Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

11-AMCP-0164

JUN 27 2011

Ms. J. A. Hedges, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port off Benton Boulevard
Richland, Washington 99354

Dear Ms. Hedges:

M-91 TRANSURANIC MIXED/MIXED LOW-LEVEL WASTE PROJECT MANAGEMENT PLAN, HNF-19169, REVISION 9

This letter transmits the Annual Revision of the M-91 Transuranic Mixed/Mixed Low-level Waste Project Management Plan, HNF-19169, Revision 9, to the State of Washington Department of Ecology (Ecology) for review and approval. Ecology comments on the previous Project Management Plan are addressed in the 2011 Project Management Plan.

This plan is submitted as a primary document under the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Action Plan, Section 9.0, Documents and Records. Transmittal of this document completes the following Tri-Party Agreement requirements:

- The M-91-03 Milestone requirement for submittal of the Project Management Plan by June 30, 2011.
- The M-91-03D-02 Milestone requirement to submit a revision to the Project Management Plan for disposition (treatment plans, variances or procurements, and schedules) of all no path forward waste (as defined in the Project Management Plan) in above ground storage as of June 30, 2009.

Comments or approval are requested within 45 days of receipt of this letter.

If you have any questions, please contact me, or your staff may contact Larry Romine, of my staff, on (509) 376-4747.

Sincerely,

Jonathan A. Dowell, Assistant Manager
for the Central Plateau

AMCP:MSC

Attachment

cc: See Page 2

cc w/attach:
G. Bohnee, NPT
L. Buck, Wanapum
D. A. Faulk, EPA
S. Harris, CTUIR
R. Jim, YN
S. L. Leckband, HAB
K. Niles, ODOE
D. Rowland, YN (4) plus 2 CDs
D. G. Singleton, Ecology
Administrative Record (M-91)
Environmental Portal

cc w/o attach:
D. G. Black, CHPRC
K. J. Lueck, CHPRC
R. E. Piippo, MSA
J. G. Vance, MSA

HNF-19169
Revision 9

M-91 Transuranic Mixed/Mixed Low-Level Waste Project Management 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

HNF-19169
Revision 9

M-91 Transuranic Mixed/Mixed Low-Level Waste Project Management Plan

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

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Executive Summary

The Hanford Site, managed by the U.S. Department of Energy (DOE), produced about 60 percent of the United States' plutonium from the mid-1940s to the late 1980s in support of national defense efforts. Much of the legacy waste and contaminated materials from the Hanford Site defense mission remains on the Central Plateau of the Hanford Site.

The *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989a[1]), commonly known as the Tri-Party Agreement, is a legal agreement between the Washington State Department of Ecology (Ecology), the U.S. Environmental Protection Agency (EPA), and DOE that identifies cleanup actions and schedules, referred to as milestones, to manage a portion of this remaining legacy waste and contaminated material. The scope of the M-091 Milestone series (Ecology et al., 1989b[2]) is to complete removal of the retrievably stored waste (RSW) from the burial grounds and eliminate the backlog of mixed low-level waste (MLLW) and transuranic mixed (TRUM) waste in storage by December 31, 2030. When these milestones are complete, DOE will have successfully treated the MLLW and shipped the TRUM waste offsite for disposal.

Ecology, EPA, and DOE approved a number of changes to the M-091 Milestone series in September 2010. These changes refocused the major milestone from the acquisition of facilities to the treatment of Hanford Site *Resource Conservation and Recovery Act of 1976*[3] MLLW and the certification and shipment of TRUM waste to satisfy land disposal restriction treatment standards. Interim milestones were established to support the actions necessary to achieve the major milestone including waste retrieval, treatment, certification, and shipment and the acquisition of facilities and/or capabilities necessary to complete that work.

This Project Management Plan (PMP) contains the current status of completed work along with DOE's plan to accomplish the remaining work scope under the M-091 Milestone series. Additional funding available through the *American Recovery and Reinvestment Act of 2009*[4] (ARRA) has allowed DOE to continue the M-091 work scope since April of 2009 when base

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

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

[3] *Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq. Available at: http://epw.senate.gov/rcra.pdf.

[4] *American Recovery and Reinvestment Act of 2009*, Pub. L. 111-5, 123 Stat. 115, February 17, 2009. Available at: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf.

funding was not available. This PMP outlines DOE's plan to accomplish the remaining work scope under the M-091 Milestone series.

This document describes DOE's current plan for the acquisition of capabilities necessary for the retrieval, storage, and treatment/processing of the MLLW and TRUM waste. The plan includes several new technical approaches to provide the necessary capabilities to accomplish the M-091 Milestone series. Included in this approach are the expanded use of commercial capabilities, the implementation of enhanced retrieval techniques, and the implementation of remote-handled (RH) technology for disposition of RH-TRUM waste.

With the additional ARRA funding, DOE has been able to make substantial progress in retrieving RSW from the burial grounds, treating MLLW, repackaging TRUM waste into certifiable containers, and shipping contact-handled (CH) TRUM waste offsite for disposal. The status of the M-091 Milestones as of May 15, 2011 is provided in Table ES-1.

Table ES-1. Status of M-091 Milestones as of May 15, 2011

M-091 Milestone	Status	Required Completion Date
M-091-03	Submitted annual revision of TRUM waste and MLLW PMP to Ecology.	6/30/2010
M-091-03	On schedule to submit 2011 annual revision of TRUM waste and MLLW PMP to Ecology.	6/30/2011
M-091-03D-02	The disposition plan for no-path-forward waste in above ground storage as of September 30, 2009, is included in this PMP.	6/30/2011
M-091-40T	1,139 m^3 CH-RSW has been retrieved towards the 2,000 m^3 of CH-RSW required to be retrieved by September 30, 2011.	9/30/2011
M-091-41A	72 m^3 non-caisson RH-RSW has been retrieved towards retrieving all non-caisson RH-RSW by September 30, 2016.	9/30/2016
M-091-42	318 m^3 of small container CH-MLLW has been treated towards the treating of all small containers CH-MLLW by September 30, 2016.	9/30/2016
M-091-43	132 m^3 of large container CH-MLLW and RH-MLLW has been treated towards the treating of all large containers CH-MLLW and RH-MLLW by September 30, 2017.	9/30/2017
M-091-44Q	300 m^3 of large container CH-TRUM waste has been repackaged into certifiable containers completing the field work portion of this milestone is ahead of schedule.	9/30/2016
M-091-44R	145 m^3 of large container CH-TRUM waste has been repackaged towards the 300 m^3 of large container CH-TRUM and/or RH-TRUM waste required to be made certifiable by September 30, 2017.	9/30/2016
M-091-46A	805 m^3 of small container CH-TRUM waste has been repackaged towards the 850 m^3 of small container CH-TRUM waste required to be certified by September 30, 2011.	9/30/2011
M-091-46G	1,000 m^3 of CH-TRUM waste has been shipped offsite for disposal completing the field work portion of this milestone.	9/30/2011

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Terms

AMWTP	Advanced Mixed Waste Treatment Project
AR	Administrative Record
ARRA	*American Recovery and Reinvestment Act of 2009*
CBFO	DOE Carlsbad Field Office
CCP	Central Characterization Project
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CH	contact-handled
CWC	Central Waste Complex
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
FS	feasibility study
FY	fiscal year
LDR	land disposal restriction
LLBG	low-level burial ground
LLW	low-level waste
MLLW	mixed low-level waste
MWT	mixed waste trench
OU	operable unit
PFP	Plutonium Finishing Plant
PMP	Project Management Plan
PUREX	plutonium-uranium extraction
RCRA	*Resource Conservation and Recovery Act of 1976*
RH	remote-handled
RI	remedial investigation
ROD	record of decision

RSW	retrievably stored waste
SAP	sampling and analysis plan
SWB	standard waste box
TSD	treatment, storage, and/or disposal
TPA	Tri-Party Agreement
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TRU	transuranic
TRUM	transuranic mixed
TRUPACT-II	Transuranic Package Transporter Model 2
WBS	work breakdown structure
WIPP	Waste Isolation Pilot Plant
WMA	waste management area
WRAP	Waste Receiving and Processing Facility

1 Project Overview

The Hanford Site, managed by the U.S. Department of Energy (DOE), produced about 60 percent of the United States' plutonium from the mid-1940s to the late 1980s in support of national defense efforts. The 943 km^2 (586 mi^2) site is located in southeastern Washington State. The Central Plateau covers approximately 121 km^2 (75 mi^2) in the center of the Hanford Site. Much of the legacy waste and contaminated materials from the site's defense mission remains on the Central Plateau.

The *Hanford Federal Facility Agreement and Consent Order* (Ecology et al., 1989a), commonly known as the Tri-Party Agreement (TPA), is a legal agreement between the Washington State Department of Ecology (Ecology), the U.S. Environmental Protection Agency (EPA), and DOE that identifies cleanup actions and schedules referred to as milestones (Ecology et al., 1989a). The scope of the M-091 Milestone series (Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*) is to complete retrieval and eliminate the backlog of Hanford mixed low-level waste (MLLW) and transuranic mixed (TRUM) waste in storage by December 31, 2030. When these milestones are completed, DOE will have retrieved the retrievably stored waste (RSW) from the burial grounds, treated and disposed the MLLW, repackaged the TRUM waste into certifiable containers, and shipped the waste offsite for disposal.

Ecology, EPA, and DOE approved changes to the M-091 Milestones in September 2010. Changes to the M-091 Milestones were considered extensive enough that Ecology and DOE decided to issue the change package as a replacement of the M-091 Milestone series. An overview of the changes follows:

- The major M-091 Milestone previously focused on the acquisition and modification of facilities/ capabilities to support retrieval, storage, and treatment of wastes. Ecology and DOE refocused the major milestone on the original milestone goal, to treat all *Hanford Site Resource Conservation and Recovery Act of 1976* (RCRA) MLLW and certify and ship TRUM waste to satisfy land disposal restriction (LDR) treatment standards. Interim milestones were established to support the actions necessary to achieve the major milestone including waste: retrieval, treatment, certification, and shipment and the acquisition of necessary facilities and/or capabilities. DOE may chose to complete certification and shipment of TRUM waste for disposal at the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, in lieu of LDR treatment if, as of the time of shipment, such waste is exempt from LDR treatment requirements when disposed at WIPP.
- The previous M-091-45 Milestone required DOE to replace a "to be determined" date for the M-091-01 Milestone, which originally required DOE to complete acquisition of facilities and modification of existing facilities, and modification of planned facilities by June 30, 2012. Ecology and DOE have agreed that DOE will not prepare a conceptual design for facilities by 2016, and replace the M-091-01 "to be determined" date at that time (2016).
- The new milestones provide a comprehensive, easily understood series of milestones to measure progress on the safe and stable processing and shipping of Hanford Site waste covered by the M-091 Milestone series and address public comments in order to make the milestones easier to read and understand.

DOE developed this Project Management Plan (PMP) in accordance with the TPA, Section 11.5, "Waste Material Stream Project Management Work Plans," prepared under Milestone series M-090-00, M-091-00, and M-092-00 of the TPA Action Plan (Ecology et al., 1989b). This PMP contains the current status of completed work along with DOE's plan to accomplish the remaining work scope under the M-091 Milestone series. This revision of the PMP incorporates the regulator comments on the previous revision submitted in June 2010.

A goal of DOE, Ecology, and EPA is to integrate the Hanford Site cleanup activities to the extent possible to enable efficient and effective management of waste. The three agencies agreed to integrate the plan for managing transuranic (TRU) and TRUM waste under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) cleanup actions, with the plan to manage similar waste forms under the M-091 work scope. This revision of the PMP also addresses the acquisition of capabilities necessary to prepare TRU and TRUM waste generated under CERCLA cleanup actions.

1.1 Goals and Objectives

Previously, the focus of the M-091 Milestones was on the acquisition and modification of facilities and capabilities to support retrieval, storage, and treatment of wastes. The TPA agencies renegotiated the milestones to refocus the goal on treating all Hanford Site RCRA MLLW, and on certifying and shipping TRUM waste to WIPP.

The milestones establish a comprehensive approach for the safe and stable processing of retrieved and aboveground stored waste. The latest change to the milestones set a deadline of 2030 to remove all legacy TRUM waste from the Hanford Site. When the M-091 Milestones are completed, the RSW will have been removed from the burial grounds, the backlog of MLLW will have been treated and disposed, and the TRUM waste will have been repackaged into certifiable containers and shipped offsite for disposal.

1.2 Scope

The scope of the M-091 Milestone series includes all MLLW and TRUM waste in aboveground storage as of June 30, 2009 and RSW in the low-level burial grounds (LLBGs). Waste in aboveground storage is defined as the waste stored within the Central Waste Complex (CWC), T Plant, and the Waste Receiving and Processing Facility (WRAP). The RSW is defined as waste that was placed in LLBG 218-W-4B, 218-W-4C, 218-W-3A, and 218-E-12B after May 6, 1970, and was believed to meet TRU waste criteria when it was placed in one of these burial grounds. Descriptions and maps of the LLBGs are included in Appendix C. An aerial view of the Hanford Site 200 West Area is presented in Figure 1-1. An aerial view of the 218-E-12B Burial Ground in the 200 East Area of the Hanford Site is presented in Figure 1-2.

The M-091 Milestone series scope is as follows:

- Acquisition of capabilities for retrieving and processing/treating TRUM waste (M-091-01)
- Disposition of no-path-forward waste (M-091-03D-02)
- Retrieval of contact-handled (CH) RSW from the LLBGs (M-091-40)
- Retrieval of remote-handled (RH) RSW from the LLBGs (M-091-41)
- Treatment of CH-MLLW in small containers (M-091-42)
- Treatment of CH-MLLW in large containers and RH-MLLW (M-091-43)
- Certification and shipment offsite of CH-TRUM waste in large containers and RH-TRUM waste (M-091-44)
- Certification and shipment offsite of CH-TRUM waste in small containers (M-091-46)

Figure 1-1. Aerial View of Hanford Site 200 West Area (April 2010)

Figure 1-2. Aerial View of 218-E-12B Burial Ground in Hanford Site 200 East Area (April 2010)

In the M-091 milestone series, the following container size definitions are used:

- When referring to MLLW, small containers are less than 10 m^3, including 55 gal drums. A large container is defined as any container that is not defined as a small container.
- When referring to TRUM waste, small containers are 55 gal drums or smaller containers, even if overpacked in 85 gal drums, and WIPP standard waste boxes (SWBs). A WIPP SWB is a 1.8 m^3 steel container that is approximately 0.94 m in height, 1.8 m in length, and 1.4 m in width. A large container is defined as any container that is not defined as a small container.

The scope of this M-091 PMP has been expanded to include the projected waste volumes and schedules for CERCLA cleanup actions, authorized in records of decision (RODs) and action memoranda at the Hanford Site, that are under the scope of the M-016 Milestone series. Chapter 7 summarizes the CERCLA cleanup actions that have the potential to generate waste with TRU constituents greater than 100 nCi/g, projected volumes, and schedules from the CERCLA cleanup actions authorized in RODs and actions memoranda. Milestone change packages M-091-10-03 (draft) and M-16-10-05 (draft) document the incorporation of the M-091-93 Milestone scope into the annual M-091 PMP.

1.3 Summary of Progress

With the additional funding available through the *American Recovery and Reinvestment Act of 2009* (ARRA) program, DOE was able to make substantial progress in retrieving RSW from the burial grounds, treating MLLW, repackaging small and large containers of TRUM waste, and shipping small containers of CH-TRUM waste offsite for disposal. The status of the M-091 Milestones as of May 15, 2011 is provided in Table 1-1.

1.4 Management Plan Overview

Figure 1-3 presents a simplified flow path for MLLW and TRUM waste retrieved from the LLBGs and aboveground storage, through treatment/processing, and to disposal. This figure illustrates DOE's overall plan for disposition of the remaining 11,500 m^3 of TRUM waste and 1,865 m^3 of MLLW (as of October 1, 2010) as shown in Figure 1-4.

The following key elements of DOE's plan support the completion of the M-091 Milestone series:

- Existing retrieval methods will continue to be used to retrieve the remaining CH-RSW and non-caisson RH-RSW. Additional retrieval methods (i.e., Trench Face Retrieval and Characterization System) have recently been implemented and will continue to be used. A project has been established to acquire the capability necessary to retrieve the RH-RSW from the alpha caissons (Chapter 2).
- Existing onsite (in-trench treatment, T Plant) and offsite (commercial facilities) capabilities will continue to be utilized to treat the remaining MLLW. The MLLW that has been identified as having no-path-forward is expected to be dispositioned through in-trench treatment, pre-treatment of the waste onsite then sent to an offsite commercial facility for LDR treatment, and/or site-specific LDR treatment variance. Majority of the no-path-forward waste is expected to be dispositioned by fiscal year (FY) 2016 (Chapter 5). The MLLW will be disposed at either the mixed waste trenches (MWTs) or the Environmental Restoration Disposal Facility (ERDF). A small portion of MLLW is thermally treated, which results in no residue; therefore, it is disposed at commercial facilities (Chapter 3).
- Existing onsite (WRAP, T Plant) and offsite (commercial facilities) capabilities will continue to be utilized to repackage the remaining small container CH-TRUM waste into WIPP certifiable containers (Chapter 4).

- Existing offsite commercial capabilities will continue to be utilized to repackage a portion of the large containers of CH-TRUM and non-caisson RH-TRUM waste into WIPP certifiable containers. Projects have been established to acquire the capabilities necessary to repackage the remaining large containers of CH-TRUM and RH-TRUM waste that cannot be repackaged commercially (Chapter 4).
- WRAP will continue to be used for TRUM waste characterization, certification, and loading of CH-TRUM waste into Transuranic Package Transporter Model 2 (TRUPACT-II) shipments to WIPP. A project has been established to acquire the capability necessary for loading RH-TRUM waste into RH-72B canister and transport casks for shipment to WIPP (Chapter 4).

Table 1-1. Status of M-091 Milestones as of May 15, 2011

M-091 Milestone	Status	Required Completion Date
M-091-03	Submitted annual revision of TRUM waste and MLLW PMP to Ecology.	6/30/2010
M-091-03	On schedule to submit 2011 annual revision of TRUM waste and MLLW PMP to Ecology.	6/30/2011
M-091-03D-02	The disposition plan for no-path-forward waste in above ground storage as of September 30, 2009, is included in this PMP (Chapter 5).	6/30/2011
M-091-40T	1,139 m^3 CH-RSW has been retrieved towards the 2,000 m^3 of CH-RSW required to be retrieved by September 30, 2011.	9/30/2011
M-091-41A	72 m^3 non-caisson RH-RSW has been retrieved towards retrieving all non-caisson RH-RSW by September 30, 2016.	9/30/2016
M-091-42	318 m^3 of small container CH-MLLW has been treated towards the treating of all small containers CH-MLLW by September 30, 2016.	9/30/2016
M-091-43	132 m^3 of large container CH-MLLW and RH-MLLW has been treated towards the treating of all large containers CH-MLLW and RH-MLLW by September 30, 2017.	9/30/2017
M-091-44Q	300 m^3 of large container CH-TRUM waste has been repackaged into certifiable containers completing the field work portion of this milestone is ahead of schedule.	9/30/2016
M-091-44R	145 m^3 of large container CH-TRUM waste has been repackaged towards the 300 m^3 of large container CH-TRUM and/or RH-TRUM waste required to be made certifiable by September 30, 2017.	9/30/2016
M-091-46A	805 m^3 of small container CH-TRUM waste has been repackaged towards the 850 m^3 of small container CH-TRUM waste required to be certified by September 30, 2011.	9/30/2011
M-091-46G	1,000 m^3 of CH-TRUM waste has been shipped offsite for disposal completing the field work portion of this milestone.	9/30/2011

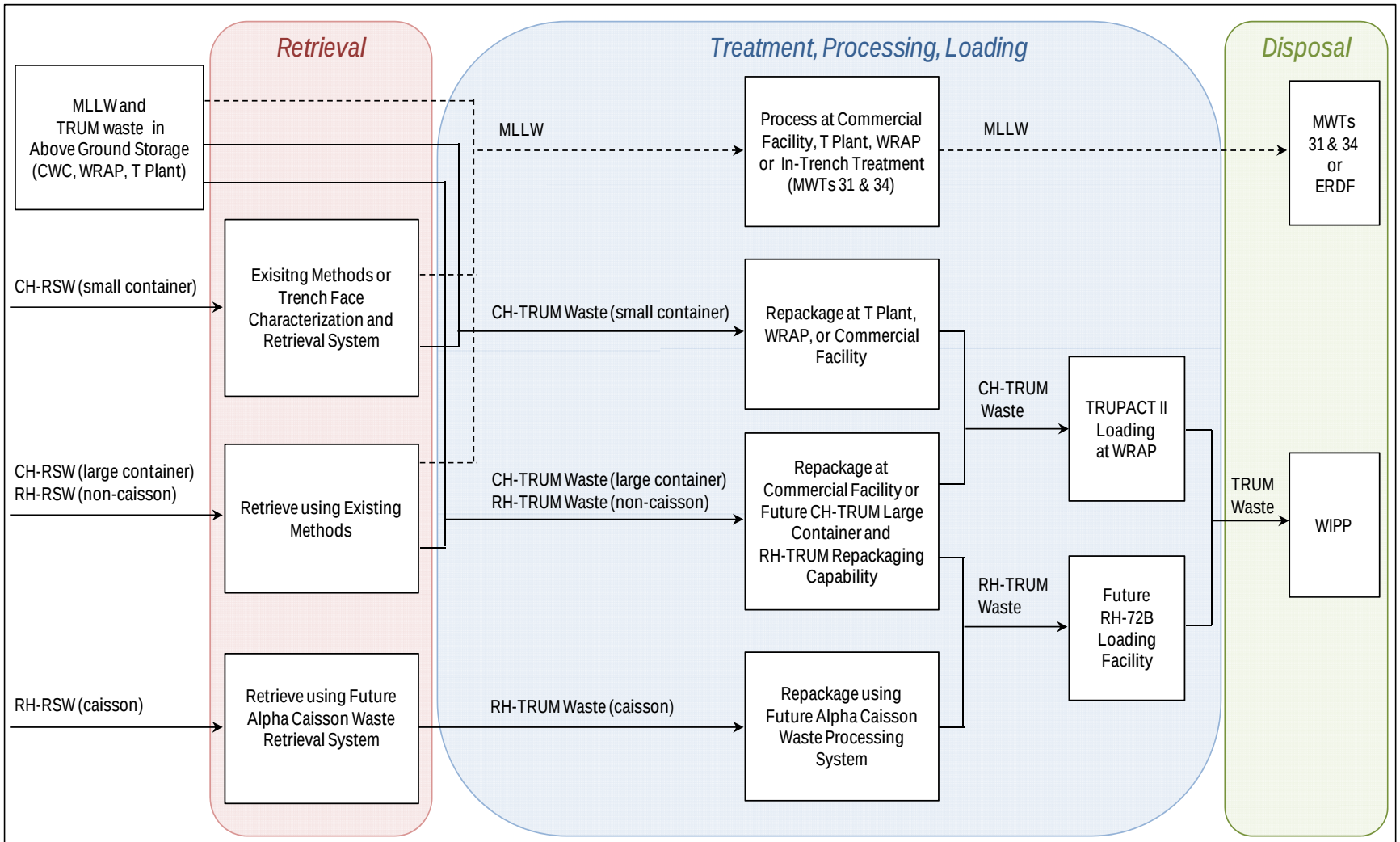
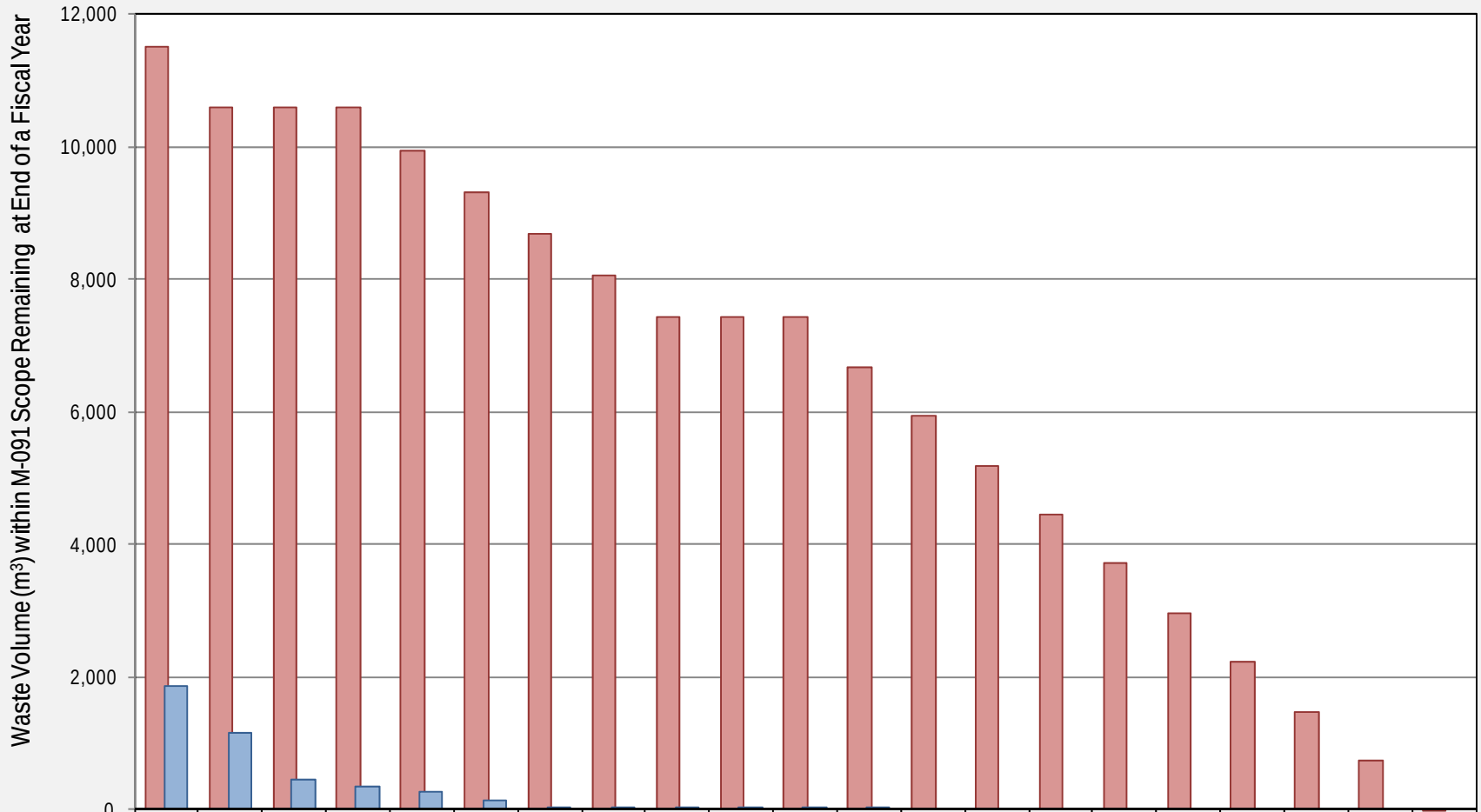


Figure 1-3. Simplified Waste Flow Path (Typical)



	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
TRU Waste	11,500	10,584	10,584	10,584	9,951	9,318	8,686	8,053	7,421	7,421	7,421	6,679	5,937	5,195	4,453	3,711	2,969	2,227	1,485	743	0
MLLW	1,865	1,155	445	360	275	140	38	38	38	38	38	38	0								

* See Appendix D, Table D-1, for the data source, analytical basis, and underlying assumption used in the development of this chart.

Figure 1-4. Waste Volume within M-091 Milestone Scope Remaining at the End of a Fiscal Year

Figure 1-4 reflects projected volumes of TRUM waste and MLLW remaining for disposition at the end of each FY. These volumes include waste in aboveground storage and waste as RSW. The RSW is considered TRUM waste until it has been retrieved and designated. Of the RSW already retrieved, subsequent analysis has shown that a percentage of the RSW is MLLW. In order to determine future capability and capacity needs, DOE has made projections as to the RSW volume breakdown of MLLW and TRUM waste (Chapters 3 and 4). Figure 1-4 reflects this breakdown, combined with the waste already designated in aboveground storage.

As shown in Figure 1-4, as of October 1, 2010, there was 11,500 m^3 of TRUM waste still to be certified and shipped offsite for disposal and 1,868 m^3 of MLLW to be treated.

For the remainder of FY 2011 (as of May 15, 2011) and through FY 2012, DOE plans to:

- Retrieve 2,200 m^3 of CH-RSW and 20 m^3 of non-caisson RH-RSW.
- Treat 1,260 m^3 of MLLW.
- Repackage 392 m^3 of large container CH-TRUM waste and RH-TRUM waste into WIPP certifiable containers at Perma-Fix Northwest during the remainder of FY 2011 to complete target milestones under M-091-44. No repackaging of large container CH-TRUM waste and RH-TRUM waste is expected to occur during FY 2012.
- Repackage 45 m^3 of CH-TRUM in small containers into WIPP certifiable containers at T Plant, WRAP, and what M-091-46 waste is planned to be repackaged at Perma-Fix Northwest during the remainder of FY 2011 to complete Milestone M-091-46A. During FY 2012, an additional 110 m^3 will be repackaged at WRAP and Perma-Fix Northwest to complete additional target milestones under M-091-46.
- Ship 400 m^3 of CH-TRUM waste to WIPP during the remainder of FY 2011. No shipments to WIPP are expected to occur during FY 2012 and FY 2013.

For the outyears, the annual workoff rates provided in Figure 1-4 are based on the funding profile given in Figure 8-1. This funding profile is based on the FY 2010 through 2018 Plateau Remediation Contract baseline, the additional ARRA funding that continues through FY 2011, and the President's FY 2012 budget request. Funding for FY 2019 through FY 2031 was estimated based on assumptions regarding operations that support completion of the M-091 Milestone series and is subject to change as planning is refined. However, there is a high degree of uncertainty in this funding profile for FY 2012 and FY 2013. Given preliminary budget levels and site priorities, it may be necessary to curtail work sharply within the M-091 Milestone work scope. However, because current plans represent an acceleration of M-091 Milestone requirements, in most cases, short-term deferral will not impact the ability to meet the milestones.

The funding profile given in Figure 8-1 does not include the funding necessary to support the CERCLA cleanup actions discussed in Chapter 7.

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2 Retrieval and Designation of Retrievably Stored Waste (M-091-40 and M-091-41)

DOE has made substantial progress in retrieving RSW from the burial grounds that contained approximately 15,200 m^3 of RSW. Since retrieval operations began in 2003, DOE has successfully retrieved over 11,100 m^3 of RSW, leaving an estimated 4,100 m^3 as of October 1, 2010 remaining to be retrieved. The RSW is in designated areas in LLBGs 218-E-12B, 218-W-3A, 218-W-4B, and 218-W-4C. Burial Ground 218-W-4B includes four alpha caissons containing RH-RSW (Section 2.3). The retrieval of CH-RSW has been completed in the 218-W-4C LLBG. Descriptions and maps of these LLBGs are included in Appendix C.

The key elements of DOE plans for completing Milestones M-091-40 and M-091-41 are as follows:

- Continue retrieving drums of RSW using existing methods (i.e., repack into 85 gal drums and transfer to CWC).
- Continue retrieving and characterizing the remaining drums of CH-RSW, and utilize existing retrieval methods that have been supplemented with the recently implemented Trench Face Retrieval and Characterization System (Section 2.2.1).
- Continue retrieving the remaining non-drum CH-RSW and non-caisson RH-RSW utilizing existing methods.
- Acquire the necessary new capability to retrieve the RH-RSW from the alpha caissons.

Retrieval has become more challenging as more frequent occurrences of degraded, failed, and contaminated containers or areas have been encountered. Containers with significant deterioration will be placed in a safe configuration (e.g., overpacking in larger containers and building of containment around degraded boxes) pending development of container specific retrieval instructions. Containers determined to present unacceptable hazards to the workers will be documented and may be reburied to provide adequate protection during storage. Weather enclosures and containment systems may be used as required to support retrieval operations.

2.1 Status and Annual Volume Projections for Retrieval of Retrievably Stored Waste

As of May 15, 2011, 1,139 m^3 of CH-RSW has been retrieved towards Milestone M-091-40T and 72 m^3 of RH-RSW has been retrieved towards Milestone M-091-41A. For the remainder of FY 2011 and through FY 2012, DOE plans on retrieving 2,200 m^3 of CH-RSW and 20 m^3 of non-caisson RH-TRUM waste using existing methods and the Trench Face Retrieval and Characterization System.

