-151, 241-A Tank Farm and 241-C Tank Farm.	The waste site is an underground concrete encased transfer line containing nine, 10.2 cm (4 in.) diameter, SS pipes. Groups of lines divert from the encasement at various points along the route to 244-CR Vault. Lines 4101, 4102, and 4103 divert into the south end of 241-A Tank Farm to feed tanks 241-A-101, 241-A-102, and 241-A-103. Lines 4104, 4105, 4106, 4017, and 4018 divert from the encasement at the north end of 241-A Tank Farm to feed tanks 241-A-104, 241-A-105, 241-A-106, and 241-AX-152 Diversion Box. Line 4107 diverts to 241-A-152 Diversion Box. North of 241-A Tank Farm, line 8656 continues to the 244-CR Vault, inside 241-C Tank Farm.	Encased Tank Farm Pipeline	None	Waste Site Length: 489 m (1,604 ft) Cumulative Pipeline Length: 517 m (1,697 ft) Pipeline Depth: TBD ft	TBD	In 2010, a damaged riser was found. Contamination survey of the riser showed 50 cpm direct beta/ gamma and no direct alpha readings.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
10	200-E-144-PL	200-E-144-PL; Tank Farm Transfer Line 4012, Transfer Line 4013 (A-4013); Encased Transfer Line from 241-CR-152, and 241-CR-153 to 241-AX-151; Lines 4006, and 4007 from 244-AR Vault to 241-AX-151	The pipeline extends from 241-C Tank farm to the 241-AX-151 Diversion Box, located south of 204 AR, near the corner of 4th Street and Buffalo Avenue at the 244-AR Vault facility.	Not specified		Lines 4012, and 4013 are located within the same encased pipe trench. 4012, and 4013 run in the same encasement as V228, and 244-PAS (see site codes 200-E-145-PL, and 200-E-147-PL) from the 241-C Tank Farm to 244-A Lift Station. Lines 4012, and 4013 continue south from 244-A, in a separate trench, to the 241-AX-151 Diversion Box. Lines 4006, and 4007 share this encasement with lines 4012 and 4013 from the 244-AR Vault facility to the 241-AX-151 Diversion Box. Line 4013 is shown as A-4013 inside the diversion box on drawing H-14-1044175 because it is attached it the U3A nozzle. The transfer line is radiologically posted as a URM Area. Two SS pipelines are inside the pipe trench. Lines 4012, and 4013 (A-4013) originate inside the 241-C Farm at the 241-CR-152 and 241-CR-153 Diversion Boxes, passes through the 241-ER-153 Diversion Box, and terminate at the 241-AX-151 Diverter Station. Both lines are 7.6 cm (3 in.) in diameter pipes.	Encased Tank Farm Pipeline	None	Waste Site Length: 566 m (1,857 ft) Cumulative Pipeline Length: 1,679 m (5,507 ft) Pipeline Depth: TBD ft	TBD	None
11	200-E-145-PL	200-E-145-PL; Interplant Transfer Line, Tank Farm Transfer Line V228; Transfer Pipeline from 241-CR-153 to 241-ER-153, 241-ER-152, and 241-ER-151	Line V228 originates in 241-C Farm at the 241-CR-153 Diversion Box, passes through the 241-ER-153 Diversion Box south of 241-C Farm and continues to the 241-ER-152 Diversion Box. Line 244 originates at B Plant and is connected to both 241-ER-151 and 241-ER-152 Diversion Boxes. Line 244 is in the same trench as V228 from 241-ER-152 to 241-ER-153. Both lines continue into 241-C Tank Farm at the 241-CR-153 Diversion Box.	Not specified	The pipelines are associated with Diversion Boxes 241-ER-151, 241-ER-152, 241-ER-153, 241-CR-153, and pipeline site codes 200-E-144-PL and 200-E-147-PL.	The pipeline is a 7.6 cm (3 in.) diameter pipeline called the Interplant Transfer System per drawing H-2-44501, Sheet 92. Pipelines V-228, and PAS-244 are inside the same pipe trench. The 241-ER-152 Diversion Box is located on the west side of the pipeline. The 241-ER-153 Diversion Box is located on the east side of the pipeline. From 244-A to 241-C, lines V228, and PAS-244 join lines 4012 and 4013 (see 200-E-144-PL). Line V228 originates in 241-C Farm at the 241-CR-153 Diversion Box, passes through the 241-ER-153 Diversion Box south of 241-C Farm and continues to the 241-ER-152 Diversion Box. Line 244 originates at B Plant and is connected to both 241-ER-151 and 241-ER-152 Diversion Boxes. Line 244 is in the same trench as V228 from 241-ER-152 to 241-ER-153. Both lines continue into 241-C Tank Farm at the 241-CR-153 Diversion Box.	Encased Tank Farm Pipeline	None	Waste Site Length: 2,145 m (7,037 ft) Cumulative Pipeline Length: 2,255 m (7,397 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
12	200-E-147-PL	200-E-147-PL; Interplant Transfer Line, Tank Farm Transfer Line PAS-244, Transfer Line from 244-CR-TK-003 to 241-ER-153	Line PAS-244 originates inside 241-C Tank Farm, at the 244-CR Vault (244-CR-TK-003), and terminates at the 241-ER-153 Diversion Box south of 241-C Farm and west of the 241-AZ Farm.	Not specified	The pipeline is associated with 200-E-144-PL, 200-E-145-PL, 241-ER-152, and 241-ER-153.	This is a 7.6 cm (3 in.) diameter SS pipeline. PAS is an acronym for PUREX Acid Sludge. The SS pipelines, V-228, and PAS-244, are inside the same pipe trench. The 241-ER-152 Diversion Box is located on the west side of the pipeline. The 241-ER-153 Diversion Box is located on the east side of the pipeline. From 244-A to 241-C, lines V228, and PAS-244 join lines 4012, and 4013 (see 200-E-144-PL). Transfer line PAS-244 is located in the Interplant Transfer pipe trench, per drawing H-2-44501, Sheet 92. The pipeline is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 2,159 m (7,083 ft) Cumulative Pipeline Length: 2,257 m (7,406 ft) Pipeline Depth: TBD ft	TBD	None
13	200-E-148-PL	200-E-148-PL; Tank Farm Transfer Line V109, Direct Buried Transfer Line from 241-C-151 to 241-A-01A	Line V109 originates inside the 241-C Farm at the 241-C-151 Diversion Box and terminates at 241-A-01A Pump Pit inside 241-A Farm.	Not specified	This pipeline passes beneath the Contamination Area known as 200-E-135. Growing contaminated vegetation was found in this area in 2000.	The line construction changes from 5 cm (2 in.) CS to 3 in. SS tubing inside the tank farm. A 59.7 cm (23.5 in.) diameter corrugated metal pipe, cut in half, covers this direct buried pipeline at each pipe bend location. The corrugated metal pipe secured the soil to allow movement of the waste piping at expansion joint locations. Transfer Line V109 is a 5.1 cm (2 in.) diameter, direct buried line, that is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 538 m (1,765 ft) Cumulative Pipeline Length: 604 m (1,983 ft) Pipeline Depth: TBD ft	TBD	None
14	200-E-149-PL	200-E-149-PL; Tank Farm Transfer Line V175, Direct Buried Transfer Line from 241-C-252 to 201-C Hot Semiworks, Tank Farm Pipeline	Line V175 originates inside 241-C Farm at the 241-C-252 Diversion Box and terminates at the 241-C-201-C Diversion Box in the 201-C Hot Semiworks complex.	Not specified	This pipeline is associated with 201-C and WIDS site code 200-E-56 soil contamination event.	The diameter of the pipeline changes to 8.9 cm (3.5 in.) outside diameter SS tubing at the 241-C-252 Diversion Box. Tank Farm Transfer Line V175 is a 5.1 cm (2 in.) diameter, direct buried, SS Tank Farm process waste pipe. The site is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	200-E-56	Waste Site Length: 563 m (1,847 ft) Cumulative Pipeline Length: 709 m (2,327 ft) Pipeline Depth: TBD ft	TBD	Radiation readings in 1957 were greater than 100 R/hr at a depth of 12 ft adjacent to the 201-C building and near the fence.
15	200-E-150-PL	200-E-150-PL, Tank Farm Transfer Line 8900, Direct Buried Transfer Line from 244-CR-TK-003 to 201-C Hot Semiworks Valve Box, Tank Farm Pipeline	Line 8900 originates inside 241-C Farm at 244-CR-TK-003 in 244-CR Vault and terminates at the 201-C Valve Box in the 201-C Hot Semiworks complex.	Not specified	This pipeline passes beneath the Contamination Area known as 200-E-135. Growing contaminated vegetation was found in this area in 2000.	This 5.1 cm (2 in.) diameter SS line was known as the Fission Product Transfer Line. Areas where the pipe turns are covered with a half circle corrugated metal pipe, known as an expansion encasement. Tank Farm Transfer Line 8900 is a direct buried Tank Farm process waste pipe. The site is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 598 m (1,962 ft) Cumulative Pipeline Length: 619 m (2,030 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
16	200-E-151-PL	200-E-151-PL, Tank Farm Transfer Line V050, Direct Buried Transfer Line from 241-C-104 to 241-A-152, Tank Farm Pipeline	Line V050 originates inside 241-C Tank Farm at the 241-C-104 Tank and terminates at the 241-A-152 Diversion Box, inside 241-A Tank Farm.	Not specified	The line is associated with 241-C-104, 241-A-152 and pipeline site code 200-E-152-PL.	Lines V050 and V051 are buried in the same soil trench. When the V050 line plugged, a replacement pipeline was set in the trench above the plugged line. There are actually two V050 lines in this trench. Operations did not change the line number. Tank Farm Transfer Line V050 is a 7.6 cm (3 in.) diameter, schedule 40 steel, Tank Farm process waste pipe. Most of this pipeline is direct buried. A total of 48.8 m (160 ft) of the line is encased in concrete. The site is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 408 m (1,339 ft) Cumulative Pipeline Length: 574 m (1,883 ft) Pipeline Depth: TBD ft	TBD	None
17	200-E-152-PL	200-E-152-PL, Tank Farm Transfer Line V051, Direct Buried Transfer Line from 241-C-104 to 241-A-152, Tank Farm Pipeline	Line V051 originates inside 241-C Tank Farm at the 241-C-104 Tank and terminates at the 241-A-152 Diversion Box inside 241-A Tank Farm.	Not specified	The line is associated with 241-C-104, 241-A-152 and pipeline site code 200-E-151-PL.	Lines V050 and V051 are buried in the same soil trench. Tank Farm Transfer Line V051 is a 7.6 cm (3 in.) diameter, schedule 40 steel, Tank Farm process waste pipe. Most of the line is direct buried. A total of 48.8 m (160 ft) is encased in concrete. The site is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 408 m (1,339 ft) Cumulative Pipeline Length: 630 m (2,068 ft) Pipeline Depth: TBD ft	TBD	None
18	200-E-153-PL	200-E-153-PL, Tank Farm Transfer Line V108/812, Direct Buried Transfer Line from 241-C-151 to 244-AR-TK-002, Tank Farm Pipeline	Line V108/812 originates inside 241-C Tank Farm at the 241-C-151 Diversion Box and terminates at 244-AR-TK-002 in 244-AR Vault.	Not specified	Line 812 is associated with UPR-200-E-86. It is a line leak that occurred in 1971. A posted URM Area, covered with shotcrete, remains. This pipeline also passes beneath the Contamination Area known as 200-E-135, south of 7th Street. Growing contaminated vegetation was found in this area in 2000.	Tank Farm Transfer Line V108/812 are 7.6 cm (3 in.) diameter, direct buried, Tank Farm process waste pipes. Line V108 is an SS pipe. Line 812 is a CS pipe. The site is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	UPR-200-E-86	Waste Site Length: 462 m (1,516 ft) Cumulative Pipeline Length: 541 m (1,774 ft) Pipeline Depth: TBD ft	TBD	In 1971, 17,385 gallons of Cs contaminated liquid was released from the waste line. Maximum contamination was detected at 5 R/hr between 3 and 6 ft bgs.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
19	200-E-154-PL	200-E-154-PL; Tank Farm Transfer Line V113, Direct Buried Transfer Line from 241-C-151 to 241-AX-01A, Tank Farm Pipeline	Line V113 originates inside 241-C Tank Farm at the 241-C-151 Diversion Box and terminates at 241-AX-01A Pump Pit inside the 241-A Tank Farm.	Not specified		A URM area is posted over a portion of 200-E-154-PL. It is located near the corner of 7th Street and Buffalo Avenue. All the straight portions are direct buried. A half circle, corrugated metal pipe covers the pipe at areas where it turns, known as an expansion encasement. Approximately 48.8 m (160 ft) of this line near 241-AX Tank Farm is pipe-in-pipe encasement at the turns. Tank Farm Transfer Line V113 is a 7.6 cm (3 in.) diameter, direct buried Tank Farm process waste pipe. The site is radiologically posted as a URM Area.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 395 m (1,296 ft) Cumulative Pipeline Length: 605 m (1,984 ft) Pipeline Depth: TBD ft	TBD	None
20	200-E-155-PL	200-E-155-PL; Pipeline from 241-C Fence to Radioactive Process Sewer Line 2904-CR-1	The pipeline originates at the 241-C-03A Pump Pit inside the 241-C Tank Farm and connects to the76.2 cm (30 in.) corrugated metal pipe (200-E-237-PL) outside the northeast corner of the 241-C Tank Farm.	Not specified	The pipeline is associated with the 241-C-03A Pump Pit and 200-E-237-PL.	Condensate from the 241-C Farm was transported to the B Pond system through this pipeline that connected to the 76.2 cm (30 in.) corrugated metal pipe (site code 200-E-237-PL). The site is an underground, 5.1 cm (2 in.) diameter, CS pipeline.	Radioactive Process Sewer	None	Waste Site Length: 86 m (282 ft) Cumulative Pipeline Length: 117 m (384 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
21	200-E-156-PL	200-E-156-PL; 216-C-1 Pipelines, Pipelines from 201-C to 216-C-1	The pipeline is located inside 200 East Area, south of 7th Street, within the Hot Semiworks stabilized area (site code 200-E-41).	Not specified	The pipeline is associated with the demolished 201-C Facility, the 216-C-1 Crib and the 200-E-41 stabilized area.	Tank 241-CX-71 received liquid waste through two 5.1 cm (2 in.) diameter SS waste inlet pipes, pipeline 200-E-156-PL from 201-C and pipeline 200-E-245-PL from the Hot Shop sink drains. As-Built Drawing H-2-4535, Revision 2, dated January 31, 1962, verifies that by this date the line from 201-C was cut and a blind flange installed near the tank. Project B-231 As-Built Drawing H-2-71672 verifies that by this time the 201 C line was cut and capped and verifies the Hot Shop sink line as capped at the shop wall by this date. The original crib line is a 10.2 cm (4 in.) diameter SS line extending from the south wall of 201-C to the 216-C-1 Crib. In 1954, the 201-C waste was rerouted through a 5.1 cm (2 in.) diameter SS line extending out of the southeast corner of 201-C. The 5.1 cm (2 in.) diameter SS replacement line ties into the original 10.2 cm (4 in.) diameter line north of the 216-C-1 Crib. The original 10.2 cm (4 in.) diameter line was rerouted to the 216-C-9 Pond. The site is the underground pipeline that fed the 216-C-1 Crib. The eastern portion of the pipeline is a 5.1 cm (2 in.) diameter SS pipe. It connects to a 10.2 cm (4 in.) diameter SS pipe as it enters the crib. It is not separately marked or posted. The pipeline is under the 200-E-41 stabilization cover material.	Radioactive Process Sewer	None	Waste Site Length: 48 m (157 ft) Cumulative Pipeline Length: 58 m (189 ft) Pipeline Depth: TBD ft	TBD	None
22	200-E-157-PL	200-E-157-PL; 216-C-10 Pipeline, Pipeline from 201-C to 216-C-10 crib (see Subsites)	The 216-C-10 Crib is located east of the Hot Semiworks stabilized area (site code 200-E-41). The crib pipeline extends from the demolished 201-C Facility, located with the 200-E-41 area, to the 216-C-10 Crib.	Not specified	The site is associated with 200-E-41, the 216-C-10 Crib and the 200-E-171-PL pipeline.	Portions of the pipeline are covered by the 200-E-41 stabilization cover material. The 216-C-10 Crib received process condensate and liquid waste from the 201-C Building via this pipeline. A gate valve is located at approximately the midpoint of the line, between 201-C and 216-C-10. The line was blanked where it tied into the 216-C-6 Crib line (see site code 200-E-171-PL). The site is two underground 5.1 cm (2 in.) diameter SS pipelines that fed the 216-C-10 Crib. The original pipeline extended from 201-C to 216-C-10. A second pipeline, from 241-CX vault, tied into the original 216-C-10 Crib line after the 216-C-6 Crib was deactivated.	Radioactive Process Sewer	None	Waste Site Length: 119 m (390 ft) Cumulative Pipeline Length: 133 m (435 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
23	200-E-158-PL	200-E-158-PL; 216-A-1 Pipeline, Pipeline from Sample Pit #3 to 216-A-1 Crib	Sample Pit #3, the 216-A-1 Crib and associated pipeline are located east of the 241-A Tank Farm, on the east side of Canton Avenue.	Not specified	The pipeline is associated with the 216-A-1 Crib.	The site is an underground pipeline. It is not separately marked or posted on the surface. The pipeline is constructed of 15.2 cm (6 in.) diameter extra strong vitrified clay.	Radioactive Process Sewer	None	Waste Site Length: 21 m (69 ft) Cumulative Pipeline Length: 25 m (83 ft) Pipeline Depth: TBD ft	TBD	None
24	200-E-159-PL	200-E-159-PL; Pipeline from 203-A to 216-A-22, Pipeline from 203-A to 216-A-28 Crib, Pipeline from UNH Truck Apron to 216-A-22 (see Subsites)	The pipeline and crib are located north of PUREX, and north of the 203-A Tank storage area.	Not specified	The pipelines are associated with 216-A-22, the UNH Truck Apron sump and 216-A-28.	The waste site is a series of underground pipelines from the 203-A Facility to the 216-A-22 and 216-A-28 Cribs and drainage from the UNH Truck Apron. The pipeline is a 10.2 cm (4 in.) SS 304 perforated pipe. It is 1.2 m (4 ft) below grade. Three lines make up this waste site. 200-E-159-PL:1 is the line from 203-A to 216-A-22. A portion of this line is aboveground and attached to the 203-A concrete retaining wall. 200-E-159-PL:2 is the drain line from the truck apron to 216-A-22. 200-E-159-PL:3 is the underground line from the 216-A-22 pipeline (Subsite 1) to the 216-A-28 Crib. The 203-A tank farm was used for storage and shipping of UNH product and concentration of UNH waste. It consisted of 460,000 L (100,000 gal) SS tanks for UNH storage and three smaller nitric acid tanks. The 216-A-22 Crib received liquid waste from the 203-A sumps and heating coil condensate from the uranyl nitrate tanks and the truck apron. The effluent was routed to the 216-A-28 Crib in 1958. The effluent piping to 216-A-28 was blanked off in November 1976 when the flow rate exceeded the infiltration capacity of the 216-A-28 Crib.	Radioactive Process Sewer	None	Waste Site Length: 6.4 m (21 ft) Cumulative Pipeline Length: 70 m (230 ft) Pipeline Depth: TBD ft	TBD	None
25	200-E-160-PL	200-E-160-PL; Pipeline from 270-E-1 to 216-B-12 Crib, V219	The pipeline is located west of 221-B, north of 7th Street.	Not specified	The site is associated with the 241-ER-151 Diversion Box, 216-B-12 Crib and 270-E-1.	The waste site is an underground 15.2 cm (6 in.) diameter and vitrified clay pipeline from the 270-E-1 neutralization pit to the 216-B-12 Crib. A 7.6 cm (3 in.) SS line (V219) diverts from a multi-line encasement to the 270-E-1 Neutralization Pit. A 15.2 cm (6 in.) SS pipeline exits the 270-E-1 tank and connects to a 15.2 cm vitrified clay pipe, that goes to the 216-B-12 Crib.	Radioactive Process Sewer	None	Waste Site Length: 323 m (1,059 ft) Cumulative Pipeline Length: 322 m (1,058 ft) Pipeline Depth: TBD ft	TBD	In 2008, Geophysical Logging was performed on DPT hole C6594. The survey detected elevated gamma radiation levels.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
26	200-E-161-PL	200-E-161-P; Pipeline from 221-BB to 216-B-55 Crib, V841	The pipeline originates south of B Plant, at 221-BB. It runs westward to the 216-B-55 Crib.	Not specified		The waste site is an underground 15.2 cm (6 in.) diameter CS pipeline that fed the 216-B-55 Crib. This line was later cut and capped and replaced with a 20.3 cm (8 in.) diameter CS pipeline.	Radioactive Process Sewer	None	Waste Site Length: 589 m (1,932 ft) Cumulative Pipeline Length: 476 m (1,561 ft) Pipeline Depth: TBD ft	TBD	None
27	200-E-162-PL	200-E-162-PL; Pipeline from 221-BB to 216-B-62 Crib, V842, Lateral Line to 216-B-12 Crib #2 (see Subsites)	The pipeline originates on the south side of B Plant at the 221-BB Sample Pit. It extends northwest of the 221-B Building to the 216-B-62 Crib.	Not specified	The pipeline is associated with 216-B-62 Crib and 216-B-12 Crib.	The waste site is a 10.2 cm (4 in.) Fiberglass Reinforced Epoxy underground pipeline that originates in the 221-BB Sample Pit. The site includes the pipeline to the 216-B-62 Crib and a lateral line to 216-B-12, Crib #2 (see Subsites). The pipeline carried B Plant process condensate waste from B Plant to 216-B-62 Crib and Crib #2 of 216-B-12.	Radioactive Process Sewer	None	Waste Site Length: 691 m (2,267 ft) Cumulative Pipeline Length: 681 m (2,235 ft) Pipeline Depth: TBD ft	TBD	None
28	200-E-163-PL	200-E-163-PL; Pipeline from B Plant Condensate Steam Diverting Pit to 216-B-64 Retention Basin	The pipeline is located west of 225-B, west of Atlanta Avenue.	Not specified	The pipeline is associated with the 216-B-64 Basin.	The effluent line from the B Plant Condensate Steam diversion pit consisted of three pipelines. Two lines were 5.1 cm (2 in.) CS and one was an 20 cm (8 in.) CS line. 216-B-64 Basin was never used for its intended purpose. The 216-B-64 Basin was reclassified as a No Action site. The pipeline was tested, but no waste was ever introduced to the system.	Radioactive Process Sewer	None	Waste Site Length: 32 m (105 ft) Cumulative Pipeline Length: 278 m (913 ft) Pipeline Depth: TBD ft	TBD	None
29	200-E-164-PL	200-E-164-PL; Pipeline to 216-A-8 Crib, Pipeline Between the 216-A-8 Control Structure and the 216-A-508 Control Structure	The pipeline runs eastward, from the 216-A-8 Control Structure (adjacent to 241-A Tank Farm) to the 216-A-508 Control Structure at the north end of the 216-A-8 Crib. The crib is located east of the 200 East Area fence.	Not specified	The pipeline is associated with the 216-A-8 Control Structure, the 216-A-508 Control Structure and the 216-A-8 Crib.	The site is a 40.6 cm (16 in.) diameter, schedule 20 steel pipeline.	Radioactive Process Sewer	None	Waste Site Length: 257 m (843 ft) Cumulative Pipeline Length: 342 m (1,121 ft) Pipeline Depth: TBD ft	TBD	None
30	200-E-165-PL	200-E-165-PL; Pipeline to 216-A-24 Crib (see Subsites)	The pipeline is located east of the 200 East Area fence. It runs north from the 216-A-508 Control Structure to the 216-A-524 Control Structure located on the west end of the 216-A-24 Crib.	Not specified		The site is a 40.6 cm (16 in.) CS pipeline. The pipeline connects the 216-A-508 Control Structure to the 216-A-524 Control Structure. A 5.1 cm (2 in.) diameter bypass line extends from the 216-A-524 Control Structure to the third lobe of the crib structure (see Subsites).	Radioactive Process Sewer	None	Waste Site Length: 213 m (699 ft) Cumulative Pipeline Length: 504 m (1,654 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
31	200-E-166-PL	200-E-166-PL; Pipeline to 216-A-34 Ditch	The pipeline extends eastward from the 241-A Tank Farm, beyond the 200 East Area fence, to the head end of 216-A-34.	Not specified	The site is associated with the 216-A-8 Sample Pit (control structure) and the 216-A-34 Ditch.	The site is an underground, 38.1 cm (15 in.) diameter vitrified clay pipe. The 216-A-34 ditch received cooling water from the contact condenser in the 241-A-431 Building via a VCP pipeline.	Radioactive Process Sewer	UPR-200-E-145 found contamination associated with this pipeline.	Waste Site Length: 207 m (679 ft) Cumulative Pipeline Length: 207 m (679 ft) Pipeline Depth: TBD ft	TBD	In 1993, contaminated soil with a radiological reading of 300,000 dpm beta/gamma was detected at a depth of 2.5 ft bgs.
32	200-E-167-PL	200-E-167-PL; Underground Pipelines from 244-A Lift Station to 241-A-A and 241-A-B Valve Pits, Lines SN-215 and SN-216	The pipeline is located south of 7th Street and west of Buffalo Avenue, inside 200 East Area.	Not specified	The pipelines are associated with the 244-A Lift Station and the 241-A Tank Farm.	The waste site is two underground, CS pipelines. Lines SN-215 and SN-216 are in the same trench that connects 244-A Lift Station with the 241-A-A and 241-A-B Valve Pits. They are double contained (pipe-in-pipe), CS lines that are surrounded by a minimum of 7.6 cm (3 in.) of polyurethane insulation. The interior pipe is 7.6 m (3 in. diameter) schedule 40 pipe. The outer pipe is 15.2 cm (6 in. diameter) schedule 40 pipe.	Encased Tank Farm Pipeline	None	Waste Site Length: 396 m (1,299 ft) Cumulative Pipeline Length: 930 m (3,051 ft) Pipeline Depth: TBD ft	TBD	None
33	200-E-168-PL	200-E-168-PL; Underground Pipeline to 216-A-3	The pipeline is located north of 202-A (PUREX) and south of the 275-EA Building.	Not specified	The pipeline is associated with 216-A-3 Crib.	The waste site an underground 10.2 cm (4 in.) Schedule 10 perforated 304 SS pipe placed horizontally 2.4 m (8 ft) below grade. Two 6.1 m (20 ft) lengths of this pipe placed perpendicularly to the first pipe, forming an H pattern inside the crib. From 1956 to 1967, the site received silica-gel regeneration waste and pump house drainage from 203-A and drainage from the UNH storage pit. The silica gel discharge was discontinued in 1967.	Radioactive Process Sewer	None	Waste Site Length: 111 m (364 ft) Cumulative Pipeline Length: 129 m (423 ft) Pipeline Depth: TBD ft	TBD	None
34	200-E-169-PL	200-E-169-PL; Pipeline to the 216-C-3 Crib	The pipeline extends from the demolished 215-C Building and the 201-C building to the 216-C-3 Crib. The majority of the pipeline is located west of the 201-C Building.	Not specified	The site is associated with the 216-C-3 Crib and pipeline 200-E-255-PL.	The waste site is an underground vitrified clay pipeline that fed the 216-C-3 Crib. The diameter of the vitrified clay pipe varied from 10.2 cm (4 in.) to 15.2 cm (6 in.). There are two manholes associated with this pipeline. Pipeline 200-E-255-PL tees off of 200-E-169-PL and fed the 216-C-9 Pond.	Radioactive Process Sewer	None	Waste Site Length: 310 m (1,017 ft) Cumulative Pipeline Length: 333 m (1,091 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
35	200-E-170-PL	200-E-170-PL; Pipeline from 276-C to 216-C-4 Crib	The pipeline runs southwest of the 276-C Building, west of the demolished 201-CF.	Start date not specified – 1965	The site is associated with the 216-C-4 Crib.	The waste site is an underground 5.1 cm (2 in.) diameter, SS pipeline. The 216-C-4 Crib was deactivated in 1965 by valving out the effluent pipeline when the specific retention capacity was reached. The crib received waste from the 276-C Solvent Handling Building.	Radioactive Process Sewer	None	Waste Site Length: 84 m (275 ft) Cumulative Pipeline Length: 131 m (430 ft) Pipeline Depth: TBD ft	TBD	None
36	200-E-171-PL	200-E-171-PL; Pipeline to the 216-C-6 Crib	The pipeline is located south of 7th Street, and west of the 216-C-10 Crib.		The pipeline is associated with the 216-C-6 Crib, the 241-CX Vault and the 200-E-157-PL.	The waste site is an underground 5.1 cm (2 in.) diameter CS pipeline. The 216-C-6 Crib received radioactive REDOX and PUREX type process condensate from 201-C and 241-CX Vault floor drainage via this pipeline. When the 216-C-6 Crib was discontinued, the effluent was diverted to the 216-C-10 Crib via 200-E-157-PL.	Radioactive Process Sewer	None	Waste Site Length: 20 m (65 ft) Cumulative Pipeline Length: 35 m (114 ft) Pipeline Depth: TBD ft	TBD	None
37	200-E-172-PL	200-E-172-PL; Pipeline from 209-E to the 216-C-7 Crib	The pipeline is located south of the 209-E Building.	Start date not specified – 1984	The pipeline is associated with the 216-C-7 Crib.	The site is an underground 5.1 cm (2 in.) SS pipeline. The 209-E floor drains and a 5.1 cm (2 in.) diameter drain pipe were sealed in 1984. The 209-E Building was designed to perform critical mass experiments using plutonium nitrate solutions and enriched uranium. At the completion of an experiment, the waste in the Neutron Reflector Tanks was discharged to a 222 L (60 gal) buried waste tank outside the building (Critical Mass Laboratory Valve Pit and Hold Up Tank (209-E-TK-111). After sampling, the tank contents that were below levels of concern were discharged to the 216-C-7 Crib.	Radioactive Process Sewer	None	Waste Site Length: 23 m (74 ft) Cumulative Pipeline Length: 23 m (74 ft) Pipeline Depth: TBD ft	TBD	None
38	200-E-173-PL	200-E-173-PL; Pipeline from 241-CX-71 to 216-C-5 Crib	The pipeline is located south of the demolished 201-C Facility. It curves around the 216-C-1 Crib area.	Start date not specified – 1955		The site is an underground 5.1 cm (2 in.) diameter CS pipeline. The site was deactivated in 1955 by valving out the effluent pipeline when the specific retention capacity was reached. The pipeline carried high salt waste that had passed through the 241-CX-71 neutralization tank to the 216-C-5 Crib.	Radioactive Process Sewer	None	Waste Site Length: 70 m (229 ft) Cumulative Pipeline Length: 72 m (237 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
39	200-E-174-PL	200-E-174-PL; 216-B-10 (A&B) Pipeline, Pipeline from 221-BC and 222-B to 216-B-10 A&B Cribs (see Subsites)	The pipeline is located south of the 221-B Building.	1949 – 1974	The pipeline is associated with the 216-B-10 A and B Cribs, 200-E-179 catch tank, the 222-B Laboratory and the 221-BC Building.	The waste site is an underground 8.9 cm (3.5 in.) diameter SS pipeline. The pipeline extends north and south from the 221-BC Building and east to west from the 222-B Building to connect to the 216-B-10 A and B Cribs. In 1949, the pipeline began to carry waste from the 222-B laboratory sink and sample slipper to the 216-B-10A and 10B Cribs. In 1969, flow to the 216-B-10A Crib was terminated. The pipeline was rerouted to feed only the 216-B-10B Crib (see Subsite 3). An in-line catch tank was added to the pipeline (see site code 200-E-179). The pipeline was extended northward to provide drainage from the 221-BC Building. The pipeline and catch tank were abandoned in 1974.	Radioactive Process Sewer	None	Waste Site Length: 133 m (436 ft) Cumulative Pipeline Length: 164 m (537 ft) Pipeline Depth: TBD ft	TBD	None
40	200-E-175-PL	200-E-175-PL; Pipeline from 292-B to 216-B-10A and B	The pipeline is located southeast of the 221-B Building. It runs diagonally from the 292-B Building to the 216-B-10 A Crib.		The pipeline is associated with the 216-B-10A Crib.	The waste site is an underground 8.9 cm (3.5 in.) diameter SS tubing pipeline. The pipeline carried floor drainage waste from the 292-B Building to the 216-B-10 A Crib.	Radioactive Process Sewer	None	Waste Site Length: 85 m (279 ft) Cumulative Pipeline Length: 100 m (328 ft) Pipeline Depth: TBD ft	TBD	None
41	200-E-176-PL	200-E-176-PL; Pipeline from 242-B to 216-B-11-A and B	The pipeline extends northward from the 242-B Evaporator Building to the 216-B-11 A and B Cribs. The pipeline runs through the 241-B Tank Farm.	Not specified	The pipeline is associated with the 242-B Evaporator and the 216-B-11 A and B Cribs.	The waste site is an underground 7.6 cm (3 in.) diameter CS pipeline. The pipeline transported condensate waste to the cribs.	Radioactive Process Sewer	None	Waste Site Length: 59 m (194 ft) Cumulative Pipeline Length: 82 m (269 ft) Pipeline Depth: TBD ft	TBD	None
42	200-E-177-PL	200-E-177-PL; Pipeline Rerouting Waste from 216-B-8 Crib Pipeline to 216-B-11A and B Reverse Wells	The pipeline extends eastward from the 216-B-8 pipeline (200-E-178-PL), north of the 241-B Tank Farm, to 216-B-11A.		The pipeline is associated with the 216-B-11 A and B Cribs and the pipeline that fed the 216-B-8 Crib (200-E-178-PL).	The waste site is an underground, 7.6 cm (3 in.) diameter CS pipeline. An aboveground, shielded sample box was situated over a flange in the pipeline. The flange is located approximately 6 m (20 ft) west of the 216-B-11 A Crib. This pipeline was installed to reroute the 216-B-8 Crib waste to the 216-B-11 A and B Cribs.	Radioactive Process Sewer	None	Waste Site Length: 97 m (318 ft) Cumulative Pipeline Length: 97 m (318 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
43	200-E-178-PL	200-E-178-PL; Pipeline from Tank 241-B-110 to 216-B-8 Crib and Tile Field	The pipeline extends northward from the 241-B-110 tank, along the east side of the 241-B Tank Farm. Most of this pipeline is located inside the 241-B Tank Farm fence.		The pipeline is associated with the B Tank Farm, 216-B-8 Crib and 200-E-177-PL (rerouted waste from 216-B-8 to 216-B-11A).	The waste site is an underground 7.6 cm (3 in.) CS pipe encased inside a 15.2 cm (6 in.) pipe. In 1955, the waste stream was diverted to the 216-B-11 A and B Cribs by cutting the pipe to the 216-B-8 Crib and rerouting the pipe to the 216-B-11 A and B Cribs (see site code 200-E-177-PL).	Radioactive Process Sewer	None	Waste Site Length: 60 m (197 ft) Cumulative Pipeline Length: 73 m (241 ft) Pipeline Depth: TBD ft	TBD	None
44	200-E-179	200-E-179, R-13 Catch Tank, Catch Tank in 216-B-10 A and B Pipeline (see site code 200-E-174-PL)	The catch tank is located approximately 20 ft north of the 216-B-10 A Crib, on the crib pipeline.		The catch tank is associated with the 216-B-10B Crib and the 200-E-174-PL.	The waste site is an underground, metal tank attached to the 216-B-10B Crib pipeline (see 200-E-174-PL). Two metal risers and a valve handle are visible at the surface. Four posts and a metal chain surround the surface features.	Catch Tank	TBD	TBD	TBD	TBD
45	200-E-180-PL	200-E-180-PL, 216-B-57 Crib Pipeline	The pipeline extends westward from the northwest corner of the 241-BY Tank farm to the 216-B-57 Crib.		The pipeline is associated with the 241-BY ITS2 structure and the 216-B-57 Crib.	The waste site is an underground 10.2 cm (4 in.) diameter CS pipeline. The Crib and a portion of the pipeline are underneath the Hanford Prototype Barrier.	Radioactive Process Sewer	None	Waste Site Length: 45 m (148 ft) Cumulative Pipeline Length: 58 m (190 ft) Pipeline Depth: TBD ft	TBD	None
46	200-E-181-PL	200-E-181-PL, 216-B-61 Crib Pipeline.	The pipeline is located northwest of the 241-BY Tank Farm.	Not specified	The pipeline is associated with the 216-B-61 Crib.	The waste site is an underground 10.2 cm (4 in.) diameter cast iron pipeline that was partially built, but never used. The 216-B-61 Crib and a portion of the pipeline were built, but never used. The length of the pipeline that leads from the waste line toward the Crib is 268 m (880 ft) long, 10.2 cm (4 in.) diameter CS and was designed for a waste flow up to 45.4 L (12 gal) per minute with equal distribution over the Crib area. However, the final 60 m (200 ft) and the tie-in connecting the 216-B-61 Crib pipeline to the waste transfer line were never installed (per 1973 drawing H-2-34522, Rev. 2).	Process Sewer	None	Waste Site Length: 205 m (673 ft) Cumulative Pipeline Length: 212 m (695 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
47	200-E-182-PL	200-E-182-PL, 216-A-7 Crib Pipeline	The pipeline extends eastward from the 241-A-302B Catch Tank, under Canton Avenue, to the 216-A-7 Crib. A portion of the pipeline is inside the 241-A Tank Farm.	Not specified	The pipeline is associated with the 241-A-152 Diversion Box, the 241-A-302B Catch Tank and the 216-A-7 Crib.	The site is an underground, 15.2 cm (6 in.) diameter, vitrified clay pipe. Cast Iron lines from the 241-A-152 Diversion Box and catch tank connect to the vitrified clay pipeline. Part of the pipeline is located inside the 241-A tank farm and part is outside the tank farm fence. The clay pipeline is reinforces where it crosses under Canton Avenue.	Radioactive Process Sewer	None	Waste Site Length: 56 m (184 ft) Cumulative Pipeline Length: 99 m (324 ft) Pipeline Depth: TBD ft	TBD	None
48	200-E-183-PL	200-E-183-PL, Pipelines from 241-A-151 Diversion Box to 216-A-2, Lines V010 and V011	The pipelines are located south of PUREX. They extend southward from the 241-A-151 Diversion Box to the 216-A-2 and 216-A-4 Cribs.	Not specified	The lines are associated with the 241-A-151 Diversion Box, 216-A-2 Crib, 216-A-4 Crib, 200-E-184-PL, 200-E-185-PL, and 200-E-196-PL.	The waste site consists of two, SS pipelines, direct buried in the same soil trench. V010 and V011 are 7.6 m (3 in.) SS pipes. Lines V014 and V016 are buried adjacent to lines V010 and V011 (see site code 200-E-185-PL).	Radioactive Process Sewer	None	Waste Site Length: 57 m (187 ft) Cumulative Pipeline Length: 120 m (395 ft) Pipeline Depth: TBD ft	TBD	None
49	200-E-184-PL	200-E-184-PL, 216-A-2 Crib Pipelines, V010, V011	The pipelines are located south of the 202-A facility and west of the 216-A-4 Crib.	Not specified	The pipelines are associated with the 241-A-151 Diversion Box, 200-E-183-PL, 200-E-186-PL and the 216-A-2 Crib.	The waste site is two parallel, 10.2 cm (4 in.) diameter, vitrified clay pipes that fed the 216-A-2 Crib. The two lines are direct buried in the same soil trench. Lines V010 and V011 are SS lines until they connect with the crib structure using a Y Branch Connection into the vitrified clay crib distribution lines. These lines were cut and capped when the 216-A-2 Crib was abandoned.	Radioactive Process Sewer	None	Waste Site Length: 30 m (98 ft) Cumulative Pipeline Length: 69 m (225 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
50	200-E-185-PL	200-E-185-PL, 216-A-4 Crib Pipelines, V014, V016	The 216-A-4 Crib lines are located south of 202-A. They enter the north side of the crib structure.	Not specified	The pipelines are associated with the 241-A-151 Diversion Box, 216-A-TK-2, 200-E-183-PL, 200-E-196-PL, and the 216-A-4 Crib.	The waste site consists of two, SS pipelines, direct buried in the same soil trench. Lines V014 and V016 are 7.6 cm (3 in.) SS pipes. Lines V010 and V011 are buried adjacent to lines V014 and V016 in the same soil trench (see site code 200-E-183-PL). Lines V014 and V016 connect into the 216-A-4 Crib structure using a Double Y Connection to connect into the vitrified clay crib distribution pipes. Line T167 enters the soil trench just north of the 216-A-4 Crib (see site code 200-E-196-PL). The line numbers indicate a specific waste stream. Waste lines V014, V016 originate at the 241-A-151 Diversion Box. They are direct buried in the same soil trench with lines V010, V011. At a point just north of the 216-A-4 Crib, the lines separate. Near the north side of the 216-A-4 Crib, line T022 from the 291-A Control House, enters the pipe trench and ties into line T167, becoming part of line T167 (see site code 200-E-196-PL). Line T167 is connected to the 216-A Sample Pit. These three lines (V014, V016 and T167) tie into the 216-A-4 Crib structure. Lines V010 and V011 split off and tie into the 216-A-2 Crib structure. Line V014 was later rerouted to 216-A-TK-2 and blanked off.	Radioactive Process Sewer	None	Waste Site Length: 96 m (315 ft) Cumulative Pipeline Length: 164 m (537 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
51	200-E-186-PL	200-E-186-PL, 216-A-31 Crib Pipelines, V010, V011	The pipelines are located south of 202-A. The 216-A-31 Crib pipelines originate at a point where the 216-A-2 Crib lines were abandoned.	Not specified	The site is associated with the 216-A-31 Crib and pipeline 200-E-184-PL.	The waste site is two underground, 7.6 cm (3 in.) diameter, SS pipes that are buried in the same soil trench. Although no contamination was released, a dose rate incident report was written in August 1961. The report indicates that the 216-A-31 Crib tie-in was made on August 25, 1961. Dose rates of 30 to 50 millirem per hour were recorded on August 25, 1961 in the work area. On August 27, 1961, an attempt was made to jet solvent from the F-13 tank to the new crib. An error was made and the waste was routed to a spare line instead of the crib, trapping the waste in the stubbed line. This created a dose rate of 500 rad per hour near the new crib lines. On August 28, 1961, the workers went back to the area to inspect the welds. No new dose rate measurements were taken. The men were exposed to the high dose rate trapped in the spare line. When discharge to the 216-A-2 Crib was discontinued, flow was diverted to the 216-A-31 Crib through two SS pipelines. The line numbers V010 and V011 indicate the waste stream was diverted from 216-A-2 to 216-A-31.	Radioactive Process Sewer	None	Waste Site Length: 47 m (154 ft) Cumulative Pipeline Length: 147 m (481 ft) Pipeline Depth: TBD ft	TBD	None
52	200-E-187-PL	200-E-187-PL; Chemical Sewer from 202-A to 216-A-29 Ditch; PUREX Chemical Sewer lines; Lines 8819, 5802, and 5701	The chemical sewer line extends from the north side of the 202-A facility and runs eastward to the head end of the 216-A-29 Ditch.	Not specified	The waste site is associated with the PUREX facility and the 216-A-29 Ditch.	The waste site is an underground chemical sewer pipeline. The pipeline begins as a 30.5 cm (12 in.) diameter vitrified clay line but increases to a 38.1 cm (15 in.) diameter vitrified clay line about midway before reaching the 216-A-29 Ditch. The original chemical sewer line connected to a 91.4 cm (36 in.) diameter corrugated metal pipe prior to entering the 216-A-29 Ditch head wall. Eight manholes and the 216-A-42E control structure are located along the pipeline. A section of this sewer near 216-A-42 Basin is constructed of polyethylene plastic. The pipeline carried PUREX chemical sewer waste to the 216-A-29 ditch. The 241-A Tank Farm was constructed during 1984 and 1985. The head end of the 216-A-29 ditch was relocated and a portion of the chemical sewer was rerouted north of the new tank farm on the north side of 4th Street. A short piece of the original 91.4 cm (36 in.) diameter corrugated metal pipe remains near the north side of the 272-AW building.	Radioactive Process Sewer	None	Waste Site Length: 1,016 m (3,333 ft) Cumulative Pipeline Length: 1,070 m (3,512 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
53	200-E-188-PL	200-E-188-PL, B Plant Chemical Sewer Line, 2904-E-2, 15 inch. VP Line, BCE	The 2904-E-2 chemical sewer line runs from the north side of 221-B to the east side of the 207-B Retention Basin. The 2904-E-2 Pipeline bypasses the retention basin to discharge directly into the 216-B-2 Ditches.		The pipeline is associated with 221-B, 225-B, 211-B, 212-B, 276-B, 224-B, 222-B, the 216-B-2 ditches, 216-B-63 ditch, 200-E-191-PL, 200-E-204-PL, 200-E-205-PL.	The site is the underground 38.1 cm (15 in.) diameter vitrified clay pipe and a section of 40.6 cm (16 in.) diameter steel piping, from B-Plant to the valve box east of the 207-B Retention Basin. The pipeline is also known as 2904-E-2 and the B Plant Chemical Sewer. The pipelines are marked above ground with steel posts and URM Pipeline signs. Access manholes are located at intervals along the length of pipelines. Vegetation over the pipelines consists of grass and tumbleweeds, with several areas of bare soil. Information for both the 2904-E-1 and 2904-E-2 pipelines was originally documented in site code 200-E-112-PL. They are separate pipelines that carried different B Plant waste components. A decision was made to give each pipeline a separate WIDS site code. The B Plant Process Sewer (2904-E-1) remained WIDS site code 200-E-112-PL. The B Plant Chemical Sewer (2904-E-2) became WIDS site code 200-E-188-PL. Some pipeline leakage had been documented in the 1970s and 1980s. Corrosion, erosion and time contributed to the defects in the sewer system. After evidence of a leak was discovered while performing an excavation near the sewer line, leak tests were conducted. Two fire hoses were placed into the sewer line. The downstream flow was equivalent to the flow from only one fire hose. Later, a temporary dam was placed in the pipeline. It took 36 hours to overflow at the sampling station. Calculating a 222 gpm flow rate, an estimated loss of 300,000 gallons per day could have been leaking into the ground from the pipeline. These results prompted the 1985 Chemical Sewer Upgrade (Project B-496). A major portion of the vitrified clay pipes on the north side of 221-B were relined. The 200-E-188-PL (2904-E-2) Pipeline bypassed the retention basin to discharge directly into the 216-B-2 Ditches. H-2-35495 shows the chemical sewer pipe being cut and plugged south of the valve pit in 1970. Two new 40.6 cm (16 in.) diameter steel pipes (see site code 200-E-205-PL) were installed to route effluent to the 216-B-2-3 ditch (see 200-E-205-PL). The piping and valve configuration allowed flow to be diverted to the 216-B-63 Ditch (See 200-E-191-PL) or the 216-B-2-3 Ditch.	Radioactive Process Sewer	UPR-200-E-138	Waste Site Length: 744 m (2,441 ft) Cumulative Pipeline Length: 782 m (2,565 ft) Pipeline Depth: TBD ft	TBD	In 1970, a leaking manometer sensing line had a dose rate of 500 R/hr at a distance of 4 inches. Several check points also had dose rates between 5 mR/hr to 5 R/hr. In 2008, Geophysical Logging in DPT hole C6606 and C6607 showed elevated Cs-137 concentrations.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
54	200-E-189	200-E-189, 216-A-TK-1 Carbonate Neutralization Tank	The tank is located south of PUREX, south of the 291-A Stack.		The tank is associated with the 291-A stack and the 216-A-TK-2 catch tank.	The waste site is an underground neutralization tank. The tank held calcium carbonate that changed the pH of the 291-A stack condensate waste via line T021.	Neutralization Tank	TBD	TBD	TBD	TBD
55	200-E-190	200-E-190, 216-A-TK-2 Catch Tank	The catch tank is located south of PUREX and west of the 216-A Sample Pit.		Line V014 is described in site code 200-E-185-PL.	The waste site is an underground catch tank. Line V014 was rerouted to 216-A-TK-2 and later blanked off. Multiple waste lines from the 216-A Sample Pit fed the catch tank. Waste was jetted from the catch tank to the 216-A-21 Crib.	Catch Tank	TBD	TBD	TBD	TBD
56	200-E-191-PL	200-E-191-PL, 216-B-63 Pipeline, Pipeline from Valve Pit to 216-B-63 Ditch	The pipeline is located northeast of the 207-B Retention Basin.	Not specified	The pipeline is associated with the 216-B-63 ditch and the 207-B Retention Basin.	The waste site is an underground, 38.1 cm (15 in.) diameter, vitrified clay pipeline. The vitrified clay pipeline is connected to the valve pit on the east side of the 207-B Retention basin by a short piece of 40.6 cm (16 in.) diameter CS pipe. The pipeline fed the 216-B-63 ditch.	Radioactive Process Sewer	None	Waste Site Length: 274 m (899 ft) Cumulative Pipeline Length: 275 m (903 ft) Pipeline Depth: TBD ft	TBD	None
57	200-E-192-PL	200-E-192-PL, 216-A-10 Pipelines (see Subsites), Lines from Sample Pit #4 to 216-A-10 Crib	The pipelines to the 216-A-10 Crib are located south of PUREX, southwest of 216-A-5.	1956 -1987	The pipeline is associated with the 216-A-10 Crib and Sample Pit #4.	The original pipeline to 216-A-10 Crib is an underground, 20.3 cm (8 in.) diameter, vitrified clay pipe. The original pipe connected to the center crib distribution line. The 216-A-10 replacement pipeline is an underground, 20.3 cm (8 in.) diameter SS pipeline. The replacement pipeline connected to a new distribution pipe, east of the original distribution pipe. The valve pit lines to the 216-A-10 Crib were blanked in April 1987, taking the crib out of service. The Process Distillate Discharge was rerouted to the 216-A-45 Crib.	Radioactive Process Sewer	None	Waste Site Length: 159 m (522 ft) Cumulative Pipeline Length: 165 m (540 ft) Pipeline Depth: TBD ft	TBD	In 2008, Geophysical Logging in DPT hole C6583 showed elevated readings of Cs-137 concentrations.
58	200-E-193-PL	200-E-193-PL, 216-A-21 Crib Pipeline, Line X015	The pipeline is located south of PUREX and east of the 216-A-4 Crib.	Not specified	The VCP pipeline is associated with the 216-A-21 Crib, 200-E-196-PL, 200-E-253-PL, and the 293-A Building.	The waste site is an underground, 15.2 cm (6 in.) diameter, vitrified clay pipeline. The pipeline from PUREX to the 216-A-36 A and B Cribs crosses this pipeline (see site code 200-E-253-PL). The 216-A-21 Crib received sump waste from 293-A Building, laboratory cell drainage from the 202-A Building, and the 291-A-1 Stack drainage via this pipeline. The VCP line was later replaced with an SS line (see site code 200-E-196-PL).	Radioactive Process Sewer	None	Waste Site Length: 102 m (335 ft) Cumulative Pipeline Length: 106 m (348 ft) Pipeline Depth: TBD ft	TBD	In 2008, Geophysical Logging in adjacent DPT holes showed elevated readings of Cs-137 concentrations.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
59	200-E-194-PL	200-E-194-PL, 216-A-32 Crib Pipeline	The 216-A-32 Crib and pipeline are located northeast of 202-A and west of the 2607-EE septic tank and tile field.	Not specified	The pipeline is associated with the 202-A Canyon and the 216-A-32 Crib.	The waste site is an underground, 15.2 cm (6 in.) diameter, vitrified clay pipeline that fed the 216-A-32 Crib. The 216-A-32 Crib received the 202-A Canyon Crane maintenance facility floor, sink, and shower drainage via this pipeline.	Radioactive Process Sewer	None	Waste Site Length: 85 m (279 ft) Cumulative Pipeline Length: 94 m (309 ft) Pipeline Depth: TBD ft	TBD	None
60	200-E-195-PL	200-E-195-PL, 241-B-361 Settling Tank and 216-B-9 Crib Pipelines, Line V204 (see Subsites).	The pipeline is located northeast of 221-B, north of the 216-B-5 Reverse Well.	1947- not known	The pipeline is associated with 221-B, the 216-B-9 Crib, 241-B-361 and pipeline 200-E-199-PL.	The site is an underground, 8.9 cm (3.5 in.) diameter, SS pipeline to the 241-B-361 Settling Tank that was later extended to the 216-B-9 Crib. Line V204 begins at the 241-B-154 Diversion Box. Line 204 is in the same soil trench as several other tank farm lines (see site code 200-E-199-PL), but diverted to the 241-B-361 Settling Tank and later routed to the 216-B-9 Crib. The drainage waste from the B Plant 5-6W cells was rerouted directly to the crib through line 204, bypassing the 241-B-361 settling tank. The 216-B-9 Crib and Tile Field were built in 1947 to replace the 241-B-361 Settling Tank and the 216-B-5 Reverse well. Line V204 was cut and rerouted to the 216-B-9 Crib.	Radioactive Process Sewer	UPR-200-E-7	Waste Site Length: 138 m (453 ft) Cumulative Pipeline Length: 168 m (551 ft) Pipeline Depth: TBD ft	TBD	Approximately 5,000 gal of liquid was lost to the ground over an area approximately 30 ft2. The maximum dose rate was 1.7 rads/hour. The contamination was covered in 1954 and delineated with a chain. It was posted as Underground Contamination.
61	200-E-196-PL	200-E-196-PL; Lines T167 and T022; SS Line to 216-A-4, 216-A-21, and 216-A-27 Cribs	The pipeline is located south of 202-A. It originates at the 216-A-4 Sample Pit. The line originally fed the 216-A-4 Crib, but later was extended further south (twice) to feed the 216-A-21 and 216-A-27 Cribs.		The pipeline is associated with the 216-A-4 Sample Pit, 216-A-TK-2, the 291-A Control House, 216-A-4 Crib, 216-A-21 Crib, 216-A-27 Crib, 216-A-26 Crib and pipeline sites 200-E-183-PL, 200-E-185-PL, 200-E-253-PL, and 200-E-270-PL.	The waste site is an underground SS pipeline that fed the 216-A-4, 216-A-21 and 216-A-27 Cribs. Portions of the line range in diameter from 5.1 cm (2 in.) to 7.6 cm (3 in.) diameter and 10.2 cm (4 in.) diameter. Line numbers indicate a specific waste stream. The T167 pipeline originally fed the 216-A-4 Crib from the 216-A-4 Sample Building. Line T022 from the 291-A Fan Control House tied into T167 just north of the 216-A-4 Crib. These lines are buried in the same soil trench as the lines described in 200-E-183-PL (V010, V011, V014, and V016). When the 216-A-4 Crib was deactivated, line T167 was rerouted to the 216-A-21 Crib. When the 216-A-21 Crib was deactivated, line T167 was rerouted to feed the 216-A-27 Crib. A branch of this pipeline tied to the 216-A-36 Crib pipeline (see site code 200-E-253-PL).	Radioactive Process Sewer	None	Waste Site Length: 251 m (823 ft) Cumulative Pipeline Length: 305 m (1,002 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
62	200-E-198-PL	200-E-198-PL; Encased Tank Farm Pipeline from 241-BX-154 Diversion to 241-BX-155 Diversion Box; Lines V282, V283, V284, and V285	The encased transfer line extends between 241-BX-154 Diversion Box, on the south side of 221-B to the 241-BX-155 Diversion Box located northeast of 221-B. The majority of this encased line is located on the west side of Baltimore Avenue.		The waste lines are associated with B Plant processes, the 241-BX-154 Diversion Box and the 241-BX-155 Diversion Box.	The waste site is an underground concrete transfer line encasement. Lines V282, V283, V284, and V285 are 8.9 cm (3.5 in.) diameter SS lines. Line V285 diverts from the encasement and connects to transfer line 200-E-199-PL.	Encased Tank Farm Pipeline	None	Waste Site Length: 926 m (3,038 ft) Cumulative Pipeline Length: 931 m (3,053 ft) Pipeline Depth: TBD ft	TBD	None
63	200-E-199-PL	200-E-199-PL; Tank Farm Lines from 241-B-154 Diversion Box to 241-B Tank Farm; Lines V204, V206, V208, V209, V211, V213, V215, and V285	The transfer line extends between the 241-B-154 Diversion Box, located at the corner of 7th Street and Baltimore Avenue and the 241-B Tank Farm. This transfer line is located on the east side of Baltimore Avenue.	Not specified	The waste site is associated with the 241-B-151, 241-B-152, 241-B-154 Diversion Boxes, and pipelines 200-E-195-PL, 200-E-198-PL, and 200-E-277-PL.	The waste site is a group of underground SS transfer lines buried in a common soil trench. All of the pipelines are 8.9 cm (3.5 in.) diameter SS lines. H-2-74451 shows a pipeline from 216-B-59B basin connecting to the 200-E-199-PL pipelines. Lines V208, V209 and V211 extend between 241-B-154 Diversion Box and 241-B-152 Diversion Box (inside 241-B Tank Farm). Lines V213 and V215 extend between 241-B-154 Diversion Box and 241-B-151 Diversion Box (inside the 241-B Tank Farm). Line V285 enters the 200-E-199-PL encasement north of 241-B-154 Diversion Box from the encasement described in 200-E-198-PL. Line V204 diverted to the 241-B-361 Settling tank and was later extended to the 216-B-9 Crib (see site code 200-E-195-PL).	Direct Buried Tank Farm Pipeline	UPR-200-E-7	Waste Site Length: 1,177 m (3, 862 ft) Cumulative Pipeline Length: 1,193 m (3,914 ft) Pipeline Depth: TBD ft	TBD	None
64	200-E-200-PL	200-E-200-PL; Pipelines from 244-AR Vault to 241-AY-152 and 241-A-153 Diversion Boxes; Lines 801, 802, 806, and 805	The pipelines extend from the 244-AR Vault building to the 241-A Tank Farm. The lines cross under Buffalo Ave	Not specified	The transfer line is associated with 244-AR Vault, 241-A-153 and 241-AY-152.	The waste site is four underground, 15 centimeter (6 inch) diameter carbon steel pipelines buried in the same soil trench. The lines split into a "Y" east of the 241-A Tank Farm fence. Lines 802 and 806 divert to 241-AY-152 Diversion Box. Lines 801 and 805 divert to the 241-A-153 Diversion Box.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 89m (280ft) Cumulative Pipeline Length: 132 m (432 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
65	200-E-201-PL	200-E-201-PL; Transfer Lines from 241-BX-155 to Diversion Boxes in 241-B Tank Farm, Lines V315 and V319	The transfer lines extend between the 241-BX-155 Diversion Box, on the west side of Baltimore Avenue and connect into the 241-B-151 and 241-B-152 Diversion Boxes located inside 241-B Tank Farm on the east side of Baltimore Avenue.	Not specified	The transfer lines are associated with B Plant processes, Diversion Boxes 241-BX-155, 241-B-151, and 241-B-152 and pipeline 200-E-202-PL.	The waste site is two underground, 8.9 cm (3.5 in.) diameter SS pipelines buried in the same soil trench. Lines V315 and V319 divert out of a bundle of lines described in site code 200-E-202-PL.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 303 m (994 ft) Cumulative Pipeline Length: 316 m (1,036 ft) Pipeline Depth: TBD ft	TBD	None
66	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	The transfer lines extend from 241-BX-155 Diversion Box to 241-BX-153 Diversion Box in the 241-BX Tank Farm. These lines are on the west side of Baltimore Avenue.	Not specified	The transfer lines are associated with B Plant process, 241-BX-155 and 241-BX-153 Diversion Boxes and pipeline site code 200-E-201-PL.	The waste site is five underground, 8.9 cm (3.5 in.) diameter SS pipelines buried in the same soil trench. Lines V316, V317, and V318 connect to the 241-BX-153 Diversion Box in 241-BX Tank Farm. Lines V315 and V319 divert eastward north of the 241-BX-155 Diversion Box to connect to the 241-B Tank Farm (see site code 200-E-201-PL).	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 262 m (860 ft) Cumulative Pipeline Length: 312 m (1,025 ft) Pipeline Depth: TBD ft	TBD	None
67	200-E-203-PL	200-E-203-PL; Pipeline from 241-BYR-154 Diversion Box to 216-B-2-2 Ditch, Line 9712.	The pipeline extends eastward from the 241-BY-154 Diversion Box, located inside the 241-BY Tank Farm. It crosses under Baltimore Avenue and connects with the head end of the 216-B-2-2 Ditch.	Not specified	The site is associated with 241-BY-154, 216-B-2-2 and pipeline site 200-E-204-PL.	The waste site is an underground, 15.2 cm (6 in.) diameter CS pipe that fed the 216-B-2-2 ditch from diversion box 241-BY-154, located inside 241-BY Tank Farm. In November 2009, contamination specks were found in an area south of 241-B Tank Farm. GPS coordinates placed the contaminated area on top of 200-E-203-PL. The information related to the contaminated area was included in the 200-E-120 Contamination Migration waste site. Because of its mapped location, the contamination could be related to the underground pipeline. The area was stabilized with clean gravel and posted as a URM Area in 2010.	Radioactive Process Sewer	200-E-120	Waste Site Length: 556 m (1,824 ft) Cumulative Pipeline Length: 589 m (1,933 ft) Pipeline Depth: TBD ft	TBD	None
68	200-E-204-PL	200-E-204-PL, Pipeline to 216-B-2-1 and 216-B-2-2 Ditches (see Subsites)	The pipeline is located northeast of the 207-B Retention Basin.	Not specified	The pipeline is associated with the 207-B Retention Basin and the 216-B-2-1 and 216-B-2 Ditches.	The waste site is an underground, 76.2 cm (30 in.) diameter vitrified clay pipeline that extends from the valve pit east of 207-B Retention Basin to the head end of the 216-B-2-1 and 216-B-2-2 Ditches. The site also includes a short section of 61.0 cm (24 in.) diameter clay pipe from the east retention basin outlet to the valve box.	Radioactive Process Sewer	UPR-200-E-32 UPR-200-E-138	Waste Site Length: 194 m (636 ft) Cumulative Pipeline Length: 202 m (662 ft) Pipeline Depth: TBD ft	TBD	In 1963, a coil leak developed, which resulted in general dose rates of 50 R/hr. In 1970, ~1,000 curies of Sr-90 was released to the 216-B-2-2 ditch from the sewer line.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
69	200-E-205-PL	200-E-205-PL, 216-B-2-3 Ditch Pipelines (see Subsites)	The pipelines are located east of the 207-B Retention Basin.	Not specified	The pipelines are associated with the 207-B Retention Basin, the B Plant Process Sewer and the 216-B-2-3 Ditch.	The waste site is two underground pipes that fed the 216-B-2-3 Ditch. One pipe is a 40.6 cm (16 in.) diameter CS line from the 207-B Retention Basin to the head end of the 216-B-2-3 Ditch. The other is a 38.1 cm (15 in.) diameter vitrified clay line from the B Plant Process Sewer line (see site code 200-E-188-PL) to the 216-B-2-3 Ditch.	Radioactive Process Sewer	None	Waste Site Length: 93 m (305 ft) Cumulative Pipeline Length: 94 m (307 ft) Pipeline Depth: TBD ft	TBD	None
70	200-E-206-PL	200-E-206-PL; Lines V716, V717, and V718/817; Double Pipes from 244-AR Vault to 241-AR-151 Diversion Box.	The diversion box is located north of the 244-AR Vault facility, east of the 291-AR ventilation system. The pipes extend eastward along the north wall of the 244-AR Building.	Not specified	The pipeline is associated with the 241-AR-151 Diversion Box and the 244-AR Vault facility.	The waste site is three underground, 7.6 cm (3 in.) diameter, SS pipes buried in the same soil trench extending from the north wall of the 244-AR Vault Building to the 241-AR-151 Diversion Box. The pipes are double contained within a larger diameter pipe.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 28 m (92 ft) Cumulative Pipeline Length: 56 m (185 ft) Pipeline Depth: TBD ft	TBD	None
71	200-E-207-PL	200-E-207-PL; Encased Transfer Line from 241-A-151 Diversion Box to 241-A-152 Diversion Box; Lines V004, V005, V006, V007, and V008	The concrete encasement originates at the 241-A-151 Diversion Box, on the south side of the PUREX building. It runs eastward and turns north to connect with the 241-A-152 Diversion Box, located inside the 241-A Tank Farm. The line crosses under both Canton Avenue and 4th Street.	Not specified	The pipelines are associated with the 241-A-151 and 241-A-152 Diversion Boxes.	The waste site is an underground concrete encasement containing five SS pipelines. Each of the five pipelines is a 8.9 cm (3.5 in.) diameter SS line. Well 299-E25-52 is located adjacent to pipeline 200-E-207-PL, inside the PUREX facility fence. The well was scheduled for decommissioning in 2007. Spectral Gamma Logging System information was collected in May 2007. A maximum concentration of 10,600 picoCuries per gram of Cs-137 was identified at a depth of 5.8 m (19 ft). Cobalt and europium were also detected.	Encased Tank Farm Pipeline	UPR-200-E-67	Waste Site Length: 601 m (1,972 ft) Cumulative Pipeline Length: 604 m (1,982 ft) Pipeline Depth: TBD ft	TBD	In 1984, contamination levels ranged from 1 to 1.5 mR/hr.
72	200-E-209-PL	200-E-209-PL, Pipeline from 272-BB to 200-E-25 Dry Well	The pipeline is located north of B Plant. It extends northward from the 272-BB Building to the 200-E-25 French drain.	Not specified	The pipeline is associated with the 200-E-25 French drain.	The waste site is an underground, 5.1 cm (2 in.) diameter, CS pipeline.	Radioactive Process Sewer	None	Waste Site Length: 15 m (50 ft) Cumulative Pipeline Length: 15 m (50 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
73	200-E-213-PL	200-E-213-PL; Transfer Lines from 221-B to 241-B-154 Diversion Box; Lines V200, V329, V330, V331, V332, V333, and V334	The transfer lines originate in various cells inside 221-B. They meet south of 221-B and run east to the 241-B-154 Diversion Box. They cross under Baltimore Avenue.		The lines are associated with 221-B and 241-B-154 Diversion Box.	The waste site is seven underground SS pipelines buried in the same soil trench. All of the lines are 8.9 cm (3.5 in.) diameter pipes. These transfer lines originate inside 221-B. They are not encased in concrete and do not connect to the 241-BX-154 Diversion Box. They were part of the original 1945 B Plant construction.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 378 m (1,240 ft) Cumulative Pipeline Length: 395 m (1,297 ft) Pipeline Depth: TBD ft	TBD	None
74	200-E-214-PL	200-E-214-PL, Pipeline to 200-E-55 French Drain, Pipeline from 291-B Sand Filter to French Drain	The pipe to the 200-E-55 French drain is located on the east side of the 291-B Sand Filter structure, southeast of B Plant.		The site is associated with the B Plant Sand Filter (site code 200-E-30) and the 200-E-55 French Drain.	The waste site is an underground, 15.2 cm (6 in.) diameter, SS pipe. An auger drill sample of the sand filter French drain was collected in September 1994. A spilt-spoon sample was collected at 4.9 m (16 ft) below ground surface. Maximum contamination levels in the soil read 20,000 disintegrations per minute beta/gamma and 2,100 disintegrations per minute alpha with hand held instruments. The sample was shipped to a mobile laboratory for analysis. The 200-E-55 French Drain received condensate from the B Plant canyon sand filter and rain water that leaked through the sand filter roof through this pipe.	Radioactive Process Sewer	None	Waste Site Length: 3.0 m (10 ft) Cumulative Pipeline Length: 3.7 m (12 ft) Pipeline Depth: TBD ft	TBD	In 1994, a split spoon sample was collected at 16 ft bgs. Max contamination levels in the soil read 20,000 dpm beta/gamma and 2,100 dpm alpha with hand held instruments.
75	200-E-215-PL	200-E-215-PL; Transfer Line Between 241-ER-151 Diversion Box and 241-ER-152 Diversion Box, Line V229	The transfer line is located southwest of B Plant. It runs between 241-ER-151 and 241-ER-152 Diversion Boxes. The line crosses under Atlanta Avenue.		The line is associated with 241-ER-151, 241-ER-152 and 200-E-147-PL.	The waste site is a direct buried underground, 7.6 cm (3 in.) diameter SS pipe inside a 15.2 cm (6 in.) CS pipe.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 198 m (650 ft) Cumulative Pipeline Length: 198 m (650 ft) Pipeline Depth: TBD ft	TBD	None
76	200-E-217-PL	200-E-217-PL; Encased Transfer Line from 241-ER-151 Diversion Box to 241-BX Tank Farm; Lines 9808, 9653, 9719, and V225 (see Subsites)	The encased transfer line extends north from the 241-ER-151 Diversion box and angles northeast to connect with the 241-BX Tank Farm. Line V225 diverts out of the encasement adjacent to the north side of the 218-E-2 Burial ground. It extends eastward to the 241-B Tank Farm.		The line is associated with the 241-ER-151 Diversion Box and the 241-B and 241-BX Tank Farms. The pipeline crosses through the 218-E-5A Burial Ground.	The waste site is four underground SS lines inside a concrete encasement. Each line is 8.9 cm (3.5 in.) in diameter. Line V225 diverts out of the encasement and extends to 241-B Tank Farm. Line V225 diverts from the concrete encasement. It extends from the encasement to 241-B Tank farm in a direct buried soil trench. The pipeline crosses through the 218-E-5A Burial Ground.	Encased Tank Farm Pipeline	None	Waste Site Length: 1,372 m (4,501 ft) Cumulative Pipeline Length: 2,505 m (8,220 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
77	200-E-218-PL	200-E-218-PL; Transfer Lines Between 241-A-151 Diversion Box and 241-AW Tank Farm; Lines V021, V022, and V023	The lines are located on the south and northeast sides of the PUREX facility. The lines go east out of the 241-A-151 Diversion Box, along the south wall of 202-A. The lines turn north and continue to the west side of the 241-AW Tank Farm. The lines connect to the 241-AW-A and 241-AW-B valve pits, inside the 241-AW Tank Farm.		The lines are associated with the 241-A-151 Diversion Box and the 241-AW A and B Valve Pits.	The waste site is three 7.6 cm (3 in.) diameter, SS pipes buried in the same soil trench. Each pipe is double contained inside a 15.2 cm (6 in.) steel pipe.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 399 m (1,309 ft) Cumulative Pipeline Length: 401 m (1,317 ft) Pipeline Depth: TBD ft	TBD	None
78	200-E-219-PL	200-E-219-PL; BY Crib Distribution Pipelines; Pipelines from 216-BY-201 Flush Tank to 216-B-43, 216-B-44, 216-B-45, 216-B-46, 216-B-47, 216-B-48, 216-B-49, and 216-B-50 Cribs (see Subsites)	The eight BY Cribs are located north of the 216-BY Tank Farm. The pipes that fed the cribs originate on the north side of the 216-BY-201 siphon tank.		The lines are associated with the 216-BY-201 Siphon Tank, 216-B-43, 216-B-44, 216-B-45, 216-B-46, 216-B-47, 216-B-48, 216-B-49, and 216-B-50 Cribs.	The waste site is an underground, 35.6 cm (14 in.) diameter, CS distribution line that fed the eight BY Cribs. A 5.1 cm (2 in.) diameter CS bypass drain line is located at 216-B-50 Crib. The pipeline distributed uranium recovery waste from the 241-BY Tank Farm to the 241-BY Cribs.	Radioactive Process Sewer	None	Waste Site Length: 226 m (741 ft) Cumulative Pipeline Length: 300 m (983 ft) Pipeline Depth: TBD ft	TBD	None
79	200-E-220-PL	200-E-220-PL, Pipeline from 241-BY Tank Farm to 216-BY-201 Flush Tank and Monitoring Pit (see Subsites)	The pipeline extends from inside 241-BY Tank Farm, north of 241-BY-101, to the 216-BY-201 Flush Tank. It crosses under the tank farm gravel access road diagonally and enters the flush tank at the southeast corner of the tank. The monitoring pit is located approximately 1.5 m (5 ft) southeast of the flush tank.		The pipeline is associated with the 241-BY Tank Farm and the 216-BY-201 Flush Tank.	The waste site is an underground, 5.1 cm (2 in.) diameter, CS pipeline and a concrete monitoring pit. The pipeline runs through the monitoring pit before connecting to the 216-BY-201 Flush Tank.	Radioactive Process Sewer	None	Waste Site Length: 62 m (203 ft) Cumulative Pipeline Length: 99 m (325 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
80	200-E-221-PL	200-E-221-PL, Pipeline to 216-B-51 French Drain, BC Crib Pipeline Drain Line	The drain line from 200-E-114-PL to the 216-B-51 French Drain is located south of 12th Street and east of Baltimore Avenue.		The pipeline is associated with the 200-E-114-PL pipeline to the BC Cribs and the 216-B-51 French Drain.	The waste site is an underground, 2.5 cm (1 in.) diameter, CS drain line. The pipeline carried flush drainage from the BC pipeline (200-E-114-PL) to the 216-B-51 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 26 m (85 ft) Cumulative Pipeline Length: 78 m (255 ft) Pipeline Depth: TBD ft	TBD	None
81	200-E-222-PL	200-E-222-PL, Distribution Pipelines from 216-BC-201 Siphon Tank to BC Cribs (see Subsites)	The pipelines are located south of Route 4A. The lines extend from the 216-BC-201 Siphon Thank to the six BC Cribs.		The lines are associated with the 216-BC-201 Siphon Tank, 216-B-14, 216-B-15, 216-B-16, 216-B-17, 216-B-18, 216-B-19 Cribs.	The waste site is an underground, 35.6 cm (14 in.) diameter, CS distribution line that fed the six BC Cribs. A 5.1 cm (2 in.) diameter CS bypass drain line is located at 216-B-18 Crib.	Radioactive Process Sewer	None	Waste Site Length: 205 m (673 ft) Cumulative Pipeline Length: 285 m (935 ft) Pipeline Depth: TBD ft	TBD	None
82	200-E-223	200-E-223, BC Pipeline Valve Pit, 200-E-114-PL Valve Pit	The valve pit is located north of 7th Street and east of the 216-B-59 Basin.		The valve pit is associated with 200-E-114-PL.	The concrete valve pit is surrounded with posts and chain and posted with radiological warning signs. The valve pit regulated flow of the Uranium Recovery Process waste being transferred to the BC Cribs and Trenches. The valve pit contains six iron gate valves.	Valve Pit	TBD	TBD	TBD	TBD
83	200-E-224-PL	200-E-224-PL; 241-A-151 Diversion Box Drain Line to 241-A-302A Catch Tank, Line V027	The 241-A-151 Diversion Box and 241-A-302A Catch Tank are located on the south side of the PUREX facility. The drain line extends between the two structures.		The drain line is associated with the 241-A-151 Diversion Box and the 241-A-302A Catch Tank.	The waste site is an underground, 8.9 cm (3.5 in.) diameter, SS drain line that is encased in concrete.	Encased Tank Farm Pipeline	None	Waste Site Length: 14 m (46 ft) Cumulative Pipeline Length: 14 m (47 ft) Pipeline Depth: TBD ft	TBD	None
84	200-E-225-PL	200-E-225-PL; Transfer Line from 241-AR-151 Diversion Box to 241-AY-102 Tank, Line V720.	The line extends from the 241-AR-151 Diversion Box, north of the 244-AR Vault facility to the 241-AY-102 tank. It crosses under Buffalo Avenue.		The pipeline is associated with the 241-AR-151 diversion box and the 241-AY-102 Tank.	The waste site is an underground, 7.6 cm (3 in.) diameter SS pipe encased within a 15.2 cm (6 in.) diameter pipe.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 64 m (210 ft) Cumulative Pipeline Length: 124 m (406 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
85	200-E-226-PL	200-E-226-PL; Transfer Line from 221-B to 241-C-154, Promethium Transfer Line, V743	The pipeline extends from the south side of 221-B (Cell 8) to the Hot Semiworks 241-C-154 Diversion Box. The line crosses under Baltimore Avenue and turns south crossing under 7th Street. The line runs eastward paralleling the 200-E-111-PL pipeline, just north of 200-E-111-PL. The line crosses through the 209-E fence and terminates at the 241-C-154 Diversion Box.		The pipeline is associated with B Plant operations, Hot Semiworks operations and 241-C-154 Diversion Box.	The waste site is an underground, 5.1 cm (2 in.) diameter SS (promethium) transfer line. Hanford drawing mentions soil mounding over the pipeline. The pipeline transferred radioactive promethium solutions from 221-B to 201-C.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 1,230 m (4,035 ft) Cumulative Pipeline Length: 1,242 m (4,074 ft) Pipeline Depth: TBD ft	TBD	None
86	200-E-227-PL	200-E-227-PL; Transfer Lines Between 244-AR Vault Facility and 241-AX-151 Diversion Box; Lines 4005/810, 4015/814, and 4019/817	The transfer lines extend southward from 244-AR Vault to 241-AX-151 Diversion Box, west of Buffalo Avenue.		The pipelines are associated with the 244-AR Vault and the 241-AX-151 Diversion Box.	The waste site is an underground concrete encasement that contains two 7.6 cm (3 in.) diameter SS pipes and one 10.2 cm (4 in.) diameter SS pipe.	Encased Tank Farm Pipeline	None	Waste Site Length: 123 m (404 ft) Cumulative Pipeline Length: 169 m (556 ft) Pipeline Depth: TBD ft	TBD	None
87	200-E-228-PL	200-E-228-PL; Drain Lines from 241-ER-151 Diversion Box to 241-ER-311 and 241-ER-311A Catch Tanks; Lines V224, V226, and V226-1 (see Subsites)	The pipelines are located southwest of B Plant, west of Atlanta Avenue, inside the 241-ER-151 Diversion Box chain link fence.		The lines are associated with the 241-ER-151 Diversion Box, 241-ER-311 and 241-ER-311A Catch Tanks.	The waste site is three underground drain lines that connect the 241-ER-151 Diversion Box to the 241-ER-311 and 241-ER-311A Catch Tanks. Line V224 is a 7.6 cm (3 in.) diameter SS line. Lines V226 and V226-1 are 10.2 cm (4 in.) diameter SS lines. The original catch tank was suspected to be leaking. It was renamed 241-ER-311A and replaced with a second catch tank located south of the original catch tank. The replacement catch tank was named 241-ER-311.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 55 m (180 ft) Cumulative Pipeline Length: 63 m (206 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
88	200-E-229-PL	200-E-229-PL; Transfer Line Between tank 241-AP-102 and 241-A-B Valve Pit, Line SN-650	The line extends north out of the 241-AP Tank Farm. It crosses under 4th Street and travels east on the north side of 4th Street. The line turns north on the west side of the 242-A Evaporator. The line terminates at the 241-A-B Valve Pit, inside the 241-A Tank Farm.		The pipeline is associated with the 241-AP-102 tank and the 241-A-B valve pit.	The waste site is an underground, 7.6 cm (3 in.) diameter SS line that is double encased within a 15.2 cm (6 in.) diameter pipe.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 265 m (869 ft) Cumulative Pipeline Length: 313 m (1,027 ft) Pipeline Depth: TBD ft	TBD	None
89	200-E-230-PL	200-E-230-PL, Pipeline from 292-B to 216-B-4 Reverse Well	The pipeline is located southeast of B Plant, extending north from the 292-B Building.		The pipeline is associated with the 292-B Building and the 216-B-4 Well.	The waste site is an underground, 15.2 cm (6 in.) diameter, vitrified clay pipe that fed the 216-B-4 Reverse Well. The pipeline transferred floor drainage from 292-B to 216-B-4.	Radioactive Process Sewer	None	Waste Site Length: 8.2 m (27 ft) Cumulative Pipeline Length: 8.2 m (27 ft) Pipeline Depth: TBD ft	TBD	None
90	200-E-231-PL	200-E-231-PL, 216-A-45 Crib Pipeline	The pipeline is located south of the PUREX security fence and south of the 216-A-10 Crib.		The pipeline is associated with the 216-A-45 Crib and the 216-A-10 pipeline (200-E-192-PL).	The waste site is an underground, 20.3 cm (8 in.) diameter fiberglass pipeline that fed the 216-A-45 Crib. The 216-A-45 Crib was built to replace the 216-A-10 Crib.	Radioactive Process Sewer	None	Waste Site Length: 340 m (1,115 ft) Cumulative Pipeline Length: 341 m (1,118 ft) Pipeline Depth: TBD ft	TBD	None
91	200-E-232-PL	200-E-232-PL, Pipeline from 207-A Basins to 216-A-30 and 216-A-37-1 Cribs (see Subsites)	The pipeline is located northeast of the PUREX facility. It extends from the 207-A Basins to the 216-A-37-1 Distribution Box.		The pipeline is associated with the 216-A-37-1 and 216-A-30 Crib distribution boxes.	The waste site is an underground, 10.2 cm (4 in.) diameter, cast iron pipeline that fed the 216-A-37-1 Crib through a distribution box. A 20.3 cm (8 in.) cement pipe extends from the 216-A-37-1 Crib distribution box to the 216-A-30 Crib distribution box (see subsite 2).	Radioactive Process Sewer	None	Waste Site Length: 648 m (2,125 ft) Cumulative Pipeline Length: 673 m (2,209 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
92	200-E-233-PL	200-E-233-PL, Pipeline from 216-A-30 Crib Distribution Box to the 216-A-37-2 Crib Distribution Box	The pipeline is located east of the 200 East Area fence, southeast of the PUREX facility.		The pipeline is associated with the 216-A-30 and 216-A-37-2 Cribs.	The waste site is an underground, 20.3 cm (8 in.) diameter, cast iron pipeline that connected the 216-A-30 Crib to the 216-A-37-2 Crib Distribution Box.	Radioactive Process Sewer	None	Waste Site Length: 160 m (525 ft) Cumulative Pipeline Length: 212 m (694 ft) Pipeline Depth: TBD ft	TBD	None
93	200-E-234-PL	200-E-234-PL; Pipelines from 242-A Evaporator Building to the 207-A Basins; Lines 300, 501, 505, and 557 (see Subsites)	The pipelines extend eastward from the 242-A Evaporator Building to the 207-A Pump Pit. They are located north of 4th Street and cross under Canton Avenue.		The pipelines are associated with the 242-A Evaporator building and the 207-A North and South Basins.	The waste site is three underground, 10.2 cm (4 in.) diameter, CS pipelines buried together in the same soil trench. They terminate at the 207-A Pump Pit. Line 505 is a spare line that is stubbed off west of the 207-A Basins (see Subsite 2). The lines transported secondary waste from the 242-A Evaporator to the 207-A Basins.	Radioactive Process Sewer	None	Waste Site Length: 183 m (600 ft) Cumulative Pipeline Length: 618 m (2,027 ft) Pipeline Depth: TBD ft	TBD	None
94	200-E-235-PL	200-E-235-PL; 207-A North Basin Distribution Lines; Lines 501,502, 503, 504, 506, and 507	The 207-A North Retention Basin is located east of Canton Avenue and north of 4th Street. The distribution lines extend north from the 207-A Pump Pit.		The distribution lines are associated with the 207-A Pump Pit and the 207-A North Basins.	The waste site is 7.6 cm (3 in.) and 10.2 cm (4 in.) diameter CS pipes that distributed waste from the 207-A Pump Pit to the three sections of the 207-A North Basin.	Radioactive Process Sewer	None	Waste Site Length: 71 m (233 ft) Cumulative Pipeline Length: 121 m (397 ft) Pipeline Depth: TBD ft	TBD	None
95	200-E-236-PL	200-E-236-PL; 207-A South Basin Distribution Lines; Lines 557, 558, 559, 560, 562, and 563	The 207-A South Retention Basin is located east of Canton Avenue and north of 4th Street. The distribution lines extend south from the 207-A Pump Pit.		The distribution lines are associated with the 207-A Pump Pit and the 207-A South Basins.	The waste site is 7.6 cm (3 in.) and 10.2 cm (4 in.) diameter CS pipes that distributed waste from the 207-A Pump Pit to the three sections of the 207-A South Basin.	Radioactive Process Sewer	None	Waste Site Length: 72 m (236 ft) Cumulative Pipeline Length: 121 m (398 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
96	200-E-238-PL	200-E-238-PL, Pipeline from 206-A to 216-A-9 Crib	The pipeline extends north from the PUREX facility (206-A). The pipeline crosses under 4th Street.		The pipeline is associated with the PUREX facility and the 216-A-9 Crib.	The waste site is an underground, 30.5 cm (12 in.) diameter pipeline from 206-A (north side of PUREX) to the 216-A-9 Crib. The majority of the pipeline is constructed of CS. A short length of SS pipe extends from the 206-A Building edge. The site was deactivated by blanking the effluent pipeline to the unit after replacing 30.5 m (100 ft) of the pipeline that had failed. A 30.5 cm (12 in.) SS pipe was installed through the trapped section of pipeline. After the line was isolated, the effluents were rerouted to the 216-A-29 Ditch via the 202-A Building chemical sewer.	Radioactive Process Sewer	None	Waste Site Length: 412 m (1,352 ft) Cumulative Pipeline Length: 427 m (1,402 ft) Pipeline Depth: TBD ft	TBD	None
97	200-E-239-PL	200-E-239-PL, Pipeline from 216-A-5 Sample Pit #4 to 216-A-5 Crib	The pipeline to the 216-A-5 Crib is located south of the PUREX facility. It extends south from the 216-A-5 Sample Pit #4.		The pipeline is associated with Sample Pit #4 and the 216-A-5 Crib.	The waste site is an underground, 20.3 cm (8 in.) diameter, SS pipeline that fed the 216-A-5 Crib.	Radioactive Process Sewer	None	Waste Site Length: 24 m (79 ft) Cumulative Pipeline Length: 28 m (91 ft) Pipeline Depth: TBD ft	TBD	None
98	200-E-240-PL	200-E-240-PL, Pipeline from Valve Pit West of Sample Pit #4 to the 216-A-38-1 Crib	The pipeline to the 216-A-38-1 Crib is located south of the PUREX facility. It extends west and southwest of the 216-A-5 Sample Pit #4.		The pipeline is associated with the 216-A-38-1 Crib.	The waste site is an underground, 20.3 cm (8 in.) diameter, SS pipeline that fed the 216-A-38-1 Crib.	Radioactive Process Sewer	None	Waste Site Length: 218 m (715 ft) Cumulative Pipeline Length: 318 m (1,043 ft) Pipeline Depth: TBD ft	TBD	None
99	200-E-241-PL	200-E-241-PL, Pipeline from 200-E-58 Neutralization Tank to the 216-A-5 Sample Pit #4, Lines 7717 and 7718 (see Subsites)	The pipeline is located south of PUREX and north of the 216-A-5 Crib.		The pipeline is associated with the 200-E-58 Neutralization Tank, and Sample Pit #4.	The waste site is 20.3 cm (8 in.) diameter SS pipelines that carried waste from PUREX to the neutralization tank (site code 200-E-58) and neutralized waste to the 216-A-5 Sample Pit. A bypass line around the sampler was added later (see Subsite 2).	Radioactive Process Sewer	None	Waste Site Length: 96 m (314 ft) Cumulative Pipeline Length: 148 m (487 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
100	200-E-242-PL	200-E-242-PL, Pipeline from 216-A-5 Sample Pit #4 to 216-A-15 French Drain	The pipeline is located south of PUREX and east of the 216-A-5 Sample Pit #4.		The pipeline is associated with Sample Pit #4 and the 216-A-15 French Drain.	The waste site is an underground, 10.2 cm (4 in.) diameter, SS pipeline that fed the 216-A-15 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 15 m (49 ft) Cumulative Pipeline Length: 16 m (52 ft Pipeline Depth: TBD ft	TBD	None
101	200-E-243-PL	200-E-243-PL, Pipeline to the 216-B-13 French Drain	The pipeline is located south of the 221-B facility and north of the 291-B Stack.		The pipeline is associated with the 291-B stack and the 216-B-13 French Drain.	The waste site is an underground, 7.6 cm (3 in.) diameter SS pipeline that fed the 216-B-13 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 6.4 m (21 ft) Cumulative Pipeline Length: 6.4 m (21 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
102	200-E-244-PL	200-E-244-PL, Pipeline from 201-C Valve Pit to 241-CX-70	The pipeline is located southeast of the 201-C Building. It extends to the 241-CX-70 Tank.		The pipeline is associated with 200-E-41 Stabilized Area, 200-E-246-PL, the HSVP and the 241-CX-70 Tank.	The waste site is an underground, 5.1 cm diameter (2 in.) SS pipeline that fed the 241-CX-70 Tank. A portion of the pipeline, near the 201-C Building, is inside a 45.7 cm (18 in.) diameter corrugated pipe encasement. The pipeline to the 241-CX-72 Tank (site code 200-E-246-PL, is buried along side of the pipeline to 241-CX-70 Tank. The Semiworks facilities decommissioning was initiated in 1983. External features were removed and the building core was entombed in concrete in 1986. In 1992, the RARA group covered the area around the Hot Semiworks facility with ash from the 200 East Powerhouse ash pile. The stabilized area is site code 200-E-41. As-Built Drawing H-2-4335, Revision 6, dated May 1, 1957, verifies that by this date the east pipeline was cut and a blind-flange installed near the tank when the line was rerouted to discharge to Tank 241-CX-72. As-Built Drawing H-2-4494, Sheet 1, Revision 4, dated October 11, 1961, verifies that by this date the remaining (west) line from the diversion box was cut and the open ends sealed. SSC Demolition Project B-231 As-Built Drawing H-2-71672, Revision 1, dated October 15, 1985, verified that by this date both of these lines were capped or blanked. Given the above existing isolations, approximately 144 ft of pipe associated with 241-CX-70 will be within the scope of TSD unit closure.	Radioactive Process Sewer	None	Waste Site Length: 41 m (135 ft) Cumulative Pipeline Length: 44 m (144 ft) Pipeline Depth: TBD ft	TBD	None
103	200-E-245-PL	200-E-245-PL, Pipeline from 201-C Hot Shop to 241-CX-71	The pipeline is located south of the 201-C Building.		The pipeline is associated with the 201-C facility and the 241-CX-71 Tank.	The waste site is an underground, 5.1 cm (2 in.) diameter SS pipeline that fed the 241-CX-71 Tank. The Semiworks facilities decommissioning was initiated in 1983. External features were removed and the building core was entombed in concrete in 1986. In 1992, the RARA group covered the area around the Hot Semiworks facility with ash from the 200 East Powerhouse ash pile. The stabilized area is site code 200-E-41.	Radioactive Process Sewer	None	Waste Site Length: 18 m (59 ft) Cumulative Pipeline Length: 24 m (78 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
104	200-E-246-PL	200-E-246-PL, Pipeline from 201-C Valve Pit to 241-CX-72	The pipeline is located southeast of the 201-C Building. It extends to the 241-CX-72 Tank.	Not specified	The pipeline is associated with 200-E-41 Stabilized Area, 200-E-244-PL, the HSVP and the 241-CX-72 Tank.	The waste site is an underground, 5.1 cm diameter (2 in.) SS pipeline that fed the 241-CX-72 Tank. A portion of the pipeline, near the 201-C Building, is inside a 45.7 cm (18 in.) diameter corrugated pipe encasement. The pipeline to the 241-CX-70 Tank (site code 200-E-244-PL, is buried along side of the pipeline to 241-CX-72 Tank. The Semiworks facilities decommissioning was initiated in 1983. External features were removed and the building core was entombed in concrete in 1986. In 1992, the RARA group covered the area around the Hot Semiworks facility with ash from the 200 East Powerhouse ash pile. The stabilized area is site code 200-E-41. Drawing H-2-4494, Sheet 1, dated October 11, 1961, verifies the waste line from 201-C as cut and capped by this date just outside the building wall when waste was diverted to the 216-C-1 Crib. Demolition Project Drawing H-2-71672, Revision 1, dated October 15, 1985, verified the only fill line from 201-C as cut and the open ends capped by this date and also verifies the line as flanged off in the 201-C A cell by this date.	Radioactive Process Sewer	None	Waste Site Length: 50 m (164 ft) Cumulative Pipeline Length: 52 m (172 ft) Pipeline Depth: TBD ft	TBD	None
105	200-E-247-PL	200-E-247-PL, Pipelines to the 209-E-WS-2 French Drain (see Subsites)	The pipelines are located on the east side of the 209-E Building.	Not specified	The pipelines are associated with the 209-E laboratory building and the 209-E-WS-2 French Drain.	The waste site is two underground pipelines from the 209-E facility that fed the 209-E-WS-2 French Drain. One line is constructed of 2.5 cm (1 in.) diameter CS. The other is constructed of 5.1 cm (2 in.) diameter SS.	Radioactive Process Sewer	None	Waste Site Length: 20 m (65ft) Cumulative Pipeline Length: 21 m (68 ft) Pipeline Depth: TBD ft	TBD	None
106	200-E-248-PL	200-E-248-PL, Pipelines to the 209-E-WS-3 Valve Pit (see Subsites)	The pipelines extend south from the 209-E Building to the 209-E-WS-3 Valve Pit.	Not specified	The pipelines are associated with the 209-E laboratory building and the 209-E-WS-3 Valve Pit.	The waste site is two underground, 5.1 cm (2 in.) diameter, SS pipelines connecting the laboratory building to the valve pit structure.	Radioactive Process Sewer	None	Waste Site Length: 2.7 m (9 ft) Cumulative Pipeline Length: 2.7 m (9 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
107	200-E-249-PL	200-E-249-PL, Pipelines to 200-E-4 French Drain (see Subsites)	The pipelines are located south of 7th Street and north of the 209-E Building.	Not specified	The pipeline is associated with the 209-E Criticality Lab and the 200-E-4 French Drain.	The waste site is an underground, 3.8 cm (1.5 in.) diameter pipeline that extends from the north side of 209-E to the 200-E-4 Dry Well. A drain line from a valve box, containing steam condensate and fire water lines, also connects to the 200-E-4 French Drain (Subsite 2). The waste carried by this pipeline was steam condensate from the steam trap in the valve pit plus steam condensate from 209-E, the equipment room.	Process Sewer	None	Waste Site Length: 7.0 m (23 ft) Cumulative Pipeline Length: 7.3 m (24 ft) Pipeline Depth: TBD ft	TBD	None
108	200-E-250-PL	200-E-250-PL, Pipeline from 2704-C to 2704-C-WS-1 Quench Tank	The pipeline is located south of 7th Street, within the 200-E-41 Stabilized Area.		The pipeline is associated with the demolished 2704-C Building and the 2704-C-WS-1 Quench Tank.	The waste site is an underground, 2.5 cm (1 in.) diameter CS line that extended from the south side of the 2704-C Building to the 2704-C Quench Tank. Although the drain received building steam condensate, periodically, the drain was labeled with radioactive postings. A 1991 site visit reported the drain cover was painted yellow and posted with a tri-foil, indicating radioactive contamination. However, in 1993, the site was described as having no radiological posting or markings. The former location of the demolished 2704-C Building was covered with gravel and posted with URM signs (200-E-41 Stabilized Area).	Radioactive Process Sewer	None	Waste Site Length: 9.1 m (30 ft) Cumulative Pipeline Length: 9.1 m (30 ft) Pipeline Depth: TBD ft	TBD	None
109	200-E-251-PL	200-E-251-PL, Pipeline from 291-C Stack to 216-C-2 Reverse Well	The pipeline is located south of 7th Street, in the Hot Semiworks Stabilized Area (see 200-E-41).		The pipeline is associated with the 291-C stack, the 216-C-2 reverse well and the 200-E-41 Stabilized Area.	The waste site is an underground, 10.2 cm (4 in.) diameter CS pipeline that connected the 291-C Stack to the 216-C-2 Reverse Well. The 216-C-2 Reverse Well is no longer visible. It is not separately marked or posted from the surrounding stabilized area (200-E-41) that is posted as URM.	Radioactive Process Sewer	None	Waste Site Length: 27 m (89 ft) Cumulative Pipeline Length: 34 m (111 ft) Pipeline Depth: TBD ft	TBD	None
110	200-E-252-PL	200-E-252-PL, Pipeline from 291-C Air Filter Building to 216-C-2 Reverse Well	The pipeline is located south of 7th Street in the 200-E-41 Stabilized Area.		The pipeline is associated with the 291-C Filter Building, the 216-C-2 Stack and the 200-E-41 Stabilized Area.	The waste site is an underground, 5.1 cm (2 in.) diameter, cast iron pipeline from the 291-C Air Filter Building to the 216-C-2 Reverse Well. Part of this line lies beneath 200-E-251-PL. The 216-C-2 Reverse Well is no longer visible. It is not separately marked or posted from the surrounding stabilized area (200-E-41) that is posted as URM.	Radioactive Process Sewer	None	Waste Site Length: 10 m (33 ft) Cumulative Pipeline Length: 14 m (45 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
111	200-E-253-PL	200-E-253-PL, Pipeline from 202-A to 216-A-36A and 216-A-36B Cribs	The pipeline is located south of the PUREX facility.		This pipeline crosses the pipeline to the 216-A-21 Crib (200-E-193-PL). A branch of pipeline 200-E-196-PL ties into this 216-A-36 Crib line.	The waste site is an underground, 15.2 cm (6 in.) diameter SS pipeline that connected the ASD Valve Pit and 295-A Sample Pit with the 216-A-36A and 216-A-36B Cribs. When the 216-A-36A Crib was extended to create the 216-A-36B Crib, the distribution pipe was lengthened by inserting a 12.7 cm (5 in.) diameter pipe through the original 15.2 cm (6 in.) diameter crib pipe.	Radioactive Process Sewer	UPR-200-E-39	Waste Site Length: 266 m (873 ft) Cumulative Pipeline Length: 339 m (1,111 ft) Pipeline Depth: TBD ft	TBD	In 1968, contaminated ammonia scrubber water was found spewing from the vent filter at the 216-A-36B Crib. Contamination ranged from 20 to 450 mR/hr.
112	200-E-254-PL	200-E-254-PL, Pipeline from 209-E to 216-C-9 Pond	The pipeline runs north and south, between the 209-E Building and the 216-C-9 Pond site. The pipeline crosses under 7th Street.		The pipeline is associated with the 209-E Criticality Lab facility and the 216-C-9 Pond.	The waste site is an underground, 10.2 cm (4 in.) diameter pipeline that fed the 216-C-9 Pond. Part of the line is constructed of vitrified clay and part is cast iron.	Radioactive Process Sewer	None	Waste Site Length: 127 m (417 ft) Cumulative Pipeline Length: 143 m (470 ft) Pipeline Depth: TBD ft	TBD	None
113	200-E-255-PL	200-E-255-PL, Pipeline Connecting 216-C-9 Pond to Pipeline 200-E-169-PL	The pipeline is located north of the 276-C Building. It runs north and south and runs under 7th Street.		This line is associated with the 216-C-9 Pond and the 200-E-169-PL Pipeline.	The waste site is an underground, 15.2 cm (6 in.) diameter vitrified clay pipe that fed the 216-C-9 Pond. This line tees off of line 200-E-169-PL.	Radioactive Process Sewer	None	Waste Site Length: 76 m (249 ft) Cumulative Pipeline Length: 76 m (250 ft) Pipeline Depth: TBD ft	TBD	None
114	200-E-256-PL	200-E-256-PL, Pipelines from 201-C (South Side) to 216-C-9 Pond	The pipeline(s) extend south from the demolished 201-C Building. The line extends east and north to discharge into the 216-C-9 Pond. The pipeline crosses under 7th Street.		The pipeline is associated with 201-C and 216-C-9 Pond.	The waste site majority of the waste site is an underground, 15.2 cm (6 in.) diameter vitrified clay pipe from the demolished 201-C Building to the 216-C-9 Pond. Two 10.2 cm (4 in.) diameter saran lined steel pipes extend from the south side of 201-C and connect to the 15.2 cm (6 in.) VCP line. A drain line from the 241-CX-71 vault ties into this line with a "Y" connection.	Radioactive Process Sewer	None	Waste Site Length: 256 m (840 ft) Cumulative Pipeline Length: 275 m (902 ft) Pipeline Depth: TBD ft	TBD	None
115	200-E-257-PL	200-E-257-PL, Pipeline from 201-C (East Side) to 216-C-9 Pond	The pipeline is located northeast of the demolished 201-C Building. It runs north and south and runs under 7th Street.		The pipeline is associated with 201-C and 216-C-9 Pond.	The waste site is an underground, 7.6 cm (3 in.) diameter, SS pipeline that fed the 216-C-9 Pond.	Radioactive Process Sewer	None	Waste Site Length: 190 m (623 ft) Cumulative Pipeline Length: 211 m (691 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
116	200-E-258-PL	200-E-258-PL, 216-C-9 Pond Lobe Distribution Piping	The pipeline runs east and west along the north side of 7th Street. Four distribution lines extend to various lobes of the 216-C-9 Pond.	Not specified	The pipelines are associated with the 216-C-9 Pond.	The waste site is an underground CS pipeline that diverted effluent to the various sections of the 216-C-9 Pond. The majority of the piping system is constructed of 15.2 cm (6 in.) diameter, CS pipe. The 216-C-9 Pond (old 221-C facility excavation) was divided into sections with dikes. Piping was arranged to provide three discharge points, one to each section.	Radioactive Process Sewer	None	Waste Site Length: 172 m (564 ft) Cumulative Pipeline Length: 250 m (819 ft) Pipeline Depth: TBD ft	TBD	None
117	200-E-259-PL	200-E-259-PL, Pipeline from 291-C Fan House to 216-C-9 Pond	The pipeline is located northeast of the demolished 201-C Building. It extended north from the demolished 291-C Fan House to the 216-C-9 Pond. The pipeline crosses under 7th Street.	Not specified	The pipeline is associated with the 291-C Stack Operation and the 216-C-9 Pond.	The waste site is an underground, 5.1 cm (2 in.) diameter, CS pipeline that fed the 216-C-9 Pond.	Radioactive Process Sewer	None	Waste Site Length: 42 m (138 ft) Cumulative Pipeline Length: 41 m (135 ft) Pipeline Depth: TBD ft	TBD	None
118	200-E-260-PL	200-E-260-PL, Steam Condensate Bypass Line from PUREX to 216-A-30, Line 8824A	The pipeline extends east from the PUREX facility, beyond the 200 East Area fence and terminates at the head end of the 216-A-30 Crib.	Not specified	The pipeline is associated with PUREX and the 216-A-30 Crib.	The waste site is an underground, 20.3 cm (8 in.) diameter, CS pipeline from PUREX to the 216-A-30 Crib. The pipeline was used as a steam condensate bypass line.	Radioactive Process Sewer	None	Waste Site Length: 582 m (1,909 ft) Cumulative Pipeline Length: 617 m (2,024 ft) Pipeline Depth: TBD ft	TBD	None
119	200-E-261-PL	200-E-261-PL, Effluent Recycle Line from 216-A-42 Basin to PUREX	The pipeline extends from the 216-A-42 Basin, located south of 241-AP Tank Farm, to the 202-A (PUREX) facility.	Not specified	The pipeline is associated with the 216-A-42 Basin and the 216-A-42A Pump Station.	The waste site is an underground, 10.2 cm (4 in.) diameter cast iron pipeline. The pipeline returned contaminated effluent from the 216-A-42 Basin back to the PUREX facility. The pipeline crosses over the top of the 218-E-14 (Tunnel #1).	Radioactive Process Sewer	None	Waste Site Length: 428 m (1,404 ft) Cumulative Pipeline Length: 459 m (1,507 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
120	200-E-262-PL	200-E-262-PL, Pipelines Associated with 216-A-42 Basin, 216-A-42A Pump Station, 216-A-42B Valve Box, and 216-A-42C Diversion Box	The 216-A-42 Basin is located south of the 241-AP Tank Farm. The pipelines and 216-A-42A Pump Station are on the west side of the 216-A-42 Basin.	Not specified	The pipelines are associated with the 216-A-42 Retention Basin, the 216-A-42A Pump Station, the 216-A-42B Valve Box and the 216-A-42C Diverter Station.	The waste site is an underground, 10.2 cm (4 in.) diameter cast iron pipeline that transferred effluent out of the 216-A-42 Retention Basin. The 216-A-42 Retention Basin was built to hold cooling water or steam condensate that was contaminated above standard release limits and prevent its disposal to the Gable and B Pond systems. After the retained effluent contents were analyzed, a built-in recovery system provided the capability of pumping solutions back into the PUREX facility for reprocessing (see site code 200-E-261-PL) or to Cribs for disposal.	Radioactive Process Sewer	None	Waste Site Length: 208 m (682 ft) Cumulative Pipeline Length: 355 m (1,166 ft) Pipeline Depth: TBD ft	TBD	None
121	200-E-263-PL	200-E-263-PL, 216-A-42 Basin Pipeline to 216-A-42C Diversion Box	The pipeline is located southeast of the 241-AP Tank Farm. The pipeline extends from the south end of the 216-A-42 Basin to the 216-A-42C Diversion Box.	Not specified	The pipeline is associated with the 216-A-42 Basin, the 216-A-42C Diversion Box and the 200-E-113-PL Pipeline.	The waste site is an underground, 20.3 cm (8 in.) diameter cast iron pipeline that connected the 216-A-42 Retention Basin to the 216-A-42C Diversion Box.	Radioactive Process Sewer	None	Waste Site Length: 48 m (157 ft) Cumulative Pipeline Length: 57 m (186 ft) Pipeline Depth: TBD ft	TBD	None
122	200-E-264-PL	200-E-264-PL, Pipeline from 242-B Evaporator Building to 207-B Retention Basin	The pipeline is located east of Baltimore Avenue. It extends south from the 242-B Evaporator Building to the 207-B Retention Basin.	Not specified	The pipeline is associated with 242-B Evaporator, 207-B Retention Basin and UPR-200-E-79.	The waste site is an underground, 10.2 cm (4 in.) diameter cast iron pipeline that connected the 242-B Evaporator Building to the 207-B Retention Basin. The surface stabilized location of UPR-200-E-79 is marked and posted with “Underground Radioactive Contamination” signs. UPR-200-E-79 describes a release that occurred in June 1953. Five leaks were discovered in the waste line that runs from 242-B to 207-B. Contamination levels up to 2,500 counts per minute were measured at the points of emission of water from the ground.	Radioactive Process Sewer	UPR-200-E-79	Waste Site Length: 154 m (505 ft) Cumulative Pipeline Length: 155 m (507 ft) Pipeline Depth: TBD ft	TBD	In 1953, five leaks were discovered in the waste line. Contamination levels were detected up to 2,500 cpm at the points of emission of water from the ground.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
123	200-E-265-PL	200-E-265-PL, 241-BY and 241-BX Tank Farm Cooling Water Pipeline to 207-B Retention Basin (see Subsites)	Portions of the pipeline are located inside the 241-B, BX and BY tank farms. It crosses under Baltimore Avenue. One segment of the pipeline connects with the west side of the 207-B Retention Basin and one segment connects with the east side of the 207-B Retention Basin.	Not specified	The pipeline is associated with the ITS process in 241-BY Tank Farm, ITS 1 and ITS 2, and the 207-B Retention Basin.	The waste site is an underground, 10.2 cm (4 in.) diameter CS pipeline that transferred ITS process cooling water to the 207-B Retention Basin. A new pipeline segment was added that bypassed the retention basin and connected to the B Ditches. The pipeline carried cooling water from the ITS process to the 207-B Retention Basin.	Radioactive Process Sewer	None	Waste Site Length: 631 m (2,070 ft) Cumulative Pipeline Length: 773 m (2,536 ft) Pipeline Depth: TBD ft	TBD	None
124	200-E-266-PL	200-E-266-PL, Pipeline from PUREX Trap Pit #1 to 216-A-11 French Drain	The pipeline extends south from PUREX Trap Pit #1. It is near the southeast corner of the 202-A Building.	Not specified	The pipeline is associated with 216-A-11 French Drain.	The waste site is an underground, 10.2 cm (4 in.) diameter CS pipeline that connected the PUREX Trap Pit #1 to 216-A-11 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 8.8 m (29 ft) Cumulative Pipeline Length: 8.8 m (29 ft 0 Pipeline Depth: TBD ft	TBD	None
125	200-E-267-PL	200-E-267-PL, Pipeline from PUREX Trap Pit #3 to 216-A-12 French Drain	The pipeline extends south from Trap Pit #3. It is located near the center of the south side of the 202-A Building.	Not specified	The pipeline is associated with 216-A-12 French Drain.	The waste site is an underground, 10.2 cm (4 in.) diameter CS pipeline that connected the PUREX Trap Pit #3 to 216-A-12 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 8.8 m (29 ft) Cumulative Pipeline Length: 8.8 m (29 ft) Pipeline Depth: TBD ft	TBD	None
126	200-E-268-PL	200-E-268-PL, Pipeline from PUREX Vacuum Cleaner Filter Box to 216-A-14 French Drain, Line T073	The pipeline is located south of 202-A and northwest of 291-AE.	Not specified	The pipeline is associated with 216-A-14 French Drain.	The waste site is an underground, 3.8 m (1.5 in.) diameter CS pipeline that connected the PUREX Vacuum Cleaning Filter Box to 216-A-14 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 3.0 m (10 ft) Cumulative Pipeline Length: 5.5 m (18 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
127	200-E-269-PL	200-E-269-PL, Pipeline from 291-A Fan Building to 216-A-33 French Drain	The pipeline is located southeast of the 291-A Fan House. Part of the pipeline is underneath the 291-AE Building.	Not specified	The pipeline is associated with 216-A-33 French Drain.	The waste site is an underground, 5.1 cm (2 in.) diameter SS pipeline that connected the 291-A Stack Fan House to the 216-A-33 French Drain. The 291-AE Building was placed on top of the French drain location. The inlet piping was capped and the drain was removed from service in 1964 because water was no longer used as a coolant for electrical fans. The site was deactivated by capping the effluent pipeline to the unit on the south side of the 291-A Fan Plenum.	Radioactive Process Sewer	None	Waste Site Length: 4.9 m (16 ft) Cumulative Pipeline Length: 41 m (135 ft) Pipeline Depth: TBD ft	TBD	None
128	200-E-270-PL	200-E-270-PL, Pipeline from 291-A Fan Control House to 216-A-26 and 216-A-26A French Drains, Line T022	The pipeline is located south of the 202-A Building, southwest of the 291-A stack.	Not specified	The pipeline is associated with 216-A-26 and 216-A-26A French Drains and 200-E-196-PL.	The waste site is an underground, 10.2 cm (4 in.) diameter SS pipeline that fed the 216-A-26 and 216-A-26A French Drains. 216-A-26A French Drain was installed to receive the fan house effluent. 216-A-26 was installed 4.6 m (15 ft) south to replace the 216-A-26A French Drain. Both drains received effluent from floor drains inside the 291-A Fan House. 216-A-26 was removed from service in 1991. The effluent source to the 216-A-26 and 216-A-26A French Drains was two floor drains located inside the 291-A Fan Control Building and the 291-A Fan Plenum. This effluent was originally discharged to 216-A-4 Crib, but was rerouted to the French drains. The floor drains were plugged by filling with epoxy during the PUREX deactivation. A new pipeline, from the 291-A Fan House to the French drains was installed.	Radioactive Process Sewer	None	Waste Site Length: 24 m (79 ft) Cumulative Pipeline Length: 27 m (87 ft) Pipeline Depth: TBD ft	TBD	None
129	200-E-271-PL	200-E-271-PL, PUREX Cooling Water Header Pipeline, Line 8823	The Cooling Water Header extends along the south side of the PUREX facility. It extends east behind Railroad Tunnel #1. A portion of the pipeline is located under Railroad Tunnel #2. The pipeline terminates at the pump pit south of 241-A-201.	Not specified	The waste site is associated with feeding the Gable and B Pond and ditch systems.	The waste site is an underground pipeline that transferred PUREX cooling water waste to the pond and ditch system. The CS pipeline has several diameters that increase from 40.6 cm (16 in.) to 76.2 cm (30 in.).	Radioactive Process Sewer	None	Waste Site Length: 429 m (1,408 ft) Cumulative Pipeline Length: 433 m (1,421 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
130	200-E-272-PL	200-E-272-PL, Pipeline to 216-A-35 French Drain	The pipeline is located near the southwest corner of the 202-A Building. It extends to the 216-A-35 French Drain.	Not specified	The pipeline is associated with PUREX and the 216-A-35 French Drain.	The waste site is an underground, 7.6 cm (3 in.) diameter, carbons steel pipeline that fed the 216-A-35 French Drain. The pipeline to the 216-A-13 French Drain was cut and capped in 1962. The effluent was diverted to the 216-A-35 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 12 m (38 ft) Cumulative Pipeline Length: 12 m (38 ft) Pipeline Depth: TBD ft	TBD	None
131	200-E-273-PL	200-E-273-PL, Pipeline to 216-A-13 French Drain (see Subsites)	The pipeline is located near the southwest corner of the 202-A Building.	Not specified	The pipeline is associated with the 216-A-13 French Drain and the PUREX Cooling Water Header pipeline (200-E-271-PL).	The waste site is an underground, 7.6 cm (3 in.) diameter carbons steel pipeline that fed the 216-A-13 French Drain. The effluent was originally tied into the PUREX Cooling Water Header pipeline (200-E-271-PL) and later routed to the 216-A-13 French Drain. The pipeline to the 216-A-13 French Drain was cut and capped in 1962. The effluent was diverted to the 216-A-35 French Drain.	Radioactive Process Sewer	None	Waste Site Length: 20 m (65 ft) Cumulative Pipeline Length: 32 m (106 ft) Pipeline Depth: TBD ft	TBD	None
132	200-E-274-PL	200-E-274-PL, Pipeline from 244-A Lift Station to 216-A-40 Basin, Line 323	The pipeline is located south of 7th Street and west of Buffalo Avenue. It is south and east of the 244-A Lift Station.	Not specified	The pipeline is associated with the 216-A-40 Basin and the 244-A Lift Station.	The waste site is an underground, 7.6 cm (3 in.) diameter CS pipeline that connected the 244-A Lift Station to the 216-A-40 Basin.	Radioactive Process Sewer	None	Waste Site Length: 144 m (472 ft) Cumulative Pipeline Length: 180 m (590 ft) Pipeline Depth: TBD ft	TBD	None
133	200-E-275-PL	200-E-275-PL, Cooling Water Pipeline to 216-A-40 Basin, Line 815	The pipeline is located south of 7th Street and west of Buffalo Avenue. It runs along the east side of the 216-A-40 Retention Basin.	Not specified	The pipeline is associated with the 216-A-40 Basin and the 244-AR Vault.	The waste site is an underground, 30.5 cm (12 in.) diameter, concrete cooling water pipeline that fed the 216-A-40 Basin.	Radioactive Process Sewer	None	Waste Site Length: 94 m (308 ft) Cumulative Pipeline Length: 219 m (717 ft) Pipeline Depth: TBD ft	TBD	None
134	200-E-276-PL	200-E-276-PL, 216-A-41 Crib Pipeline	The pipeline is located west of Buffalo Avenue and north of the 244-AR Vault.	Not specified	The pipeline is associated with the 216-A-41 Crib.	The waste site is an underground, 10.2 cm (4 in.) diameter, vitrified clay pipeline that connected the 296-A-13 Stack to the 216-A-41 Crib. The pipeline carried stack drainage to the 216-A-41 Crib.	Radioactive Process Sewer	None	Waste Site Length: 4.9 m (16 ft) Cumulative Pipeline Length: 5.5 m (18 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
135	200-E-277-PL	200-E-277-PL, 216-B-59 and 216-B-59B Pipelines (see Subsites)	The pipeline extends from the south side of 221-B to 216-B-59 Retention Basin. It crosses under Baltimore Avenue.	Not specified	The pipeline is associated with B Plant operations and the 216-B-59 Retention Basin and pipeline 200-E-199-PL.	The waste site is an underground pipeline that connected 221-B to the 216-B-59 Retention Basin. The majority of the pipeline is constructed of varied diameters of CS pipe. The section of pipe that extends from the 221-BA Sampling Building to the head end of the basin is constructed of 38.1 cm (15 in.) diameter vitrified clay pipe. The bypass line that connects to the center of the basin is constructed and the pipeline rerouting basin effluent to 241-B Tank Farm are constructed of 5.1 cm (2 in.) diameter CS (see subsites). In 1978, a new pipeline was added that connected the 216-B-59B Basin to pipeline 200-E-199-PL, allowing effluent to be directed into the tank farm system.	Radioactive Process Sewer	None	Waste Site Length: 810 m (2,657 ft) Cumulative Pipeline Length: 1,134 m (3,721 ft) Pipeline Depth: TBD ft	TBD	None
136	200-E-279-PL	200-E-279-PL, Pipeline from 241-B-361 Settling Tank to 216-B-5 Reverse Well	The pipeline is located on the east side of Baltimore Avenue, northeast of the 241-B-361 Settling Tank.	Not specified	The pipeline is associated with the 241-B-361 Settling Tank and the 216-B-5 Reverse Well.	The waste site is an underground, 5.1 cm (2 in.) diameter SS pipeline that carried waste from the 241-B-361 Settling Tank to the 216-B-5 Reverse Well.	Radioactive Process Sewer	None	Waste Site Length: 23 m (75 ft) Cumulative Pipeline Length: 32 m (105 ft) Pipeline Depth: TBD ft	TBD	None
137	200-E-281-PL	200-E-281-PL, Pipeline from 241-B Tank Farm to 216-B-7A and 216-B-7B Cribs, Line V306	The pipeline is located north of the 241-B Tank Farm.	Not specified	The pipeline is associated with the 241-B-201 and 241-B-202 tanks and the 216-B-7A and B Cribs.	The waste site is an underground, 7.6 cm (3 in.) diameter SS pipeline that connects the 241-B-202 and 241-B-202 Tanks to the 216-B-7A and 216-B-7B Cribs.	Radioactive Process Sewer	None	Waste Site Length: 14 m (45 ft) Cumulative Pipeline Length: 59 m (193 ft) Pipeline Depth: TBD ft	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
138	200-E-282-PL	200-E-282-PL; Process Waste Lines from 202-A to 241-AX-151 Diversion Box; Lines 4001, 4002, 4003, and 4004	The pipeline encasement originates on the south side of the PUREX facility. It extends westward beyond the facility footprint and turns north in between the double security fences on the west side of PUREX. The pipeline continues under 4th Street and angles east until it terminates at the 241-AX-151 Diversion Box.	Not specified	No associated facilities or structures.	The concrete encased pipeline contains four 7.6 cm (3 in.) diameter, stainless steel pipelines.	Encased Tank Farm Pipeline	None	Waste Site Length: 993 m (3,258 ft) Cumulative Pipeline Length: 1,000 m (3,280 ft) Pipeline Depth: TBD ft	TBD	None
139	200-E-283-PL	200-E-283-PL, Pipeline from 242-A Building to 200-E-127-PL (to Gable and B Ponds)	The pipeline is located on the east side of the 242-A Evaporator Building.	Not specified	The pipeline is associated with the 200-E-127-PL and 600-291-PL pipelines and the 242-A Evaporator Building.	The waste site is an underground 15.2 cm (6 in.) diameter CS pipeline that connects 242-A to the 200-E-127-PL (to Gable and B Ponds) pipeline. The pipeline transferred waste from 242-A Evaporator to the Gable and B Ponds via pipeline 200-E-127-PL. Later, this effluent was transferred to the TEDF system. A portion of the 200-E-127-PL pipeline was reused to feed the TEDF system.	Radioactive Process Sewer	None	Waste Site Length: 42 m (138 ft) Cumulative Pipeline Length: 52 m (169 ft) Pipeline Depth: TBD ft	TBD	None
140	200-E-285	200-E-285, 216-A-8 Sample Pit, Sample Pit #2, 216-A-8 Control Structure	The sample pit is located on the east side of 241-A Tank Farm, outside the tank farm fence.	Not specified	The sample pit is associated with the 216-A-8 Crib, 216-A-34, 241-A Tank Farm, 200-E-164-PL, 200-E-166-PL, and UPR-200-E-18.	The sampler pit is a concrete structure with three valves, two vent stacks, and one curved, metal bonnet extending from the structure. The structure is surrounded with post and chain with URM and Contamination Area signs. The area around the structure is gravel and asphalt.	Control Structure	TBD	TBD	TBD	In 1959, contaminated moisture dripping from a vent pipe bonnet at the 216-A-8 Proportional Sample Pit contaminated the ground around the cement pad (see UPR-200-E-18).
141	216-A-508	216-A-508, Control Structure for 216-A-8 Crib, 216-A-8 Distribution Box	The site is located east of the 200 East Area, outside the 200 East Area fence, adjacent to the west end of the 216-A-8 Crib.	Not specified	The control structure is associated with the 216-A-8 Crib, the 200-E-164-PL Pipeline, the 216-524 Control Structure and the 241-A Tanks Farms.	The structure is surrounded with radiological chain and posted with Contamination Area and Radiologically Controlled Area signs. The 216-A-508 Control Structure, located west of the 216-A-8 Crib, controlled whether the effluent flow was diverted to the 216-A-8 or 216-A-24 Crib.	Control Structure	None	TBD	TBD	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
142	216-A-524	216-A-524, 216-A-524 Control Structure, 216-A-524 Weir, 216-A-24 Control Structure	The site is located on the west end of the 216-A-24 Crib	Not specified	The site is associated with the 216-A-24 Crib, the 200-E-165-PL Pipeline and the 216-A-508 Control Structure.	The 216-A-524 Weir is an underground liquid effluent control structure. The weir is a concrete structure with the interior being divided vertically into three chambers. The unit is covered with two removable concrete cover slabs. The aboveground features have been removed. The underground piping includes blanked off 40.6 cm (16 in.) steel inlet and outlet pipes, two 40.6 cm (16 in.) steel blanked off outlet stubs and one with a 5.1 cm (2 in.) steel bypass. A stop log and sluice gates are also present. Three gate valves with hand wheels and a filtered vent pipe extended above ground, but have been removed.	Control Structure	None	TBD	TBD	None
143	241-A-151	241-A-151, 241-A-151 Diversion Box	The diversion box is located south of the east end of the 202-A Building.	1956 to end date not specified	Associated with 241-A-302-A Catch Tank, A and AX Tank Farms.	The site is a reinforced concrete structure with cover blocks. Most of the structure is below grade. It is marked and radiologically posted.	Diversion Box	UPR-200-E-25, UPR-200-E-26, UPR-200-E-31, UPR-200-E-42, UPR-200-E-65	Dimensions: 17.98 × 9.6 m (59 × 31.5 ft)	Multiple UPRs. Highly concentrated process wastes have contaminated the inside of the diversion box.	None
144	241-A-302A	241-A-302A, 241-A-302-A Catch Tank	The catch tank is located south of the east end of the 202-A Building and west of the 241-A-151 Diversion Box. It is located inside the PUREX security fence.	1956 to 2005	Associated with the 241-A-151 Diversion Box.	The unit is an underground cylindrical vessel made of CS. It sits inside a pump pit with a riser extending to the surface. It is surrounded with posts and chain and is marked with radiological signs.	Catch Tank	None	Dimensions: 5.03 × 2.90 m (16.51 × 9.5 ft) Tank Volume: 32,440.98 L (8,57 gal)	1996 waste estimated as 6,418 L (1698 gal).	None
145	241-A-302B	241-A-302B, 241-A-302-B Catch Tank, IMUST, V062	The 241-A-302B catch tank is buried outside the tank farm perimeter fence, east of 241-A Tank Farm, adjacent to Canton Avenue.	1989	The unit is associated with 241-A Tank Farm and 241-A-152 Diversion Box and the 200-E-182-PL pipeline. The drain line to this catch tank is V062.	The east slope of the 241-A Tank Farm has been sprayed with shotcrete. The shotcrete surrounds the area where the 241-A-302B Catch Tank is located. A riser and electrical box are visible. A staircase has been installed to provide access to the tank surface. The underground tank is positioned horizontally. The tank is marked and radiologically posted. The tank received liquid effluents from the 241-A-151 Diversion Box, located south of PUREX, and the 241-A-152 Diversion Box, that is located inside the tank farm perimeter fence. This tank was the subject of an Unusual Occurrence Report issued in February 1989 due to fluctuating liquid levels.	Catch Tank	TBD	TBD	TBD	TBD

