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Revision 3

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

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

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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Richland, Washington

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

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PREFACE

This revision of the Project Management Plan (PMP) for the M-91 series milestones of the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement - TPA) address Washington State Department of Ecology (Ecology) revision 2 comments and documents Department of Energy (DOE) strategies to align plans with TPA M-91 milestone commitments. This PMP has been updated to be consistent with the July 3, 2007 version of the draft M-91-07-01 change package dated July 7, 2007.

Strategy changes include:

- Increasing capacity to process M-91-42 contact-handled (CH) transuranic (TRU) waste and mixed transuranic (TRUM) waste to certify stored, retrieved, and newly generated wastes (before July 1, 2011) by the end of 2011. After this date, M-91-42 TRUM waste will be certified within one year of generation. Increased capacity includes additional on-site capacity for waste repackaging, waste characterization and waste transport.
- Establishing off-site and on-site processing capability for selected CH TRU waste in containers (generally less than 10 m^3) prior to the construction of capabilities to process the remainder of the remote-handled (RH) and/or large TRUM waste. This capability is being pursued to support the M-91-44 commitment to begin processing/certifying RH and large container TRUM waste at a rate of 300 m^3 per year by June 30, 2012.
- Evaluating the benefits of constructing a new Solid Waste Processing Center (SWPC) facility to process large container and RH waste rather than modifying T Plant to house the SWPC. The evaluation includes early integration of safety into the SWPC design, and describes benefits of both sites. This study is planned to be complete by March 2008.
- Establishing on-site capability for direct-loading of certified RH TRU waste into Waste Isolation Pilot Plant (WIPP) shipping containers/casks that is independent from future capabilities to process RH TRU waste. This supports a WIPP need for earlier shipment of RH waste from Hanford, as well as the M-91-44 300 m^3 per year processing rate.
- Expanding use of commercial capabilities to treat M-91-43 MLLW to support the M-91-43 treatment rate of 300 m^3 per year of large CH MLLW containers and RH MLLW.

FOREWORD

This revision of the Project Management Plan (PMP) for the Tri-Party Agreement - TPA M-91 series milestones was prepared by Fluor Hanford with guidance from the Department of Energy (DOE). The M-91 series milestones include: 1) retrieval of post-1970 retrievably stored "suspect" transuranic (TRU) waste, 2) acquisition of capabilities and/or facilities to process/treat mixed low-level waste (MLLW) and TRU waste, and 3) treatment/processing of MLLW and TRU waste. This PMP has been updated to be consistent with the draft TPA change package M-91-07-01.

Since completion of the M-91 negotiations in 2003, DOE has met 37 of 39 M-91 requirements on or ahead of schedule. Accomplishments include retrieval of 5,600 m^3 of "suspect" TRU waste, treatment of over 5,600 m^3 of MLLW, and completed thermal treatment of 600 m^3 of MLLW (M-91-12). Only the December 31, 2006 M-91-42I milestone to certify 3,000 m^3 has not been completed.

DOE will retrieve all CH retrievably stored waste (RSW) within burial grounds 218-W-4C, 218-W-4B, 218-W-3A, and 218-E-12B by December 31, 2010. Retrieval of RSW will meet the M-91-40 commitments of 7,200 m^3 (cumulative) by December 31, 2007, 9,700 m^3 (cumulative) by December 31, 2008, 12,200 m^3 (cumulative) by December 31, 2009, and complete retrieval of CH RSW by December 31, 2010. Retrieval actions will be concurrently conducted in multiple burial grounds.

DOE plans to meet M-91-42 MLLW requirements by using available commercial capabilities and capacities. DOE plans to complete treatment of M-91-42 MLLW (with an available treatment path) that is in storage as of December 31, 2002, and from retrieval and newly generated M-91-42 MLLW as of June 30, 2009, by December 31, 2009. After June 30, 2009 M-91-42 MLLW will be treated within one year of generation.

DOE continues to work with Ecology to pursue in-trench treatment of MLLW where possible and to expand the use of commercial capabilities to process the majority of the M-91-15 and M-91-43 MLLW. MLLW that cannot be commercially treated will be processed through the Solid Waste Processing Center (SWPC).

DOE is increasing capacity for processing M-91-42 CH TRU waste and CH mixed transuranic (TRUM) waste to certify stored, retrieved, and newly generated wastes (in permitted storage as of July 1, 2011) by the end of 2011. After this date, M-91-42 TRUM waste will be certified within one year of generation. Increased capacity includes additional on-site capacity for waste repackaging, waste characterization and waste transport. Current planning assumes resources to operate CH TRU waste drum repackaging lines with capabilities to process 100 m^3 per year at the Waste Receiving and Processing (WRAP) facility, 400 m^3 per year at T Plant, and 100 m^3 per year of waste that does not require repackaging (including newly generated waste). The M-91-42 CH TRU waste processing rate will be increased to 700 m^3 per year for fiscal year (FY) 2009 through the end of 2011.

Approximately 70 percent of the M-91-42 CH TRU/TRUM waste currently in permitted storage is included in a WIPP-approved waste stream. Plans are to obtain WIPP waste stream approval for an additional 23 percent of the stored waste in the next two years. Approval of the remaining waste streams will be completed by mid-2011 to support waste certification.

DOE is evaluating alternatives to establish off-site and on-site processing capability for selected CH TRU waste in containers (generally less than 10 m^3) before the construction of the SWPC. A subset of these containers with lower plutonium levels is being assessed for shipping and processing off-site. On-site alternatives being studied include "hands-on" processing using special protective clothing/equipment such as bubble-suits and use of limited remote systems. This study is planned to be completed in March 2008. This capability is being pursued to support the M-91-44 commitment to begin processing/certifying TRUM waste at a rate of 300 m^3 per year by June 30, 2012.

In addition, DOE is evaluating plans to establish on-site capability for direct-loading of certified RH TRU waste into WIPP shipping containers/casks independent from future capabilities to process RH TRU waste. This capability would assure that processing operations for waste sorting and size reduction are not rate limited by RH TRU waste loading operations.

The SWPC will provide capabilities to process the remainder of the RH and/or large TRUM waste and MLLW containers. Futhermore, DOE is evaluating benefits of modifying T Plant for the SWPC or to construct a new SWPC facility to process the remaining large container and RH waste. The evaluation includes early integration of safety into the SWPC design. This study is planned to be complete by March 2008.

Building blocks of scope and funding are estimated to assist possible adjustments needed if funding obtained for FY 2008 is different than the funding profile identified. This PMP assumes the President's budget for FY 2008. FY 2009 funding and beyond is assumed to be unconstrained.

Annual revisions of this PMP will be submitted on June 30 every year starting in 2008 and continuing until the M-91 milestones are completed. The President's budget, which is issued each February, will be incorporated in the June PMP revisions.

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1.0 PROJECT GOALS AND OBJECTIVES

This Project Management Plan (PMP) addresses Hanford processing of contact-handled (CH) and remote-handled (RH) mixed low-level waste (MLLW) and transuranic (TRU) waste. Planning and volumes for non-mixed TRU waste are included for U.S. Department of Energy (DOE) planning purposes. In this PMP, TRU waste refers to both non-mixed and mixed TRU waste. Any information on non-mixed TRU waste in this PMP is for information purposes only and is not subject to the Resource Conservation and Recovery Act of 1976 (RCRA) or the Hazardous Waste Management Act (HWMA). The hazardous and/or dangerous waste portion of mixed TRU waste is subject to the RCRA and HWMA. Statements and information related to radiological constituents in non-mixed and mixed TRU waste are not commitments enforceable under either RCRA or HWMA.

The requirements of the M-91 series milestone with regard to the acquisition of new facilities, modification of existing facilties, and modification of planned facilities necessary for treatment/processing of RCRA mixed and suspect mixed transuranic waste do not apply as to facilities for Land Disposal Restriction (LDR) treatment (or for certification in lieu of such treatment) of mixed transuranic waste prior to a final appealable judgment on the merits of the LDR storage and treatment claim in *Washington v. Abraham*, NO. CT 03 5018 AAM, and after such a judgment, only as set forth in the accompanying settlement agreement.

The M-91 series milestones do not include any requirements to establish schedules for the management of pre-1970 TRU/mixed transuranic (TRUM) waste. Before this date (1970) there was no TRU waste to segregate as the definition was prospective in its application and/or implementation. Consequently, schedules for the management of pre-1970 TRU/TRUM will be established, pursuant to applicable provisions of the Hanford Federal Facility Agreement and Consent Order HFFACO (Tri-Party Agreement Tri-Party Agreement [TPA]) other than the M-91 series milestones, following the issuance of operable unit records of decision (RODs).

This PMP was developed in accordance with Agreement Section 11.5, *Waste/Material Stream Project Management Work Plans Prepared Under Agreement Milestone Series M-90-00, M-91-00 and M-92-00* of the TPA. This PMP has been updated to include modifications proposed in the draft TPA change package M-91-07-01 and supersedes and completely replaces previously prepared M-91 PMPs.

Waste management objectives and requirements include:

- compliant storage of MLLW and TRU waste
- retrieval of post-1970 retrievably stored "suspect" TRU waste (RSW)
- effective management of newly generated MLLW and TRU waste
- treatment/processing of MLLW and TRU waste
- certification and shipment of TRU waste for disposal at the Waste Isolation Pilot Plant (WIPP), and
- acquisition of capabilities and/or facilities to treat/process MLLW and TRU waste.

2.0 BACKGROUND

2.1 Overview of Mixed Waste Management

Mixed Waste is defined as radioactive waste that also contains dangerous and/or hazardous constituents. In anticipation of the potential for mixed waste to be subject to RCRA, radioactive waste disposal operations undertook the practice

of segregating non-mixed LLW from mixed LLW in July 1986.

Based on the May 1987 Byproducts Rule, the radiological constituents of Mixed Waste are governed by the Atomic Energy Act (AEA), and the chemical and hazardous constituents are governed by RCRA. The Washington State Department of Ecology (Ecology) is authorized by the Environmental Protection Agency (EPA) to implement the federal hazardous waste rules in Washington State. This is done through the Dangerous Waste Regulations (Washington Administrative Code [WAC] 173-303) which implement the HWMA as amended.

In order to obtain the authorization for mixed waste from EPA, the Washington State HWMA was amended in July 1987 to incorporate the definition of mixed waste.

In November 1987, Ecology was authorized by the EPA to regulate mixed waste in lieu of federal regulation. Subsequently, representatives from DOE Richland Operations Office (DOE-RL) and Westinghouse Hanford Company (WHC), EPA Region X, and Ecology met to discuss the strategy needed to handle the mixed waste that was being generated at the Hanford Site. The resulting strategy, effective January 15, 1988, allowed all containerized mixed waste generated on-site (except for RH waste and ignitable waste) to be consolidated for temporary above-ground storage on retrievable storage pads. Mixed waste generated off-site could not be accepted for storage, except on a case-by-case basis with concurrence from EPA and Ecology, until the radioactive mixed waste storage buildings were in place. These new storage buildings were placed in service beginning in 1989 and are now part of the Central Waste Complex (CWC).

Finally, in September 1996, agreement was reached with the Attorney General of Washington that the effective date for mixed waste in Washington State is August 19, 1987. Applicability of LDRs to mixed waste became applicable over time as the national capacity variance for a treatment standard expired. Today, all LDRs apply to mixed waste in Washington State.

Types of Waste

LLW is radioactive waste that is not spent fuel, high-level waste, transuranic waste, byproduct material, or naturally occurring radioactive material. LLW includes both MLLW and non-MLLW. LLW can be CH or RH.

MLLW is LLW that is subject to RCRA or Chapter 70.105 of the *Revised Code of Washington* (RCW). Non-MLLW is LLW that is not subject to RCRA or 70.105 RCW. MLLW can be CH or RH.

Transuranic waste is waste that meets the definition in subsection (18) of Section 2 of the WIPP Land Withdrawal Act, Pub. L. 102-579. Transuranic waste includes both TRUM waste and TRU waste, and comprises the following categories: CH TRU, CH TRUM, RH TRU, and RH TRUM.

In this PMP, waste labeled TRU includes both non-mixed and mixed TRU waste. Waste labeled as TRUM is mixed TRU waste. Waste labeled as "TRU waste only" is non-mixed TRU waste.

Retrievably Stored Waste Containing Transuranic Nuclides

The Atomic Energy Commission (AEC, a DOE predecessor agency) initially defined TRU waste as "wastes with known or detectable contamination of transuranium nuclides." In March 1970, AEC sites were directed to segregate TRU waste and place it in retrievable storage that would allow the waste to be retrieved within 20 years. Before this date, no effort was made to segregate TRU waste from LLW or to make waste retrievable.