Figures 2-1 and 2-2 present a summary of the CH-RSW and RH-RSW that has been or is projected to be retrieved in the coming years. The bars represent the CH-RSW and RH-RSW that has been or is projected to be retrieved during an FY, and the line represents the cumulative volume remaining at the end of an FY. The schedule of retrieval activities is based on the assumption that funding levels are available as given in Figure 8-1. However, there is a high degree of uncertainty in the funding levels for FY 2012 and FY 2013. Given preliminary budget levels and site priorities, it may be necessary to curtail work sharply within the M-091 Milestone work scope. However, because current plans represent an acceleration of M-091 Milestone requirements, short-term deferral will not impact the ability to meet the milestones in most cases.

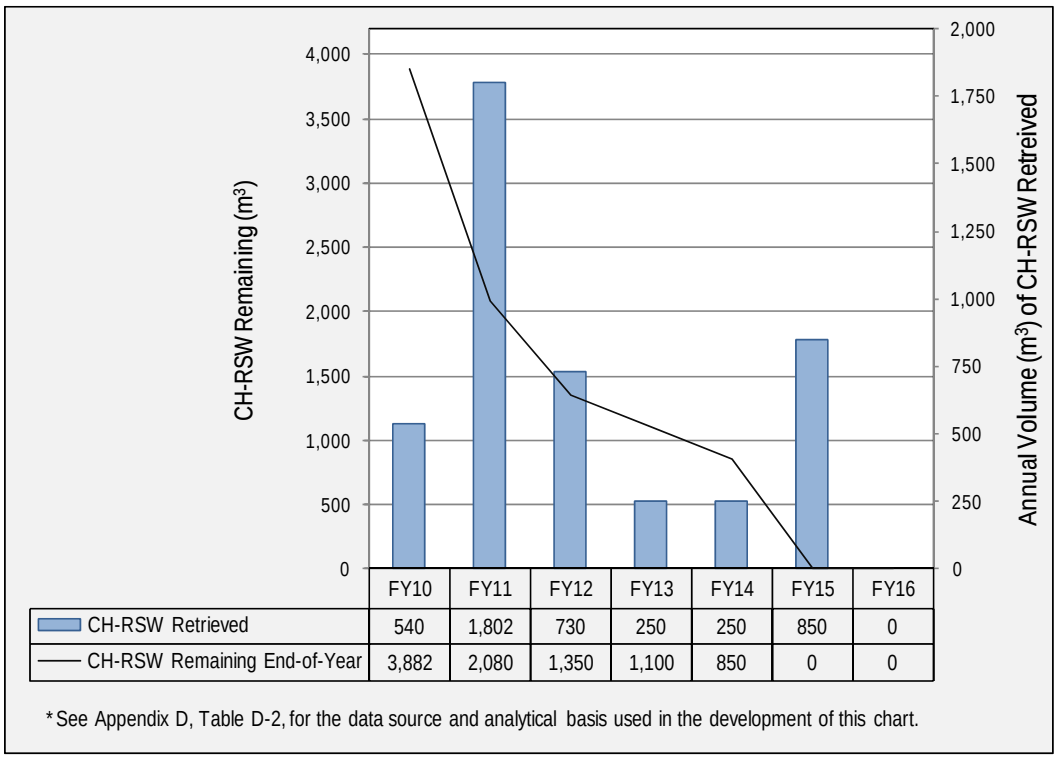


Figure 2-1. Volume Projections for CH-RSW (M-091-40) Retrieval

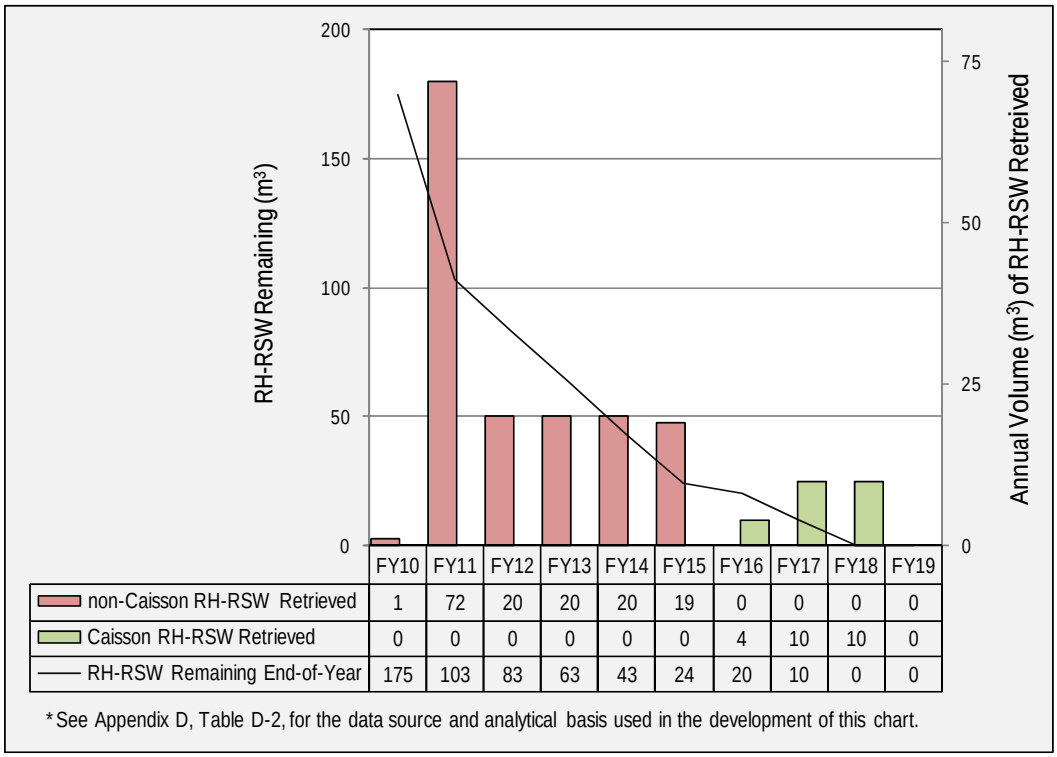


Figure 2-2. Volume Projections for RH-RSW (M-091-41) Retrieval

DOE expects to complete the M-091-40 and M-091-41A Milestones by retrieving all the CH-RSW and non-caisson RH-RSW by the end of FY 2015. DOE expects to complete the M-091-41 Milestone by acquiring new capability to retrieve the alpha caisson RH-RSW by the end of FY 2015 and then retrieve this RH-RSW by the end of FY 2018.

2.2 Retrieval Approach of Non-Caisson Retrievably Stored Waste

The existing retrieval process and techniques, supplemented with the newly acquired retrieval and characterization equipment, will continue to be used to retrieve the remaining CH-RSW and non-caisson RH-RSW.

The retrieval process begins with the development of a retrieval plan that addresses the following.

- Identification of the trench area(s)
- Characterization of the buried containers in the selected trench areas, identification of radiological, chemical, and industrial hazards based on the characterization data
- Determination of hazard controls to be applied to retrieval operations
- Review of existing processes, techniques, equipment, tools, and procedures to determine if they are adequate and appropriate for the planned retrieval activity
- Identification of actions that need to be addressed prior to initiating retrieval activities

In addition, subsurface (geophysical) surveys are performed to identify underground container configuration and any obstruction that may be encountered during excavation activities. The information gathered during the planning process is documented in a retrieval plan.

2.2.1 Retrieval and Characterization of CH-RSW Drums

The remaining 13,800 drums of CH-RSW (as of April 24, 2011) are located in the 218-W-3A, 218-W-4B, and 218-E-12B LLBGs. In February of 2011, retrieval of CH-RSW drums began in Trenches 17 and 27 of the 218-E-12B LLBG using the Trench Face Retrieval and Characterization System. The remaining CH-RSW drums in 218-W-3A LLBG will likely be retrieved using existing methods (repack into 85 gal drums and transfer to CWC). Small containers of RH-RSW intermingled with CH-RSW drums are also being retrieved. A simplified flow path for retrieval and characterization is presented in Figure 2-3.

Excavation of the trench is initiated following completion of site setup and preparation. Retrieval of the containers is primarily be performed using existing and proven handling processes. Due to the potential existence of higher dose containers, new long reach and remote equipment (e.g., crawler) has been acquired to support the retrieval and handling activities (see Figure 2-4).

Containers that have contamination on the outside of the container and/or poor integrity will be placed into a plastic drum bag or an 85 gal drum overpack. Containers are then removed from the trench by forklift, crane, or conveyor system for characterization. Containers with higher radiological dose RH-RSW will be retrieved using the newly acquired remote-controlled crawler and/or crane with lifting attachments that allow for remote handling of containers. As these containers are retrieved, they will be placed in concrete shielded over packs. If RH containers are found that are believed to have poor integrity, they will be covered with lead blankets, soil, or other shielding to reduce dose rates and a plan will be developed for retrieving these containers.

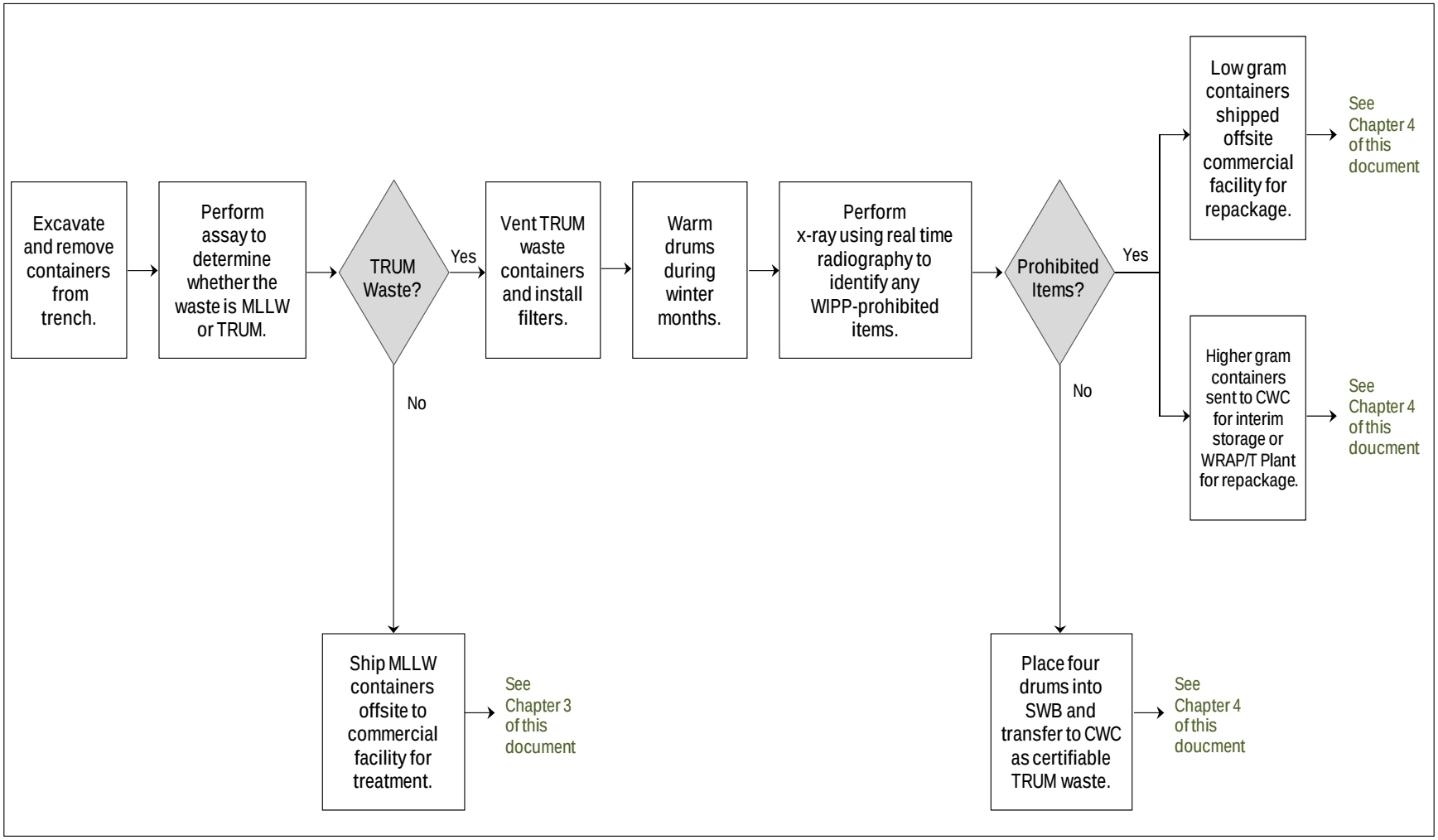


Figure 2-3. Simplified Flow Path of Trench Face Characterization System

Excavation using
newly acquired
remote-controlled crawler.

Exposed drums
during excavation.

Lifting drum
from trench.

Figure 2-4. Example of Drums Being Removed from 218-E-12B Trenches

This system is housed in trailers and CONEX containers (i.e., large metal cargo container) that are currently staged at the 218-E-12B LLBG until retrieval activities are complete and will then be moved to the West Area LLBGs. The equipment is staged in or near the trench chosen for retrieval for the purpose of minimizing handling of the drums by bringing the equipment to the trenches and not having to transfer the drums to WRAP to be characterized.

Once a drum (or low radiological dose RH container) has been removed from the trench, it is processed through the gamma assay system and/or neutron assay equipment to determine whether it is MLLW or TRUM waste. If the cesium levels in the containers are high enough that they flood the gamma assay detectors, the gamma assay results are indeterminate, or the containers are too large for the gamma assay equipment, they will be moved to the neutron assay system for characterization. The containers determined to be MLLW will be sent directly to an offsite commercial facility for treatment prior to disposal (Chapter 3).

Once assayed, the TRUM drums are vented. The vented drums are then moved into the real time radiography equipment, where an x-ray of the drum is performed to determine if it contains any WIPP prohibited items. During the winter months, a drum warming unit will be used to melt any liquids inside a drum prior to going in the real time radiography equipment. Drums that do not contain WIPP prohibited items are placed into WIPP SWBs (four drums per SWB) and transferred to CWC as certifiable TRUM waste. Drums that have WIPP prohibited items and low plutonium content are sent offsite to Perma-Fix Northwest, located in Richland, Washington, for repackaging into WIPP-certifiable containers. Drums with prohibited items and higher plutonium content are sent to CWC for interim storage until the drums can be repackaged onsite at either WRAP or T Plant (Chapter 4).

2.2.2 Retrieval of Non-Drum CH-RSW and Non-Caisson RH-RSW

Existing method will continue to be utilized to retrieve the remaining containers of CH-RSW (not including drums) and RH-RSW. The current inventory of containers (as of May 20, 2011), not including drums of CH-RSW, consists of:

- 6 containers (greater than 10 m^3) of CH-RSW located in a trench to be removed and transferred to a treatment, storage, and/or disposal facility (TSD).
- 10 containers (greater than 10 m^3) of CH-RSW that have been removed from a trench waiting to be transferred to a TSD.
- 178 containers (less than 10 m^3) of CH-RSW located in a trench to be removed and transferred to a TSD.
- 38 containers (less than 10 m^3) of CH-RSW that have been removed from a trench waiting to be transferred to a TSD.
- 153 containers of RH-RSW located in a trench to be removed and transferred to a TSD.
- 21 containers of RH-RSW that have been removed from a trench waiting to be transferred to a TSD.

The excavation techniques for exposing large containers of RSW and non-caisson RH-RSW in the LLBGs is similar to the excavation of drums as described in Section 2.2.1. The difference between the retrieval approaches comes during the removal of the large containers from the trenches as described in this subsection.

The initial field activity comprises site setup and preparation. Retrieval and portable nondestructive assay equipment are staged in or near the trench chosen for retrieval. During the planning process, containers

with the potential to be MLLW are identified and assays are performed at the trenches using portable assay equipment. Container staging and work areas are defined and set up. Equipment setback distances are determined by engineering analysis to ensure trench slope stability is maintained. Weather enclosures may be used in selected retrieval activities. The excavation of the trench is initiated following completion of site setup and preparation.

During excavation, once the overburden is removed to the extent that the containers become visible, the container condition is evaluated. If the visible containers provide evidence of significant degradation, an appropriate protective covering is applied to protect the waste from the environmental conditions until it is time to retrieve the containers. Excavation activities will be monitored to identify any contamination that may be present and to minimize impacts to worker health and safety. Radiological measurements of the container are performed to measure the radiological dose rate and identify potential contamination. Industrial hygiene sampling is also performed to monitor potential chemical hazards. If conditions are encountered that may require actions outside those in approved operating procedures, appropriate actions will be determined, documented, and taken to remediate the conditions.

Individual containers are not immediately accessible for inspection to determine the extent of the condition upon removal of overburden, tarps, plywood, or other protective materials. Containers may also be exposed for an extended period before retrieval can be started or completed for various reasons (e.g., equipment requirements, permits, weather, adjacent containers, or identification of new or changed conditions).

Retrieval may include container repair, over packing, application of fixatives for contamination control, and moving the containers to a staging location for final inspection, labeling, and surveys. A crane and/or a forklift are used to remove or reposition containers in the trenches. Other equipment may be used in the retrieval activities such as remote controlled equipment that will accomplish similar tasks without exposing personnel to the immediate hazards of retrieval. Figure 2-5 illustrates an example of a container in good condition being lifted from the trench. Figure 2-6 illustrates an example of a large container that is degraded, requiring reinforcement and placement on a lifting base prior to being lifted from the trench. Figure 2-7 illustrates an example of a container that has failed, requiring the waste to be placed into a new container prior to being removed from the trench.

2.3 Retrieval of Caisson RH-RSW

Burial Ground 218-W-4B includes four alpha caissons containing high radiological dose RH-RSW. Based on available records, the four caissons contain a total of 5,567 containers (approximately 23.5 m^3) that are primarily 1 gal cans, with a few 2 and 5 gal cans. This waste was generated from post-irradiation examination of reactor fuel elements and other material in the 325 and 327 hot cell facilities in the 300 Area of the Hanford Site.

The alpha caissons are cylindrical, underground waste repositories used to store dry, RH-RSW. The alpha caissons are located 4 m (14 ft) below grade, and have a 1 m (3 ft) diameter loading chute where the RH-RSW was loaded into the caisson and a 0.3 m (1 ft) diameter ventilation shaft. Loading of this waste material into the alpha caissons occurred between 1970 and 1988. The fifth alpha caisson in the 218-W-4B was never used and is empty. Figure 2-8 presents a schematic of an alpha caisson.

Lifting of a container directly from a trench

Another example of a container being lifted driectly out of a trench.

Figure 2-5. Examples of Large Containers in Good Condition Being Retrieved from LLBG

Excavation of container in trench

Reinforcing container with plywood

Placing container onto a lifting base

Lifting container from trench

Figure 2-6. Examples of Large Container in Degraded Condition Being Retrieved from LLBG

Excavation of container in trench

Removing container collapsed lid

Placing waste into new container prior to being removed from trench

Figure 2-7. Examples of Failed Container Being Packaged Prior to Retrieval from LLBG

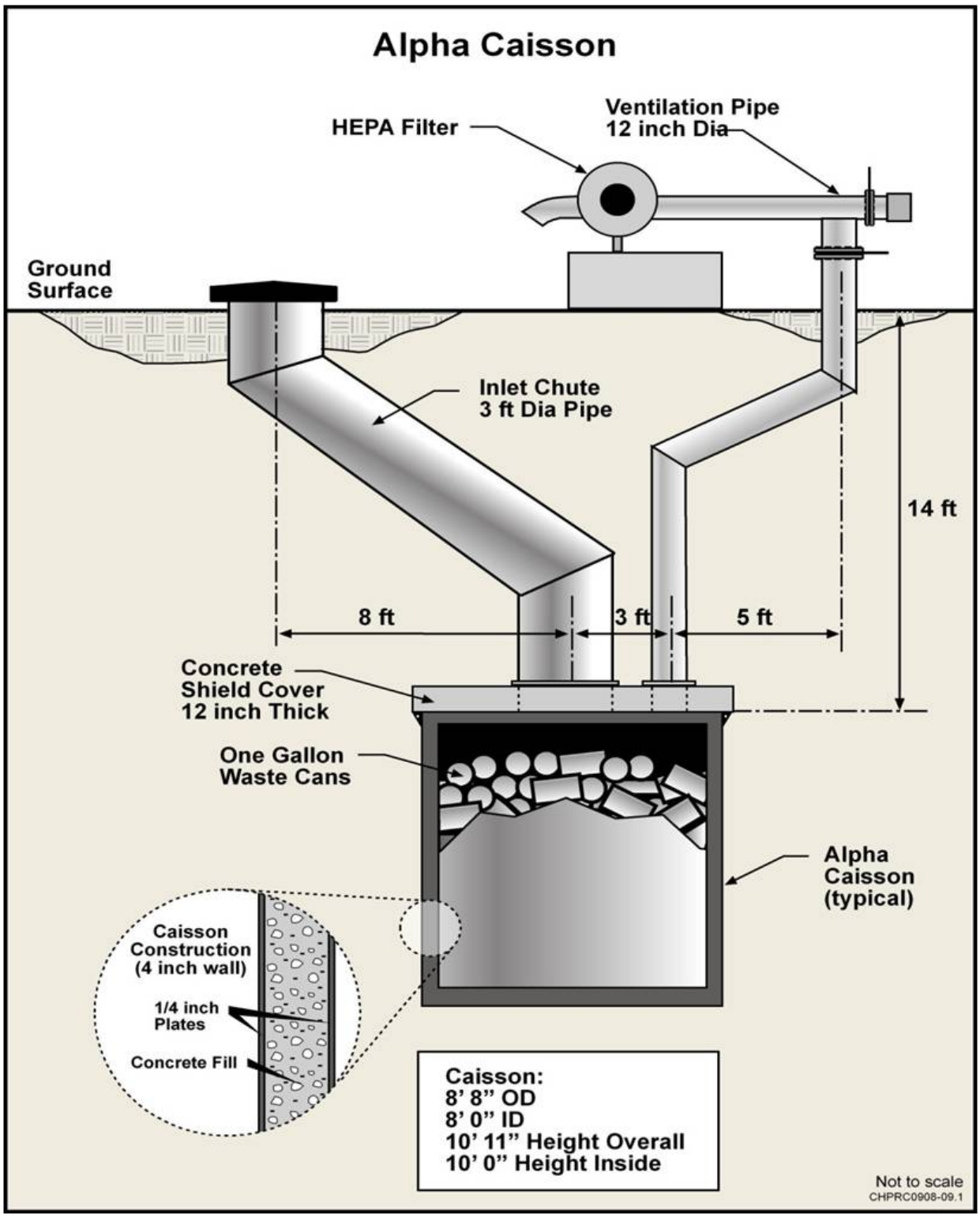


Figure 2-8. Schematic of an Alpha Caisson

Current onsite capabilities are not adequate to retrieve the RH-RSW from these caissons. As a result, new capability will be acquired through the Alpha Caisson Waste Retrieval Project. Retrieval of the waste from the caissons will be complicated by the offset inlet chute (Figure 2-9), the heaped and random arrangement of the containers (Figure 2-10), and the assumed breached containers from the impact of sliding and dropping into the caisson. Retrieval will be further complicated by the presence of solid waste forms (e.g., plastic sheeting, rope, wire, and rods), loose equipment and materials, and soil that has accumulated over the years of loading operations.

The Alpha Caisson Waste Project will provide the capability to retrieve, characterize, and package the RH-RSW that is currently located in the alpha caissons in the 218-W-4B LLBG. This project has been defined as two separate systems to maximize flexibility in schedule and operation. The first is the Alpha Caisson Waste Retrieval System that will be responsible for accessing the individual alpha caissons, removing the RH-RSW waste materials from the caissons, performing preliminary radiological dose and weight measurements, and packaging the waste into site compliant packages waiting further processing. A conceptual schematic of the Alpha Caisson Waste Retrieval System is provided in Figure 2-11. The Alpha Caisson Waste Retrieval System will be constructed of modular units that are designed to be relocatable. This modular approach was established to enable reuse of these systems at other locations on the Hanford Site. The project schedule for acquiring the alpha caisson RH-RSW retrieval system is provided in Table 2-1. The RH-RSW waste containers generated from this activity will be transferred to the Alpha Caisson Waste Processing System that is discussed in Section 4.2.3.

Table 2-1. Alpha Caisson Retrieval Project Schedule

M-091 Milestone	Activity	Scheduled Completion Date
-	Complete Conceptual Design of Alpha Caisson Waste Retrieval System	2/2010
	Complete Definitive Design of Alpha Caisson Waste Retrieval System	9/30/2013
	Complete Construction of Alpha Caisson Waste Retrieval System	5/04/2015
M-091-41	Complete Retrieval of Caisson RH-RSW	9/30/2018

Once the all RH-RSW has been removed from the caissons, the remaining debris will be removed, all entry points to each caisson will be secured, and the caissons will be backfilled to grade level awaiting final remediation.

2.4 Post-Retrieval Activities

Milestone M-091-40 requires that as RSW retrieval proceeds, DOE will sample and analyze trench substrates with the purposes of determining whether or not release of contaminates to the environment have occurred and, if so, the nature and extent of contamination. Sampling that has been performed is documented in the Administrative Record (AR).

The sampling and analysis plans (SAPs) for the four LLBGs are as follows:

- 218-W-4C Sampling and Analysis Plan, DOE/RL-2003-48
- 218-W-4B Burial Ground Sampling and Analysis Plan, DOE/RL-2004-70
- 218-E-12B Burial Ground Sampling and Analysis Plan, DOE/RL-2004-32
- 218-W-3A Burial Ground Sampling and Analysis Plan, DOE/RL-2004-71

Figure 2-9. Alpha Caisson (1987)

Figure 2-10. Waste Containers in Alpha Caisson 4 (1987)

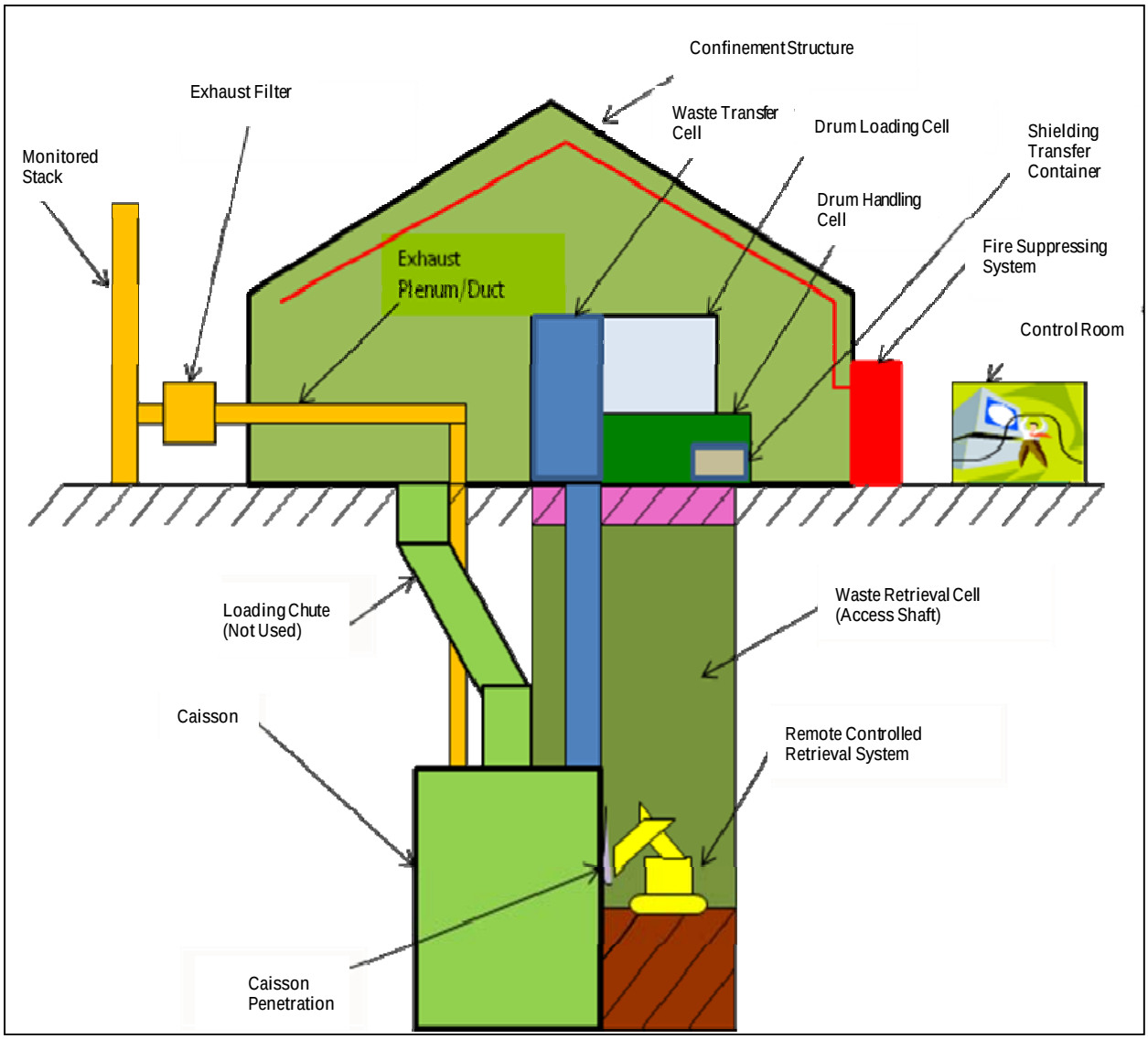


Figure 2-11. Conceptual Schematic of the Alpha Caisson Retrieval System

Once all CH-RSW has been removed from the trenches in the LLBGs, information and photographs regarding as-left trench conditions will be documented and sampling of the soil will commence per the SAPs that have been developed to determine whether contaminants have been released from the burial grounds where CH-RSW has and will be retrieved. The M-091-41 Milestone does not require sampling and analysis.

Once all RH-RSW (Milestone M-091-41) has been removed from the trenches in the LLBGs, information and photographs regarding as-left trench conditions will be documented.

For the purposes of this PMP, it is assumed that any soil remediation in the trenches where RSW is removed will be covered as part of the 200-SW-1 Operable Unit (OU) CERCLA cleanup actions (M-016 Milestone series).

3 Treatment and Disposal of Mixed Low-Level Waste (M-091-42 and M-091-43)

Substantial progress has been made in recent years in the treatment and disposal of MLLW, which was once thought to have no-path-forward. Since 1997, over 9,500 m^3 of MLLW has been treated and disposed. The majority of this MLLW has been treated using commercial capabilities and disposed onsite at either the MWTs or ERDF. As of May 15, 2011, 1734 m^3 of MLLW remained to be treated and disposed, 266 m^3 is in aboveground storage and a projected 1,468 m^3 of RSW that will assay as MLLW. The combination of commercial capabilities and in-trench treatment will continue to be used for treating the remaining MLLW. The MLLW remaining that cannot currently be treated either commercially or by in-trench treatment is considered no-path-forward waste. Disposition of this waste is covered under Milestone M-091-03D-02, as discussed in Chapter 6.

Current commercial facilities under contract include:

- Perma-Fix Northwest, located in Richland, Washington
- East Tennessee Material and Energy Corporation, Inc., located in Oak Ridge, Tennessee
- Perma-Fix Diversified Scientific Services, Inc., located in Tennessee
- Energy*Solutions* Clive Site, located in Utah
- Impact Services, located in Tennessee

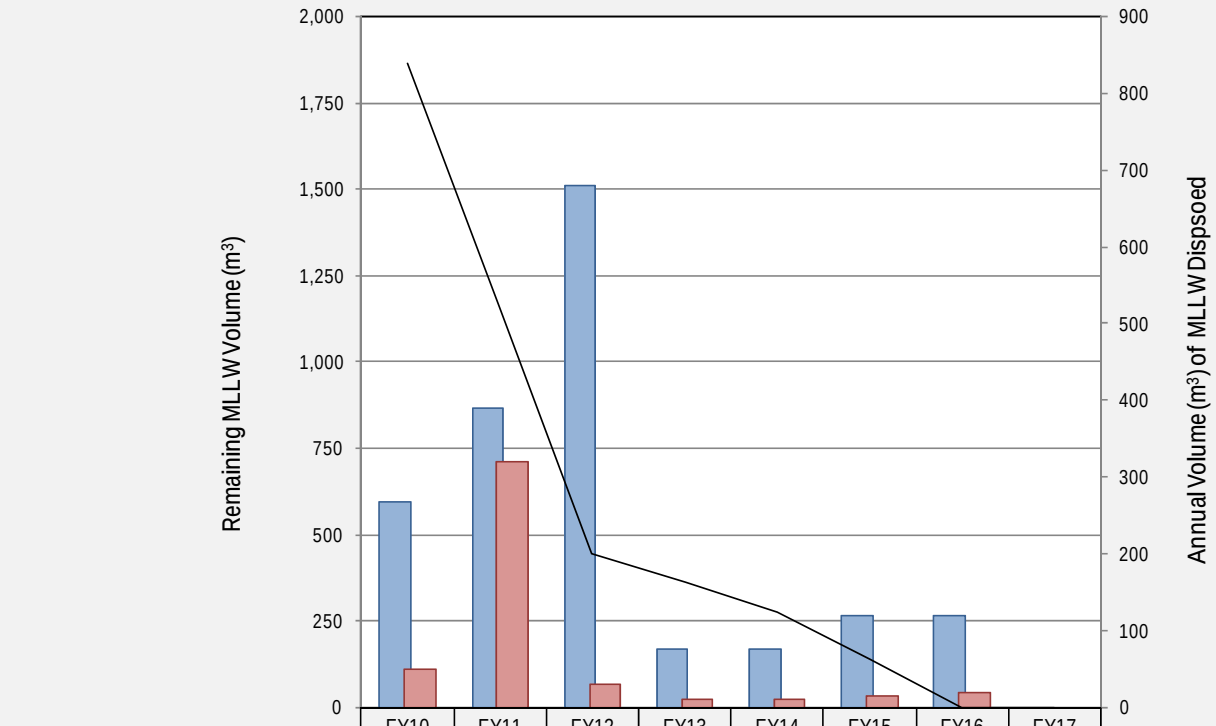
In-trench treatment of the waste will continue to be performed to meet the LDR. This is performed within MWTs 31 and 34 of the 218-W-5 LLBG to minimize significant worker risks and physical infrastructure limitations associated with opening and processing some of the RH-MLLW. In March 2011, 30 m^3 of waste was macro-encapsulated in MWT 34 (see Table 5-2).