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
146	241-AR-151	241-AR-151, 241-AR-151 Diversion Box	The diversion box is located north of the 244-AR Vault facility, east of 291-AR. It is on the west side of Buffalo Avenue.	Not specified	This unit is associated with 241-AY and -AZ tank farms and the 244-AR Vault. A pipeline associated with this diversion box is 200-E-206-PL. The drain line is V717.	The 241-AR-151 diversion box is a reinforced concrete structure. The walls and floor of the diversion box are lined with 11 gage SS. The box drains to the 244-AR Vault and is equipped with a leak detector that alarms inside 242-A evaporator building. The structure is covered with a weather protective cover. The unit is utilized for the transfer of liquid mixed waste generated at PUREX to the AY and AZ Tank Farms.	Diversion Box	TBD	TBD	TBD	TBD
147	241-B-154	241-B-154, 241-B-154 Diversion Box	The unit is located east of 221-B, at the intersection of Baltimore Avenue and 7th Street.	1945 to 1984	Associated with B Plant, 241-B-302 Catch Tank, 241-B-151, 241-B-152, and 200-E-116.	The site is a diversion box that interconnects the 241-B-151 and 241-B-152 Diversion Boxes with the 221-B Building. The unit is a rectangular reinforced concrete structure. It was sprayed with gray weatherizing foam. Later, a layer of shotcrete was placed over the diversion box, extending beyond the structure to include the surrounding ground surface.	Diversion Box	UPR-200-E-45, UPR-200-E-77	Dimensions: 10.97 × 2.74 × 5 m (36 × 9 × 16.4 ft)	Diversion box may contain about 23 kg (50 lb) of lead shielding.	None
148	241-B-302B	241-B-302B, 241-B-302-B Catch Tank, 241-B-302, IMUST	This catch tank is located north of the 241-B-154 Diversion Box, adjacent to the corner of 7th Street and Baltimore Avenue.	1945 to 1985	Associated with B Tank Farm and 241-B-154 Diversion Box.	This unit is an underground horizontal CS tank. The catch tank and the 241-B-154 Diversion Box are surrounded with post and chain. The surface of the area inside the chain has been covered with gravel and sprayed with gray weatherizing material. The site is marked with radiological and IMUST signs.	Catch Tank	UPR-200-E-77	Dimensions: 10.94 × 2.74 m (35 × 9 ft) Tank Volume: 66,933.94 L (17,682.07 gal)	1985 estimated Volume of liquid as 16,027 L (4249 gal) and sludge as 2,608 L (690 gal).	None
149	241-BX-154	241-BX-154, 241-BX-154 Diversion Box	This Diversion Box is located south of the 221-B Building and east of the 241-BX-302B Catch Tank.	1948 to 1985	Associated with the 241-BX-302-B Catch Tank and the BX Tank Farm. This unit interconnects the 241-B-252 and 241-BX-155 Diversion Boxes and the 221-B Building.	This diversion box is a reinforced concrete structure.	Diversion Box	UPR-200-E-77	Dimensions: 6.71 × 2.74 × 3.96 m (22 × 9 × 13 ft)	Not available	None
150	241-BX-155	241-BX-155, 241-BX-155 Diversion Box	This Diversion Box is located northeast of B Plant on the south side of Atlanta Avenue.	1948 to 1984	Associated with the 241-BX-302-C Catch Tank and the BX Tank Farm.	This diversion box is a reinforced concrete structure. The diversion box has been isolated and covered with waterproof foam sealant. The area around the diversion box has been surface stabilized with gravel and posted with URM area signs, except for the surface area above the 241-B-302-C Catch Tank. This area does not have the additional layer of gravel and remains posted as a CA.	Diversion Box	UPR-200-E-78	Dimensions: 6.10 × 2.74 × 3.96 m (20 × 9 × 13 ft)	Not available	None