In 1973, the TRU waste segregation limit was

established at 10 nanocuries of transuranic isotopes per gram. In 1982, the limit was changed to 100 nanocuries per gram. 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 nanocuries per gram for defining TRU waste. This waste has been termed "suspect" TRU because some of this waste will be designated LLW following radiological characterization. In addition, waste was categorized as TRU by waste process knowledge rather than by assay. Also, all retrieveably stored RH waste (drum and box) is considered suspect because the capability to reliably determine (by assay) the TRU waste content of these containers did not exist on the Hanford Site or the DOE complex. When the M-91 milestones were revised in 2003, the term RSW was defined to refer to what was primarily termed "suspect TRU waste." In this PMP, the term RSW is used to be consistent with the current M-91 definition as follows:

- RSW is waste that is or was believed to be contaminated with significant concentrations of transuranic isotopes 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. During the retrieval process, containers of RSW will be segregated into two categories: (1) CH RSW and (2) RH RSW. Subsequent analysis and categorization of the RSW pursuant to RCRA, CH. Chapter 70.105 of the RCW, the Atomic Energy Act, and the WIPP Land Withdrawal Act will result in most or all of this waste being classified as one of the following types of waste: CH LLW, RH LLW, CH MLLW, RH MLLW, CH TRU, CH TRUM, RH TRU, or RH TRUM. 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, the decision as to how to move forward will be determined through the cleanup process set forth in RCRA, CH. Chapter 70.105 of the RCW, and/or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as appropriate. Those processes may result in additional requirements for the remediation of such wastes.

Waste Designation

Designation is the process for determining (1) which containers of LLW are MLLW and (2) which containers of transuranic waste are transuranic mixed waste (CH TRUM or RH TRUM). Designation of waste will be performed pursuant to WAC 173-303-070 through 100. These regulations allow the use of "Acceptable Knowledge," surrogate sampling and other measures for designation to minimize workers' radiation exposure and to reduce costs. Where applicable, DOE intends to use information gathered through the certification of transuranic waste in support of its designation of related LLW streams. Where appropriate, DOE will use measures allowed under state and federal regulations to perform accurate and cost-effective designations of LLW.

Land Disposal Restrictions

Pursuant to the Hazardous and Solid Waste Amendments of 1984, Land Disposal Restrictions (LDRs) were promulgated in the late 1980s. 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. The latest year's report is the calendar year 2006 *Hanford Site Mixed Waste Land Disposal Restrictions Summary Report (DOE/RL-2006-23 Revision 0)*. The report provides total waste volume for both the currently stored inventory and the waste forecasted to be generated during the next five years by "Treatability Group." This PMP

addresses MLLW LDR Treatability Groups MLLW-02 through MLLW-10 as described in Section 2.2, Waste Requiring Processing and Disposition.

Transportation of Waste

Mixed waste is currently transported on the Hanford Site by truck and rail. On-site transportation of waste is managed by DOE. Transportation of waste off-site is regulated by the U.S. Department of Transportation (DOT). A 2003 memorandum of understanding (MOU) between the Western Governors Association and DOE headquarters requires that DOE conduct transuranic waste shipments through the Western States, in accordance with the protocols contained in the "WIPP Transportation Safety Program Implementation Guide" and WIPP Transportation Plan, not including shipments within the same DOE site or other transuranic waste shipments as agreed to between DOE and the states.

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 off-site meets DOT regulations for design, material, manufacturing methods, and testing.

Waste Acceptance Criteria

Solid Waste Operations Complex

The *Hanford Site Solid Waste Acceptance Criteria* (HSSWAC) defines the baseline criteria for acceptance of waste at the following Hanford Site Solid Waste Operations Complex (SWOC) treatment, storage, and/or disposal (TSD) units: the CWC, Waste Receiving and Processing (WRAP) facility, T Plant, and the low-level burial grounds (LLBGs) that include the Mixed Waste Disposal Trench (MWDT). The waste acceptance criteria (WAC) for each TSD unit have been established to ensure that waste can be managed within the operating requirements of the unit, including environmental regulations, DOE Orders, permits, nuclear safety requirements, waste analysis plans, performance assessments, and other applicable requirements.

Environmental Restoration Disposal Facility (ERDF)

The Environmental Restoration Disposal Facility Waste Acceptance Criteria defines the baseline criteria for acceptance of waste at ERDF.

Data Sources

The amounts, characteristics, and locations of MLLW and TRU waste were obtained by completing data sorts on the Solid Waste Inventory Tracking System (SWITS) and the Solid Waste Integrated Forecast Technical (SWIFT) databases. The SWITS database contains records for the majority of waste containers currently stored at Hanford, while the SWIFT database contains estimates for waste expected to be generated in the future.

The SWITS database contains data (e.g., volumes, container information, and radiological, physical, and dangerous waste characteristics) on each container of stored waste managed by the Fluor Hanford (FH) Waste Stabilization and Disposition Project. Generator data, waste transfer data or shipping records for the stored waste were used to extract waste information for input to the SWITS database. The SWITS database is a dynamic database and is updated frequently to reflect waste receipt, processing, and shipment volumes. Waste containers in SWITS that did not have a TSD acceptance date at the time the database was queried were included. The data contained in this PMP were obtained on January 3, 2007. Annual updates will use a point in time of approximately January 1 of each year.

The 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. The generator specifies the containers in which the waste will be shipped, the projected number of containers, the physical form of the waste, the Waste Specification Record (WSRd), the dangerous characteristics of the waste, and the radionuclide activity concentration in the waste. The SWIFT database is updated semi-annually and published in the SWIFT report. The data contained in this plan correspond to the SWIFT Report 2007.0 published in January 2007. The annual January SWIFT updates will be used for the annual PMP update.

The SWIFT data are obtained through formal meetings and contact with the individual generating units and are validated through a quality control process that includes approval by appropriate authorities.

CERCLA Waste

Wastes generated during CERCLA cleanup actions that will be treated through "M-91 capabilities" will be identified as part of the Record of Decision Process, and will be integrated with M-91 through the M-16-93 Implementation Work Plan. RH wastes from the 618-10/11 have been identified and are included in the waste feed for the M-91 Project. As new waste streams are identified that will be processed through the M-91 capabilities, they will be included in future updates to the PMP. As specified in the M-91-03-01 M-91 Change Package the M-91 series was revised specifically to address capabilities for RCRA waste. Because the M-91 series was not for addressing CERCLA waste a separate change package, M-16-03-03, was processed at the same time to provide language in M-16-93 to provide an implementation workplan to describe the plan for obtaining capabilities for processing CERCLA TRU and TRUM. The M-16-93 plan addresses how M-91 capabilities will be considered in evaluation of processing of new CERCLA wastes.

2.2 Waste Requiring Processing and Disposal

Waste that is RSW in the LLBG, in above-ground storage (primarily at CWC), and forecast to be generated during site cleanup requires processing and disposal. Figure 1 provides the volume of each type of waste.

Enlargements of Figures 1, 5, 6, 7, and 8 are provided in Appendix B along with applicable data sources and notes. Retrieval and storage inventory volumes are as of January 3, 2007. The following waste is not included:

- Waste that has already been treated/ processed or disposed
- Unforecasted waste (i.e., potential waste from CERCLA or decontamination and decommissioning [D&D] cleanup actions not yet specified)
- Non-mixed LLW regulated by Toxic Substances Control Act (TSCA) requirements
- Waste known as "German Logs" (vitrified high-level waste). Includes packages CASTOR-GSF-001, -002, -003, -005, -006, -007, GNS-12-1, and GNS-12-2
- Waste from the "Liquid Radioactive Waste Storage Tanks"
- Waste suspected to be Reactor Irradiated Nuclear Material, and
- Increased waste volumes resulting from failed RSW containers (i.e., retrieval waste volumes are based on original container volumes).

Retrieval and storage volumes are the internal volume of the waste package (e.g., a 55-gallon drum has an internal waste treatment volume of 0.208 m^3 and an external volume of 0.257 m^3). WHC-SD-WM-CSD-005 documents *Hanford's Commonly Used Containers; Treatment, Storage, and Disposal Volumes*.

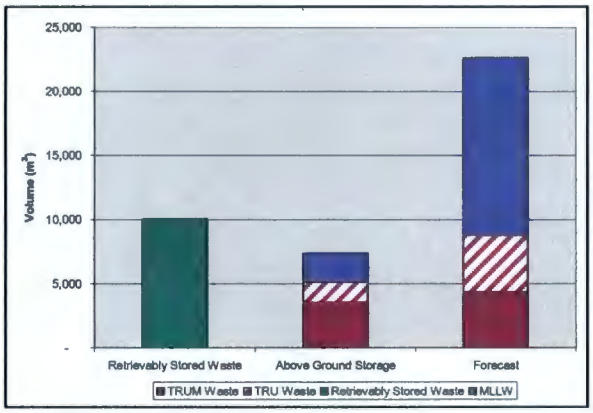

Figure 1. Hanford MLLW/TRU Waste Sources.

Retrieval of RSW packages will require substantially more handling and over-packing, due to waste container integrity issues (see Figures 2 and 3), than the original 2003 forecast of 10 percent of the drums (see Section 3.2, Planned Approach for MLLW and TRU Waste Management). It is assumed that 100 percent of the remaining RSW drums that will be retrieved will require over-packs (see Figure 4). Larger sized RSW containers are anticipated to require similar over-packing. Based on process experience, the volume of debris within RSW waste containers is assumed to be 99.5 percent of the overall waste, and 0.5 percent is non-conforming waste. Approximately 0.4 percent of the non-conforming waste can be treated during routine processing; the remaining 0.1 percent requires additional treatment.

Figure 2. Waste Container Integrity Issues.

Figure 3. Waste Container Handling.

Figure 4. Waste Container Over-packing.

After retrieval and assay, a significant portion of the RSW will be designated as non-TRU (LLW) based on the change in definition of TRU waste (currently defined as 100 nanocuries per gram versus the previous 10 nanocuries per gram). In addition, waste was often categorized as TRU waste as a conservative measure rather than by assay. Based on this change in definition, waste records, and field experience it is assumed that 50 percent of the RSW will be managed as MLLW and 50 percent TRU waste (see Figure 5). Note: To date 53 percent of the 55-gallon drums and 68 percent of the non-drum containers retrieved have been TRU waste. Most of the containers retrieved to-date have been from 218-W-4C, which contained the most recent RSW, which is anticipated to have a higher percentage of TRU waste due to the definition changes. The 50/50 split assumption will be revised, as necessary, in future PMP revisions after more waste is retrieved from the other three RSW burial grounds.

Forecast volumes are life-cycle from January 2007 through September 2035 (see Forecasted Waste later in this section). Forecasted volumes do not include waste that goes directly to ERDF, MLLW processed and disposed by the River Protection Project, or liquid waste. Forecast volumes are the maximum external dimensions of the waste package. CERCLA remediation decisions could result in additional waste requiring processing and disposal.

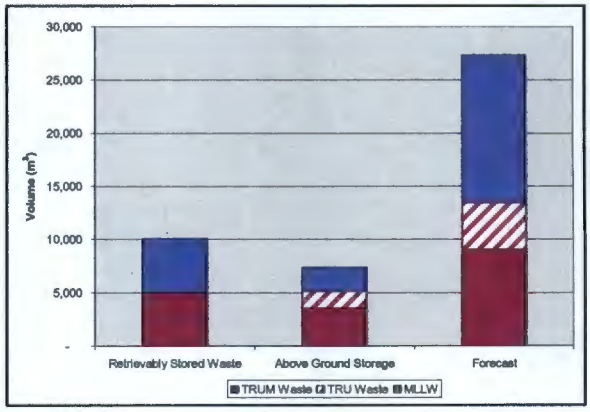

Figure 5. Hanford MLLW/TRU Waste with Retrieval Split.

Currently two CERCLA actions have been identified with waste containing transuranic constituents. The proposed 618-10/11 burial grounds cleanup plan has identified approximately 90 m^3 of CH waste and 1,300 m^3 of RH waste that contains transuranic constituents requiring processing and disposal. A small quantity of waste containing transuranic constituents has also been identified in the U Plant canyon and will be quantified as part of 221-U (U Plant canyon) closure.

Additional CERCLA waste sites and facilities with waste containing transuranic constituents include:

- Liquid waste disposal sites – Cribs, trenches, reverse wells, ditches, ponds, unplanned release sites and settling tanks
- Burial grounds – Non-retrievably stored waste, and
- Canyon, facilities, and associated tunnels.