3.1 Status and Annual Volume Projections for Treatment and Disposal of Mixed Low-Level Waste

During FY 2010, 268 m^3 of small container CH-MLLW (Milestone M-091-42) and 50 m^3 of large containers of CH-MLLW and RH-MLLW (Milestone M-091-43) were treated. For the remainder of FY 2011 and through FY 2012, DOE plans to utilize existing offsite capabilities to treat 1,000 m^3 of small container CH-MLLW towards Milestone M-091-42 and 260 m^3 of large container CH-MLLW and RH-MLLW towards Milestone M-091-43.

Figure 3-1 presents a summary of the volume of MLLW that has been treated or is projected to be treated from FY 2010 through FY 2016. The projections are based on available inventory from retrieval operations where the RSW designates as MLLW.

The volume projections provided in Figure 3-1 are based on the assumption that funding levels are available as given in Figure 8-1. However, there is a high degree of uncertainty in the funding levels for FY 2012 and FY 2013. Given preliminary budget levels and site priorities, it may be necessary to curtail work sharply within the M-091 Milestone work scope. However, because current plans represent an acceleration of M-091 Milestone requirements, short-term deferral will not impact the ability to meet the milestones in most cases.



	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
CH-MLLW (sm) Treated (M-091-42)	268	390	680	75	75	120	120	0
Ch-MLLW (lg) & RH-MLLW Treated (M-091-43)	50	320	30	10	10	15	20	0
CH-MLLW & RH-MLLW Remaining End-of-Year	1,865	1,155	445	360	275	140	0	0

* See Appendix D, Table D-3, for the data source, analytical basis, and underlying assumptions used in the development of this chart.

Figure 3-1. Volume Projections for Disposal of MLLW (M-091-42 and M-091-43)

3.2 Overview of MLLW Treatability Groups

The MLLW is categorized by the necessary treatment path to ensure that the waste, once treated, will meet LDR requirements for disposal. The *Calendar Year 2010 Hanford Site Mixed Waste Land Disposal Restrictions Summary Report* (DOE/RL-2011-31) includes the following treatability groups:

- MLLW-01 “LDR Compliant Waste,” Treatment Path: Direct disposal without additional LDR treatment
- MLLW-02 “Inorganic Non-Debris,” Treatment Path: Non-thermal (stabilization)
- MLLW-03 “Organic Non-Debris,” Treatment Path: Thermal
- MLLW-04 “Hazardous Debris,” Treatment Path: Non-thermal (macro-encapsulation)
- MLLW-05 “Radioactive Lead Solids,” Treatment Path: Non-thermal (macro-encapsulation)
- MLLW-06 “Mercury Waste,” Treatment Path: Mercury stabilization (that is, amalgamation or grout stabilization)

- MLLW-07 “RH and Large Container,” Treatment Path: In-trench treatment, commercial
- MLLW-08 “Unique Wastes,” Treatment Path: No treatment capability
- MLLW-09 “Radioactive Batteries,” Treatment Path: Macro-encapsulation
- MLLW-10 “Reactive Metals,” Treatment Path: Deactivation of reactive component

Pursuant to the *Hazardous and Solid Waste Amendments of 1984*, LDRs were promulgated beginning in 1986 for nonradioactive waste. The LDRs later became effective for mixed waste. Beginning in 1990, TPA Milestone M-26-01 required a plan with subsequent yearly reports on the volume of mixed waste in storage at the Hanford Site. This year’s report (DOE/RL-2011-31) provides total waste volume for both the currently stored inventory and the waste forecast to be generated during the next 5 years by Treatability Group. This PMP addresses MLLW LDR Treatability Groups MLLW-02 through MLLW-10. Treatability Group MLLW-01, direct disposal of LDR compliant waste, requires no processing and is not included in this PMP.

3.3 Treatment Capabilities for MLLW

Commercial capabilities are to treat/process inorganic nondebris (MLLW-02), organic nondebris (MLLW-03), hazardous debris (MLLW-04), radioactive lead solids (MLLW-05), mercury waste (MLLW-06), radioactive batteries (MLLW-09), and reactive metals (MLLW-10) assayed as CH-MLLW in small containers.

Commercial capabilities will also be used to treat/process RH-MLLW and CH-MLLW in large containers (MLLW-07). In-trench treatment in the MWTs may be used to minimize significant worker risks and physical infrastructure limitations associated with opening and processing some of the waste contained in this treatability group.

3.3.1 Stabilization (MLLW-02)

The treatment path for inorganic nondebris MLLW is commercial stabilization and is represented in LDR Treatability Group MLLW-02. Waste within this group consists of many different inorganic solids (e.g., particulates, absorbed liquids, sludges, resins, and soils) and lab packs that are contaminated with regulated metals and other inorganics.

The objective of stabilization is to immobilize the hazardous component through chemical and/or physical fixation into low solubility materials, and by encapsulation to reduce the potential for future releases. Usually, stabilization is accomplished by mixing the waste with Portland cement or pozzolanic materials at a preselected ratio, but stabilization can also include mixing with polymer materials. Pretreatment processes may be employed prior to stabilization (e.g., drying, shredding, screening, and chemical treatments).

Several commercial treatment facilities located in the United States can accept the majority of the Hanford Site’s waste in Treatability Group MLLW-02. T Plant and WRAP have waste stabilization capability and could be used to supplement commercial facilities. However, there are two drums of MLLW-02 waste that contain high concentrations of inorganic mercury that are identified as no-path-forward waste and discussed in Chapter 5.

3.3.2 Thermal Treatment of Organics (MLLW-03)

The treatment path for organic nondebris MLLW is commercial thermal treatment and is represented in LDR Treatability Group MLLW-03. Waste within this group consists of many different inorganic and organic solids (e.g., particulates, absorbed liquids, sludges, resins, and soils) and labpacks that are

contaminated with organic regulated dangerous waste constituents. This group may also include dangerous waste containing polychlorinated biphenyls that require thermal destruction. The thermal treatment process destroys organic materials by oxidation, combustion, and/or pyrolysis.

Commercial treatment facilities are located in the United States that can accept the Hanford Site's waste in Treatability Group MLLW-03.

3.3.3 Macro-Encapsulation (MLLW-04, MLLW-05, MLLW-09)

Waste within Treatability Group MLLW-04 meets the definition of hazardous debris as defined in 40 CFR 268.2, "Definitions Applicable in This Part." The physical characteristics include paper, plastic, wood, rubber, rags, and lesser quantities of metallic and inorganic waste components. This waste may include organic/carbonaceous waste constituents in excess of 10 percent as defined in WAC 173-303-040, "Dangerous Waste Regulations," "Definitions."

Waste within Treatability Group MLLW-05 meets the definition of the radioactive lead solids subcategory as described in 40 CFR 268.40, "Applicability of Treatment Standards." The physical makeup consists of many different forms of radioactive lead solids including bricks, sheets, shot-filled blankets, and lead-lined debris items where the lead comprises more than 50 percent of the waste matrix. The primary treatment path for MLLW debris and radioactive lead solids is commercial macro-encapsulation.

Waste within Treatability Group MLLW-09 is, or contains, radioactively contaminated batteries that have the treatment requirements specified in 40 CFR 268.40 (i.e., D006, cadmium batteries; D008, lead acid batteries; D009, mercury batteries; and D011, silver batteries).

The primary treatment path for MLLW debris, radioactive lead solids, and radioactively contaminated batteries is commercial macro-encapsulation. Macro-encapsulation consists of applying a surface coating of polymeric organics or using a jacket of inert inorganic materials (e.g., cement) to allow substantial reduction of surface exposure to potential leaching media. Portland cement based grouts have mainly been used to macro-encapsulate this waste on the Hanford Site. The waste is typically sent through one or more size reduction steps (e.g., sorting, cutting/shearing, compaction, and super compaction), prior to macro-encapsulation.

Commercial treatment facilities are located in the United States and can accept the Hanford Site's waste in the MLLW-04, -05, and -09 treatability groups. The T Plant facility has macro-encapsulation capability and could be used to supplement commercial facilities. However, there are five drums of MLLW debris (MLLW-04) that have been identified as no-path-forward waste and discussed in Chapter 5.

3.3.4 Mercury Stabilization and Amalgamation (MLLW-06)

Radioactively contaminated mercury waste requires either stabilization or amalgamation. The Hanford Site inventory of mercury-bearing waste is currently zero (represented in LDR Treatability Group MLLW-06). Commercial capabilities are available if this waste were to be generated.

3.3.5 Repack and In-Trench Treatment (MLLW-07)

Waste that falls into the MLLW-07 treatability group includes very large packages that, when treated, pose a transportation concern, and/or waste packages that have a significant radiological inventory that pose a worker protection concern. The waste will be limited to hazardous debris; chemical stabilization and macro-encapsulation under 40 CFR 268.45, "Treatment Standards for Hazardous Debris," will be utilized to render the waste LDR compliant. In addition, the mixed waste containers will meet the 90 percent full container requirements following treatment. Treatment would be limited to those technologies that can be employed for containerized mixed waste only.

Commercial facilities will be used to treat most CH-MLLW in large containers and some RH-MLLW. Waste within Treatability Group MLLW-07 consists of: (1) large containers of MLLW, (2) RH-MLLW packages, and (3) RH-MLLW that is shielded down to contact handling levels for safe handling and storage. DOE has implemented significant commercial capability with firms in Washington and Utah to disposition a significant portion of this LDR Treatability Group.

In-trench treatment of waste within this MLLW-07 treatability may also be used. Part A permit application revision for the LLBGs was approved by Ecology to allow immobilization of this MLLW in the MWTs. Treatment of a portion of MLLW-07 waste is best performed at the location in which it is to be disposed (such as LLBG 218-W-5 T31/T34 or ERDF), due to significant worker risks and physical infrastructure limitations associated with opening and processing some of the waste contained in Treatability Group MLLW-07.

In-trench treatment to meet the LDR requirements has been, and will be performed within MWTs 31 and 34 of the 218-W-5 Burial Ground. A Part A permit application revision for the LLBGs was approved by Ecology to allow immobilization of MLLW-07 waste in the MWTs. The treatment capability consists of the use of immobilization technologies for mixed waste debris as listed under 40 CFR 268.4. In addition, the mixed-waste containers will meet the 90 percent full container requirements following treatment. Treatment is limited to those technologies that can be employed in/on containerized waste.

In the past year, 60 containers of MLLW-07 waste has been treated that previously was considered no-path-forward waste (see Table 5-2). However, an additional 67 containers of MLLW-07 waste have been identified as no-path-forward waste and are discussed in Chapter 5.

3.3.6 Disposition Path for MLLW-08

Waste within Treatability Group MLLW-08, is a unique waste for which no permitted treatment capability exists in the United States or the capability exists but the capability is very limited. In the past year, a drum of beryllium dust was treated and disposed that was previously considered a no-path-forward waste (see Table 5-2). Currently, there is no MLLW-08 waste in aboveground storage.

3.3.7 Deactivation (MLLW-10)

Reactive metals containing radioactive contamination require deactivation as the specified treatment technology under RCRA. Waste within Treatability Group MLLW-10 has water reactive materials, including sodium metal.

In the past year, 40 containers of sodium metal contaminated debris were processed at a commercial facility that previously was considered a no-path-forward waste (see Table 5-2). Currently, there is no MLLW-10 waste in storage at CWC.

3.4 Disposal of MLLW

On the Hanford Site, MLLW is disposed at the MWTs and ERDF. The MWTs (LLBG 218-W-5, Trenches 31 and 34) are RCRA-compliant, meet Subtitle C disposal requirements, and provide permanent disposal of low-level and mixed waste. They have a double-liner system with leachate collection. The capacity of the MWTs is 22,300 m^3 with approximately half of the capacity is currently used.

ERDF is authorized to dispose of waste under CERCLA in order to meet RCRA landfill requirements. The landfill is used for disposal of environmental restoration waste being generated from cleanup activities. ERDF is designed to provide permanent disposal capacity to accommodate projected Hanford low-level and mixed wastes.

In 2007, an amendment to the ERDF ROD was approved, authorizing treatment and/or disposal at ERDF of specific Hanford only waste that is not covered in other existing Hanford CERCLA authorization or RODs. Examples of Hanford only waste include waste from surveillance and maintenance at Hanford facilities, environmental research and development activities, sample analyses, liquid effluent waste treatment, and environmental monitoring programs.

4 Certification and Shipment of TRUM Waste (M-091-44 and M-091-46)

DOE has made considerable progress in certifying and disposing of TRUM waste by repackaging over 8,400 m^3 into WIPP certifiable containers and shipping over 3,900 m^3 to WIPP or the Advanced Mixed Waste Treatment Project (AMWTP) in Idaho for disposal. This chapter presents DOE's plan to complete Milestones M-091-44 and M-091-46 by continuing to utilize existing capabilities and, where necessary, acquiring new capabilities to treat, certify, and ship the remaining containers of CH-TRUM and RH-TRUM wastes for offsite disposal.

The key elements of DOE's plan to complete Milestones M-091-44 and M-09-46 are as follows:

- Continue utilizing existing onsite capabilities at T Plant and WRAP, and offsite capabilities at Perma-Fix Northwest to repackage the small containers of CH-TRUM waste that is in aboveground storage as of June 30, 2009, and from retrieval operations into WIPP certifiable containers.
- Continue utilizing recently demonstrated capabilities at Perma-Fix Northwest to repackage a portion of the large containers of CH-TRUM and non-caisson RH-TRUM waste that is in aboveground storage as of June 30, 2009, and from retrieval operations into WIPP certifiable containers. New capability onsite will be acquired to repackage the remaining portion of large container CH-TRUM and non-caisson RH-TRUM waste that cannot be repackaged at Perma-Fix Northwest.
- Acquire the necessary new capability to repackage the retrieved alpha caisson RH-TRUM waste into WIPP certifiable containers.
- Continue utilizing WRAP to support certification of TRUM waste and loading CH-TRUM waste for shipment to WIPP.
- Continue using the Central Characterization Project (CCP) (Section 4.3.1) to certify and ship TRUM waste to WIPP (or AMWTP) until all TRUM waste has been shipped offsite.
- Acquire the necessary capability to load RH-TRUM waste into RH-72B casks for shipment to WIPP.

4.1 Status and Annual Volume Projections for Certification and Shipment of TRUM Waste

During FY 2010 and through May 15, 2011, DOE has accomplished the following:

- 445 m^3 of CH-TRUM in large containers and RH-TRUM waste was repackaged into WIPP certifiable containers (M-091-44).
- 805 m^3 of CH-TRUM waste in small containers was repackaged into WIPP certifiable containers (M-091-46).
- 1,000 m^3 of CH-TRUM was shipped offsite to WIPP or the AMWTP (M-091-46).

For the remainder of FY 2011 and through FY 2012, DOE plans to accomplish the following:

- Repackage 392 m^3 of large container CH-TRUM waste and RH-TRUM waste into WIPP-certifiable containers at Perma-Fix Northwest during the remainder of FY 2011 to complete target milestones under M-091-44. No repackaging of large container CH-TRUM waste and RH-TRUM waste is expected to occur during FY 2012.

- Repackage 45 m^3 of CH-TRUM in small containers into WIPP certifiable containers at T Plant and WRAP; M-091-46 waste is planned to be repackaged at Perma-Fix Northwest during the remainder of FY 2011 to complete Milestone M-091-46A. During FY 2012, an additional 110 m^3 will be repackaged at WRAP and Perma-Fix Northwest to complete additional target milestones under M-091-46.
- Ship 400 m^3 of CH-TRUM waste to WIPP during the remainder of FY 2011. No shipments to WIPP are expected to occur during FY 2012 and FY 2013.

Figure 4-1 presents a summary of the volume of TRUM waste that has been or is projected to be repackaged into WIPP-certifiable containers. The bars represent the CH-TRUM and RH-TRUM waste projected to be certified during an FY, and the line represents the remaining inventory to be certified at the end of an FY. The projected values are based on after processed volumes. At the end of FY 2010, approximately 1,360 m^3 of waste was either certified waste awaiting shipment to WIPP or certifiable waste awaiting certification by CCP, that is not included in Figure 4-1.

Figure 4-2 presents a summary of the volume of TRUM waste that has been and is projected to be shipped to WIPP. The bars represent the CH-TRUM and RH-TRUM waste projected to be shipped to WIPP during an FY, and the line represents the remaining inventory to be shipped to WIPP at the end of an FY. Shipments of TRU waste to WIPP or AMWTP are expected to be completed by FY 2030.

To accomplish this M-091 Milestone work scope, DOE will utilize existing capabilities and acquire the necessary new capabilities as described in the following sections.

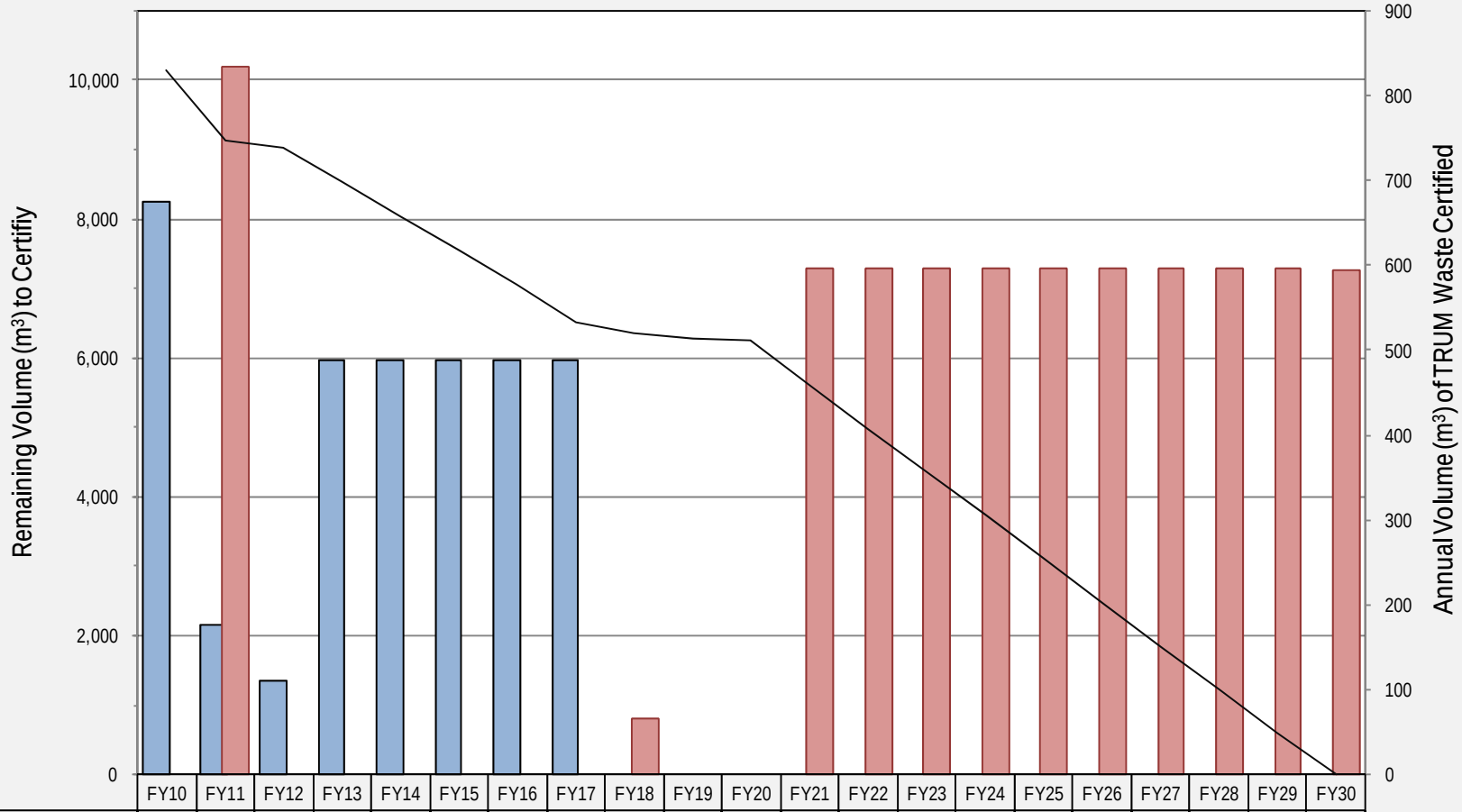
The schedule of TRUM waste repackaging and shipping activities is based on the assumption that funding levels are available as given in Figure 8-1. However, there is a high degree of uncertainty in the funding levels for FY 2012 and FY 2013. Given preliminary budget levels and site priorities, it may be necessary to curtail work sharply within the M-091 Milestone work scope. However, because current plans represent an acceleration of M-091 Milestone requirements, short-term deferral will not impact the ability to meet the milestones in most cases.

4.2 Approach for Generating Certifiable Containers of TRUM Waste

Figure 4-3 illustrates the simplified flow path of TRUM waste starting with the initial screening of the suspect TRUM waste to determine if it is TRUM or MLLW, determining whether the TRUM containers have prohibited items, repackaging the TRUM waste into WIPP certifiable containers, submitting the containers to CCP for certification and, finally, shipment of the TRUM waste to WIPP. The following subsections describe the TRUM waste flow path. WIPP compliant containers include 55 gal drums and WIPP SWBs.

4.2.1 Processing Approach for Small Container of CH-TRUM Waste

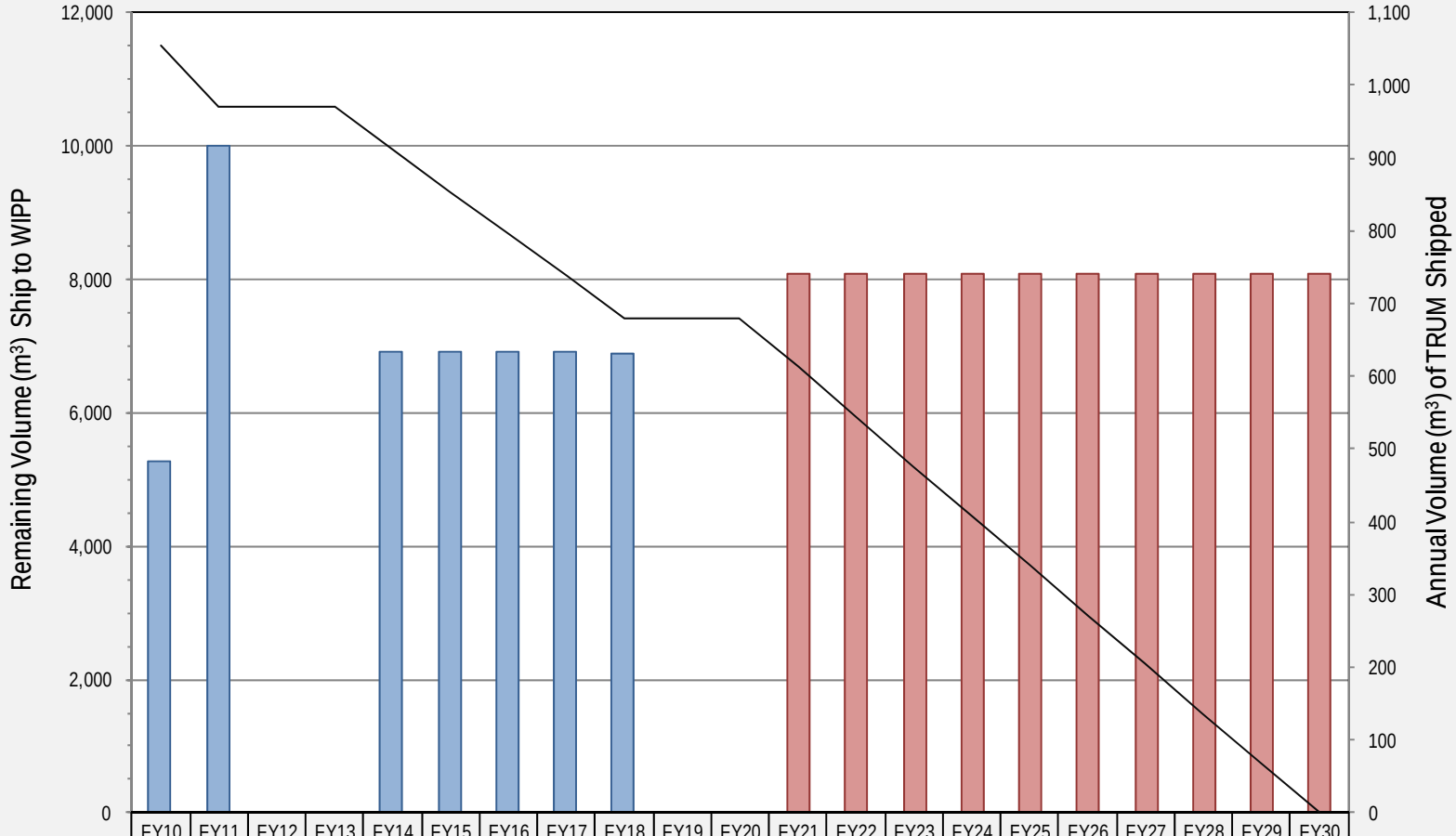
DOE repackages small containers of TRUM waste into WIPP certifiable containers onsite at T Plant and WRAP as described in the following subsections, and has a contract with the offsite commercial facility, Perma-Fix Northwest, to perform repackaging of CH-TRUM waste. For TRUM waste, small containers are defined as 55 gal drums or SWBs.



	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
CH-TRUM (sm)	674	176	110	488	488	488	488	488	0												
CH-TRUM (lg) & RH-TRUM	0	835	0	0	0	0	0	0	65	0	0	596	596	596	596	596	596	596	596	596	595
Remaining TRUM to be Certified	10,140	9,129	9,019	8,531	8,043	7,555	7,067	6,499	6,354	6,274	6,243	5,615	4,988	4,360	3,733	3,105	2,478	1,850	1,223	595	0

*See Appendix D, Table D-4, for the data source, analytical basis, and underlying assumptions used in the development of this chart.

Figure 4-1. Certifiable Volume Projections of CH-TRUM and RH-TRUM Waste (M-091-44 and M-091-46)



	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
CH-TRUM (sm) shipped	484	916	0	0	633	633	633	633	632	0											
CH-TRUM (lg) & RH-TRUM shipped	0	0	0	0	0	0	0	0	0	0	0	742	742	742	742	742	742	742	742	742	742
Remaining Volume to be Shipped	11,500	10,584	10,584	10,584	9,951	9,318	8,686	8,053	7,421	7,421	7,421	6,679	5,937	5,195	4,453	3,711	2,969	2,227	1,485	743	0

* See Appendix D, Table D-4, for the data source, analytical basis, and underlying assumptions used in the development of this chart.

Figure 4-2. Projection of CH-TRUM and RH-TRUM Waste Shipments to WIPP (M-091-44 and M-091-46)

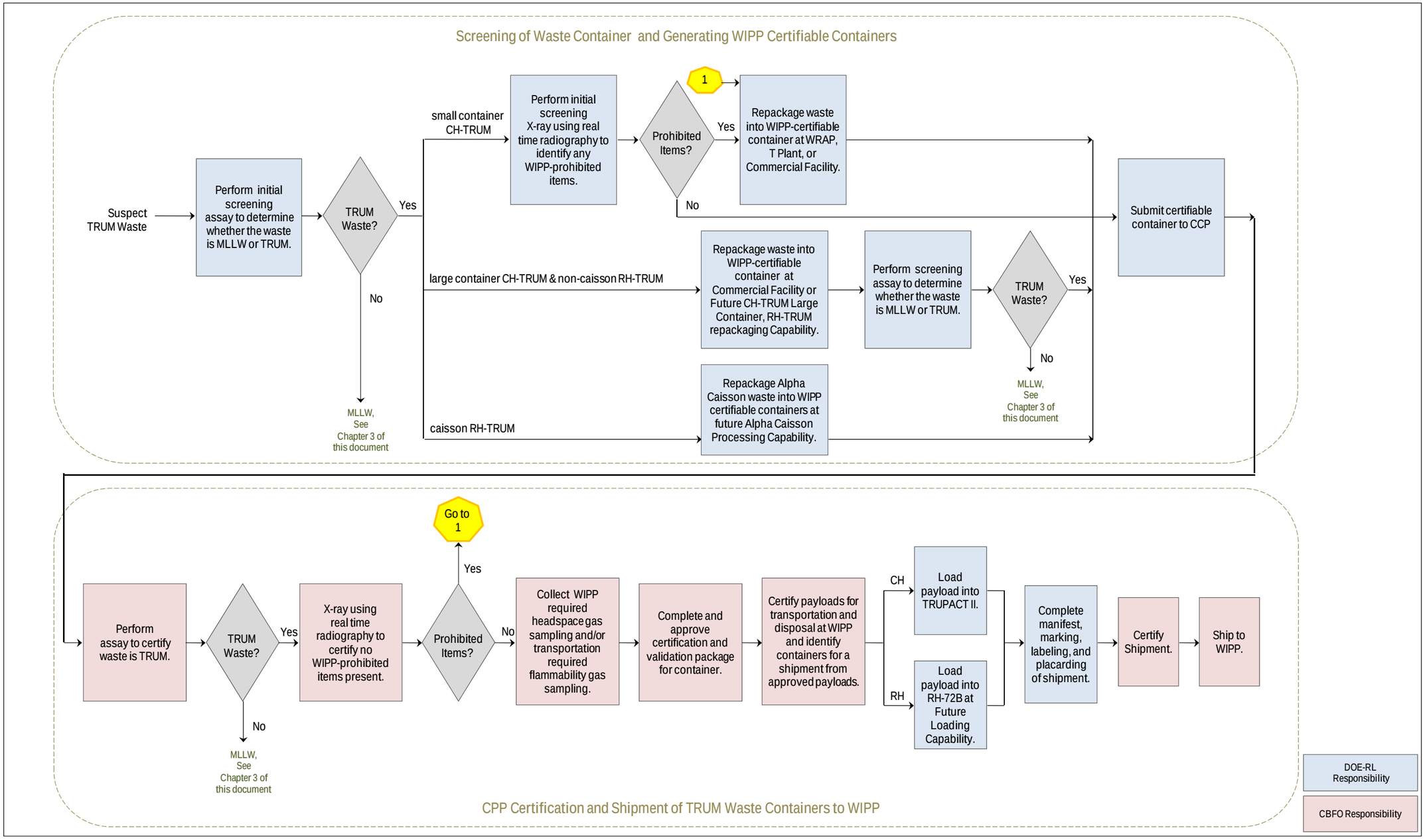


Figure 4-3. Simplified TRUM Waste Flow Path (Typical)

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4.2.1.1 T Plant Processing

DOE utilizes the T Plant canyon for treating (e.g., pH neutralization, liquid absorption, and macro-encapsulation), venting, sampling, and repackaging waste. T Plant utilizes modular enclosure structures for TRUM waste sorting, processing, and volume reduction. These activities are performed in glove bags inside the enclosure structures to control the spread of contamination (see Figure 4-4).

Currently, T Plant has the capability to repackage 55 and 85 gal containers of CH-TRUM waste. T Plant modular containment systems have TRUM waste processing limitations (i.e., plutonium quantities, weight, and sharp items). The 2706-T Facility activities include staging, verifying, treating, venting, sampling, repackaging, and storing CH waste.

4.2.1.2 WRAP Characterization and Processing

DOE characterizes and processes TRUM waste in the 2336W Building, which is the main WRAP building, with limited waste characterization performed in the 2404-WC Building. Characterization and processing performed includes x-raying and assaying containers, repackaging waste treatment, sampling headspace gas and flammable gas, and drum venting.