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
151	241-BX-302B	241-BX-302B, 241-BX-302-B Catch Tank, IMUST	The 241-B-302B Catch Tank is located on the south side of the 221-B Building (near section 12), and northwest of 241-BX-154 Diversion Box.	1948 to 1985	Associated with 241-BX-154 Diversion Box and BX Tank Farm.	The buried tank is covered with gravel. It is surrounded with post and chain. The tank is marked with radiological and IMUST signs.	Catch Tank	None	Dimensions: 5.49 × 3.05 m (18 × 10 ft) Tank Volume: 43,112.06 L (11,389 gal)	Estimated residual Volume of supernate as 355 L (94 gal) and sludge as 3591 L (950 gal).	None
152	241-BX-302C	241-BX-302C, 241-BX-302-C Catch Tank, IMUST	The 241-BX-302C Catch Tank is located southeast of 241-BX -155 Diversion Box, between Atlanta Avenue and Baltimore Avenue.	1948 to 1985	Associated with the 241-BX-155 Diversion Box and BX Tank Farm.	This catch tank is a horizontal cylinder of direct buried CS. It is inside a recently graveled URM area, related to the 241-BX-155 Diversion Box surface stabilization. The tank was not covered with extra gravel and is separately posted as a CA. The tank is marked with radiological and IMUST signs.	Catch Tank	UPR-200-78	Dimensions: 5.49 × 3.05 m (18 × 10 ft) Tank Volume: 43,070.42 L (11,378 gal)	1984 estimated Volume of sludge as 2,400 L (635 gal) and supernatant as 862 L (228 gal).	None
153	241-C-154	241-C-154, 241-C-154 Diversion Box	The Diversion Box is located south of 7th Street, southeast of the (demolished) 201-C Process Building and northeast of the 216-C-1 Crib.	1946 to 1985	Associated with the 201-C C-Cell, the B Plant Promethium Transfer Line (line V743), and 200-E-41 stabilized area.	The diversion box has been covered with clean backfill material (ash) and is no longer visible. It is located within the larger Hot Semiworks Facility surface stabilized area (200-E-41).	Diversion Box	None	Dimensions: 2.44 × 2.44 × 2.44 m (8 × 8 × 8 ft)	Not available	None
154	241-CX-70	241-CX-70, 241-CX-TK-70 Tank, Strontium Hot Semiworks, IMUST	The tank is located south of 7th Street, within the Hot Semiworks stabilized area (200-E-41).		Associated with 201-C, 276-C, 2704-C, 241-CX-71, and 241-CX-72. The pipeline to 241-CX-70 is site code 200-E-244-PL. It is inside the 200-E-41 stabilized area.	The unit stored Semiworks Process waste. The 241-CX-70 Tank is constructed of concrete with a 2.5 cm (1 in.) thick SS plate liner. The sides and top are 0.3 m (1 ft) thick concrete and the bottom thickness varies from 0.6 m (2 ft) at the edges to 22.9 cm (9 in.) at the center. The tank is located below grade, with several risers and vents visible above grade. The underground tank is surrounded with post and chain. It is posted with Hazardous Waste, Restricted Area-Inactive Tank signs. In the spring of 2004, a cave-in occurred on the west side of the tank. The collapse was approximately 2.1 m(7 ft) deep. The cave-in area was posted as a CA.	Storage Tank	TBD	TBD	TBD	TBD

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
155	241-CX-71	241-CX-71, 241-CX-TK-71, 241-CX Neutralization Tank, Strontium Hot Semiworks, IMUST	The tank is located south of 7th Street, within the Hot Semiworks stabilized area (200-E-41). It is near the northeast corner of the 216-C-1 Crib.		Associated with 201-C, 276-C, 2704-C, 216-C-1, 216-C-5, 241-CX-70 and 241-CX-72. The pipeline to 241-CX-71 is site code 200-E-245-PL. It is inside the 200-E-41 stabilized area.	This tank provided acidic waste neutralization via a flow-through limestone layer for 201-C process condensate and the coil and condensate cooling water stream prior to discharge to the 216-C-1 and 216-C-5 Cribs. It may have also received process condensates from REDOX and PUREX pilot plant operations, decontamination flushes and hot shop sink waste. Replacement limestone was added as needed through a large central riser pipe. This tank is constructed of SS and lies below grade, on a reinforced concrete foundation pad. The underground tank is surrounded with steel posts and chain. It is posted with Hazardous Waste, Restricted Area-Inactive Tank signs.	Neutralization Tank	TBD	TBD	TBD	TBD
156	241-CX-72	241-CX-72, 241-CX-TK-72 Vault and Tank, 241-CX-72 Waste Self Concentrator, Strontium Hot Semiworks, IMUST	The tank is located south of 7th Street, within the Hot Semiworks stabilized area (200-E-41).	1957 to 1958	Associated with 201-C, 276-C, 2704-C, 241-CX-70, and 241-CX-71. The pipeline to 241-CX-72 is site code 200-E-246-PL. It is inside the 200-E-41 stabilized area.	This was an experimental tank used to study the characteristics of self-concentrating waste from the Plutonium Uranium Extraction (PUREX) process. The 241-CX-72 Tank is vertically oriented with welded steel construction, resting on a concrete pad inside a steel caisson with the tank top below surface grade. A cylindrical heater is located just above each stiffening ring. A number of penetrations extend through the tank top, including an agitator. This tank was used for approximately one year, during 1957 through 1958. The 241-CX Vault is located below grade adjacent to the 241-CX-72 Tank. The vault is constructed of reinforced concrete, divided into two sections. In 1961, the inlet piping was cut and capped. The tank is located inside a small building, with a cover that has been placed over the tank. It is marked with radiological postings and Keep Out signs.	Storage Tank	TBD	TBD	TBD	TBD

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
157	241-ER-151	241-ER-151, 241-ER-151 Diversion Box	The site is located southwest of the B Plant and near the corner of 7th Street and Atlanta Avenue.	1945 to end date not specified	Associated with the 241-ER-311 Catch Tank, the Cross-Site Transfer Line, 241-EW-151 Vent Station, the 244-BX Double Contained Receiver Tank, and the 241-ER-152, 241-ER-153, and 241-UX-154 Diversion Boxes and the 241-ER-311 Catch Tank.	The diversion box is located inside a locked chain link fence. The fence is posted with "Caution - contact Radiological Control and Tank Farm Shift Office prior to entry" signs. The diversion box is surrounded with a metal safety barricade.	Diversion Box	UPR-200-E-84, UPR-600-20	Dimensions: 13.11 × 3.05 × 5.18 m (43 × 10 × 17 ft)	Diversion box may contain about 23 kg (50 lb) of lead shielding.	September 1998 rad surveys detected up to 10,000 cpm on contaminated specks and 25,000 cpm on ant hill.
158	241-ER-152	241-ER-152, 241-ER-152 Diversion Box	This 241-ER-152 Diversion Box is southeast of the 224-B Building, and east of 241-ER-151 Diversion Box, near the corner of Atlanta Avenue and 7th Street.	1945 to end date not specified	Associated with the 241-ER-151 and 241-ER-153 Diversion Boxes, the 241-ER-311 Catch Tank, and transfer lines. It is also associated with the stabilized contamination know as 200-E-29.	Most of the reinforced concrete diversion box structure is underground. The floor and lower portions of the walls are lined with SS. Cover blocks with lifting hooks are visible from the surface. The 241-ER-152 Diversion Box is surrounded with radiation rope and CA signs.	Diversion Box	None	Dimensions: 3.66 × 3.66 × 4.57 m (12 × 12 × 15 ft)	~540 m^2 (6,000 ft2); in 1996, contamination spread over an area measuring approximately 0.5 ha (1.2 acre)	None
159	241-ER-153	241-ER-153, 241-ER-153 Diversion Box	The 241-ER-153 Diversion Box is located south of 7th Street, inside the fenced 244-A lift station.	Not specified	The 241-ER-153 diversion box is associated with the 244-A Lift Station, 241-C Tank Farm, and the 241-ER-151, and 241-ER-152 Diversion Boxes and pipelines 200-E-145-PL and 200-E-147-PL.	Most of the diversion box structure is underground. The cover blocks with lifting bails are visible on the surface. The 244-A Lift Station is fenced, marked and radiologically posted. Several transfer lines are connected to 241-ER-153. They include V228, V244, SN232, SN233, and SN234. One of the process lines in the diversion box (SN-233) failed at another location and is out of service. The location of the diversion box is not shown on H-2-44501 Sheet 81, though the proper location can be inferred by observing process line nozzle placements in the detail drawing, (H-2-37966) and locating the diversion box at the junction of the process lines shown in H-2-44501 Sheet 81.	Diversion Box	TBD	TBD	TBD	TBD

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Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
160	241-ER-311	241-ER-311, 241-ER-311 Catch Tank, 241-ER-311A Replacement Tank	The tank is located south of the B Plant, and west of Atlanta Avenue, inside the 241-ER-151 Diversion Box fence.	1954 to 1991	Associated with the 241-ER-311A Catch Tank, 241-ER-151, 241-ER-152, and 241-ER-153 Diversion Boxes, automatic liquid level sensors, leak detection, and a submersible pump.	The underground tank is located inside the 241-ER-151 Diversion Box locked chain link fence. The fence is posted as a CA and a URM area, and is labeled with IMUST signs. The placement of these structures within the fence is that the 241-ER-311 Catch Tank is the furthest south, nearest the chain link fence. The 241-ER-311A Catch Tank is located adjacent to the north side of the 241-ER-311 tank (in the middle of the three structures). The 241-ER-151 Diversion Box is north of the 241-ER-311A Catch Tank.	Catch Tank	UPR-200-E-84	Dimensions: 12.19 × 2.90 m (40 × 9.5 ft)	~500,000 beta/ gamma due to contaminated ant hill.	None
161	241-ER-311A	241-ER-311A, 241-ER-311A Catch Tank, old 241-ER-311, original 241-ER-311 Catch Tank, IMUST	This unit is below grade. The tank is located southwest of the B Plant. It is south of 7th Street and west of Atlanta Avenue.	1950 to 1954	Associated with the 241-ER-151 Diversion Box.	It is located within a chain link fence that is posted as a CA and a URM area, and is labeled with IMUST signs. The 241-ER-151 Diversion Box, the 241-ER-311 Catch Tank, and the 241-ER-311A Catch Tank all are located inside this chain link fence. The placement of these structures within the fence is that the 241-ER-311 Catch Tank is the furthest south, nearest the chain link fence. The 241-ER-311A Catch Tank is located adjacent to the north side of the 241-ER-311 Catch Tank (in the middle of the three structures). The 241-ER-151 Diversion Box is north of the 241-ER-311A Catch Tank.	Catch Tank	UPR-200-E-84	Dimensions: 10.97 × 2.74 m (36 × 9 ft) Tank Volume: 104,855.91 L (27,700 gal)	6,500 L (1,700 gal) ~10 Ci fission material.	None
162	244-A CT	244-A CT, 244-A Catch Tank, 244-A RT, 244-A Receiver Tank, 244-A DCRT, 244-A-TK/SMP	This site is located west of the 241-AZ Tank Farm and south of the 241-C Tank Farm. It is inside the 244-A Lift Station fence.	Not specified	Structures associated with the 241-A DCRT are the 244-A Lift Station, 241-ER-153 diversion box and the 241-A valve pits. See Site code 244-A LS.	The unit is an underground structure constructed of CS. It sits vertically inside a reinforced concrete steel-lined vault. Above the tank is the lift station (site code 244-A LS). The original drawing (H-2-38203) refers to this tank as a Catch Tank. The structure was built prior to the use of the DCRT designation. 244-A is a tank inside a vault, but did not receive saltwell pumping like other DCRTs. The diameter, length, and capacity in the Dimensions field are for the vault. The tank has a capacity of 16,280 gal (61,630 L).	Catch Tank	TBD	TBD	TBD	TBD

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163	244-A LS	244-A LS, 244-A Lift Station, 244-AR Lift Station, 244-AR LS, SN-232, SN-233, SN-234 (see Subsites).	This site is located south of 7th Street, west of the 241-AZ Tank Farm and south of the 241-C Tank Farm.	Not specified	The 244-A LS is associated with the 241-ER-153 diversion box, the 244-A DCRT, lines SN-232, SN-233, SN-234 and the 241-A valve pits. Per drawing H-2-38203, structures related to the 244-A Lift Station also include the exhaust fan and stack, instrument enclosure, caisson, flush pit, service pit, vacuum pump pad and transfer piping. The lift station is also associated with UPR-200-E-70, UPR-200-E-100, UPR-200-E-143, 200-E-144-PL, 200-E-145-PL, 200-E-147-PL, and 200-E-167-PL.	The lift station is surrounded with a chain link fence. The surface is covered with gravel. The lift station consists of an underground concrete structure containing a filter pit, pump pit, and vault in which the catch tank (244-A DCRT) is installed. This site includes the exhaust fan and stack, instrument enclosure, caisson, flush pit, service pit, and vacuum pump pad. The structure is posted with multiple radiological postings, including Radiation Area, URM Area, Radioactive Material Area, and Contamination Area. The 244-A LS provides lag storage for waste transferred from the 241-ER-153 diversion box, via lines SN-232, SN-233 and SN-234. The waste was then sent to the 241-A valve pit. Over years of operation, contaminated surface soil specks and animal feces have been found on multiple occasions adjacent to the 244-A Lift Station facility. In some instances, efforts were made to clean up the contamination as it was found. Sometimes the surface soil was scraped up and removed. The number, size and shape of posted Contamination Areas in the vicinity of the lift station changes with various lift station activities and clean up activity efforts.	Control Structure	TBD	TBD	TBD	TBD

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164	244-AR VAULT	244-AR Vault, 244-AR Vault	The building is located west of the 241-A Tank Farm, at the corner of 4th Street and Buffalo Avenue.	1966-1978	The facility includes a crane, control room, two ventilation systems, a sluicing system (no longer in use), and a solution piping system.	The 244-AR Vault facilities include a canyon building, a service building, two concrete housings, and a change room. The canyon building is a reinforced concrete, two level, multi-cell structure. The lower process cells contain four tanks and a failed equipment cell, while the upper cells contain the associated piping and equipment. The upper and lower cells are separated by cover blocks with recessed lifting bails. The facility is posted with multiple radiological postings including Internally Contaminated Systems, Radiation Area, URM Area, Radiological Buffer Area, Radioactive Material Area, Contamination Area, High Contamination Area, and Fixed Contamination Area. The unit received waste sluiced from the 241-A and -AX Tank Farms. Processing took place, then the waste was shipped to B Plant. The facility was the focal point for reprocessing and routing of PUREX-generated waste between tank farms and B Plant facilities in the late 1960s and between the tank farms and the Waste Encapsulation Storage Facility in the late 1970s. In 1984, a decision was made to upgrade the 244-AR vault for use as a waste transfer facility. The extensive upgrading effort provided improved features for the safe and efficient transferring of PUREX-generated waste between the tank farms and B Plant. The waste consisted of cladding removal waste enroute to B Plant and transuranic waste from B Plant/Waste Encapsulation Storage Facility to the tank farms.	Receiving Vault	TBD	TBD	TBD	TBD
165	241-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	The site is located south of Route 3, approximately halfway between the 200 East and West Areas. It is south of the 609-A Fire Station.	1955 to 2005	This site is part of the Cross Site Waste Transfer System and is associated with Diversion Boxes 241-UX-154 (200 West) and 241-ER-151 (200 East). The vent station is associated with the cross site transfer line that runs between Diversion Boxes 241-UX-154 (200 West) and 241-ER-151 (200 East).	The vent station is enclosed in a locked, chain link fence. It consists of an underground concrete structure containing an SS tank in a vault with a jumper pit above the tank. The tank has two vent risers that extend above grade and a riser for the unit's leak detection system. At the bottom of the stairwell access is a floor drain that connects to a nearby French drain. Several hazard and radiological warning signs are posted on the fence. Also, two areas outside the fence, adjacent to the northeast side of the vent station, are posted with URM area signs.	Catch Tank	UPR-600-20	Dimensions: 8.5 × 3.05 × 4.69 m (27.9 × 10 × 15.4 ft)	26 Acres; 10,000 dpm to 50 mR/hr.	None

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166	HSVP	HSVP, Hot Semiworks Valve Pit, 201-C Diversion Box, Semiworks Valve Pit	This valve pit is adjacent to the remains of the 201-C Building and southeast of the main canyon area. It is located within the 200-E-41 surface stabilized area.	1951 to 1986 or 1952 to 1963	Associated structures include the 201-C Building, valves, transfer lines, the 244-CR Vault, C Tank Farm, and the 241-CX-70 Tank. Also associated with 200-E-41 Stabilized Area.	The site is a sealed, concrete-filled, vertically configured, stainless-steel cylinder that is buried beneath the ash barrier that was placed over the decommissioned 201-C Process Building (see 200-E-41). The surface-stabilized area is posted with URM area signs. The valve pit is not separately marked or posted.	Valve Pit	None	Depth:1.68 m (5.50 ft)	Diversion box may contain about 23 kg (50 lb) of lead shielding.	None
167	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	The encased pipeline runs from 241-UX-154 Diversion Box, adjacent to 221-U inside 200 West Area, to the 241-ER-151 Diversion Box inside 200 East Area.	1952-1995	The pipeline is associated with the 241-UX-154 Diversion Box, the 241-ER-151 Diversion Box, 241-EW-151 Vent Station and UPR-600-20.	The waste site is the underground pipeline that is located beneath the surface stabilized UPR-600-20 soil contamination site. It is posted with URM signs. The cross site transfer line was originally constructed in 1952 to support the Uranium Metal Recovery operations. Various process and tank farm waste has been transported between 200 East and 200 West Areas through this underground concrete encased group of pipelines. The cross site transfer line consists of six SS pipelines (V360, V361, V362, V363, V364, and V366) inside a concrete encasement. The encasement type is known as 6-59, indicating there are six lines inside a 150 cm (59 in.) wide encasement. The concrete encased SS pipelines are buried at depths that range from 1.5 to 4.6 m (5 to 15 ft). There are 58 encasement test risers (swab risers) spaced regularly along the pipeline that provided access to the encasement void space. This cross site line was replaced with a new pipeline in 1995 (see 600-269).	Encased Tank Farm Pipeline	UPR-600-20	Waste Site Length: 19,645 ft Cumulative Pipeline Length: 19,767 ft Pipeline Depth: TBD ft	TBD	In March 1988, while conducting a radiological survey of the 241-EW-151 Vent Station (located approximately midway between 200 East and 200 West Areas on the transfer line) contamination was identified approximately 100 m (300 ft) outside the established radiation zone boundaries of the vent station, above the transfer line. The MSCM tractor was used to survey the entire surface of the pipeline. Numerous spots of contamination were identified at various locations along the entire length of the transfer line. Contamination levels ranged from a few hundred counts per minute to 750 millirem per hour. To characterize the

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											integrity of the pipeline, eight boreholes were drilled with an auger at four locations along the transfer line. Although no contamination was found to have leaked below the pipeline encasement, contamination was found in sagebrush growing next to the encasement. This indicated that the roots of the sagebrush had penetrated the encasement. The contamination was given an Unplanned Release number UPR-600-20 in 1989.
168	UPR-200-E-3	UPR-200-E-3, line leak from 221-B to 241-BX-154, UN-200-E-3	The release occurred on the south side of 221-B, between the 221-B Building and 241-BX-154.	1951 – Exact date of the occurrence is unknown	B Plant	The release is not separately marked or posted.	Unplanned Release	None	Not available.	The release consisted of B Plant first-cycle waste.	Excavation efforts abandoned when readings of 120 rad/h found with 18 in. Soil remaining over pipeline.

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169	UPR-200-E-7	UPR-200-E-7, UN-200-E-7, Cave-In Near 216-B-9 (241-B-361 Crib), Pipeline Leak	The Unplanned Release occurred on the east side of Baltimore Avenue, near the 216-B-9 Crib. The 216-B-9 Crib has an alias name of the 241-B-361 Crib. In 1954, a cave-in was noted over the underground line near the 241-B-361 Crib.	Not specified	This release is associated with pipeline sites 200-E-195-PL and 200-E-199-PL.	The site is an unplanned release to the soil from a waste line break. A single metal post with a WIDS sign marks an estimated release location near the 216-B-9 Crib. The exact location of the cave-in on the process line cannot be determined from the available documentation. HW-60807 states that in 1954 a cave in occurred near the 361-B Crib, which is today known as 216-B-9. The hand drawn sketch in HW-60807 shows the Unplanned Release location as being south and slightly west of the 361-B Reverse Well (216-B-5), approximately where the 241-B-361 tank is located. This location is approximately 125 m (400 ft) southwest of the south edge of the posted 216-B-9 Crib. The contamination was covered in 1954, delimited by a chain and posted as “Underground Contamination.” That location is no longer marked or posted. On November 30, 1954, leakage from the waste line between 221-B and the 241-B-361 Crib (alias 216-B-9 Crib) caused the ground to cave-in near the 241-B-361 Crib. Approximately 19,000 L(5,000 gal) of liquid was lost to the ground. The maximum dose rate observed was 1.7 rads/hour over an area covering 2.7 m2 (3 ft2). The contamination was covered and delineated with a chain fence. The area was posted with “Underground Contamination” signs.	Unplanned Release	TBD	TBD	TBD	TBD
170	UPR-200-E-18	UPR-200-E-18, Contamination Release at the 216-A-8 Sampler Pit, UN-200-E-18	The release site is approximately 30 m (100 ft) east of the 241-A-271 Building, at the 216-A-8 proportional sample pit. It is east of 241-A Tank Farm and west of Canton Avenue.	Not specified	The site is associated with the 242-B Evaporator and the 207-B Basin. The release occurred in the pipeline assigned site code 200-E-264-PL.	The sampler pit is a concrete structure with three valves, two vent stacks, and one curved bonnet extending from the structure. The structure is surrounded with post and chain with URM and Contamination Area signs. The area around the structure is gravel and asphalt.	Unplanned Release	TBD	TBD	TBD	Contaminated moisture dripping from a vent pipe bonnet at the 216-A-8 Proportional Sample Pit contaminated the ground around the cement pad.