As new waste streams are identified through the CERCLA process that will be processed through M-91 capabilities, they will be added to future updates of the PMP.

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 2006 Hanford Site Mixed Waste Land Disposal Restrictions Summary Report* includes:

- 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 "Elemental Lead," **Treatment Path – Non-Thermal (Macro-encapsulation)**
- MLLW-06 "Elemental Mercury," **Treatment Path – Mercury Stabilization (i.e., amalgamation or grout stabilization)**
- MLLW-07 "RH and Large Container," **Treatment Path – In-Trench Treatment, Commercial, near-term on-site (generally less than 10 m^3) capability, or future Solid Waste Processing Center (SWPC)**
- MLLW-08 "Unique Wastes," **Treatment Path – No Path (lack of treatment capability)**
- MLLW-09 "Lead Acid & Cadmium Batteries," **Treatment Path – Macro-encapsulation**
- MLLW-10 "Reactive Metals," **Treatment Path – Deactivation of Reactive Component**

***Organic/Carbonaceous (O/C) LDR inapplicability certification has been in affect since 1999 allowing for the treatment of the O/C debris by methods other than incineration.**

The volume of the MLLW Treatability Group waste sources is summarized based on processing plans discussed in Section 3.2, Planned Approach for MLLW and TRU Waste Management, and in Figure 6. The MLLW-01, LDR-compliant waste is not generally addressed in this PMP because it is stored and disposed in compliance with WAC-173-303 requirements and the LDR storage prohibition requirements as specified in 40 Code of Federal Regulations (CFR) Part 268.50(e). Volumes of MLLW treated by Hanford generators prior to storage/disposal are included in MLLW-01.

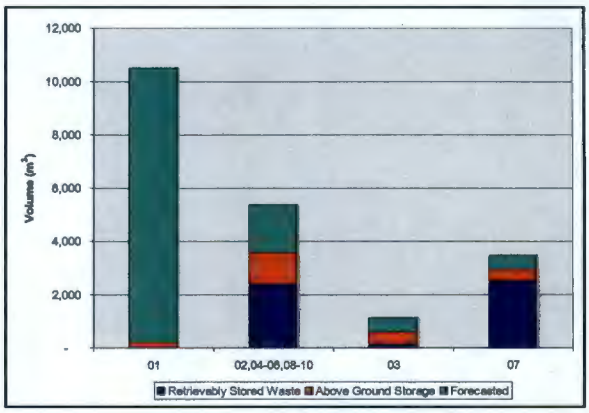

Figure 6. MLLW Treatability Group Sources.

A "Tree Chart" of MLLW and TRU waste by treatability group requiring processing is included in Appendix C. Assumptions used in the Tree Chart include:

- Reassignment as RH of packages listed as CH in SWITS:
  - With a dose rate of >200 mR/hr
  - Containing lead shielding
- Suspect Reactor Irradiated Nuclear Material marked as TRU waste is not included
- Waste marked as LLW TSCA is not included
- RSW burial grounds consists of suspect TRU waste from 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B
- Fifty percent of the retrieved suspect TRU waste from the RSW is assumed to be MLLW
- Retrieval and storage data is as of January 3,

2007. Forecast data is the baseline case from SWIFT 2007.0 for the period January 2007 through September 2035

- Retrieval and storage numbers include packages without a TSD accept date
- Volumes for retrieval and storage are the internal waste treatment; volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste treatment, 0.257 m^3 external), and
- Shipped or already disposed waste is not included. Over 2,600 m^3 of CH TRU waste has been certified to date.

The Tree Chart includes the volumes of the various wastes which is helpful for grouping waste treatment/processing approaches discussed in Section 3.0.

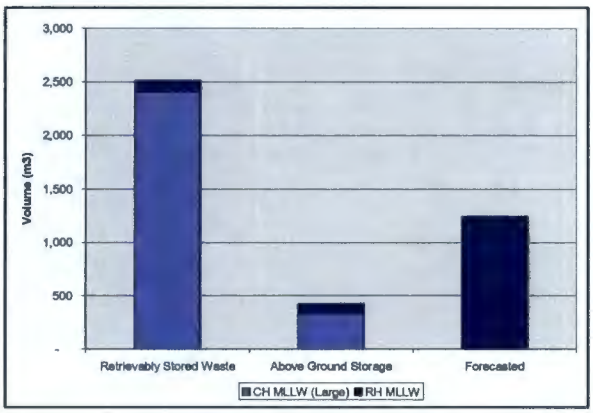

Figure 7. MLLW-07 Sources.

Small containers and large containers have different meanings depending on whether they are used in reference to MLLW/LLW or transuranic waste. When referring to MLLW/LLW, small containers are containers less than 10 m^3, including 55-gallon drums. A large container is anything not defined as a small container. When referring to transuranic waste, small containers are 55-gallon drums or smaller containers even if over-packed in 85-gallon drums, and newly generated WIPP standard waste boxes (SWBs). A large container is anything not defined as a small container.

Figure 7 provides the volumes of the MLLW-07 sources that are CH and RH.

TRU Waste Treatability Groups

Transuranic waste is categorized by the necessary treatment path to ensure that this waste, once processed, will meet WIPP WAC for disposal. The *Calendar Year 2006 Hanford Site Mixed Waste Land Disposal Restrictions Report* includes:

- CH TRUM Standard Waste – small containers
- CH TRUM Special Waste – large containers
- RH TRUM Waste.

Figure 8 provides the volume of TRU waste in storage by treatability group.

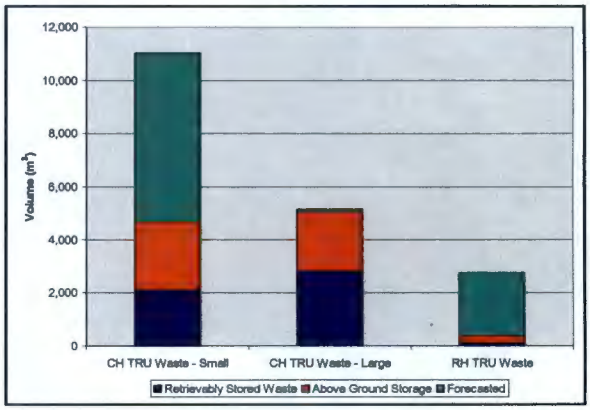

Figure 8. TRU Waste Sources.

Waste in Storage

Approximately 6,900 containers (2,200 m^3) of MLLW (approximately 190 m^3 is MLLW-01 LDR Compliant Waste) and 9,600 containers (5,100 m^3) of TRU waste are in above-ground storage.

The stored waste volume and the number of waste containers, by waste generator, are provided in Appendix D for MLLW and Appendix E for TRU waste.

LLBG Post-1970 RSW

Hanford has more than 21,400 containers (10,100 m^3) of RSW temporarily stored in the 200 Area LLBG awaiting retrieval. Over 5,600 m^3 of RSW has been retrieved to date.

Forecasted Waste

Approximately 13,900 m^3 (including MLLW-01) of CH and RH MLLW and 8,800 m^3 of CH and RH TRU waste are forecast through fiscal year (FY) 2035. There is no off-site MLLW forecast.

The volume of waste and time-frames of generation have varied considerably in the annual forecasts. This is due to changes in waste generator plans/estimates and overall site cleanup plans/estimates. The volume of newly generated TRU waste has been less than the planning basis established in FY 2003. The near -term forecast (2007 through 2011) for TRU waste generation is also significantly lower than the FY 2003 planning basis, due to changing remediation approaches.

Remediation of the 618-10 and 618-11 burial grounds, located near the Energy Northwest Generating Station, is required per the Record of Decision for the 300-FF-2 Operable Unit (April 2001). These burial grounds contain RH and CH TRU waste, along with larger quantities of LLW and MLLW. Actual volumes will depend on the approaches taken in the remediation and significant changes in forecasts have occurred based on changing remediation approach proposals. DOE and EPA have yet to approve the cleanup approach, and the timeframe for this waste generation may change.

The forecasted waste volume and the number of waste containers, by generator unit, are provided in Appendix D for MLLW and Appendix E for TRU waste.

Number of Containers and Volumes

Appendix F provides the number of containers and volumes for different types of waste containers.

2.3 Mixed Waste Commercial Disposition

Commercial processing will be used on selected MLLW Treatability Groups, which are discussed in Section 3.2, Planned Approach for MLLW and TRU Waste Management.

2.4 Component and Treatability Groups Stability (Contamination Migration)

Above-ground storage for mixed waste is in accordance with regulatory requirements. Currently, mixed waste is primarily stored in the 200 West Area CWC. The CWC buildings are designed to meet storage requirements for hazardous waste as required by Washington State Dangerous Waste Regulations.

Disposal of MLLW in accordance with regulatory requirements has occurred in Trenches 31 and 34, burial ground 218-W-5 in the 200 West Area and ERDF. The facilities are built to RCRA standards and employ a double liner-leachate collection system as required for near-term containment. Leachate is treated for any contaminants that may be released from the waste. All disposed wastes have been treated to satisfy LDR requirements for hazardous constituents prior to disposal as defined in Washington State Dangerous Waste Regulations.

2.5 Earlier Evaluations

CH MLLW Processing Studies

Non-Thermal Treatment

In 1991, the Strategy Assessment for Project

W-100, WRAP Module 2, recommended that the WRAP 2 facility project be divided into smaller functional projects. Based on this study, the WRAP 2 Project split into WRAP 2A and WRAP 2B. The primary functions of WRAP 2A were to include processing, packaging, and certification of retrieved and newly generated CH mixed waste using non-thermal treatment technologies. A change request to TPA milestone M-19-00 was submitted in October 1991 (M-19-91-1) to charter the separation of WRAP 2 into 2A and 2B. However, this request was later deleted due to commercialization of WRAP 2A waste treatment functions.

Thermal Treatment

A commercial thermal treatment contract was recommended to provide waste treatment of the hazardous constituents by thermal destruction, and subsequent immobilization of the radionuclides in a final grouted or slag/glass waste form. Commercial thermal treatment would process wastes regulated by the TSCA and most listed and characteristic hazardous wastes restricted from land disposal under RCRA. In addition to TSCA-regulated polychlorinated biphenyls (PCBs), a significant quantity of radioactive MLLW containing RCRA F-coded, ignitable, and reactive organic constituents is stored or will be generated at the Hanford Site. Thermal destruction is the Best Demonstrated Available (treatment) Technology (BDAT) for these RCRA LDR wastes with organic toxic constituents. DOE indicated an interest in considering thermal treatment as a primary option for the treatment of radioactive MLLW because significant volume reduction can be realized using thermal treatment.

A strategy for this activity was initially established that involved consideration and assessment of three treatment options:

- Installation and operation of an on-site thermal treatment facility (Project W-242)
- Treatment at another DOE site, and
- Contracting for commercial thermal treatment.

Each of the above options was investigated to a varying extent and resulted in supporting documentation, such as waste characterization studies, thermal treatment technology studies, site-specific preliminary engineering designs and cost estimates, and hazard classification analyses.

The option of on-site thermal treatment was investigated in FY 1991 and 1992. An engineering study was performed to identify the preferred technologies for treating Hanford Site radioactive mixed waste. A rotary kiln incinerator was the thermal treatment technology recommended for further evaluation and development. An engineering study for a site-specific thermal treatment facility was partially completed in FY 1992. The site-specific study included a facility design and equipment layout, as well as estimates of capital and operating costs.

The option of sending the waste to other DOE sites for treatment was investigated in detail for the specific case of treatment at Idaho National Engineering and Environmental Laboratory's (INEEL) Waste Experimental Reduction Facility (WERF), which was being refurbished and permitted for restart. The INEEL's WAC for off-site waste treatment was found to be too limited to be of practical consideration. Other sites, such as Savannah River and Oak Ridge National Laboratory, had thermal treatment facilities, but facility management at these sites indicated projected waste acceptance was at capacity.

The option of commercial thermal treatment provided the most desirable combination of technical feasibility and economic attractiveness. Commercial thermal treatment was initially investigated by surveying the industry's capability and interest in addressing the Hanford Site radioactive MLLW thermal treatment problem. In FY 1994, it was decided that industry

interest and capability was sufficient to issue a request for proposal (RFP) to treat the thermally treatable CH MLLW inventory (existing and projected), and a thermal treatment contract was awarded in November 1995. The company that was awarded the contract proposed a vitrification process to thermally treat the combustible portion of the waste and would produce a glass/slag final waste form for that portion of the waste. The noncombustible portion of the waste would be separated and treated with either microencapsulation (grouting) or macro-encapsulation.