Characterization performed includes using automated x-ray and assay equipment used to examine and characterize waste, radiography to x-ray containers to determine whether WIPP prohibited items are present, and gamma and neutron assay equipment to determine whether the waste is TRUM or MLLW. Headspace gas and flammable gas sampling is also performed in the 2336W and 2404-WC Buildings.

WRAP has the capability to repackage 55 gal drums of CH-TRUM waste, with limited capabilities to process 85 gal overpacks containing internal packages that potentially have integrity issues. Repackaging of CH-TRUM waste is performed in glove boxes to protect workers from exposure to potentially radioactive materials (see Figure 4-5). Drum venting is also performed at WRAP.

WRAP treatment capabilities include amalgamation of mercury, neutralization for acidity or alkalinity of an aqueous solution (pH) adjustment, solidification of free liquids, and limited macro-encapsulation.

4.2.2 Processing Approach for CH-TRUM (Large Container) and RH-TRUM (Non-Caisson) Waste

Currently, the capability to process large containers of CH-TRUM and RH-TRUM waste does not exist on the Hanford Site. During FY 2011, a pilot program was undertaken to demonstrate the availability of processing TRUM waste at a commercial facility. As of May 15, 2011, 445 m^3 of large container CH-TRUM waste was repackaged into certifiable containers at Perma-Fix Northwest, located in Richland, Washington (see Figure 4-6). An additional 392 m^3 of large container CH-TRUM waste is scheduled to be repackaged commercially by the end of FY 2011. Commercial capabilities are available to process containers with low grams of plutonium of CH-TRUM waste and low dose rate RH-TRUM waste. For TRUM waste, a large container is defined as any container that is not a 55 gal drum or SWB.

For the remaining large container of CH-TRUM and RH-TRUM waste that cannot be processed using commercial capabilities, a new capability will be acquired to repackage the remaining portion of large container CH-TRUM waste and non-caisson RH-TRUM waste that cannot be repackaged at Perma-Fix Northwest. The project schedule for acquiring this capability is provided in Table 4-1.

Enclosure structure located in T Plant canyon.

Repackage of TRUM waste inside a glove bag that is located in the enclosure structure.

Figure 4-4. Repackage of TRUM Waste at T Plant

Outside a glovebox at WRAP that is used to repackage of TRUM waste.

Repackage of TRUM waste inside a WRAP glovebox.

Figure 4-5. Repackage of TRUM Waste at WRAP

Figure 4-6. Repackage of TRUM Waste at Perma-Fix Northwest

4.2.3 Processing Approach for RH-TRUM (Caisson) Waste

Current onsite capabilities are not adequate to repackage the alpha caisson waste into WIPP certifiable containers (see Section 2.3 for description of waste containers). As a result, a new capability is being acquired through the Alpha Caisson Waste Processing Project that will perform the required processing and packaging of the waste to generate WIPP certifiable containers. These certifiable containers will be shipped to CWC for storage while awaiting final certification by CCP and loading into the RH-72B shipping cask for transfer to WIPP. This processing system will use remote handling technology and will be constructed of modular units that are designed to be relocatable. This modular approach was established to enable reuse of these systems at other locations on the Hanford Site.

The project schedule for acquiring the RH-72B cask loading capability is provided in Table 4-1.

4.3 Shipments of TRUM Waste to WIPP

The following subsections describe the certification program for shipment of TRUM waste to WIPP for disposal.

4.3.1 CCP Certification Program

The DOE Carlsbad Field Office (CBFO) is responsible for characterization, certification, and shipment of the TRU waste to WIPP for disposal or to AMWTP through CCP. The flow path presented in Figure 4-3 shows the activities under CCP's responsibility.

Table 4-1. TRUM Waste Project Schedule

M-091 Milestone	Activity	Scheduled Completion Date
M-091-01A	Complete conceptual design of alpha caisson processing capability.	9/30/2016
	Complete conceptual design of large container CH-TRUM waste and RH-TRUM waste repackage capability.	
	Complete conceptual design of RH-72B cask loading capability.	
M-091-01B	Complete definitive design of alpha caisson processing capability.	9/30/2018
	Complete definitive design of large container CH-TRUM waste and non-caisson RH-TRUM waste repackage capability.	
	Complete definitive design of RH-72B cask loading capability.	
-	Complete construction of alpha caisson processing capability.	9/30/2020
	Complete construction of large container CH-TRUM waste and RH-TRUM waste repackage capability.	
	Complete construction of RH-72B cask loading capability.	
M-091-44	Certify all large containers CH-TRUM waste and non-caisson RH-TRUM waste.	12/31/2030
	Certify all alpha caisson RH-TRUM waste.	
M-091-44	Complete shipments of all RH-TRUM waste to WIPP.	12/31/2030

To support DOE in the packaging and disposal of TRU wastes, CCP provides characterization services in accordance with the 2010 *Waste Isolation Pilot Plant Hazardous Waste Facility Permit*, *Attachment C, Waste Analysis Plan* (NM4890139088-TSDF), and the *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant* (DOE/WIPP-02-3122). In addition, CCP provides intersite certification and transportation for containers to be transported to AMWTP.

The waste acceptance criteria applicable to the transportation, storage, and disposal of CH-TRU and RH-TRU waste at WIPP are defined in DOE/WIPP-02-3122. These criteria serve as DOE instructions for ensuring that CH-TRU and RH-TRU waste are managed and disposed of in a manner that protects human health and safety and the environment.

4.3.2 CH-TRUM Waste Shipments to WIPP

At WRAP, DOE loads drums and SWBs of CH-TRUM waste drums into TRUPACT-II containers that are shipped to WIPP. Each stainless steel TRUPACT-II (see Figure 4-7) is approximately 2.4 m (8 ft) in diameter, 3 m (10 ft) high, and constructed with leak-tight inner and outer containment vessels. TRUPACT-II can hold up to fourteen 55 gal waste drums, or two SWBs. Three TRUPACT-II containers are typically shipped three at a time to WIPP (see Figure 4-8).

4.3.3 RH-TRU Waste Shipments to WIPP

DOE currently does not have the capability onsite that is necessary to load and ship the RH-TRUM waste to WIPP. To facilitate the shipment of RH-TRU waste to WIPP for disposal, DOE will acquire onsite RH-72B canister loading and cask loading capability. It is anticipated that an RH-TRU waste canister loading and cask loading facility will be constructed by the end of FY 2018. The facility will have the capability to load 30 and 55 gal drums into a canister (up to three 55 gal drums per canister). The canister is loaded into a RH-72B cask (Figure 4-9) for shipment to WIPP.

The project schedule for acquiring the RH-72B cask loading capability is provided in Table 4-1.

Figure 4-7. Loading a TRUPACT-II with TRUM Waste Drums at WRAP

Figure 4-8. TRUPACT-II Shipment of TRUM Waste to WIPP

Figure 4-9. RH-72 Cask Used to Ship RH-TRUM Waste to WIPP

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5 No-Path-Forward Waste (M-091-03D-02)

Several miscellaneous containers of MLLW have characteristics that are impediments to the identification of a disposal path. These wastes either exceed U.S. Department of Transportation (DOT) shipping requirements or exceed offsite commercial facility acceptance requirements, and/or LDR treatment technology is not available. Considerable progress has been made in recent years in the treatment of these types of waste once thought to have no-path-forward. Since 1997, approximately 30,000 waste containers totaling more than 10,000 m^3 have been dispositioned through an item-by-item approach.

Table 5-1 lists the 74 containers of MLLW that have been identified as no-path-forward waste as of May 24, 2011. These containers are grouped into seven waste streams, and a disposition plan and schedule for each waste stream have been identified. The disposition paths for the no-path-forward waste include in-trench treatment, pretreatment of the waste onsite then ship to an offsite commercial facility for LDR treatment, and site-specific LDR treatment variance. The majority of this waste is expected to be dispositioned by FY 2016.

Table 5-2 identifies the containers of no-path-forward waste that were dispositioned, during the past year, as follows:

- A variance was obtained from Ecology allowing a drum of beryllium dust to be stabilized to meet the LDR treatment standard.
- In-trench treatment by macro-encapsulation was used to treat containers of RH-MLLW.
- A commercial facility treated the sodium metal contaminated debris waste.

If additional no-path-forward waste is identified in future years, as a result from retrieval of the RSW or during the waste characterization and certification efforts, the waste will be discussed in future revisions of the PMP and will not be subject to the proposed milestone.

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Table 5-1. No-Path-Forward Waste as of May 24, 2011

Waste Stream	Treatability Group	Container Type	Volume (m^3)	Treatment Problem	Disposition Path Description	Disposition Schedule
Onsite Treatment Required	MLLW-04	2 drums	0.6	High dose rate debris and/or high Curie content that exceeds DOT shipping requirements and/or offsite commercial facility acceptance requirements.	The waste containers will be examined to determine if they meet the less than 10 percent void space, absorb any free liquids with Washington State approved absorbents, and then macro-encapsulated in the MWTs.	Treat by 9/30/2016.
	MLLW-07	9 drums	2.0			
High Inorganic Mercury	MLLW-02	2 drums	0.4	The LDR treatment requirement for this waste is specified as "RMERC" (as defined in 40 CFR 268.42). No commercial facility has been located yet that can accept the waste for treatment per the specified treatment technology.	Work with offsite commercial treatment facilities to determine if they can treat to the LDR treatment standard. If no capability is identified, then a site-specific LDR Treatment variance will be requested from Ecology for stabilizing the waste to meet the RCRA Universal Treatment Standard requirements.	If offsite commercial capability can be identified to treat this waste, the waste will be shipped to the facility in FY 2011 and completed in FY 2012. If by a treatment variance is required, treat by 9/30/2016 provided the treatment variance is approved by 9/30/2015.
Onsite Repack then Offsite Treatment	MLLW-04	3 drums	1.0	This waste stream consists of liquid containing waste containers that currently do not meet DOT shipping requirements. However, if the liquids were absorbed, the waste then could be shipped to a commercial facility for treatment.	Transfer the waste containers to either T Plant or WRAP for liquid absorption, then ship offsite to a commercial facility for final treatment.	Treat by 9/30/2016.
	MLLW-07	7 drums	2.0			
High Uranium	MLLW-07	1 drum	0.2	The uranium content exceeds DOT shipping requirements and offsite commercial facility acceptance requirements.	Submit a site-specific LDR Treatment variance to Ecology to allow macro-encapsulation of D007 (chromium) characteristic associated with the waste.	Treat by 9/30/2016 provided the treatment variance is approved by 9/30/2015.
Argon Nation Laboratory Grouted Fuel	MLLW-07	42 drums	8.9	The waste containers are high dose rates and the Curie content exceeds DOT shipping requirements and offsite commercial facility acceptance requirements.	DOE has submitted a site-specific LDR Treatment variance to Ecology on 5/16/2011 to allow macro-encapsulation of this waste in the MWTs.	Treat by 9/30/2011 provided the treatment variance is approved by 8/1/2011.
325 Building Hot Cell Debris	MLLW-07	7 drums	1.5	High dose rate debris in shielded waste drums. Waste containers do not meet DOT shipping requirements and contain too high of radiological inventory for acceptance at offsite commercial treatment facilities.	Confirm the drums meet the less than 10 percent void space, place into a high integrity container located in MWTs. The high integrity container meets macro-encapsulation requirements when sealed.	Treat by 9/30/2011.
Oversize Package	MLLW-07	1 box (12 ft × 12 ft, 8 in. × 9 ft)	38.4	This waste container was retrieved from the 218-W-3A LLBG and is too high for acceptance at Perma-Fix Northwest.	Repackage the container into smaller containers using the future onsite capability to repackage large containers of TRUM waste (see Section 4.2.2) and then ship the waste to an offsite commercial facility for treatment.	The schedule for processing this waste is dependent on future onsite capability and will be established as part of the change package required under M-091-44T.
			TOTAL	**55**		

Table 5-2. No-Path-Forward Waste Treated in the Past Year

Waste Stream	Treatability Group	Container Type	Volume (m^3)	Treatment Problem	Disposition Path Description	Disposition Schedule
P015 Beryllium Dust	MLLW-08	1 Drum	0.2	The LDR treatment requirement for this waste is specified as "RMETL" or "RTTHRM" (as defined in 40 CFR 268.42). No commercial facility could be located that could perform this type of waste treatment on a MLLW.	Submitted and obtained a site-specific LDR Treatment variance from Ecology to allow stabilization of the waste to meet the beryllium Universal Treatment Standards.	Received variance approval on 6/7/2010 from Ecology. Waste treatment was performed at Perma-Fix Northwest during FY 2011 and the treated residues were disposed in the MWT on 4/27/2011.
High Temperature Gas Reactor RH-MLLW	MLLW-07	60 Drums and Boxes	28.9	The dose rate and Curie content of this waste precluded shipment to an offsite commercial treatment facility.	Macro-encapsulation and disposal of the debris waste in the MWT.	The waste was transferred from CWC to the MWT Trench 34 where it was macro-encapsulated utilizing a Portland cement based grout mixture. Treatment was completed on 3/24/11.
Sodium Metal Contaminated Debris	MLLW-10	40 Drums and Boxes	24.3	A previous attempt in FY 2007 to have this waste treated by a commercial facility failed, and the waste was returned untreated and placed back into storage onsite.	Issued a Request for Proposal to determine if there were any other commercial treatment facilities that could disposition this waste. Issued a contract to Impact Services in Tennessee to treat the waste.	Processing of the waste at Commercial Facility was completed on 5/20/11.
		TOTAL	**53.4**			

6 Storage Capacity

CWC, T Plant, WRAP, and LLBGs provide storage of containers managed under the M-091 Milestone series. Table 6-1 lists the permitted storage capacities as stated in the applicable Part A permit. The design storage capacities are much larger. The maximum volume of waste that would require storage at one time is projected to be 11,000 m^3. With a permitted storage capacity of 33,729 m^3, the need for additional storage capacity is not expected. As the outyear schedule for the management of waste containers is refined, the impact on storage capacity will be reevaluated.

Table 6-1. Facility Permitted Storage Capacity

Facility	Operating Unit	Permitted Capacity* (m^3)
CWC	WA 89000 8967, Part III, Operating Unit 6	20,796
T Plant	WA 89000 8967, Part III, Operating Unit 9	946
WRAP	WA 89000 8967, Part III, Operating Unit 7	1,987
LLBG	WA 89000 8967, Part III, Operating Unit 17	10,000
	Total	**33,729**

* Ecology and DOE are in the process of revising the current Part A forms for CWC, T Plant, WRAP, and LLBGs. Any approved changes to the current Part A forms will be reflected in a future annual revision of this PMP.

The following assumptions were used to determine the adequacy of the current storage capacity:

- TRUM waste will remain in aboveground storage (as of June 30, 2009) until the waste is treated/processed and shipped to WIPP.
- RSW will be designated and stored at CWC awaiting treatment/processing.
- After treatment/processing, TRUM waste will be stored at CWC and WRAP awaiting final characterization, certification, and shipment to WIPP.

6.1 CWC Storage

The CWC, located in the 200 West Area, provides storage for dangerous and mixed waste. The following waste management activities are associated with storage:

- Loading and unloading of containers for shipments
- Transferring containers from one building or storage area to another area
- Relocating a container from storage for treatment
- Performing required facility, equipment, and container inspections

The storage areas provide space for various sizes of waste containers. Storage structures with physical features that provide for segregated storage areas are operated to maintain appropriate separation between containers of incompatible waste (incompatibility is defined in WAC 173-303-395, “Dangerous Waste Regulations,” “Other General Requirements”).

Secondary containment has been incorporated into the design of the Flammable and Alkali Waste Storage Modules, the 2401-W Building, and the 2402-Series and 2403-Series Buildings. Any waste containers

that are to be stored outside of the storage buildings and modules requiring secondary containment will be stored over spill containment pallets or equivalent devices meeting the requirements of WAC 173-303-630(7), “Dangerous Waste Regulations,” “Use and Management of Containers.” Liquid incompatible wastes will be segregated within these outside storage areas by separating the containers of incompatible waste on portable spill containment pallets, or equivalent devices meeting the requirements of WAC 173-303-630(9).

6.2 T Plant Storage

T Plant storage structures and areas use a variety of engineered and administrative controls to provide segregation of and maintain appropriate separation between incompatible wastes. Storage of dangerous and/or mixed waste in various sized containers could take place in the 221-T canyon, 221-T railroad tunnel, 2706-T, 214-T storage building, other support structures and storage areas, or outdoor storage areas located within the boundaries of T Plant.

The storage and storage/treatment areas provide space for the management and storage of various sizes of waste containers. Storage structures with physical features that provide for segregated storage areas are operated and maintain appropriate separation between containers of incompatible waste (incompatibility is defined in WAC 173-303-040. The management of the containers is consistent with and performed in accordance with T Plant procedures and controls.

6.3 WRAP Storage

The 2336W Building is the main WRAP building and divided into administrative, shipping and receiving, waste characterization, and processing areas. Storage of dangerous and mixed waste occurs in the shipping and receiving area, characterization area, Room 152 of the administrative area, and the process area. Two large container storage buildings are part of WRAP (2402-WB, 2404-WC). The storage capacity at WRAP also includes outdoor storage that is intended to facilitate the WRAP waste management activities such as the loading and unloading of containers for shipment, transferring containers from one building to another area or TSD unit, or relocating a container for storage awaiting treatment or characterization.

These storage/treatment areas provide space for the management and storage of various sizes of waste containers. Storage structures and areas are operated to maintain appropriate separation between containers of incompatible waste (incompatibility is defined in WAC 173-303-395). Waste containers holding a dangerous waste that is incompatible with any waste or other materials stored nearby will be separated from the other materials or protected from them by means of portable spill containment pallets or equivalent devices meeting the requirement of WAC 173-303-630(7).

6.4 LLBG Storage

The MWTs (218-W-5 LLBG, Trenches 31 and 34) provide storage for various sized containers of mixed waste.

7 TRU and TRUM Waste Generated from CERCLA Cleanup Actions

A goal of DOE, Ecology, and EPA is to integrate the Hanford Site cleanup activities to the extent possible to enable efficient, effective management of waste. The three agencies agreed to integrate the plan for managing TRU and TRUM waste under the CERCLA cleanup actions with the plan to manage similar waste forms under the M-091 Milestone work scope. As a result, this M-091 PMP addresses the acquisition of capabilities necessary to prepare TRU and TRUM waste within the scope of the M-016 Milestone series for the disposal at WIPP. This PMP reflects retrieval decisions, projected waste volumes, and schedules for CERCLA cleanup actions authorized in RODs and action memoranda at the Hanford Site. The remedial actions for all non-tank farm and non-canyon OUs are to be completed by September 30, 2024 per Milestone M-016-00.

Schedules for CERCLA cleanup actions are established through the following CERCLA decision documentation:

1. **Prepare Remedial Investigation (RI) and Feasibility Study (FS)**. The RI presents data collected during the investigation and other characterization activities (analogous to the RCRA facility investigation). The FS develops and evaluates alternatives for remediation (analogous to the RCRA facility) comparable to the RCRA corrective measures study.

2. **Prepare Proposed Plan**. This plan is based on the detailed information contained in the RI/FS reports.

3. **Receive Public Input**. Ecology, EPA, and DOE will solicit input from the Tribal Nations and the public regarding the preferred remedial alternatives, which are described in the Proposed Plan.

4. **Select Preferred Alternative**. Comments received from the Tribal Nations and the public regarding the preferred alternatives will assist Ecology, EPA, and DOE in selecting a final decision on the preferred alternatives that will be taken to clean up the contamination associated with the OUs described in the Proposed Plan.

5. **Prepare Record of Decision (ROD)**. After Ecology, EPA, and DOE consideration of the comments received, a ROD will be issued identifying the final cleanup remedies selected for implementation, including a summary of the responses to comments.

6. **Post-ROD Activities**. The selected remedial alternative is implemented after the final ROD is approved. This stage may involve remedial design and design verification studies, construction, remediation process optimization, and operation and maintenance of the implemented processes (comparable to the RCRA corrective measure implementation stage).

The OUs and facilities that may generate TRU waste are at different stages in the CERCLA decision process.

Table 7-1 summarizes the OUs and/or facilities that will or will not be addressed in this PMP. Those to be included have the potential to generate waste with TRU constituents greater than 100 nCi/g during CERCLA cleanup actions and are within the scope of the M-016, M-083, and M-085 Milestone series. The groundwater OUs and the tank farm waste management areas (WMAs) are not addressed in this PMP.

Table 7-1. Summary of Operable Units and Facilities

Operable Unit or Facility	Comment
300-FF-2, PFP, 221-U Facility, 100 K Basins, 209E, 200-BC-1, 200-PW-1, 200-PW-6, 200-SW-2, 200-WA-1, 200-DV-1, 200-IS-1, 200-EA-1, 200-CP-1 (including the PUREX Tunnels #1 and #2), 224B, 209E, and 200-CR-1	• Potential waste with TRU constituents greater than 100 nCi/g is generated during cleanup/closure actions at these OUs and facilities. • Addressed in this PMP (Table 7-2).
100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-NR-1, 100-IU-2, 100-IU-6, 100-KR-1, 100-KR-2, 100-HR-1, 100-HR-2, 200-CW-1, 200-CW-3, 200-CW-5, 200-PW-3, and 200-CB-1	• No waste with TRU constituents greater than 100 nCi/g is expected to be generated during CERCLA cleanup actions at these OUs. • Not addressed in this PMP.
200-BP-5, 200-PO-1, 100-NR-2, 100-FR-3, 100-KR-4, 100-HR-3, and 100-FF-5, 200-UP-1, and 200-ZP-1	• No waste with TRU constituents greater than 100 nCi/g is expected to be generated during CERCLA cleanup actions at these groundwater OUs. • Not addressed in this PMP.
WMA Series	• Tank farm WMAs are covered under the M-045 Milestone series. • Not addressed in this PMP.

7.1 Status of Approved CERCLA Cleanup Actions Generating TRU and TRUM Waste

DOE is currently implementing several major CERCLA cleanup actions on the Hanford Site in accordance with approved RODs and Action Memorandas that have or are projected to generate TRU or TRUM waste. Table 7-2 presents the forecast volumes of these cleanup actions that were provided from the projects in HNF-EP-0918, *Solid Waste Integrated Forecast (SWIFT) FY2011—FY2045*, published in January 2011, and represents a forecast subject to time changes. The following subsections discuss these cleanup actions.

7.1.1 Plutonium Finishing Plant

The Plutonium Finishing Plant (PFP) represented the end of the line associated with plutonium production at Hanford. The PFP is a complex consisting of multiple buildings. Ultimately, DOE will decontaminate and demolish all of these structures as Hanford Site cleanup continues. The long-term goal for PFP is to bring it down to slab-on-grade, which means that the buildings are all to be decontaminated and demolished, debris will removed, and only concrete floors of the various structures will be left. DOE is performing the PFP decontamination and decommissioning in accordance with DOE/RL-2005-13, *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action*. DOE is accelerating critical decontamination and decommissioning to have PFP slab-on-grade in FY 2013.

Table 7-2. TRU and TRUM Waste Forecast from CERCLA Cleanup Actions

	FY 2011		FY 2012		FY 2013		FY 2014		FY 2015		FY 2016		FY 2017		Total	
Generator	**CH**	**RH**	**CH**	**RH**	**CH**	**RH**	**CH**	**RH**	**CH**	**RH**	**CH**	**RH**	**CH**	**RH**	**CH**	**RH**
PFP[a]	780		1,350		110										2,240	0
100 K[a]								27		10					0	37
209 E[a]	90														90	0
U Plant[b]		2													0	2
618-10/11[a]			40		40			80	30	170	30	270			140	520

a. Projected volumes, in m^3, are from HNF-EP-0918, *Solid Waste Integrated Forecast (SWIFT) FY 2011-2045*, and the internal volume of the container is used.

b. Projected volumes, in m^3, are from DOE/RL-2010-106, *90% Design Remedial Design Report Addenda for the Disposition of Tank D-10 from Cell 30 within the 221-U Plant Canyon Facility.*

From FY 2011 through FY 2013, 2,240 m^3 of CH-TRU waste will be generated (HNF-EP-0918). To date, 182 m^3 of TRU waste has been transferred from PFP to WRAP for certification and shipment to WIPP. DOE is utilizing existing capabilities to disposition the TRU waste generated during the slab-on-grade activities. Glove box sizes are being reduced in-house or at Perma-Fix Northwest. The decision to whether the glove box sizes are reduced onsite or offsite is dependent on whether the glove box radiological dose in within DOT shipping limits and Perma-Fix Northwest license limits. Some glove boxes cannot be moved around the facility and are being reduced in size in situ. It is expected that the remaining waste will be packaged in WIPP certifiable containers at the point-of-generation and no new capabilities will be required.

7.1.2 100 K Basin

The K Basin Interim Remedial Action ROD Amendment indicates that the sludge will be treated, packaged for disposal, interim stored pending shipment, and shipped to a national repository for disposal. Sludge (27 m^3) from the 105-KW Basin originated primarily from the 105-KE Basin floor and pits, fuel canisters, and fuel washing. DOE plans to package the sludge into transport casks, transfer them to T Plant in FY 2014, and place them into interim storage until a new treatment and packaging facility is available. The K Basin Remediation is being performed in accordance with *Amendment to the Interim Remedial Action Record of Decision for the 100 K Area K Basins* (EPA, 2005).

Treatment and packaging technology evaluations are ongoing. DOE is currently evaluating a variety of sludge treatment and packaging process proposed by vendors. The design of the treatment and packaging system is not mature enough to determine whether the solidification and packaging system could be used for packaging of other RH-TRU(M) sludge (e.g., U Plant Tank D-10).

During K Basin cleanup, an estimated 10 m^3 filter media (sand, garnet) with TRU constituents greater than 100 nCi/g may also be generated.

7.1.3 209E Critical Mass Laboratory

DOE used the 209E Critical Mass Laboratory from 1961 through 1983. The radioactive nature of the work that was done in this building has resulted in some parts of the building becoming contaminated. It was designed to provide a heavily shielded reactor room where quantities of plutonium and uranium in solution could be brought to near critical configurations under carefully controlled and monitored

conditions. Potential TRUM waste will include process equipment (e.g., tanks and vessels) and ancillary equipment (e.g., hoods and piping). The TRUM waste will be packaged in certifiable WIPP SWBs. DOE is performing the CERCLA cleanup actions at the 209E Building in accordance with *Action Memorandum for Decontamination, Deactivation, Decommissioning, and Demolition (D4) Activities for 200 East Area Tier 2 Buildings/Structures* (DOE/RL-2010-102).

The projected 90 m^3 of CH-TRU waste will be packaged in WIPP certifiable containers at the point-of-generation and transferred to WRAP during FY 2011 for certification and shipped to WIPP. No new capabilities will be required to disposition this waste.

7.1.4 U Plant

TRUM waste generated during the CERCLA cleanup actions at U Plant is a tank heel. During FY 2011, DOE will remove Tank D-10, located in Cell 30 of the 221-U Facility, from the canyon and transfer it to CWC for interim storage until capability is available to repackage the waste in a WIPP certifiable container, as described in DOE/RL-2010-106, *90% Design Remedial Design Report Addenda for the Disposition of Tank D-10 from Cell 30 within the 221-U Plant Canyon Facility*. The tank heel contains approximately 500 gal of solid and liquid that has been designated as RH-TRUM waste. U Plant decontamination and decommissioning is being performed in accordance with the *Record of Decision 221-U Facility (Canyon Disposition Initiative) Hanford Site, Washington* (Ecology et al., 2005).

DOE will disposition the Tank D-10 heel at the future large package/RH capability. There is a possibility that the tank heel could be dispositioned at the same future facility used to disposition the K Basin sludge; however, design of this treatment and packaging system is not mature enough to determine whether the solidification and packaging system could be used for packaging of other RH-TRUM sludge.

7.1.5 618-10 and 618-11 Burial Grounds (300-FF-2)

Two of the most challenging CERCLA cleanup actions at the Hanford Site will be the 618-10 and 618-11 Burial Grounds that are part of the 300-FF-2 OU. Incomplete operational records and history associated with past waste disposal practices of the 300 Area waste streams complicate these actions. The burial grounds contain waste that was generated by the 300 Area of the Hanford Site that was used for developing and manufacturing reactor fuel and conducting laboratory research during Hanford's plutonium production mission.

TRU wastes were disposed in trenches, as well as vertical pipe units and caissons. The vertical pipe units were constructed by welding three to five bottomless drums together and buried vertically about 3 m (10 ft) apart. The caissons were constructed of galvanized corrugated metal pipe (10 ft high, 8 ft diameter) and buried approximately 15 ft underground. DOE is performing the 618-10 and 618-11 Burial Ground remediation in accordance with *Record of Decision for Remedial Actions in the 300-FF-2 Operable Unit* (Ecology et al., 2001).

DOE has already started work in the 618-10 Burial Ground. Intrusive and nonintrusive characterization has been completed and remediation of a portion of the burial ground has begun. The River Corridor Contractor has begun discussions with the Plateau Remediation Contractor to utilize the equipment at WRAP for the characterization of the waste containers removed from the 618-10 Burial Ground. Initially, the WRAP high energy x-ray equipment can be used to penetrate the approximately 100 concrete lined drums being removed to determine whether liquids are present.

Characterization of the 618-11 Burial Ground is beginning in FY 2011. DOE has a milestone to cleanup both burial grounds by the end of FY 2018.

7.2 Status of Future CERCLA Cleanup Decisions with the Potential to Generate TRU and TRUM Waste

Table E-1 in Appendix E describes the OUs and facilities with potential to generate waste with TRU constituents greater than 100 nCi/g during CERCLA cleanup actions. Completion schedules will be established with the CERCLA work plans and closure conditions/schedules established in the Hanford Facility Dangerous Waste Permit, where applicable. Table E-1 in Appendix E gives the waste unit name, waste type, estimated volume, and schedule. The volume projections are based on currently available information and will be updated as the CERCLA process for a given OU progresses. The sources of the estimated volumes are referenced in the table.

Although a significant volume of material with TRU constituents greater than 100 nCi/g has been identified, the majority of the CERCLA decisions have not been made regarding cleanup. This results in a significant level of uncertainty regarding the volumes and time of TRU waste generation.

7.3 Summary of Disposition Approaches per Waste Form

The form of waste with the potential for TRU constituents greater than 100 nCi/g generated during CERCLA cleanup actions fall into three general categories as follows: (1) soil/gravel/rock, (2) debris, and (3) sludge. The following subsections outline the waste disposition approach of each of these categories.

7.3.1 Soil, Gravel, and Rock

During the CERCLA cleanup actions of contaminated cribs, trenches, and tile fields, an estimated 6,200 m^3 of soil/gravel/rock waste could be generated that has a potential to have TRU constituents greater than 100 nCi/g. This estimated volume is based on current available data and is dependent on the area and depth of soil excavated. It is expected that this waste will be packaged in WIPP certifiable containers at the point-of-generation.

Cleanup actions could include: (1) removal and stockpiling of clean overburden for use in backfilling once contaminated area has been removed; (2) removal of contaminated soil/gravel/rock using conventional excavation technology and placement into WIPP certifiable containers (SWB or drums); and (3) assay of containers to determine whether they are TRU waste or LLW/MLLW. The TRU waste containers will be certified by CCP and shipped to WIPP, and the LLW/MLLW containers to ERDF.

7.3.2 Debris

During the CERCLA cleanup actions of facilities and burial grounds, an estimated 28.700 m^3 of contaminated debris waste could be generated that has the potential to have TRU constituents greater than 100 nCi/g. The majority of debris waste generated during the cleanup actions at facilities will be packaged into WIPP certifiable containers at the point-of-generation.

For debris waste that cannot be packaged into WIPP certifiable containers at the point-of-generation, the future large container CH-TRUM and RH-TRUM capability being acquired under the M-091 scope could also be used to repackage this waste. However, this would result in the facility to operate past the anticipated shutdown date of FY 2030 as currently planned. Waste in this category may include a portion of the 27,290 m^3 of debris waste removed from the 200-SW-2 landfills. The debris waste from the landfills could also be repackaged at WRAP, T Plant, or commercially as is being done with the RSW. However, this would require WRAP and T Plant to be operated longer than anticipated.

7.3.3 Sludge

During the CERCLA cleanup actions of facilities, an estimated 250 m^3 of sludge waste could be generated that has a potential to have TRU constituents greater than 100 nCi/g. Typically, sludge removal from tanks would employ a power fluidics system to loosen and homogenize the sludge, and transfer to WIPP certifiable drums or SWBs at the point-of-generation. An absorbent would be added to the SWB to absorb residual liquid and stabilize the sludge. These waste containers would be certified by CCP and shipped to WIPP.

The design of the treatment and packaging system for the K Basin sludge is not mature enough to determine whether the solidification and packaging system could be used for packaging of other TRU sludge.