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171	UPR-200-E-42	UPR-200-E-42, 241-AX-151 Release, UN-200-E-42	The 241-AX-151 Diversion Box is located near the corner of 4th Street and Buffalo Avenue, adjacent to the 204-AR Unloading Station. The UPR site included a dirt bank east of the 241-AX-151 Diversion Box and weeds east of the established parking lot.	1972 to end date not specified	Associated with 241-AX-151 Diversion Box and 244-AR Vault.	A WIDS sign has been placed near the diversion box structure to document the release.	Unplanned Release	None	Not available	Not available	In 1972, contamination of up to 300 mrad/h with spots to 20 rad/h was found. The blacktop east of the diversion box was contaminated up to 3,000 cpm. The dirt bank had contamination up to 2,000 cpm and weeds contaminated 300 to 800 cpm.
172	UPR-200-E-45	UPR-200-E-45, UN-200-E-45, contamination spread from the 241-B-154 Diversion Box	The 241-B-154 Diversion Box is located at the corner of 7th Street and Baltimore Avenue. The release involving loose contamination spreading in a southeasterly direction from the 241-B-154 Diversion Box.	1974	This release is related to the 241-B-154 Diversion Box.	A large area on the northeast corner of 7th Street and Baltimore Avenue is surrounded with post and chain and is marked as a URM area. The URM surrounds the 241-B-154 Diversion Box, which has been covered with a coating of gray grout. The original UPR is not separately marked or posted.	Unplanned Release	UPR-200-E-77	Dimensions: ~91.5 × 30.5 m (300 × 100 ft) Area: 2,787.09 m2 (29,999.97 sq ft)	Contaminated particles (specks) spread from inside diversion box.	Ground surface contamination up to 50,000 cpm and up to 30,000 cpm on blacktop.
173	UPR-200-E-67	UPR-200-E-67, UN-216-E-67, Excavation of Radioactively Contaminated Pipe Encasement (V004, V005, V006, V007, V008) UN-200-E-67	This site was located in an excavation site, north of the 272-AW parking lot, near the corner of 4th Street and Canton Avenue.	Not specified	The release is associated with pipeline site 200-E-207-PL.	The 1984 excavation has been backfilled. A WIDS sign has been placed at the approximate location of the excavation. The release occurred on May 7, 1984. An old, contaminated pipe encasement was encountered during the excavation. Contamination levels ranged from 1 to 1.5 milirad/hr. An encased pipeline (containing lines V004, V005, V006, V007, and V008) extends between the 241-A-151 Diversion Box, south of PUREX, to the 241-A-152 Diversion Box that is located inside the 241-A Tank Farm (see site code 200-E-207-PL).	Unplanned Release	TBD	TBD	TBD	TBD

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174	UPR-200-E-77	UPR-200-E-77, UN-216-E-5, 241-B-154 Diversion Box Ground Contamination, UN-200-E-77	This site is located east of 221-B Building, at the northeast corner of Baltimore Avenue and 7th Street. It surrounds the 241-B-154 Diversion Box.	1946 to end date not specified	Site associated with the 241-B-154 Diversion Box.	A large graveled area on the northeast corner of 7th Street and Baltimore Avenue is surrounded with post and chain and is marked as a URM area. The URM surrounds the 241-B-154 Diversion Box, which has been covered with a coating of gray grout. The area appears to have been posted in stages. A large posted oval area (URM) extends north and east from the diversion box. Another posted area (URM) extends west to Baltimore Avenue and turns northward. In January 2000, a separate CA was posted around a power pole (adjacent to a manhole) within the larger URM. In 2002, the posting around the power pole was removed and a Fixed Contamination Area sign was attached to the pole.	Unplanned Release	None	Dimensions: 125 × 120 m (410 × 394 ft)	Original release involving metal waste solution from 221-B Building with about 1 Ci fission products.	1975 rad survey found surface contamination up to 80,000 cpm.
175	UPR-200-E-78	UPR-200-E-78, UN-216-E-6, 241-BX-155 Diversion Box ground contamination, UN-200-E-78	This site is located in the area around the 241-BX-155 Diversion Box, south of the BX Tank Farm, northeast of B Plant between Atlanta and Baltimore Avenues.	1955 to end date not specified		The diversion box has been isolated and covered with gray grout. The area around the diversion box and the surface area above the 241-B-302-C Catch Tank have been surface stabilized with gravel and posted with URM area signs.	Unplanned Release	None	Area: 18.58 sq m (200 sq ft)	Contaminated ground. Release involving salt containing waste from B Plant with about 10 Ci of fission products.	At the time of the release, the maximum dose rate was 22.6 rad/h.
176	UPR-200-E-79	UPR-200-E-79, UN-216-E-7, 242-B to 207-B Line Break, UN-200-E-79, 200-E-264-PL Line Break									
177	UPR-200-E-84	UPR-200-E-84, 241-ER-151 Catch Tank Leak, UN-200-E-84, UN-216-E-12	The release occurred adjacent to the 241-ER-151 Diversion Box, southwest of the 221-B Building.	1953	Associated with 241-ER-311 Catch Tank and 241-ER-151 Diversion Box.	The 241-ER-151 Diversion Box and the 241-ER-311 Catch Tank are located inside a chain link fence that is radiologically posted. A WIDS sign has been placed at the approximate location of the release.	Unplanned Release	None	Not available	Contaminated acid with about 10 Ci of fission products.	In 1975, surface contamination was up to 90,000 cpm.
178	UPR-200-E-100	UPR-200-E-100, Radioactive Contamination Near 244-A Lift Station, UN-216-E-100, UN-216-E-29, UN-200-E-100	UPR-200-E-100 consisted of radioactive rodent feces and contamination specks located south of Seventh Street and west of Buffalo Street, adjacent to the 244-A Lift Station. Due to rodent movement and some contamination migration	Not specified	UPR-200-E-100 is associated with the 244-A Lift Station, the 241-C Tank Farm, UPR-200-E-143, UPR-200-E-56 and the 216-A-40 Retention Basin.	Various radiological postings exist in this vicinity that are associated with the 244-A Lift Station and 241-C Tank Farm contamination migration. A WIDS sign has been placed at the approximate location of the release. Routine radiological surveys of the 244-A Lift Station Area have changed the size and the shape of the posted areas as new contamination specks are identified and remediation attempts occur.	Unplanned Release	TBD	TBD	TBD	Radiological surveys done in April 1985 identified large areas of surface contamination north and west of the 244-A Lift Station. Specks of contamination ranged from 50,000 counts

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			from wind, the size and the shape of the contaminated area was redefined several times.								per minute to 7 rad per hour. Another area east of 241-C Tank Farm and north of 7th Street was also identified with contamination levels up to 100,000 counts per minute. A small area of partially buried plastic sheeting, rebar and rags was found east of the 244-A Lift Station. A contamination characterization investigation was conducted in May 1985 to determine if it was the source of the contamination spread. Contamination with levels up to 7 rad per hour were found near a partially buried pile of debris. Core samples were taken at a distance of 0.9 m (3 ft) and 0.45 m (1.5 ft) from the debris and also through the center of the debris. In each area, core samples readings were “less than detectable” when surveyed with a GM and P-11 probe, eliminating the debris as the contamination source.

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
179	UPR-200-E-145	UPR-200-E-145, W049H Green Soil, VCP Pipeline Leak	The site is east of the 241-A Tank Farm entrance, northeast of the 242-A Evaporator Building, and east of Canton Avenue.	Not specified	The 38 cm (15 in.) vitrified clay pipe is 200-E-166-PL, feeding the 216-A-34 Trench.	The site currently is a flat, disturbed area, with no vegetation. The area is covered with sandy soil and some rocks and gravel. The release was identified in a pipeline excavation that was oriented north to south. The north end of the excavation was located at a power pole with a blue air sample cabinet. In December 2003, growing contaminated tumbleweeds were found on the surface of this underground pipeline. The weeds were removed and the surface was stabilized. An area measuring approximately 3.0 m by 6.1 m (10 by 20 ft) is posted with URM signs. The coordinates of the excavation were E575490, N136130 on the north end and E575490, N136118 on the south end. The contaminated soil was identified on December 13, 1993. The contamination is suspected to be leakage from an underground vitrified clay pipe. The date of the actual release from the pipe is unknown. The contaminated soil was placed back into the excavation. The new W049H pipe (within an encasement) was laid inside the north/south excavation, underneath the existing 38.1 cm (15 in.) vitrified clay pipe. The new, encased pipe was covered with about 0.3 m (1 ft) of surrounding soil. Plastic was laid inside the excavation to contain contaminated soil. The contaminated soil was then returned to the excavation and topped with another layer of plastic. A total of 0.9 m (3 ft) of non-contaminated soil was added to bring the excavation to grade. Contamination also exists beneath and outside of the plastic liner and was not disturbed in this action. Approximately 1.8 m (6 ft) of the 38.1 cm (15 in.) vitrified clay pipeline was exposed during excavation for the replacement line. In 1993, while excavating for the installation of a new pipeline (Project W-049H) and exposing existing utility lines, contaminated soil with a radiological reading of 300,000 disintegrations/minute beta-gamma was detected at a depth of 0.8 m (2.5 ft). The contamination was found above an existing 38.1 cm (15 in.) vitrified clay pipe, which was suspected to be the source. Leakage from the 38.1 cm (15 in.) vitrified clay pipe is	Unplanned Release	TBD	TBD	TBD	TBD

Table B-1. Summary Information for Pipeline System Waste Sites Located in the East Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/ Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
						the suspected cause of soil contamination. A 38 cm (15 in.) pipe runs east to west at this location that was connected to the 216-A-34 Crib.					

Sources:

H-2-44511 Series, *Area Map – 200 West Area Facilities*.

H-2-71672, *Piping Plans 241CX Tanks 70 71 72*.

HW-52860, *Standby Status Report Hot Semiworks Facility*.

HW-60807, *Unconfined Underground Radioactive Waste and Contamination in the 200 Areas—1959*.

Notes:

Teflon is a trademark of E.I. du Pont de Nemours and Company, Wilmington, Delaware.

Bgs = below ground surface
CA = contamination area
COB = cleanout box
DCRT = double contained receiver tank
DPT = direct push technology
HSVP = hot semiworks valve pit
IMUST = inactive miscellaneous underground storage tank
ISVAC = integrated soil, vegetation, and animal control
ITS = in-tank solidification
LERF = Liquid Effluent Retention Facility
MSCM = mobile surface contamination monitor
OU = operable unit
PAS = PUREX acid sludge
PUREX = Plutonium-Uranium Extraction (Plant or process)
RARA = radiation area remedial action
REDOX = Reduction-Oxidation (Plant or process)
SS = stainless steel
TEDF = Treated Effluent Disposal Facility
TSD = treatment, storage, and disposal
UNH = uranyl nitrate hexahydrate
UPR = unplanned release
URM = underground radioactive material
VCP = vitrified clay pipeline
WIDS = Waste Information Data System

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Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
1	200-W-7	200-W-7, 246-L, 241-S-TK-1, 243S-TK-1, 243-S-TK1, 200W Personnel Decontamination Facility catch tank, IMUST	The site is located northwest of the 242-S Evaporator and just north of the MO-326 Trailer.	1978 to 1988	Associated with the MO-0326 trailer. It was the personnel decontamination facility for the 200 West Tank Farms.	The underground tank is inside a chained area that measures approximately 3 by 3 m (9 by 9 ft), with three risers extending to the surface. The tank is posted with IMUST signs and radiological postings.	Catch Tank	None	Dimensions: 3 × 3 m (10 × 10 ft) Tank Volume: 2,081.98 L (550 gal)	Waste contents would contain low levels of radionuclides.	None
2	200-W-16	200-W-16, 292-T underground tanks, IMUST 292-TK-1, 292-TK-2	The underground tanks are near the southeast corner of the 292-T Building addition. The 292-T Building is south of the 291-T Stack and north of the 222-T Building.	1944 to 1970	Associated with 291-T, 221-T, and the 292-T facility (200-W-40).	Two metal riser pipes extend about 0.5 m (1.5 ft) above grade near the southeast corner of the 292-T Building addition. Both are capped and one appears to have a pressure relief vent. These pipes extend from two buried tanks (292-TK-1 and 2). A chain link fence encloses the area where the tanks are located. The fence is posted with Access Restricted signs. The site is within a chained area posted "Contamination Area."	Storage Tank	None	Dimensions: 0.90 × 0.60 m (2.95 × 1.97 ft) Tank Volume: 416.35 L (109.99 gal)	Unknown quantity of material placed into tanks.	Rad survey done in 1995 revealed a 2 mrem/h dose rate above the tanks.
3	200-W-58	200-W-58, Z-Plant Diversion Box #1	Z Plant Diversion Box #1 is located south of 234-5Z, in between the two fences that make up the double enclosed Z Plant exclusion area. It is directly south of the 241-Z-361 Settling Tank.	Unknown	Associated with the 241-Z-361 Settling Tank, 216-Z-1, 216-Z-2, 216-Z-3, 216-Z-1A, 216-Z-12, and 216-Z-18.	The Z Plant fenced exclusion area is covered with gravel. The concrete lid of the diversion box is visible above ground. The unit is buried to a depth of 2.7 m (9 ft), and its upper surface (a thick concrete lid) is slightly above ground level.	Valve Pit	None	Dimensions: 2.10 × 2.10 × 2.80 m (6.89 × 6.89 × 9.19 ft).	Not available	None
4	200-W-59	200-W-59, Z-Plant Diversion Box #2	Z Plant Diversion Box #2 is located southwest of the 234-5Z Building, between the two fences that make up the double enclosed Z Plant exclusion area. It is west of the 241-Z-361 Settling Tank and directly north of the 216-Z-12 Crib.	Not applicable	Associated with 216-Z-361, 216-Z-12, and 200-W-58.	The structure is buried with its concrete lid slightly above ground level. The Z Plant fenced exclusion area is covered with gravel.	Valve Pit	None	Dimensions: 2.10 × 2.10 × 5.20 m (6.89 × 6.89 × 17.06 ft)	Not available	In 1976, 5,000 dpm at 17 ft bgs found when drilled two wells near the crib pipelines and diversion box.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
5	200-W-78-PL	200-W-78-PL; Pipeline between 241-TX/TY and 241-T Tank Farms; Lines 6012, 6025, 7624, and 7630	The underground line is located in 200 West Area between the 241-Tand 241-TX/TY Tank Farms, on the west side of Camden Avenue.	1944	The line is associated with 241-T and 241-TX Tank Farms. UPR-200-W-167 was also located in the vicinity of this pipeline.	The site is an encased underground pipeline that runs between the 241-TXR-151 Diversion Box in the 241-TX Tank Farm and the 241-TR-153 Diversion Box in the 241-T Tank Farm. The encasement contains four lines (6012, 6025, 7624, and 7630). Outside the tank farm fence, the line is marked with "Radioactive Pipeline" signs. There are several stabilized, individually radiologically posted areas on top of (or adjacent to) this pipeline, near the east side of the 241-TY Tank Farm perimeter fence. The DynCorp Integrated Soil, Vegetation and Animal Control group submitted three posted surface contaminated areas, located on or adjacent to this pipeline, to WIDS as Discovery Sites (in 2000) when evidence of contaminated biological intrusion above the line was discovered. In April 2001, a fourth area of contamination was identified. The area posted measured 3.0 by 13.74 m (10 by 45 ft). The encased transfer line is marked on the surface with signs on posts. Drawing H-2-44511, Sheet 118, shows a schedule 40 steel line that connects the 242-T Evaporator with the 207-T Retention Basin, a few feet to the east, running parallel with the encased line. It is difficult to determine which line is the source of the contamination being brought to the surface. The lines inside the tank farm fence are direct buried in a soil trench. The portion of the lines that are outside the tank farm fence are encased in cement. Lines 6012, 6025, 7624, and 7630 are inside this pipe trench and encasement. Lines 6025, and 7630 connect 241-TR-153 Diversion Box with 241-TXR-151 Diversion Box. Line 6012 connects the 241-T-101 salt well pump with 244-TX DCRT. Line 7624 connects the 241-T-111 salt well pump with 244-TX DCRT. The lines inside the tank farm are direct buried, SS.	Encased Tank Farm Pipeline	UPR-200-W-167	Waste Site Length: 374 m (1,227 ft) Cumulative Pipeline Length: 3,305 m (10,843 ft) Pipeline Depth: 0.9 to 4.0 m (3 to 13 ft)	Not available	Evidence of contaminated biological intrusion above the line. Difficult to determine which line is the source of the contamination. April 2001 rad survey detected soil contamination up to 4,000 cpm.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
6	200-W-79-PL	200-W-79-PL, 216-T-36 Crib Pipeline, V663	The pipeline is located south of 23rd Street and west of Camden Avenue.	Not specified	The site is associated with the 216-T-36 Crib, 241-T-151 Diversion Box and 200-W-130-PL.	The site is a 10.2 cm (4 in.) diameter, vitrified clay underground pipeline that fed the 216-T-36 Crib. There were three separately posted Contamination Areas located on top of this pipeline, west of the 216-T-36 Crib. In November 2000, the Contamination Areas were stabilized and reposted as URM areas. The DynCorp Integrated Soil, Vegetation and Animal Control group submitted this site to WIDS as a Discovery Site. The radiological surveys indicate there is growing, contaminated vegetation on the crib pipeline, inside the posted Contamination Areas, west of the crib. A radiological survey done in August 1998 identified a rabbit brush plant with radiological readings of 80,000 counts per minute. Other ground surface areas inside the posted area ranged from 600 to 4,000 counts per minute.	Radioactive Process Sewer	None	Waste Site Length: 162 m (532 ft) Cumulative Pipeline Length:196 m (642 ft) Pipeline Depth: 2.4 to 3.7 m (8 to 12 ft)	TBD	A radiological survey done in 1998 identified a rabbit brush plant with radiological readings of 80,000 cpm. Other readings on ground surface areas ranged from 600 to 4,000 cpm.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
7	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)	The underground process sewer line extends from the northwest side of the 221-U Building to the 216-U-14 Ditch. The line runs south, under 16th Street, and turns west until it intersects with the south end of the ditch. A pipeline from 224-U, and 222-U extends along the northwest side of these buildings and connects to the main process sewer line in a manhole north of 16th Street.	Not specified	The pipeline is associated with the 221-U Plant, 224-U, 222-U, 291-U, and the 216-U-14 Ditch. The 216-U-16 Crib pipeline (200-W-170-PL) attaches to this process sewer line.	The majority of the waste site is an underground, 30.5 cm (12 in.) diameter and 45.7 cm (18 in.) diameter, vitrified clay pipeline. A 20.3 cm (8 in.) diameter process sewer line from 224-U and 222-U connects to the main process sewer line. It terminated at a timber headwall where the flow entered the 216-U-14 Ditch. The surface of the pipeline is marked with URM and Pipeline signs. At intervals along the pipeline, there are 1.2 m, (4 ft) diameter, and yellow manholes. Feed lines are listed as subsites. In 2000, the DynCorp Integrated Soil, Vegetation and Animal Control group submitted a small Contamination Area attached to one of the pipeline manholes to WIDS as a Discovery Site. The Contamination Area measures approximately 1.5 m (5 ft) by 1.5 m (5 ft). It is located west of the 216-U-16 Crib. GPS coordinates were collected at the posted Contamination Area and given to the Central Mapping system. The manhole and associated radiation zone are considered to be part of the 200-W-84-PL pipeline. The pipeline transported process sewer waste from 221-U, 224-U, 222-U, and 291-U to the 216-U-14 Ditch. This pipeline bypasses the 207-U Retention Basin.	Process Sewer	None	Waste Site Length: 1,227 m (4,008 ft) Cumulative Pipeline Length: 2,104 m (6,903 ft) Pipeline Depth: TBD	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
8	200-W-88-PL	200-W-88-PL, T Plant Process Sewer Pipeline, 221-T Process Sewer, 24 in. Process Sewer, 200-W-88 (see Subsites)	The Process Sewer pipeline runs west from 221-T to the 207-T Retention Basin on the north side of 23rd Street.	Not specified	The pipelines are associated with 221-T, 224-T, 2706-T, and 207-T.	The main waste site is a vitrified clay process sewer pipeline connecting T Plant buildings to the 207-T Retention Basin. The main line is a 61.0 cm (24 in.) diameter, underground vitrified clay pipeline extending from 221-T and 224-T to the 207-T Retention Basin. Feed lines from various support facilities are listed as subsites. There are multiple 1.2 m (4 ft) diameter, yellow concrete manholes visible at intervals along the sewer line. This site also includes a radiologically posted area around one of the manholes located northwest of 216-T-6 Crib (see subsites). In 2000, the DynCorp Integrated Soil, Vegetation and Animal Control group found a posted Contamination Area adjacent to a process sewer manhole. No previous radiological survey could be found to describe the radiological conditions inside the posted area or when it was posted. The Contamination Area was surface stabilized in April 2002 and the posting changed to URM. The Process Sewer lines transferred process cooling water, air conditioning condensate and floor drain waste from 221-T, 224-T, and 2706-T to the 207-T Retention Basin. The retention basin released effluent to ditch that led to the 216-T-4-1 and 216-T-4-2 Ponds.	Radioactive Process Sewer	None	Waste Site Length: 1,200 m (3,936 ft) Cumulative Pipeline Length: 1,492 m (4,896 ft) Pipeline Depth: 2.4 to 3.7 m (8 to 12 ft)	TBD	In 2002, a radiation survey found the area around the 200-W-88 Manhole to be less than background for both beta/gamma and alpha contamination.
9	200-W-97-PL	200-W-97, encased pipeline from 240-S-151 Diversion Box to 241-S-151 Diversion Box	The pipeline extends northwest from the REDOX facility to the S/SX Tank Farms.	Not specified	Associated with 202-S, 203-S, 204-S, and 205-S and the 241-S-151 Diversion Box.	The site is an underground concrete-encased pipeline. The surface is marked with URM Pipeline signs. Yellow swab risers are located along the pipeline. One swab riser, near the 204-S Facility, has been surrounded with posts and chain and is posted with Soil Contamination Area signs.	Tank Farm Process Piping	None	Waste Site Length: 584 m (1,916 ft) Cumulative Pipeline Length:598 m (1,963 ft) Pipeline Depth: 3.0 to 4.3 m (10 to 14 ft)	Soil contamination area located on the underground pipeline.	October 2001: a rad survey detected up to 20,000 cpm on tumbleweed fragments and soil.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
10	200-W-98-PL	200-W-98, encased pipeline from 240-S-151 to 241-U-153 Diversion Box, V458,V459,V460	The pipeline is located south of 16th Street, extending in a southeast direction from the 241-U-153 Diversion Box to 204-S and the REDOX Facility.	Not specified	Associated with the 204-S Facility and the 241-U-153 Diversion Box.	The site is a cement-encased underground pipeline. The pipeline is marked with URM – Pipeline signs.	Tank Farm Process Piping	None	Waste Site Length: 1,100 m (3,608 ft) Cumulative Pipeline Length: 1,227 m (4,027 ft) Pipeline Depth: 3.7 to 4.3 m (12 to 14 ft)	Not available	None
11	200-W-99-PL	200-W-99, encased pipeline from 241-U-151 to 241-S-151 Diversion Boxes	The pipeline is located south of 16th Street, extending from the 241-U-151 Diversion Box to the 241-S-151 Diversion Box.	Not specified		The site is a cement-encased underground pipeline. The pipeline is marked with URM – Pipeline signs.	Tank Farm Process Piping	None	Waste Site Length: 597 m (1,958 ft) Cumulative Pipeline Length: 778 m (2,554 ft) Pipeline Depth: 3.0 to 4.6 m (10 to 15 ft)	Not available	None
12	200-W-100-PL	200-W-100, encased Pipeline from 241-UX-154 to 241-SX-152 Diversion Box, lines 4700, 4701, 4853, V762, V503, and V505	The pipeline begins on the east side of the 221-U Building and extends in a southwest direction to terminate at the 241-SX-152 Diversion Box, located on the east side of the S/SX Tank Farms.	Not specified		The site is a cement-encased underground pipeline. The pipeline is marked with URM – Pipeline signs.	Tank Farm Process Piping	None	Waste Site Length: 1,200 m (3,936 ft) (Cumulative Pipeline Length: 1,259 m 4,130 ft) Pipeline Depth: 3.0 to 4.6 m (10 to 15 ft)	Not available	In 1998, ground-penetrating radar scans in the area revealed 44 linear anomalies.
13	200-W-105-PL	200-W-105, encased transfer line between 241-UX-154 Diversion Box and TX Tank Farm	The pipeline begins on the east side of the 221-U Building and extends in a northwest direction to terminate at the 241-TX-155 Diversion Box. The line continues through the Diversion Box to the TX Tank Farm.	1946	The encasement includes tank farm lines V-375, V-382, and 4859/4703.	The site is a cement-encased underground pipeline. The pipeline is marked with URM – Pipeline signs.	Tank Farm Process Piping	None	Waste Site Length: 1,100 m (3,608 ft)Cumulative Pipeline Length: 1,224 m (4,016 ft) Pipeline Depth: 3.0 to 4.6 m (10 to 15 ft)	Not available	In 1998, ground-penetrating radar scans in the area revealed 44 linear anomalies.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
14	200-W-125-PL	200-W-125-PL, 216-Z-1 Ditch Replacement Pipeline (see Subsites)	The pipeline extends east from the 231-Z Building and turns south to connect with the head end of the 216-Z-11 Ditch.	Not specified	The site is associated with 216-Z-1 Ditch, 216-Z-11 Ditch, 216-Z-20 Crib, and the 231-Z Building.	The site is an underground buried pipeline. The pipeline is a 45.7 m (18 in.) diameter, vitrified clay pipe. When 216-Z-11 and 216-Z-19 Ditches were discontinued, the effluent was diverted to 216-Z-20 via a 38.1 cm (15 in.) diameter, polyvinyl chloride pipe. The pipeline was installed to transfer effluent to the 216-Z-11, 216-Z-19, and 216-Z-20 Ditches after the 216-Z-1 Ditch was abandoned.	Radioactive Process Sewer	None	Waste Site Length: 670 m (2,198 ft) Cumulative Pipeline Length: 1,233 m (4,044 ft) Pipeline Depth: TBD	TBD	In 2002, smear samples were collected and analyzed for radionuclides (HEIS #: B14PL7, and B14PL8).
15	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	The encased pipeline connects the 241-T-151 and 241-T-152 Diversion Boxes, located inside 241-T Tank Farm to the 241-TX-155 Diversion Box, located south of 23rd Street, and north of the Powerhouse Pond.	Not specified	The pipelines are associated with 241-T-151, 241-T-152, and 241-T-155 Diversion Boxes and UPR-200-W-113.	The site is an underground cement encasement containing three CS pipelines. The encasement is marked and posted with URM and Pipeline signs. The encasement contains lines V399, V405, and V411. Each pipeline is made of 7.6 cm (3 in.) diameter CS. The lines connect 241-T-151 and 241-T-152 with 241-TX-155.	Encased Tank Farm Pipeline	None	Waste Site Length: 606 m (1,988 ft) Cumulative Pipeline Length: 1,907 m (6,258 ft) Pipeline Depth: 2.7 to 4.6 m (9 to 15 ft)	TBD	None