The initial results derived from this procurement activity strongly suggested that thermal treatment by a commercial contractor provided acceptable technical risk accompanied by minimum financial risk to DOE, and that a unit cost-based thermal treatment service would be significantly more cost-effective than the construction of an on-site thermal treatment facility (using capital funds).

Studies concluded that the other two options (on-site facility and other DOE site facilities) would continue to be considered as possible alternatives until the uncertainty can be eliminated regarding privatizing thermal treatment. One concern was that a commercial off-site treatment facility might not be capable of thermally treating alpha-contaminated waste. The company that was awarded the thermal treatment contract indicated that the treatment of alpha-contaminated, non-TRU, and radioactive mixed waste would be included in the design of its treatment facilities.

Commercial thermal treatment capabilities continue to be utilized to support M-91-42 commitments. There continues to be limited capabilities and capacities for commercial thermal treatment, especially for TSCA MLLW.

RH and Large Container CH MLLW and TRU Waste Processing Studies

Studies assumed that transfer for treatment of all RH MLLW and large-size CH MLLW would be by truck or rail in casks, whether the waste is directly from storage or a generator. The receiving function would have the capability to remove the waste container from the transport vehicle. Cask or over-pack handling capability would be required.

Size reduction would be performed if needed to make large items more manageable and able to fit into smaller containers. Waste would be sorted to group according to processing requirements. Items requiring thermal treatment would be segregated from those requiring non-thermal stabilization. Stabilization would consist of adding a reagent (e.g., grout mixture) to the waste to immobilize any hazardous constituents present. The contaminants are not removed or destroyed but the mobility of the contaminants is decreased by adding a stabilizing agent.

The RH MLLW would be packaged into containers for shipment and disposal. Waste would meet the acceptance criteria of the disposal site. Waste would either be transferred to storage awaiting disposal or would be transferred directly to disposal.

Initial efforts to identify capabilities for processing waste began in the mid-1980s. Continuing evaluation of waste treatability groups, WAC, cleanup schedules, and budget considerations, resulted in development of a new set of TPA milestones, the M-91 series. These evaluations resulted in establishing T Plant as the baseline for RH and CH large container processing.

In September 2005, the Initial Engineering Study and Functions report was issued for processing MLLW and TRU waste that is either CH in boxes/large containers or RH waste in various packages. The report evaluated modifying T Plant to process large containers of CH

waste and RH waste that cannot be processed at commercial facilities. New T Plant capabilities would include modular cells referred to as solid waste processing modules (SWPMs) in the T Plant canyon that process both MLLW and TRU waste and a Solid Waste Handling Facility (SWHF) added to the south end of the T Plant canyon (see Figure 9). The strategy uses existing Hanford facilities (WRAP, CWC, 2706-T, the MWDTs, and ERDF) and commercial facilities to support waste staging, processing and disposal.

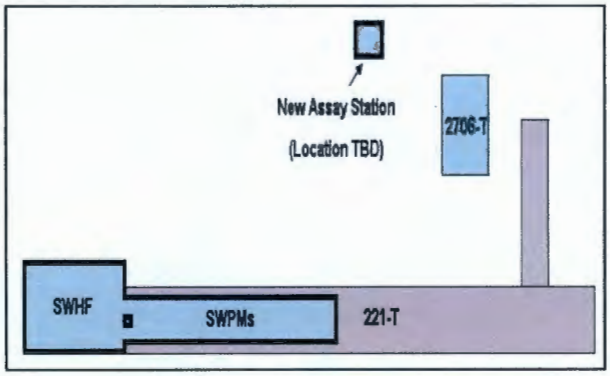

Figure 9. Location of New T Plant Complex Capabilities.

The Initial Engineering Study and Functions report further stated that the ability to perform required basic functions such as RH-72B cask payload container, RH TRU waste loading and sealing, and handling and processing of large containers of CH waste/RH waste will dictate the size and the cost of the new T Plant SWPMs and SWHF. Processing capacity will be a function of the ability to routinely load-in and load-out containers with minimal contamination issues, maintain remote equipment in an operational condition, and staff for multi-shift operations.

The 10-160B cask is an alternative to using the RH-72B cask. The 10-160B holds ten 55-gallon drums of waste versus three 55-gallon drums in a payload container for the RH-72B. Drums shipped in the 10-160B cask must be unloaded and repackaged into a RH-72B payload container at WIPP. WIPP is capable of transferring one filled payload container per day into the tunnels.

In April 2006, Pacific Northwest National Laboratory (PNNL) assessed (*Solid Waste Processing Center Primary Opening Cell Remote Equipment Report*, PNNL-15779) and provided general guidance on the following issues:

- Remote processing feasibility
- What remote equipment would be required, and to what extent that equipment is available commercially off-the-shelf
- The extent to which technology development is required, and
- The feasibility of siting the proposed facility within T Plant.

PNNL concluded that, based on its analysis of the preliminary information of the processing requirements, remote processing within T Plant appears to be technically feasible. In performing this assessment, information was gathered on other remote handling facilities across the DOE complex, including the West Valley Remote-Handled Waste Facility, the Idaho Advanced Mixed Waste Treatment Project, and the Oak Ridge Spallation Neutron Source Target Facility. Experts in the fields of hot cell operation, TRU assay, and criticality safety were interviewed, and detailed discussions were conducted with major equipment vendors. PNNL stated that remote systems/ equipment/tool testing was essential to the success of the project.

In September 2006, the *Processing Hanford Remote-Handled and Large Package Mixed Low-Level Waste and Transuranic Waste Engineering Study* was issued. The Engineering Study further defined the strategy and the capabilities required to process the MLLW for disposal on-site in the MWDTs, ERDF and/or the Integrated Disposal Facility (IDF), and the capabilities required to process TRU waste for disposal at WIPP.

The 2006 Engineering Study identified modifications to Hanford's T Plant Complex required to enable it to process CH MLLW in packages greater than 35 m^3, large-size packages of CH TRU waste, RH MLLW, and RH TRU waste (RH waste containers are all sizes). The new processing capability would be called the T Plant SWPC. The T Plant SWPC would allow processing of packages measuring up to 20 ft x 13 ft x 11 ft, weighing up to 83,000 lb, having dose rates (unshielded at the container surface) up to 20,000 rem/hr, and containing up to 2,100 g of plutonium. Plans would process 600 m^3 per year of TRU waste and 300 m^3 per year of MLLW through the upgraded complex.

The 2006 Engineering Study estimated the T Plant SWPC to cost $390 million, including escalation and contingency. This cost estimate assumed a planned startup of the new SWPC as June 30, 2016.

The 2006 Engineering Study identified that commercial facilities are being used to process (e.g., macroencapsulate, remove prohibited items, repackage) CH MLLW in packages up to 15 m^3. The study recommended that commercial facilities be expanded to treat CH MLLW in larger packages up to 35 m^3, and to continue to pursue in-trench treatment as applicable and expanding commercial usage to treat all large MLLW possible.

Also in September 2006, the *T Plant Solid Waste Processing Center Functional Design Criteria* was issued. The document provides the functional and design requirements for a T Plant SWPC and supports acquisition of these new capabilities through the DOE capital project process.

DOE has submitted documentation, per DOE Order 413.3A, for critical decision (CD)-0 "Approve Mission Need." Approval of CD-0 formally establishes a project and begins the process of conceptual planning and design used to develop alternative concepts and functional requirements. In addition, CD-0 approval allows the Program to request Project Engineering and Design funds for use in preliminary design, final design, and baseline development. CD-1 is the approval of alternative selection and of the cost range. CD-2 is approval of the performance baseline. CD-3 is the approval to start construction. CD-4 is approval to start operations.

The amount of time between future CD-1 through CD-4 decisions will vary. Projects may quickly proceed through the early Critical Decisions due to lack of complexity, the presence of constraints that reduce available alternatives, or the absence of significant technology and development requirements. Due to the complexity of this project, an accelerated CD process is not expected in this case.

Other Evaluations

In 1990, WHC-EP-0225, *Contact-Handled Transuranic Waste Characterization Based on Existing Records,* attempted to quantify the extent of the TRU/TRUM waste management workscope. This study concluded that there are uncertainties surrounding the projected waste volumes because of inadequate or incomplete records retained during early Hanford Site operations.

In 1995, WHC-SD-WM-ES-341, *Solid Waste and Materials System Alternatives Study,* presented alternatives to provide the necessary facilities to satisfy TPA Milestone M-33-00. M-33-00 established the requirement to submit a change package for acquisition of new facilities, modification of existing facilities, or modification of planned facilities for storage, processing, and/or disposal of solid waste and materials. Subsequent to this study, HNF-2063, *Trade Study for the Processing, Treatment, and Storage of Hanford Site Solid Waste Streams That Have No Current Path Forward,* evaluated alternative locations or facilities for the processing, treatment, and storage of the Hanford Site solid waste streams.

The Alternatives Study identified several options for TRU/TRUM waste streams that could not be processed with current planned capabilities. This exhaustive study provided the bases for establishing the TPA M-91 milestones.

Five alternatives were evaluated in detail:

- single new facility integrating storage and processing needs
- multiple new modular facilities integrating storage and processing needs
- multiple existing facilities integrating storage and processing needs
- maximizing use of the Washington Nuclear Plant 1 Facility (now Energy Northwest) integrating storage and processing needs, and
- current planning baseline.

The alternative that utilized multiple existing facilities was identified as having the lowest programmatic or regulatory uncertainties and risk. It also had the lowest projected cost of the alternatives, with the exception of the WNP-1 alternative.

In 1996, WHC-SD-WM-RPT-060, *Solid Waste Program Technical Baseline Description,* described a program to receive, store, treat, decontaminate, and dispose of radioactive/ nonradioactive waste and the required activities and technical challenges inherent in this process. This program addressed, in detail, the planned retrieval of TRU waste from trench 4 of the 218-W-4C LLBG and the planned removal of RH TRU waste stored in dry caissons. Caisson waste is RSW in the 218-W-4B burial ground caissons alpha-1 through alpha-4.

218-E-12B Treatability Study

A treatability study was conducted to assess field conditions related to RSW at the 218-E-12B burial ground. The treatability study was conducted in two phases.

During Phase 1, areas of the undisturbed burial ground containing RSW underwent geophysical, chemical, and radiological assessment to identify the most appropriate locations for examination of field conditions associated with waste retrieval. Geophysical assessments included electromagnetic induction, magnetic field, and ground-penetrating radar methods to survey and map the selected trenches. Chemical assessment included passive soil gas surveys to identify any hot spots of volatile organic constituents, which could indicate breached containers of waste containing organic constituents. Radiological assessment included surveys of the undisturbed trenches to determine if radiation readings could be used to identify waste locations and/or types.

During Phase 2 activities, the overburden layer was removed and waste containers in Trench T-17 and Trench T-27 were exposed. Radiological and industrial hygiene monitoring techniques were used to characterize the potential personnel exposure to hazardous constituents related to the activity of uncovering the waste containers and contact with the containers and adjacent soil. Visual examination of the condition of the buried wastes/waste containers verified the adequacy of existing burial-ground records and confirmed that the waste is RSW.

During the treatability study, no contamination was encountered that would have resulted in suspension of waste retrieval operations using the procedures in place for RSW retrieval at 218-W-4C. Some of the drums encountered showed damage due to historic waste management practices that included driving trucks across the waste trench to compact the buried waste. While original paint is still visible on some of the drums encountered, corrosion of some drum surfaces was also found (see Figure 10). Because of these observations, planning for RSW retrieval at the 218-E-12B Burial Ground must include contingencies for encountering drums in poor condition.

Figure 10. Treatability Study Excavation.

The treatability study successfully verified locations of waste containers in Trenches T-17 and T-27 within 218-E-12B using non-intrusive technologies; confirmed that the waste observed appeared to be RSW as defined in the TPA change package M-91-03-01; corroborated information provided by waste disposal records (e.g., that metallic containers are detectable in areas where records indicate drums were buried); and confirmed that, with adequate precautions, the waste retrieval process currently in use at the 218-W-4C Burial Ground should be applicable to the remaining RSW burial grounds.

2.6 Specific Regulatory Requirements

Significant Applicable Statutes

Mixed waste management activities will consider the following requirements as well as any other applicable regulations or DOE requirements.

Clean Air Act (42 U.S.C. 7401 et seq.)