8 Project Control Elements

The following sections identify DOE's project control elements for the planning, managing, and reporting performance necessary to complete the M-091 Milestone work scope. These project control elements are consistent with DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, and related project management activities.

8.1 Funding Profile and Project Work Breakdown Structure

The funding profile to support activities necessary to complete the M-091 Milestone series is given in Figure 8-1. This funding profile is based on the FY 2010 through FY 2018 Plateau Remediation Contract baseline, the additional ARRA funding that continues through FY 2011, and the President's FY 2012 budget request. Funding for FY 2019 through FY 2031 was estimated based on assumptions regarding operations that support achievement of the M-091 Milestone series and is subject to change as planning is refined. The funding profile does not include the funding necessary to support the CERCLA cleanup actions discussed in Chapter 7.

Work that is part of this PMP is broken down into discrete, defined units of scope. DOE uses this breakdown for planning, estimating, and scheduling performance measurement of work. This breakdown, known as the work breakdown structure (WBS) is developed to organize, define, and display work to be performed in completing a project. The specific element numbers and descriptions are as follows.

WBS 013.01 Project Management—This scope includes safety, health, and quality technical support, and oversight is performed to support implementation of key programs such as the Integrated Safety Management System, Corrective Action Management, Occurrence Reporting, and Quality Assurance Program. This scope also includes support management and staff to the overall project to provide waste support services to Hanford Site generators, human relations, buyer/procurement staff, and project controls (e.g., schedulers/cost analysts). Technical support includes environmental and nuclear/criticality safety engineering from centralized organizations to support development and implementation of regulatory permits, safety bases, procedure reviews, hazard analysis generation, and criticality safety evaluation report development.

Strategic planning and integration is another critical scope element that provides onsite interface between DOE contractors and subcontractors to ensure that mission needs are met. Also included in this scope is the maintenance of the transportation and packaging program, in accordance with applicable requirements for onsite and offsite shipments of regulated waste and materials and nonregulated materials.

WBS 013.04 MLLW Treatment—This scope provides for M-091-42 MLLW and M-091-43 MLLW treatment. Processing includes thermal and nonthermal treatment. Activities consist of managing offsite commercial MLLW treatment/disposal contracts, shipping MLLW packages that have been determined to be LDR compliant to the MWTs or ERDF for disposal, and treatment of selected waste containers.

	WBS	SCOPE	TOTAL	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
M-091	013.01	Project Management -PBS RL-13	342,091	18,483	18,850	18,230	15,463	15,053	14,748	14,415	14,052	13,656	15,711	16,025
	013.04	Mixed Low Level Waste Treatment	37,103	10,995	15,364	7,297	690	690	1,034	1,034	0	0	0	0
	013.05	TRU Retrieval	298,515	40,886	42,332	33,390	33,437	59,996	37,873	18,861	16,291	15,448	1	0
	013.06	TRU Repackaging	287,707	14,660	23,069	2,584	5,771	29,868	28,679	26,340	27,077	27,835	2,381	4,036
	013.07	Waste Receiving and Processing Facility (WRAP)	207,458	9,025	8,965	15,871	10,469	9,510	9,776	8,071	8,296	8,528	9,668	8,160
	013.08	T-Plant	172,308	12,200	11,567	14,086	12,181	16,896	7,990	10,199	15,766	8,155	7,133	6,020
	013.09	Central Waste Complex	143,732	8,475	8,087	6,353	6,998	6,329	5,561	7,323	5,325	5,523	6,808	5,746
	013.10	Environmental Restoration Disposal Fac (ERDF)	56,007	11,747	0	0	328	2,094	3,754	2,800	1,695	383	1,233	1,056
	013.12	Integrated Disposal Facility	7,396	263	262	629	271	269	276	284	292	300	370	312
	013.15	TRU Disposition	523,644	14,480	15,455	4,138	1,152	5,671	5,464	6,992	5,798	5,464	18,128	25,000
	013.21	Mixed Waste Trenches (MWTs)	16,306	739	596	806	630	1,139	396	421	2,044	2,101	604	510
M-091 Subtotal			2,092,266	141,953	144,546	103,383	87,389	147,512	115,551	96,739	96,636	87,393	62,038	66,865
Other Subtotal			1,332,009	48,751	57,745	40,381	44,792	51,554	55,849	54,880	52,871	60,608	57,882	59,202
M-091 TOTAL			3,424,276	190,704	202,291	143,764	132,181	199,066	171,400	151,619	149,507	148,001	119,920	126,067

	WBS	SCOPE	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031
M-091	013.01	Project Management -PBS RL-13	16,346	13,796	14,072	14,353	14,640	14,933	15,232	15,536	15,847	16,164	16,487
	013.04	Mixed Low Level Waste Treatment	0	0	0	0	0	0	0	0	0	0	0
	013.05	TRU Retrieval	0	0	0	0	0	0	0	0	0	0	0
	013.06	TRU Repackaging	4,036	8,386	8,507	8,677	8,851	9,028	9,209	9,393	9,581	9,772	9,968
	013.07	Waste Receiving and Processing Facility (WRAP)	8,160	8,490	8,659	8,833	9,009	9,189	9,373	9,561	9,752	9,947	10,146
	013.08	T-Plant	6,020	6,246	6,000	6,120	6,242	6,367	6,495	6,624	0	0	0
	013.09	Central Waste Complex	5,746	5,978	6,098	6,220	6,344	6,471	6,600	6,732	6,867	7,004	7,144
	013.10	Environmental Restoration Disposal Fac (ERDF)	1,056	15,229	1,500	1,530	1,561	1,592	1,624	1,656	1,689	1,723	1,757
	013.12	Integrated Disposal Facility	312	325	331	338	345	351	359	366	373	380	388
	013.15	TRU Disposition	25,000	35,700	36,414	37,142	37,885	38,643	39,416	40,204	41,008	41,828	42,665
	013.21	Mixed Waste Trenches (MWTs)	510	531	541	552	563	574	586	598	609	622	634
M-091 Subtotal			67,186	94,681	82,123	83,765	85,440	87,149	88,892	90,670	85,726	87,441	89,190
Other Subtotal			60,552	61,933	63,345	64,790	66,268	67,780	69,327	70,909	72,528	74,184	75,878
M-091 TOTAL			127,738	156,614	145,468	148,555	151,708	154,929	158,219	161,579	158,254	161,625	165,068

dollars in $000s

* See Appendix D, Table D-5, for the basis of this figure.

Figure 8-1. RL-0013 Annual Funding Profile

WBS 013.05 TRU Retrieval—This scope provides for retrieval of suspect TRU waste from the LLBG (218-W-4C, 218-W-4B, 218-E-12B, and 218-W-3A). Retrieval consists of the following activities:

- Removing soil over RSW containers within the trenches
- Removing the RSW containers from the trenches
- Assaying all containers and venting the containers as required
- Designating waste
- Shipping the containers to the appropriate TSD facility
- Sampling of the LLBG trenches

WBS 013.06 TRU Repackaging—This scope provides repackaging of TRUM waste at WRAP, T Plant, and local commercial facility (i.e., Perma-Fix Northwest) such that it can be certified to meet the WIPP waste acceptance criteria.

WBS 013.07 WRAP—This scope provides activities for the safe operation of WRAP and maintaining WRAP in a ready-to-serve condition.

WBS 013.08 T Plant—This scope provides activities for the safe operation of T Plant and maintaining the T Plant in a ready-to-serve condition.

WBS 013.09 CWC/LLBGs—This scope provides for the safe operation of CWC and maintaining CWC in a ready-to-serve condition and the safe operation of LLBGs.

The LLBGs contain two lined mixed waste trenches (218-W-5 LLBG, Trenches 31 and 34) that are within the boundaries of the LLBGs. Operations and maintenance of these trenches are included in WBS 013.21.

WBS 013.15 TRU Disposition—This scope includes support of CCP certification activities and shipment of TRU waste to WIPP and AMWTP.

WBS 013.21 Mixed Waste Trenches—This scope provides activities for the safe operation of the MWTs and maintaining the MWTs in a ready-to-serve condition.

8.2 Project Schedule and Critical Path Analysis

Appendix F presents the M-091 Milestone series logic tied lifecycle schedule that is supported by the funding profile presented in Figure 8-1. The following tasks are included on the schedule:

- Acquisition of new capabilities to retrieve the alpha caisson RH-RSW, to treat/process the remaining waste, and to load RH casks for shipment to WIPP. Within DOE, projects typically progress first by performing an alternative study that evaluates and selects a preferred alternative; second, this is followed by a conceptual design phase, which is an iterative process to define, analyze, and refine project concepts and alternatives; and third, a definitive design phase where the design of the project is finalized. The final step is the construction phase. These projects are included in the M-091-01 Milestone as shown in Table 4-1.

- Annual preparation of the PMP (Milestone M-091-03).

- Retrieval of CH-RSW and RH-RSW (Milestones M-091-40 and M-091-41). Retrieval operations will generate CH and RH wastes in a variety of packages, which feed into the treatment and processing of MLLW and TRUM waste.

- The treatment/processing of CH-MLLW and RH-MLLW (Milestones M-091-42 and M-091-43). Waste for treatment and processing is from the RSW retrieval operations and waste in storage.
- The processing and shipment of CH-TRUM and RH-TRUM waste (Milestones M-091-44 and M-091-46). Waste for processing is from the RSW retrieval operations and waste in storage.

8.3 Constraints and Risks

The following subsections identify constraints and uncertainties associated with the ability to accomplish the M-091 Milestone work scope.

8.3.1 Budget

The schedule of activities presented in this PMP is based on the assumption that funding levels are available as given in Figure 8-1. However, there is a high degree of uncertainty in this funding profile for FY 2012 and FY 2013. Given preliminary budget levels and site priorities, it may be necessary to curtail work sharply that supports the M-091 Milestone series.

Ecology has proposed the following integrated 5-year priorities for 2010 through 2015 (Letter, Ecology to DOE Richland Operation Office, dated June 1, 2010):

1. Build and prepare to operate the Waste Treatment Plant.
2. Retrieve tanks on the consent decree schedule (10 tanks in C Farm by 2014); including submission of the C Farm Closure permit modification application.
3. Meet groundwater milestones for the River Corridor and Central Plateau.
4. Complete River Corridor cleanup, including soil sites, reactors, K Basins, and 618-10/11 Burial Grounds.
5. Complete PFP cleanup.
6. Complete retrieval, certification, and shipment of TRU by the proposed TPA milestone dates.
7. Complete Outer Central Plateau area soil sites by the proposed dates, including closure of the Solid Waste Landfill and the Nonradioactive Dangerous Waste Landfill.
8. Complete remedial investigations and cleanup decisions for Central Plateau soils by the proposed TPA milestone dates.
9. Complete closure of the canyons and demolition of the remaining Central Plateau buildings.

This integrated priority list is consistent with the proposed TPA and consent decree revisions.

Lower levels of available funding could result in placing the facilities (i.e., T Plant, WRAP) that support the M-091 Milestone work scope into a minimum safe condition with operations sufficient only to support other Hanford Site generators. In addition, programs including MLLW treatment and disposal, TRUM waste characterization and shipping, and retrieval of RSW could be temporarily suspended.

This sharp reduction in waste generation (M-091 Milestone work scope and other Hanford cleanup work) will also impact the ability of commercial facilities, which rely heavily on M-091 Milestone feed, to maintain trained and experienced staff. If adequate feed is not available, the vendors may be forced to close operations entirely. With the loss of commercial capability, DOE may be required to develop these capabilities onsite in the future at considerable expense.

Without adequate near-term funding, current scheduled work would be deferred. However, because current plans represent an acceleration of M-091 Milestone requirements, short-term deferral will not impact the ability to meet the milestones, in most cases, but could have an impact if commercial facilities close during unfunded FYs.

Focus on the completion of cleanup along the Columbia River Corridor coupled with future funding uncertainty formed the basis for the recently renegotiated milestones. Target (unenforceable) milestones were established for M-091 Milestone work in FY 2012 through FY 2014 and enforceable milestones were agreed to for FY 2015 and FY 2016 as the River Corridor cleanup is completed and funding is made available to refocus on MLLW and TRUM retrieval.

8.3.2 New Technology Being Acquired

The majority of waste under the scope of the M-091 Milestone series can be managed using existing technologies and processing methods. However, current technologies and processing methods are not adequate to retrieve and process the alpha caisson RH-RSW, process the large container CH-TRUM and RH-TRUM, or load waste into the RH-72B cask for shipment of RH-TRUM waste to WIPP. Additionally, commercial capabilities are being relied upon to support completion of the milestones.

8.3.2.1 Retrieval and Processing of RH-RSW in Alpha Caissons

The alpha caissons contain waste containers that have a much higher level of radioactivity than previously retrieved. The mobile hot cell design that is being considered for the retrieval and processing of the alpha caisson waste is based upon expected radiation levels to be encountered as calculated from available waste records. There is a risk that the actual waste containers hold higher quantities of fission material than indicated in the waste records. This could result in modification being required to the designed retrieval and processing modules with corresponding cost and schedule impacts. To reduce the impact, review of all available waste records has been performed. The systems will be designed with the flexibility to handle various containers and number/volume of product (output) containers.

Also during design development, alternate processing paths will be explored to address the worst case scenario through administrative controls and sound operational practices to ensure worker safety. During the development of the design, workers from operations, radiological safety, and nuclear safety organizations will be involved to ensure adequate controls are in place for the worker safety.

Because this technology has not previously been used at Hanford and because the caisson waste has a much higher dose than experienced with offsite use of the mobile hot cells, there is a probability that unanticipated startup and implementation problems will be encountered. These problems could impact productivity, with resulting cost and schedule impacts. To mitigate this risk, cold testing and training of mobile hot cells using mock-up caisson to simulate field conditions will be performed.

8.3.2.2 Repackaging of RH-TRUM Waste

The RH-TRUM waste containers have a much higher level of radioactivity than previously repackaged CH-TRUM waste containers. The new onsite repackaging capability is being designed to remotely remove the waste from the current container, size reduce and sort waste, treat nonconforming items, and package and support certification from CCP to generate a WIPP-compliant container. The majority of the RH-TRUM waste containers will be received in metal and/or concrete overpacks. These containers will need to be opened, and the waste will be repackaged or size reduced into WIPP certifiable containers. The surface dose rate of the waste can be as high as 50,000 mrem/hr.

Similar to the alpha caisson project, during the development of the design of the RH-TRUM repackaging capability, workers from operations, radiological safety, and nuclear safety organizations will be involved

to ensure that adequate controls are in place for worker safety. Because this technology for repackaging and sizing reducing waste has not previously been used at the Hanford Site and because the RH-TRUM waste has a much higher dose than experienced with repackaging CH-TRUM waste, there is a probability that unanticipated startup and implementation problems will be encountered. These problems could impact productivity, with resulting cost and schedule impacts. To mitigate this risk, cold testing and training of remote equipment, using mock-up containers to simulate actual conditions, will be performed.

8.3.2.3 RH-TRUM Waste Loading into Canister and RH-72B Cask

Loading of RH-TRUM waste containers into canisters and RH-72B casks, as discussed in Section 4.3.3, has not been performed on the Hanford Site. However, it is successfully performed at other DOE sites, and those sites will be consulted, during the design of the RH-TRUM waste loading facility at the Hanford Site, to incorporate lessons learned.

8.3.3 Higher Contamination Levels than Expected

There is a risk that RSW retrieval operations are impacted by higher than expected contamination levels, container degradation, or container location. RSW retrieval is moving into the higher risk trenches where waste records may be less complete and waste packaging may be more degraded than encountered to date. Although retrieval planning considers the most likely waste contamination/exposure scenario in developing the retrieval approach, there is a possibility that contamination levels (radiological or chemical) may be greater than expected or that container degradation may be more significant than expected, requiring in-trench overpacking prior to retrieval. There is also a risk that some containers will be buried at depths that require shoring trench boxing during retrieval. These retrieval complexities would result in schedule impacts.

8.3.4 Increase in RSW Volume

There is a risk of RSW retrieval operations encountering waste that is either not identified in records or is comingled with non-RSW due to inaccurate records or soil contamination. Based on inspections of recently excavated waste containers in the trenches and handling the waste at the point-of-generation, the volume of waste to be retrieved is uncertain due to difficulty in identifying the RSW containers in trenches where the waste is not clearly marked. Inability to identify the containers may result in increased volumes of waste to be retrieved before determining that the RSW waste sought has been retrieved. The volumes and characteristics of RSW waste to be processed are based upon existing records. Waste not identified in the records or inaccurate records could result in unexpected waste volumes or characteristics.

8.3.5 Increase in Volume of TRUM Waste to be Shipped to WIPP

Volumes could increase if smaller quantities of waste must be placed into the waste packages to meet the WIPP requirements. Having additional size reduction, as an example, increases the amount of processing time and increases the number of shipment to WIPP. The WIPP acceptance criteria allows for a limited number of waste packages that exceed a surface contact dose rate of 100 R/hr. Much of the RH-RSW waste that will be generated as part of the alpha caisson retrieval could exceed the 100 R/hr dose limit. This could result in the need for additional size reduction and separation into separate waste containers or incorporation of shielding into the waste package, thus increasing the total number of RH-TRUM packages and, therefore, increasing the number and duration of shipments to WIPP.

8.3.6 Final Certification and Shipment

Final certification and shipment of TRUM waste to WIPP is dependent on support from CCP and WIPP. CCP has been contracted by CBFO to characterize and certify that TRU waste is being packaged at the Hanford Site. Shipments to WIPP are dependent upon a number of factors, including availability to shipping casks, shipping priorities established by CBFO, WIPP approvals of new waste forms, and the

availability of CCP resources to certify wastes. These factors could impact the ability to meet planned shipping schedules and cause prolonged storage at CWC.

8.4 Key Deliverables/Products

Key deliverables/products that will be developed in support of the M-091 work scope include the submittal of annual revisions of this PMP on June 30 every year until the M-091 Milestones are completed. The PMP will include the funding profile, which includes a lifecycle projection of annual funding required to accomplish project scope in accordance with the top-level WBS and schedule (see Figure 8-1). The PMP will detail project objectives, work schedules, expected outputs, integration with other programs and projects, and project management alternatives consistent with established agreement and other project constraints.

8.5 Performance Measurement

DOE conducts a performance measurement of the M-091 Milestones to provide an objective assessment of work accomplishments and progress against the baseline plan (scope, schedule, and budget) to manage the baseline effectively and to provide data for management decision making and reporting. The project performance is measured by comparing the amount of work planned with actual accomplishments to determine whether cost and schedule performance is as planned. DOE monitors the project performance monthly by comparing the budgeted cost for work performed to the actual cost of work performed.

8.6 Project Interface Control

DOE controls project interfaces through contract requirements, statements of work, interface control documents, and/or Memoranda of Agreement/Understanding. These documents define the interface and/or service, roles and responsibilities, accountabilities, and authorities.

Interface among the M-091-00 Milestone TRUM waste and MLLW activities and other projects, including waste generating programs for inventory tracking and capacity configuration purposes, is essential for successful project execution. The following waste activities, projects, facilities, and organizations require integration for successful project execution:

- CH2M HILL Plateau Remediation Company
- Mission Support Alliance, LLC
- CCP and WIPP
- MWTs 31 and 34
- WRAP
- T Plant
- CWC
- RSW retrieval
- ERDF
- Commercial processing facilities

8.7 Reporting

TPA reporting requirements are described in Chapter 4, “Agreement Management,” of the TPA (Ecology et al., 1989a). The primary interface for reporting and notification is from DOE Project Managers to their regulatory counterparts or through the Interagency Management and Integration Team. DOE typically

provides a status on the M-091 Milestones to the Ecology Project Manager on a monthly basis that is documented in the AR. In addition, monthly M-091 Milestone Project Manager meetings are held. The roles and responsibilities for the Project Manager and the Integration Team are contained in TPA Sections 4.1 and 4.2, respectively (Ecology et al., 1989a).

8.8 Change Management

TPA and baseline change management are discussed in the following subsections.

8.8.1 TPA Change Management

TPA change management is described in the TPA Action Plan, Section 12.0, “Changes to the Agreement” (Ecology et al., 1989b). The appropriate authority level for approval of a change is based on the content of the change. All changes will be processed using the change control form provided in Section 12.3.1, “Change Control Form,” of the TPA Action Plan (Ecology et al., 1989b).

Changes to the M-091 Milestone PMP will be in accordance with the TPA Action Plan, Section 9.0, “Documentation and Records,” and Section 9.3, “Document Revision” (Ecology et al., 1989b). Changes will be documented in the AR. Changes or revisions to the PMP may also result in the need to modify TPA milestones. Such changes are subject to the requirements of Section 12.0, “Changes to the Agreement,” of the TPA Action Plan (Ecology et al., 1989b).

DOE will submit revisions to this PMP annually on June 30 of every year until the M-091 Milestones are completed. The PMP revision will include DOE’s plans and schedules to address all requirements set forth in the M-091 Milestone series. Each revision of the M-091-03 Milestone PMP will, after approval by Ecology, supersede previous M-091-03 Milestone PMPs.

DOE will submit the PMP revision to Ecology for review and approval as primary documents pursuant to the TPA Action Plan, Section 9.2.1 (Ecology et al., 1989b). DOE will implement the PMP, as approved.

8.8.2 Baseline Change Management

DOE maintains a contract budget log under configuration control and management that reconciles to the current contract target costs. Changes are controlled and formally reviewed and approved. DOE requires the contractor to maintain a baseline change process that is approved by DOE.

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Appendix A

Glossary of Terms

A1 Terms

Terms used in the waste management plan are defined in this appendix.

Caissons, as used within the M-091 Milestone series (Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order Action Plan*), are the four caissons containing retrievably stored waste (RSW) in the 218-W-4B Burial Ground.

Certification, as used within the M-091 Milestone series, is defined as follows:

- All activities necessary for waste to be packaged, in order to meet the Waste Isolation Pilot Plant (WIPP) acceptance criteria, are completed. The volume of waste certified is the volume of waste given to the Central Characterization Project for certification verification. If subsequent WIPP certification reveals that the waste cannot be shipped to WIPP, this waste will not count toward meeting the milestone volume requirements (and will be subtracted from meeting such requirements) until such time as it has been determined to meet the WIPP waste acceptance criteria.
- The transuranic mixed (TRUM) waste has been shipped to Idaho, which may also count toward certification based upon actual shipment to Idaho and contingent upon the waste not returning to Hanford Site.
- The waste has been treated to meet land disposal restriction treatment standards.

Contact-Handled (CH) waste is a waste container with a surface dose rate less than or equal to 200 mrem/h.

Designation is the process of determining whether a waste is regulated under the dangerous waste lists (WAC 173-303-080, “Dangerous Waste Regulations,” “Dangerous Waste Lists,” through 173-303-082, “Dangerous Waste Sources”), characteristics (WAC 173-303-090, “Dangerous Waste Characteristics”), or criteria (WAC 173-303-100, “Dangerous Waste Criteria”). The process for designating wastes is described in WAC 173-303-070, “Designation of Dangerous Waste.” A waste that has been designated as a dangerous waste may be either dangerous waste or extremely hazardous waste. These regulations allow the use of “acceptable knowledge,” surrogate sampling, and other measures for designation to minimize radiation exposure to workers and to reduce costs.

Low-Level Waste (LLW) is defined as radioactive waste that is not spent fuel, high-level waste, transuranic (TRU) waste, byproduct material, or naturally occurring radioactive material.

Mixed (M) Waste is a dangerous, extremely hazardous, or acutely hazardous waste that contains a nonradioactive hazardous component and, as defined by 10 CFR 20.1003, “Standards for Protection Against Radiation,” source, special nuclear material, or by-product material subject to the *Atomic Energy Act of 1954*.

Retrievably Stored Waste (RSW), as used within the M-091 Milestone series, is or was believed to meet the TRU waste criteria when it was placed in the 218-W-4B, 216-W-4C, 218-W-3A, and 218-E-12B Burial Ground trenches after May 6, 1970. RSW does not include waste in containers that have deteriorated to the point that they cannot be retrieved and stabilized (e.g., placed in overpacks) in a manner that would allow them to be transported and designated without posing significant risks to workers, the public, or the environment. With respect to any such containers, and with respect to any release of RSW, how to move forward will be determined through the cleanup process set forth in the *Resource Conservation and Recovery Act of 1976*; RCW 70.105, “Hazardous Waste Management;”

and/or the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, as appropriate. Those processes may result in additional requirements for the remediation of such wastes.

The Atomic Energy Commission (a Department of Energy [DOE] predecessor agency) initially defined TRU waste as "waste with known or detectable contamination of transuranium nuclides." In March 1970, the Atomic Energy Commission directed field sites to segregate TRU waste and place it in retrievable storage that would allow the waste to be retrieved within 20 years. Before this date, this waste was disposed as LLW.

In 1973, the TRU waste segregation limit was established at 10 nCi/g of TRU. In 1982, the limit was changed to 100 nCi/g. This limit was enacted by Congress in 1992. Because of the changing definition of TRU waste, waste generated and stored between 1970 and 1982 could contain less than the current threshold of 100 nCi/g for defining TRU waste. This waste has been termed "suspect" TRU because some of it will be designated as LLW following radiological characterization.

Remote-Handled (RH) waste is a waste container with a surface dose rate greater than 200 mrem/h. The RH waste volumes are based on the sum of all containers listed in Solid Waste Information and Tracking System (SWITS) with a cumulative contact dose rate greater than 200 mrem/h, and/or have a SWITS shielding code of lead, steel, or concrete, and/or coded in SWITS as RH.

Small and Large Containers have different meanings, depending on whether they are used in reference to MLLW or TRUM waste. When referring to MLLW, small containers are less than 10 m^3 (353.2 ft^2), including 208.2 L (55 gal) drums. When referring to TRUM waste, small containers are 208.2 L (55 gal) drums or small containers, even if overpacked in 321.75 L (85 gal) drums and WIPP standard waste boxes (SWBs). A large container is anything that is not defined as a small container, and vice versa.

Standard Waste Box (SWB) is a 1.8 m^3 (63.57 ft^3) steel container that is approximately 0.94 m (3.1 ft) in height, 1.8 m (5.9 ft) in length, and 1.4 m (4.6 ft) in width. The SWB met U.S. Department of Transportation requirements for specification 7A Type A packaging by DOE in 1988.

Solid Waste Integrated Forecast Technical (SWIFT) database contains estimates of future waste volumes and characteristics forecasted by waste-generating units. The waste-generating units provide basic information that is incorporated into the SWIFT database. This forecast is updated annually and published in the SWIFT report.

Solid Waste Information and Tracking System (SWITS) is a Hanford Site database containing records of waste containers stored at Hanford and contains data (e.g., volume; container information; and radiological, physical, and dangerous waste characteristics) about each container of stored waste considered within the scope of the M-091 Milestone series. SWITS is a dynamic database that is updated frequently to reflect waste receipts, processing, and shipment volumes; as a result, data presented in this revision of the Project Management Plan may differ from previous versions.

Transuranic (TRU) waste meets the definition, in the *Waste Isolation Pilot Plant Land Withdrawal Act*, Pub. L. 102-579 (Section 2.18), of radioactive waste containing more than 100 nCi of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years.

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Appendix B

Applicable Regulatory Requirements

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Terms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CAA	*Clean Air Act Amendments of 1990*
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HFFACO	Hanford Federal Facility Agreement and Consent Order
HSW EIS	Hanford Site Waste Environmental Impact Statement
NEPA	*National Environmental Policy Act of 1969*
OU	operable unit
RCRA	*Resource Conservation and Recovery Act of 1976*
ROD	record of decision
TC&WM EIS	Tank Closure and Waste Management Environmental Impact Statement
TRU	transuranic
TRUM	transuranic mixed
WIPP	Waste Isolation Pilot Plant
WDOH	Washington State Department of Health

B1 Applicable Regulatory Requirements

Mixed waste management activities will consider the requirements described in the following sections as well as any other applicable regulations or U.S. Department of Energy (DOE) requirements.

B1.1 *Clean Air Act of 1990* (42 USC 7401, et seq.)

The Hanford Site air operating permit has been issued in accordance with Title V of the *Clean Air Act Amendments of 1990* (CAA) and is implemented through federal and state programs under 40 CFR 70, "State Operating Permit Programs," and WAC 173-401, "Operating Permit Regulation." The permit is intended to provide a compilation of applicable (CAA) requirements both for radioactive emissions and for criteria/toxic emissions at the Hanford Site. Current air permitting documentation is expected to address existing mixed waste management activities. New air permitting documentation will be needed for alpha caissons retrievably stored waste retrieval and future large container and remote handling capabilities. Activities addressed by the Project Management Plan will be reviewed against the permitting documentation, as necessary, to ensure that mixed waste management activities are addressed.

B1.2 *Hazardous Materials Transportation Act of 1975* (49 USC 5101, et seq.)

Hazardous material transportation requirements include employee training programs, performance standards, and preparation of shipping papers to identify and track hazardous materials, design of packaging and containers, marking, and labeling. Specific requirements will be followed that relate to mixed waste management activities and the shipment mode used (i.e., rail, aircraft, vessel, and public highway). Offsite shipments of hazardous materials must comply with the implementing regulations of 49 CFR Parts 101, 106, 107 and 171 through 180, "Transportation," administered by the U.S. Department of Transportation (DOT). Onsite waste movements must comply with DOE requirements, including DOE/RL-2001-36, *Hanford Sitewide Transportation Safety Document*.

B1.3 *National Environmental Policy Act of 1969* (42 USC 4321, et seq.)

The Hanford Solid Waste Environmental Impact Statement (HSW EIS) analyzed potential impacts associated with the onsite and offsite treatment, storage, disposal, and transportation of mixed low-level waste and transuranic (TRU) waste (DOE/EIS-0286F, *Final Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement*). A record of decision (ROD) was issued (69 FR 39449, "Record of Decision for the Solid Waste Program, Hanford Site, Richland WA: Storage and Treatment of Low-Level Waste and Mixed Low-Level Waste; Disposal of Low-Level Waste and Mixed Low-Level Waste, and Storage, Processing, and Certification of Transuranic Waste for Shipment to the Waste Isolation Pilot Plant").

The HSW EIS was challenged through litigation, resulting in a settlement agreement (*Washington v. Bodman*, 2006). The settlement agreement required that a new Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS) be created to replace the HSW EIS, but allows the HSW EIS to be relied on until the issuance of the ROD for the new EIS. This is stated in the following stipulation:

> *Pending finalization of the TC&WM EIS, the HSW EIS will remain in effect to support ongoing waste management activities at Hanford (including off-site waste transportation such as TRU and TRUM shipments to WIPP), in combination with other applicable Hanford Site NEPA and CERCLA documents, permits and approvals; provided, that pending finalization of the TC&WM EIS, DOE will not rely on the groundwater analysis in the HSW EIS for decision-making. When completed, the TC&WM EIS will supersede the HSW EIS.*

The TC&WM EIS was issued for public comment in October of 2009, and public comment closed in March 2010. As of this writing, the ROD has not yet been issued, so the HSW EIS continues to be relied upon for purposes of M-091 milestone activities.

B1.4 *Resource Conservation and Recovery Act of 1976* (42 USC 6901, et seq.), as Amended by the *Hazardous and Solid Waste Amendments of 1984*

Federal regulations, implementing the *Resource Conservation and Recovery Act of 1976* (RCRA) and RCRA corrective action, address the requirements for hazardous wastes, including treatment, storage, disposal, and transportation (40 CFR Parts 260 through 271, "Hazardous Waste Management System: General"). The U.S. Environmental Protection Agency (EPA) has authorized the Washington State Department of Ecology (Ecology) to administer the State's statute and regulations, RCW 70.105, "Hazardous Waste Management," and WAC 173-303, "Dangerous Waste Regulations," in lieu of the federal RCRA regulations.

B1.5 *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (42 USC 9601, et seq.)

The *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) addresses spill cleanups and hazardous substances left at past practice waste sites. DOE performs investigation and response actions for release of hazardous substances at the Hanford Site as the lead agency delegated authority under CERCLA Section 104 by presidential Executive Order 12580 (1987). In 1989, pursuant to CERCLA Section 120, DOE executed an agreement with EPA and Ecology governing execution of CERCLA response actions and measures to bring Hanford into compliance with RCRA Treatment, Storage, and Disposal Unit and Corrective Action requirements. The agreement is titled the Hanford Federal Facility Agreement and Consent Order (HFFACO), also called the "Tri-Party Agreement." EPA or Ecology divide the responsibility as lead regulatory agency for various response actions at the Hanford Site.