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Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
16	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	The majority of this pipeline is located east of Camden Avenue. It connected the 241-T-151, and 241-T-152 Diversion Boxes, located inside 241-T Tank Farm, to the 241-U-151 Diversion Box located east of 241-U Tank Farm. Lines V445, V663, and V662 extend from 241-T-151 Diversion Box. Lines V601, V682, and V683 extend from 241-T-152 Diversion Box. The two sets of pipelines join together south of 241-T Tank Farm, south of 23rd Street.	Not specified	The site is associated with, 200-W-79-PL, and 200-W-131-PL. Line V601 is associated with UPR-200-W-29.	The site is a soil trench that contains multiple SS pipelines exiting the 241-T-151, and 241-T-152 diversion boxes. Each line is 7.6 cm (3 in.) in diameter. Three lines (V445, V663, V662) extend south from the 241-T-151 Diversion Box. Three lines (V601, V682, and V683) extend south from 241-T-152 Diversion Box. One line from each diversion box (V445, and V601) merge together south of 241-T Tank Farm, south of 23rd Street and continue to 241-U-152 Diversion Box. The lines are encased in concrete only where they pass under 23rd Street. Lines V445, V662 and V663 exit the 241-T-151. Lines V662, and V663 exit 241-T-151 Diversion Box in the same trench as V445. V662 and V663 were originally spare lines that were cut and capped south of the diversion box, outside the tank farm fence. Line V663 was later reactivated to connect to the 216-T-36 Crib (see site code 200-W-79-PL). V445 continues south to 241-U-151. Lines V601, V682, and V683 exit 241-T-152 Diversion box. V682, and V683 were spare lines that were cut and capped south of 241-T Tank Farm, outside the tank farm fence. Line V601 merges with line V445 south of 241-T Tank Farm and shares the same trench until V601 diverts to 241-TX tank farm. Line V416 enters the soil trench from 241-TX tank farm at the point where V601 leaves the trench. South of 241-TX tank farm, line V445 shares the same trench with line V416 until they connect to 241-U-152 Diversion Box. See UPR-200-W-29.	Direct Buried Tank Farm Pipeline	UPR-200-W-29 UPR-200-W-27	Waste Site Length: 1,679 m (5,510 ft) Cumulative Pipeline Length: 3,537 m (11,604 ft) Pipeline Depth: 2.4 to 3.7 m (8 to 12 ft)	TBD	Survey performed day of UPR incidents in 1954, reported dose rate of 11.5 R/hr at 2 in.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
17	200-W-131-PL	200-W-131-PL, V601, Spur to 241-TX Tank Farm	The majority of this pipeline is located east of Camden Avenue. It connected the 241-T-152 Diversion Box, located inside 241-T Tank Farm, to the 241-U-151 Diversion Box, located east of 241-U Tank Farm. A "T" was made to redirect effluent to 241-TX Tank Farm.	Not specified	The site is associated with WIDS site 200-W-130-PL, 241-T-152, 241-T Tank Farm, 241-TX Tank Farm, 241-TX-153, and 241-U Tank Farm.	The site is a 7.6 cm (3 in.) diameter, SS pipeline in a soil trench. Line V601 originally connected 241-T-152 and 241-U-151. Line V601 was later cut and rerouted to 241-TX Tank Farm with an east/west pipe spur and a "T" connection to 241-TX-153 Diversion Box. The north portion of the pipeline connected 241-T Tank Farm with 241-TX Tank Farm. The southern portion of the pipeline connected 241-U Tank Farm with 241-TX Tank Farm.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 179 m (587 ft) Cumulative Pipeline Length: 206 m (675 ft) Pipeline Depth: 2.4 to 3.7 m (8 to 12 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
18	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	The bundle of pipelines begins at 221-T and terminates at the 241-T-151 Diversion Box in the 241-T Tank Farm.	Not specified		Seven, 7.6 cm (3 in.) diameter, pipelines are contained in the same soil trench. Three lines (V653, V654, and V706) are 7.6 cm (3 in.) diameter, SS lines. Four lines (V667, V668, V669, and V707) are 7.6 cm (3 in.) diameter, CS line. The group of pipelines is marked with URM and Pipeline signs. The pipelines transported T Plant waste to the 241-T-151 and 241-T-152 Diversion Boxes, inside 241-T Tank Farm. Some of the lines are SS and others are CS. Line V653 is a 7.6 cm (3 in.) diameter, SS line from section 10 of 221-T. Line V654 is a 7.6 cm (3 in.) diameter, SS line from section 9 of 221-T. Line V667 is a 7.6 cm. (3 in.) diameter, CS line from section 5 of 221-T. Line V668 is a 7.6 cm (3 in.) diameter, CS line from section 15 of 221-T. Line V669 is a 7.6 cm (3 in.) diameter, CS line from section 15 of 221-T. Line V706 is a 7.6 cm (3 in.) diameter, SS line from 224-T. Line V707 is a 7.6 cm (3 in.) diameter, CS line from section 10 of 221-T.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 797 m (2,614 ft) Cumulative Pipeline Length: 851 m (2,793 ft) Pipeline Depth: 2.7 to 3.7 m (9 to 12 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
19	200-W-137-PL	200-W-137-PL; Pipeline from 241-S-151 Diversion Box, 216-S-1, and 2 cribs, Line V533	The pipeline and cribs are located east of the 241-SX Tank Farm. The pipeline runs from 241-S-151 Diversion Box to 216-S-1 and 2 cribs.	1952	The pipeline is associated with 241-S-151 Diversion Box and 216-S-1 and 2 cribs	The site is an underground double-contained pipeline. With 8.9 cm (3.5 in.) diameter, SS tubing that is encased in a 15.2 cm (6 in.) diameter SS pipeline. This site was used as a subsurface liquid distribution system that received cell drainage and process condensate from the REDOX facility. The site consists of two opened bottom crib boxes made of timbers. The cribs are connected in series. Overflow from Crib S1 flows into Crib S2 through the underground pipe. The cribs were set in a gravel lines trench and backfilled.	Radioactive Process Sewer	UPR-200-W-36	Waste Site Length: 57 m (187 ft) Cumulative Pipeline Length: 184 m (304 ft) Pipeline Depth: 4.0 to 5.5 m (13 to 18 ft)	TBD	None
20	200-W-138-PL	200-W-138-PL; Pipeline from 240-S-151 to 216-S-7 Crib, V547	The crib and pipeline are located west of the 202-S Building.	Not specified	The pipeline is associated with 216-S-7 Crib, 240-S-151 Diversion Box, and the encased pipeline 200-W-98-PL	The site in an underground pipeline that extends from and encased pipeline (200-W-98-PL) to the 216-S-7 Crib. The pipeline is 7.6 cm (3 in.) diameter SS pipe that diverted from the 200-W-98-PL encasement. The 216-S-7 Crib was used to replace 216-S-1 and 2 cribs that received cell drainage and process condensate waste. The crib consists of two wooden cribs measuring 4.9 m (16.1 ft) square and 1.6 m (5.2 ft). The boxes are set 15.2 m (50 ft) apart. The cribs were set in gravel and covered with backfill.	Radioactive Process Sewer	None	Waste Site Length: 246 m (807 ft) Cumulative Pipeline Length: 262 m (861 ft) Pipeline Depth: 1.8 to 4.3 m (6 to 14 ft)	TBD	None
21	200-W-139-PL	200-W-139-PL; pipeline from 200-W-138-PL to 216-S-9 Crib, V547	The pipeline is located northwest of the 202-S facility.	Not specified	The pipeline is associated with UPR-200-W-109, 216-S-9 Cribs, 200-W-138-PL, the 200-W-98-PL encased pipeline, and the 240-S-151 Diversion Box.	The waste site is an underground, 7.6 cm (3 in.) diameter, SS pipeline that leads to the 216-S-9 Crib. When the 216-S-9 Crib was built to replace the 216-S-7 Crib, the pipeline was tied into the 216-S-7 pipeline (200-W-138-PL).	Radioactive Process Sewer	UPR-200-W-109	Waste Site Length: 270 m (885 ft) Cumulative Pipeline Length: 310 m (1 018 ft) Pipeline Depth: 3.7 to 4.9 m (12 to 16 ft)	TBD	Dose rates from the UPR event in 1969 were reported at 450 mR/hr, which decreased to 20 mR/hr as the UPR absorbed into the soil.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
22	200-W-140-PL	200-W-140-PL, pipeline from 292-T (200-W-40)	The pipeline is located east of the 221-T Building.	Not specified	The pipeline is associated with the 292-T Building (site code 200-W-40), the 200-W-142-PL Pipeline, and 216-T-8 Crib.	The waste site is a 8.9 cm (3.5 in.) diameter, SS underground pipeline. The original 292-T Building 6.4 by 4.87 m (21 by 16 ft) housed the 291-T Stack Gas Sampling System. The waste line from 292-T connected to the pipeline to the 216-T-8 Crib (see 200-W-142-PL).	Radioactive Process Sewer	None	Waste Site Length: 76 m (249 ft) Cumulative Pipeline Length: 84 m (277 ft) Pipeline Depth: 0 to 3.7 m (0 to 12 ft)	TBD	None
23	200-W-141-PL	200-W-141-PL; Pipeline connecting 200-W-139-PL to 216-S-23 Crib, V547	The waste site is located northwest of the 202-S facility.	Not specified	The pipeline is associated with UPR-200-W-108, 240-S-151 Diversion Box, 200-W-98-PL, 216-S-9 Crib, 216-S-23 Crib, and 200-W-139-PL pipeline.	The waste site is an underground pipeline from the 216-S-9 Crib to the 216-S-23 Crib; it is a 15.2 cm (6 in.) concrete lined iron pipe. The 216-S-23 Crib was built to replace the 216-S-9 Crib. The pipeline for 216-S-23 (200-W-141-PL) was tied into the 216-S-9 pipeline (200-W-139-PL).	Radioactive Process Sewer	UPR-200-W-108	Waste Site Length: 249 m (816 ft) Cumulative Pipeline Length: 255 m (837 ft) Pipeline Depth: 5.2 to 7.6 m (17 to 25 ft)	TBD	None
24	200-W-142-PL	200-W-142-PL, Pipeline from 222-T to 216-T-8 Crib	The pipeline extends southward from the 222-T Building.	Not specified	The pipeline is associated with the 222-T Building and 292-T (site codes 200-W-40 and 200-W-140-PL).	The site is an underground, 8.9 cm (3.5 in.) diameter, SS pipeline. 222-T laboratory waste was sent to the 216-T-8 Crib via this pipeline. In 1949, the effluent line from 292-T (site code 200-W-140-PL) was also connected to this crib pipeline.	Radioactive Process Sewer	None	Waste Site Length: 100 m (328 ft) Cumulative Pipeline Length: 128 m (420 ft) Pipeline Depth: 0 to 3.7 m (0 to 12 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
25	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	The encased pipeline begins at the 241-TX-154 Diversion Box. It runs diagonally south of 23rd Street and terminates at the 241-TX-155 Diversion Box.	Not specified	The site is associated with the 221-T facility operations, the 241-TX-154 Diversion Box and the 241-TX-152, and 241-TX-155 Diversion Boxes.	The waste site is an underground, concrete encased pipeline. The pipelines inside the encasement are 8.9 cm (3.5 in.) diameter. SS lines. The majority of the encasement contains seven SS pipelines (V383, V384, V385, V387, V388, V391, and V392). There is a section of nine SS lines near the 241-TX-154 Diversion Box. This section contains the seven lines (mentioned above) and two, short stub lines - V728, and V729. The section of pipeline near the 241-TX-155 Diversion Box contains 10 lines. This section contains the seven main lines (mentioned above), an extra line from the 241-TX-302B Catch Tank (V393) and two short stub lines (V390, and V386). All of the lines in the encasement originally connected to 241-TX-155. Lines V387, V388, drain line DR820 were diverted to 241-TX-152.	Encased Tank Farm Pipeline	None	Waste Site Length: 1,100 m (3,608 ft) Cumulative Pipeline Length: 8,228 m (26,995 ft) Pipeline Depth: 1.2 to 6.1 m (4 to 20 ft)	TBD	None
26	200-W-146-PL	200-W-146-PL, 216-S-22 Crib Pipeline	The pipeline extends from the 293-S Building to the 216-S-22 Crib. It is located east of the 202-S (REDOX) Building.	Not specified	The pipeline is associated with the 216-S-22 Crib.	The pipeline is a 10.2 cm (4 in.) diameter, vitrified clay pipe. The piping in the 293-S Building was blanked in 1967. The site provided subsurface liquid disposal for the 293-S Building waste. The crib is a gravel structure with a side slope of 1:1.5. A pipe enters the unit below grade, branches out at right angles downwards to the bottom, and runs along the bottom for the length of the unit. The section of pipe along the crib bottom has open joints. The rest of structure is filled with backfill.	Radioactive Process Sewer	None	Waste Site Length: 59 m (194 ft) Cumulative Pipeline Length: 66 m (218 ft) Pipeline Depth: 1.5 to 3.0 m (5 to 10 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
27	200-W-147-PL (includes 200-W-147-P-B)	200-W-147-PL, Pipeline from 207-SL to 216-S-19 Pond	The majority of the pipeline is located south of the 200 West Area fence.	Not specified	The pipeline is associated with the 216-S-19 Pond.	The site is an underground 20.3 cm (8 in.) diameter vitrified clay pipe, extending from the 207-SL retention basin to the 216-S-19 Pond. In 1984, the 216-S-19 Crib was replaced with the 216-S-26 Crib. The pipeline to the crib was connected to the 216-S-19 Crib pipeline at Manhole #3 (see 200-W-148-PL). The portion of the pipeline from 207-SL to Manhole #3 continued to be used to feed the 216-S-26 Crib. The portion of pipeline southward from Manhole #3 to the 216-S-19 Pond was abandoned. The pipeline carried waste from the 222-S and 202-S facilities to the 216-S-19 Pond via the 207-SL Retention Basin.	Radioactive Process Sewer	None	Waste Site Length: 587 m (1,926 ft) Cumulative Pipeline Length: 617 m (2,025 ft) Pipeline Depth: 1.2 to 2.4 m (4 to 8 ft)	TBD	In 1983, core samples were taken near the pipe inlet. Maximum reading was 300 cpm at depths of 8 to 24 in.
28	200-W-149-PL	200-W-149-PL, Pipelines Related to 216-S-20 Crib (see Subsites)	The 216-S-20 Crib and associated pipelines are located northeast of the 222-S Laboratory, and 207-SL Retention Basin.	Not specified	The 216-S-20 Crib effluent was associated with the 219-S Building, the 207-SL Retention Basin. and the lab waste truck unloading station.	There are three source facilities that fed the 216-S-20 Crib. Each source had separate pipelines to the crib. Two, side by side, 8.9 cm (3.5 in.) diameter SS lines extends from 219-S to the 216-S-20 Crib. One 20.3 cm (8 in.) diameter, CS line extends from the 207-SL Retention Basin valve pit to the 216-S-20 Crib. Another 15.2 cm (6 in.) diameter, CS pipeline extends from the truck unloading station to the 216-S-20 Crib (see subsites). The 216-S-20 Crib received waste from lab hoods and decontamination sinks in the 222-S Building via the 219-S Retention Building and the 207-SL Retention Basin. It also received 300 Area laboratory waste via trucks, unloaded into the manhole at the adjacent waste unloading station.	Radioactive Process Sewer	None	Waste Site Length: 116 m (380 ft) Cumulative Pipeline Length: 176 m (579 ft) Pipeline Depth: 1.2 to 2.4 m (4 to 8 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
29	200-W-150-PL	200-W-150-PL, Pipelines Associated with 216-S-13 Crib (see Subsites)	The 203-S, 204-S, 205-S, 276-S, and associated pipelines are located northwest of the 202-S (REDOX) facility.	Not specified	The pipelines are associated with the REDOX process, the 203-S, 204-S, 205-S, and 276-S Buildings and WIDS site 200-W-22 Stabilized Area.	The waste site is a series of pipelines extending from the 205-S, 204-S, 203-S, and 267-S facilities to the 216-S-13 Crib. The pipelines are either 10.2 cm (4 in.) or 15.2 cm (6 in.) diameter Vitrified Clay Pipe that have 15.2 cm (6 in.) of concrete surrounding the clay pipes. The concrete was poured around the VCP pipes. It is not the same type of concrete encasement associated with tank farm piping.	Radioactive Process Sewer	None	Waste Site Length: 164 m (538 ft) Cumulative Pipeline Length: 234 m (769 ft) Pipeline Depth: 3.7 to 6.1 m (12 to 20 ft)	TBD	None
30	200-W-151-PL	200-W-151-PL, 200-W-42 Pipe Remaining Under 16th Street	The pipe is located southeast of the 224-UA Building, beneath the 16th Street asphalt.	Not specified	The site is associated with the 221-U and 224-U facilities and the pipeline that fed 216-U-8 and 216-U-12 Cribs (see site code 200-W-42).	The piece of pipeline remaining under 16th Street is not visible. Encased tank farm line 200-W-100-PL diagonally crosses 200-W-151-PL at 16th Street. WIDS site code 200-W-42 is the underground vitrified clay pipeline transferred process condensate from the 221-U and 224-U Buildings and the 291-U Stack to the 216-U-8, and 216-U-12 Cribs.	Radioactive Process Sewer	None	Waste Site Length: 25 m (82 ft) Cumulative Pipeline Length: 8.0 m (109 ft) Pipeline Depth: 2.4 to 4.6 m (8 to 15 ft)	TBD	In 1994, samples were taken to determine if contamination had been spread laterally from the pipeline. Samples were analyzed for Cs-137, Sr-90, gross alpha, and gross beta. Data is documented in BHI-00033.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
31	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	The pipeline is located west and southwest of the 202-S (REDOX) Building.	Not specified	The pipeline was associated with 202-S (REDOX Building), 207-S Retention Basin, 216-S-17 Pond, and 2904-S-170.	The site is an underground, 61.0 cm (24 in.) diameter vitrified clay pipe that begins at the 202-S (REDOX) Building. The pipeline is not visible, but a metal sample shack is located over the western end, above the 2904-S-170 Control Structure. Seven manholes are visible on the surface along the pipeline. Multiple process coil leaks into the waste stream between 1952 and 1954 resulted in high levels of radioactivity in the 207-S Retention Basin and the 216-S-17 Pond. In 1954, the inlet pipe into the Retention Basin was plugged and a bypass pipeline was installed around the retention basin. The pipeline carried liquid waste from the REDOX facility to the 2904-S-170 Control Structure, before it was sent to the liquid waste disposal sites (207-S, 216-S-16, and 216-S-17).	Radioactive Process Sewer	None	Waste Site Length: 1,400 m (4,592 ft) Cumulative Pipeline Length: 1,494 m (4,901 ft) Pipeline Depth: 0.9 to 4.6 m (3 to 15 ft)	TBD	None
32	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)	The pipeline begins inside the 200 West Area, at the 240-S-151 Diversion Box, northwest of the 202-S Building. It extends in a southwesterly direction, extending outside the 200 West Perimeter fence, to the 2904-S-172, and 241-S-171 Control Structures.	Not specified	The pipeline is associated with 240-S-151, 2904-S-172, 2904-S-171, and pipeline 200-W-212-PL.	The waste site is an underground a 25.4 cm (10 in.) diameter steel pipeline to the 2904-S-172 Control Structure and a short 30.5 cm (12 in.) diameter pipeline that exits the south side of the Control Structure and connects to the 61.0 cm (24 in.) VCP line (site code 200-W-152-PL). See Subsites 1 and 2. Three lines (V540, V544, and V548) exit the encasement (see 200-W-212-PL) and feed into 200-W-153-PL.	Radioactive Process Sewer	None	Waste Site Length: 1,237 m (4,057 ft) Cumulative Pipeline Length: 1,249 m (4,098 ft) Pipeline Depth: 1.2 to 4.3 m (4 to 14 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
33	200-W-154-PL	200-W-154-PL, Pipeline from 200-W-152-PL to 216-S-5 Crib	The pipeline is located outside the 200 West Area perimeter fence, southwest of 207-S.	Not specified	The site is associated with the REDOX cooling water effluent stream (202-S Redox Building) and the 200-W-152-PL pipeline and the 216-S-5 Crib.	The waste site is an underground 61.0 cm (24 in.) diameter, vitrified clay pipeline that feeds the 216-S-5 Crib. The pipeline connects to the 200-W-152-PL. The 216-S-5 Crib was built as a replacement for the grossly contaminated 216-S-17 Pond. The 216-S-5 Crib received the process vessel cooling water and steam condensate from the 202-S (REDOX) Building.	Radioactive Process Sewer	None	Waste Site Length: 98 m (321 ft) Cumulative Pipeline Length: 108 m (355 ft) Pipeline Depth: 1.5 to 2.1 m (5 to 7 ft)	TBD	None
34	200-W-155-PL (includes 200-W-155-PL-B)	200-W-155-PL, Pipeline from 2904-S-160 Control Structure to 216-S-16 Ditch	The pipeline is located outside the 200 West Area perimeter fence, southwest of the 207-S Retention Basin.	Not specified	The site is associated with the REDOX cooling water effluent stream, the 2904-S-160 Control Structure, the 216-S-16 Ditch and Pond, and the 216-S-6 Crib.	The waste site is an underground 61.0 cm (24 in.) diameter, vitrified clay pipe. It extends from the 2904-S-160 Control Structure to the head end of the 216-S-16 Ditch. In 1954, the original 61.0 cm (24 in.) process sewer line (site code 200-W-152-PL) was plugged and the flow to the 216-S-17 Pond was abandoned. The effluent was directed to the 216-S-6 Crib and later to the 216-S-16 Pond via the 2904-S-160 Control Structure. Flow could be directed to 216-S-6 Crib at Manhole 8 via pipeline 200-W-156-PL.	Radioactive Process Sewer	None	Waste Site Length: 743 m (2,438 ft) Cumulative Pipeline Length: 766 m (2,514 ft) Pipeline Depth: 1.8 to 4.9 m (6 to 16 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
35	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	The pipeline is located outside the 200 West Area fence, southwest of the 202-S (REDOX) Building.	Not specified	The pipeline is associated with 200-W-155-PL, 200-W-153-PL, 2904-S-171 Control Structure, and the 216-S-6 Crib.	The waste site is an underground 45.7 cm (18 in.) diameter, vitrified clay pipeline extending from Manhole 8 on the 200-W-155-PL Pipeline to the 2904-S-171 Control Structure and the 216-S-6 Crib. The 2904-S-171 was built to measure and regulate flow of process waste being routed to the 216-S-6 Crib. Pipeline 200-W-156-PL entered the control structure from the north. Pipeline 200-W-153-PL entered the control structure from the east. This 216-S-6 Crib operated from November 1954 to July 1972. The crib was constructed as part of the Segregation Project. REDOX effluent with a high potential for contamination was diverted to the 216-S-6 Crib. Effluent with a low potential for contamination was sent to the 216-S-5 Crib.	Radioactive Process Sewer	None	Waste Site Length: 24 m (79 ft) Cumulative Pipeline Length: 24 m (79 ft) Pipeline Depth: 1.8 to 2.1 m (6 to 7 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
36	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)	The pipeline attaches to manholes located on the north side of 202-S, the south side of 271-S, the south side of 211-S, and south of the 205-S building. The chemical sewer extends beyond the 200 West Area fence, southwest of 202-S.	Not specified	The waste site is associated with the 216-S-10 Ditch and Pond and the REDOX process sewer (site code 200-W-152-PL).	The site is an underground vitrified clay pipeline with diameters of 20.3 cm (8 in.) and 30.5 cm (12 in.). A 10.2 cm (4 in.) diameter, vitrified clay pipe extends from the 205-S Building to the main chemical sewer line. The chemical sewer piping exiting 202-S is SS. The SS pipes connect to vitrified clay pipes in manholes surrounding the 202-S facility. The vitrified clay pipes are encased in concrete at locations where they pass under a roadway. The effluent discharge to the 216-S-10 Ditch was stopped in 1991. Manhole #2 was isolated by filling it with concrete in 1994. Drawing H-2-44511 shows another plug in the line west of Manhole #2. The REDOX chemical sewer connected to Manhole #3, southwest of 202-S. It connected to the 216-S-10 Ditch at Manhole #2.	Process Sewer	None	Waste Site Length: 1,007 m (3,303 ft) Cumulative Pipeline Length: 1,089 m (3,573 ft) Pipeline Depth: 2.7 to 4.9 m (9 to 16 ft)	TBD	Geophysical Logging done in 2008 showed no elevated levels of Cs-137.
37	200-W-158-PL	200-W-158-PL, Pipeline from 293-S to 200-W-152-PL	The pipeline is located east and south of 202-S.	Not specified	The pipeline is associated with the 293-S Building and the REDOX Process Sewer (site code 200-W-152-PL).	The waste site is an underground 20.3 cm (8 in.) diameter, vitrified clay pipeline from the 293-S Building to the 200-W-152-PL pipeline. It connects to the REDOX Process Sewer (200-W-152-PL) on the south side of 202-S at Manhole #4.	Process Sewer	None	Waste Site Length: 176 m (577 ft) Cumulative Pipeline Length: 180 m (592 ft) Pipeline Depth: 0.6 to 3.7 m (2 to 12 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
38	200-W-159-PL	200-W-159-PL, Cooling Water Lines from 241-SX-401, and 241-SX-402 to 216-U-10 Pond	The pipelines begin inside the 241-SX Tank Farm at the 241-SX-401 and 241-SX-402 Buildings. They cross Cooper Avenue and run west, north of the 216-S-21 Crib.	Not specified	The site is associated with 241-SX-401, 241-SX-402, and 216-U-10 Pond.	The waste site is two 20.3 cm (8 in.) diameter, underground CS pipelines that carried cooling water from the 241-SX-401 and 241-SX-402 Condenser Shielding Buildings to the 216-U-10 Pond. 241-SX-401 and 241-SX-402 are located inside the 241-SX Tank Farm Fence. In 1984, the pipeline from 241-SX-402 was tied into the 216-S-25 Crib Pipeline (see site code 200-W-161-PL).	Radioactive Process Sewer	None	Waste Site Length: 528 m (1,732 ft) Cumulative Pipeline Length: 712 m (2,335 ft) Pipeline Depth: 1.8 tp 2.4 m (6 to 8 ft); 3.0 to 4.0 m (10 to 13 ft)	TBD	None
39	200-W-160-PL	200-W-160-PL, Pipeline from 241-SX-401, and 241-SX-402 to 216-S-21 Crib	The pipeline begins inside the 241-SX Tank Farm at the 241-SX-401 and 241-SX-402 Buildings. It crosses Cooper Avenue and terminates at the 216-S-21 Crib.	Not specified	The pipeline is associated with the 241-SX-401and 241-SX-402 Buildings and the 216-S-21 Crib.	The site is an underground, 20.3 cm (8 in.) diameter, CS pipeline. The 241-SX-401 and 241-SX-402 Buildings are located inside the 241-SX Tank Farm fence. The pipeline carried condensate from the 241-SX-401, and 241-SX-402 Condensate Shielding Buildings to the 216-S-21 Crib.	Radioactive Process Sewer	None	Waste Site Length: 129 m (423 ft) Cumulative Pipeline Length: 262 m (860 ft) Pipeline Depth: 1.8 to 3.0 m (6 to 10 ft)	TBD	None
40	200-W-161-PL	200-W-161-PL, Pipeline from 242-S to 216-S-25 Crib, Line 557	The pipeline extends south of the 242-S Evaporator. It crosses under Cooper Avenue and terminates at the 216-S-25 Crib. The 216-S-25 Crib is located west of the 200 West Area perimeter fence.	Not specified	The pipeline is associated with the 242-S Evaporator and the 216-S-25 Crib.	The waste site is an underground, 10.2 cm (4 in.) diameter, CS pipeline. In 1984, the pipeline from 241-SX-402 (site code 200-W-159-PL) was tied into the 216-S-25 Crib Pipeline. The pipeline carried process steam condensate from the 242-S Evaporator to the 216-S-25 Crib.	Radioactive Process Sewer	None	Waste Site Length: 367 m (1,203 ft) Cumulative Pipeline Length: 367 m (1,203 ft) Pipeline Depth: 1.5 to 2.4 m (5 to 8 ft)	TBD	None
41	200-W-162-PL	200-W-162-PL, Pipeline from 241-SX-701 to 216-SX-2 Crib	The pipeline is located south of the 241-S Evaporator Building. It extends from the south side of the 241-SX-701 Building to the 216-SX-2 Crib. The pipeline, building, and crib are located west of the 241-SX Tank Farm fence.	Not specified	The pipeline is associated with the 241-SX-701 Building and the 241-SX-2 Crib.	The site is an underground, 15.2 cm (6 in.) diameter, vitrified clay pipe. The vitrified clay pipe connects to a 10.2 cm (4 in.) diameter, cast iron pipe at the edge of the 241-SX-701 Building.	Radioactive Process Sewer	None	Waste Site Length: 15 m (50.3 ft) Cumulative Pipeline Length: 46 m (150 ft) Pipeline Depth: 1.2 to 1.5 m (4 to 5 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
42	200-W-163-PL	200-W-163-PL, T Plant Process Sewer, 18 in. 221-T Process Sewer Pipeline (see Subsites)	The pipeline extends westward from T Plant and connects to the pipeline that fed the 216-T-4 Ditch (see site code 200-W-164-PL).	Not specified	The pipeline is associated with 200-W-9, 221-T, 224-T, and the 216-T-4 Ditch.	The waste site is an underground, 45.6 cm (18 in.) diameter vitrified clay pipeline. Several manholes are visible at the surface. Feed lines are listed as subsites. This process sewer line bypasses the 207-T Retention Basin. WIDS site code 200-W-9 documents a waste pipeline being discovered during an unrelated excavation. An old vitrified clay pipe was uncovered while excavating for Manhole T-2 for the new waste line from T Plant to the 200 Area Treated Effluent Disposal Facility (project W291). The pipeline was left in the excavation.	Radioactive Process Sewer	None	Waste Site Length: 1,207 m (3,959 ft) Cumulative Pipeline Length: 1,294 m (4,245 ft) Pipeline Depth: TBD	TBD	None
43	200-W-164-PL	200-W-164-PL, Pipeline from 207-T Retention Basin to the 216-T-4 Ditch	The pipeline extends from the west side of the 207-T Retention Basin, diagonally northwest, to the 216-T-4 Ditch.	Not specified	The site is associated with the 207-T Retention Basin, the 216-T-4-1 and 216-T-4-2 Ditches, and the 45 cm (18 in.) pipeline from T Plant (see site code 200-W-163-PL).	The waste site is an underground 61.0 cm (24 in.) diameter, vitrified clay pipe. The 207-T Retention Basin has been backfilled to grade.	Radioactive Process Sewer	None	Waste Site Length: 206 m (675 ft) Cumulative Pipeline Length: 206 m (675 ft) Pipeline Depth: 2.7 to 3.0 m (9 to 10 ft)	TBD	None
44	200-W-165-PL	200-W-165-PL, Pipeline from Tank 241-TX-112 to 207-T Retention Basin	The pipeline extends from the 241-TX-112 Tank, inside the 241-TX Tank Farm to the 207-T Retention Basin. The retention basin is located west of 221-T, on the north side of 23rd Street. This pipeline extends south from the 207-T Basin. It crosses under Camden Avenue near the 242-T Building.	Not specified		The waste site is an underground 15.2 cm (6 in.) diameter pipe. A portion of this pipeline is located inside the 241-TX Tank Farm. The 207-T Retention Basin has been backfilled to grade.	Radioactive Process Sewer	None	Waste Site Length: 467 m (1,532 ft) Cumulative Pipeline Length: 707 m (2,320 ft) Pipeline Depth: 1.2 to 2.4 m (4 to 8 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
45	200-W-166-PL	200-W-166-PL, Pipeline from 242-T Evaporator Building to the 207-T Retention Basin	The pipeline is located south of 23rd Street. The line crosses under Camden Avenue Portions of it are on both sides of Camden Avenue. The pipeline connected the 242-T Evaporator Building with the 207-T Retention Basin.	Not specified	The pipeline is associated with the 242-T Evaporator, the 207-T Basin, and UPR-200-W-14.	The waste site is an underground 10.2 cm (4 in.) diameter, cast iron pipeline. The pipeline is marked with signs. It passes beneath several surface stabilized areas that are posted as "URM areas." The 207-T Retention Basin has been backfilled to grade. Text from UPR-200-W-14 states that in October 1952, a steam coil in the 242-T Waste Evaporator tank caused ground contamination along the surface above the leaking cast iron pipe that carries cooling water and steam condensate from the waste evaporator building to the 207-T Retention Basin. The pipeline carried cooling water from the 242-T Evaporator to the 207-T Retention Basin.	Radioactive Process Sewer	UPR-200-W-14	Waste Site Length: 468 m (1,535 ft) Cumulative Pipeline Length: 545 (1,789 ft) Pipeline Depth: 1.2 to 2.4 m (4 to 8 ft)	TBD	Radiation Survey, 2008. Maximum contamination readings of 90,000 dpm found on soil removed from shovel to a depth of 2 in.
46	200-W-167-PL	200-W-167-PL; Pipeline from 242-T Evaporator to 2-7-T Retention Basin.	The pipeline is located south of 23rd Street. Portions of the pipeline are on both sides of Camden Avenue	Not Specified	The pipeline is associated with 207-T, 242-T, and 200-W-175-PL.	The waste site is an underground 10.2 cm (4 in.) diameter CS pipeline. The pipeline connected the 242-T Evaporator Building with the 207-T Retention Basin, carrying the cooling water from the building to the basin. The pipeline has been cut and abandoned in place and the Retention Basin (207-T) has been backfilled to grade.	Radioactive Process Sewer	None	Waste Site Length: 500 m (1,640 ft) Cumulative Pipeline Length: 515 m (1,691 ft) Pipeline Depth: 1.8 to 2.7 m (6 to 9 ft)	TBD	None
47	200-W-168-PL	200-W-168-PL, 216-U-3 Crib, and 216-U-14 Ditch Pipelines (see Subsites)	The pipeline is located east of the corner of 16th Street and Cooper Avenue. The pipeline extends southward from the 241-U-110 Tank, inside the 241-U Tank Farm, to the 216-U-3 Crib. The 216-U-3 Crib is located south of the 241-U Tank Farm. The pipeline crosses under 16th Street.	Not specified	The pipeline is associated with the 241-U-110 Tank and the 216-U-3 Crib.	The waste site is two parallel underground, 5.1 cm (2 in.) diameter, CS pipelines buried in the same soil trench. Both lines originate at the 241-U-110 Tank. One line extends to the 216-U-3 Crib. The other line diverts to the 216-U-14 Ditch. Part of the pipeline is inside the 241-U Tank Farm and part of the pipeline is outside the 241-U Tank Farm.	Radioactive Process Sewer	None	Waste Site Length: 103 m (338 ft) Cumulative Pipeline Length: 242 m (793 ft) Pipeline Depth: 1.5 to 2.1 m (5 to 7 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
48	200-W-170-PL	200-W-170-PL; 216-U-16 Crib Pipeline	The pipeline is located south of 16th Street, the pipeline attaches to the U Plant Process Sewer (200-W-84).	Not specified	The pipeline is associated with the U Plant Process Sewer (200-W-84-PL) and the 216-U-16 Crib.	The waste site is an underground, 30.5 cm (12 in.) diameter, polyvinyl chloride pipe. The 216-U-16 Crib pipeline (200-W-170-PL) ties into the U Plant Process Sewer.	Radioactive Process Sewer	None	Waste Site Length: 39 m (127 ft) Cumulative Pipeline Length: 43 m (142 ft) Pipeline Depth: TBD	TBD	None
49	200-W-171	200-W-171; Leak from 234-5Z Pipe Trench to 241—Z Tank D-6, 200-W-219-PL	The release occurred in the subsurface concrete pipe trench extends from 234-5Z to 241-Z, located inside the PFP security fence.	Not specified	The pipe trench is associated with pipeline 200-W-219-PL.	The waste site is a subsurface concrete pipe trench that encloses six SS pipes that transferred waste from 234-5Z to the 241-Z Tanks. The pipes diameters range from 7.6 cm (3 in.) to 20.3 cm (8 in.). The concrete encasement is known as the 241-Z Primary Pipe Trench.	Unplanned Release	TBD	TBD	TBD	TBD
50	200-W-172	200-W-172; Liquid Leaking from Drain Laterals Below 234-5Z Floor Slab	The release occurred in the soil underneath the 234-5Z Building.	Not specified	The release is associated with the plutonium finishing processes.	The waste site consists of a series of underground pipes. Secondary drain laterals carried liquid from the 234-5Z Building to the main lines in the subsurface pipe tunnels. There are 52 side lateral pipes that carried process liquids into the main tunnel drain lines. Approximately 15 lateral lines possibly leaked.	Unplanned Release	TBD	TBD	TBD	TBD
51	200-W-173-PL	200-W-173-PL, 216-T-33 Crib Pipeline, Pipeline from 2706-T to 216-T-33 Crib	The pipeline is located west of 221-T and south of 2706-T.	Not specified		The majority of the waste site is an underground, 20.3 cm (8 in.) diameter, vitrified clay pipeline that fed the 216-T-33 Crib. A portion of the pipeline from 2706-T to the weir pit is an underground 15.2 cm (6 in.) diameter, vitrified clay pipe. The discharge pipeline plugged near the Crib discharge point shortly after the 216-T-33 Crib became active. Sections of the pipeline were removed. The 2706-T Facility decontaminated vehicles, railcars and large pieces of equipment. Water containing chemicals and radionuclide contamination went down the facility drains.	Radioactive Process Sewer	None	Waste Site Length: 71 m (233 ft) Cumulative Pipeline Length: 79 m (258 ft) Pipeline Depth: 1.5 to 3.0 m (5 to 10 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
52	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	The pipeline extends southeast out of the 241-T Tank Farm. Most of the pipeline is located south of 23rd Street. The line crosses under Camden Avenue. Part of the line is located on the east side of Camden Avenue and part is on the west side of Camden Avenue. A portion of the pipeline is inside the 241-T Tank Farm.	Not specified	The site is associated with the 241-T-112 Tank, the 216-TY-201 Flush Tank and pipeline 200-W-167-PL.	The site is an underground, 8.9 cm (3.5 in.) diameter, CS pipeline extending from the 241-T-112 Tank to the 216-TY-201 Flush Tank. The waste to 216-T-26 originally came from the 241-TY Tank Farm. In 1956, the pipeline from 241-TY Tank Farm to the 216-T-26 Crib was isolated by installing a blank flange in the pipe between the east perimeter fence of the 241-TY Tank Farm and Camden Avenue. A portion of an existing pipeline (see 200-W-167-PL) was reused to create a new pipeline that routed waste from 241-T-112 Tank (inside 241-T Tank Farm) to the 216-T-201 Flush Tank and the 216-T-26 Crib. The 8.9 cm (3.5 in.) diameter pipe changes to a 7.6 cm (3 in.) diameter pipe where the pipeline turns eastward to connect with the 241-T-201 Flush Tank.	Radioactive Process Sewer	None	Waste Site Length: 327 m (1,073 ft) Cumulative Pipeline Length: 335 m (1,099 ft) Pipeline Depth: 1.2 to 3.4 m (4 to 11 ft)	TBD	Pipeline was characterized in 2008. Geophysical logging in DPT hole (C6623) showed elevated levels of Cs-137.
53	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	The concrete encasement extends eastward from 241-TX tank farm to the 241-TX-155 Diversion Box, located east of Camden Avenue.	Not specified	The waste site is associated with the 241-TX-153 Diversion Box and the 241-TX-155 Diversion Box.	The waste site is an underground concrete transfer line encasement. All of the lines inside the encasement are 8.9 cm (3.5 in.) diameter SS lines.	Encased Tank Farm Pipeline	None	Waste Site Length: 246 m (804 ft) Cumulative Pipeline Length: 249 m (818 ft) Pipeline Depth: 3.0 to 4.3 m (10 to 14 ft)	TBD	None
54	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	The pipelines extend eastward from the 241-TX Tank Farm to the 241-TX-155 Diversion Box, located east of Camden Avenue.	Not specified	The pipelines are associated with the 241-TXR-151 Diversion Box, the 241-TXR Vault and the 241-TX-155 Diversion Box.	The waste site is two 8.9 cm (3.5 in.) SS lines buried in a common soil trench. Line V7616 extends between the 241-TXR-151 Diversion Box (inside the 241-TX Tank Farm) to the 241-TX-155 Diversion Box (outside the tank farm). Line V7653 extends from the 244 TXR Vault (inside the 241-TX Tank Farm) to the 241-TX-155 Diversion Box (outside the tank farm).	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 223 m (731 ft) Cumulative Pipeline Length:230 m (753 ft) Pipeline Depth:4.0 to 4.3 m (13 to 14 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
55	200-W-178-PL	200-W-178-PL; Pipeline from 241-Z to 244-TX DCRT, Lines HSW-202, and HSW-203	The pipeline is located west of Camden Avenue. The pipeline exits the east side of the Plutonium Finishing Plant security fence and runs north to enter the west side of the 241-TX Tank Farm.	Not specified	The pipeline is associated with the 241-Z Tank Farm and the 244-TX DCRT in the 241-TX Tank Farm.	The waste site is two underground 5.1 cm (2 in.) SS pipelines buried in the same soil trench. The SS lines are double (pipe in pipe) pipe construction. The pipeline transported waste from tank D-5, in 241-Z Tank Farm to the 244-TX DCRT in the 241-TX Tank Farm.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 926 m (3,037 ft) Cumulative Pipeline Length: 929 m (3,048 ft) Pipeline Depth: 0.9 to 2.4 m (3 to 8 ft)	TBD	None
56	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	The pipelines extend north from 241-S Tank Farm to 241-U Tank Farm, along the east side of Cooper Avenue.	Not specified		The waste site is four CS lines buried in the same soil trench. Two lines (SL100, and SL101) are 5.1 cm (2 in.) diameter pipes double contained inside 10.2 cm (4 in.) diameter pipes. Two lines (SN216/281, and DR327) are 7.6 cm (3 in.) diameter pipes double contained within 15.2 cm (6 in.) diameter pipes. In 1980, UPR-200-W-115 was assigned to the surface soil contamination along this pipeline.	Direct Buried Tank Farm Pipeline	UPR-200-W-115	Waste Site Length: 407 m (1,335 ft) Cumulative Pipeline Length: 411 m (1,347 ft) Pipeline Depth: 0.9 to 2.4 m (3 to 8 ft)	TBD	As of 1995, radiation levels ranged from 2,000 to 4,000 dpm beta. Dose rates are assumed to be from nearby COBs and the transfer line itself and not from a loss of radiological control.
57	200-W-180-PL	200-W-180-PL, Pipelines from 221-T to 216-T-1 Ditch (see Subsites)	The pipeline to the 216-T-1 Ditch extends north from the northwest corner of the 221-T Facility.	Not specified	The pipeline is associated with the 221-T and 277-T Buildings and the 216-T-1 Ditch.	The waste site is an underground, 20.3 cm (8 in.) diameter, vitrified clay pipe that fed the 216-T-1 Ditch. The vitrified clay pipes extending out of the 221-T Building are smaller diameter (10.2 cm (4 in.) and 15.2 cm (6 in.). A 10.2 cm (4 in.) diameter cast iron pipe from the 277-T Building connects to the main vitrified clay line (see subsite).	Radioactive Process Sewer	None	Waste Site Length: 72 m (236 ft) Cumulative Pipeline Length: 84 m (275 ft) Pipeline Depth: 0.3 to 1.5 m (1 to 5 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
58	200-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	The lines are located west of U Plant at the intersection of 16th Street and Camden Avenue. The lines extend from 241-U-152 Diversion Box, located outside the tank farm, to 241-U-153 Diversion Box, located inside the 241-U Tank Farm fence. The lines cross under Camden Avenue.	Not specified	The lines are associated with 241-U-152, and 241-U-153 Diversion Boxes.	The waste site is three 8.9 cm (3.5 in.) diameter SS lines buried in the same soil trench.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 38 m (125 ft) Cumulative Pipeline Length: 39 m (127 ft) Pipeline Depth: 4.0 to 4.6 m (13 to 15 ft)	TBD	None
59	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	The lines are located on the east side of Camden Avenue, west of the 216-U-14 Ditch. They extend between the 241-U-152 Diversion Box and the 241-TX-152, and 241-TX-155 Diversion Boxes.	Not specified	The lines are associated with 241-U-152, 241-TX-152, and 241-TX-155 Diversion Boxes.	The waste site is three underground, 7.6 cm (3 in.) diameter SS lines in the same concrete encasement. Line V410 has been stubbed and capped near 241-TX-155.	Encased Tank Farm Pipeline	None	Waste Site Length: 1,100 m (3,608 ft) Cumulative Pipeline Length: 1,195 m (3,919 ft) Pipeline Depth: 2.1 to 4.3 m (7 to 14 ft)	TBD	None
60	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	The lines are located near the intersection of 16th Street and Camden Avenue. They extend between the 241-U-151 and 241-U-152 Diversion Boxes.	Not specified	The lines are associated with the 241-U-151, and 241-U-152 Diversion Boxes.	The waste site is two, 7.6 cm (3 in.) diameter, CS lines buried in the same soil trench. Each line is double contained inside a 15.2 cm (6 in.) diameter pipe.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 22 m (72 ft) Cumulative Pipeline Length: 22 m (72 ft) Pipeline Depth: 3.7 to 4.6 m (12 to 15 ft)	TBD	None
61	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	The pipeline is near the corner of 16th Street and Camden Avenue. It crosses under Camden Avenue. Approximately one third of the drain line is located outside of the 241-U Tank Farm, east of the tank farm fence. Approximately two thirds of the pipeline is located inside the 241-U Tank Farm fence.	Not specified	The pipeline is associated with the 241-U-151, 241-U-152, and 241-U-153 Diversion Boxes and the 241-U-301 Catch Tank.	The waste site is an underground, 10.2 cm (4 in.) diameter CS pipeline that connects the 241-U-151, 241-U-152, and 241-U 153 Diversion Boxes to the 241-U-301 Catch Tank. Individual 10.2 cm (4 in.) diameter drain lines from the three diversion boxes connect to the same 10.2 cm (4 in.) diameter pipeline to the catch tank. The pipeline provided diversion box drainage to the 241-U-301 Catch Tank.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 55 m (180 ft) Cumulative Pipeline Length: 55 m (182 ft) Pipeline Depth: 4.6 to 6.1 m (15 to 20 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
62	200-W-185-PL	200-W-185-PL; Transfer Lines Between 241-U-151 and 241-U-153 Diversion Boxes; Lines V450 and V451	The lines are located near the corner of 16th Street and Camden Avenue. The lines cross under Camden Avenue. A portion of these lines is located inside the 241-U Tank Farm.	Not specified	The lines are associated with the 241-U-151 and 241-U-153 Diversion Boxes.	The waste site is two underground, 8.9 cm (3.5 in.) diameter SS lines buried in the same soil trench. The lines transferred waste between the 241-U-151 and 241-U-153 Diversion Boxes.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 42 m (138 ft) Cumulative Pipeline Length: 43 m (140 ft) Pipeline Depth: 4.0 to 4.6 m (13 to 15 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
63	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	The pipelines originate north of the REDOX, at the 240-S-152 Diversion Box. They extend eastward and connected to the 204-S and 205-S Facilities.	Not specified	The pipelines are associated with 240-S-152 Diversion Box and the 204-S, and 205-S Facilities.	The waste site is an underground concrete encasement that contains two 8.9 cm (3.5 in.) diameter SS pipelines. The 203-S, 204-S, and 205-S Facilities have been partly remediated. The above ground features of this area were removed in 1983. Decommissioning activities included removing above ground equipment and structures, isolating utilities, removal of process equipment and tanks, and surface stabilizing the remainder of the site. The bulk of the radioactive structures and equipment were removed and buried. No attempt was made to remove deep concrete structures or buried piping. The radioactive structures that were covered in place are the 203-S Basin, the 204-S Basin, the 205-S Vault, the 205-S Building base pad, various isolated utility lines, the railcar unloading area, the concrete encased pipeline from the REDOX facility to the tank farm, and the REDOX chemical sewer. Structures were removed to a level equal to 0.61 m (2 ft) below the railroad grade level. The area was graded and leveled with clean backfill material. The final closure activities included placing signs and concrete monuments. (see WIDS site code 200-W-22). The pipeline transferred waste from the 240-S-152 Diversion Box to the 205-S Process Cell. Line 1045 was rerouted to connect directly to the 204-S facility.	Encased Tank Farm Pipeline	None	Waste Site Length: 165 m (541 ft) Cumulative Pipeline Length: 165 m (541 ft) Pipeline Depth: 1.8 to 2.4 m (6 to 8 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
64	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	The pipelines are located north of the 202-S Building, connecting the 240-S-151 Diversion Box to the 240-S-152 Diversion Box.	Not specified	The pipelines are associated with the 240-S-151, and 240-S-152 Diversion Boxes.	The waste site is a concrete encasement containing three 8.9 cm (3.5 in.) diameter SS pipelines.	Encased Tank Farm Pipeline	None	Waste Site Length: 58 m (190 ft) Cumulative Pipeline Length: 173 m (567 ft) Pipeline Depth: 2.1 to 3.7 m (7 to 12 ft)	TBD	None
65	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	The pipelines are located east of Camden Avenue. They extend south from the 216-TY-201 Flush Tank to feed the 216-T-26, 216-T-27, and 216-T-28 Cribs.	Not specified	The pipelines are associated with 216-TY-201 Flush Tank and the 216-T-26, 216-T-27, and 216-T-28 Cribs.	The waste site is the underground, 35.6 cm (14 in.) diameter, CS waste distribution line from the flush tank to the cribs. A 15.2 cm (6 in.) diameter polyvinyl chloride pipeline extends from the truck unloading station, east of the cribs, to the main crib distribution line.	Radioactive Process Sewer	None	Waste Site Length: 18 m (59 ft) Cumulative Pipeline Length: 132 m (434 ft) Pipeline Depth: 2.1 to 3.4 m (7 to 11 ft)	TBD	None
66	200-W-190-PL	200-W-190-PL; Discharge Line from 240-S-151 Diversion Box to 240-S-302 Catch Tank, Line V554	The discharge line is located north of the 202-S Facility, extending eastward from the 240-S-151 Diversion Box to the 240-S-302 Catch Tank.	Not specified	The line is associated with the 240-S-151 Diversion Box and the 240-S-302 Catch Tank.	The waste site is an underground 7.6 cm (3 in.) diameter SS line connecting the 240-S-151 Diversion Box to the 240-S-302 Catch Tank. This is a steam jet discharge line extending out of a concrete encasement. The majority of the line is direct buried.	Direct Buried Tank Farm Pipeline	None	Waste Site Length: 14 m (46 ft) Cumulative Pipeline Length: 15 m (48 ft) Pipeline Depth: 0.9 to 1.5 m (3 to 5 ft)	TBD	None
67	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	The transfer line is located southwest of T Plant. It extends from the 241-TX-155 Diversion Box to the 241-TY-153 Diversion Box. The line crosses under Camden Avenue.	Not specified	The lines are associated with the 241-TX-155, and 241-TY-153 Diversion Boxes and pipeline 200-W-105-PL from U Plant. This line is also associated with UPR-200-W-135.	The waste site is a concrete encasement that contains three 7.6 cm (3 in.) diameter SS lines and one 7.6 cm (3 in.) diameter CS line. The 241-TY-153 Diversion Box is located inside the 241-TY Tank Farm fence. Line 402 is located inside the tank farm fence. It diverts from the encasement and connects to the 244-TX DCRT. Lines V406, and V408 are stubbed and capped just outside the 241-TX-155 Diversion Box. The diversion box drain line is V408. See UPR-200-W-135.	Encased Tank Farm Pipeline	UPR-200-W-135	Waste Site Length: 368 m (1,207 ft) Cumulative Pipeline Length: 374 m (1,227 ft) Pipeline Depth: 1.5 to 4.3 m (5 to 14 ft)	TBD	In 1990, before stabilization, radiological readings up to 20,000 dpm beta were noted during an annual radiological survey.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
68	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).	The pipeline is located west of U Plant and north of 16th Street.	Not specified	The pipeline is associated with the U Plant facilities and the 207-U Basin.	The majority of the waste site is an underground, 61.0 cm (24 in.) diameter, vitrified clay pipe that carried waste from U Plant operations to the 207-U Retention Basin. A 61.0 cm (24 in.) cast iron line from 221-U, two 25.4 cm (10 in.) cast iron lines and a 10.2 cm (4 in.) diameter steel line from 224-U feed the main VCP process sewer. The 207-U Basin received process sewer waste from the 221-U Building and the 224-U Building through this pipeline.	Radioactive Process Sewer	None	Waste Site Length: 1,033 m (3,388 ft) Cumulative Pipeline Length: 1,557 m (5,109 ft) Pipeline Depth: 1.5 to 2.4 m (5 to 8 ft)	TBD	None
69	200-W-193-PL	200-W-193-PL; Pipelines from 224-U to 214-U-361 Settling Tank	The majority of the pipeline is located southwest of the 221-U Facility, north of 16th Street.	Not specified	The pipelines is associated with 221-U, 224-U, 214-U-361, and 216-U-1 and 2 Cribs.	The waste site is an underground, 8.9 cm (3.5 in.) diameter SS pipe that fed the 241-U-361 Settling Tank.	Radioactive Process Sewer	None	Waste Site Length: 302 m (990 ft) Cumulative Pipeline Length: 304 m (997 ft) Pipeline Depth: TBD	TBD	In 1994, smear samples from inside the SS pipe were taken. The samples read 30,000 cpm.
70	200-W-194-PL	200-W-194-PL; Pipeline from 241-U-361 Settling Tank to 216-U-1, and 216-U-2 Cribs	The pipeline is located south west of 221-U and north of 16th Street.	Not specified	The pipelines are associated with 224-U, 221-U, and 241-U-361.	The waste site is an underground, 8.9 cm (3.5 in.) diameter SS pipeline from the 241-U-361 Settling Tank to the 216-U-1 and 216-U-2 Cribs.	Radioactive Process Sewer	None	Waste Site Length: 41 m (134 ft) Cumulative Pipeline Length: 57 m (186 ft) Pipeline Depth: TBD	TBD	None
71	200-W-195-PL	200-W-195-PL; Pipeline to U Plant (224-U) to 216-U-17 Crib.	The pipeline is located east of U Plant. Most of it is north of 16th Street. It crosses under Beloit Avenue.	Not specified	The pipeline is associated with 224-U and the 216-U-17 Crib.	The waste site is an underground, 10.2 cm (6 in.) polyethylene pipeline that fed the 216-U-17 Crib.	Radioactive Process Sewer	None	Waste Site Length: 316 m (1,036 ft) Cumulative Pipeline Length: 328 m (1,076 ft) Pipeline Depth: 1.2 to 1.8 m (4 to 6 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
72	200-W-196-PL	200-W-196-PL, Pipelines from Railcar Unloading Stations to 216-T-34 Crib	The pipelines are located west of T Plant, near the railroad tracks that led into the T Plant area. Railcar Unloading Stations 1 and 2 (see site code 200-W-21) were located on the railroad tracks. The pipelines extend from the unloading stations to the crib.	Not specified	The pipelines are associated with site codes 200-W-21, 216-T-34, and 216-T-35 Cribs.	The waste site is two parallel underground pipelines that extend from railcar Unloading Stations 1 and 2 to the 216-T-34 Crib. The two lines are buried in the same soil trench. One of the pipelines is constructed of 20.3 cm (8 in.) diameter vitrified clay. The other pipeline is constructed of 15.2 cm (6 in.) diameter polyvinyl chloride. The railcar unloading stations are WIDS site code 200-W-21. The railcar unloading stations were used to unload 300 Area liquid laboratory waste sent in railroad tanker cars from the 340 Facility. The waste was pumped into the adjacent 216-T-34 and 216-T-35 Cribs.	Radioactive Process Sewer	None	Waste Site Length: 55 m (180 ft) Cumulative Pipeline Length: 103 m (339 ft) Pipeline Depth: TBD	TBD	None
73	200-W-197-PL	200-W-197-PL, Pipelines from Railcar Unloading Stations to 216-T-35 Crib	The pipelines are located west of T Plant, near the railroad tracks that led into the T Plant area. Railcar Unloading Stations 1 and 2 (see site code 200-W-21) were located on the railroad tracks. The pipelines extend west from the 216-T-34 Crib feed lines (see 200-W-196-PL).	Not specified	The pipelines are associated with the 216-T-34 Crib pipeline (site code 200-W-196-PL) and the 216-T-35 Crib.	The waste site is two parallel underground polyvinyl chloride pipelines that extend from the 216-T-34 Crib pipeline to the 216-T-35 Crib. The two lines are buried in the same soil trench. One of the pipelines is constructed of 20.3 cm (8 in.) diameter polyvinyl chloride. The other pipeline is constructed of 15.2 cm (6 in.) diameter, polyvinyl chloride. The railcar unloading stations are WIDS site code 200-W-21. The railcar unloading stations were used to unload 300 Area liquid laboratory waste sent in railroad tanker cars from the 340 Facility. The waste was pumped into the adjacent 216-T-34, and 216-T-35 Cribs.	Radioactive Process Sewer	None	Waste Site Length: 150 m (492 ft) Cumulative Pipeline Length: 276 m (907 ft) Pipeline Depth: 2.4 to 3.7 m (8 to 12 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
74	200-W-198-PL	200-W-198-PL, Pipelines from Truck Unloading Station to 216-T-34, and 216-T-35 Cribs	The pipeline is located near the northwest corner of the 216-T-34 Crib.	Not specified	The pipeline is associated with the Truck Unloading Station near 216-T-34 Crib and the 200-W-197-PL Pipeline.	The waste site is an underground, 15.2 cm (6 in.) diameter, polyvinyl chloride pipeline from the truck unloading station to the lines that fed the 216-T-34, and 216-T-35 Cribs. Tank trucks of waste emptied into the truck unloading station that fed the 216-T-34 and 216-T-35 Cribs.	Radioactive Process Sewer	None	Waste Site Length: 38 m (126 ft) Cumulative Pipeline Length: 38 m (126 ft) Pipeline Depth: 2.4 to 3.7 m (8 to 12 ft)	TBD	None
75	200-W-199-PL	200-W-199-PL, Pipelines from Building 231-Z to 231-W-151 Vault	The waste site is located east of the 231-Z Building.	Not specified	The pipelines are associated with the 231-Z Facility, the 231-W-151 Vault, and 200-W-200-PL.	The waste site is three underground, 7.6 cm (3 in.) diameter, SS pipelines that fed the 231-W-151 Vault. The three lines are direct buried in the same soil trench. A three line manifold redirected the effluent flow from 231-Z to 216-Z-16, and 216-Z-17 (see site codes 200-W-200-PL and 200-W-201-PL)	Radioactive Process Sewer	None	Waste Site Length: 36 m (118 ft) Cumulative Pipeline Length: 102 m (336 ft) Pipeline Depth: 1.2 to 1.8 m (4 to 6 ft)	TBD	None
76	200-W-200-PL	200-W-200-PL, 216-Z-16 Crib Pipeline	The pipeline extends north and west of the 231-Z Building.	Not specified	The pipeline is associated with the 231-Z Building, 200-W-199-PL and the 216-Z-16 Crib.	The waste site is an underground, polyvinyl chloride pipeline that transferred waste from the 231-Z Building to the 216-Z-16 Crib. The majority of the pipeline is 10.2 cm (4 in.) in diameter. A short length of pipe is 7.6 cm (3 in.) in diameter. This pipeline tees off of pipeline 200-W-199-PL with a three line manifold. The manifold redirected flow from the 231-W-151 Vault to 216-Z-16 and 216-Z-17 Cribs.	Radioactive Process Sewer	None	Waste Site Length: 128 m (420 ft) Cumulative Pipeline Length: 134 m (441 ft) Pipeline Depth: 1.5 to 3.4 m (5 to 11 ft)	TBD	None
77	200-W-201-PL	200-W-201-PL, 216-Z-17 Crib Pipeline	The pipeline is located east of the 231-Z Building.	Not specified	The pipeline is associated with the 231-Z Building, pipeline 200-W-199-PL and 216-Z-17 Crib.	The waste site is an underground, 7.6 cm (3 in.) diameter CS pipeline that fed the 216-Z-17 Crib. This pipeline tees off of 200-W-199-PL.	Radioactive Process Sewer	None	Waste Site Length: 67 m (220 ft) Cumulative Pipeline Length: 74 m (243 ft) Pipeline Depth: 1.2 to 1.8 m (4 to 6 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
78	200-W-202-PL	200-W-202-PL, Pipeline from 231-W-151 to 216-Z-5 Crib (see Subsites)	The pipeline is located northeast of the 231-Z Building.	Not specified	The pipeline is associated with the 231-W-151 Vault, the 216-Z-5 Crib, and the pipeline to 216-Z-10 (site code 200-W-204-PL).	The waste site is an underground, 7.6 cm (3 in.) diameter SS pipeline from the 231-W-151 Vault to the 216-Z-5 Cribs. An extra overflow line was added that connected to the 216-Z-10 pipeline (200-W-204-PL) (see Subsites). Deactivation of the Crib included capping the waste pipeline west of the 231-W-151 Vault.	Radioactive Process Sewer	None	Waste Site Length: 29 m (95 ft) Cumulative Pipeline Length: 19 m (61 ft) Pipeline Depth: 1.2 to 1.8 m (4 to 6 ft)	TBD	None
79	200-W-203-PL	200-W-203-PL, Pipeline from 231-W-151 Vault to 216-Z-7 Crib	The pipeline is located northeast of the 231-Z Building.	Not specified	The pipeline is associated with the 231-W-151 Vault and the 216-Z-7 Crib.	The waste site is an underground, 7.6 cm (3 in.) diameter pipeline connecting the 231-W-151 Vault to the 216-Z-7 Crib.	Radioactive Process Sewer	None	Waste Site Length: 139 m (456 ft) Cumulative Pipeline Length: 225 m (738 ft) Pipeline Depth: 1.2 to 1.8 m (4 to 6 ft)	TBD	None
80	200-W-204-PL	200-W-204-PL, Pipeline from 231-W-151 Vault to 216-Z-10 Reverse Well	The pipeline is located east of the 231-W-151 Vault. It extends eastward from the vault to the 216-Z-10 Reverse Well.	Not specified	The pipeline is associated with the 231-W-151 Vault and the 216-Z-10 Reverse Well.	The waste site is an underground, 7.6 cm (3 in.) diameter SS line connecting the 231-W-151 Vault to the 216-Z-10 Reverse Well. RHO-LD-114 says there are three inlet pipes that enter the well casing at 1.52 m (5 ft), 1.83 m (6 ft), and 2.13 m (7 ft) below surface grade.	Radioactive Process Sewer	None	Waste Site Length: 15 m (49 ft) Cumulative Pipeline Length: 15 m (49 ft) Pipeline Depth: 1.2 to 1.8 m (4 to 6 ft)	TBD	None
81	200-W-209-PL	200-W-209-PL, 207-Z Pipelines	The 207-Z Retention Basin is located southeast of the 234-5Z Building and east of the 241-Z Facility.	Not specified	The pipelines are associated with 241-Z-361, 234-5Z Building, and 200-W-207-PL.	The waste site is three underground pipelines associated with the 207-Z Retention Basin. One 20.3 cm (8 in.) diameter CS pipe extends from 234-5Z to the retention basin. One 15.2 cm (6 in.) diameter CS pipe extends from the retention basin to the 241-Z-361 Settling Tank. One 15.2 cm (6 in.) diameter pipe extends from the 207-Z retention basin to Manhole #7 and flows into the process sewer (200-W-207-PL).	Radioactive Process Sewer	None	Waste Site Length: 143 m (469 ft) Cumulative Pipeline Length: 159 m (522 ft) Pipeline Depth: 1.5 to 3.0 m (5 to 10 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
82	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	The pipeline is located northwest of 202-S. It extends west from the 240-S-151 Diversion Box.	Not specified	The pipeline is associated with the 240-S-151 Diversion Box, 2904-S-171, 216-S-6, 216-S-17, and pipeline 200-W-153-PL.	The waste site is a six line encasement from the 240-S-151 Diversion Box. Three lines (V546, V549, and V551) are stubbed off and were never used. The other three lines (V544, V548, and V550) connect to a reducer, where the three lines become one line. The three lines carried REDOX steam condensate waste. They exit the encasement and feed into 200-W-153-PL. The encasement ends abruptly. It does not connect to a facility or a tank farm. Lines V546, V549, and V551 were stubbed off and never used. Lines V544, V548, and V550 transferred REDOX steam condensate waste. They tied into a 10 in. line that sent waste to 216-S-6 Crib.	Encased Tank Farm Pipeline	None	Waste Site Length: 149 m (489 ft) Cumulative Pipeline Length: 882 m (2,895 ft) Pipeline Depth: 3.4 to 4.6 m (11 to 15 ft)	TBD	None
83	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	The pipeline is located west of Camden Avenue. It extends south from inside the 241-TX Tank Farm at the 241-TX-153 Diversion Box to the 216-T-19 Crib.	Not specified	The pipeline is associated with the 241-TX-153 Diversion Box, the 241-TX-302A Catch Tank, and the 216-T-19 Crib.	The waste site is two underground SS pipelines inside a concrete encasement. The lines transferred waste from the 241-TX-153 Diversion Box and the 241-TX-302A Catch Tank to the 216-T-19 Crib.	Radioactive Process Sewer	None	Waste Site Length: 12 m (39 ft) Cumulative Pipeline Length: 232 m (762 ft) Pipeline Depth: 3.0 to 7.0 m (10 to 23 ft)	TBD	None
84	200-W-216-PL	200-W-216-PL, Pipelines from 291-Z to 216-Z-15 French Drain	The pipeline is located inside the PFP security fence. It is adjacent to the north side of the 291-Z Building.	Not specified	The pipeline is associated with the 216-Z-15 French Drain.	The waste site is an underground, 10.2 cm (4 in.) diameter pipeline from the 291-Z Building to the 216-Z-15 French Drain. Research of available reference drawings did not find the material used for this pipeline.	Radioactive Process Sewer	None	Waste Site Length: Under building Cumulative Pipeline Length: TBD Pipeline Depth: TBD	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
85	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	The pipelines inside an encasement, known as a pipe tunnel, that extends from the south wall of 234-5Z to the north side of 241-Z. They are located inside the PFP security fence.	Not specified	The pipeline is associated with the 241-Z Tanks and Unplanned Release site code 200-W-171.	The waste site is six underground SS pipes inside a concrete encasement that transferred waste from 234-5Z to the 241-Z Tanks. The pipe diameters range from 7.6 cm (3 in.) to 20.3 cm (8 in.). The concrete encasement is known as the 241-Z Primary Pipe Trench and Tunnel 3.	Radioactive Process Sewer	UPR-200-W-171	Waste Site Length: 88 m (288 ft) Cumulative Pipeline Length: 520 m (1,705 ft) Pipeline Depth: 1.5 to 2.4 m (5 to 8 ft)	TBD	The ground surface surrounding the 244-CR Vault became contaminated during the numerous piping changes and activities associated with the vault. Leak was estimated at 3,000 to 30,000 gallons containing between 3 and 30 grams of plutonium.
86	200-W-222-PL	200-W-222-PL, 207-U Retention Basin Outlet Pipeline to the 216-U-14 Ditch	The pipeline is located north of 16th Street and east of Camden Avenue. It extends from the west side of the 207-U Retention Basin.	Not specified	The pipe is associated with 207-U and 216-U-14 Ditch.	The waste site is an underground, 0.61 cm (24 in.) diameter vitrified clay pipe. The pipe carried effluent out of the 207-U Retention Basin to the 216-U-14 Ditch.	Radioactive Process Sewer	None	Waste Site Length: 102 m (335 ft) Cumulative Pipeline Length: 104 m (342 ft) Pipeline Depth: 2.4 to 3.0 m (8 to 10 ft)	TBD	None
87	200-W-223-PL	200-W-223-PL, Pipeline from 242-S Evaporator to 216-U-14 Ditch	The pipeline is located on the west side of Cooper Avenue. It extends north from the 242-S Evaporator to the 216-U-14 Ditch. It crosses under Cooper Avenue.	Not specified	The pipeline is associated with the 216-U-14 Ditch.	The waste site is an underground, 0.61 cm (24 in.) diameter corrugated metal pipe that transferred effluent from the 242-S Evaporator Building to the 216-U-14 Ditch.	Radioactive Process Sewer	None	Waste Site Length: 209 m (686 ft) Cumulative Pipeline Length: 225 m (739 ft) Pipeline Depth: 1.2 to 2.1 m (4 to 7 ft)	TBD	None
88	200-W-224-PL	200-W-224-PL, Pipeline from 234-5Z, and 236-Z to West Side of 241-Z	The pipeline is located inside the Plutonium Finishing Plant security fence. It extends south from 234-5Z and connects to the west side of 241-Z.	Not specified	The pipeline is associated with 234-5Z, 236-Z, and 241-Z	The waste site is four underground, 5.1 cm diameter (2 in.) SS pipelines buried in the same soil trench. Each SS line is encased inside a 15.2 cm (6 in.) diameter polyurethane pipe casing.	Radioactive Process Sewer	None	Waste Site Length: 104 m (341 ft) Cumulative Pipeline Length: 490 m (1,609 ft) Pipeline Depth: 1.5 to 2.7 m (5 to 9 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
89	200-W-225-PL	200-W-225-PL, PFP 6 in. Condensate Line Connecting to Process Sewer	The pipeline is located inside the Plutonium Finishing Plant security fence. It extends from the southwest corner of 234-5Z to southeast of 232-Z.	Not specified	The pipeline is associated with 234-5Z and the 200-W-207-PL process sewer.	The waste site begins as an underground, 15.2 cm (6 in.) diameter CS condensate pipeline that connected 234-5Z with the Z Plant Process Sewer (see site code 200-W-207-PL). Other portions of the pipe are constructed of transite and corrugated metal.	Radioactive Process Sewer	None	Waste Site Length: 128 m (419 ft) Cumulative Pipeline Length: 177 m (582 ft) Pipeline Depth: 0.9 to 1.5 m (3 to 5 ft)	TBD	None
90	200-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	The pipeline is located north of 23rd Street. It extends from the east side of 224-T to the 216-T-3 Reverse Well.	Not specified	The pipeline is associated with 216-T-3 Reverse Well and 241-T-361 Settling Tank.	The waste site is an underground, 7.6 cm (3 in.) diameter SS pipeline that carried waste from the 224-T Plutonium Concentration Facility to the 216-T-361 Settling Tank and the 216-T-3 Reverse Well. H-2-951 shows 224-T waste that had been discharged to 241-T-361 being diverted to 241-T-252 Diversion Box, inside 241-T Tank Farm.	Radioactive Process Sewer	None	Waste Site Length: 788 m (2,585 ft) Cumulative Pipeline Length: 873 m (2,865 ft) Pipeline Depth: 2.4 to 3.4 m (8 to 11 ft)	TBD	None
91	200-W-227-PL	200-W-227-PL, Pipeline from 221-T Separations Facility to 216-T-6 Crib	The pipeline is located on the north side of 23rd Street. It extends from the east side of 221-T, turns south, and then runs west to the 216-T-6 Cribs.	Not specified	The pipeline is associated with the 216-T-6 Cribs.	The waste site is an underground, 7.6 cm (3 in.) diameter SS pipeline that fed the 216-T-6 Cribs. The section of the pipeline nearest the Crib is constructed of CS.	Radioactive Process Sewer	None	Waste Site Length: 522 m (1,712 ft) Cumulative Pipeline Length: 553 m (1,812 ft) Pipeline Depth: 2.4 to 3.4 m (8 to 11 ft)	TBD	None
92	200-W-228-PL	200-W-228-PL, Pipeline from 232-Z to 241-Z, 3 in. Contaminated Waste Line	The pipeline is located inside the Plutonium Finishing Plant security fence, south of 234-5Z. It extends from 232-Z to the west side of 241-Z.	Not specified	The pipeline is associated with 241-Z.	The waste site is an underground, 7.6 cm (3 in.) diameter pipeline from 232-Z to 241-Z. It is labeled on drawings as “contaminated waste line.”	Radioactive Process Sewer	None	Waste Site Length: 69 m (226 ft) Cumulative Pipeline Length: 84 m (276 ft) Pipeline Depth: 1.2 to 1.8 m (4 to 6 ft)	TBD	None
93	200-W-229-PL	200-W-229-PL, Pipeline from 2736-ZB to 241-Z	The pipeline is located inside the Plutonium Finishing Plant security fence, south of 234-5Z. It extends from 232-Z to the west side of 241-Z.	Not specified	The pipeline is associated with 241-Z.	The waste site is an underground, 7.6 cm (3 in.) diameter CS pipeline extending from the southeast corner of 2736-ZB to the west side of 241-Z.	Radioactive Process Sewer	None	Waste Site Length: 44 m (144 ft) Cumulative Pipeline Length: 61 m (199 ft) Pipeline Depth: 0.9 to 1.8 m (3 to 6 ft)	TBD	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
94	200-W-230-PL	200-W-230-PL, Pipeline from Railroad Unloading Station to 276-S-141, and 276-S-142 Hexone Tanks	The pipeline is located northwest of the 202-S Canyon Building.	1951-1967	The pipeline is associated with the 276-S-141, and 276-S-142 Hexone Tanks.	The waste site is a series of underground CS pipelines associated with the 276-S-141, and 276-S-142 Hexone Tanks. A 6.4 cm (2.5 in.) diameter CS line extended from the railroad track to the tanks. A 6.4 cm (2.5 in.) diameter outlet line and a 5.1 cm (2 in.) diameter inlet line is associated with each tank.	Radioactive Process Sewer	None	Waste Site Length: 22 m (72 ft) Cumulative Pipeline Length: 39 m (128 ft) Pipeline Depth: TBD	TBD	None
95	216-S-172	216-S-172, 216-S-172 Weir Box and Control Structure, 2904-S-172 Weir, 216-S-172 Control Structure	The unit is located outside the southwest corner of the 200 West Area perimeter fence and north of 216-S-5 Crib.	Not specified	The site is associated with the 202-S Building, 200-W-153-PL pipeline, and the 216-S-16 Ditch.	This site is an underground concrete structure with interior hand operated sluice gates. Float wells were attached to the outside north and south walls. The structure has been covered with soil and posted with URM/Cave-In Potential signs. The control structure was used to divert 202-S process vessel cooling water to 216-S-6 and steam condensate to the 216-S-16 Ditch.	Control Structure	TBD	TBD	TBD	TBD
96	216-TY-201	216-TY-201, Supernatant Disposal Flush Tank, IMUST	The unit is located in the 200 West Area. It is east of Camden Avenue and south of 23rd Street.	Not specified	The tank is associated with supernatant waste from tanks 241-TY-101, 241-TY-102, 241-TY-103, and 241-TY-104 in the 241-TY Tank Farm; tanks 241-T-110, 241-T-111, and 241-T-112 in the 241-T Tank Farm, 200-W-175-PL, and the 216-T-26, 216-T-27, and 216-T-28 Cribs.	The 216-T-26, 216-T-27, and 216-T-28 Cribs and the 216-TY-201 Tank are enclosed in a common area with steel post and chain barricade. The area is posted URM. The 216-TY-201 Flush Tank is located in the northeast corner of the area. It has three risers protruding from a mound of earth. The 216-TY-201 Tank is delineated with steel post and chain and marked with “Inactive Miscellaneous Underground Storage Tank” signs. According to HNF-2503, the 241-T-112 Tank was taken out of service in 1977 and isolated in 1981. The flush tank can be assumed isolated at the same time as the 241-T-112 Tank. In HNF-2503, the waste volume remaining in the tank is estimated to be 24,000 L (638 gal) at the time of isolation. The estimate is based on the low water line of 15.2 cm (6 in.). It is possible some of	Settling Tank	TBD	TBD	TBD	TBD