The Hanford Site air operating permit has been issued in accordance with Title V the *Clean Air Act Amendments of 1990*, and is implemented through federal and state programs under 40 CFR Part 70 and WAC 173-401. The permit is intended to provide a compilation of applicable *Clean Air Act* requirements both for radioactive emissions and for non-radioactive emissions at the Hanford Site. Current air-permitting documentation is expected to address mixed waste management activities. Activities addressed by the PMP will be reviewed against the permitting documentation, as necessary to ensure that mixed waste management activities are addressed.

Hazardous Materials Transportation Act of 1975 (49 U.S.C. 5101 et seq.)

Hazardous material transportation requirements include the preparation of shipping papers to identify and track hazardous materials, packaging and container design, marking, labeling, performance standards, and employee training programs. Specific requirements will be followed relating to mixed waste management activities and the shipment mode used (i.e., rail, aircraft, vessel, and public highway). Off-site shipments of hazardous materials must comply with the implementing regulations at 49 CFR administered by the U.S. Department of Transportation. On-site waste movements must comply with DOE requirements including the *Hanford Sitewide Transportation Safety Document*.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

The Hanford Site Solid (Radioactive and Hazardous) Waste Environmental Impact Statement (DOE-EIS-0286) addresses the onsite and off-site treatment, storage, disposal, and transportation of MLLW.

Toxic Substance Control Act

Chemical Waste Landfill authorization is required for specific categories of TSCA waste. Currently the MWDTs do not have this authorization and it will be required.

RCRA of 1976 as amended by the Hazardous and Solid Waste Amendments (42 U.S.C. 6901 et seq.) of 1984

RCRA addresses the requirements for hazardous wastes, including the treatment, storage, disposal, and transportation (40 CFR Parts 260-282). EPA has authorized Washington State to administer RCRA through the State's HWMA in lieu of the federal regulations.

CERCLA

CERCLA addresses the hazardous waste sites prior to 1970. EPA is the lead regulatory agency for CERCLA cleanup actions at Hanford. DOE performs some investigation and cleanup actions for past practice units at Hanford through the CERCLA process. In September 2006, DOE submitted an M-16-93 implementation work plan to EPA for the acquisition of capabilities necessary to prepare TRU and TRUM waste generated by CERCLA cleanup actions at the Hanford Site for disposal at WIPP. This work plan reflected 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 (i.e., after all 200 Area RODs are issued). As part of the approval process, EPA will consult with Ecology to ensure that wastes from CERCLA operable units for which Ecology is the lead regulatory agency are properly planned.

In order to avoid duplicative requirements, the M-16-93 work plan is integrated with 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 work plan was submitted pursuant to Section 11.6 of the Tri-Party Agreement.

Washington State Hazardous Waste Management Act (RCW Chapter 70.105)

The HWMA directs Ecology authority to regulate the treatment, storage, disposal, and transportation, of dangerous waste in Washington State. Mixed waste is a subset of dangerous waste. Ecology has promulgated regulations in WAC 173-303, *Dangerous Waste Regulations*. Mixed waste generation activities are subject to generator requirements. Mixed waste management activities that cannot utilize generator provisions must be conducted according to the RCRA and Dangerous Waste permits under WAC 173-303 in order to operate. Existing permits are expected to address processing activities, with the exception of modification of T Plant and treatment in the trenches at the LLBG. A revision of the LLBG Part A Permit application is anticipated to be submitted to include treatment in-trench provisions.

Washington Clean Air Act (RCW Chapter 70.94) and Associated Regulations

Ecology's Nuclear Waste Program regulates air toxic and criteria pollutant emissions from the Hanford Site. Ecology promulgates and enforces the regulations under the Washington *Clean Air Act* (RCW Chapter 70.94). Ecology's implementing requirements (e.g., WAC 173-400, WAC 173-460) specify reviewing new source emissions, permitting, applicable controls, reporting, notifications, and complying with the general standards for applicable sources of Hanford Site emissions.

The Washington State Department of Health's Division of Radiation Protection regulates radioactive air emissions statewide as authorized by EPA and Washington State legislative authority. The Washington State Department of Health implements the federal/state requirements under state regulation WAC 246-247. 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 to the Washington State Department of Health and EPA. Typical requirements for radioactive air-emission sources include ensuring adequate emission controls, emissions monitoring/sampling, and/or annual reporting of air emissions.

At the local level, the Benton Clean Air Authority is authorized by EPA to establish a local oversight and compliance program for asbestos renovation and/or demolitions, as regulated by EPA under the National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61, Subpart M). The Benton Clean Air Authority enforces/adopts the federal/state regulations, respectively by reference, as well as imposes additional requirements on sources within the local agency's jurisdiction. Activities addressed by this PMP will be reviewed against the permitting documentation, as necessary to ensure that activities for managing mixed waste are addressed.

3.0 PROJECT SCOPE

3.1 Description of Facilities

RSW Burial Grounds

The RSW is stored in designated areas in four burial grounds:

- 218-E-12B
- 218-W-3A
- 218-W-4B
- 218-W-4C

218-E-12B includes two trenches (T17 and T27) that contain CH RSW. 218-W-3A includes 14 trenches (T1, T4, T5, T6, T6S, T8, T9S, T10, T15, T 17, T23, T30, T32, and T34) that contain CH RSW. 218-W-4B contains three trenches (T7, T7V, and T11) that contain CH RSW. 218-W-4C contained five trenches (T1, T4, T7, T20, and T29) that contain CH RSW (some of these trenches have been retrieved [i.e., T4 was completed in November 2006]).

Approximately 37,000 RSW containers were placed in the retrievable storage trenches, starting in 1970 and ending in 1988. Some of the trenches were asphalt-paved. Most of the waste containers were covered with plywood, tarps, and soil.

The waste containers varied in size up to 20 ft x 13 ft x 11 ft, weights up to 83,000 lb, dose rates (unshielded at the container surface) up to 20,000 rem/hr, and plutonium content up to 2,100 g. The waste packages are stored in various configurations in the LLBG (Figures 11 through 13).

Figure 11. Suspect TRU Waste Drum Storage in the LLBG.

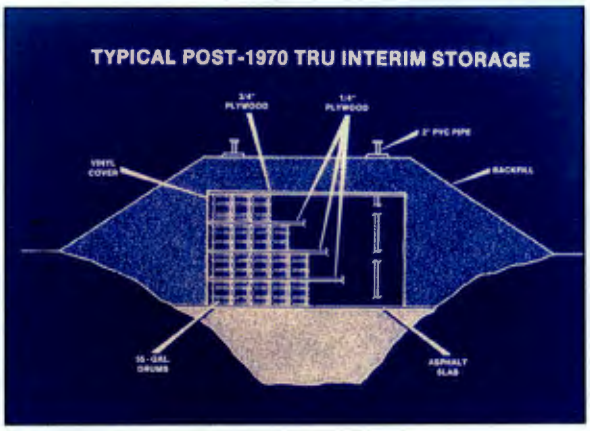

Figure 12. Typical Storage of Suspect TRU Waste Drums in the LLBG.

Figure 13. Large Container TRU Waste Stored in the LLBG.

On-Site Mixed Waste Storage

Central Waste Complex

The CWC, a series of buildings conforming to RCRA requirements, receives and stores radioactive waste in a safe and compliant manner. The CWC began accepting waste in August 1988.

The storage facilities, located in the Hanford 200-West Area, now include 12 small mixed waste storage buildings (the 2402 series); five large storage buildings (the 2403 series and 2404-WA); and Building 2420-W, used for cask storage. In addition, there are 27 modules for storing low-flashpoint mixed waste and 12 modules for storing alkali metals. Also, waste storage pads (paved and gravel) are part of the CWC.

The CWC provides indoor and outdoor interim storage (see Figure 14) for mixed waste, TRU waste, and a small amount of LLW, waiting processing or treatment and final disposition. The CWC operating indoor capacity is approximately 12,800 m^3. Some RH waste stored in burial ground 218-W-3AE is included in the above-ground inventory.

Figure 14. Container Storage at CWC.

All newly generated waste must meet acceptance criteria set by the Hanford Site Solid Waste Acceptance Program. Waste is generally packaged in 55-gallon drums, unless alternate packages are dictated by size, shape, or other form of waste. Each drum is handled individually using a hand truck, forklift or crane. Drums are placed on pallets banded together; the pallets are stored (see Figure 15). The storage buildings or pads have physical features that provide for segregated storage areas to maintain appropriate separation between groups of incompatible waste and to comply with fire code requirements.

Figure 15. Drum Storage in CWC.

The Hanford Site Solid Waste Acceptance Program requirements will dictate the volume of RSW waste containers and newly generated MLLW and TRU waste containers that can be stored. Spacing of stored waste containers

depends on the dose equivalent curies in the packages and criticality packaging types.

Mixed Waste Storage at the T Plant Complex/WRAP

The T Plant Complex and the WRAP facility provide additional storage for mixed waste packages. Packages are stored at WRAP and T Plant waiting processing or shipment to CWC, or shipment directly to treatment or disposal.

WRAP

WRAP processes 55-gallon drums of CH TRU waste for shipment to WIPP. WRAP has limited capabilities to process 85-gallon overpacks containing internal packages that have intregrity issues. WRAP does not have capabilities to process or ship RH waste. TRU, MLLW and LLW verification are also performed at WRAP. WRAP (see Figure 16) has automated processes to examine and characterize waste using x-ray (non-destructive examination), gamma, and neutron assay (non-destructive assay) equipment. Two large container storage buildings (2404-WB and 2404-WC) are part of WRAP. The 2404-WC building has been modified to provide insulation and climate control to facilitate head-space gas sampling operations. Repackaging waste is performed as required to meet WIPP certification requirements (See Figure 17). Certification is completion of all certification activities required by the WIPP Hazardous Waste Permit for acceptance into WIPP and entry into the WIPP Waste Information System. Most of the waste handling operations are performed remotely to minimize exposure of personnel to radioactive materials.

Figure 16. WRAP.

WRAP also performs non-destructive examination (NDE) of TRU waste in standard waste boxes. Boxes not exceeding 2.74 meters long by 1.6 meters wide by 1.7 meters high can be received for NDE and boxes not exceeding 2.43 meters long by 1.5 meters wide by 1.5 meters high can be received for non-destructive assay (NDA) screening.

Figure 17. WRAP TRU Waste Processing Line.

WRAP processing capabilities include amalgamation of mercury (not currently in use), neutralization for pH adjustment, solidification of free liquids, limited macroencapsulation, and loading of CH TRU waste (see Figure 18) into the Transuranic Package Transporter Model 2 (TRUPACT II) for shipment to WIPP (see Figure 19). Expanded waste certification and waste loading capacity for TRUPACT II's will be evaluated to meet M-91-42 and M-91-44 needs.

Figure 18. Loading the TRUPACT II with TRU Waste Drums in WRAP.

Figure 19. TRUPACT II Arriving at WIPP.

T Plant

The T Plant Complex consists of the 221-T Canyon (see Figure 20), the 2706 T Facility, and several support structures. The canyon has internal dimensions of 37 ft wide by nearly 800 ft long. There is 26 ft of clearance between the canyon deck and the crane rails. T Plant processing cells are 17 ft long, 13 ft wide, and 21 ft deep. The T Plant Canyon crane can lift 90,000 lb. Container size in the canyon is limited to less than 22 ft long, 13 ft high, and 18 ft wide. Current activities in the canyon facility include storage, verification, treatment, venting, sampling, and repackaging of CH waste. T Plant capabilities provide capacity using Perma-Cons for MLLW and TRU waste sorting, processing and volume reduction. Perma-Cons are modular containment systems which are attached to make a rigid enclosure. T Plant does not have the capabilities to process RH wastes.

Figure 20. Inside the T Plant Canyon.

Currently T Plant has the capability to repackage 85-gallon CH TRU waste. Approximately 10 percent of the 55-gallon drums over-packed into 85-gallon drums will not be able to be processed through the T Plant PermaCons due to processing limitations including plutonium quanities, weight, sharp items, etc. Modification of WRAP is being evaluated for processing these containers.

The 2706-T Facility was upgraded in 1999 to provide secondary containment and leak detection for wet decontamination operations. Container size in the 2706-T Facility is limited to less than 40 ft long, 14 ft high, and 12 ft wide. The facility is limited to handling CH waste. Current activities at the facility include storage, verification, treatment, venting, sampling, and repackaging of CH waste.

Future SWPC

The future SWPC (either at T Plant or a new facility) will support RH as well as large

container CH MLLW and small/large container CH TRU waste processing that cannot be provided by in-trench treatment, commercial facilities, WRAP and T Plant/2706-T or other facilities. The SWPC will initiate operations in June 2017.

DOE is evaluating the benefits of constructing a new facility to process large container and RH waste rather than modifying T Plant. This study is planned to be complete by March 2008.