In September 2006, DOE submitted an M-016-93 implementation work plan to EPA proposing the acquisition of capabilities necessary to prepare transuranic mixed (TRUM) waste generated by CERCLA cleanup actions at the Hanford Site for disposal at the Waste Isolation Pilot Plant (WIPP). This work plan reflected retrieval decisions, projected waste volumes, and schedules from all CERCLA cleanup actions authorized in RODs and action memoranda at the Hanford Site and will provide for updates and revisions as new information becomes available (i.e., after all 200 Area RODs are issued). As part of the approval process for RODs and action memoranda, EPA and the DOE Richland Operations Office will obtain Ecology concurrence to ensure that wastes from CERCLA Operable Units (OUs) for which Ecology is the lead regulatory agency, are properly planned.

B1.6 *Washington State Hazardous Waste Management Act of 1976* (RCW 70.105)

The *Washington State Hazardous Waste Management Act of 1976* authorizes Ecology to regulate the treatment, storage, disposal, and transportation of dangerous waste in Washington State. Mixed waste is dangerous waste that is mixed with radioactive elements. The chemical characteristics of the mixed waste are regulated under RCRA and Washington Dangerous Waste regulations, while the radioactive characteristics are regulated by DOE under the Atomic Energy Act. Ecology has promulgated dangerous waste regulations in WAC 173-303. Mixed waste generation activities are subject to generator requirements. Mixed waste management activities that cannot utilize generator provisions must be conducted according to dangerous waste permits under WAC 173-303 in order to operate. Existing permits are expected to address processing activities.

B1.7 "Washington Clean Air Act" (RCW 70.94)

Ecology's Nuclear Waste Program regulates air toxicity and criteria pollutant emissions from the Hanford Site. Ecology promulgates and enforces the regulations under RCW 70.94, "Washington Clean Air Act." Ecology's implementing requirements (e.g., WAC 173-400, "General Regulations for Air Pollution Sources," and WAC 173-460, "Controls for New Sources of Toxic Air Pollutants") specify review of new source emissions, permitting, applicable controls, reporting, notifications, and compliance with the general standards for applicable sources of Hanford Site emissions.

The Washington State Department of Health (WDOH) Radiation Protection Division regulates radioactive air emissions statewide, as authorized by EPA and Washington State legislative and regulatory authority. WDOH implements the state requirements, adopts and implements the federal requirements under WAC 246-247, "Radiation Protection—Air Emissions," and enforces the federal requirements under authority delegated by EPA. Before beginning any work that would result in creating a new or modified source of radioactive airborne emissions, a notice of construction application must be submitted for review and approval by WDOH, resulting in issuance of an operating license. Typical license requirements for radioactive air emission sources include ensuring adequate emission controls, emissions monitoring/sampling, and annual reporting of emissions.

B1.8 Department of Transportation

Onsite transportation of waste is managed by DOE in accordance with DOE/RL-2001-36. Transportation of waste offsite is regulated by DOT. A Memorandum of Understanding, between the Western Governors' Association and DOE, requires that DOE conduct TRU waste shipments through the western states in accordance with the protocols contained in the *WIPP Transportation Safety Program Implementation Guide* (WGA and DOE-CBFO, 2003). Shipments within the same DOE site, or other TRU waste shipments as agreed to between DOE and the states, are not included. Shipments of TRU waste to commercial firms using road closures are acceptable.

The type of packaging required to transport the waste depends, in part, on the total quantity of radioactivity, the form of the materials, and the concentration of radioactivity. DOE is responsible for determining the appropriate container for the material it is transporting. DOE ensures that each waste package being transported offsite meets DOT regulations for design, material, manufacturing methods, and testing.

B2 References

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Appendix C

Descriptions of Low-Level Burial Grounds with Retrievably Stored Waste

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Terms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
LLBG	low-level burial ground
OU	operable unit
RCRA	*Resource Conservation and Recovery Act of 1976*
RSW	retrievably stored waste
TSD	treatment, storage, and/or disposal

C1 Descriptions of Low-Level Burial Grounds with Retrievable Stored Waste

Retrievably stored waste (RSW) is in designated areas of low-level burial grounds (LLBGs) 218-E-12B, 218-W-3A, 218-W-4B, and 218-W-4C. The following sections provide background information on each LLBG.

C1.1 218-W-4B

The 218-W-4B LLBG is located in the central portion of the 200 West Area of the Hanford Site. The trenches are 175 m (575 ft) long and 3.7 m (12 ft) deep. Figure C-1 presents a map of the 218-W-4B LLBG. The 218-W-4B LLBG is located in the LLBG *Resource Conservation and Recovery Act of 1976* (RCRA) treatment, storage, and/or disposal (TSD) unit. The 218-W-4B LLBG is also included in the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) 200-SW-2 Radioactive Landfills and Dump Group Operable Unit (OU).

The LLBG received miscellaneous radioactive solid waste from the 100, 200, and 300 Areas and offsite shipments from 1967 to 1990. Solid waste at the site consists of rags, paper, cardboard, plastic, pumps, tanks, process equipment, and other miscellaneous high dose rate transuranic waste.

The site contains RSW in Trenches T7, TV7, and T11 and four alpha caissons. Trench T7 is divided into two sections that were designed to receive RSW. The east end of the trench is referred to as TV7, a diamond shaped structure made up of a concrete lined “V” bottom and metal cover. The cement floor of Trench TV7 is a barrier to waste constituent migration, similar to the asphalt pad used in the remainder of Trench T7, with the exception of a known preferred direction of migration along the cement surface.

In the fall of 1972, the first asphalt pad was built in the remainder of Trench T7. Drums were arranged in modules, typically 12 drums wide by 12 drums deep by 4 drums high. Flame retardant plywood sheets were placed to separate the layers of drums and other packages. When modules were completed, they were covered with tarps and plywood sheets.

From 1970 to 1972, Trench T11 received waste drums and boxes that were stacked horizontally and “direct buried” in the ground without tarps or plywood to separate the soil overlying the waste. Other containers, such as concrete or steel burial boxes, ductwork, stainless steel tanks, and a culvert, were placed in this trench.

C1.2 218-W-4C

The 218-W-4C LLBG is located inside the 200 West Area of the Hanford Site and consists of 15 trenches ranging from 91 to 219 m (300 to 719 ft) long. Figure C-1 presents a map of the 218-W-4C LLBG. The 218-W-4C LLBG is located in the LLBG RCRA TSD unit. The 218-W-4C LLBG also is included in the CERCLA 200-SW-2 Radioactive Landfills and Dump Group OU.

In the 218-W-4C LLBG, Trenches T1, T4, T7, T20, T24, and T29 contain RSW. This waste is placed in modules on asphalt pads that contain drums and other packages, including boxes and steel and concrete casks. Drums were arranged in modules, typically 12 drums wide by 12 drums deep by 4 drums high. Flame retardant plywood sheets were placed to separate the layers of drums and other packages. When modules were completed, they were covered with tarps and plywood sheets. The contact-handled RSW has been removed from this LLBG.

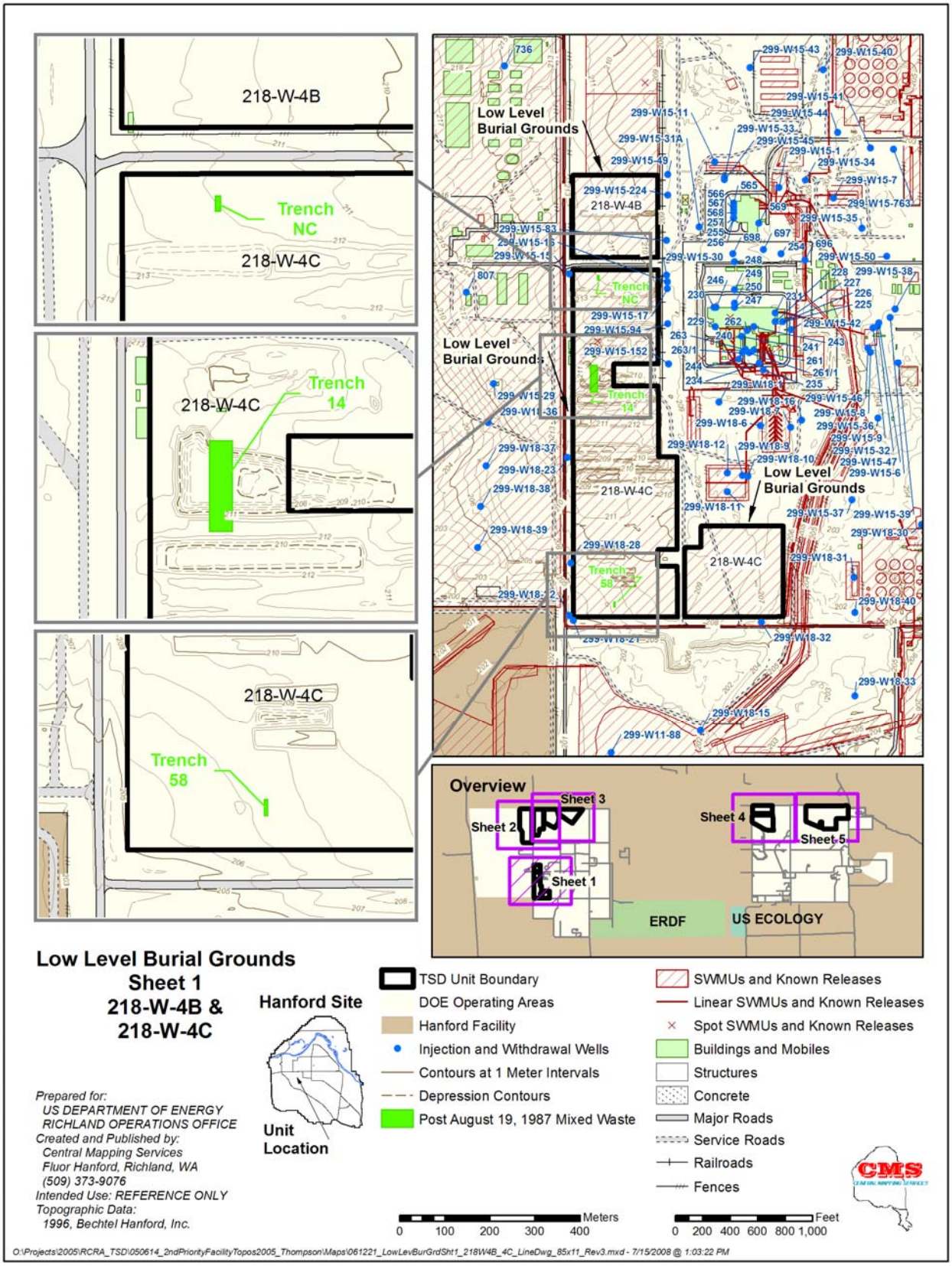

Figure C-1. Map of Low-Level Burial Grounds 218-W-4B and 218-W-4C

C1.3 218-W-3A

The 218-W-3A LLBG is located inside the 200 West Area of the Hanford Site. Figure C-2 presents a map of the 218-W-3A LLBG. The 218-W-3A LLBG is also included in the CERCLA 200-SW-2 Radioactive Landfills and Dumps Group OU. The 218-W-3A LLBG began operating in 1970 and contains solid, dry industrial waste. The RSW is located in 14 trenches: T1, T4, T5, T6, T6S, T8, T9S, T10, T15, T17, T23, T30, T32, and T34.

The 218-W-3A LLBG has no asphalt pads and used only earthen bottom (potentially gravel fill) trenches. Drums were stacked horizontally in earthen trenches from 1970 until approximately 1974. The waste drums were buried directly in the ground without tarps or plywood to separate the soil overlying the waste. Direct contact with the soil increased the probability that containers have corroded and might be breached. The actual date when tarp coverage was initiated has not been established. Later, drums were stacked vertically and placed on plywood, and the completed module waste was covered with nylon tarps and plywood before soil emplacement. The 218-W-3A LLBG received RSW until 1987.

C1.4 218-E-12B

The 218-E-12B LLBG is located inside the 200 East Area of the Hanford Site. Figure C-3 presents a map of the 218-E-12B LLBG. The 218-E-12B LLBG is included in the CERCLA 200-SW-2 Radioactive Landfills and Dumps Group OU. The RSW is located in two trenches: T17 and T27.

The 218-E-12B LLBG began operating in 1967. The RSW originated from the Plutonium-Uranium Extraction Facility and was placed in 218-E-12B LLBG Trenches T-17 and T-27 between May 1970 and October 1972.

Drums were stacked horizontally in earthen trenches from 1970 to 1972. The waste drums were directly buried in the ground (i.e., not on asphalt pads as they were in the 218-W-4C LLBG) without tarps or plywood to separate the soil overlying the waste. Direct contact with the soil increased the probability that the containers have corroded and might be breached.

C2 References

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq., Pub. L. 107-377, December 31, 2002. Available at: http://epw.senate.gov/cercla.pdf.

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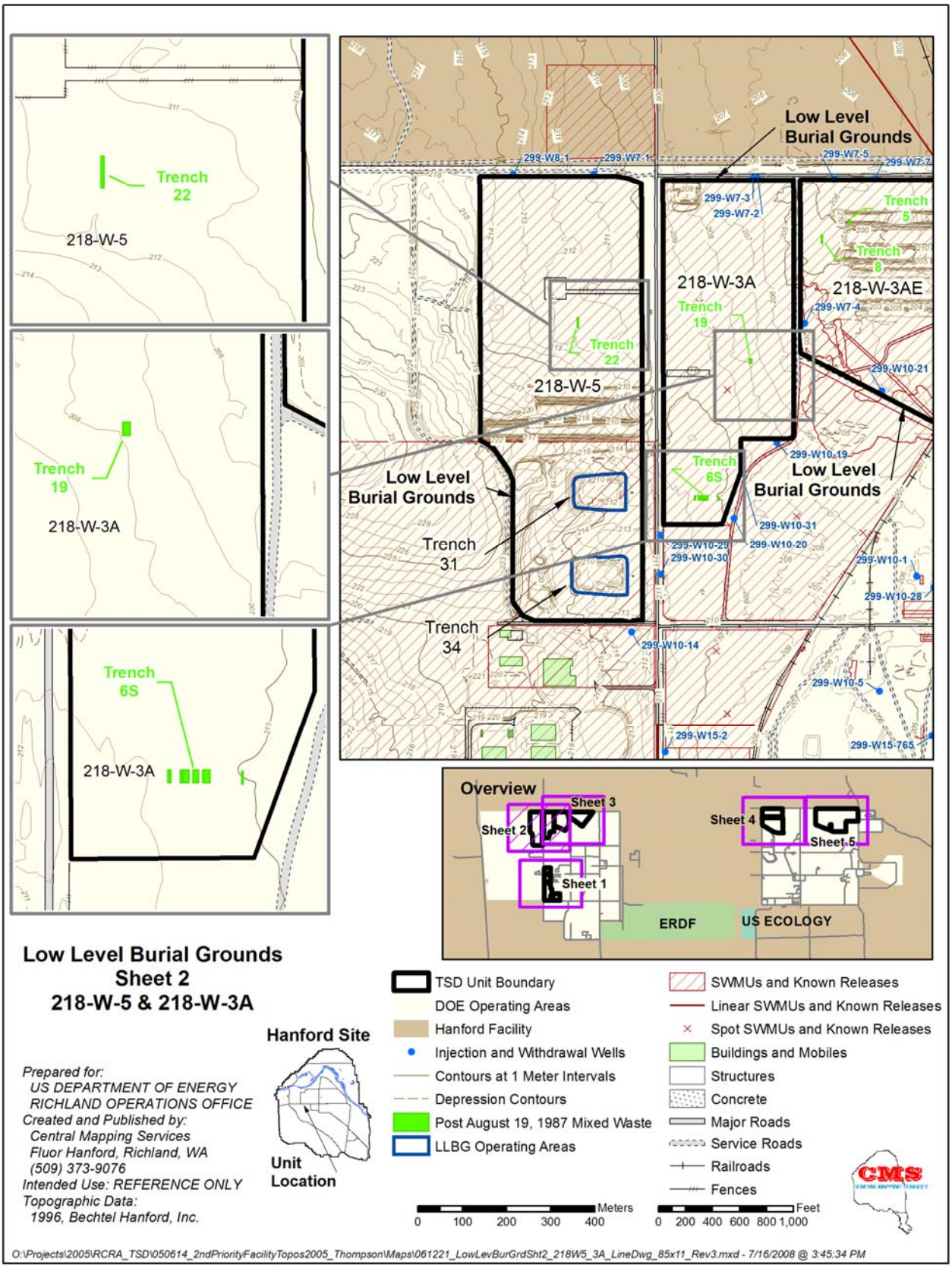

Figure C-2. Map of Low-Level Burial Ground 218-W-3A

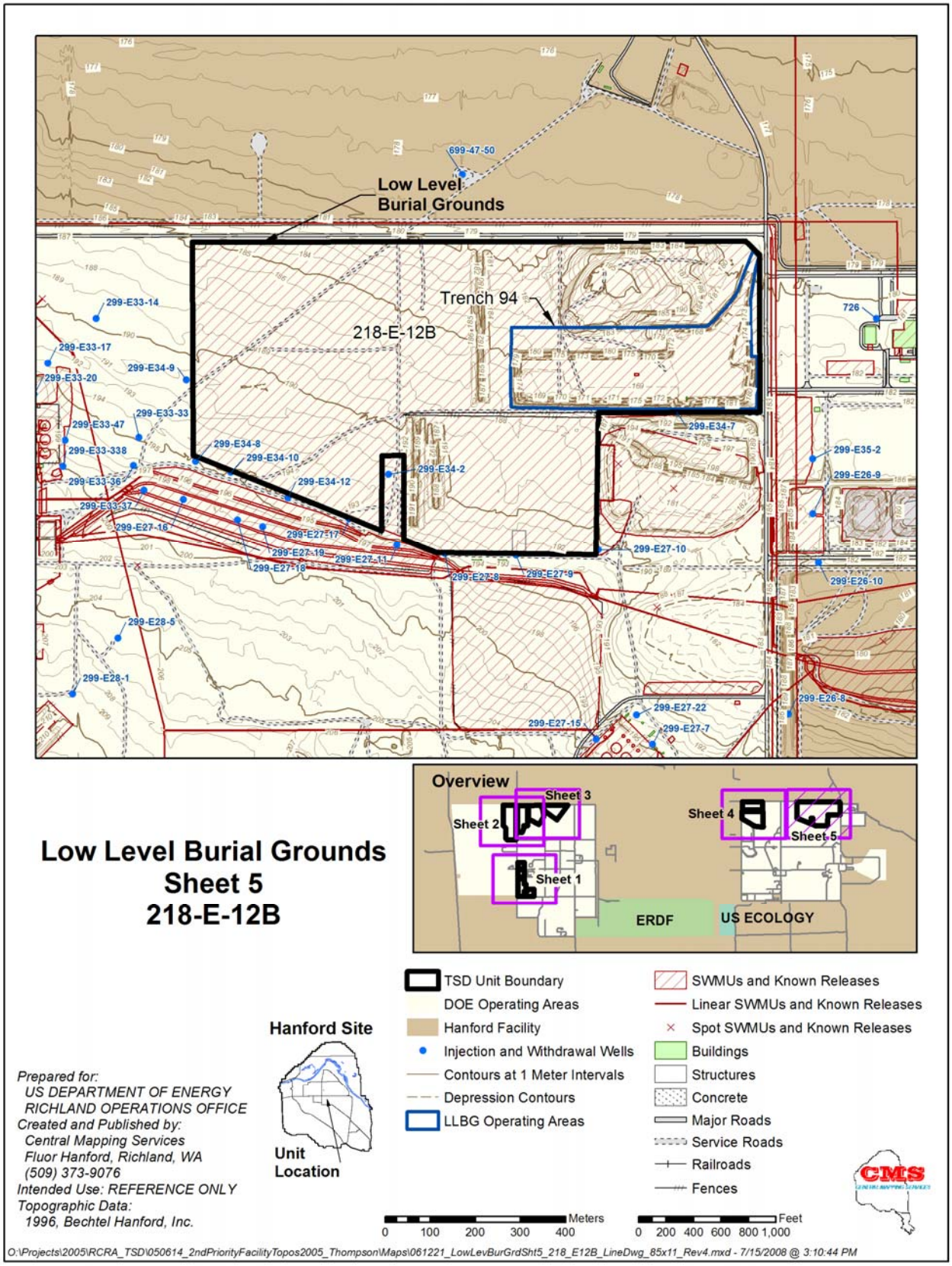

Figure C-3. Map of Low-Level Burial Ground 218-E-12B

Appendix D

Basis for Figures

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Terms

CBFO	DOE Carlsbad Field Office
CCP	Central Characterization Project
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CH	contact-handled
CHPRC	CH2M HILL Plateau Remediation Company
DOE	U.S. Department of Energy
FY	fiscal year
MLLW	mixed low-level waste
PMP	Project Management Plan
RH	remote-handled
RSW	retrievably stored waste
SWITS	Solid Waste Information and Tracking System
TRU	transuranic
TRUM	transuranic mixed waste
WIPP	Waste Isolation Pilot Plant
WRAP	Waste Receiving and Processing (Facility)

D1 Tables

Tables D-1 through D-5 describe the data sources, analytical bases, and underlying assumptions for certain figures included in the main text of this document.

Table D-1. Basis for Figure 1-4

Data Source, Analytical Basis, and Underlying Assumptions	
Data Source	• Inventory as of October 1, 2010 is based on SWITS data sorts. • The volume of an RSW container is as reported in SWITS; volumes will be adjusted based on actual volumes removed during waste retrieval operations (see Table 2-1). • Volumes are internal volumes of a waste container (e.g., a 55 gal drum has an internal volume of 0.208 m^3 and an external volume of 0.257 m^3).
Analytical Basis	• Projected annual volumes are based on the funding profile presented in Figure 8-1: – In FY 2011 to FY 2013, the remaining MLLW in aboveground storage, except for the 38 m^3 of no-path-forward waste (see Chapter 5), and RSW assayed as MLLW will be treated and disposed (See Chapter 3). – In FY 2014 to FY 2030, an average 2 shipments of CH-TRUM waste to WIPP at 8.4 m^3 per shipment, except for FY 2019 and FY 2020 (see Chapter 4). – In FY 2021 to FY 2030, an average 2 shipments of RH-TRUM waste to WIPP per week at 0.6 m^3 per shipment (see Chapter 4). • Shipped volume is the treated volume. During repackaging of CH-TRUM waste, it has been found that for every four drums repackaged, five drums of certified waste are generated, on average, resulting in a factor increase of 1.25. This factor is also assumed to be valid for non-caisson RH-TRUM waste. Volume increases can result from activities such as repackaging performed to generate compliant packages ready for final characterization, certification, and shipment to WIPP. For caisson RH-TRUM waste, a factor increase of 10 was used because the waste in a single container will need to be redistributed in several certified containers to minimize dose rates and maintain isotopic distribution (see Chapter 4). • Due to rounding, total may not equal sum of individual values.

Table D-1. Basis for Figure 1-4

Data Source, Analytical Basis, and Underlying Assumptions	
Underlying Assumptions	• After retrieval and assay, a significant portion of the RSW will be designated as non-TRU waste based on the change in the definition of TRU waste (to 100 nCi/g from the former definition of 10 nCi/g), which occurred after the waste was placed into retrievable storage in the trenches. Based on this change in definition, waste records, and field experience, the following percentages of MLLW and TRUM waste were derived (operational experience may make it necessary to change these assumptions in future revisions of this PMP): – The CH-RSW in small containers is 64 percent CH-MLLW and 36 percent CH-TRUM waste. – The CH-RSW in large containers is 25 percent CH-MLLW and 75 percent CH-TRUM waste. – The non-caisson RH-RSW is 50 percent RH-MLLW and 50 percent RH-TRUM waste. – Alpha caisson RH-RSW is 100 percent RH-TRUM waste. • Retrieval and TRUM waste repackage activities will supply the feed necessary to support the shipment schedule to WIPP. • Retrieval activities will support the feed necessary to support the treatment/disposal schedule for MLLW. • Commercial facilities are available and have sufficient capacity to treat the MLLW. • No-path-forward waste will be dispositioned as identified in Chapter 5. • CCP and CBFO will support the TRUM waste shipment schedule to WIPP. • Shipments of small container CH-TRUM waste (M-091-46) will be completed at the end of FY 2018. • Waste containers generated from the commercial treatment of large container CH-TRUM waste will begin in FY 2021. • No shipments of TRUM waste to WIPP in FY 2012, FY 2013, FY 2019, and FY 2020. • Shipments of RH-TRUM waste to WIPP will begin in FY 2021 and continue through FY 2030.

Table D-2. Basis for Figures 2-1 and 2-2

	Data Source, Analytical Basis, and Underlying Assumptions
Data Source	• RSW consists of suspect TRUM waste in burial grounds 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B. • The volume of RSW is as of October 1, 2010 as reported in SWITS. • Volumes are internal volumes of a waste container (e.g., a 55 gal drum has an internal volume of 0.208 m^3 and an external volume of 0.257 m^3). • RH-RSW volumes are based on the sum of all containers listed in SWITS, with a cumulative contact dose greater than 200 mrem/h, and/or have a SWITS shielding code of lead, steel, or concrete, and/or are coded in SWITS as RH. • SWITS is a dynamic database and is updated frequently to reflect updated information. As a result, data presented in this revision of the PMP may differ from previous volumes as follows: – The volume of RSW retrieved is based the actual volume measured when the container is removed from the trench. In some instances, the dimension of a container in SWITS is found not to represent the actual dimensions of a container retrieved. In these instances, SWITS will be updated with the actual volume removed, and this volume will be used to count towards the milestone. For example, when the culverts (cylinders) are retrieved, the original volume in SWITS was based on a rectangular container. SWITS was updated with the actual volume of the cylinder. – For failed containers that are repacked in the trench prior to retrieval, the waste volume reported in SWITS will be the volume counted towards the milestone. – There are instances where waste originally was reported in SWITS as RH but, because it has decayed over the past 30 years, the waste retrieved is CH. However, the retrieved waste will be counted toward the M-091-41 Milestone because the projected volumes of RH are based on the original data reported in SWITS.
Analytical Basis	• Projected annual volumes are based on the funding profile given in Figure 8-1. • Due to rounding, the total may not equal the sum of individual values.

Table D-3. Basis for Figure 3-1

	Date Source, Analytical Basis, and Underlying Assumptions
Data Source	• Inventory as of October 1, 2010 is reported in SWITS. • Volumes are internal volumes of a waste container (e.g., a 55 gal drum has an internal volume of 0.208 m^3 and an external volume of 0.257 m^3). • Volumes are given as pretreated volumes.
Analytical Basis	• Projected annual volumes are based on the funding profile given in Figure 8-1, and availability of inventory from RSW retrieval operations is as discussed in Chapter 2. • Due to rounding, the total may not equal the sum of individual values.
Underlying Assumptions	• After retrieval and assay, a significant portion of the RSW will be designated as non-TRU waste based on the change in the definition of TRU waste (to 100 nCi/g from the former definition of 10 nCi/g), which occurred after the waste was placed into retrievable storage in the trenches. Based on this change in definition, waste records, and field experience, the following percentages of MLLW and TRUM waste were derived (operational experience may make it necessary to change these assumptions in future revisions of this PMP): – The CH-RSW in small containers is 64 percent CH-MLLW. – The CH-RSW in large containers is 25 percent CH-MLLW. – The non-cassion RH-RSW is 50 percent RH-MLLW. – Alpha caisson RH-RSW is 0 percent MLLW. • During repackaging of TRUM waste in large containers, MLLW will not be segregated from the TRUM waste. This will be refined in future revisions of the PMP. • MLLW small containers are defined as containers less than 10 m^3, including 55 gal drums. • An MLLW large container is defined as any MLLW container that is not defined as an MLLW small container. • Commercial facilities are available and have sufficient capacity to treat the MLLW.

Table D-4. Basis for Figures 4-1 and 4-2

	Data Source, Analytical Basis, and Underlying Assumptions
Data Source	• Inventory as of October 1, 2010 is based on SWITS data sorts. • The volume of an RSW container is as reported in SWITS; volumes will be adjusted based on actual volumes removed during waste retrieval operations. • Volumes are internal volumes of a waste container (e.g., a 55 gal drum has an internal volume of 0.208 m^3 and an external volume of 0.257 m^3).
Analytical Basis	• Projected annual volumes are based on the funding profile given in Figure 8-1: – The projections used throughout this PMP are based on level loaded work-off rates. – FY 2013 to FY 2017, an average 44 drums of CH-TRUM waste is repackaged per week; 44 weeks per year (488 m^3 certified per year). – FY 2021 to FY 2030, an average 565 m^3 of CH-TRUM waste in large containers is repackaged per year. – FY 2021 to FY 2023, an average 42 caisson containers of RH-TRUM waste is repackaged per week; 44 weeks per year (80 m^3 certified per year). – FY 2021 to FY 2030, an average 25 m^3 of non-caisson RH-TRUM waste is repackaged per year (31 m^3 certified per year). – In FY 2014 to FY 2018, an average 2 shipments of CH-TRUM waste is shipped to WIPP per week at 8.4 m^3 per shipment; 40 weeks per year (633 m^3/yr shipped to WIPP). – In FY 2021 to FY 2030, an average 2 shipments of CH-TRUM waste is shipped to WIPP per week at 8.4 m^3 per shipment; 40 weeks per year (687 m^3/yr shipped to WIPP). – In FY 2021 to FY 2030, an average 2 shipments of RH-TRUM waste is shipped to WIPP per week at 0.6 m^3 per shipment; 40 weeks per year (55 m^3/yr shipped to WIPP). – Production rates: 10 drums/week/line/shift at WRAP; 17 drums/week/line/shift at T Plant, 50 drums/week at Commercial Facility. Number of shipments to WIPP per week is dictated by DOE and is dependent on priority across the DOE Complex. • Certified and shipped volume is the treated volume. During repackaging of CH-TRUM waste, it has been found that for every four drums repackaged, five drums of certified waste are generated, on average, resulting in a factor increase of 1.25. This factor is also assumed to be valid for non-caisson RH-TRUM waste. Volume increases can result from activities such as repackaging performed to generate compliant packages ready for final characterization, certification, and shipment to WIPP. For caisson RH-TRUM waste, a factor increase of 10 was used because the waste in a single container will need to be redistributed in several certified containers to minimize dose rates and maintain isotopic distribution. • Due to rounding, the total may not equal the sum of individual values.
Underlying Assumptions	• After retrieval and assay, a significant portion of the RSW will be designated as non-TRU waste based on the change in the definition of TRU waste (to 100 nCi/g from the former definition of 10 nCi/g), which occurred after the waste was placed into retrievable storage in the trenches. Based on this change in definition, waste records, and field experience, the following percentages of MLLW and TRUM waste were derived (operational experience may make it necessary to change these assumptions in future revisions of this PMP): – The CH-RSW in small containers is 36 percent CH-TRUM waste. – The CH-RSW in large containers is 75 percent CH-TRUM waste.

Table D-4. Basis for Figures 4-1 and 4-2

Data Source, Analytical Basis, and Underlying Assumptions
– The non-caisson RH-RSW is 50 percent RH-TRUM waste. – Alpha caisson RH-RSW is 100 percent RH-TRUM waste. • During repackaging of TRUM waste in large containers, MLLW will not be segregated from TRUM waste. This assumption will be refined in future revisions of the PMP. • The large containers are considered full with no void space. This assumption will be refined in future revisions of the PMP. • Shipments of small container CH-TRUM waste (M-091-46) will be completed at the end of FY 2018. • Alpha caisson processing will begin in FY 2021 and continue through FY 2023 at a rate of 8 m^3 per year. Alphas caisson packages are 0.004 m^3 (1 gal). • Onsite large container CH-TRUM and RH-TRUM waste processing (M-091-44) will begin in FY 2021 and continue through FY 2030. • Commercial capability will be available to process a portion of large container CH-TRUM and RH-TRUM waste. • No TRUM waste will be shipped to WIPP in FY 2012, FY 2013, FY 2019, and FY 2020. • Shipment of waste containers generated from the commercial treatment of large container CH-TRUM waste will begin in FY 2021. • Shipments of RH-TRUM waste to WIPP will begin in FY 2021 and continue through FY 2030.

Table D-5. Basis for Figure 8-1

Underlying Assumptions
• FY 2011 escalated dollars. • Based on FY 2010 through 2018 CHPRC baseline. Funding for FY 2019 through FY 2031 was estimated based on assumptions regarding operations that support achievement of the M-091 Milestone series and is subject to change as planning is refined. • Activities to meet the M-091 Milestones series will be complete by December 31, 2030 (first quarter of FY 2031). • The funding profile for CERCLA activities discussed in Chapter 7 is not included. • Other activities include management reserve, fee, and assessments. • WRAP is maintained in ready-to-serve until small packages of CH-TRUM waste shipments are complete. • T Plant in maintained in ready-to-serve until FY 2028. • Production rates: 10 drums/week/line/shift at WRAP; 17 drums/week/line/shift at T Plant, 50 drums/week at Commercial Facility. Number of shipments to WIPP per week is specified by CBFO and is dependent on priorities throughout the DOE complex.