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
						the liquid may have evaporated over time. The tank is constructed of concrete. The tank has a manhole located at each end. Three risers extend from the top of the tank to 61 cm (24 in.) above ground level. Two of the 20.3 cm (8 in.) diameter vent pipes had filters installed on top. The vent filters have been removed and the pipes have been capped. One 10.2 cm (4 in.) diameter pipe is located on the south end of the tank. An underground, 7.6 cm (3 in.) diameter pipeline from the 241-T-112 Tank enters the tank near the top of the tank. A "Miller Siphon" is located at the bottom of the tank and drains waste to a 35.6 cm (14 in.) diameter line connected to the 216-T-26, 216-T-27, and 216-T-28 Cribs. An overflow pipe is also connected to this line. The flush tank originally received supernatant from the TY Tank Farm (1953-1955) and discharged the overflow to the 216-T-26 Crib. The pipeline from 241-TY Farm was blanked near the 241-TY Tank Farm eastern fence line in December 1955. After 1955, the flush tank received waste via another pipeline from tank 241-T-112 in the 241-T Tank Farm. Overflow from the flush tank was discharged to the 216-T-27 and 216-T-28 Cribs.					
97	240-S-151	240-S-151, 240-S-151 Diversion Box	The 240-S-151 Diversion Box is located north of the 202-S Canyon Building.	1950 to 1987	Associated with the 240-S-302 Catch Tank, UPR-200-W-82, and S Tank Farm.	This unit is constructed of reinforced concrete and is rectangular. The 240-S-151 Diversion Box has been weather covered.	Diversion Box	UPR-200-W-82	Dimensions: 17.07 × 3.05 × 5.18 m (56 × 10 × 17 ft)	Not available	None
98	240-S-152	240-S-152, 240-S-152 Diversion Box	The 240-S-152 Diversion Box is located north of the 202-S Canyon Building.	1977 to 1980	Associated with 240-S-302 Catch Tank and S Tank Farm.	This unit is constructed of reinforced concrete and is rectangular. The 240-S-152 Diversion Box has been weather covered.	Diversion Box	None	Dimensions: 4.27 × 3.05 × 2.63 m (14 × 10 × 8.63 ft)	Not available	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
99	240-S-302	240-S-302, 240-S-302 Catch Tank, IMUST Line V556, and V557	This unit is located north of the 202-S Building and east of the 240-S-151 Diversion Box.	Not specified	The 240-S-302 Catch Tank is associated with the 240-S-151 Diversion Box. The drain lines to this catch tank are V556, and V557.	This unit is a horizontal, cylindrical, steel tank. The 240-S-302 Catch Tank is buried underground to provide shielding from radiation. The tank is surrounded with posts and chain and posted with radiological and IMUST signs. This tank has been isolated. In 1985 the tank was confirmed to be a leaker. Approximately 2,300 L (600 gal) of rainwater were released between June 1985 and January 1986. The tank received leakage, spillage, line flushes, and drainage associated with waste transfers through Diversion Box 240-S-151.	Catch Tank	None	Dimensions: 10.97 × 6.71 m (36 × 22 ft) Tank Volume: 66,933.94 L (17,682.07 gal)	Tank received leakage, spillage, line flushes, and drainage associated with waste transfers. In 1985, the tank was confirmed to be a leaker. Approximately 600 gal of rainwater were released between June 1985 and January 1986.	None
100	241-SX-302	241-SX-302, 241-SX-302 Catch Tank, SX-304, IMUST Line V595	The 241-SX-302 Catch Tank is located east of the 241-SX-101 Tank, inside the tank farm fence.		The 241-SX-302 Catch Tank is associated with drain line V595, the 241-SX-151 Diversion Box and the 241-SX-152 Diversion Box.	The 241-SX-302 Catch Tank an underground horizontal cylindrical steel tank. Three yellow risers are visible on the surface. It is surrounded with post and chain and marked with radiological and IMUST signs. Drainage and leaks from the 241-SX-151 Diversion Box and the 241-SX-152 Diversion Boxes collected and were stored in the 241-SX-302 Catch Tank.	Catch Tank	TBD	TBD	TBD	
101	241-TX-152	241-TX-152, 241-TX-152 Diversion Box	This unit is located east of the TX Tank Farm. It is east of Camden Avenue and south of 23rd Street. It is north of the 200 West Area Powerhouse pond.	1949 to end date not specified	Associated with the T Plant, SY Tank Farm, UPR-200-W-113, and the 241-TX-154 Diversion Box.	The diversion box is a rectangular reinforced concrete structure. Most of the structure is below ground. A few inches of the structure that extend above ground are covered with a gray weather coating. It is surrounded with light posts and chain and is posted with various radiological postings.	Diversion Box	None	Dimensions: 3.2 × 2.44 × 3.66 m (10.5 × 8 × 12 ft)	Diversion box may contain about 23 kg (50 lb) of lead shielding.	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
102	241-TX-154	241-TX-154, 241-TX-154 Diversion Box	This unit is located on the east side of the 221-T Building.	1949 to end date not specified	Associated with T Plant operations, 241-TX-152 Diversion Box, 241-TX-302C Catch Tank, and SY Tank Farm.	The diversion box is a rectangular reinforced concrete structure. Most of the structure is belowground. The diversion box is surrounded with post and chain. It is labeled and radiologically posted. The adjacent area has been covered with shot-crete.	Diversion Box	UPR-200-W-21, UPR-200-W-38, UPR-200-W-40, UPR-200-W-160	Dimensions: 10.97 × 3.05 × 5.49 m (36 × 10 × 18 ft)	Diversion box may contain about 23 kg (50 lb) of lead shielding.	None
103	241-TX-155	241-TX-155, 241-TX-155 Diversion Box	This unit is located east of the TX Tank Farm, south of 23rd Street and north of the 200 West Area Powerhouse pond.	1949 to 1980	Associated with the 241-TX-302B, and 241-TX-302BR Catch Tanks, and the T, TX, and TY Tank Farms.	The diversion box is a rectangular reinforced concrete structure. Most of the structure is below ground. A few in.es of the structure that extends aboveground are covered with a gray weather coating. It is surrounded with light posts and chain and CA signs.	Diversion Box	UPR-200-W-5, UPR-200-W-28, UPR-200-W-76, UPR-200-W-113, UPR-200-W-131, UPR-200-W-160, UPR-200-W-135	Dimensions: 17.07 × 6.10 × 5.39 m (56 × 20 × 17.67 ft)	Multiple releases documented, including contaminated nitric acid solution in 1952. Diversion box may contain about 23 kg (50 lb) of lead shielding.	None
104	241-TX-302B	241-TX-302B, 241-TX-302-B Catch Tank, IMUST	This tank is located east of the TX Tank Farm, northeast of the 241-TX-155 Diversion Box.	1949 to 1982	Associated with the 241-TX-155 Diversion Box and 241-TX-302BR Catch Tank.	This unit is an underground cylindrical tank made of steel. The ground surface around the tank has been covered with gravel. The tank is surrounded with light posts and chain and is posted with CA and IMUST signs.	Catch Tank	UPR-200-W-131	Dimensions: 10.97 × 2.74 m (36 × 9 ft) Tank Volume: 66,933.94 L (17,682.07 gal)	1984 estimated Volume waste as 4,987 L (1,320 gal).	Tank sampled in 1984; reported dose rate of 24 mrad/h and pH 9.95
105	241-TX-302BR	241-TX-302BR, 241-TX-302BR Catch Tank, 241-TXR-302BR, IMUST	The 241-TX-302BR Catch Tank is located east of the 241-TX-155 Diversion Box. It is located east of Camden Avenue and south of 23rd Street.	1950 to 1954	Associated with UPR-200-W-131, 241-TX-155 Diversion Box, 241-TX-302B Catch Tank, and 216-T-20 Acid Pit.	This unit is an underground horizontal cylindrical tank made of steel. The ground surface around the tank has been covered with gravel. The tank is surrounded with posts and chain and is labeled with IMUST signs.	Catch Tank	UPR-200-W-131	Dimension: 10 × 2.44 m (32.8 × 8 ft) Tank Volume: 45,424.95 L (12,000.00 gal)	Not available	None
106	241-TX-302C	241-TX-302C, 241-TX-302-C Catch Tank	The 241-TX-302 Catch Tank is located southeast of the center of the 221-T Building.	1949 to 2005	Associated with the 241-TX-154 Diversion Box.	This unit is an underground horizontal cylindrical tank made of CS. The tank area has been sprayed with shot-crete to control surface contamination.	Catch Tank	UPR-200-W-21, UPR-200-W-40, UPR-200-W-38, UPR-200-W-160	Dimensions: 11.99 × 2.74 m (39.33 × 9 ft) Tank Volume: 54,178.49 L (14,312.44 gal)	Not available	None

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
107	241-U-151	241-U-151, 241-U-151 Diversion Box	The 241-U-151 Diversion Box is located northeast of the intersection of Camden Avenue and 16th Street, east of the U Tank Farm.	1946 to end date not specified	Associated with the 241-U-301 Catch Tank and the 244-S, and 244-TX Double Contained Receiver Tanks. The unit also is associated with the 241-U-152, and 241-TX-152 Diversion Boxes.	The diversion box is marked and radiologically posted. This unit is constructed of reinforced concrete with multiple encased liquid waste transfer lines. The diversion box structure is mostly below ground. It has three layers of cover blocks.	Diversion Box	UPR-200-W-6	Dimensions: 6.10 ×2.74 × 5.07 m (20 × 9 × 16.62 ft)	Diversion box may contain about 23 kg (50 lb) of lead shielding.	None
108	241-U-152	241-U-152, 241-U-152 Diversion Box	The 241-U-152 Diversion Box is located northeast of the intersection at Camden Avenue and 16th Street, east of the U Tank Farm.	1946 to end date not specified	The 241-U-152 Diversion Box is associated with the 241-U-301 Catch Tank, and 241-U-153 Diversion Box.	The diversion box is marked and radiologically posted. The unit is constructed of reinforced concrete with multiple encased liquid waste transfer lines. The diversion box structure is mostly belowground. It has three layers of cover blocks.	Diversion Box	UPR-200-W-6	Dimensions: 8.53 × 2.74 × 5.07 m (28 × 9 × 16.63 ft)	Diversion box may contain about 23 kg (50 lb) of lead shielding.	None
109	241-UX-154	241-UX-154, 241-UX-154 Diversion Box	The 241-UX-154 Diversion Box is located southeast of the 221-U Canyon Building.	Not specified	The 241-UX-154 Diversion Box is associated with the 221-U Canyon Building, 241-WR Vault, 291-U stack, 241-TX-155 Diversion Box, and 241-UX-302 Catch Tank.	The diversion box is marked and radiologically posted. The unit is mostly below grade, constructed of reinforced concrete. Multiple encased liquid waste transfer lines enter the box through its southeast wall. In 1998, ground penetrating radar scans were done in the vicinity of the 241-UX-154 Diversion ox and other areas on the south east side of 221-U. A total of 44 linear anomalies were identified. This unit was used to transfer waste solutions from processing and decontamination operations. The 241-UX-154 Diversion Box served as a waste transfer hub not only for the 200 West Area, but also for cross site waste transfers through the inter-area (cross-site) transfer line. The diversion box also received drainage from the 291-U Stack.	Diversion Box	TBD	TBD	TBD	TBD

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110	241-UX-302A	241-UX-302A, 241-U-302 Catch Tank, 241-UX-302 Catch Tank, 241-UX-302, Lines V380, and V381	The tank is located southeast of the 221-U Building and south of the 241-UX-154 Diversion Box.	Not specified	The unit is associated with 241-UX-154 Diversion Box and U Plant. The drain lines from the diversion box are lines V380, and V381.	The catch tank is an underground tank. It is covered with gravel, marked and radiologically posted. In March 2006, the tank was estimated to contain 6,551 L (1,724 gal) based on the liquid level gauge reading of 42 cm (16.61 in.). Between June 2004 and February 2006, the tank liquid level decreased approximately 1.8 cm (0.7 in.) with is equivalent to approximately 380 L (100 gal). The assessment team determined the small change in volume could be from a pin-hole leak or evaporation. The assessment team recommended that 241-UX-302A be declared and assumed leaking tank in May 2006. In October 2006, the more liquid was pumped out of the tank, leaving a residual of approximately 3.8 L (1 gal). The catch tank collected excess liquid from the 241-UX-154 Diversion Box and 291-U Stack condensate drainage.	Catch Tank	TBD	TBD	TBD	TBD
111	241-WR VAULT	241-WR Vault, 241-WR Vault (Tanks-001 through -009), 241-WR-01 Through 09, 241-WR Diversion Station Vault, 244-WR Vault, 296-U-6 Stack, IMUST (see Subsites)	This site is located northeast of the 221-U Building, west of Beloit Avenue.	Not specified	The vault is associated with the 296-U-6 Stack, 221-U Plant processes, PUREX facility, REDOX facility, 241-UX-154, and BC Cribs and Trenches.	The vault is a below grade, reinforced concrete structure. There are nine compartments arranged in two rows with an 189,000 L (50,000 gal) tank in each compartment. A concrete wall separates the two rows of tanks. In addition to the tanks, the vault contains miscellaneous agitators, pumps, and valves. It is marked and posted with URM area signs. The exhaust stack and dry well are included in this site. See subsite descriptions. The vault ceased operation in 1976 and is currently inactive. The aboveground structures, entry ports and vents have been dismantled. Plasticized foam was used to seal the vault. All tanks and related equipment remain in place and are estimated to include a contamination	Receiving Vault	TBD	TBD	TBD	TBD

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
						burden of 60 curies beta. Tank leaks within the vault were noted in the 1960s. 241-WR-001 was reported to have collapsed during the TBP operation (1952 to 1958) and was observed to be empty in 1965. However, the 001 sump contained 51,786 L (13,700 gal) of liquid. Samples taken at that time indicated the liquid to be slightly contaminated water. All of the sumps and tanks were pumped out in 1965. When tank 002 was pumped, it floated loose from its base, rupturing the lines connected to the tank. A significant cleanup and repair effort was required to return the facility to service. Tanks WR-001, WR-002, WR-004, and WR-005 are suspected to have leaked. Individual specific occurrence reports were not issued. The “hot side” tanks have reportedly contaminated the "cold side" of the vault. During the WR vaults active operation, it stored uranyl nitrate hexahydrate, nitric acid, and tributyl phosphate wastes transferred to the resident storage tanks. During U Plant uranium recovery operations (1952 to 1958), uranyl nitrate hexahydrate was stored and used as feed for 221-U, recovered nitric acid was temporarily stored, and tributyl phosphate wastes were stored before routing to BC Cribs and Trenches via the Cross Site Transfer line. Following termination of uranium recovery operations in 1958, the vault was used to store nitric acid and thorium from REDOX and PUREX. In October 1965, contaminated water, including 3.14 kg (6.92 lb)g of thorium, was discharged to 216-U-12 Crib.					

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112	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	The site is located inside the Z-Plant Security Fence, near the south end of the complex.	Not specified	The site is related to 241-Z-D-4, 241-Z-D-5, 241-D-6, 241-Z-D-7, and 241-Z-D-8. Unplanned Releases UPR-200-W-74, UPR-200-W-75, and UPR-200-W-79 are also associated with 241-Z. The sample building (241-ZA) located on the southeast corner of the 241-Z is also part of this site. The pipelines to 241-Z is described in site codes 200-W-219-PL. The waste transfer line from 241-Z to 241-TX Tank Farm is 200-W-178-PL. The pipeline from 241-Z to 241-Z-361 Settling Tank is site code 200-W-220-PL. Pipelines that fed 241-Z include 200-W-219-PL, 200-W-224-PL, 200-W-228-PL, and 200-W-229-PL.	Site currently consists the below grade concrete vault containing four storage and treatment tanks. The aboveground features have been removed. The site was activated on November 24, 1948. The RCRA TSD portion of this facility consists of the tanks (excluding D-6), the internal piping, the concrete vaults, ancillary equipment and the soil directly below the tanks. The external pipelines leading from buildings in 234-5Z to the 241-Z Facility are not considered part of this site. The D6 tank and cell is a past practice unit that is not part of the RCRA TSD. The TSD unit consists o f the D-4, D-5, D-7, D-8 and an overflow tank. A RCRA Closure Plan was submitted to the Washington State Department of Ecology in July 2003. The site will be closed pursuant to the closure plan and in conjunction with CERCLA closure of the Plutonium Finishing Plant. The final transfer of liquid radioactive waste from the 241-Z Liquid Waste Treatment Facility to Hanford's Tank Farms was completed successfully November 8, 2004. The final transfer contained a combination of cleanout and flush wastes, and liquid wastes generated as part of the PFP Stabilization and Packaging Project. The waste transfer, along with subsequent tank flushes totaling about 34,068.7 L (9,000 gal), was constantly monitored to assure that liquid levels in both tanks were changing as expected. The 241-Z Tanks are a waste treatment, storage and collection system containing below grade tanks	Neutralization Tank	TBD	TBD	TBD	TBD

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						in covered concrete cells. The operating capacity of the tank system was 65,000 L (17,000 gal). Liquid wastes generated from Plutonium Finishing Plant operations were collected in tank 241-Z-D-8 for interim storage. The waste was transferred to 241-Z-D-5 for treatment (pH adjustment) prior to discharge to the tank farms via 244-TX Receiver Tank. Tanks 241-Z-D-4, and 241-Z-D-7 were reserve waste accumulation tanks. See UPR-200-W-74, UPR-200-W-75, and UPR-200-W-79.					

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113	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	The underground tank is north of 276-S Building and directly south of the 276-S-142 Tank. The tank is west of the REDOX railroad tracks.	Not specified	Structures associated with the tank include: solvent transfer lines, the 276-S-142 Tank, the Tank Car Unloading Station, and process equipment in the 276-S Building. The pipelines associated with the hexone tanks are site code 200-W-230-PL.	The site is a below grade CS tank enclosed in a chain line fenced area. The tank is the southernmost tank in a two tank network connected to the 276-S Solvent Handling Facility. The tank had an 89,000 L (23,575 gal) capacity. The tank has been filled with cement. The last documented waste transfer for this site was in 1969. The liquid mixed waste was run through a distillation system and pumped to tank cars for temporary storage. All pumpable liquids had been removed from the tank and distilled in 1992, when the tank cars were taken off site to dispose of the waste. A nitrogen blanket was added to the tank. The remaining 19 to 114 L (5 to 30 gal) of liquid is expected to be removed by evaporation over time due to the nitrogen purge process. The tank is currently being closed under interim status, containing small amounts of liquid mixed waste. The tank stored various liquid mixed wastes until 1992, when most of the waste was transferred to tank cars for offsite incineration. From 1951 to 1967, the tank was used to store reagent-grade hexone for makeup as a solvent at REDOX. The hexone was delivered to REDOX in rail cars that were unloaded into the 276-S-141, and 241-S-142 Tanks via underground lines at the railcar unloading station.	Storage Tank	TBD	TBD	TBD	TBD

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114	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	The underground tank is north of the 276-S Building and directly north of the 276-S-141 Tank. The system is west of the railroad tracks.	Not specified	Structures associated with the tank include: solvent transfer lines, the 276-S-141 Tank, the Tank Car Unloading Station, and process equipment in the 276-S Building. The pipelines associated with the hexone tanks are site code 200-W-230-PL.	The site is a below grade CS tank. The tank is the northernmost tank in a two tank network connected to the 276-S Solvent Handling Facility. The tank has a 89,000 L (23,575 gal) capacity. The last documented waste transfer for this site was in 1969. The liquid mixed waste was run through a distillation system and pumped to tank cars for temporary storage. Most of the liquids have been removed from the tank and distilled to reduce the number of radionuclides present. In 1992, the tank cars were taken offsite to dispose of the waste. A nitrogen blanket was added to the tank. The remaining 19 to 114 L (5 to 30 gal) of liquid is expected to be removed by evaporation over time due to the nitrogen purge process. The tank is currently being closed under interim status and contains a small amount of liquid mixed waste. The tank stored various liquid mixed waste until 1992, when most of the liquid mixed waste was transferred to tank cars for offsite incineration. From 1951 to 1967, the tank was used to store reagent-grade hexone for makeup as a solvent at REDOX. The hexone was delivered to REDOX in rail cars that were unloaded into the 276-S-141 and 241-S-142 Tanks via underground lines at the railcar unloading station.	Storage Tank	TBD	TBD	TBD	TBD

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
115	2904-S-160	2904-S-160, 2904-S-160 Control Structure, 2904-S-160 Weir	The structure is located southwest of the southwest corner of the 200 West Area, outside the perimeter fence and north of the 216-S-5 Crib.		The site is associated with the 216-S-172 control structure, the 216-S-17 and 216-S-16 Ponds, the 216-S-6 Crib, and the 200-W-155-PL and 200-W-152-PL pipelines.	The unit is an inactive waste management unit consisting of a below grade pentagonal structure with reinforced concrete walls, floor, and roof. 61 cm (24 in.) diameter vitrified clay pipes provided inlet and outlet flow for the structure. The site has been surface stabilized and is posted with URM/Cave-in Potential signs. The unit was built to divert process vessel cooling waste and steam condensate from 202-S Building to the 216-S-17 Pond, 216-S-6 Crib, and 216-S-16 Pond.	Control Structure	TBD	TBD	TBD	TBD
116	2904-S-171	2904-S-171, 2904-S-171 Weir Box, 2904-S-171 Control Structure, 216-S-171	The site is located southwest of the 200 West Area, outside the perimeter fence, adjacent to the north side of the 216-S-6 Crib.		The structure is associated with the 216-S-6 Crib, and the 200-W-153-PL, and 200-W-156-PL pipelines.	The 2904-S-171 Control Structure is a below grade, rectangular concrete weir structure. The inlet piping consisted of 45.7 cm (18 in.) diameter vitrified clay pipe. The outlet piping consisted of 45.7 cm (18 in.) diameter corrugated metal pipe. The site has been backfilled with clean material and is posted with URM signs. The walls, floor, and roof were constructed of 25.4 cm (10 in.) thick concrete. It had a hand operated gate valve. The unit was built to measure and regulate flow of process waste being routed to the 216-S-6 Crib. Pipeline 200-W-156-PL entered the control structure from the north. Pipeline 200-W-153-PL entered the control structure from the east.	Control Structure	TBD	TBD	TBD	TBD

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
117	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	The encased pipeline runs from 241-UX-154 Diversion Box, adjacent to 221-U inside 200 West Area, to the 241-ER-151 Diversion Box inside 200 East Area.	1952-1995	The pipeline is associated with the 241-UX-154 Diversion Box, the 241-ER-151 Diversion Box, 241-EW-151 Vent Station and UPR-600-20.	The waste site is the underground pipeline that is located beneath the surface stabilized UPR-600-20 soil contamination site. It is posted with URM signs. The cross site transfer line was originally constructed in 1952 to support the Uranium Metal Recovery operations. Various process and tank farm waste has been transported between 200 East and 200 West Areas through this underground concrete encased group of pipelines. The cross site transfer line consists of six SS pipelines (V360, V361, V362, V363, V364, and V366) inside a concrete encasement. The encasement type is known as 6-59, indicating there are six lines inside a 150 cm (59 in.) wide encasement. The concrete encased SS pipelines are buried at depths that range from 1.5 to 4.6 m (5 to 15 ft). There are 58 encasement test risers (swab risers) spaced regularly along the pipeline that provided access to the encasement void space. This cross site line was replaced with a new pipeline in 1995 (see 600-269).	Encased Tank Farm Pipeline	UPR-600-20	Waste Site Length: 19,645 ft Cumulative Pipeline Length: 19,767 ft Pipeline Depth: TBD ft	TBD	In March 1988, while conducting a radiological survey of the 241-EW-151 Vent Station (located approximately midway between 200 East and 200 West Areas on the transfer line) contamination was identified approximately 100 m (300 ft) outside the established radiation zone boundaries of the vent station, above the transfer line. The MSCM tractor was used to survey the entire surface of the pipeline. Numerous spots of contamination were identified at various locations along the entire length of the transfer line. Contamination levels ranged from a few hundred counts per minute to 750 millirem per hour. To characterize the integrity of the pipeline, eight boreholes were drilled with an auger at four locations along the transfer line.

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Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
											Although no contamination was found to have leaked below the pipeline encasement, contamination was found in sagebrush growing next to the encasement. This indicated that the roots of the sagebrush had penetrated the encasement. The contamination was given an Unplanned Release number UPR-600-20 in 1989.
118	UPR-200-W-2	UPR-200-W-2, UN-200-W-2, Underground Waste Line Leak	The cave-in occurred on the southeast side of the 221-T Facility, near stairwell R-19.	June 1947	Associated with 221-T.	The area around stairwell R-19 at the 221-T facility currently is paved with asphalt. A long, narrow URM area is posted around the R-19 area.	Unplanned Release	UPR-200-W-98	Depth: 3.35 m (11 ft)	Mixed process effluent	None
119	UPR-200-W-5	UPR-200-W-5, overflow at 241-TX-155, UN-200-W-5	The site consists of the 241-TX-155 Diversion Box and the adjacent hillside to the west. The diversion box is located east of Camden Avenue, east of the TX Tank Farm.	1950	Associated with the 241-TX-155 Diversion Box.	In 2000 and 2001 multiple areas of soil and vegetation contamination were identified, and all were posted. For consolidation purposes, all of the new CAs were recorded and mapped as UPR-200-W-113. A WIDS sign has been placed at the approximate location of the release.	Unplanned Release	UPR-200-W-28, UPR-200-W-113, UPR-200-W-131	Not available	Contaminated soil	None
120	UPR-200-W-6	UPR-200-W-6, UN-200-W-6, contamination spread from 241-U-151, and 241-U-152 Diversion Boxes	The contamination spread occurred at the 241-U-151 and -152 Diversion Boxes, located east of the U Tank Farm, near the corner of 16th Street and Camden Avenue.	1950 to end date not specified	Associated with the 241-U-151, and 241-U-152 Diversion Boxes.	The ground around the 241-U-151 and the 241-U-152 Diversion Boxes has been covered with gravel. The diversion boxes are marked and posted. A WIDS sign has been placed at the approximate location of the release.	Unplanned Release	None	Not available	Ground contamination from diversion boxes.	Maximum dose rate of 20 mrad/h on the surface of the soil.

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121	UPR-200-W-28	UPR-200-W-28, Release from 241-TX-155 Diversion Box, UN-200-W-28	The release site is located adjacent to the 241-TX-155 Diversion Box, approximately 244 m (800 ft) east of the TX Tank Farm and north of the 200 West Area Powerhouse Pond.	1954 to end date not specified	Associated with the 241-TX-155 Diversion Box.	The documented contaminated area was found at the 241-TX-155 Diversion Box. There is a large posted URM area west of the diversion box and several smaller radiologically posted areas in this vicinity (see UPR-200-W-113 and UPR-200-W-135). The diversion box has been isolated and weather covered and is marked and posted with various radiological control signs. A WIDS sign has been placed at the approximate location of the release.	Unplanned Release	UPR-200-W-5, UPR-200-W-113, UPR-200-W-131, UPR-200-W-135	Dimensions: 9.1 × 30.5 m (30 × 100 ft)	Contaminated soil.	In 1970, soil samples reported less than detectable contamination. Over the years, contaminated vegetation, animal feces, and soil specks periodically have been identified.
122	UPR-200-W-29	UPR-200-W-29, Transfer Line Leak, UN-200-W-29, UPR-200-W-27	The site is located at the southeast corner of the intersection of Camden Street and 23rd Street. The release site is located adjacent to the 241-TX-155 Diversion Box, approximately 244 m (800 ft) east of the TX Tank Farm and north of the 200 West Area Powerhouse Pond.	1954 to end date not specified	Associated with the 241-T-152 Diversion Box.	The area is currently surrounded with steel posts, covered with gravel, and posted as a URM area.	Unplanned Release	UPR-200-W-64, UPR-200-W-97	Dimensions: 30.5 × 22.9 m (100 × 75 ft)	Less than 3,800 L (1,000 gal) estimated to have escaped.	Contaminated soil with a maximum dose rate of 11.5 rad/h at a distance of 5 cm (2 in.) over waste run-off area and up to 4.5 rad/h at 0.9 m (3 ft) near the cave in. February 1998 rad survey detected no surface contamination.
123	UPR-200-W-32	UPR-200-W-32, UNH transfer line break, UN-200-W-32	The release occurred near the northwest corner of the REDOX Plant.	Release occurred in 1954	204-S Facility	The release site is not currently marked or posted. The aboveground pipeline has been removed.	Unplanned Release	None	Not available	Unknown amount of UNH.	None
124	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	The site was located along the aboveground UNH process line that ran from REDOX to U Plant, at a location just outside and to the north of the REDOX exclusion area.	Release occurred in September 1955	204-S Facility	Much of the area north of REDOX has been surface stabilized. The UPR site is not marked or posted.	Unplanned Release	None	Not available	Unknown amount and concentration/ activity of UNH solution.	None

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125	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	The release occurred on the southeast side of T Plant (221-T), between the 241-TX-154 Diversion Box and the 241-TX-302 Catch Tank. The liquid release affected a large area between the 221-T and 222-T Buildings. The release site is located adjacent to the 241-TX-155 Diversion Box, approximately 244 m (800 ft) east of the TX Tank Farm and north of the 200 West Area Powerhouse Pond.	1955	Release associated with 241-TX-154 Diversion Box and 241-TX-302C Catch Tank. UPR-200-W-21 occurred in the same vicinity in 1953.	The area around the 241-TX-154 Diversion Box and the catch tank has been stabilized with sprayed concrete (shotcrete). The area is posted with URM area signs. A WIDS sign has been placed at this location.	Unplanned Release	UPR-200-W-21	Area: ~139.35 sq m (1,500 sq ft). Cleanup activities increased the contaminated area to approximately 371.6 sq m (4,000 sq ft). 163 × 25 m (534.78 × 82.02 ft) covered in shot-crete	Contaminated with radioactive metal waste solution that is high salt and neutral to basic. Estimated volume of up to 19,000 L (5,026 gal).	In 1968, the maximum dose rate encountered through backfill was 500 mrad/h. Note: It is reported that a hose with 33 rad/h contamination was buried in the backfill over the area.
126	UPR-200-W-64	UPR-200-W-64, Road Contamination at 23rd and Camden Avenue, UN-200-W-64	The release is located between the east shoulder of Camden Avenue and the posted URM area (UPR-200-W-29/ UPR-200-W-97), near the corner of 23rd Street and Camden Avenue.	1969 to end date not specified	UPR-200-W-29 and UPR-200-W-97 are the apparent source of contamination for this release.	The corner of 23rd Street and Camden Avenue has been stabilized with clean gravel because of two waste line leak events. The stabilized area is surrounded with chain and posted with URM area signs. The road shoulders are not posted. A WIDS sign has been placed at the approximate location of the release.	Unplanned Release	UPR-200-W-29, UPR-200-W-97	Dimensions: ~15.4 × 0.6 m (50 × 2 ft) strip bordering Camden Avenue at its intersection with 23rd Street	Cs-137 was the only detectable radioactive isotope; source appears to be rain water runoff from adjacent UPR areas.	In 1969, contamination up to 600 cpm was reported.
127	UPR-200-W-97	UPR-200-W-97, Transfer Line Leak, UN-216-W-5, UN-200-W-97	The release occurred southeast of the T Tank Farm at the corner of 23rd Street and Camden Avenue.	1966	Associated with the underground pipeline connecting 241-T-152 Diversion Box and the 241-TX-153 Diversion Box. It occurred at the same location as UPR-200-W-29 and adjacent to UPR-200-W-64. The site is associated with UPR-200-W-29, because a repeat release from the same broken transfer line (documented in UPR-200-W-29 in 1954) occurred again in 1966.	The site is located at the corner of 23rd Street and Camden Avenue. It is marked and posted as URM."The release site was stabilized with clean soil, sand, ureabore herbicide, and crushed rock.	Unplanned Release	UPR-200-W-29, UPR-200-W-64	Dimensions: 36.6 × 1.8 × 0.91 m (120 × 6 × 3 ft)	Waste was a high salt, neutral to basic solution; second-cycle bismuth phosphate waste from 241-T-107 Tank; leak estimated to contain about 10 Ci of fission products.	1966 dose rate at bottom of 3 ft hole was 9 rad/h. 1990 rad survey detected subsurface contamination of 600 cpm, down from the 60,000 cpm reported in the 1978 survey.

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128	UPR-200-W-98	UPR-200-W-98, UN-216-W-6, 221-T waste line break at R-19, UN-200-W-98	The release site is located near the southeast corner of the 221-T Canyon Building, at door R-19.	1945	Associated with underground pipelines near the R-19 section of the 221-T Canyon Building.	The area around door R-19 is paved with asphalt and posted as a URM area. There is no sign that specifically marks the area as a UPR site.	Unplanned Release	UPR-200-W-2	Not available	Approximately 10 Ci of high salt, neutral to basic fission products.	Maximum dose rate of 20 rad/h (in 1945) at 5 cm (2 in.). 1975 rad survey reported 500 cpm. In 1977, test holes cut to 4 ft in release area detected no rad contamination.
129	UPR-200-W-102	UPR-200-W-102, UN-216-W-12, UN-200-W-102, 224-T Underground Line Leak	UPR occurred adjacent to the south and east sides of the 224-T Building.	1972	Associated with underground process lines at the 224-T Building.	The east and south sides of the 224-T Building are covered with gravel. The area along the east side of the 224-T Building is posted as a URM area.	Unplanned Release	None	Dimensions: 15.24 × 3.66 × 3.66 m (50.0 × 12.0 × 12 ft)	The release consisted of alpha laden moisture from process tank lines that contaminated the soil around the pipeline. An estimated 72 g of plutonium were contained in the contaminated soil that was removed when the leak was discovered.	August 2000 rad survey detected no contamination.

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130	UPR-200-W-108	UPR-200-W-108, Line Leak at 216-S-9 Crib, UN-216-W-18, UN-200-W-108	UPR-200-W-108 occurred at the junction of the 216-S-9 and 216-S-23 Crib Liners, south of the 216-S-9 Crib and approximately 61 m (200 ft) north of 13th Street.	Not specified	UPR-200-W-108 was associated with pipeline 200-W-139-PL, the 216-S-9 Crib, the REDOX D-2 Receiver Tank, the 240-S-151 Diversion Box, the 216-S-23 Crib, and UPR-200-W-109.	The release site is posted as a "Surface Contamination Area." The excavation was filled after the work was completed. Dose rates of 40 rad per hour from the bottom of the waste line were shielded. Lead shielding was used to reduce dose rates to personnel. Approximately 114 L (30 gal) of waste solution was discharged into a hole in the ground dug below the opening of the line. The original intended tie-in was successfully made. On January 8, 1969, during the tie-in of the 216-S-9 Crib waste line to the new 216-S-23 Crib, contaminated water was encountered coming from a break at the junction of the two crib lines. Further excavation disclosed a severe expansion buckle in the line at that point, and a similar buckle in the line near the 202-S Building. There is no way of determining how long the line had been leaking or how much waste was discharged to the ground.	Unplanned Release	TBD	TBD	TBD	TBD

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Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
131	UPR-200-W-109	UPR-200-W-109, Waste Line Leak Near 218-W-9, UN-216-W-19, UN-200-W-109	UPR-200-W-109 occurred just inside the east perimeter chain of the 218-W-9 Burial Ground, south of which is located north of the 216-S-7 Crib in 200 West Area.	Not specified	UPR-200-W-109 is associated with the 218-W-9 Burial Ground, UPR-200-W-108, 216-S-7, 216-S-23, the D-2 Receiver Tank in the 202-S Building, and the 240-S Diversion Box.	The release was a transfer line break that occurred within the east chain barricade of the 218-W-9 Burial Ground. The 218-W-9 Area was interim stabilized in 1991 with 45.7 to 61 cm (18 to 24 in.) of uncontaminated backfill. The release site was covered with soil and re-vegetated along with 218-W-9. The release occurred on January 24, 1969. A previous break in the same underground line was identified on January 8, 1969 (UPR-200-W-108). Both unplanned releases were part of the same project connecting a waste line to the 216-S-23 Crib. UPR-200-W-109 is related to the UPR-200-W-108 incident. After repairing the initial buckled portions of the waste line, a pressure test indicated another leak in the line at some point upstream toward the 202-S Building. Further excavation and pressure testing finally determined a leak to be somewhere between the first discovered leak and the northwest corner of the REDOX area fence. Additional hydrostatic testing finally forced water to bubble to the ground surface. Excavation of the bubble site disclosed a vertical buckling of the pipeline with a sizable break in the line. The buckled and broken waste transfer line was from the 240-S Diversion Box. Dose rates on the liquid were 450 millirad/hr, but as the liquid sank into the ground, the dose rate dropped to 20 mrem/hr.	Unplanned Release	TBD	TBD	TBD	TBD

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132	UPR-200-W-113	UPR-200-W-113, Soil Contamination East of the TX Tank Farm, UN-216-W-23, Contamination Areas Around 241-TX-155 Diversion Box, UN-200-W-113	The site is an area east of the TX Tank Farm, on the east side of Camden Avenue. Posted CAs are located west, south, north, and east of the 241-TX-155 and 241-TX-152 Diversion Boxes.	1977 to end date not specified	Associated with the 241-TX-155 and 241-TX-152 Diversion Boxes and associated underground pipelines going into and out of the diversion boxes.	The original contaminated area was surface stabilized in 1990 and is surrounded with concrete marker posts and posted as a URM area. In 1998, 1999, and 2000, additional surface contamination was identified adjacent to the surface stabilized area and on the north, south, east, and west sides of the diversion boxes. CAs also have been identified on the surface of underground transfer lines associated with the 241-TX-155 Diversion Box. The additional CAs also are considered a part of this site (UPR-200-W-113) and are marked with posts, chain, and CA and Soil Contamination Area signs. One small CA, southeast of 241-T (located on a transfer line to the diversion box), recently was stabilized with gravel and now is posted with URM area signs.	Unplanned Release	UPR-200-W-28, UPR-200-W-76, UPR-200-W-135	Not available	Multiple UPRs. Contaminated rabbit feces and low-level beta/gamma surface contamination. Source of contamination was subsurface.	August 1998 underground pipe rad survey detected up to 80,000 cpm; October 1999 rad survey detected 20,000 cpm on rusty railroad rail.
133	UPR-200-W-114	UPR-200-W-114, UN-216-W-24, Ground Contamination East of SX Tank Farm, UN-200-W-114	UPR-200-W-114 was located east of the SX Tank Farm.	1980	Associated with multiple releases from operation activities in the SX Tank Farm and the 241-SX-151 and 241-S-151 Diversion Boxes. Documented operational releases extending eastward from the tank farm include UPR-200-W-20, UPR-200-W-49, UPR-200-W-50, UPR-200-W-51, UPR-200-W-52, and UPR-200-W-82.	This site is no longer marked or posted. For many years, the release site had been a large area posted with a light chain and Surface Contamination Area signs. The 216-S-8 Trench and the 216-S-1 and the 216-S-2 Cribs were located within the larger contamination zone. The surface contamination was scraped up and consolidated into other nearby waste sites. The cribs were individually surface stabilized and reposted with URM area signs.	Unplanned Release	UPR-200-W-20, UPR-200-W-49, UPR-200-W-50, UPR-200-W-51, UPR-200-W-52, UPR-200-W-82	Dimensions: 106.68 × 137.16 m (350.0 × 450.0 ft). Area:~ 4.8 ha (11.9 ac)	Waste consists of particulate matter.	None

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134	UPR-200-W-115	UPR-200-W-115, UN-216-W-25, Ground Contamination Above Transfer Line along Cooper Street	UPR-200-W-115 is located above the encased transfer line that runs along the east side of Cooper Street. The pipeline extends between the 242-S Evaporator Facility and the 241-U Tank Farm.	Not specified	The release site was associated with the encased transfer lines from the 242-S Evaporator Building to 241-U. The pipelines associated with this release are discussed in site code 200-W-179-PL.	The site had been delineated with light chain barricade and Surface Contamination warning signs. A waste site inspection, done in February 1998, found the area has been covered with gravel and posted as an URM area. There is no specific occurrence date. The soil was contaminated over time from activities that opened the COBs and caused contamination to spread. The area was given an UPR site number in September 1980. The release refers to the radiologically posted soil above the underground, encased transfer line that runs from the 242-S Evaporator Building to the 241-U Tank Farm. In 1981, Harold Maxfield stated that he believed the area was incorrectly designated as an unplanned release. He based his opinion on a radiation survey performed on October 7, 1981. The survey report indicated the soil and the surface features of the pipeline (COBs) were free of removable contamination. The report stated the only radiation detected was a dose rate emitting from the COBs. There was no evidence of loss of radiological control at that time. The site is considered to be the soil above an encased transfer line extending from the 242-S Evaporator to the 241-U Tank Farm. The pipeline is equipped with a series of COBs along the length of the line to allow access into the pipeline.	Unplanned Release	TBD	TBD	TBD	TBD

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135	UPR-200-W-130	UPR-200-W-130, Line Leak at 231-W-151 Sump, UN-200-W-130	UPR-200-W-130 occurred in the soil on the east side of the 231-W-151 Sump, near the 231-Z Building.	Not specified	UP-200-W-130 was associated with a waste line, the 231-W-151 Sump and the 231-Z Building.	A WIDS sign has been placed at the approximate location of the release. The contamination spread occurred on January 20, 1967, during the initial excavation. Due to the fact that the diversion box was connected to the 231-Z Facility, only a “Poppy” (alpha meter) was used to survey the area and the personnel. The area was temporarily backfilled to stabilize the area over the week end. The job resumed on January 23, 1967. At this time, a survey of the soil adjacent to the waste line revealed 100 mrem/hr beta contamination and 50 mrem/hr gamma contamination. The radiation monitor discussed with his supervisor the fact that the personnel and equipment had previously been released from the area using only an alpha detector. It was decided that the personnel, equipment and the homes of the affected personnel needed to be checked for beta/gamma contamination. Low levels of beta/gamma contamination were found on several articles of clothing, a shovel and three trucks. While hand excavating to uncover a waste line adjacent to the 231-W-151 Diversion Box, contamination was detected in the soil. The soil adjacent to the waste line contained 40,000 disintegrations per minute alpha contamination, and 150 mrem/hr beta/gamma contamination. The release was due to a leaking flange. The dose rate on the waste line was 1.5 rad per hour.	Unplanned Release	TBD	TBD	TBD	TBD

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Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
136	UPR-200-W-131	UPR-200-W-131, Release from 241-TX-155	The release occurred near the 241-TX-155 Diversion Box, located east of Camden Avenue and east of the TX Tank Farm.	1953	Associated with the 241-TX-155 Diversion Box, the 241-TX-302 Catch Tank.	The 241-TX-155 Diversion Box and 241-TX-302B Catch Tank are surrounded with post and chain and CA signs. Clean gravel has been placed around the diversion box, and a sign has been added to the chain boundary, identifying this to be the location of UPR-200-W-131.	Unplanned Release	UPR-200-W-113	Not available	Multiple UPRs of dilute acidic waste solution. Contaminated rabbit feces and low-level beta/gamma surface contamination. Source of contamination was subsurface.	Ground contamination up to 25 rad/h at 0.6 m (2 ft).
137	UPR-200-W-135	UPR-200-W-135, Release from 241-TX-155, UN-200-W-135	The cave-in associated with UPR-200-W-135 was located approximately 46 m (150 ft) northwest of the 241-TX-155 Diversion Box. The diversion box is located east of Camden Avenue and east of the TX Tank Farm.	1954	Associated with the 241-TX-155 Diversion Box.	Three major encased transfer lines are associated with the 241-TX-155 Diversion Box. Many areas of contamination have been identified on these transfer lines during 1999, 2000, and 2001. UPR-200-W-113 is located on a transfer line directly west of the 241-TX-155 Diversion Box and is surrounded with concrete marker posts and URM area signs. An extension of UPR-200-W-113 is located northwest of the original area, surrounded with metal posts and chain, and posted with CA signs. A single metal post, labeled UPR-200-W-135, has been placed adjacent to the UPR-200-W-113 CA.	Unplanned Release	UPR-200-W-13	Dimensions: 12.19 × 0.61 m (40 × 2 ft)	Estimated 1,000 gal of mixed waste.	Estimated 300 rad/h at a distance of 10 cm (4 in.).
138	UPR-200-W-161	UPR-200-W-161, UN-216-W-35, UN-200-W-161	The site is located east of the U Tank Farm, on the east side of Camden Avenue. It extends northward from the corner of 16th Street and Camden Avenue and the 241-U-152 Diversion Box.	1990 to end date not specified	Associated with U Tank Farm. A tank farm pipeline is buried in this approximate location.	The site is a large radiologically controlled area posted with URM area signs. A WIDS number sign has been posted at this location.	Unplanned Release	None	Dimensions: 280 × 50 m (918.6 × 164 ft). Area: ~ 0.77 ha (1.9 acres)	Windblown contaminated soil particles.	The general contamination was 250 to 450 cpm; one area up to 8,000 cpm. 1990 soil sample results: 2,930 pCi/g strontium, 6.26 pCi/g Cs-137, 3.27 pCi/g plutonium, and 0.00000026 pCi uranium. 1990 rad survey detected up to 80,000 cpm.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information
139	UPR-200-W-164	UPR-200-W-164, Overhead UNH Line Leak, UN-216-W-29	UPR-200-W-164 affects the soil beneath the aboveground UNH pipeline that extended from 204-S to 224-U. The pipeline was attached to a steam line located north of 204-S.	Release occurred in 1952	Associated with the aboveground UNH transfer line from the 204-S Storage Tanks to the 224-U Building.	The aboveground UNH line has been removed. The Radiation Area signs that surrounded the pipeline also were removed. A portion of the site was interim stabilized in 1993. An area of contaminated soil found under the steam line, adjacent to the 216-S-9 Crib, was covered with clean soil and posted with URM warning signs.	Unplanned Release	None	Area: 0.028 ha (0.07 ac)	Unknown amount of UNH.	None
140	UPR-200-W-167	UPR-200-W-167, Contamination Migration from the TY Tank Farm, UN-216-W-32	UPR-200-W-167 was located adjacent to the TY Tank Farm fence, extending east and north from the fence.	1985 to end date not specified	Associated with TY Tank Farm operations and WIDS site code 200-W-78.	The original release site, identified in 1985, was a Soil Contamination Area located adjacent to the east side of the TY Tank Farm. After the contamination was scraped and removed in 1986, the site was no longer marked or posted. Later, in 2000, three areas on the east and northeast sides of the TY Tank Farm (within the original boundaries of this UPR) were reposted as CAs. Contaminated ant hills and growing contaminated vegetation was found on top of a tank farm transfer line located outside the eastern tank farm fence (also see WIDS site code 200-W-78). In November 2000, the CAs were covered with biobarrier material and gravel. These areas were reposted with URM area signs. The underground radioactive pipeline is marked with posts and "Radioactive Pipeline" signs. The pipeline runs through the recently stabilized areas.	Unplanned Release	None	Dimensions: ~192 × 42 – 60 m (630 × 140 – 195 ft). Area: ~8,400 sq m (90,000 sq ft) in an "L."	Radioactive contamination (specks) that migrated from TY Tank Farm; later, contaminated vegetation and ant hills found in this area.	1987 and 1988 rad surveys reported no detectable contamination.