MLLW Disposal

Mixed waste is disposed of in the Mixed Waste Trenches (LLBG 218-W-5, Trenches 31 and 34, the ERDF, and Trench 94 [LLBG 218-E-12B]). Trench 94 is for defueled naval reactor compartments. Mixed waste could also be disposed of at an off-site commercial facility. Trench 94 data are not included in this report. Future waste disposal is planned at IDF as well as the mixed waste trenches and ERDF.

Mixed Low-Level Waste Disposal Trenches

The first MWDT (LLBG 218-W-5, Trench 34) was built in 1993, and the second MWDT (LLBG 218-W-5, Trench 31) was built in 1994. Waste storage in Trench 34 began in 1997, and disposal operations began in 1999 after the leachate that is generated from the cell was accepted for treatment at the 200 Area Effluent Treatment Facility (ETF). Waste storage in Trench 31 began in 2003, and disposal was initiated in September 2004. The MWDTs are RCRA-compliant and meet Subtitle-C disposal requirements (see Figures 21 and 22). They have a double-liner system with leachate collection.

Figure 21. MWDT.

A substantial portion of the Hanford Site's RCRA MLLW will be disposed in the MWDTs. Waste for disposal in these units must meet the Hanford Site Solid WAC. As of June 2007, 6,000 m^3 of the MWDTs' combined capacity of 22,300 m^3 has been used (or approximately 27 percent of the combined capacity).

Figure 22. Container Disposal in the MWDT.

Environmental Restoration Disposal Facility

ERDF (see Figure 23) is a RCRA-compliant landfill that is authorized under CERCLA. The landfill is used for disposal of environmental restoration waste being generated from cleanup

activities. ERDF is designed to receive, treat (e.g. macro-encapsulation), and dispose of LLW or mixed waste generated through remediation of the Hanford Site. The landfill opened in 1996 and currently has six cells. The original two cells are filled. Cells 5 and 6 are now in use. Additional cells can be added as needed.

Figure 23. ERDF.

In 2007, an amendment to the ERDF ROD was approved, authorizing for treatment and/or disposal at ERDF of specific Hanford-only waste that is not covered in other existing Hanford agreements. 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.

Integrated Disposal Facility

IDF (see Figure 24) will consist of a single landfill with two separate, expandable cells. One cell will be permitted as a RCRA Subtitle-C-compliant landfill system, with the other cell not permitted. Both landfill cells will include a double liner, a leachate collection and removal system, and a leak-detection system. The landfill liner system will comply with RCRA requirements for hazardous waste landfills. IDF will be designed to allow for future expansion. Each future liner construction project will connect the previously constructed liner and the operations systems and then extend the disposal area. The disposal landfill cover will be designed and located to satisfy the dangerous waste disposal requirements, once a decision is made to construct the final cover over the landfill. IDF operations are required to begin prior to reaching the capacity limitation of the current MWDTs. Current projections show that the MWDTs will be filled in 2020. This fill date assumes no new off-site waste and includes change in volume for stabilization and treatment.

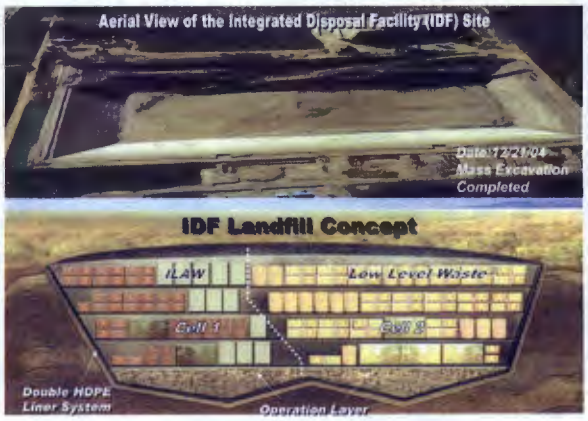

Figure 24. Conceptual Drawing of the Integrated Disposal Facility.

3.2 Planned Approach for MLLW and TRU Waste Management

Retrieval of CH RSW

Retrieval of CH RSW is uncovering CH wastes within DOE's RSW trenches, removing such CH wastes from the trenches, and transferring it to a permitted and compliant-treatment, storage or disposal facility, ERDF, or for waste designated in accordance with WAC 173-303-070 through -100 as non-mixed to a storage or disposal facility that DOE determines is appropriate. Storage of any retrieved CH RSW that has not been designated as non-mixed, pursuant to WAC 173-303-070 through -100, shall include secondary containment pursuant to WAC 173-303-630(7).

Suspect CH RSW is being retrieved and designated. 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. These containers and any release of RSW will require a decision as to how to move forward that is determined through the cleanup process set forth in RCRA, Chapter 70.105 RCW, and/or CERCLA as appropriate.

DOE plans to meet with Ecology to jointly develop a plan for addressing non-RSW before that situation arises.

All CH RSW in the four burial grounds will be retrieved by December 31, 2010. Appendix G includes a flow chart of the waste retrieval process, assumptions, and an overview of the CH RSW retrieval process. The process flow chart identifies major activities and decision points.

In April 2006, concurrent retrieval was approved for all trenches at the four LLBGs (Change Control Form M-91-06-02).

Figure 25. First RSW Drums Retrieved From Trench T4 in January 2004.

The process begins when soil is carefully removed using excavation equipment (see Figures 25 through 27). Monitoring is performed during excavation to identify potential radiological and chemical hazards. Once the waste containers are exposed, they are inspected, verified against waste storage records, and removed from the storage modules for further processing (see Figure 28). Weather enclosures are being utilized to improve retrieval efficiencies (see Figures 29 and 30). Nearly 100 percent of the remaining CH drums are anticipated to require over-packing.

Figure 26. Excavation of RSW Drums.

Figure 27. Excavation of RSW Containers.

Figure 28. RSW Removal and Inspection.

Figure 29. 218-E-12B Weather Enclosure.

Figure 30. RSW Shade Structure.

Once the containers are removed from the trench, measurements are performed to determine whether the waste is TRU or LLW. Containers with low concentrations of transuranic radionuclides are non-destructively assayed to establish the waste as either TRU waste or LLW. If gram levels are "high," the container is assumed to be TRU waste and measurements are not performed at the process area. Any TRU waste drum that is found not to be vented is vented and a filter is installed to prevent pressurization of the TRU waste drum. Waste containers are then moved to CWC for storage or to processing.

Within 90 days from retrieval, both LLW and the TRU waste generated are designated using the same process. In general, the designations of the retrievably stored debris waste are based on acceptable knowledge data packages that have been developed for use in certifying TRU waste per the WIPP WAC. For non-debris waste, additional characterization may be performed in order to manage the waste in the most cost-effective and compliant manner. Lack of acceptable knowledge for waste designation delays less than 20 percent of containers removed from trenches for transfer to storage. Containers that cannot be moved may be left in place temporarily with the approval of Ecology. To date, no containers have been identified that could not be moved.

Fifty-five gallon drums of TRU waste being retrieved are in worse condition than previously assumed in FY 2003 and found in the field in 2004. Thus, fewer waste drums are "directly certifiable." These detoriated drums require placement in 85-gallon over-packs for retrieval, transportation and storage. However, WIPP does not accept 85-gallon drum over-packs because this would result in inefficient use of repository space.

The 85-gallon drums are being stored for reprocessing, which requires more resources than originally assumed in FY 2003 and found in 2004.

DOE has obtained concurrence from Ecology to use the 218-W-4C Processing Area to stage,

sample, assay, designate, and handle the containers retrieved from the 218-W-3A, 218-E-12B, and 218-W-4B burial grounds. At a future date, the process area may be moved to a centralized location (e.g., 218-W-5). The 90-day designation clock for waste coming from these burial grounds to the processing area would not start until waste was transferred from the processing area to a permitted and compliant TSD. This process will allow more efficient use of resources.

Retrieval of RH RSW

Retrieval of RH RSW is uncovering RH wastes within DOE's RSW trenches, removing such RH wastes from the trenches and caissons, transferring it to permitted and compliant treatment, storage or disposal facilities, ERDF, or for waste designated in accordance with WAC 173-303-070 through - 100 as non-mixed to a storage or disposal facility that DOE determines is appropriate. Storage of any retrieved RSW that has not been designated as non-mixed pursuant to WAC 173-303-070 through -100 shall include secondary containment pursuant to WAC 173-303-630(7).

Retrieval of RH RSW will begin by January 1, 2011. Retrieval of non-caisson RH RSW will be completed by December 31, 2014. Retrieval of caisson (see Figures 31 and 32) RSW in 218-W-4B burial-ground will be completed by December 31, 2018. Engineering studies for obtaining capabilities to retrieve RSW RH waste are planned for 2008. The caisson engineering study will provide a schedule of activities to obtain capabilities. Experience obtained from 618-10/11 retrieval activities will be utilized as applicable.

Figure 31. Partially Buried Caisson Loading Chute During Construction.

Figure 32. RSW in a Caisson.

MLLW Treatment

For processing, Hanford will use a combination of capabilities for in-trench treatment, commercial capabilities, T Plant, 2706-T and the SWPC (either at T Plant or a new facility). A process flow diagram for MLLW and TRU Waste is provided in Appendix H (Appendix I provides a summary of the volume changes between PMP revision 3 and revision 2). The current strategy is to use in-trench treatment when possible to minimize significant worker

risks and physical infrastructure limitations associated with opening and processing some of the waste contained in Treatability Group MLLW-07. The majority of the mixed waste containers in LDR Treatability Groups MLLW-02 through 07 and MLLW-09 and 10 will be treated using commercial capabilities. A small portion of the MLLW will be treated at T Plant/2706-T as applicable. Waste that cannot be treated using any of the above capabilities may be processed through the future SWPC (either at T Plant or a new facility). Currently, treatment capabilities have not been identified for MLLW in LDR Treatability Group MLLW-08, Unique Waste. MLLW-08 waste remaining consists of only two drums of waste.

Tentative treatment paths had been identified for all of this waste based on the treatability group categories. However, there is a relatively small population of waste within the various treatability groups that have treatment path challenges. A detailed evaluation is being done on the small remaining population of waste to establish specific paths for the waste on a container-by-container basis. For those containers that do not meet any existing waste acceptance criteria for treatment/disposition, specific regulatory paths and schedules will be identified. If treatment capability is not available, a regulatory path and schedule will be proposed to meet the 2009 commitment in M-91-42.

A review of all containers in storage as of September 30, 2006, is planned to identify treatment paths by container and will be included in the *Remaining Waste Report* to be prepared by March 2008. The schedules for these treatability groups are covered in TPA Milestones M-91-42 and M-91-43.

DOE plans to meet M-91-42 MLLW requirements by using available commercial capabilities and capacities. DOE plans to complete treatment of M-91-42 MLLW (with an available treatment path) in storage as of December 31, 2002, and from retrieval and newly generated M-91-42 MLLW as of June 30, 2009, by December 31, 2009. After this date, M-91-42 MLLW will be treated within one year of generation. DOE is working to establish a disposition path for all currently stored TSCA PCBs MLLW. There are currently limited commercial capabilities and capacities to support the treatment schedules in M-91-42 and M-91-43, as well as limited capabilities/capacities for treatment of MLLW TSCA PCBs.

Commercial Stabilization – Treatment Path for LDR Treatability Group MLLW-02

The treatment path for inorganic non-debris mixed waste is commercial stabilization and is represented in LDR Treatability Group MLLW-02. This waste consists of both solids and aqueous liquids and would primarily be regulated for toxic metal characteristics, corrosivity and/or inorganic Underlying Hazardous Constituents (UHCs) above LDR treatment standards. The waste may also contain organic non-regulated constituents and/or organic regulated constituents below Universal Treatment Standard (UTS) levels.

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 also can include mixing with polymer materials (see Figure 33). This treatment prepares the waste to meet the disposal requirements. Many pretreatment processes may be employed prior to stabilization, such as drying, shredding, screening, and chemical treatments.

Figure 33. Commercial Stabilization of Mixed Waste.

There are several commercial treatment facilities in the United States that can accept the majority of Hanford's waste in this treatability group. Inorganic non-debris waste that cannot be accepted at a commercial treatment unit, due to having too high a radiological inventory (curie content and/or dose rate), are included in the MLLW-07 treatability group and will be treated at the future SWPC. The SWPC will separate nonconforming CH items from the RH waste and ship the items to commercial facilities for treatment. On-site treatment of selected MLLW-02 wastes may also be performed.