D2 Reference

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq., Pub. L. 107-377, December 31, 2002. Available at: http://epw.senate.gov/cercla.pdf.

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Appendix E

Outyear CERCLA Cleanup Actions

Terms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CMS	corrective measures study
EE/CA	engineering evaluation/cost analysis
ERDF	Environmental Restoration Disposal Facility
FS	feasibility study
LLBG	low-level burial ground
LLW	low-level waste
MLLW	mixed low-level waste
OU	operable unit
PFP	Plutonium Finishing Plant
PMP	Project Management Plan
PUREX	Plutonium Uranium Extraction
RCRA	*Resource Conservation and Recovery Act of 1976*
RD/RA	remedial design/remedial action
REDOX	reduction oxidation
RFI	RCRA facility investigation
RI	remedial investigation
SWB	solid waste box
SWITS	Solid Waste Information and Tracking System
TBD	to be determined
TPA	Tri-Party Agreement
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TRU	transuranic
TRUM	transuranic mixed
TSD	treatment, storage, and/or disposal
WIPP	Waste Isolation Pilot Plant

Table E-1. Operable Units and Facilities with Potential to Generate Waste with Transuranic Constituents Greater Than 100 nCi/g during CERCLA Cleanup Actions

Operable Unit/Site Name	Description	Potential Waste with Transuranic Constituents Greater Than 100 nCi/g			Schedule
		Waste Unit Name	Waste Form	Volume	
200-BC-1	The 216-B-53A Trench is 18.3 by 3 m (60 by 10 ft) at the base. The site received waste from the liquid release at the Plutonium Recycle Test reactor in the 300 Area during which secondary cooling waste became contaminated with plutonium and mixed fission products. Of all the specific retention trenches in the BC Cribs and Trenches area, only the 216-B-53A Trench is considered to have the potential to contain concentrations of transuranic constituents greater than 100 nCi/g. **Reference:** DOE/RL-2009-36, *BC Cribs and Trenches Excavation-Based Treatability Test Report*.	216-B-53A, Trench	Soil, Rock, Gravel	38 m^3	*M-015-91B*: Submit FS Report(s) for the 200-BC-1/200-WA-1 OUs (200 West Inner Area) by 6/30/2013. *M-016-00*: Complete remedial actions for all non-tank farm and non-canyon OUs by 9/30/2024.
200-PW-1, 200-PW-6	From the time the PFP Complex came online in 1949, it generated large volumes of waste effluent. The liquid waste that contained low levels of plutonium and other contaminates discharged to the 200-PW-1 and 200-PW-6 OUs waste sites infiltrated into the ground, contaminating the underlying soil. The preferred option for remediation, presented in the draft Proposed Plan, is removal, treatment, and disposal. The technical feasibility is proven and commercially available. Conceptually, the removal, treatment, and disposal process consists of the following steps: (1) remove and stockpile clean overburden for use in backfilling; (2) remove contaminated soils and debris using conventional excavation technology and place in waste containers; (3) haul waste containers to assay/screening station and then to ERDF or WIPP for disposal; (4) backfill excavation with clean fill and compact; and (5) construct an evapotranspiration barrier as necessary and replant surface with native vegetation. In the 1970s, 0.3 m (1 ft) of soil was removed from the floor of the 216-Z-9 Trench, which was contaminated with relatively high concentrations of plutonium and americium, to reduce the risk of a nuclear criticality reaction. The 241-Z-8 Settling Tank contains approximately 1,890 L (500 gal) of sludge and the 241-Z-361 Settling Tank contains approximately 800 L (200 gal) of liquid and 75 m^3 (98 yd^3) of sludge. Sludge removal in the two settling tanks would employ a power Fluidics system to loosen and homogenize the sludge, and transfer it to SWBs. An absorbent would be added to the SWBs to absorb residual liquid and stabilize the sludge. After characterization, this waste will likely designate as TRU(M) waste and be transported to WIPP for disposal. Associated pipelines and emptied settling tanks covered under the 200-PW-1 and 200-PW-6 OUs are expected to be LLW and will be transferred to ERDF for disposal. The pipelines are constructed of various materials, primarily stainless steel or vitrified clay pipe. The proposed preferred alternative for the 200-CW-5 OU, Z-Ditches (216-Z-1D, -11,-19), and 216-Z-20 Tile Field except for the north portion of 216-Z-1D Ditch is removal, treatment, and disposal of the contamination. The waste generated by implementing this preferred alternative is expected to be LLW, which can be disposed at ERDF. **References:** DOE/RL-2006-51, *Remedial Investigation Report for the Plutonium/Organic-Rich Process Condensate/Process Waste Group Operable Unit: Includes the 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units*. DOE/RL-2007-27, *Feasibility Study for the Plutonium/Organic-Rich Process Waste Group Operable Unit: Includes the 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units*. DOE/RL-2009-117, *Proposed Plan for the Remediation of the 200-CW-5, 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units*. DOE/RL-2003-52, *Tank 241-Z-361 Engineering Evaluation/Cost Analysis*.	216-Z-1A, Tile Field 216-Z-9, Trench 216-Z-18, Crib 216-Z-1, Crib 216-Z-2, Crib 216-Z-3, Crib 216-Z-12, Crib 216-Z-5, Crib	Soil, Rock, Gravel	2,064 m^3	*M-015-00*: Complete the RI/FS (or RFI/CMS and RI/FS) process for all non-tank farm OUs except for canyon associated past practice waste site OUs covered in M-85-00 by 12/31/2016. *M-016-00*: Complete remedial actions for all non-tank farm and non-canyon OUs by 9/30/2024.
		241-Z-361, Settling Tank 241-Z-8, Settling Tank	Sludge	77 m^3	
		Total		**2,141 m^3**	

Table E-1. Operable Units and Facilities with Potential to Generate Waste with Transuranic Constituents Greater Than 100 nCi/g during CERCLA Cleanup Actions

Operable Unit/Site Name	Description	Potential Waste with Transuranic Constituents Greater Than 100 nCi/g			Schedule
		Waste Unit Name	Waste Form	Volume	
200-SW-2	The 200-SW-2 consists of 24 landfills, 3 ponds, and 1 ditch. The majority of the waste disposed in the 200-SW-2 landfills originated from the processing facilities located in the 200 East and 200 West Area, with some of the waste originating from the 100 and 300 Areas, as well as from offsite sources. Before 1970, LLW and MLLW were disposed in the same landfill trenches as waste that contained transuranic constituents. After 1970, waste that was designated as TRU waste was segregated in either specified LLBG trenches or underground concrete caissons in the LLBGs for future retrieval. Retrieval of this TRU waste (currently known as retrievably stored suspect-TRU waste) is accomplished under TPA Milestones M-091-40 and M-091-41, as discussed in Chapter 3 of this PMP. Prior to 1960, detailed inventory records were not maintained and specific information about the early landfills often is not available. **References:** The estimated volumes are based on currently available data in SWITS. DOE/RL-2004-60, *200-SW-1 Nonradioactive Landfills Group Operable Unit and 200-SW-2 Radioactive Landfills Group Operable Unit Remedial Investigation/Feasibility Study Work Plan*.	218-E-12B, Burial Ground	Debris	120 m^3	*M-015-93A*: Submit revised RFI/CMS and RI/FS work plan for the 200-SW-2 OU by 12/31/2011. *M-015-93B*: Submit RFI/CMS, RI/FS, and Proposed Corrective Action Decision/ Proposed Plan for the 200-SW-2 OU by 12/31/2016. *M-016-00*: Complete remedial actions for all non-tank farm and non-canyon OUs by 9/30/2024.
		218-E-5, Burial Ground		140 m^3	
		218-W-1, Burial Ground		6,560 m^3	
		218-W-2, Burial Ground		8,240 m^3	
		218-W-2A, Burial Ground		180 m^3	
		218-W-3, Burial Ground		5,930 m^3	
		218-W-3A, Burial Ground		50 m^3	
		218-W-4A, Burial Ground		5,140 m^3	
		218-W-4B, Burial Ground		1,110 m^3	
		Total		**27,290 m^3**	
200-WA-1	200 West Inner Area (200-WA-1) is defined as other sites in the 200 West Area not included in 200-CR-1; 200-IS-1; 200-PW-1,-6; 200-BC-1; 200-CW-5; or 200-SW-2 are within the new 200-WA-1 OU. **References:** DOE/RL-2007-02, *Supplemental Remedial Investigation/Feasibility Study Work Plan for the 200 Area Central Plateau Operable Units*. DOE/RL-2005-61, *Remedial Investigation Report for the 200-LW-1 (300 Area Chemical Laboratory Waste Group) and 200-LW-2 (200 Area Chemical Laboratory Waste Group) Operable Units*. From Table 2-15 in RHO-RE-ST-30P, *Hanford Defense Waste Disposal Alternatives: Engineering Support Data for the Hanford Defense Wasted- Environmental Impact Statement*. DOE/RL-2003-64, *Feasibility Study for the 200-TW-1 Scavenged Waste Group, the 200-TW-2 Tank Waste Group, and the 200-PW-5 Fission-Product Rich Waste Group Operable Units*.	216-S-1, & -2, Crib	Soil, Gravel, Rock	1,700 m^3	*M-015-91B*: Submit FS Report(s) for the 200-BC-1/200-WA-1 OUs (200 West Inner Area) by 6/30/2013. *M-016-00*: Complete remedial actions for all non-tank farm and non-canyon OUs by 9/30/2024.
		216-Z-7, Crib		590 m^3	
		241-T-361	Sludge/Liquid	93 m^3	
200-DV-1	The 200-DV-1 OU includes waste sites with deep vadose zone contamination that may be a potential threat to groundwater and cannot be remediated using typical surface techniques (e.g., excavation and capping). The vadose zone is defined as the unsaturated region of soil between the ground surface and the water table. **Reference:** Estimated volumes taken from Table 2-15 in RHO-RE-ST-30P, *Hanford Defense Waste Disposal Alternatives: Engineering Support Data for the Hanford Defense Wasted- Environmental Impact Statement*.	216-T-3, Injection/Reverse Well	Soil, Rock, Gravel	<10 m^3	*M-015-110A*: Submit RFI/CMS and RI/FS work plan for the 200-DV-1 OU by 9/30/2012. *M-015-110B*: Submit CMS, FS, and Proposed Plan/Proposed Corrective Action Decision for 200-DV-1 by 9/30/2015. *M-016-00*: Complete remedial actions for all non-tank farm and non-canyon OUs by 9/30/2024.
		216-B-5, Injection/Reverse Well		60 m^3	
		216-B-7A & -7B, Crib		430 m^3	
		216-T-32, Crib		460 m^3	
		216-T-18, Crib		590 m^3	
		216-T-5, Trench		TBD	
		216-T-7, Crib		TBD	
		216-T-6, Crib		290 m^3	

Table E-1. Operable Units and Facilities with Potential to Generate Waste with Transuranic Constituents Greater Than 100 nCi/g during CERCLA Cleanup Actions

Operable Unit/Site Name	Description	Potential Waste with Transuranic Constituents Greater Than 100 nCi/g			Schedule
		Waste Unit Name	Waste Form	Volume	
		Total		**1,840 m^3**	
200-IS-1, 200-EA-1	200 East Inner Area (200-EA-1) and 200-IS-1 sites not included in one of the canyon OUs will remain in the 200-IS-1 OU. Other waste sites not included in 200-CS-1, 200-CP-1, 200-PW-3, or 200-SW-2 are reassigned to the new 200-EA-1 OU. The 200-IS-1 OU includes pipelines, diversion boxes, catch tanks, related structures, and RCRA TSD tanks. Potential source of TRU waste is residual sludge/liquid within the structures. Associated pipelines and structures (e.g., diversion boxes, catch tanks, vaults, and storage tanks) are expected to be LLW. The 241-CX-72 Storage Tank is located at the former Hot Semiworks Facility, East of B Plant in the 200 East Area. **References:** DOE/RL-2002-14, *Volume of residual sludge in Tank 241-CX-72 from Table 2-2 in 241-CX-72 Tanks/Lines/Pits/Boxes/Septic Tank and Drain Fields Waste Group OU RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes: 200-IS-1 and 200-ST-1 OUs.* DOE/RL-2003-64, *Volume of residual sludge in 241-B-361 from Table 2-3 in Feasibility Study for the 200-TW-1 Scavenged Waste Group, the 200-TW-2 Tank Waste Group, and the 200-PW-5 Fission-Product Rich Waste Group OUs.* DOE/RL-2004-60, *200-SW-1 Nonradioactive Landfills Group OU and 200-SW-2 Radioactive Landfills Group OU Remedial Investigation/Feasibility Study Work Plan.*	241-CX-72, Storage Tank	Sludge/Liquid	3 m^3	*M-015-90*: Submit revised RFI/CMS and RI/FS work plan for the 200-IS-1 OU by 6/30/2011. *M-015-92A*: Submit an RFI/CMS and RI/FS work plan for the 200-EA-1 OU (200 East Inner Area) by 12/31/2012. *M-015-92B*: Submit CMS, FS, and Proposed Corrective Action Decision(s)/Proposed Plan(s) for the 200-EA-1 and 200-IS-1 OUs (Central Plateau 200 East Inner Area) by 6/30/2014. *M-016-00*: Complete remedial actions for all non-tank farm and non-canyon OUs by 9/30/2024. *M-037-10*: Complete unit-specific closure requirements according to the closure plan for 241-CX Tank System (241-CX-70/71/72) by 9/30/2020.
		241-B-361, Settling Tank		78 m^3	
		Diversion Boxes, Catch Tanks		TBD	
		Total		81 m^3	
200-CP-1, PUREX Tunnel #1 and Tunnel #2	The PUREX plant consists of the main fuels reprocessing building (202A) and a number of ancillary buildings. WHC-IP-0977, Section 4.0, describes the many process vessels, chemical storage tanks, and other types of equipment that are potential candidates for removal and processing as solid waste. The volume of potential solids waste is estimated at 9,660 m^3 of which it is estimated that seven percent is TRU. The PUREX Plant is designated as a Tier 1 facility. Final disposition to be addressed using the CERCLA remedial action coordinated with RCRA closure. Completion schedules to be established with the RI/FS work plans and RD/RA work plans and closure conditions/schedules established in the Hanford Facility Dangerous Waste Permit. **Reference:** WHC-IP-0977, *Estimation of PUREX Equipment and Materials That are Candidates for Removal and Waste Processing During PUREX Plant Closure*. The two PUREX tunnels, Tunnel #1 and Tunnel #2, were used for interim storage to shelter failed or obsolete process equipment. The process equipment, bulky and highly radioactive, could not be removed from the PUREX Plant. Tunnel #1 is filled to capacity with eight railcars that contain approximately 590 m^3 (20,835 ft) of unsegregated radioactive waste. Section 3.1 of WHC-IP-0977 describes the equipment stored in Tunnel #1. It is estimated that approximately 45 percent of the waste could be classified as TRU, while the remainder is LLW. Tunnel #2, which currently holds 17 railcars, contains approximately 1,370 m^3 (61,094 ft) of unsegregated radioactive waste. Section 3.2 of WHC-IP-0977, describes the equipment stored in Tunnel #2. Approximately 30 percent of the unsegregated radioactive waste is estimated to be TRU. **Reference:** WHC-IP-0977	PUREX Complex	Debris	680 m^3	*M-085-20A*: Submit RI/FS work plan for the 200-CP-1 OU (PUREX Canyon/associated past practice waste sites) by 9/30/2015. *M-085-00*: Complete response actions for the canyon facilities/associated past practice waste sites, other Tier 1 Central Plateau facilities not covered by existing milestones, and Tier 2 Central Plateau facilities by TBD.
		PUREX Tunnel #1		270 m^3	
		PUREX Tunnel #2		410 m^3	
		Total		1,360 m^3	

Table E-1. Operable Units and Facilities with Potential to Generate Waste with Transuranic Constituents Greater Than 100 nCi/g during CERCLA Cleanup Actions

Operable Unit/Site Name	Description	Potential Waste with Transuranic Constituents Greater Than 100 nCi/g			Schedule
		Waste Unit Name	Waste Form	Volume	
224B	The 224B Building, located in the 200 East Area of the Hanford Site, was used to purify and concentrate diluted plutonium nitrate solution that was the of the 221-B Building bismuth-phosphate process. The building consists of a single canyon-type building, constructed of reinforced concrete and concrete block. There are six hot cell areas within the 224B Building. Majority of the radioactive inventory exists within the process cell equipment and piping. The 224B Building is designated as a Tier 1 Facility based on the fact that an EE/CA has already been developed and not on the results of the graded approach process. Final demolition of the 224B Building will be in accordance with DOE/RL-2004-36, *Action Memorandum for the Non-Time Critical Removal Action for the 224-B Plutonium Concentration Facility*. **References:** DOE/RL-2004-36, *Action Memorandum for the Non-Time Critical Removal Action for the 224-B Plutonium Concentration Facility*. SD-DD-TRP-002, *Radiological Characterization of the 224B Hot Cell*.	224B	Debris	TBD	*M-085-50*: Submit revised removal action work plan for the 224B Concentration Facility by 12/31/2015. *M-085-00*: Complete response actions for the canyon facilities/associated past practice waste sites, other Tier 1 Central Plateau facilities not covered by existing milestones, and Tier 2 Central Plateau facilities by TBD.
200-CR-1	The REDOX Facility, also referred to as the 221-S Process Canyon Building or S Plant, is a chemical separation facility constructed in 1952 to employ an advanced organic solvent extraction process as a replacement for the B and T Plants. Irradiated rods were transferred to the REDOX facility where the plutonium was extracted and transferred as plutonium nitrate to Z Plant for final processing. As with other canyon buildings, the REDOX facility is constructed entirely of concrete and its process equipment is contained in cells. The REDOX Canyon and Service Facility is designated as a Tier 1 facility. Final disposition of the REDOX Facility is to be addressed using CERCLA remedial action. Completion schedules to be established with RI/FS work plans and RD/RA work plans. **Reference:** BHI-00176, *S Plant Aggregate Area Management Study Technical Baseline Report*.	REDOX	Debris	TBD	*M-085-30A*: Submit RI/FS work plan for the 200-CR-1 OU (REDOX Canyon/associated past practice waste sites) by 12/31/2017. *M-085-00*: Complete response actions for the canyon facilities/associated past practice waste sites, other Tier 1 Central Plateau facilities not covered by existing milestones, and Tier 2 Central Plateau facilities by TBD.

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Appendix F

Critical Path Schedule

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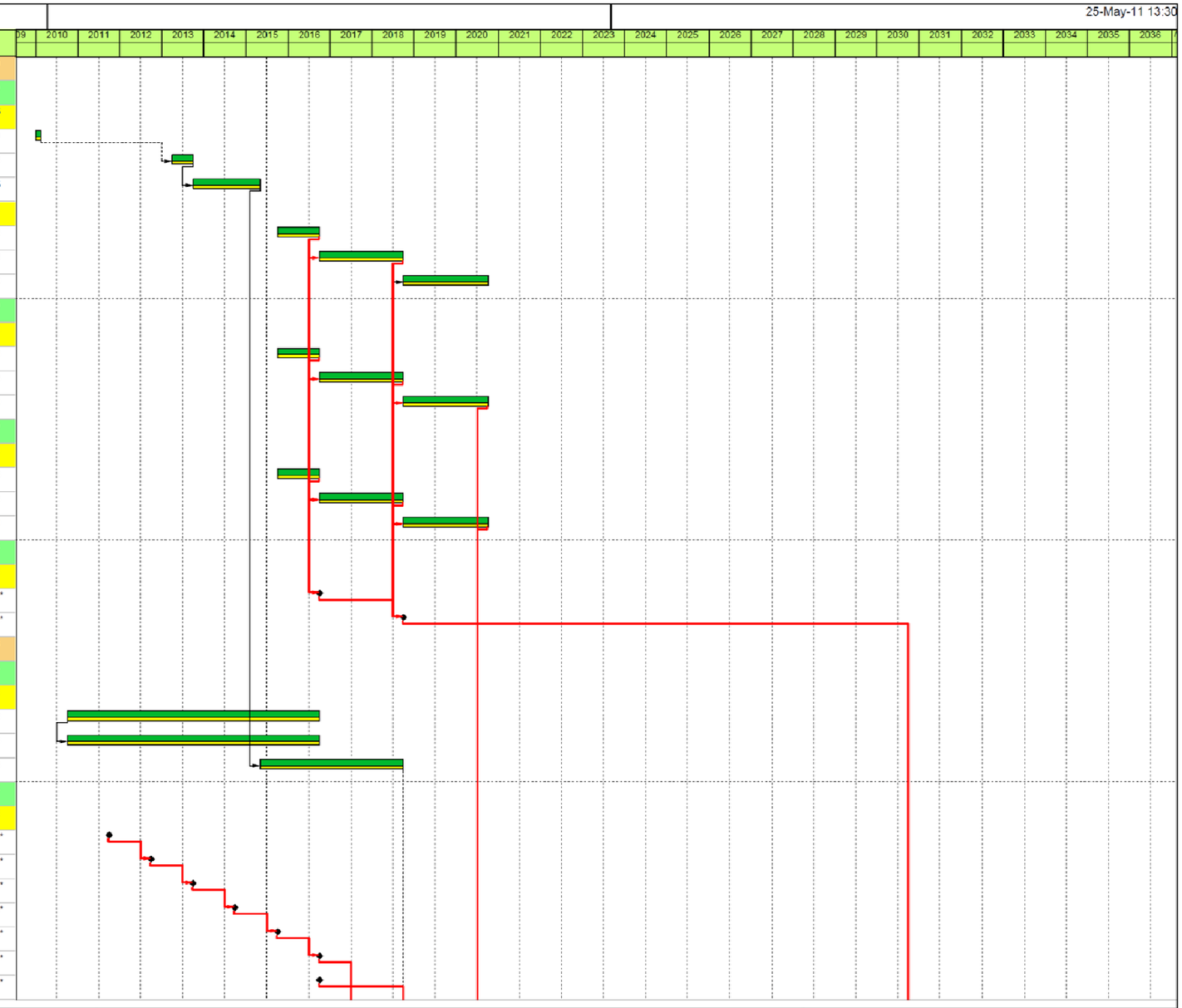
M-91 Activities

25-May-11 13:30

Activity ID	Activity Name	Start	Finish
M-091-01		04-Jan-10	30-Sep-20
Retrieval & Processing		04-Jan-10	30-Sep-20
Retrieval and Processing		04-Jan-10	04-May-15
C1000	Caisson Waste Retrieval System Conceptual Design	04-Jan-10*	12-Feb-10
C1010	Caisson Waste Retrieval System Definitive Design	01-Apr-13*	30-Sep-13
C1020	Caisson Waste Retrieval System Construction/Readiness	01-Oct-13	04-May-15
Alpha Caisson Processing System		01-Oct-15	30-Sep-20
C1040	Caisson Waste Processing Sys Conceptual Design	01-Oct-15*	30-Sep-16
C1050	Caisson Waste Processing Sys Definitive Design	03-Oct-16*	28-Sep-18
C1060	Caisson Waste Processing Sys Construction/Readiness	01-Oct-18	30-Sep-20
CH-TRUM (LG) & RH-TRUM Waste Processing Capability		01-Oct-15	30-Sep-20
Waste Processing Capability		01-Oct-15	30-Sep-20
E1000	Waste Processing Capability Conceptual Design	01-Oct-15*	30-Sep-16
E1010	Waste Processing Capability Definitive Design	03-Oct-16	28-Sep-18
E1020	Waste Processing Capability Construction/Readiness	01-Oct-18*	30-Sep-20
RH Cask Loading Capability		01-Oct-15	30-Sep-20
Cask Loading Capability		01-Oct-15	30-Sep-20
F1000	RH Cask Loading Facility Conceptual Design	01-Oct-15*	30-Sep-16
F1010	RH Cask Loading Facility Definitive Design	03-Oct-16*	28-Sep-18
F1020	RH Cask Loading Facility Construction	01-Oct-18*	30-Sep-20
M-91 Milestones		30-Sep-16	28-Sep-18
M-91 Milestones		30-Sep-16	28-Sep-18
G1000	TPA M-091-01A - Complete Conceptual Design / or acquisition / or modifications		30-Sep-16*
G1010	TPA M-091-01B - Complete Conceptual Design / or acquisition / or modifications		28-Sep-18*
M-091-40 - M-091-41		01-Oct-10	31-Dec-18
Retrieval & Processing		01-Oct-10	28-Sep-18
Retrieval and Processing		01-Oct-10	28-Sep-18
C1027	Retrieve CH-RSW	01-Oct-10*	30-Sep-16
C1028	Retrieve RH-RSW Non-Caisson	01-Oct-10*	30-Sep-16
C1030	Retrieve RH-RSW Caisson	05-May-15	28-Sep-18
M-91 Milestones		30-Sep-11	31-Dec-18
M-91 Milestones		30-Sep-11	31-Dec-18
G1035	TPA M-091-40T - Retrieve 2000 m3 of CH-RSW		30-Sep-11*
G1040	TPA M-091-40U-T01 - Retrieve Minimum 250m3 CH-RSW		28-Sep-12*
G1050	TPA M-091-40V-T01 - Retrieve Minimum 250m3 CH-RSW		30-Sep-13*
G1060	TPA M-091-40W-T01 - Retrieve Minimum 250m3 CH-RSW		30-Sep-14*
G1070	TPA M-091-40X - Retrieve 1250m3 Total in FY 15		30-Sep-15*
G1030	TPA M-091-40 - Complete Retrieval and Designation of CH-RSW in 4B, 3A, 12B and 4C		30-Sep-16*
G1090	TPA M-091-41A - Complete Retrieval Non-Caisson RH-RSW		30-Sep-16*



Primary Baseline ◆ Milestone
Current Bar Labels % Complete

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TASK filter: All Activities

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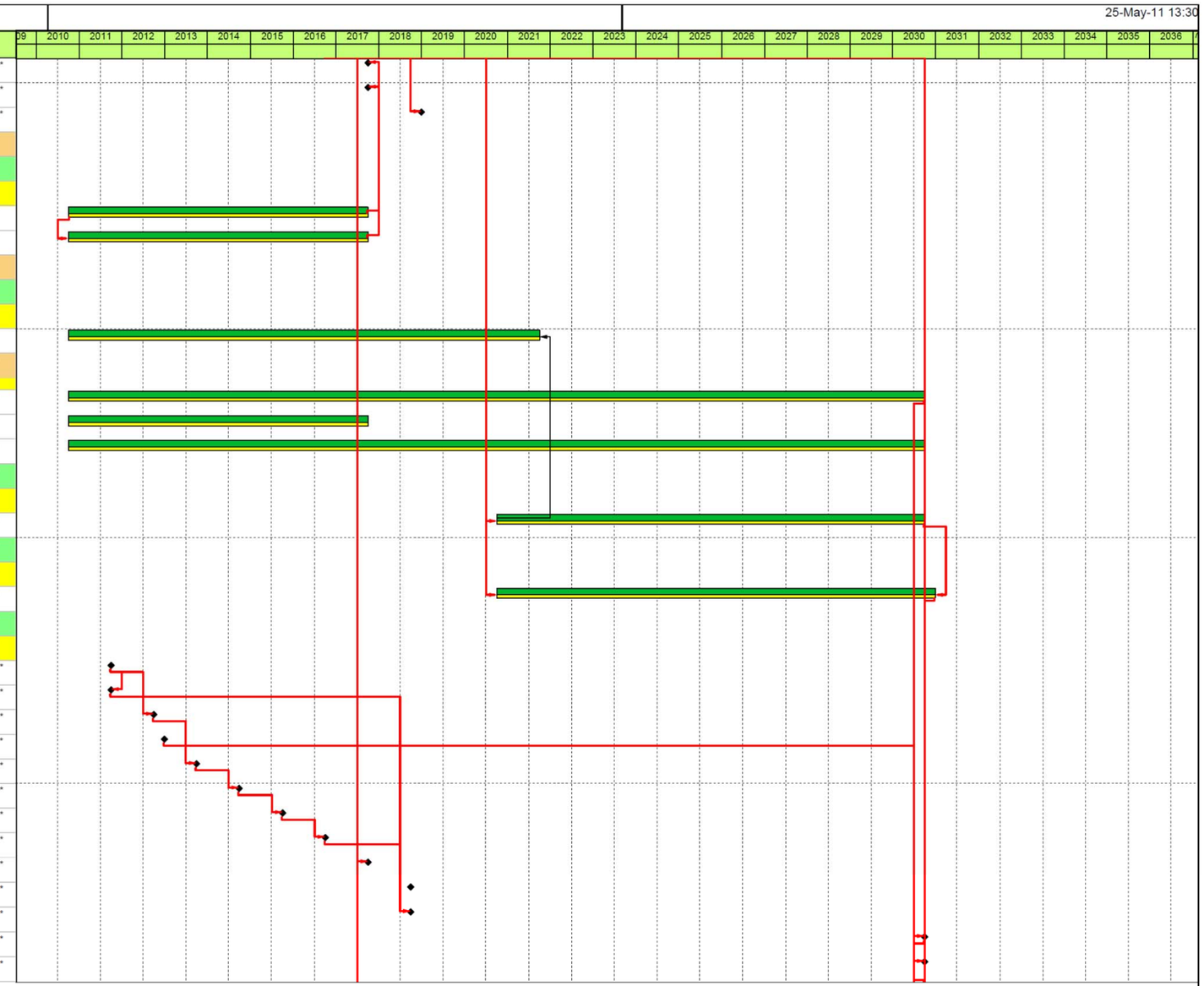
Figure F-1. Critical Path Schedule (Sheet 1 of 3)

M-91 Activities

25-May-11 13:30

Activity ID	Activity Name	Start	Finish
G1033	TPA M-091-42 - Treat and Dispose CH-MLLW Small		29-Sep-17*
G1036	TPA M-091-43 - Treat and Dispose CH-MLLW Lg & RH-MLLW		29-Sep-17*
G1080	TPA M-091-41 - Complete Retrieval RH-RSW		31-Dec-18*
M-091-42 - M-091-43		01-Oct-10	29-Sep-17
Mixed Low Level Waste		01-Oct-10	29-Sep-17
MLLW		01-Oct-10	29-Sep-17
B050	Treat CH-MLLW Small (M-91-42)	01-Oct-10*	29-Sep-17
B060	Treat CH-MLLW LG & RH-MLLW (M-91-43)	01-Oct-10*	29-Sep-17
M-091-03D-02		01-Oct-10	30-Sep-21
No-Path Forward Waste		01-Oct-10	30-Sep-21
No-Path Forward Waste		01-Oct-10	30-Sep-21
NP100	No-Path Forward Waste Disposition	01-Oct-10*	30-Sep-21
M-091-44 - M-091-46		01-Oct-10	31-Dec-30
D1000	Commercially Process CH-TRUM (Lg) & RH-TRUM	01-Oct-10*	30-Sep-30
D1010	Onsite Processing CH-TRUM (sm)	01-Oct-10*	29-Sep-17
D1020	Ship CH-TRUM Offsite	01-Oct-10*	30-Sep-30
CH-TRUM (LG) & RH-TRUM Waste Processing Capability		01-Oct-20	30-Sep-30
Waste Processing Capability		01-Oct-20	30-Sep-30
E1030	Waste Processing Capability Operations	01-Oct-20*	30-Sep-30
RH Cask Loading Capability		01-Oct-20	31-Dec-30
Cask Loading Capability		01-Oct-20	31-Dec-30
F1030	RH Cask Loading Facility Operations	01-Oct-20*	31-Dec-30
M-91 Milestones		30-Sep-11	31-Dec-30
M-91 Milestones		30-Sep-11	31-Dec-30
G1190	TPA M-091-46A - Certify 850 m3 of Small Container CH-TRUM		30-Sep-11*
G1250	TPA M-091-46G - Complete offsite shipment of 1000m3 of Small container CH-TRUM Waste		30-Sep-11*
G1200	TPA M-091-46B-T01 - Certify 300 m3 of Small Container CH-TRUM		28-Sep-12*
G1130	TPA M-091-44P - Designate all RH-TRUM Waste & Containers of CH-RSW in 4B,3A,12C, & 4C		31-Dec-12*
G1210	TPA M-091-46B-T02 - Certify 125 m3 of Small Container CH-TRUM		30-Sep-13*
G1220	TPA M-091-46B-T03 - Certify 125m3 of Small Container CH-TRUM		30-Sep-14*
G1230	TPA M-091-46E - Certify 250m3 of Small Container CH-TRUM		30-Sep-15*
G1240	TPA M-091-46F - Certify 250 m3 of Small Container CH-TRUM		30-Sep-16*
G1180	TPA M-091-46 - Complete Certification of Small Container CH-TRUM		29-Sep-17*
G1170	TPA M-091-44T - Submit a Change Package for Annual Milestones		28-Sep-18*
G1260	TPA M-091-46H - Complete Offsite shipment of all Small Container CH-TRUM Waste		28-Sep-18*
G1150	TPA M-091-44R - Certify 300 m3 of Large Container CH-TRUM or RH-TRUM		30-Sep-30*
G1160	TPA M-091-44S - Certify 300 m3 of Large Container CH-TRUM or RH-TRUM		30-Sep-30*