Table B-2. Summary Information for Pipeline System Waste Sites Located in the West Inner Area

Count	Site Code	Site Names	Location	Dates of Operation	Associated Facilities or Structures	General Description	Site Type	Associated UPR Waste Site(s)	Approximate Site Dimensions/Area or Approximate Waste Site Length/Cumulative Pipeline Length/Pipeline Depth	Contaminant Inventory/ Volume Released	Radiation Survey/Soil Sampling Information

Sources:

H-2-44511 Series, *Area Map – 200 West Area Facilities*.

HW-52860, *Standby Status Report Hot Semiworks Facility*.

HW-60807, *Unconfined Underground Radioactive Waste and Contamination in the 200 Areas—1959*.

Notes:

Teflon is a trademark of E.I. du Pont de Nemours and Company, Wilmington, Delaware.

bgs below ground surface

CA = contamination area

COB = cleanout box

CERCLA= *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*

DCRT = double contained receiver tank

DPT = direct push technology

HSVP = Hot Semiworks Valve Pit

IMUST = inactive miscellaneous underground storage tank

ISVAC = integrated soil, vegetation, and animal control

MSCM = mobile surface contamination monitor

PFP = Plutonium Finishing Plant

PUREX = Plutonium-Uranium Extraction Plant

RCRA = *Resource Conservation and Recovery Act of 1976*

REDOX = Reduction-Oxidation Plant

SS = stainless steel

TBD = to be determined

TSD = treatment, storage, and disposal

UNH = uranyl nitrate hexahydrate

UPR = unplanned release

URM = underground radioactive material

VCP = vitrified clay pipeline

WIDS = Waste Information Data System

1

2

1

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

Document Review - Preliminary Summary													Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data									
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
Plutonium/ Organic-Rich Process Condensate/ Process Waste (200-PW-1)	11	216-Z-1, 216-Z-2, 216-Z-3, and 216-Z-1A	Provides data for the effluent pipeline from Z Plant (234-Z5, 236-Z, and 242-Z Buildings) into the 216-Z-2 Crib, and between the 216-Z-2 and 216-Z-1 Cribs (pp. 13 to 14), and summary of existing data for 216-Z-1 and -2 Cribs and Tile Field. Also 216-Z-3 overflow into 216-Z-1A Tile Field (p. 24).	Not specified	(N)	Acidic process, analytical, and development laboratory wastes; aqueous and organic waste; uranium waste (pp. 14 to 15)	1 and possible 3	None	None	None	Previous waste-site inventory, scintillation probe, and groundwater sampling data summarized (pp. 18 to 20, 22); previous crib plutonium/ americium sampling results summarized (p. 23)	SS may degrade at low pH Process used oxalic acid, which breaks down into chelans	**200-W-219-PL** (3 to 8 in. diameter SS/ trench encasement from -5Z to 241-Z) **200-W-224-PL** (2 in. diameter SS/6 in. encasement from -5Z to 241-Z) **200-W-220-PL** (6 in. diameter SS from 241-Z to Z-361) **200-W-210-PL** (8 in. diameter SS between Z-361 and Z-1, Z-2, Z-1A; 8 in. VCP branch to Z-3 and overflow between Z-3 and Z-1A) **200-W-174-PL** (2 in. diameter SS, between -5Z and Z-1A)
	11	216-Z-1A and 216-Z-3	Provides data for the effluent pipeline from the 234-Z5 Building via the 241-Z-361 Settling Tank into the 216-Z-3 Crib (p. 24) and summary of existing data for 216-Z-3 Crib. Overflow into 216-Z-1A Tile Field (p. 24).	Not specified	(N)	Neutral/basic process, analytical, and development laboratory wastes (p. 25); low-salt (Reference 13, p. 6)	4	None	None	None	Previous waste-site inventory and scintillation probe data summarized (pp. 28 to 29)	None	**200-W-209-PL** (8 in. diameter CS from -5Z to 207-Z RB, 6 in. diameter CS from RB to Z-361) **200-W-210-PL** (8 in. diameter SS between Z-361 and Z-1, Z-2, Z-1A; 8 in. VCP branch to Z-3 and overflow between Z-3 and Z-1A)
	11	216-Z-9	Provides data for the RECUPLEX effluent pipeline from the 234-5Z Building into the 216-Z-9 Trench (pp. 52 to 53) and summary of existing data for the 216-Z-9 Trench.	Not specified	(N)	Acidic, aqueous and organic waste; high salt	1,2,4	None	None	None	Previous waste-site inventory, scintillation probe, and well groundwater sampling data summarized (pp. 53, 57, 60 to 61)	RECUPLEX estimates on p. 61	**200-W-206-PL** (1-1/2 in. diameter SS from -5Z to Z-9)

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

Document Review - Preliminary Summary												Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data								
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
	12		Provides data for the pipelines from the RECUPLEX Facility in 234-5 Z Plant to the 216-Z-9 Trench.	Not specified	(N)	High salt content and acidic (containing aluminum, magnesium, calcium, and other metal nitrate salt waste, degraded solvents) (p. 1)	1,2	None	None	None	Summary of 1973 study of plutonium distribution in the 216-Z-9 Trench, which later was mined and 58 kg of plutonium was removed (pp. 4 to 5)	SS may degrade at low pH and high heat	
	19		Provides summary of existing data for the lines out to the 216-Z-9 Crib.	Not specified	(N)	Not specified	1,2,4	None	None	None	None	None	
	13	216-Z-12	Provides data for the pipelines from the Z Plant 234-Z, 232-Z, 236-Z, 242-Z, and RECUPLEX processes to 216-Z-12 Crib and summary of existing data for the 216-Z-12 Crib (pp. 16, 18, and 20).	Not specified	(N)	Low salt, slightly basic (pH ~8), aqueous plutonium-bearing laboratory and process waste containing sodium, fluoride, and nitrate (p. 1)	4	None	None	None	Previous waste-site investigations summarized (pp. 33 to 50)	Waste from Z Plant process and labs drained to 241-Z Waste Storage Tanks, then (after neutralized) to 241-Z-361 Settling Tank, with overflow to 216-Z-12 Crib via Diversion Boxes 1 then 2 (pp. 16 and 18)	**200-W-219-PL** (3 to 8 in. diameter SS/ trench encasement from -5Z to 241-Z) **200-W-224-PL** (2 in. diameter SS/6 in. encasement from -5Z to 241-Z) **200-W-220-PL** (6 in. diameter SS from 241-Z to Z-361) **200-W-209-PL** (8 in. diameter CS from -5Z to 207-Z RB, 6 in. diameter CS from RB to Z-361) **200-W-210-PL** (8 in. diameter SS between Z-361 and Z-1, Z-2, Z-1A) **200-W-208-PL** (6 in. diameter SS from W-58 DB [near Z-361] toW-59 Diversion Box [near crib] and then to Z-12, 12 in. VCP from W59- Diversion Box to Z-12; 12 in. VCP from W-59 Diversion Box to small drain field; 12 in. diameter VCP from S-58 to small drain field)
	11		Provides data for the effluent pipelines from the 241-Z Neutralization Tank via 241-Z-361 Settling Tank to the 216-Z-12 Crib (p. 68) and summary of existing data for 216-Z-12 Crib.	Not specified	(N)	Slightly acidic, low salt process waste (p. 68)	4	None	None	None	Previous waste-site inventory, scintillation probe, and well groundwater sampling data summarized (pp. 71, 74 to 75)	None	

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

Document Review - Preliminary Summary													Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data									
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
	11	216-Z-18	Provides data for the effluent pipeline from the 236-Z and 242-Z Buildings into the 216-Z-18 Crib (p. 92) and summary of existing data for the 216-Z-18 Crib.	Not specified	(N)	Acidic, high salt waste (p. 92)	1,2	None	None	None	Previous waste-site inventory, scintillation probe, and well groundwater sampling data summarized (pp. 95, 98 to 99)	None	**200-W-219-PL** (3 in. to 8 in. diameter SS/ trench encasement from -5Z to 241-Z) **200-W-224-PL** (2 in. diameter SS/6 in. encasement from -5Z to 241-Z) **200-W-220-PL** (6 in. diameter SS from 241-Z to Z-361) **200-W-210-PL** (8 in. diameter SS between Z-361 and Z-1, Z-2, Z-1A; 8 in. VCP branch to Z-3 and overflow between Z-3 and Z-1A) **200-W-174-PL** (2 in. diameter SS, between -5Z and Z-1A; 3 in. diameter SS branch out to Z-18)
Uranium-Rich Process Waste (200-PW-2)	7	216-A-10	Provides existing data for the 216-A-10 Crib; mention of associated piping.	Leaks suspected since acidic waste destroyed VCP integrity (2.2.3.5)	(N)	PUREX acidic process condensate, acidic process distillate (D002), and corrosive/mixed waste (D002) process distillate (2.2.3.5) containing uranium and nitrate (Table 2-1)	1 and possible 3	None	None	None	Previous waste-site radionuclide inventory, sampling and logging results, and soil/vegetation contaminant concentrations summarized (2.2.3.5, 3.3.1.5, and Tables 3-4 and 3-5)	In 1987, waste stream diverted to 216-A-45 Crib See Reference 16 for waste stream effluent samples before discharge to the Crib Process used oxalic acid, which breaks down into chelans	**200-E-192-PL** (8 in. diameter VCP original line, 8 in. dis SS replacement line/routing from sample pit #4 to crib) **200-E-241-PL** (8 in. diameter SS from PUREX to sample pit #4)

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

Document Review - Preliminary Summary												Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data								
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
	7	216-B-12	Provides existing data for the 216-B-12 Crib; mention of associated piping from 221-U, 224-U, and 221-B Buildings (2.2.3.2) into the 216-B-12 Crib.	Not specified	(N)	Low salt, neutral/basic process condensate including limestone (2.2.3.2); neutral to basic, low salt, containing large amounts of uranium, fission products, and tributyl phosphate (Table 2-1)	4	None	None	None	Previous waste-site radionuclide inventory and logging results summarized (2.2.3.2, and 3.3.1.2)	Operated from 1957 to 1973	**200-E-160-PL** (6 in. diameter VCP from 241-ER-151) most likely 241-ER-151 was fed by line V836 of 200-E-111-PL from 221-B. V836 is a CS line (no diameter provided in WIDS). **200-E-162-PL**(4 in. diameter fiberglass reinforced epoxy branch from 221-B and B-12)
	7	216-A-36B	Provides existing data for the 216-A-36B Crib; mention of associated piping from 202-A (PUREX) to the 216-A-36B Crib (southern 500 ft of original 216-B-36 Crib).	Not specified	(N)	Ammonia scrubber distillate waste (2.2.3.6); neutral to basic, low salt, containing large amounts of uranium (Table 2-1)	4 and possible 2	None	None	None	Previous waste-site sampling and logging results, and soil/vegetation contaminant concentrations summarized (2.2.3.2, 3.3.1.6, and Tables 3-4 and 3-5)	See Reference 17 for waste stream effluent samples before discharge to the 216-A-36B Crib Process used NaOH to scrub NH3; aqueous NH3 is basic	**200-E-253-PL** (6 in. diameter SS from 202A to crib)
	17		Provides waste stream characterization data for PUREX ammonia scrubber condensate that flowed into storage tanks in 1990; flowed into 216-A-36-B Crib until 1987 (p. v).	Not specified	(N)	Contains ammonia (p. 2-8)	Not specified	None	None	None	Four waste stream samples taken (p. 3-1); results reported in Tables 3-2 to 3-5	None	
Uranium-Rich Process Waste & General Process Waste (200-PW-2 & 200-PW-4)	16	216-A-10 and 216-A-45	Provides waste stream characterization data for PUREX process condensate wastewater stream flow to the 216-A-45 Crib; flowed to 216-A-10 Crib until 1987 (p. 1-4).	Not specified	(N)	Process condensate	1	None	None	None	Eight waste stream samples taken in 1990 (p. 3-1); results reported in Tables 3-2 to 3-6	Note: Diverted waste stream from 216-A-10 Crib to the 216-A-45 Crib in 1987 (p. 1-4)	**200-E-241-PL** (8 in. diameter SS from PUREX to sample pit #4) **200-E-192-PL** (8 in. diameter VCP original line from sample pit 4 to A-10 crib; 8 in. diameter SS replacement line) **200-E-231-PL** (8 in. diameter fiberglass branch to A-45 crib)

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

Document Review - Preliminary Summary													Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data									
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
General Process Waste (200-PW-4)	25	216-S-22	Provides information on the 216-S-22 Crib; mentions associated piping from 293-S Acid Recovery Facility (p. 2-16).	None mentioned	(N)	Liquid waste containing nitrate and sodium (p. 2-16)	Likely 1	None	None	None	None	Acid recovery process generated acidic waste	**200-W-146-PL** (4 in. diameter VCP from 293-S to S-22 crib)
	7	216-A-37-1	Provides existing data for the 216-A-37-1 Crib; mention of associated piping from 242-A Evaporator to the 216-A-37-1 Crib.	Not specified	(N)	Process condensate (2.2.3.8) containing ammonia and mixed waste from solvents (Table 2-1)	2,4	None	None	None	Results summarized for logging of groundwater wells near waste site; additional data in Section 3.3.1.8	Process knowledge: waste believed to contain Am-241, Cs-137, H-3, I-129, Pm-147, Pu-239, Ru-106, Sn-113, and Sr-90 (2.2.3.8)	**200-E-232-PL** (4 in. diameter CI from 207-A to 216-A-37-1 crib) Upstream pipelines exists
Fission Product Process Waste (200-PW-5)	24	216-B-11A and 216-B-11B	Provides information on the 216-B-11A, and 216-B-11B Reverse Wells; mentions associated pipeline from the 242-B Evaporator (p. 2-31).	Not specified	(N)	Low salt, neutral to basic process condensate (p. 2-31)	4	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, and uranium; "these two wells are placed in line with a 7.6 cm (3 in.) steel inlet pipe" (p. 2-31)	None	**200-E-176-PL** (3 in. diameter CS from 242-B Evaporator to cribs) **200-E-177-PL** (3 in. diameter CS branch from B-8 crib piping [200-E-178-PL] to B-11 cribs; direction of flow is from B-8 to B-11) **200-E-178-PL** (3 in. diameter CS from B tank farm to B-8 and B-11 cribs)
Plutonium Process Waste (200-PW-6)	11	216-Z-4	Provides data for the effluent pipeline from the 231-Z Building into the 216-Z-4 Trench (p. 30) and summary of existing data for 216-Z-4 Trench.	Not specified	(N)	Neutral/basic process and laboratory waste (p. 30)	4	None	None	None	Previous waste-site radionuclide inventory data summarized (p. 31)	None	According to WIDS 216-Z-4 was likely fed by an aboveground pipeline from the 231-W-151 sump. 231-W-151 received drainage from 231-Z thru **200-W-199-PL** (3 in. diameter SS)
	11	216-Z-5	Provides data for the effluent pipeline from the 231-Z Building into the 216-Z-5 Crib (p. 32) and summary of existing data for 216-Z-5 Crib. Pipeline also may have received 300 Area laboratory wastes (p. 33).	Not specified	(N)	Process waste (p. 32); possibly 300 Area laboratory waste (p. 33)	Possible 1	None	None	None	Previous waste-site radionuclide inventory, scintillation probe, and well groundwater sampling data summarized (pp. 35 to 36)	Process solutions were low pH	**200-W-199-PL** (3 in. diameter SS, 231-Z to 231-W-151) **200-W-202-PL** (3 in. diameter SS from 231-W-151 to Z-5 crib)

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

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				Types of Pipeline Characterization Data								
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
	11	216-Z-6	Provides data for the effluent pipeline from the 231-Z Building, via the 231-W-151 Sump Tank into the 216-Z-6 Crib (p. 37) and summary of existing data for the 216-Z-6 Crib.	Not specified	(N)	Neutral/basic process waste (pp. 38)	4	None	None	None	Previous waste-site radionuclide inventory data summarized (p. 40)	None	According to WIDS 216-Z-6 was fed by an aboveground pipeline from the 231-W-151 sump. **200-W-199-PL** (3 in. diameter SS, 231-Z to 231-W-151)
	11	216-Z-8	Provides data for the effluent pipeline from the 234-5Z Building, via the overflow from the storage tank, into the 216-Z-8 French Drain (p. 49) and summary of existing data for 216-Z-8 French Drain.	Not specified	(N)	Neutral/basic RECUPLEX filter backflush	4	None	None	None	Previous waste-site radionuclide inventory data summarized (p. 51)	None	**200-W-205-PL** (1.5 in. SS from -5Z to settling tank then 4 in. CS from settling tank to Z-8 french drain)
	11	216-Z-10	Provides data for the effluent pipelines from the 231-Z Building into the 216-Z-10 Reverse Well (p. 62) and summary of existing data for the 216-Z-10 Reverse Well.	Not specified	(N)	Neutral/basic process and laboratory waste (p. 62)	4	None	None	None	Previous waste-site inventory reported as 50 g of plutonium; no other radionuclides reported (pp. 62, and 64)		**200-W-199-PL** (3 in. diameter SS, 231-Z to 231-W-151) **200-W-204-PL** (3 in. diameter SS from 231-W-151 to Z-10) An overflow line from **200-W-202-PL** (line to 216-B-5) also fed the **200-W-204-PL** (3 in. diameter SS). RHO-LD-114 shows three inlet pipes to Z-10 (Fig 16). H-2-44511, sheet 103 shows a branch from a 3 in. IPS to 216-Z-7.

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Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
Steam Condensate (200-SC-1)	6	216-T-36	Includes limited information on the pipeline carrying steam condensate from the 221-T and 221-U Buildings and from 2706-T Building decontamination into the 216-T-36 Crib.	Not specified	(N)	Steam condensate, decontamination waste, and miscellaneous waste (Table 2-4)	2,4	None	None	None	Previous waste-site radionuclide inventory data/ditch information reported (Table C-4, p. C-35/C-36)	The majority of T Plant decontamination wastes were basic; a few were acidic	**200-W-79-PL** (4 in. diameter VCP branch from 200-W-130-PL to T-36 crib) **200-W-130-PL** (3 in. diameter SS from 241-T-151 diversion box to where 200-W-79-PL branches off) Cannot tell what are the upstream pipelines to **200-W-79-PL**. WIDS shows **200-W-129-PL** connected to 241-T-151. Likely to other pipelines connected to this diversion box that WIDS does not show as it is in the T Farm area.
Gable Mountain/B-Ponds and Ditches Cooling Water (200-CW-1)	24	207-B	Provides information on the waste pipeline from the 242-B Evaporator to the 207-B Retention Basin (p. 2-58).	5 leaks in 1953, UN-200-E-79 (p. 2-58)	(N)	Not specified	4	None	None	Unplanned release occurred when five leaks were detected in the pipeline in June 1953; up to 2,500 cpm detected at points of emission (p. 2 to 58)	None	None	**200-E-112-PL** (24 in. diameter VCP, inlet pipe known as 2904-E-1, from B Plant to 207-B) **200-E-264-PL** (4 in. diameter CI, connects 242-B Evaporator to 207-B) **200-E-265-PL** (4 in. diameter CS, transferred 241-BY ITS process cooling water to 207-B Retention Basin/was later rerouted)
	9		Provides data for the 200-E-112-PL Pipeline, which consists of two process sewer lines (2904-E-1 and 2904-E-2) that carried B Plant water to the 207-B Retention Basin (Table 2-6).	Not specified for 2904-E-1; 2904-E-2 found leaking in 1985 (Table 2-6)	(N)	Two process sewer waste (Table 2-6)	4	None	None	None	None	A portion of the 2904-E-2 Pipeline was found to be leaking and was repaired in 1985; operated from 1944 to 1997 (Table 2-6)	**200-E-112-PL** is only one of the three feed lines to 207-B. It applies only to the 24 in. diameter VCP. The 15 in. diameter VCP called 2904-E-2 (**200-E-188-PL**) did not enter 207-B. **200-E-264-PL** and **200-E-265-PL** should be included and 4 in. diameter CS (**200-E-265-PL**). **200-E-112-PL** is only one line not two as indicated in the reference summary (2904-E-1 and 2904-E-2 are on opposite sides of 207-B).

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

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	9	207-B, 216-B-3, and B Pond System	Provides data for the 200-E-126-PL Pipeline, which extends eastward from the 207-B Retention Basin to the 216-B-3 Ditch and B Pond System (Table 2-6).	Leaks inferred in Table 2-6	(N)	Not specified	1,4	None	None	None	None	Operated from 1945 to 1997 (Table 2-6) Received PUREX effluent, which was 1 or 4 waste type	**200-E-188-PL** (15 in. diameter VCP B Plant Chemical Sewer line [from north of B Plant] connects to **200-E-191-PL** and **200-E-205-PL** located on east of 207-B. **200-E-191-PL** (15 in. diameter VCP connects valve pit located on east of 207-B to 216-B-63) **200-E-204-PL** (30 in. diameter VCP connects valve pit located on east of 207-B to 216-B-2-1 and 216-B-2-2) **200-E-205-PL** (16 in. diameter CS connects 207-B to 216-B-2-3) **200-E-126-PL** (22 in. diameter poly pipe from 207-B to diverter station 2; 21 in. diameter VCP from diverter station 2 to head end of 216-B-3 ditches; 24 in. diameter corrugated metal from diverter station 2 to diverter station 3; 30 in. diameter corrugated metal connecting 216-B-3A to 216-B-3C; replaced the 216-B-2 ditch system and connected 207-B to the 216-B-3 ditch/pond system) **200-E-265-PL** (4 in. diameter CS, transferred 241-BY ITS process cooling water to 207-B Retention Basin/was later rerouted to connect to the B ditches) Feed lines would also include: **200-E-112-PL,200-E-264-PL, and 200-E-265-PL**

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Gable Mountain/B-Ponds and Ditches Cooling Water (200-CW-1)	24	241-B-154 Diversion Box and 207-B Retention Basin	Provides information on the 221-B Building cooling water pipeline to the 241-B-154 Diversion Box, then to the 207-B Retention Basin (pp. 2-59 to 2-60).	1946 (UN-200-E -80) and 1966 (UN-200-E-1) leaks (p. 2-59)	(N)	Not specified	4	None	None	Metal waste leaked from pipeline in 1946, containing ~10 Ci fission products; 1966 leak apparently contained similar waste liquid (p. 2-59)	None	None	TBD
U-Pond/Z-Ditches Cooling Water (200-CW-5)	5	Z Ditches	Includes characterization of pipeline from the 231-Z Building to the Z Ditches.	Leakage suspected (2.1.5)	(N)	Cooling water, steam condensate, and laboratory waste (Reference 6, 3.3.2.1). Cooling water and steam condensate; assumed to contain plutonium and other transuranic elements (Reference 6, 3.3.2.1)	4	Remote video (2.1.5)	None	One smear sample collected from pipe interior; analyzed for 17 rad analytes (2.1.5, 3.2.2); detected 23.5 pCi Pu-238, 1,210 pCi Pu-239, 226 pCi, and 813 pCi, Am-241; 14 radionuclides undetected (Appendix C)	None	216-Z-11 may be difficult to distinguish because ditches overlap; several sources discharged to the 216-Z-11 Ditch (Figure 2-4 and from Reference 6: Figure 2-9 and Section 3.3.2)	TBD
	6	216-U-14	Includes limited information on pipeline carrying process sewer waste from the 221-U and 271-U Buildings into the 216-U-14 Ditch.	Not specified	(N)	Chemical sewer wastewater, steam condensate, and cooling water (3.3.1.1)	Not specified	None	None	None	Previous waste-site sampling information reported (Tables 3-1 to 3-4) and summarized (3.3.1.2)	The 216-U-14 Ditch is a representative waste site characterized in Reference 5 Several pipelines from different sources carried waste to the 216-U-14 Ditch (2.2.2.2, 3.3.1.1, Table 2-9)	**200-W-84-PL** (12 in. diameter and 18 in. diameter VCP from 221-U to 216-U-14; 8 in. diameter from 224-U and 222-U to U-14) **200-W-102-PL** (various size; from 2724-W) **200-W-168-PL** (2 in. diameter CS; from 241-U Tank Farm **200-W-223-PL** (24 in. diameter corrugated metal; from 242-S Evaporator **200-W-222-PL** (24 in. diameter VCP; from 207-U)

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	27	216-Z-20	Provides information on the 216-Z-20 Crib; mentions associated piping from the Z Plant (pp. 8-8, and 8-9).	Not specified	(N)	Cooling water, steam condensate, storm sewer, building drain, chemical drains, laboratory drains, and miscellaneous drain waste (p. 8-8)	1,4	None	None	None	None	Crib is classified as a low-level waste site (p. 8-8) Chemical drain would convey acidic wastes	**200-W-125-PL** **200-W-207-PL**
300 Areas Chemical Laboratory Waste (200-LW-1)	26	216-T-28	Provides information on the 216-T-28 Crib; mentions associated piping from the 221-T Buildings, 2706-T Building, and 300 Area laboratory waste from the 340 Building (pp. 2-17 and 2-18).	Not specified	(N)	Liquid mixed waste containing nitrate; steam condensate decon. waste, misc. effluent, decon. waste, and laboratory waste (pp. 2-17 to 2-18)	2,4	None	None	None	None	Many of the decontamination wastes at T Plant were basic	TBD
200 Areas Chemical Laboratory Waste (200-LW-2)	11	216-Z-7	Provides data for the effluent pipeline from the 231-Z Building, via the 231-W-151 Sump Tank, into the 216-Z-7 Crib (p. 42) and summary of existing data for the 216-Z-7 Crib. Also, 300 Area laboratory waste from the 340 Waste Neutralization Facility (p. 42).	Not specified	(N)	231-Z process, laboratory, and operations waste; 300 Area laboratory waste (p. 42).	4	None	None	None	Previous waste-site inventory, scintillation probe, and well groundwater sampling data summarized (pp. 45, 47 to 48)	None	TBD
	11	216-Z-16	Provides data for the effluent pipeline from the 231-Z Building into the 216-Z-16 Crib (p. 82) and summary of existing data for the 216-Z-16 Crib.	Not specified	(N)	Neutral/basic Pacific Northwest Laboratory operations waste (p. 82)	4	None	None	None	Previous waste-site inventory, scintillation probe, and well groundwater sampling data summarized (pp. 85 to 86)	None	TBD
	11	216-Z-17	Provides data for the effluent pipeline from 231-Z Building into the 216-Z-17 Trench (p. 87) and summary of existing data for 216-Z-17 Trench.	Not specified	(N)	Neutral/basic Pacific Northwest Laboratory operations waste (p. 87)	4	None	None	None	Previous waste-site radionuclide inventory data summarized (pp. 85 to 86, 90)	None	TBD

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Miscellaneous Waste (200-MW-1)	11	216-Z-13	Provides data for the effluent pipeline from the 291-Z Building into the 216-Z-13 French Drain (p. 76) and summary of existing data for the 216-Z-13 French Drain.	Not specified	(N)	ET-8 exhaust fan steam condensate and floor drainage (p. 76)	4	None	None	None	None	Radionuclide content is unknown; low levels are assumed (p. 76)	TBD
	11	216-Z-14	Provides data for the effluent pipeline from the 291-Z Building into the 216-Z-14 French Drain (p. 78) and summary of existing data for the 216-Z-14 French Drain.	Not specified	(N)	ET-9 exhaust fan steam condensate (p. 78)	4	None	None	None	None	Radionuclide content is unknown; low levels are assumed (p. 78)	TBD
	11	216-Z-15	Provides data for the effluent pipeline from the 291-Z Building into the 216-Z-15 French Drain (p. 80) and summary of existing data for the 216-Z-15 French Drain.	Not specified	(N)	S-12 evaporator cooler drainage (p. 80)	4	None	None	None	None	Radionuclide content is unknown; low levels are assumed (p. 80)	TBD
	27	216-U-7	Provides information on the 216-U-7 French Drain; mentions associated piping from the 221-U Counting Box (p. 9-7).	Not specified	(N)	Liquid waste from counting box floor drain (p. 9-7)	Not specified	None	None	None	Appendix B shows radionuclide inventory and hazardous chemical inventory.	None	TBD
Scavenged Waste (200-TW-1)	14	200-E-114 Pipeline	Develops conceptual approach to closure of ancillary equipment (pipelines, diversion boxes, and similar structures) based on C Tank Farm (p. ES-1); includes limited information on the 200-E-114 Pipeline.	Leak suspected – unplanned release site (p. 2-19)	(N)	Not specified	Possible 2	None	None	None	None	Used for transfer of tank farm liquid waste, which was basic	TBD
	24	216-B-14	Provides information on the 216-B-14 Crib; mentions associated pipeline from 221-U Building (p. 2-20).	Not specified	(N)	High salt, neutral/basic scavenged tributyl phosphate waste (p. 2-20)	2	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, uranium, ferrocyanide, nitrate, phosphate, sodium, sulfate-based compounds (p. 2-20)	None	TBD

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Scavenged Waste (200-TW-1)	24	216-B-15	Provides information on the 216-B-15 Crib; mentions associated pipeline from 221-U Building (p. 2-21).	Not specified	(N)	High salt, neutral/basic scavenged tributyl phosphate waste (p. 2-21)	2	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, uranium, ferrocyanide, nitrate, phosphate, sodium, and sulfate-based compounds (p. 2-21)	None	TBD
	24	216-B-16	Provides information on the 216-B-16 Crib; mentions associated pipeline from 221-U Building (pp. 2-21 and 2-22).	Not specified	(N)	High salt, neutral/basic scavenged tributyl phosphate waste (p. 2-22)	2	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, uranium, ferrocyanide, nitrate, phosphate, sodium, and sulfate-based compounds (p. 2-22)	None	TBD
	24	216-B-17	Provides information on the 216-B-17 Crib; mentions associated pipeline from 221-U Building (p. 2-22).	Not specified	(N)	High salt, neutral/basic scavenged tributyl phosphate waste (p. 2-22)	2	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, uranium, ferrocyanide, nitrate, phosphate, sodium, and sulfate-based compounds (p. 2-22)	None	TBD
	24	216-B-18	Provides information on the 216-B-18 Crib; mentions associated pipeline from 221-U Building (p. 2-22).	Not specified	(N)	High salt, neutral/basic scavenged tributyl phosphate waste (p. 2-22)	2	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, uranium, ferrocyanide, nitrate, phosphate, sodium, and sulfate-based compounds (p. 2-22)	None	TBD

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Scavenged Waste (200-TW-1)	24	216-B-19	Provides information on the 216-B-19 Crib; mentions associated pipeline from 221-U Building (p. 2-23).	Not specified	(N)	High salt, neutral/basic scavenged tributyl phosphate waste (p. 2-23)	2	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, uranium, ferrocyanide, nitrate, phosphate, sodium, and sulfate-based compounds (p. 2-23)	None	TBD
	26	216-T-18	Provides information on the 216-T-18 Crib; mentions associated piping from 221-T Building (p. 2-15).	Not specified	(N)	First-cycle scavenged tributyl phosphate supernatant wastes (p. 2-15)	Not specified	None	None	None	None	Mentions "above-ground piping was removed…at completion of discharge" (p. 2-15); reference to inlet pipeline	TBD
	26	216-T-26	Provides information on the 216-T-26 Crib; mentions associated piping from the T Plant (pp. 2-16 and 2-17).	Not specified	(N)	First-cycle scavenged tributyl phosphate supernatant wastes; mixed waste containing ferrocyanide and other inorganics (pp. 2-16 to 2-17)	Not specified	None	None	None	None	None	TBD
Tank Waste (200-TW-2)	24	216-B-7A and 216-B-7B	Provides information on the 216-B-7A and 216-B-7B Cribs; mentions associated piping (pp. 2-16 to 2-17).	Not specified	(N)	1946-1961, low salt, alkaline rad waste from B Plant; 1961-1967, decon. construction waste from 221-B Building (p. 2-17)	4	None	None	None	Waste contained Cs-137, Ru-106, Sr-90, plutonium, uranium, and transuranic waste (p. 2-17)	One pipeline supplied both cribs simultaneously (p. 2-16)	TBD

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Tank Waste (200-TW-2)	24	216-B-9	Provides information on the waste pipeline from the 221-B Building to the 216-B-9 Crib (pp. 2-58 to 2-59).	1954 leak, UN-200-E-7 (p. 2-58)	(N)	Not specified	Likely 1	None	None	Unplanned release occurred when a leak developed in the waste line; 1.7 rem/h contamination (p. 2-58)	None	WIDS associates leak with 241-B-361 Settling Tank (see discussion on pp. 2-58 to 2-59); monitoring well 299-E28-54 is very close to leak location (p. 2-59). This crib was designed for 1st cycle precipitation waste, which was acidic.	TBD
Tanks/Lines/Pits/Boxes (200-IS-1)	15	Cross-site transfer pipes (241-UX-154 and 241-ER-151)	Provides information on the cross-site transfer pipelines, between 241-UX-154 Diversion Box and 241-ER-151 Diversion Box (p. ES-1); UPR-600-20 is associated with the Cross-Site Transfer System (2-1, 2-3).	4 of 6 plugged (ES-1)	(Y) Lines V360 and V361 were last pressure tested in the early 1980s and are considered sound Lines V-363, V-364, and V-366 are considered plugged and line V-363 may have integrity issues Line V-362 is considered unserviceable and may have integrity issues (RPP-25113)	High- and low-level radioactive waste; liquid waste for evaporative concentration (2-1)	2	None	To characterize the integrity of the pipeline, eight boreholes were auger drilled at four locations along the transfer line in 1988 (p. 2-5)	"No contamination was found below the encasement, but contamination was found in adjacent sagebrush, indicating that the roots had penetrated the encasement" (2-5). Note: In May 1995, the DOE tested one of the remaining lines using pressurized water; results showed the line was intact. It was used to transfer supernatant from double-shell tank 241-SY-102 to the 200 Areas in August 1995 (p. 2-1)	None	UPR-600-20 consists of contaminated pipeline and encasement, any subsurface leaks, associated surface speck contamination, and contaminated vegetation on the surface of the cross-site transfer line; the surface above the pipeline became contaminated through biological transport of radioactive materials that leaked in the pipeline encasement and windblown particulates from the vent station (2-5); waste was adjusted to high pH before transfer	TBD

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	28		Provides information on investigation along the cross-site transfer pipelines between 241-UX-154 Diversion Box and 241-ER-151 Diversion Box (p. 2)	Not specified	(Y) Same as above	Not specified	2	None	Soil samples from eight auger holes at four locations along the pipeline (p. 8)	Soils near the encasement were free from contamination (p. 11); radiation found in adjacent sagebrush indicates that the roots have penetrated the encasement; caps have been left off swab risers during sampling, which could account for some contamination near risers (p. 14); additional results on p. 12	Soil surveys and analysis of vegetation, animals, and feces were conducted in June 1988 to determine if encasement was leaking (pp. 5, 8, and 11).	Associated with tank farm waste, which was high pH	TBD
Tanks/Lines/Pits/Boxes (200-IS-1)	24	241-BX-154 Diversion Box	Provides information on two waste pipelines (V335 and V336) from the 221-B Building to the 241-BX-154 Diversion Box (p. 2-59).	1951 (UN-200-E-3), and 1972 (UN-200-E-85) leaks (p. 2-59)	(Y) Line V-335 ruptured by heavy vehicle traffic in 1950 (Johnson, 2007).	Not specified	2,4	None	None	Pipeline was not repaired after 1951 leak, because readings of 120 rem/h were detected with 46 cm (18 in.) of soil remaining (p. 2-59)	None	Associated with tank farm waste, which was high pH	TBD
	24	241-B-154 Diversion Box	Provides information on two steam condensate waste pipelines (V200 and V334) from sections 10 and 9, respectively, of the B Plant Concentrator (221-B Building) to the 241-B-154 Diversion Box (p. 2-59).	Two 1972 leaks, UN-200-E-103 and UN-200-E-44 (p. 2-59)	(Y) V-200 failed pressure test 7-14-1974 (Johnson, 2007).	Not specified	2,4	None	None	Second leak probably resulted from failure of repairs made after the first leak (p. 2-59)	None	Steam condensate was near neutral pH	TBD
Tanks/Lines/Pits/Boxes (200-IS-1)	14	200-E-111 Pipeline	Develops conceptual approach to closure of ancillary equipment (pipelines, diversion boxes, and similar structures) based on C Tank Farm (ES-1); includes limited information on the 200-E-111 pipeline.	Leak suspected—unplanned release site (p. 2-19)	No information	Not specified	2,4	None	None	None	None	Associated with tank farm waste, which was high pH	TBD

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Tanks/Lines/Pits/Boxes (200-IS-1)	14	200-E-116 Pipeline to 241-C-151 and -152 Diversion Boxes	Develops conceptual approach to closure of ancillary equipment (pipelines, diversion boxes, and similar structures) based on C Tank Farm (p. ES-1); includes limited information on the 200-E-116 Pipeline, which transported waste from the B Plant (241-B-154 Diversion Box) to the 241-C-151 and 241-C-152 Diversion Boxes in the C Tank Farm (p. 2-20).	Leak suspected - unplanned release site (p. 2-19)	(N)	Radioactive mixed waste (p. 2-20) originating from B Plant	2,4	None	None	None	None	The 241-C-151 Diversion Box was determined to be the source of UPR-200-E-68 (p. 2-21); associated with tank farm waste, which was high pH	TBD
U Plant Facility Area (200-UW-1)	3	216-U-1 and 216-U-2	For pipeline from U Plant to 216-U-1/2 Cribs: provides remote camera survey for pipe integrity; sampling of liquid within pipeline (4.2).	No	(N)	Acidic and high in radionuclides (4.2)	1	Yes	None	Liquid from within the pipe was collected (4.2.2); pipe was intact with liquid in low spots (5.0); last 6.1 to 9.1 m (20 to 30 ft) went on line before the 241-U-361 Settling Tank was filled with liquid; none of the soils exterior to the pipe showed signs of contamination (5.0); results to be reported in the 200-UP-2 limited field investigation summary report (4.2.2)	Surface rad survey (3.1.4.3)	None	TBD
	4		Additional information on activities reported in Reference 3b; also reported 216-U-1/2 characterization data and OU risk assessment.	Not specified	(N)	Not specified	1	None	None	Wipe samples of pipeline interior showed up to 30,000 cpm, but the exterior of the pipe and the surrounding soils showed no activity (3.2.3)	Waste-site surface rad survey and soil sampling and subsurface gamma logging and soil sampling results discussed (3.2.1 to 3.2.5, and Tables 3-1 and 3-2)	SS may degrade at low pH and high heat.	TBD
U Plant Facility Area (200-UW-1)	27	216-U-4A	Provides information on the 216-U-4A French Drain; mentions associated piping from the 216-U-4 Reverse Well (p. 9-6).	Not specified	(N)	Acidic plutonium and fission product decontamination waste (p. 9-6)	1	None	None	None	Appendix B shows radionuclide inventory and hazardous chemical inventory	SS may degrade at low pH and high heat.	TBD

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Document Review - Preliminary Summary													Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data									
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
	27	216-U-8 and 216-U-12	Provides information on the 216-U-8 Crib; mentions associated piping from the 221-U and 224-U Buildings and the 291-U Stack (p. 9-8).	Not specified	(N)	Acidic process condensate and stack drainage (p. 9-8)	1	None	None	None	Appendix B shows radionuclide inventory and hazardous chemical inventory	None	TBD
	27		Provides information on the 216-U-8 Crib; mentions associated pipeline from the 216-U-8 Crib feed line; waste from the 224-U Buildings, 291-U Stack, and tanks C-5 and C-7 (p. 9-9).	Not specified	(N)	Acidic process condensate, stack drainage, tank, and storm drain wastes (p. 9-9)	1	None	None	None	Appendix B shows radionuclide inventory and hazardous chemical inventory	None	TBD
U Plant Facility Area (200-UW-1)	3	216-U-8, and 216-U-12 (cont)	For pipeline from 222-U and 224-U Buildings to 216-U-8/-12 Cribs: provides remote camera surveys for pipe integrity (4.1), surface soil and vegetation sampling (3.2, 4.1), subsurface soil sampling (4.1), and surface rad survey (3.1.4.3).	Leaks suspected because of joint condition (4.1.2.1)	(N)	Acidic (4.1)	1	115 m of older (to 216-U-8) pipe section and 25 m of newer (to 216-U-12) pipe section (Fig. 5)	Soil samples (23) collected from seven areas at surface, at pipe depth, and midway along the path of older (216-U-8) pipe section (4.1.2.2, Figure 7); analysis was for rad and select chemical constituents (3.0)	Pipe relatively intact except joints of older section (5.0); sampling results summarized in Appendices A and B	Surface rad survey (3.1.4.3) showed clear pattern where VCP was located (4.1.1)	Note: Schedule 40 SS pipe routed around 2715-U Building, then changes to a 6 in. VCP as reported here (4.1)	TBD
	4	216-U-8, and 216-U-12	Reported additional information on pipeline activities reported in Reference 3a; also reported 216-U-8/12 Crib characterization data and OU risk assessment.	Leaks suspected because of joint condition (3.4.2)	(N)	Not specified	1	None	18 soil and 8 vegetation samples	Maximums generally were found near VCP (except in vegetation for Sr-90); lateral movement of contaminants was minimal (3.4.3); sample results for maximum concentrations in Tables 3-4 and 3-5; many of the older (216-U-8) joints were dislodged; the degree of dislodging varied from minor to very serious (3.4.2).	Waste-site sampling and borehole logging results (3.4.3 to 3.4.5 and Tables 3-4 to 3-7)	None	TBD

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

Document Review - Preliminary Summary													Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data									
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
U Plant Facility Area (200-UW-1)	7		Provides existing data for the 216-U-8 Crib, with information on the pipeline that carried waste from the 221-U and 224-U Tanks and the 291-U-1 Stack (2.2.3.3) to the 216-U-8 Crib.	Leaks suspected because of joint condition (3.3.1.3)	(N)	Acidic process condensate and stack drainage (2.2.3.3)	1	None	Vegetation sampling near pipeline	Detected 426 pCi/g Am-241, 49,100 pCi/g Cs-137, 70.6 pCi/g Pu-239/240, and 1,380 pCi/g Sr-90 (3.3.1.3, Tables 3-2 and 3-3)	Previous waste-site logging results, borehole data, and soil/vegetation contaminant concentrations summarized (3.3.1.3 and Tables 3-2 to 3-5)	Operated from 1952 until crib was replaced by 216-U-12 in 1960 (2.2.3.3)	TBD
	7		Provides existing data for the 216-U-12 Crib, with information on the pipeline carrying waste from the U Plant (291-U-1 Stack drainage, 244-WR Vault waste, 224-U process condensate, storm drain, and Tank C-7 waste, 224-B waste from Tanks C-5 and C-7 [2.2.3.4]) to the 216-U-12 Crib.	Not specified	(N)	Corrosive (D0002) mixed waste (2.2.3.4) containing nitrate and tributyl phosphate	Not specified	None	None	None	Previous waste-site soil/vegetation sampling and logging results summarized (2.2.3.4, 3.3.1.4, and Tables 3-4 and 3-5)	Replaced 216-U-8 Crib in 1960, and was replaced by 216-U-17 Crib in 1988 Pipeline runs from 216-U-8 Crib feed line to 216-U-12 Crib	TBD
	27	216-U-8	Provides information on the 216-U-8 Crib; mentions associated piping between the three Crib structures (p. 9-8).	Not specified	(N)	Acidic process condensate and stack drainage (p. 9-8)	1	None	None	None	Appendix B shows radionuclide inventory and hazardous chemical inventory	SS may degrade at low pH and high heat	TBD
	27	216-U-16	Provides information on the 216-U-16 Crib; mentions associated pipeline from 224-U, 221-U, and 271-U (pp. 9-11 and 9-12).	Not specified	(N)	Steam and process condensate, chemical sewer waste, and compressor cooling water (p. 9-12)	Not specified	None	None	None	Appendix B shows radionuclide inventory and hazardous chemical inventory	None	TBD
	27	216-U-17	Provides information on the 216-U-17 Crib; mentions associated pipeline from UO3 process condensate (p. 12).	Not specified	(N)	Process condensate	Not specified	None	None	None	Appendix B shows radionuclide inventory and hazardous chemical inventory	None	TBD
	18		Provides waste stream characterization data for UO3 Plant condensate stream that flowed from 224-U to the 216-U-17 Crib until July 1989, when discharge was temporarily suspended (pp. v, 2-5).	Not specified	(N)	Neutralized process condensate	Not specified	None	None	None	5 waste stream samples taken in 1990 (p. 3-1); results in Appendix A, Tables 3-2 and 3-3	Note: Moved waste stream from 216-U-12 Crib to 216-U-17 Crib in 1988 (p. 1-4)	TBD

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U Plant Facility Area (200-UW-1)	1	241-C-152 Diversion Box	Provides data summary from investigation of leak in the V-122 line that carried 221-B Building cesium ion-exchange process feed from the 241-C-105 Tank to the 241-C-152 Diversion Box (p. 2).	Leak detected visually in December 196 9 near the 241-C-152 Diversion Box; at joint with polyethylene gasket (p. 2)	(Y) Pressure tested to 200 psig for 30 minutes when installed in July 1964	High-level liquid waste containing Cs-137 as a major constituent (p. 2)	2	None	Soil samples collected from 10 wells drilled from 1.2 to 4.9 m (4 to 16 ft) from pipeline leak source and to depths of 30 ft (p. 2)	Radiological data used to plot three general concentration zones (Fig. 7, p. 12); radionuclides reported were Cs-137, Ce-144, Zr, Nb-95, Ru-106, and Cs-134 (p. 3); soil results summarized (p. 13)	None	None	TBD
(WMA-C)	20	241-C-151, -152, and -153 Diversion Boxes	Planned UPR-200-E-82 borehole sampling and near-surface characterization using direct pushes (pp. 6-14 and 6-17). Will provide geophysical data and soil samples near the 241-C-151, -152, and -153 Diversion Boxes (and an unplanned release site near the 241-C-152 Diversion Box p. 6-7).	Past leak event (p. 6-7)	(N)	High-activity derivatives of PUREX waste (p. 6-7)	2,4	None	Samples to be collected	To be reported: data for a complete set of radiological and chemical contaminants (p. 6-14)	Samples may be collected.	Purposes: to determine extent and magnitude of vertical Tc-99 migration (p. 6-13); to provide useful indication of effects of tank structures on infiltration rates (p. 6-7); to provide pipeline status, sample the pipe, or external pipe tests (pp. 6-13 to 6-14); and to provide contaminant concentration and distribution data (p. 6-18); field reports for geophysical logging will be prepared after direct pushes are completed	TBD
(WMA-B)	21	241-B-151, -152, and -153 Diversion Boxes	Will provide geophysical data and the potential for soil samples near the 241-B-151, -152, and -153 Diversion Boxes (unplanned release site – p. 5-4).	Metal waste leaks in vicinity of 241-B-151, -152, and -153 Diversion Boxes (p. 5-5)	NA	Metals, uranium, and possibly Tc-99 (Reference 21, p. 4-10)	Not specified	None	Samples may be collected near corners of Diversion Boxes from 10 ft bgs to base of the tanks (p. 4-10)	To be reported: gamma logging and potential soil sampling results (p. A-25)	Samples may be collected.	Purpose: to determine effectiveness of reported past cleanup and whether additional investigations are required (p. A-25); field reports will be prepared after direct pushes are completed	TBD
(Various)	2	Multiple	Provides summary of existing information on various waste sites.	Not specified	NA	Not specified	Not specified	None	None	None	None	None	TBD

Table B-3. Preliminary Summary of Characterization and Attribute Data for Pipelines System Waste Sites

Document Review - Preliminary Summary													Initial Work Plan Evaluation of Pipeline Attributes
				Types of Pipeline Characterization Data									
Process Waste Stream and (Associated Historical Process Waste OU)	Reference Source (see Notes)	Associated Liquid Waste Disposal Sites	Summary of Applicable Document Information	Pipeline Leaks/Plugs	Pipeline Pressure Tested (Y) = Yes (N) = No	Waste Stream Information	Waste Type*	Camera Surveys Inside Pipelines	Soil or Vegetation Sampling Adjacent to Pipeline	Additional Pipeline Information/Results	Related Data	Other Comments	Associated Pipeline Waste Site Code, Pipe Size, Material, and General Routing
(WMA-C)	22, 23	C Tank Farm	Provides information about eight borings drilled to assess soils adjacent to leak in process transfer line from 244-AR Vault to the C Tank Farm (Reference 22, Volume 1, p. 102; Reference 23, p. 1).	Line leak (Reference 22, Volume 1, p. 102; Reference 23, p. 1)	(N)	Process waste containing Cs-137 (Reference 22, Volume 1, p. 102; Reference 23, pp. 1 to 2)	Not specified	None	Soil samples collected from eight test wells; number of samples not specified (Reference 22, Volume 1, p. 104; Reference 23, p. 2)	Eight test wells (Reference 22, Volume 1, p. 103; Reference 23, p. 1); soil contamination up to 334 µCi/g Cs-137; samples near pipeline showed contamination zone near location of a CS to SS joint in the pipeline (Reference 22, Volume 1, pp. 104, 106; Reference 23, pp. 2 and 4)	None	None	TBD
(U Canyon)	8	Pipes under 221-U Building	Provides data for two (north and south) sections of drainline under 221-U Process Cells into Tank 5-6 in 221-U Process Cell 10 (2.4.4) as part of further characterization activities identified in the Phase 1 feasibility study (2.4).	None detected (2.4.4)	(N)	Not specified	Not specified	Remote video and gamma (2.4.4)	None	Two (one each from south and north sections) "opportunistic" samples of residual on robotic crawler were collected from inside the pipe (2.4.4); south section sample contained rad levels ~2 orders of magnitude greater than in the north section, where transuranic activity >100 nCi/g, and elevated levels of chromium, lead, and Aroclor 1254 (expired trademark) occurred; north section sample contained elevated mercury and phthalates (2.4.4); for both samples ("radionuclide concentrations characteristic of the 221-U facility and processes"). Overall dose rates in pipe ~100 mrem/h (2.4.4); complete sample data in Table 2-2.	None	None	TBD

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	10	Pipes under 221-U Building	Provides summary of existing data for a cell drainage tile line to cell 10 in 221-U.	Not specified	No information	Not specified	Not specified	None	None	None	None	None	TBD

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3. BHI-00033, *Surface and Near Surface Field Investigation Data Summary Report for the 200-UP-2 Operable Unit.*
4. DOE/RL-95-13, *Limited Field Investigation for the 200-UP-2 Operable Unit.*
5. DOE/RL-2003-11, *Remedial Investigation Report for the 200-CW-5 U Pond/Z Ditches Cooling Water Group, the 200-CW-2 S Pond and Ditches Cooling Water Group, the 200-CW-4 T Pond and Ditches Cooling Water Group, and the 200-SC-1 Steam Condensate Group Operable Units.*
6. DOE/RL-99-66, *Steam Condensate/Cooling Water Waste Group Operable Units RI/FS Work Plan; Includes: 200-CW-5, 200-CW-2, 200-CW-4, and 200-SC-1 Operable Units.*
7. DOE/RL-2000-60, *Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sampling Plan Includes: 200-PW-2 and 200-PW-4 Operable Units.*
8. DOE/RL-2001-11, *Final Feasibility Study for the Canyon Disposition Initiative (221-U-Facility).*
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11. RHO-LD-114, *Existing Data On the 216-Z Liquid Waste Sites.*
12. RHO-ST-21, *Report on Plutonium Mining Activities at 216-Z-9 Enclosed Trench.*
13. RHO-ST-44, *216-Z-12 Transuranic Crib Characterization: Operational History and Distribution of Plutonium and Americium.*
14. RPP-20604, *Tank Farm Ancillary Equipment Disposition Study.*
15. RPP-20605, *Cross-Site Transfer System Disposition Study.*
16. WHC-EP-0342, Addendum 12, *PUREX Plant Process Condensate Stream-Specific Report.*
17. WHC-EP-0342, Addendum 14, *PUREX Plant Ammonia Scrubber Condensate Stream-Specific Report.*
18. WHC-EP-0342, Addendum 19, *UO3 Plant Process Condensate Stream-Specific Report.*
19. WHC-SD-NR-ER-103, *Final Report for the Remote CCTV Survey of Abandoned Process Effluent Drain Lines 840 and 840D in Support of the 200 West Area Carbon Tetrachloride ERA.*
20. RPP-16608, *Site-Specific Single-Shell Tank Phase 1 RCRA Facility Investigation/Corrective Measures Study Work Plan Addendum for Waste Management Areas C, A-AX, and U.*
21. RPP-6072, *Site-Specific SST Phase 1 RFI/CMS Work Plan Addendum for WMA B-BX-BY.*

22,23. ARH-1972, included in RHO-CD-673 as pp. 103-106, *Handbook 200 Areas Waste Site (RHO-CD-673); PSS Line Leak (Line No. 812*).