Thermal Treatment of Organics – Treatment Path for LDR Treatability Group MLLW-03

The treatment path for organic non-debris MLLW is commercial thermal treatment (see Figure 34) and is represented in LDR Treatability Group MLLW-03. This mixed waste consists of both solids and liquids, and would primarily be regulated for hazardous organic constituents and/or TSCA PCBs. The waste may also contain inorganic regulated constituents that will require additional treatment after organic destruction.

Figure 34. Thermal Treatment Facility in Richland, Washington.

Destruction of the organic constituents can be achieved by various treatment methods including (but not limited to) incineration, vitrification, steam reforming, thermal desorption, pyrolysis, chemical oxidation, and ultraviolet (UV)-oxidation. Several pretreatment processes may be employed prior to thermal treatment, such as drying, shredding, screening, and chemical treatments.

There are only a few thermal treatment facilities in the United States that can accept mixed waste with organic hazardous constituents and/or PCBs, and these facilities are very restrictive on the amount of radiological contamination they can accept in the waste. Additional discussion of the plans for this waste will be included in the *Remaining Waste Report* to be prepared by March 2008. Organic non-debris MLLW that cannot be accepted for treatment at commercial facilities due to radiological concerns is included in MLLW LDR Treatability Group MLLW-07 and may be treated in the SWPC.

Hanford began treating MLLW off-site by thermal treatment methods in 1998 with the treatment of Tri-Butyl Phosphate in Tennessee.

During 2000, O/C MLLW debris was incinerated at WERF at the INEEL site; however, WERF has now been closed and is not expected to operate again.

In 2001, Treatability Group MLLW-03 waste

was treated at a commercial facility located in Richland, Washington. Treatment was performed by using a gasification-vitrification (GASVIT) unit. Due to operational problems of the GASVIT unit and financial problems within the company, the unit was shut down in mid-2001. The GASVIT unit has not been restarted and it is not known at this time if it ever will be restarted.

During 2003, commercial treatment of LDR Treatability Group MLLW-03 commenced at a commercial firm headquartered in Oak Ridge, Tennessee. Treatment was performed by using a combination of thermal desorption process and a combustion process. Waste has been treated each year since and is expected to continue.

Beginning in 2005, commercial treatment of LDR Treatability Group MLLW-03 commenced in Richland by means of treatability studies. Thermal desorption and plasma destruction technologies were used to treat the waste. Treatment of MLLW-03 waste continued through October 2006. Future thermal treatment relies on commercial success at obtaining operational permits for the thermal desorption and plasma systems.

The first 600 m^3 of production was counted against TPA milestones M-91-12 and M-91-12A, both complete. Waste volumes beyond 600 m^3 are tracked and counted against TPA milestone M-91-42.

Commercial Macroencapsulation – Treatment Path for LDR Treatability Groups MLLW-04, MLLW-05, and MLLW-09

The primary treatment path for mixed waste debris and radioactive lead solids is commercial macroencapsulation. These wastes are represented in LDR Treatability Groups MLLW-04 (Hazardous Debris), MLLW-05 (Radioactive Lead Solids) and MLLW-09 (Radioactive Contaminated Batteries). The waste consists of solids and may contain one or more organic and/or inorganic regulated characteristic and listed waste codes. UHC determination is not required since this waste is being treated by the macroencapsulation specified treatment technology as defined in 40 CFR Part 268.42 (for MLLW-05) and 40 CFR Part 268.45 (for MLLW-04 and MLLW-09). Much of the packaged debris waste contains items that are organic-based (e.g., paper, plastic, wood, rubber) in excess of 10 percent by volume. Ecology views these waste packages as meeting the definition of O/C waste that is restricted from land disposal by the State-Only O/C LDR unless the waste is incinerated. Since there is not sufficient incineration capability/ capacity within 1,000 miles of Washington State's borders for this type of waste, Hanford qualifies for, and is currently covered by, the 1,000-mile inapplicability certification for O/C LDR specified in WAC 173-303-140(4)(d)(iii).

Macroencapsulation consists of applying a surface coating of polymeric organics or using a jacket of inert inorganic materials (e.g., cement) to substantially reduce surface exposure to potential leaching media. Hanford has mainly employed the use of Portland cement-based grouts to macroencapsulate this waste. Prior to macroencapsulation, the waste is normally sent through one or more size-reduction steps (e.g., sorting, cutting/shearing, compaction, super-compaction).

Hanford began treating mixed waste debris on-site in 1996 (see Figure 35) and initiated off-site commercial treatment in 1999. Beginning in 2003, commercial macroencapsulation of radioactive lead solids and drained radioactively contaminated lead acid batteries commenced. Hanford has macroencapsulated over 4,800 m^3 of mixed waste through FY 2006.

There are several commercial treatment facilities in the United States that can accept the majority of Hanford's waste in these treatability groups. Debris and radioactive lead solids that cannot be accepted at a commercial treatment unit due to having too high a radiological inventory (curie

content and/or dose rate) are included in the MLLW-07 LDR Treatability Group and are planned for treatment on-site.

Figure 35. On-Site Macroencapsulation of Mixed Waste.

Other debris treatment technologies may be used to process some of the Hanford Site's mixed waste debris (e.g., sealing, microencapsulation, extraction methods).

Mercury Stabilization and Amalgamation – Treatment Path for LDR Treatability Group MLLW-06

Radioactively contaminated mercury waste requires either stabilization or amalgamation. The Hanford Site inventory of mercury-bearing waste is relatively small (represented in LDR Treatability Group MLLW-06), as is the case with the inventories at other sites across the DOE complex. Some of the mercury has already been amalgamated; however, since the amalgamation was done in response to mercury spills from broken equipment (e.g., manometers, thermometers, mercuric switches), no LDR certification is on record to allow disposal at this time.

There are a limited number of commercial treatment units in the United States capable of accepting and treating this waste. Most of Hanford high-concentration mercury wastes have been shipped for commercial treatment. WRAP has processing capabilities for amalgamation of mercury that are not currently in use. Disposition of the remaining mercury-bearing waste for those waste packages that cannot be accepted at one of these commercial treatment units due to having too high a radiological inventory (curie content and/or dose rate) will be treated at the SWPC as Treatability Group MLLW-07 waste. The SWPC will separate nonconforming CH items from the RH waste and ship the items to commercial facilities for treatment.

Treatment Path for LDR Treatability Group MLLW-07

Commercial facilities will be used to treat most CH MLLW in large containers and some RH MLLW. The SWPC will be used to process the remaining large container CH and RH MLLW. Nonconforming CH MLLW items found during SWPC unpackaging will be shipped to commercial facilities for treatment.

Due to significant worker risks and physical infrastructure limitations associated with opening and processing some of the waste contained in Treatability Group MLLW-07, treatment of a portion of MLLW-07 waste is best performed at the place it is to be disposed (i.e., LLBG 218-W-5 T31/T34, ERDF). Waste that falls into this category are very large packages that upon treatment pose a transportation concern, and/or waste packages that have a significant radiological inventory that pose a worker protection concern. The waste would be limited to hazardous debris, chemical stabilization and macroencapsulation under 40 CFR Part 268.45 would 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 in/on containerized mixed waste only. Submittal of modified Part A and a Waste Analysis Plan (WAP) to the regulators is required. DOE has initiated discussions with Ecology on the merits of in-trench treatment in the MWDTs.

Disposition Path for LDR Treatability Group MLLW-08

LDR Treatability Group MLLW-08 (Unique Waste) is waste requiring treatment by unique specified treatment technologies (e.g., recovery of metals, recovery by thermal), or mixed waste with dioxins/furans listed waste codes in which there is no known current treatment capability in the United States. As of January 2007, only two containers of MLLW-08 have been identified in storage: one drum containing dioxins and one drum containing beryllium dust. The path forward for this treatability group is to obtain treatment variances or determination of equivalent treatments (DETs) which will allow treatment of this waste by existing commercial methods and capabilities. DOE will work with Ecology and EPA on the path forward for these wastes. Additional discussion of the plans for MLLW-08 will be included in the *Remaining Waste Report* to be prepared by March 2008.

Deactivation – Treatment Path for LDR Treatability Group MLLW-10

Reactive metals containing radioactive contamination require deactivation as the specified treatment technology under RCRA. Excluding the sodium metal product currently residing at the Fast Flux Test Facility (FFTF) and 200 West Area, the Hanford Site inventory of reactive metal waste is relatively small (represented in LDR Treatability Group MLLW-10). The majority of the reactive metal waste is sodium that is packaged in drums and being stored at the CWC. Some of this waste contains debris material (e.g., piping, pumps, valves) that are contaminated with reactive metals.

A limited number of commercial treatment units in the United States are capable of accepting and treating this waste. Hanford is currently working to procure commercial treatment services for this waste and anticipates initiating shipment and treatment in 2008. Some of the reactive metal waste may not be acceptable at these commercial treatment units due to having too high a radiological inventory (curie content and/or dose rate). Such waste would be included in the MLLW-07 Treatability Group and treated at the SWPC. The SWPC will separate nonconforming CH items from the RH waste and ship the items to commercial facilities for treatment.

MLLW Process Flow Diagrams

Appendix J provides the estimated volumes generated from waste processing. Appendix K provides process flow diagrams for the MLLW treatability groups.

The waste processing flow diagrams contained in Appendix K depict the TSD paths of specific MLLW streams. Major TSD steps are identified and volume adjustments are indicated for processing steps when appropriate. The diagrams are intended to give a broad view of the TSD process while recognizing that individual containers within a waste stream may have unique characteristics or circumstances requiring a different TSD path. The flow diagrams were developed for waste streams with existing TSD paths, and for those still to be developed.

In developing the waste processing flow diagrams, wastes that had the same TSD paths were grouped into waste streams. The MLLW streams identified include:

- CH MLLW in small containers
- LDR Treatment Group MLLW-01, Direct Disposal
- CH MLLW in large containers (MLLW-07), and
- RH MLLW (MLLW-07).

The first step common to all the waste streams is an internal volume conversion. The volumes used within this document are a combination of inventory waste data from SWITS, which are recorded using the internal container dimensions, and forecasted waste data, which use external container dimensions. The waste volumes are converted into internal volumes by applying a 15 percent volume decrease to the

forecasted data. The conversion factor is an averaged value, as the actual factor is container-dependant (e.g., a 55-gallon drum has a 23.5 percent increase, while a large box may have a 10 percent increase).

Steps involving volume increases or decreases are identified with a multiplier in the process step (e.g., 1.25x means the waste volume is increased by 25 percent). Volume increases can result from activities such as repacking resulting in a discarded container and/or packing inefficiencies when placing waste in smaller containers.

It is assumed that during processing, especially involving waste streams that are sorted and/or unpacked, that some of the waste may be reclassified. Steps resulting in either change in handling or change to waste type are identified in the flow diagram. A summary is included in Appendix J of the waste volumes by waste stream and the estimated ending volume by waste type.

MLLW Assumptions

- Commercial treatment capability and capacity is available for LDR Treatability Groups MLLW-02, MLLW-03, MLLW-04, MLLW-05, MLLW-06, MLLW-09, and MLLW-10. A treatment path will be established for disposition for all currently stored TSCA PCBs MLLW.
- Treatment/disposition path forward for MLLW-08 will require regulatory decision (i.e., treatment variances, alternative treatment methods).
- Regulatory approvals to begin In-Trench Treatment in Trench 31 and Trench 34 will be obtained after a modified Part A and a WAP are approved.
- Commercial facilities can treat the majority of M-91-43 MLLW.
- Any M-91-43 production prior to June 2008 can be counted toward the production goals.
- Transportation of M-91-43 containers to commercial facilities is viable.
- The SWPC will be constructed to treat containers that cannot be treated in-trench or commercially. Selected nonconforming CH MLLW items found during SWPC unpackaging will be shipped to commercial facilities for treatment.
- O/C LDR certification exemption will be maintained through the life-cycle of waste treatment.
- For RSW awaiting retrieval, the distribution will be within MLLW-03, MLLW-04 and MLLW-07 (see Tree Chart in Appendix C).
- Permits and WAPs for the SWPC will be required for RH and large container processing capabilities. After Critical Decision One (CD-1) is approved on the SWPC Project, a RCRA permit modification date will be established as part of the SWPC Project schedule. Other permits, such as CWC and WRAP, will be modified as needed with status provided through the Project Manager Meetings.
- DOE obtains Ecology concurrence to move the staging area to a centralized location (e.g., 218-W-5). The 90-day designation clock for waste coming from these burial grounds to the processing area would not start until waste was transferred from the processing area to a permitted and compliant TSD.