Primary Baseline ◆ ◆ Milestone
Current Bar Labels % Complete

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TASK filter: All Activities

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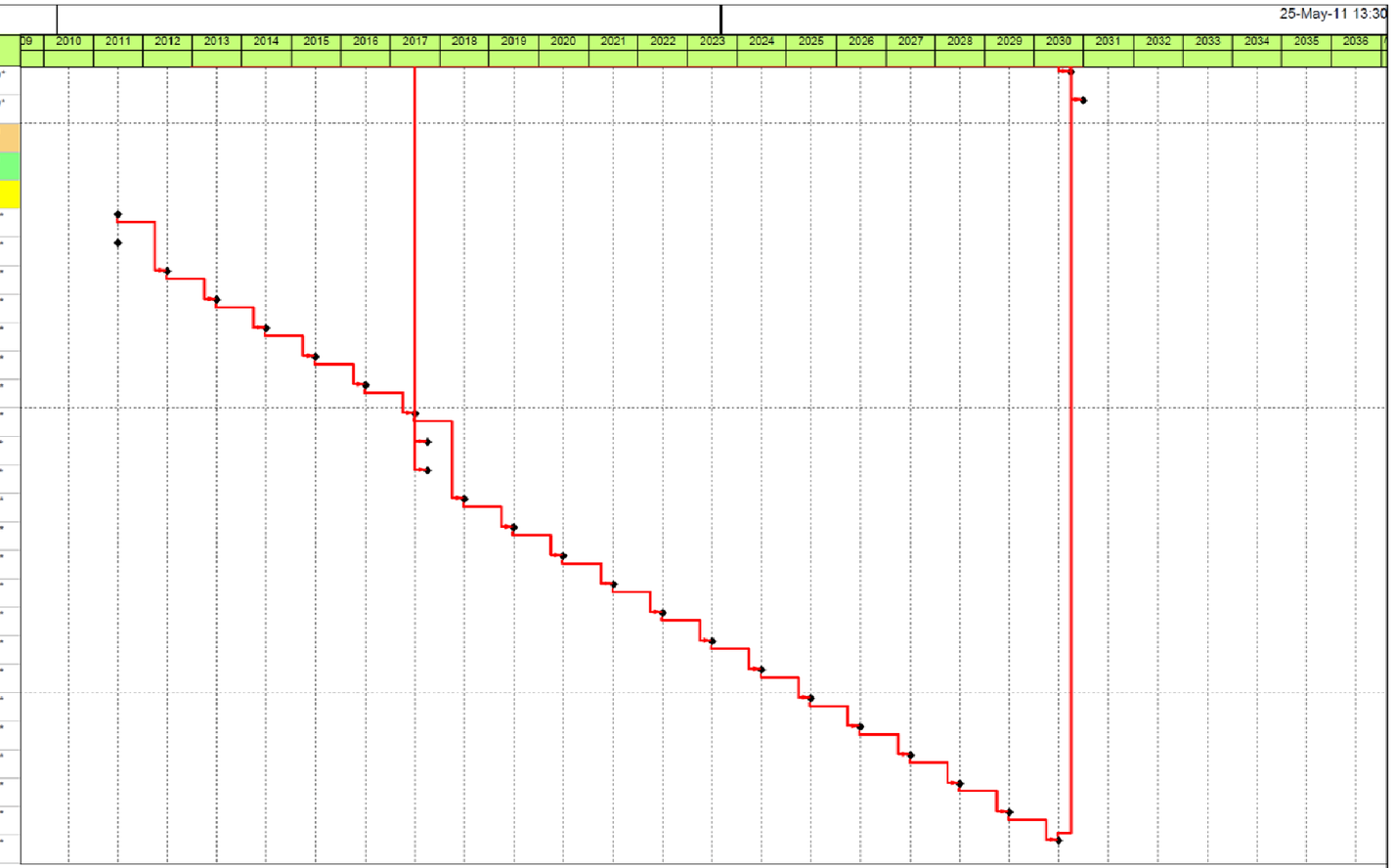
Figure F-1. Critical Path Schedule (Sheet 2 of 3)

M-91 Activities

25-May-11 13:30

Activity ID	Activity Name	Start	Finish
G1140	TPA M-091-44Q - Certify 300 m3 of Large Container CH-TRUM and or RH-TRUM		30-Sep-30*
G1120	TPA M-091-44 - Complete Treatment of Large Container CH-TRUM & RH-TRUM		31-Dec-30*
M-091 Milestones		30-Jun-11	28-Jun-30
M-91 Milestones		30-Jun-11	28-Jun-30
M-91 Milestones		30-Jun-11	28-Jun-30
G1290	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-11*
G1020	TPA M-091-03D-02 - Submit a Rev of PMP for No Path Forward Waste		30-Jun-11*
G1300	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		29-Jun-12*
G1310	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		28-Jun-13*
G1320	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-14*
G1330	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-15*
G1340	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-16*
G1350	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-17*
G1110	TPA M-091-43 - Complete Treatment of Large Container CH-MLLW & RH-MLLW		02-Oct-17*
G1100	TPA M-091-42 - Complete Treatment of Small Container CH-MLLW		02-Oct-17*
G1360	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		29-Jun-18*
G1380	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		28-Jun-19*
G1400	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-20*
G1410	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-21*
G1420	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-22*
G1430	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-23*
G1440	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		28-Jun-24*
G1450	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-25*
G1460	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-26*
G1370	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-27*
G1390	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		30-Jun-28*
G1470	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		29-Jun-29*
G1480	TPA M-091-03 - Submit Rev of Hanford TRUM and MLLW PMP to Ecology showing annual progress		28-Jun-30*



Primary Baseline ◆ Milestone
Current Bar Labels % Complete

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Figure F-1. Critical Path Schedule (Sheet 3 of 3)

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Appendix G

Tri-Party Agreement Milestone Change Packages M-091-09-01, M-91-10-03 (draft), and M-16-10-05 (draft)

Change Number M-091-09-01	Federal Facility Agreement and Consent Order *Change Control Form* Do not use blue ink. Type or print using black ink.	**Date** August 23, 2010

Originator Matt McCormick **Phone** (509) 373-9971

Class of Change
[X] I – Signatories [ ] II – Executive Manager [ ] III – Project Manager

Change Title
Modification of Hanford Federal Facility Agreement and Consent Order (HFFACO) M-091 Series Milestones

Description/Justification of Change

The Washington State Department of Ecology (Ecology) and the U.S. Department of Energy (DOE) - Richland Operations Office (RL) initiated M-091-45 negotiations on September 8, 2009 to reach an agreement on adjustments in work scope and milestones consistent with a shift of resources to the river corridor and other higher priority Hanford Site cleanup tasks. The Parties agreed that it was prudent to expand the scope to encompass all the M-091 series milestones, and to simplify the language in the M-091 series, in response to public comments that the milestones were difficult to read and understand.

Continued on page 2

Impact of Change
This change replaces existing milestones to establish a comprehensive approach for the safe and stable processing of retrieved and retrievably stored Hanford Site wastes, including establishing enforceable milestones for the shipment of TRUM waste from the Hanford Site, and revising the major milestone definition to focus on completing treatment and offsite shipment of TRUM waste.

Affected Documents
The HFFACO, as amended and Hanford Site internal planning management, and budget documents (e.g., DOE contractor Baseline Change Control documents; M-091-03 Hanford Site TRUM waste and MLLW Project Management Plan and LDR Report).

Approvals

Ecology	9/15/10 Date	✓ Approved	____ Disapproved
DOE-RL	9/2/2010 Date	X Approved	____ Disapproved
EPA	9/9/10 Date	X Approved	____ Disapproved

1

Description/Justification continued from page 1:

Previously, the major milestone focused on the acquisition and modification of facilities/capabilities to support retrieval, storage and treatment of wastes. Ecology and DOE refocused the major milestone on the original milestone goal, to treat all Hanford Site *Resource Conservation and Recovery Act of 1976 (RCRA)* mixed low-level waste (MLLW) and certify and ship transuranic mixed (TRUM) waste to satisfy Land Disposal Restriction treatment standards. Interim milestones in this change package support the actions necessary to achieve the major milestone including waste: retrieval, treatment, certification, and shipment and the acquisition of necessary facilities and/or capabilities. DOE may choose to complete certification and shipment of TRUM waste for disposal at the Waste Isolation Pilot Plant (WIPP) in lieu of LDR treatment if, as of the time of shipment, such waste is exempt from LDR treatment requirements when disposed at WIPP.

Negotiation of these M-91 milestones started because milestone M-091-45 required DOE to submit a change package for interim milestones. M-091-45 requirements included that DOE replace a "To Be Determined" (TBD) date for the M-091-01 milestone. The latter milestone originally required DOE to complete acquisition of facilities, modification of existing facilities, and modifications of planned facilities by 6/30/2012. Ecology and DOE have agreed that DOE will now prepare a conceptual design for facilities by 2016, and replace the M-091-01 TBD date at that time (2016).

This M-091 change package provides a comprehensive, easily understood series of milestones to measure progress on the safe and stable processing and shipping of Hanford Site waste covered by the M-091 milestone series and meets the M-091-45 interim milestone requiring completion of negotiations.

This change package addresses the public's comments to make the milestones easier to read and understand. The negotiation team also streamlined the milestones through the elimination of unnecessary historical text, removing requirements embedded in the milestone text and rewording the milestones to a distinct understandable action.

The changes are extensive enough that the Parties have decided to issue the change package as a replacement of the M-091 series milestones.

Number	Milestone	Due Date
M-091-00	Complete the treatment to Land Disposal Restriction (LDR) treatment standards for all Hanford Site *Resource Conservation and Recovery Act of 1976* (*RCRA*) mixed low-level waste (MLLW) and *RCRA* transuranic mixed (TRUM) waste. DOE may choose to complete certification and shipment of TRUM waste for disposal at the Waste Isolation Pilot Plant (WIPP) in lieu of LDR treatment if, as of the time of shipment, such waste is exempt from LDR treatment standards when disposed at WIPP. Notification of certification in support of shipment will be reported at least annually as part of the project manager meetings or quarterly milestone review for inclusion in the administrative record. **Definitions** **"Certification"** as used herein is defined as: • Completion of all activities necessary for waste to be packaged such that it can meet the Waste Isolation Pilot Plant Waste Acceptance Criteria	Date to be established pursuant to milestone M-091-044T.

Number	Milestone	Due Date
	(WIPP WAC). If subsequent WIPP certification reveals the waste cannot be shipped to WIPP this waste will not count toward meeting the milestone volume requirements (and will be subtracted from meeting such requirements) until such time as it has been determined to meet WIPP WAC or; • The TRUM has been shipped to Idaho. TRUM waste shipped to Idaho may also count toward certification based upon actual shipment to Idaho and contingent upon the waste not returning to the Hanford Site, or; • The waste has been treated to meet LDR treatment standards. **"Contact Handled (CH)"** waste is a waste container with a surface dose rate less than or equal to 200 millirem per hour. **"MLLW"** is LLW that is subject to *RCRA* or 70.105 RCW. "LLW" is defined as radioactive waste that is not spent fuel, high-level waste, TRU waste, byproduct material, or naturally occurring radioactive material. **"Remote Handled (RH)"** waste is a waste container with a surface dose rate greater than 200 millirem per hour. **"Retrievably Stored Waste (RSW)"** as used herein is defined as waste that is or was believed to meet the TRU waste criteria when it was placed in the 218-W-4B, 218-W-4C, 218-W-3A and 218-E-12B burial ground trenches after May 6, 1970. RSW does not include waste in containers that have deteriorated to the point that they cannot be retrieved and stabilized (e.g. placed in over-packs) in a manner that would allow them to be transported and designated without posing significant risks to workers, the public or the environment. With respect to any such containers, and with respect to any release of RSW, how to move forward will be determined through the cleanup process set forth in *RCRA*, CH. 70.105 RCW, and/or the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)* as appropriate. Those processes may result in additional requirements for the remediation of such wastes. **"Retrieval of CH RSW"** is defined as uncovering CH wastes within DOE's RSW trenches, removing such CH wastes from the trenches, and transferring the waste to a permitted and compliant treatment, storage or disposal unit or the Environmental Restoration and Disposal Facility (ERDF). **"Retrieval of RH RSW"** is defined as uncovering RH wastes within DOE's RSW trenches and caissons, removing such RH wastes from the trenches and caissons, and transferring the waste to a permitted and compliant treatment, storage or disposal unit or the ERDF. **"Shipment"** is defined as TRUM waste containers leaving the Hanford Site, and includes waste shipped to either Idaho or the Waste Isolation Pilot Plant (WIPP), and contingent upon the waste not returning to the Hanford Site. **"Small Containers and Large Containers"** as used herein have different meanings depending on whether they are used in reference to MLLW or TRUM waste.	

Number	Milestone	Due Date
	• When referring to MLLW, small containers are containers less than 10 cubic meters, including 55-gallon drums. A large container is anything not defined as a small container. • When referring to TRUM waste, small containers are 55-gallon drums or smaller containers even if over packed in 85-gallon drums, and WIPP standard waste boxes (SWB). A WIPP SWB is a 1.8 cubic meter steel container that is approximately 0.94 meters in height, 1.8 meters in length, and 1.4 meters in width and was qualified by the DOE in 1988 as meeting the U.S. Department of Transportation (DOT) requirements for specification 7A type A packaging. A large container is defined as any container that is not defined as a small container. **"TRUM Waste"** is TRU waste that is subject to *RCRA* or 70.105 RCW. **"TRU Waste"** as used herein is defined as waste that meets the definition in Subsection (18) of Section 2 of the WIPP Land Withdrawal Act. Pub. L. 102-579. **"200 Area Caissons"** as used herein are defined as RSW in the 218-W-4B burial ground caissons Alpha-1 through Alpha-4. **Note:** To provide further clarification on how volumes should be determined in different M-091 contexts, and to be consistent with the volumes of waste listed in the Hanford Site Solid Waste Inventory Tracking System (SWITS), the following descriptions are provided: • Volumes for the purposes of determining amounts retrieved shall be based on the volume of the original containers in retrievable storage. For example, the volume of a 55-gallon RSW drum that would be counted toward "retrieval" would be 55-gallons (0.208 cubic meters), even if in the process of retrieval the drum needed to be over-packed into an 85 gallon drum. • The volume of MLLW "treated" will be counted as the retrieval volume (for RSW) or the MLLW pre-treatment container volume (for stored waste). • The volume of small container CH TRUM waste counted as certified will be the volume of the certified container containing the waste unless the waste is compacted. In the event that the waste is compacted, the volume of the pre-compaction container will be counted. • The volume of large container CH TRUM waste and RH TRUM waste (in above ground storage as of June 30, 2009 and in retrievable storage)will be based on the pre-treatment volume of each large container CH TRUM waste as listed in Hanford's SWITS. **Note:** Each requirement of these M-091 series milestones is considered a distinct work requirement independently subject to the enforcement provisions of the agreement.	

Number	Milestone	Due Date
M-091-01	Complete the acquisition of new facilities, modification of existing facilities, and modification of planned facilities necessary for retrieval, storage, and treatment/processing, of all Hanford Site *RCRA* TRUM waste.	Date to be established pursuant to milestones M-091-01A and M-091-01B.
M-091-01A	Complete the conceptual design for acquisition of capabilities and/or acquisition of new facilities, modification of existing facilities, and/or modification of planned facilities necessary for retrieval, designation, storage, and treatment/processing prior to disposal of all Hanford Site RH TRUM waste and TRUM waste in large containers (in above ground storage as of June 30, 2009 and in retrievable storage). In addition, submit a milestone change package (based on the conceptual design) for annual construction milestones for the planned facilities necessary for retrieval, storage, and treatment/processing, of all Hanford Site RH TRUM waste and large container CH TRUM waste.	09/30/2016
M-091-01B	Complete the definitive design for acquisition of capabilities and/or acquisition of new facilities, modification of existing facilities, and/or modification of planned facilities necessary for retrieval, designation, storage, and treatment/processing prior to disposal of all Hanford Site RH TRUM waste and TRUM waste in large containers (in above ground storage as of June 30, 2009 and in retrievable storage). In addition, submit a milestone change package documenting any substantial variations, based on the definitive design, from annual construction milestones finalized pursuant to M-091-01A.	09/30/2018
M-091-03	Submit a revision of the Hanford Site TRUM waste and MLLW Project Management Plan (PMP) to Ecology pursuant to, and in compliance with, the requirements of agreement section 11.5. Revisions of the PMP shall address *RCRA* MLLW and TRUM waste and will consider and expressly evaluate the impact on M-091 retrieval, treatment and processing capabilities that may result from retrieval, treatment and/or processing of any other TRUM waste including but not limited to offsite TRUM waste and Hanford Site TRUM waste generated after January 1, 2003. Annual revisions of the PMP will be submitted on June 30 every year starting in 2008 and continuing until the M-091 milestones are completed. The PMP revisions shall include plans and schedules to meet all the requirements set forth in the M-091 milestone series. Each revision of the M-091-03 PMP shall, upon approval by Ecology, supersede previous M-091-03 PMPs. The PMP will include a description of completed and scheduled work relating to RH waste and large containers of RH and CH waste performed in accordance with the requirements of the M-091 milestone series. The PMP will document work completed during the previous federal fiscal year and work scheduled for the coming fiscal year. The PMP shall identify by citation all publicly available reports describing pertinent project issues and accomplishments, and shall identify anticipated projects for the coming year. With respect to RH TRUM waste, large container TRUM waste, RH MLLW and large container MLLW; the PMP submitted yearly will specifically include at least	Due date annually by June 30

Number	Milestone	Due Date
	one measurable action to be taken by DOE to acquire capabilities to manage such wastes. PMP revisions will be submitted to Ecology for review and approval as primary documents pursuant to agreement action plan section 9.2.1. DOE shall implement the plan as approved.	
M-091-03D-02	Submit a revision to the PMP for disposition (treatment plans, variances or procurements and schedules) of all no path forward waste (as defined in the PMP) in above ground storage as of June 30, 2009.	06/30/2011
M-091-40	Complete the retrieval and designation of CH RSW in burial grounds 218-W-4B, 218-W-3A and 218-E-12B. 1. If specific large containers cannot be removed from a trench within 60 days of being exposed DOE shall notify Ecology within the 60-day period. Ecology will inspect the containers and impose specific conditions for that waste container to prevent releases to the environment. In determining such conditions Ecology will consider among other factors; whether the waste containers has been inspected and found to be intact and not posing a threat to human health and the environment (or re-packaged to prevent release to the environment) and existing documentation concerning the presence of free liquids. 2. As RSW retrieval proceeds, DOE shall sample and analyze trench substrates with the purposes of determining whether or not releases of contaminants to the environment have occurred, and, if so, the nature and extent of contamination. Such sampling and analysis shall be in accordance with Ecology approved sampling and analysis plans (SAP). DOE will implement approved SAPs, as a requirement of this milestone, during retrieval of all RSW. The results of burial ground vent and substrate sampling and analysis pursuant to approved SAPs shall be submitted to Ecology quarterly in the project managers' meetings for inclusion in the administrative record. Such reports shall document results and methodologies, shall assess results against regulatory requirements, shall include a description (or descriptions) of documented contaminant releases to the environment, and shall describe planned and/or scheduled additional work. 3. Within 90 days of retrieval, DOE shall designate all CH RSW retrieved from the RSW trenches pursuant to the Washington Administrative Code (WAC) 173-303-070 through 100.	09/30/2016
M-091-40T	Retrieve 2,000 cubic meters of CH RSW.	09/30/2011
M-091-40U-T01	Retrieve a minimum of 250 cubic meters of CH RSW in Fiscal Year 2012. Any volume retrieved above the 250 cubic meters shall count towards fulfillment of M-091-40X.	09/30/2012

Number	Milestone	Due Date
M-091-40V-T01	Retrieve a minimum of 250 cubic meters of CH RSW in Fiscal Year 2013. Any volume retrieved above the 250 cubic meters shall count towards fulfillment of M-091-40X.	09/30/2013
M-091-40W-T01	Retrieve a minimum of 250 cubic meters of CH RSW in Fiscal Year 2014. Any volume retrieved above the 250 cubic meters shall count toward fulfillment of M-091-40X.	09/30/2014
M-091-40X	Retrieve a total of 1,250 cubic meters of CH RSW in Fiscal Year 2015.	09/30/2015
M-091-41	Complete the retrieval and designation of RH RSW (regardless of package size, including the 200 area caissons).	12/31/2018
M-091-41A	Complete retrieval of non-caisson RH RSW.	09/30/2016
M-091-42	Complete the treatment of small container CH MLLW (in above ground storage as of June 30, 2009 and in retrievable storage) to meet applicable LDR treatment standards in compliance with WAC 173-303-140. 1. Treatment of *CERCLA* waste and newly generated CH MLLW will not be counted toward meeting the volume requirements of this milestone. RSW determined to be MLLW in the treatability groups covered by this milestone will be counted toward meeting the volume requirements of this milestone when treated. 2. If the actual volume of retrieved CH MLLW covered by this milestone is lower than the estimated volumes anticipated by these milestones DOE will only be required to treat the volume of waste generated, retrieved and/or in storage.	09/30/2017
M-091-43	Complete the treatment of large container CH MLLW and RH MLLW (in above ground storage as of June 30, 2009 and in retrievable storage) to applicable LDR treatment standards in compliance with WAC 173-303-140.	09/30/2017
M-091-44	Complete the treatment of large container CH TRUM waste and RH TRUM waste (in above ground storage as of June 30, 2009 and in retrievable storage). DOE may choose to complete certification and shipment of TRUM waste for disposal at the Waste Isolation Pilot Plant (WIPP) in lieu of LDR treatment if, as of the time of shipment, such waste is exempt from LDR treatment standards when disposed at WIPP. Notification of certification in support of shipment will be reported at least annually as part of the project manager meetings or quarterly milestone review for inclusion in the administrative record.	12/31/2030
M-091-44P	DOE shall designate all RH TRUM waste and large containers of CH TRUM waste currently in above ground storage (as of June 30, 2003) according to the requirements of WAC 173-303-070 through 100.	12/31/2012
M-091-44Q	Certify a total of 300 cubic meters of large container CH TRUM waste and/or RH TRUM waste.	09/30/2016

Number	Milestone	Due Date
	Any volume certified above 300 cubic meters shall count toward fulfillment of subsequent milestones.	
M-091-44R	Certify a total of 300 cubic meters of large container CH TRUM waste and/or RH TRUM waste. Any volume certified above 300 cubic meters shall count toward fulfillment of subsequent milestones.	09/30/2017
M-091-44S	Certify a total of 300 cubic meters of large container CH TRUM waste and/or RH TRUM waste.	09/30/2018
M-091-44T	Submit a change package for annual milestones to treat or certify and ship large container CH TRUM waste and RH-TRUM waste (in above ground storage as of June 30, 2009 and in retrievable storage) to complete the disposition of this waste.	09/30/2018
M-091-46	Complete the certification of small container CH TRUM waste (in above ground storage as of June 30, 2009 and in retrievable storage)	09/30/2017
M-091-46A	Certify 850 cubic meters of small container CH TRUM waste.	09/30/2011
M-091-46B-T01	Certify 300 cubic meters of small container CH TRUM waste. Any volume certified above the 300 cubic meters shall count towards fulfillment of M-091-46E.	09/30/2012
M-091-46C-T02	Certify 125 cubic meters of small container CH TRUM waste. Any volume certified above the 125 cubic meters shall count towards fulfillment of M-091-46E.	09/30/2013
M-091-46D-T03	Certify 125 cubic meters of small container CH TRUM waste. Any volume certified above the 125 cubic meters shall count towards fulfillment of M-091-46E.	09/30/2014
M-091-46E	Certify 250 cubic meters of small container CH TRUM waste. Any volume certified above 250 cubic meters shall count toward fulfillment of subsequent milestones.	09/30/2015
M-091-46F	Certify 250 cubic meters of small container CH TRUM waste.	09/30/2016
M-091-46G	Complete offsite shipment of 1,000 cubic meters of small container CH TRUM waste.	09/30/2011
M-091-46H	Complete offsite shipment of all small container CH TRUM waste (in above	09/30/2018

Number	Milestone	Due Date
	ground storage as of June 30, 2009 and in retrievable storage).	

Change Number	Federal Facility Agreement and Consent Order Change Control Form Do not use blue ink. Type or print using black ink.	Date
M-91-10-03		October 8, 2010

Originator **Phone**

DRAFT

Mike Collins (509) 376-6536

Class of Change

[ ] I - Signatories [**X**] II - Executive Manager [ ] III - Project Manager

Change Title

Add the M-016-93 CERCLA TRU Workplan scope into the M-091-03 Project Management Plan

Description/Justification of Change

Approval of this change from completes the agreement that was documented in correspondence dated June 2, 2010 from Ecology and EPA to DOE, Re: *Tri-Party Agreement Milestone M-16-93,* stating ”After reviewing these workplans, the U.S. Environmental Protection Agency and the Washington State Department of Ecology have reached the conclusion that the intent of the milestone would be better served by incorporating the information into the M-91 TRU Mixed/Mixed Low Level Waste Project Management Plan (PMP) developed pursuant to milestone M-91-03.”

The wastes to be addressed by these workplans are nearly identical to wastes being addressed in the M-091 series of milestones with the difference being that the M-016-93 wastes are generated from CERCLA projects. Producing a unique workplan for CERCLA projects is not conducive to an integrated site-wide approach to address these wastes.

Description/Justification of Change continued on page 2.

Impact of Change

No impact is anticipated as the scope of the M-016-93 CERCLA TRU Workplan will be integrated with the M-091-03 Project Management Plan. TPA change package M-16-10-05 has been initiated to delete the M-016-93 interim milestone.

Affected Documents

The Hanford Federal Facility Agreement and Consent Order, as amended, and the M-091-03 Project Management Plan beginning with the 2011 submittal.

Approvals

_____ _____ _____Approved
Disapproved
DOE Date

Page 1 of 3

_____ _____ _____Approved
Disapproved
EPA Date

_____ _____ _____ Approved
Disapproved
Ecology Date

Change Form M-91-10-03
Page 2 of 3

Description/Justification of change continued.

This change form incorporates M-016-93 Interim Milestones scope into the annual M-91 Project Management Plan (PMP).

By the approval of this change form it is also agreed that the finalization and approval of previously submitted workplans under past M-016-93 Interim Milestones are terminated as this scope is now integrated into the M-091-03 PMPs. The modifications identified to the M-091-03 interim milestone in this change package are only effective for the M-091-03 milestones which are due in 2011 and beyond.

Change Form M-91-10-03
Page 3 of 3

Modifications to interim milestone M-091-03 are denoted by the use of ~~strikeout~~ to indicate text to be deleted and double underline to indicate text to be added.

M-91-03 Lead Agency: Dual	Submit a revision of the Hanford Site TRUM waste and MLLW Project Management Plan (PMP) to Ecology and EPA pursuant to, and in compliance with, the requirements of agreement section 11.5. Revisions of the PMP shall address *RCRA* MLLW and TRUM waste and will consider and expressly evaluate the impact on M-091 retrieval, treatment and processing capabilities that may result from retrieval, treatment and/or processing of any other TRUM waste including but not limited to offsite TRUM waste and Hanford Site TRUM waste generated after January 1, 2003. Annual revisions of the PMP will be submitted on June 30 every year starting in 2008 and continuing until the M-091 milestones are completed. The PMP revisions shall include plans and schedules to meet all the requirements set forth in the M-091 milestone series. Each revision of the M-091-03 PMP shall, upon approval by Ecology, supersede previous M-091-03 PMPs. The PMP will include a description of completed and scheduled work relating to RH waste and large containers of RH and CH waste performed in accordance with the requirements of the M-091 milestone series. The PMP will document work completed during the previous federal fiscal year and work scheduled for the coming fiscal year. The PMP shall identify by citation all publicly available reports describing pertinent project issues and accomplishments, and shall identify anticipated projects for the coming year. With respect to RH TRUM waste, large container TRUM waste, RH MLLW and large container MLLW; the PMP submitted yearly will specifically include at least one measurable action to be taken by DOE to acquire capabilities to manage such wastes. The PMP will also address the acquisition of capabilities necessary to prepare TRU and TRUM waste generated by CERCLA cleanup actions at the Hanford Site for disposal at the Waste Isolation Pilot Plant (WIPP). This PMP will reflect retrieval decisions, projected waste volumes, and schedules from all CERCLA cleanup actions authorized in records of decision and action memoranda at the Hanford Site, and will provide for updates and revisions as new information becomes available to the annual issuance of the PMP. PMP revisions will be submitted to Ecology and EPA for review and approval as primary documents pursuant to agreement action plan section 9.2.1. DOE shall implement the plan as approved.	Due date annually by June 30

Change Number	Federal Facility Agreement and Consent Order Change Control Form Do not use blue ink. Type or print using black ink.	Date
M-16-10-05		October 8, 2010

Originator **Phone**

DRAFT

Mike Collins (509) 376-6536

Class of Change

[ ] I - Signatories [**X**] II - Executive Manager [ ] III - Project Manager

Change Title

Deletion of Interim Milestone M-016-93B

Description/Justification of Change

Approval of this change from completes the agreement that was documented in correspondence dated June 2, 2010 from Ecology and EPA to DOE Re: *Tri-Party Agreement Milestone M-16-93* stating ”After reviewing these workplans, the U.S. Environmental Protection Agency and the Washington State Department of Ecology have reached the conclusion that the intent of the milestone would be better served by incorporating the information into the M-91 TRU Mixed/Mixed Low Level Waste Project Management Plan (PMP) developed pursuant to milestone M-91-03.”

The wastes to be addressed by the M-016-93 work plans are nearly identical to the wastes being addressed by the M-091 series of milestones with the difference being that the M-016-93 wastes are from CERCLA projects.

Description/Justification of Change continued on page 2.

Impact of Change

No impact is anticipated as the scope of the M-016-93 CERCLA TRU Workplan will be integrated with the M-091-03 Project Management Plan. TPA change package M-91-10-03 has been initiated to add the M-016-93 scope into the M-091-03 project management plan interim milestone.

Affected Documents

The Hanford Federal Facility Agreement and Consent Order, as amended, and the M-091-03 Project Management Plan beginning with the 2011 submittal.

Approvals

_____ _____ _____Approved
Disapproved
DOE Date

_____ _____ _____Approved
Disapproved
EPA Date

_____ _____ _____ Approved
Disapproved
Ecology Date

Page 1 of 2

Change Form M-16-10-05
Page 2 of 2

Description/Justification of change continued.

Producing a unique workplan for CERCLA projects is not conducive to an integrated site-wide approach to address these wastes.

This change form therefore deletes existing and any future M-016-93 Interim Milestones, change request M-91-10-03 incorporates the scope into the annual M-91 Project Management Plan (PMP) that is developed pursuant to interim milestone M-091-03.

By the approval of this change form it is also agreed that the finalization and approval of previously submitted workplans under past M-016-93 Interim Milestones are terminated as this scope is now integrated into the M-091-03 PMPs beginning with the June 30, 2011 report.

Modifications to interim milestone M-016-93B are denoted by the use of ~~strikeout~~ to indicate text to be deleted and <u>double underline</u> to indicate text to be added.

~~M-016-93B~~	~~Submit An Implementation Workplan To EPA For the Acquisition of Capabilities Necessary to Prepare TRU And TRUM Waste Generated by CERCLA Clean Up Actions at the Hanford Site for Disposal at the Waste Isolation Pilot Plant (WIPP). This Workplan Will Reflect Retrieval Decisions, Projected Waste Volumes, and Schedules From All CERCLA Cleanup Actions Authorized In Records of Decision and Action Memoranda at the Hanford Site, and Will Provide for Updates and Revisions As New Information Becomes Available (At A Minimum, The Workplan Must Be Revised In 2009 [After All 200 Area RODs Are Issued] And In 2012). As Part Of The Approval Process, EPA Will Consult With Ecology To Ensure That Wastes From~~	~~12/31/2012~~

	~~CERCLA Operable Units For Which Ecology Is The Lead Regulatory Agency Are Properly Planned For. This Workplan Will Provide A Schedule For Acquiring The Capabilities for TRU And TRUM Management Necessary To Support All CERCLA Cleanup Actions. In Order To Avoid Duplicative Requirements, The M-16-93 Workplan Will Integrate Plans Developed Pursuant To The M-91 Milestones To Provide Capabilities For RCRA Mixed And Suspect Mixed Transuranic Waste Where Such Capabilities Also Can Be Used For CERCLA TRU/TRUM Waste. The Workplan Will Be Submitted Pursuant to Section 11.6 of the Tri-Party Agreement.~~	