24. DOE/RL-92-05, *B Plant Source Aggregate Area Management Study Report.*
25. DOE/RL-91-60, *S Plant Source Aggregate Area Management Study Report.*
26. DOE/RL-91-61, *T Plant Source Aggregate Area Management Study Report.*
27. BHI-00174, *U Plant Aggregate Area Management Study Technical Baseline Report.*
28. 80322-88-090, "Surface Contamination Investigation Report, Cross-Country Waste Transfer Line."

Notes:

Full reference information is provided in Section B2.

† All pipeline burial configuration information was derived from design drawings available in WIDS.

* Waste Stream Type No: 1 Very Acidic; 2 High Salts/Very Basic; 3 Chelates/High Salt; 4 Low Salts/Near Neutral

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bgs = below ground surface
CI = cast iron
CS = carbon steel
DOE = U.S. Department of Energy
OU = operable unit
psig = pounds per square inch gauge
PUREX = Plutonium-Uranium Extraction (Plant or process)
RB = retention basin
RECUPLEX = Recovery of Uranium and Plutonium by Extraction (Plant or process)
SS = stainless steel
TBD = to be determined
UPR = unplanned release
VCP = vitrified clay pipeline
WIDS = Waste Information Data System database

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Appendix C

Potential Applicable or Relevant and Appropriate Requirements

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Terms

ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COC	contaminant of concern
Eco-SSL	ecological soil screening level
EPA	U.S. Environmental Protection Agency
FS	feasibility study
IDW	investigation-derived waste
MNA	monitored natural attenuation
MTCA	Model Toxics Control Act
NRC	Nuclear Regulatory Commission
PCB	polychlorinated biphenyl
PRG	preliminary remediation goal
RTD	removal, treatment, and disposal
TBC	to be considered
UPR	unplanned release

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C1 Introduction

This appendix provides a preliminary list of applicable or relevant and appropriate requirements (ARARs) for pipeline system and associated unplanned release (UPR) waste sites within the Inner Areas (Table C-1).

The preliminary ARARs identified in this appendix fall into one of three categories: chemical specific, location specific, or action specific. These categories are defined as follows:

- Chemical-specific requirements are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of public and worker safety levels and site cleanup levels.
- Location-specific requirements are restrictions placed on the concentration of dangerous substances or the conduct of activities solely because they occur in special geographic areas.
- Action-specific requirements are usually technology-based or activity-based requirements or limitations triggered by the remedial actions performed at the site.

To be considered (TBC) information is nonpromulgated advisories or guidance issued by federal or state governments that is not legally binding and does not have the status of potential ARARs. In some circumstances, TBCs will be considered along with ARARs in determining the remedial action necessary for protection of human health and the environment. The TBCs complement the ARARs in determining protectiveness at a site or implementation of certain actions.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
Soil and Vadose Zone					
Model Toxics Control Act Statute and Regulation **(Ecology Publication 94-06 ["Model Toxics Control Act," Chapter 70.105D RCW, as amended; "MTCA Cleanup Regulation," Chapter 173-340 WAC])**					
"Soil Cleanup Standards for Industrial Properties" (WAC 173-340-745(5))	Chemical	Establishes soil cleanup levels where industrial land use represents the reasonable maximum exposure in accordance with the criteria presented in these regulations.	Soil in the Inner Areas contains contaminants that require remediation. The requirements corresponding to Method C soil cleanup levels will be used to calculate cleanup levels based on an industrial land use.	ARAR	Soil cleanup actions where concentration of hazardous substances in the soil exceed Method C cleanup levels.
Guidance for Developing Ecological Soil Screening Levels (OSWER Directive 9285.7-55)	Chemical	Provides a set of risk-based ecological soil screening levels (Eco-SSLs) for several soil contaminants that are of ecological concern for terrestrial plants and animals at hazardous waste sites. Also describes the process used to derive these levels and provides guidance for their use.	Soil in the Inner Areas contains contaminants that require remediation. Comparison to Eco-SSLs may be appropriate for defining potential contaminants of concern (COCs) or to default to an Eco-SSL for COCs that lacks corresponding published cleanup criteria in Model Toxics Control Act (MTCA).	TBC	Soil cleanup actions to protect Ecological Receptors.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Deriving Soil Concentrations for Groundwater Protection" (WAC 173-340-747(3) and (8))	Chemical	Establishes soil cleanup levels where industrial land use represents the reasonable maximum exposure under both current and future site use conditions. Cleanup standards require specification of the following: hazardous substance concentrations that protect human health and the environment (cleanup levels), the location of the site where cleanup levels must be attained ("points of compliance"), and other regulatory requirements that apply to the cleanup action because of the type of action or location of the site. These requirements are specified in the applicable state and federal laws and are generally established in conjuncture with the selection of a specific cleanup action.	Soil in the Inner Areas contains contaminants that require remediation. The requirements corresponding to Method C soil cleanup levels may be used to calculate cleanup levels based on an industrial land use.	ARAR	Soil cleanup actions where concentration of hazardous substances in the soil exceeds soil concentration for protection of groundwater.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Terrestrial Ecological Evaluation Procedures" (WAC 173-340-7490) "Site-Specific Terrestrial Ecological Evaluation Procedures" (WAC 173-340-7493) "Priority Contaminants of Ecological Concern" (WAC 173-340-7494)	Chemical	Defines goals and procedures for determining whether a release of hazardous substances to soil may pose a threat to the terrestrial environment. Characterizes existing or potential threats to terrestrial plants or animals exposed to hazardous substances in soil; and establishes site-specific cleanup standards for the protection of terrestrial plants and animals. Provides numeric concentrations of hazardous substances determined to persist, bioaccumulate, or are highly toxic to terrestrial ecological receptors. Concentrations listed in Table 749-2 are based on protection of wildlife for industrial and commercial land uses, and that are protective of plants and animals for other land uses.	Soil in the Inner Areas contains contaminants that require evaluation to determine if ecological exposures have the potential to cause significant adverse effects. Soil in the Inner Areas contains contaminants that require evaluation to determine if ecological exposures have the potential to cause significant adverse effects.	ARAR	Soil remediation activities including removal, treatment, and disposal (RTD) and monitored natural attenuation (MNA).

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
Radionuclide ARAR Dose Compliance Concentrations for Superfund Sites					
"Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination" (Luftig and Weinstock, 1997 [OSWER Directive 9200.4-18]) "Distribution of OSWER Radiation Risk Assessment Q & A's Final Guidance" (Luftig and Page, 1999 [OSWER Directive 9200.4-31P])	Chemical	This memorandum presents clarification for establishing protective cleanup levels in media for radioactive contamination at *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) sites. U.S. Environmental Protection Agency (EPA) has determined that the dose limits established by the Nuclear Regulatory Commission (NRC) in "Radiological Criteria for License Termination" (62 FR 39058) (25 mrem/yr, which is equivalent to 5×10^{-4} increase lifetime risk) will not provide a protective basis for establishing preliminary remediation goals (PRGs) under CERCLA. A dose of 15 mrem/yr effective dose (approximately equivalent to 3×10^{-4} increase in lifetime risk) is preferred as the maximum dose limit for humans. In the final guidance, EPA further clarifies that 15 mrem/yr is not a presumptive cleanup level under CERCLA. Rather, site decision makers should continue to use the CERCLA risk range when ARARs are not used to set cleanup levels. This is for several reasons, as using dose based guidance would result in unnecessary inconsistency regarding how radiological and nonradiological (chemical) contaminants are addressed at CERCLA sites.	Soil in the Inner Areas contains radioactive contaminants that, if not remediated, could pose unacceptable risk to human health.	TBC	Development of soil cleanup levels.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (OSWER Directive 9200.4-17P)	Action	Provides the framework and appropriateness for using the MNA as a remedy component for organic and inorganic contaminants.	Soil in the Inner Areas contains contaminants that require remediation. The use of MNA as a remedy may be appropriate.	TBC	Soil remediation activities including MNA.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
Air					
Radionuclide ARAR Dose Compliance Concentrations for Superfund Sites					
"Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination" (Luftig and Weinstock, 1997 [OSWER Directive 9200.4-18]) "Distribution of OSWER Radiation Risk Assessment Q & A's Final Guidance" (Luftig and Page, 1999 [OSWER Directive 9200.4-31P])	Chemical	This memorandum presents clarification for establishing protective cleanup levels in media for radioactive contamination at CERCLA sites. EPA has determined that the dose limits established by the NRC in "Radiological Criteria for License Termination" (62 FR 39058) (25 mrem/yr, which is equivalent to 5×10^{-4} increase lifetime risk) will not provide a protective basis for establishing PRGs under CERCLA. A dose of 15 mrem/yr effective dose (approximately equivalent to 3×10^{-4} increase in lifetime risk) is preferred as the maximum dose limit for humans. In the final guidance, EPA further clarifies that 15 mrem/yr is not a presumptive cleanup level under CERCLA. Rather, site decision makers should continue to use the CERCLA risk range when ARARs are not used to set cleanup levels. This is for several reasons, as using dose based guidance would result in unnecessary inconsistency regarding how radiological and nonradiological (chemical) contaminants are addressed at CERCLA sites.	Air in the Inner Areas may contain radioactive contaminants that if not remediated, could pose unacceptable risk to human health.	TBC	Development of air cleanup levels.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Washington Clean Air Act" (RCW 70.94, as amended); "General Regulations for Air Pollution Sources" (WAC 173-400)					
"General Regulations for Air Pollution Sources" (WAC 173-400)	Action	Defines methods of control to be employed to minimize the release of air contaminants associated with fugitive emissions resulting from materials handling, construction, demolition, or other operations. Emissions are to be minimized through application of best available control technology.	Remedial actions implemented in the Inner Areas have the potential to emit emission subject to these standards because hazardous contaminants detected in the Inner Areas include covered hazardous air pollutants.	ARAR	Actions performed at the Inner Areas that could result in the emission of hazardous air pollutants, including decontamination, demolition, and excavation activities implemented during a remedial action that have the potential to emit visible, particulate, fugitive, and hazardous air emissions and odors.
"General Standards for Maximum Emissions" (WAC 173-400-040)	Action	All sources and emissions units are required to meet the general emission standards unless a specific source standard is available. General standards apply to visible emissions, particulate fallout, fugitive emissions, odors, emission detrimental to health and property, sulfur dioxide, and fugitive dust.	Remedial actions implemented in the Inner Areas have the potential to emit emission subject to these standards because hazardous contaminants detected in the Inner Areas include covered regulated hazardous air pollutants.	ARAR	Remedial actions that have the potential to release hazardous air emissions.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Emission Standards for Sources Emitting Hazardous Air Pollutants" (WAC 173-400-075)	Action	Establishes national emission standards for hazardous air pollutants. Adopts, by reference, "National Emission Standards for Hazardous Air Pollutants" (40 CFR 61) and appendices.	Hazardous contaminants detected in the Inner Areas include covered regulated hazardous air pollutants.	ARAR	Actions performed at the Inner Areas that could result in the emission of hazardous air pollutants, including decontamination, demolition, and excavation activities implemented during the remedial action that have the potential to emit visible, particulate, fugitive, and hazardous air emissions and odors.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Washington Clean Air Act" (RCW 70.94, as amended); "Controls for New Sources of Toxic Air Pollutants" (WAC 173-460)					
"Purpose" (WAC 173-460-010) "Applicability" (WAC 173-460-030) "Control Technology Requirements" (WAC 173-460-060) "Ambient Impact Requirement" (WAC 173-460-070) "First Tier Review" (WAC 173-460-080)" Table of ASIL, SQER and de Minimis Emission Values" (WAC 173-460-150)	Action	Establishes control of new sources emitting toxic air pollutants to prevent air pollution, reduce emissions to the extent reasonably possible, and maintain such levels of air quality as will protect human health and safety. Toxic air pollutants include carcinogens and noncarcinogens listed in WAC 173-460-150. Three major requirements of this regulation include (1) implementation of best available control technology for toxics, (2) quantification of toxic air pollutant emissions, and (3) health and safety protection demonstration.	Hazardous contaminants detected in soil in the Inner Areas include constituents that would constitute toxic air pollutants if released to the air.	ARAR	Soil remediation activities that have the potential to emit hazardous air emissions and that would be considered a new source.
"Washington Clean Air Act" (RCW 70.94, as amended); "Ambient Air Quality Standards for Particulate Matter" (WAC 173-470)					
"Ambient Air Quality Standards" (WAC 173-470-100)	Action	Sets maximum acceptable levels for particulate matter in the ambient air at 150 $\mu g/m^3$ over a 24-hour period, or 60 $\mu g/m^3$ annual geometric mean. It also sets the 24-hour ambient air concentration standards for particles less than 10 µm in diameter (PM_{10}) at 105 $\mu g/m^3$ and 50 $\mu g/m^3$ geometric mean.	Particulate matter can be generated during the remedial actions. Ambient air quality standards for particulate matter will be considered if the remedial actions raise emissions above the standard.	ARAR	Remediation activities (e.g., excavation, RTD) that have the potential to emit particulate matter above maximum acceptable levels.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Particle Fallout Standards" (WAC 173-470-110)	Action	Establishes the standard for particle fallout not to exceed 10 g/m^2 per month in an industrial area or 5 g/m^2 per month in residential or commercial areas. Alternative levels for areas where natural dust levels exceed 3.5 g/m^2 per month are set at 6.5g/m^2 per month, plus background levels for industrial areas and 1.5 g/m^2 per month, plus background in residential and commercial areas.	Particulates and dust can be generated during the remedial actions.	ARAR	Remediation activities (e.g., excavation, RTD) that have the potential to emit particulate matter above maximum acceptable levels.
"Washington Clean Air Act" (RCW 70.94, as amended); "Ambient Air Quality Standards and Emission Limits for Radionuclides" (WAC 173-480)					
"Ambient Standard" (WAC 173-480-040)	Action	Defines the maximum allowable level for radionuclides in the ambient air, which shall not cause a maximum accumulated dose equivalent of 25 mrem/yr to the whole body or 75 mrem/yr to any critical organ. However, ambient air standard under 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities," and Subpart I, "National Emission Standards for Radionuclide Emissions from Federal Facilities Other Than Nuclear Regulatory Commission Licensees and Not Covered by Subpart H," are not to exceed amounts that result in an effective dose equivalent of 10 mrem/yr to any member of the public.	Hazardous contaminants detected in soil in the Inner Areas include radionuclides that could be emitted to ambient air during remedial actions.	ARAR	Remediation activities (e.g., excavation, RTD, demolition, ventilation, vacuuming/exhaust) that have the potential to emit radionuclides above maximum acceptable levels.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"General Standards for Maximum Permissible Emissions" (WAC 173-480-050)	Action	At a minimum, all emission units shall make every reasonable effort to maintain radioactive materials in effluents to unrestricted areas, as low as reasonably achievable (ALARA). Control equipment of sites operating under ALARA shall be defined as reasonably available control technology and as low as reasonably achievable control technology.	The potential for fugitive and diffuse emissions due to demolition and excavation and related activities will require efforts to minimize those emissions.	ARAR	Remediation activities (e.g., excavation, RTD, demolition, ventilation, vacuuming/exhaust) that have the potential to emit radionuclides above maximum acceptable levels.
"Emission Monitoring and Compliance Procedures" (WAC 173-480-070)	Action	Requires that radionuclide emissions shall be determined by calculating the dose to members of the public using Department of Health approved sampling procedures at the point of maximum annual air concentration in an unrestricted area where any member of the public may be.	Hazardous contaminants detected in soil in the Inner Areas include radionuclides that could be emitted to unrestricted areas during remedial actions.	ARAR	Remediation activities (e.g., excavation, RTD, demolition, ventilation, and vacuuming/exhaust) that have the potential to emit radionuclides to unrestricted areas above maximum acceptable levels.
"Emission Standards for New and Modified Emission Units" (WAC 173-480-060)	Action	Requires that construction, installation, or establishment of a new air emission control units utilize best available radionuclide control technology.	Hazardous contaminants detected in soil in the Inner Areas include radionuclides that could be emitted from air emission control units during remedial actions.	ARAR	Remediation activities (e.g., excavation, RTD, demolition, ventilation, and vacuuming/exhaust) that require air pollution control equipment and have the potential to emit radionuclides.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Nuclear Energy and Radiation" (RCW 70.98, as amended); "Radiation Protection—Air Emissions" (WAC 246-247)					
"National Standards Adopted by Reference for Sources of Radionuclide Emissions" (WAC 246-247-035 (1)(a)(ii))	Action	Establishes requirements equivalent to 40 CFR 61, Subpart H, by reference. Radionuclide airborne emissions from the waste site shall be controlled so as not to exceed amounts that would cause an exposure to any member of the public of greater than 10 mrem/yr effective dose equivalent.	Substantive requirements of this standard are applicable because the remedial action may include activities such as excavation, decontamination, and stabilization of contaminated areas that many provide airborne emissions of radioactive particles.	ARAR	Remedial activities.
"General Standards" (WAC 246-247-040(3)) "General Standards" (WAC 246-247-040(4))	Action	Requires that emissions be controlled to ensure emission standards are not exceeded.	Hazardous contaminants detected in soil in the Inner Areas reactor sites include radionuclides that could be emitted during remedial actions.	ARAR	Remediation activities (e.g., RTD, excavation, demolition, ventilation).
"Monitoring, Testing and Quality Assurance" (WAC 246-247-075)	Action	Establishes the monitoring, testing, and quality assurance requirements for radioactive air emissions. Emissions from nonpoint and fugitive sources of airborne radioactive material shall be measured. Measurement techniques may include, but are not limited to sampling, calculation, smears, or other reasonable method for identifying emissions as determined by the lead agency.	Hazardous contaminants in the Inner Areas waste sites include radionuclides that could be emitted as airborne radioactive material during remedial actions.	ARAR	Remediation activities (e.g., RTD, excavation, demolition, ventilation) that could be emitted from fugitive sources.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
Solid Wastes					
***Toxic Substances Control Act of 1976* (Pub L. 107-377, as amended; 15 USC 2605, et seq.); "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions" (40 CFR 761)**					
"Applicability," "PCB Waste" (40 CFR 761.50(b)1, 2, 3, 4 and 7) "Applicability," "Storage for Disposal" (40 CFR 761.50(c))	Action	Establishes general PCB disposal requirements for the storage and disposal of PCB wastes including liquid PCB wastes, PCB items, PCB remediation waste, PCB bulk product wastes, and PCB/radioactive wastes at concentrations greater than 50 ppm.	PCB wastes may be encountered and or generated during the remediation of the Inner Areas.	ARAR	Soil excavation and remediation, equipment and debris handling and disposal, and investigation-derived waste (IDW) management and disposal.
"Disposal Requirements" "PCB liquids" (40 CFR 761.60(a)) "Disposal Requirements" "PCB Articles" (40 CFR 761.60(b)) "Disposal Requirements" "PCB Containers" (40 CFR 761.60(c))	Action	Establishes requirements applicable to the handling and disposal of PCB liquids, PCB articles, and PCB containers.	PCB liquids, articles, and/or containers may be encountered and or generated during the Inner Areas.	ARAR	Equipment and debris handling, storage, and disposal; IDW management and disposal.
"PCB Remediation Waste" (40 CFR 761.61)	Action	Provides cleanup and disposal options for PCB remediation waste based on the concentration at which the PCBs are found.	PCB remediation wastes may be encountered and or generated during the remedial actions for the Inner Areas.	ARAR	Soil remediation, RTD, and IDW management and disposal.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Hazardous Waste Management" (RCW 70.105, as amended); "Dangerous Waste Regulations" (WAC 173-303)					
"Identifying Solid Waste" (WAC 173-303-016) "Recycling Processes Involving Solid Waste" (WAC 173-303-017)	Action	Establishes criteria for solid and recycled solid wastes.	Solid wastes and/or recycled solid wastes may be generated during the Inner Areas remedial actions.	ARAR	Remediation activities.
"Designation of Dangerous Waste" (WAC 173-303-070)	Action	Establishes the method for determining if a solid waste is a dangerous waste (or an extremely hazardous waste).	Dangerous/hazardous waste may be generated during the Inner Areas remedial actions.	ARAR	Remediation (including waste treatment) activities that generate wastes (e.g., drums, barrels, tanks, containers, bulk wastes, debris, and contaminated soil).
"Conditional Exclusion of Special Wastes" (WAC 173-303-073)	Action	Establishes the conditional exclusion and the management requirements of special wastes, as defined in "Definitions" (WAC 173-303-040).	Special wastes may be generated during the Inner Areas remedial actions.	ARAR	Feasability study (FS) remediation activities (disposal, storage, recycling, and onsite treatment) that manage special wastes consistent with the requirements of the *Washington Administrative Code*.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Requirements for Universal Waste" (WAC 173-303-077)	Action	Identifies those wastes exempted from regulation under "Land Disposal Restrictions" (WAC 173-303-140) and "Requirements for Generators of Dangerous Waste" (WAC 173-303-170) through "Reserved" (173-303-9907) (excluding "Special Powers and Authorities of the Department" [WAC 173-303-960]). These wastes are subject to regulation under "Standards for Universal Waste Management" (WAC 173-303-573).	Universal wastes may be generated during the Inner Areas remedial actions.	ARAR	FS remediation activities (disposal, storage, recycling, and onsite treatment) that manage universal wastes consistent with the requirements of the *Washington Administrative Code*.
"Recycled, Reclaimed, and Recovered Wastes" (WAC 173-303-120) "Recycled, Reclaimed, and Recovered Wastes" (WAC 173-303-120(3)) "Recycling of Used Oil" (WAC 173-303-120(5))	Action	Defines the requirements for the recycling of materials that are solid and dangerous waste. Specifically, WAC 173-303-120(3) provides for the management of certain recyclable materials, including spent refrigerants, antifreeze, and lead acid batteries. WAC 173-303-120(5) provides for the recycling of used oil.	Recycled, reclaimed, and recovered wastes may be generated during the Inner Area remedial actions.	ARAR	FS remediation recycling activities consistent with the requirements of the *Washington Administrative Code* and are not otherwise subject to CERCLA as hazardous substances.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Land Disposal Restrictions" (WAC 173-303-140)	Action	Establishes treatment requirements and disposal prohibitions for land disposal of dangerous waste and incorporates by reference (WAC 173-303-140(2)(a)) the federal land disposal restrictions of "Land Disposal Restrictions" (40 CFR 268) that are applicable to solid waste that is designated as dangerous or mixed waste in accordance with "Designation Procedures" (WAC 173-303-070(3)).	Onsite land disposal may be a selected remedy for the Inner Area dangerous waste and debris.	ARAR	Remediation wastes destined for onsite land disposal.
"Requirements for Generators of Dangerous Waste" (WAC 173-303-170)	Action	Establishes the requirements for dangerous waste generators. WAC 173-303-170(3) includes the substantive provisions of "Accumulating Dangerous Waste On-Site" (WAC 173-303-200) by reference. WAC 173-303-200 further includes certain substantive standards from "Use and Management of Containers" (WAC 173-303-630) and "Tank Systems" (WAC 173-303-640) by reference. Specifically, the substantive standards for management of dangerous/mixed waste are relevant and appropriate to the management of dangerous waste that will be generated during the remedial action.	Dangerous wastes may be generated from the remedial actions in the Inner Areas.	ARAR	IDW and remediation wastes (contaminated soil, personnel protective gear, treatment chemicals, etc.).
"Accumulating Dangerous Waste On-Site" (WAC 173-303-200)	Action	Establishes the requirements for accumulating wastes onsite. WAC 173-303-200 further includes certain substantive standards from WAC 173-303-630 and -640 by reference.	Dangerous waste may be generated from the remedial actions in the Inner Areas.	ARAR	Management of dangerous waste during remedial actions.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Purpose and Applicability" (WAC 173-303-64610) "Requirements" (WAC 173-303-64620)	Action	Establishes requirements for corrective action for releases of dangerous wastes and dangerous constituents including releases from solid waste management units.	Releases of dangerous wastes and dangerous constituents have occurred within the Inner Areas that may present a threat to human health and the environment.	ARAR	Remediation of dangerous wastes and dangerous constituents from solid waste management units and spill sites. Corrective action can also be applied at treatment, storage, and disposal units and components whenever a release occurs.
"Closure and Post-Closure" (WAC 173-303-610(2))	Action	Establishes closure requirements applicable to all dangerous waste facilities and post-closure care requirements applicable to all regulated units (as defined in WAC 173-303-040) at which dangerous wastes will remain after closure (including tank systems, landfills, surface impoundments, waste piles, and miscellaneous units).	Dangerous wastes may remain in the Inner Areas after closure.	ARAR	Remedial design and operation of regulated units that contain dangerous wastes and that will remain in the Inner Areas after closure.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
"Solid Waste Management—Reduction and Recycling" (RCW 70.95, as amended); "Solid Waste Handling Standards" (WAC 173-350)					
"Owner Responsibilities for Solid Waste" (WAC 173-350-025) "Performance Standards" (WAC 173-350-040) "On-Site Storage, Collection and Transportation Standards" (WAC 173-350-300) "Remedial Action" (WAC 173-350-900)	Action	Establishes minimum functional performance standards for the proper handling and disposal of solid waste. Requirements for the proper handling of solid waste materials originating from residences, commercial, agricultural and industrial operations and other sources and identifies those functions necessary to ensure effective solid waste handling programs at both the state and local level.	Solid, nondangerous waste will be generated during the implementation of the Inner Areas remedial actions.	ARAR	Remedial actions that generate solid, nondangerous waste.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
Historical and Archeological Resources					
***National Historic Preservation Act of 1966* (Pub. L 89-665, as amended, 16 USC 470, et seq.)**					
"Protection of Historic Properties" (36 CFR 800) "Procedures for Implementing the National Environmental Policy Act and Assessing the Environmental Effects Abroad of EPA Actions," "Applicant Requirements" (40 CFR 6.301(b))	Location	Legislation intended to preserve historical and archaeological sites in the United States of America. Requires federal agencies to consider the impacts of their undertaking on cultural properties through identification, evaluation, mitigation processes, and consultation with interested parties.	Cultural and historic sites have been identified within the Inner Areas.	ARAR	Remediation activities that occur in areas near cultural or historic sites.
***Protection and Enhancement of the Cultural Environment* (Executive Order 11593)**					
"National Historic Landmarks Program" (36 CFR 65) "National Register of Historic Places" (36 CFR 60)	Location	Requires federal agencies to consider the impacts of their undertaking on cultural properties through identification, evaluation, mitigation processes, and consultation with interested parties.	Cultural and historic sites have been identified within the Inner Areas.	ARAR	Remediation activities that occur in areas near cultural or historic sites.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
Native American Graves Protection and Repatriation Act of 1990 **(Pub. L. 101-601, as amended, 25 USC 3001, et seq.); "Native American Graves Protection and Repatriation Regulations" (43 CFR 10)**					
"Native American Graves Protection and Repatriation Regulations" (43 CFR 10)	Location	Establishes federal agency responsibility for discovery of human remains, associated and unassociated funerary objects, sacred objects and items of cultural patrimony. Requires Native American Tribal consultation in the event of discovery.	Native American archaeological, cultural and historic sites have been identified within 100-F/IU-2/IU-6; Native American remains and associated objects may be present.	ARAR	Investigations and remedial activities that affect Native American archaeological, cultural areas and historic sites that contain associated remains and objects.
Archeological and Historic Preservation Act of 1974 **(Pub. L. 93-291, as amended; 16 USC 469a-1 through 469a-2(d))**					
"Applicant Requirements" (40 CFR 6.301(c))	Location	Requires that remedial actions do not cause the loss of any archaeological or historic data. This act mandates preservation of the data; it does not require protection of the actual waste site or facility.	Archaeological and historic sites have been identified within the Inner Areas.	ARAR	Investigations that occur in areas near archeological or historic sites.
Natural and Ecological Resources					
Endangered Species Act of 1973 **(Pub. L. 93-205, as amended; 7 USC 136, 16 USC 1531, et seq.)**					
"Interagency Cooperation—Endangered Species Act of 1971, as Amended" (50 CFR 402) "Responsible Official Requirements" (40 CFR 6.302(c))	Location	Prohibits actions by federal agencies that are likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of habitat critical to them. Mitigation measures must be applied to actions that occur within critical habitats or surrounding buffer zones of listed species, in order to protect the resource.	Federal endangered and/or threatened species including plants and animals are found within the Inner Area.	ARAR	Remediation actions that occur within critical habitats or designated buffer zones of federal listed species.

Table C-1. Potential Federal and Washington State Applicable or Relevant and Appropriate Requirements and To Be Considered Materials for Pipeline System and Associated Unplanned Release Waste Sites of the East and West Inner Areas

Regulatory Citation	ARAR Category	Description of Regulatory Requirement	Rationale for Including	Potential Relevancy	Possible Application
***Migratory Bird Treaty Act of 1918* (16 USC 703-712; Ch. 128; July 13, 1918; 40 Stat. 755), as amended**					
Migratory Bird Treaty Act of 1918 (16 USC 703-712)	Location	Protects all migratory bird species and prevents "taking" of protected migratory birds, their young, or their eggs.	Migratory birds occur in the Inner Area.	ARAR	Remedial actions that require mitigation measures to deter nesting by migratory birds on, around, or within remedial action site and methods to identify and protect occupied birds' nests.

C2 References

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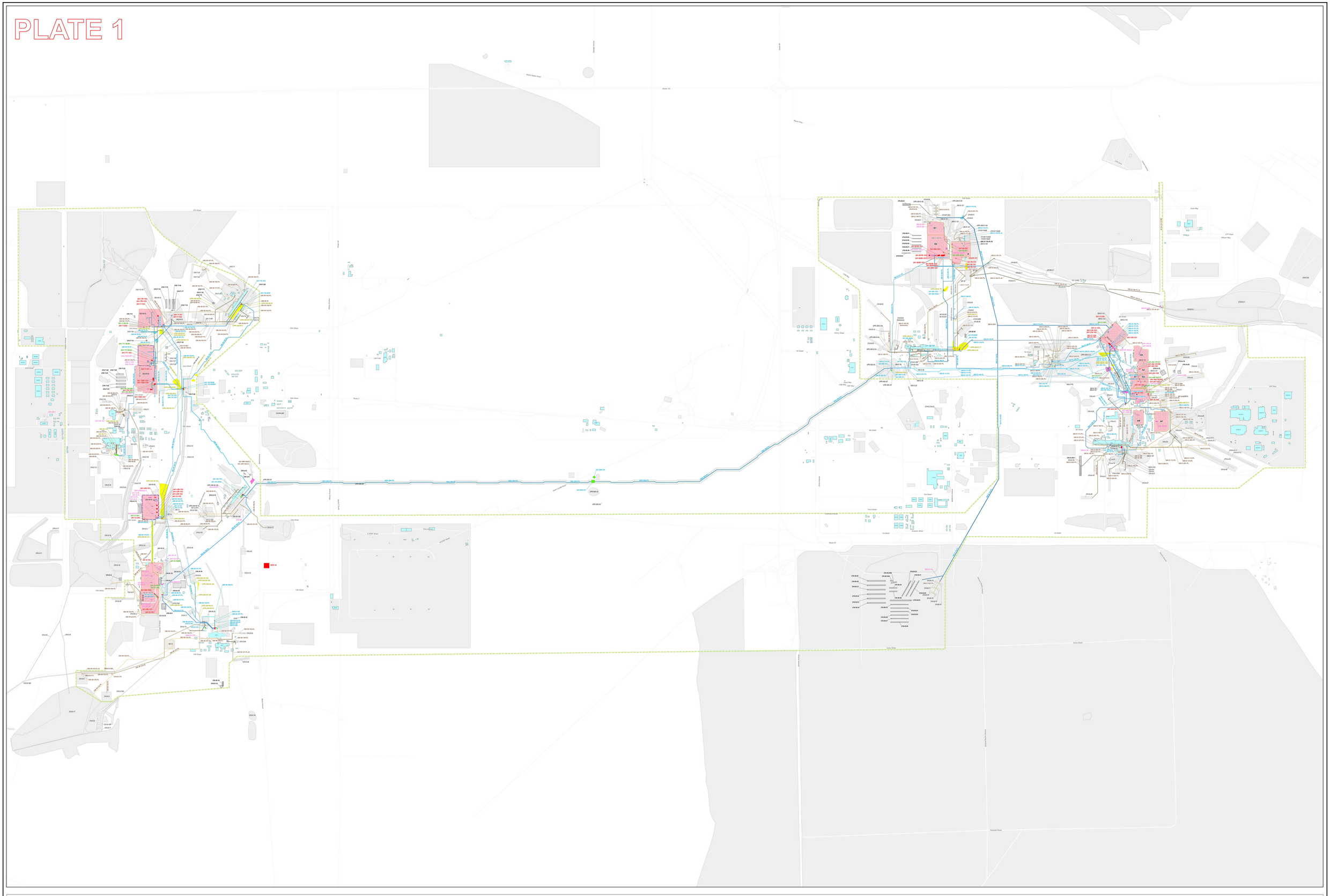
PLATE 1



200-IS-1 OU Waste Sites – Inner Area

Pipelines and Unplanned Releases

- Pipeline System RCRA TSD Tank Component Waste Sites
- Pipeline System Past Practice Waste Sites
- Pipeline System Past Practice Unplanned Release Waste Sites

Pipeline System Components

- Catch Tank, Storage Tank, Neutralization Tank, Settling Tank
- Diversion Box
- Other Structures

Color Key: 200-IS-1 OU Scope

Past Practice Pipeline - Brown Label
RCRA-TSD Pipeline - Blue Label
Past Practice Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Brown Label
RCRA-TSD Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Blue Label
Past Practice Other Structures - Brown Label
RCRA-TSD Other Structures - Blue Label
RCRA-TSD Diversion Box - Blue Label

Color Key: Other OU or WMA Scope (Not 200-IS-1 OU Scope)

Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Green Label
Other Structures - Pink Label
Diversion Box - Red Label

Liquid Disposal Waste Sites

- Fed by overground pipeline
- Fed By Truck
- No Pipeline Connected
- Not Used

Tank Farm, Facility, WIDS, Boundaries

- Tank Farms Facilities Boundary - Active
- Tank Farms Facilities Boundary - Inactive
- Tank Farms Facilities
- Buildings
- Other WIDS Sites
- Inner Area Boundary *Geographical Closure Area*

N W E S

Meters
0 200 400 600

Feet
0 500 1,000 1,500 2,000

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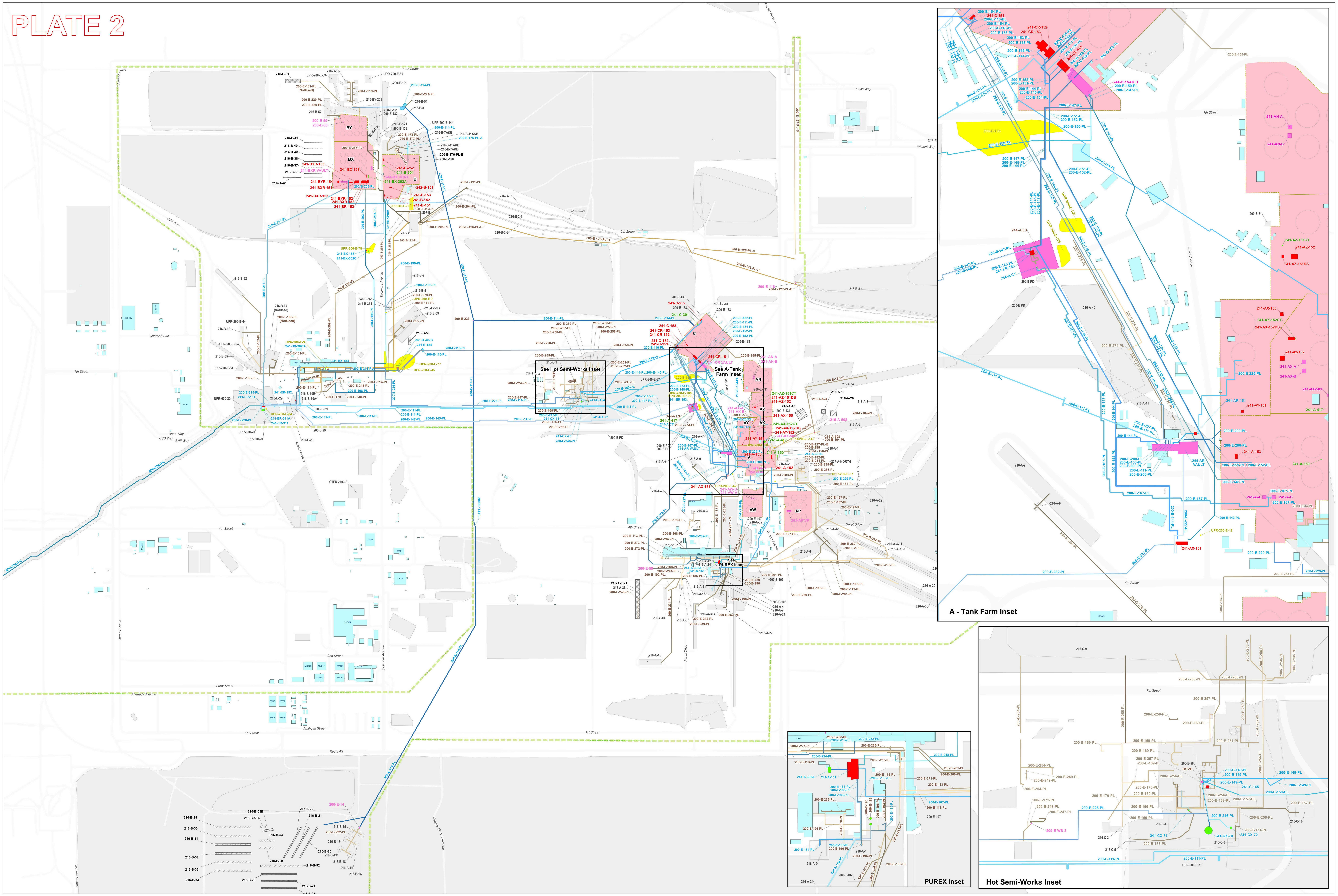
PLATE 2



200-IS-1 OU Waste Sites – East Inner Area

Pipelines and Unplanned Releases

- Pipeline System RCRA TSD Tank Component Waste Sites
- Pipeline System Past Practice Waste Sites
- Pipeline System Past Practice Unplanned Release Waste Sites

Pipeline System Components

- Catch Tank, Storage Tank, Neutralization Tank, Settling Tank
- Diversion Box
- Other Structures

Color Key: 200-IS-1 OU Scope

Past Practice Pipeline - Brown Label
RCRA-TSD Pipeline - Blue Label
Past Practice Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Brown Label
RCRA-TSD Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Blue Label
Past Practice Other Structures - Brown Label
RCRA-TSD Other Structures - Blue Label
RCRA-TSD Diversion Box - Blue Label

Color Key: Other OU or WMA Scope (Not 200-IS-1 OU Scope)

Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Green Label
Other Structures - Pink Label
Diversion Box - Red Label

Liquid Disposal Waste Sites

- Fed by overground pipeline
- Fed By Truck
- No Pipeline Connected
- Not Used

Other Features

- Tank Farms Facilities Boundary - Active
- Tank Farms Facilities Boundary - Inactive
- Tank Farms Facilities
- Buildings
- Other WIDS Sites
- Inner Area Boundary *Geographical Closure Area*

CMS CENTRAL MAPPING SERVICES

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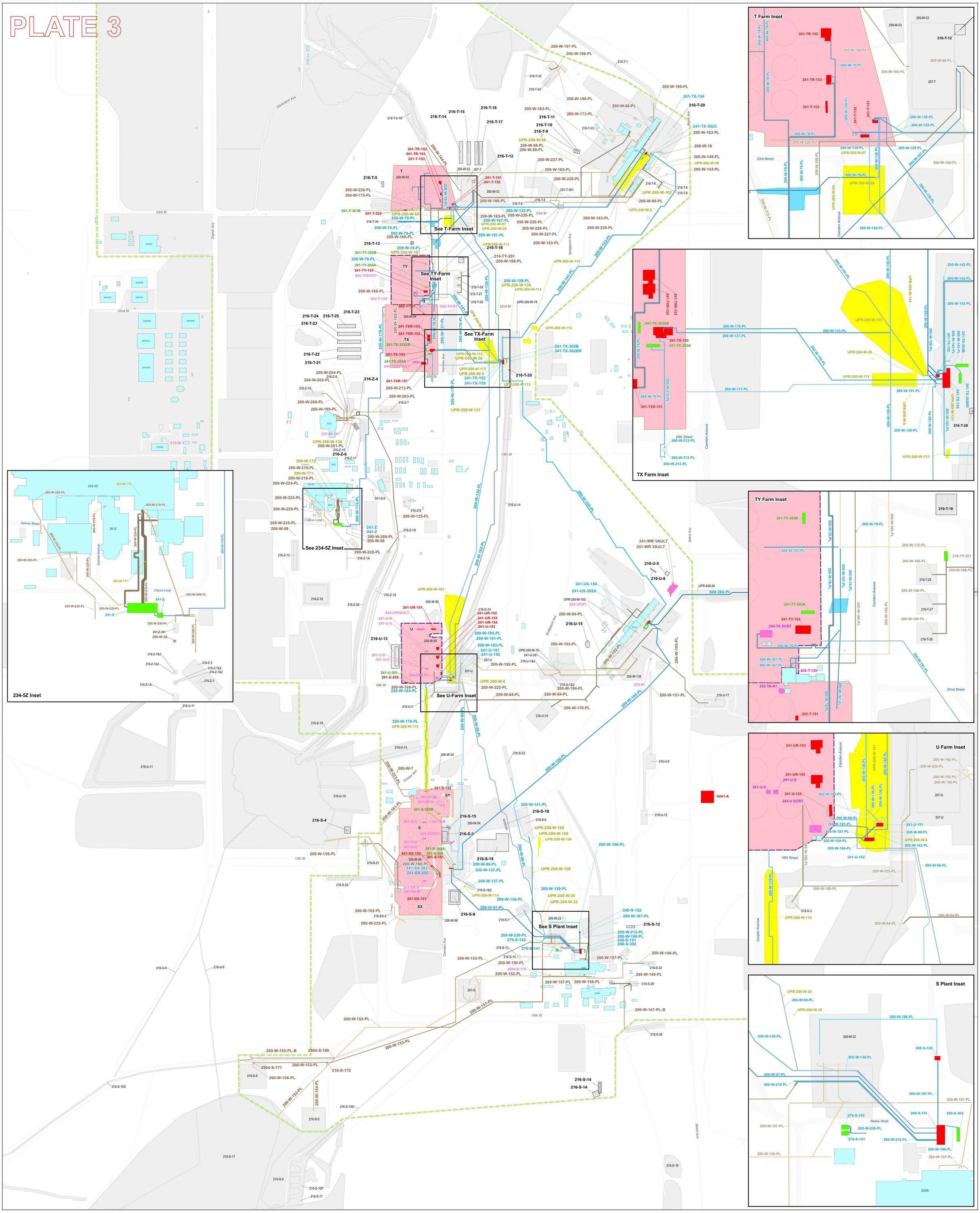
PLATE 3



200-IS-1 OU Waste Sites – West Inner Area

Pipelines and Unplanned Releases

- Pipeline System RCRA TSD Tank Component Waste Sites
- Pipeline System Past Practice Waste Sites
- Pipeline System Past Practice Unplanned Release Waste Sites

Pipeline System Components

- Catch Tank, Storage Tank, Neutralization Tank, Settling Tank
- Diversion Box
- Other Structures

Color Key: 200-IS-1 OU Scope

Past Practice Pipeline - Brown Label
RCRA-TSD Pipeline - Blue Label
Past Practice Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Brown Label
RCRA-TSD Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Blue Label
Past Practice Other Structures - Brown Label
RCRA-TSD Other Structures - Blue Label
RCRA-TSD Diversion Box - Blue Label

Color Key: Other OU or WMA Scope (Not 200-IS-1 OU Scope)

Catch Tank, Storage Tank, Neutralization Tank, Settling Tank - Green Label
Other Structures - Pink Label
Diversion Box - Red Label

Liquid Disposal Waste Sites

- Fed by overground pipeline
- Fed By Truck
- No Pipeline Connected
- Not Used

Other Features

- Tank Farms Facilities Boundary - Active
- Tank Farms Facilities Boundary - Inactive
- Tank Farms Facilities
- Buildings
- Other WIDS Sites
- Inner Area Boundary *Geographical Closure Area*

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Coordinate System: Washington State Plane, South Zone, Meters

N W E S

Meters: 0 100 200 300 400

Feet: 0 400 800 1,200

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