TRU Waste Processing

The primary facilities in which TRU waste processing operations take place are CWC, WRAP and T Plant. Appendix L provides a flowchart of the Hanford CH TRU waste process and assumptions used for WIPP certification activites. CWC facilities utilized include several warehouse-type buildings for the storage of waste containers. WRAP capabilities utilized include drum and box non-destructive examination; drum and box non-destructive assay; gloveboxes for visual examination, repackaging and compaction of drums, TRUPACT II loading, and waste storage. The 2404-WC

building provides climate control to facilitate head-space gas sampling operations. Head-space gas analysis is performed at the Waste Sampling and Characterization Facility (WSCF). T Plant capabilities utilized include the repackaging of drums in Perma-Con structures in the T Plant canyon. The 2706-T facility is utilized to provide limited capability for drum venting.

The degraded condition of virtually all the waste containers retrieved, and the high percentage of containers that are discovered containing prohibited items or multiple layers of confinement, has resulted in a significant increase in waste requiring processing. This labor-intensive process increases the cost of processing per cubic meter. Also, due to WIPP not accepting 85-gallon drums for disposal, it is planned that all 85-gallon drums produced from retrieval will require repackaging in T Plant prior to being certified. In addition, WRAP may be modified to support processing of these containers.

Quickscan NDE is used to identify containers with prohibited items or other non-compliant conditions. It is assumed that 35 percent of the RSW stored drums (and one percent of newly generated waste) fall into this category and the percentage varies by waste stream. The rejected drums are repackaged at WRAP or T Plant. In FY 2007, characterization and certification operations are expected to produce 400 m^3 of certified waste (100 m^3 from WRAP repack, 200 m^3 from T Plant repack, and 100 m^3 from newly generated/not requiring repack).

DOE is increasing capacity for processing of M-91-42 CH TRU waste and CH TRUM to certify stored, retrieved, and newly generated wastes (in permitted storage as of July 1, 2011) by the end of 2011. After this date M-91-42 TRUM waste will be certified within one year of generation. Current planning assumes resources to operate CH TRU waste drum repackaging lines with capabilities to process 100 m^3 per year at WRAP, 100 m^3 per year of waste not requiring repackaging (including newly generated waste), and 400 m^3 per year at T Plant. The M-91-42 CH TRU waste processing rate will be increased to 700 m^3 per year for FY 2009 through the end of 2011.

During FY 2007, the WRAP and T Plant repackaging lines will be operated on a single shift. In mid-2007, additional funds were provided to expand T Plant capacities. Planning for 2008 assumes resources to operate three CH TRU waste drum repackaging lines (one at WRAP on a simgle shift and two at T Plant on two shifts). This provides nominally 100 m^3 per year at WRAP and 400 m^3 per year at T Plant, and 100 m^3 of waste that does not require repackaging. During FY 2008 the T Plant repackaging lines operations will be increased to operate on two shifts.

Prior to the construction of the SWPC, DOE is evaluating alternatives to establish off-site and on-site processing capability for selected CH TRU waste in containers (generally less than 10 m^3). A subset of these containers with lower plutonium levels is being assessed for shipment and processing off-site. On-site alternatives being studied include "hands-on" processing using special protective clothing/equipment such as bubble-suits and use of limited remote systems. This new capability is being pursued to support the M-91-44 commitment to process/ certify TRUM waste at a rate of 300 m^3 per year by June 30, 2012.

DOE is evaluating establishing on-site capability for direct-loading of certified RH TRU waste into WIPP shipping containers/casks that is independent from future capabilities to process RH TRU waste. This capability would assure that processing operations for waste sorting and size reduction are not rate limited by RH TRU waste loading operations. In additon, DOE will pursue opportunities to ship RH TRU waste in 10-160B casks prior to establishing new RH-72B capabilties.

Futhermore, DOE is evaluating the alternative of constructing a facility to process large container

and RH waste rather than modifying T Plant. This study is planned to be complete by March 2008.

Commercial capabilities will be used as appropriate to augment on-site capabilities. Transportation of TRU waste off-site will require agreement consistent with the 2003 MOU between the Western Governors Association and U.S. Department of Energy Headquarters (DOE-HQ) on transuranic waste shipments.

WIPP Prohited Items

Items prohibited from WIPP disposal include the following:

- Liquid Waste: Waste shall contain as little residual liquid as is reasonably achievable by pouring, pumping and/or aspirating, and internal containers shall contain less than one inch or 2.5 cm of liquid in the bottom of the container. Total residual liquid in any payload container (e.g., 55-gallon drum or standard waste box) shall not exceed 1 percent volume of that container. Residual liquids containing PCBs are prohibited at WIPP. This waste stream does not contain waste designated with Hazardous Waste Number U134.
- Corrosives
- Reactives
- Ignitables
- Pyrophorics
- Explosives
- Compressed gases (pressurized containers)
- Sealed containers greater than four liters (nominal), except for Waste Materials Type II.2 packaged in metal containers.
- PCBs not authorized under an EPA PCB waste disposal authorization.
- Non-TRU hazardous waste.
- Wastes incompatible with backfill, seal and panel closures materials, container and packaging materials, shipping container materials, or other wastes.
- Sharp/heavy objects in the waste that are not blocked, braced, or suitably packaged as necessary to provide puncture protection for the payload container packaging those objects.
- Waste that has ever been managed as high-level waste and waste from tanks specified in HNF-2599, Table B-8, unless specifically approved through a Class 3 permit modification.
- Any containers found during the characterization process to contain any of the above prohibited items will be segregated and the condition will be corrected. Because no prohibited articles are allowed for shipment to WIPP, any container with these items will be repackaged or the prohibited item will be treated or removed prior to certification. Only certified containers will be shipped to WIPP for disposal.

WIPP-Approved Waste Streams

In order for TRU waste to be disposed at WIPP, information is required on specific waste streams by WIPP. The extent of these efforts are significant especially on the large number of small-volume waste streams. Approximately 70 percent of the M-91-42 CH TRU/TRUM waste currently in permitted storage is included in a WIPP-approved waste stream. Plans are to obtain WIPP waste stream approval for an additional 23 percent of the stored waste in the next two years. Approval of the remaining waste streams will be completed by mid-2011 to support waste certification. Gaining waste stream approval for the remaining 30 percent of the waste on the schedule will require a minumum of 12 solid sampling and analysis events, currently conducted at Idaho National Laboratory (INL). WIPP-approved waste streams include:

- CFFD (Kerr McGee Debris)
- HASH (Hanford Incinerator Ash)
- MPFPD (Mixed Plutonium Finishing Plant [PFP] Debris)

- MPUREXD (Mixed Plutonium Uranium Extraction [PUREX] Debris)
- NPFPD (Non-mixed PFP Debris)
- NPUREXD (Non-mixed PUREX Debris)
- RFASH (Rocky Flats Ash)
- RLCBWD (Consolidated Babcock and Wilcox Debris)
- RLM233SD (Mixed 233S Debris)
- RLM308D (Mixed 308 Debris)
- RLM325D (Mixed 325 Debris)
- RLMVIPAC (Vibratory Packed Fuel Debris)
- RLMWARD (Westinghouse Advanced Reactor Division [WARD] Debris)
- RLSWOCD (Solid Waste Operations Complex Debris)
- SSC (Sand, Slag, and Crucible).

The waste streams slated for near-term approval (by 2009) include:

- RLM231ZD (Mixed 231-Z Debris)
- RLM300D (Mixed 300 Area Debris)
- RLMGEVALD (Mixed GE Vallecitos Debris)
- MPFPD-F00X (Mixed PFP Debris with F00X HWNs)
- RLETECD (ETEC/ESG Debris)
- KEBASIN01 (NLOP Sludge from K Basin)
- RL216Z9 (Homogeneous Waste from 216Z-9 Crib)
- RLM209ED (Mixed 209E Debris)
- RLMPUNIT (Absorbed Plutonium Nitrate Solutions from PFP)
- S3000CFDD (Kerr McGee Debris)
- S3000MPFP (Mixed PFP)
- S3000RLM300 (Mixed 300 Area)
- S3000RLM325 (Mixed 325).

TRU Waste Process Flow Diagrams

Appendix J provides the estimated volumes generated after completion of waste processing. Appendix M provides process flow diagrams for the TRU waste treatability groups.

The waste processing flow diagrams contained in Appendix M depict the TSD paths of specific TRU waste streams. Major TSD steps are identified and volume adjustments are indicated for processing steps when appropriate. The diagrams are intended to give a broad view of the TSD process while recognizing that individual containers within a waste stream may have unique characteristics or circumstances requiring a different TSD path. The flow diagrams were developed for waste streams with both existing TSD paths and for those still to be developed.

In developing the waste processing flow diagrams, wastes that had the same TSD paths were grouped into waste streams. The TRU waste streams identified include:

- CH TRU waste in small containers
- CH TRU waste in large containers
- RH TRU waste

The first step common to all the waste streams is an internal volume conversion. The volumes used within this document are a combination of inventory waste data from SWITS, which are recorded using the internal container dimensions, and forecasted waste data, which use external container dimensions. The waste volumes are converted into internal volumes by applying a 15 percent volume decrease to the forecasted data. The conversion factor is an averaged value as the actual factor is container dependant (e.g., a 55-gallon drum has a 23.5 percent increase, while a large box may have a 10 percent increase).

Steps involving volume increases or decreases are identified with a multiplier in the process step (e.g., 1.25x means the waste volume is increased by 25 percent). Volume increases can result from activities such as repacking resulting in a discarded container and/or packing inefficiencies when placing waste in a smaller container.

It is assumed that during processing, especially involving waste streams that are sorted and/or unpacked, some of the waste may be

reclassified. Steps resulting in either change in handling or change to waste type are identified in the flow diagram. A summary of the waste volumes by waste stream and the estimated ending volume by waste type is included in Appendix J.

TRU Waste Assumptions

- Increased capacity is established for processing M-91-42 TRU waste to complete the backlog of waste by the end of 2011.
- Solids sampling and analysis necessary to support the development of new waste stream profiles will continue to be provided by INL as needed to meet the 2011 schedule. There is no significant increase in the number of waste streams requiring approval.
- Off-site processing capability is established for selected M-91-44 CH TRU waste in containers generally less than 10 m^3 to support processing at a rate of 300 m^3 per year beginning no later than June 30, 2012.
- Any waste certification prior to June 2012 can be counted towards M-91-44.
- On-site processing capability is established for selected M-91-44 CH TRU waste in containers generally less than 10 m^3 to support processing at a rate of 300 m^3 per year by the end of 2013.
- The SWPC is constructed and operation initiated by June 2017.
- WIPP remains open through 2032.
- WIPP provides timely approval of waste streams, including waste stream consolidation, to support Hanford TRU waste certification.
- Permits and WAPs for SWPC will require revision to incorporate the addition of RH and large container processing capabilities. After CD-1 is approved on the SWPC Project, a RCRA permit modification date will be established as part of the SWPC Project schedule. Other permits, such as CWC and WRAP, will be modified as needed with status provided through the Project Manager Meetings.
- DOE obtains Ecology concurrence to move the staging area to a centralized location (e.g., 218-W-5). The 90-day designation clock for waste coming from these burial grounds to the processing area would not start until waste was transferred from the processing area to a permitted and compliant TSD.
- More detailed assumptions are provided in Appendix L and M.

3.3 Work Breakdown Structure

The following Work Breakdown Structure (WBS) elements are applicable to the MLLW and TRU waste discussed in this PMP. The elements are included in the Waste Management Project WBS Hierarchy for Project Baseline Summaries (PBS) in RL-0013 and RL-0080. The WBS dictionary sheets identify scope of activities covered under the WBS, planning assumptions applicable for planning the work scope, functions and requirements that define the WBS work scope, and source documents that drive the requirements. The WBS information below is current as of August 2007, but is subject to changes resulting from contract revisions. Appendix N provides an appended dictionary brief description of each WBS element. Appendix O provides the funding profile required to perform the work in this PMP by WBS element.

WBS	Title
4.2.2	CWC
4.2.3	WRAP
4.2.4.1	Operate and Maintain T Plant
4.2.4.3	M-91 Facility Activities
4.2.8	LLBGs
4.2.9	MWDTs
4.2.10	MLLW Treatment
4.2.11	TRU Retrieval
4.2.12	WIPP Certification
4.2.13	Project Management
4.2.15	Solid Waste Processing Complex

3.4 Treatment and Storage Capability/Capacity and Processing Schedules

The MLLW and TRU waste discussed in this document have varying treatment requirements and processing options. In order to demonstrate the path-forward for the MLLW and TRU waste, the wastes have been categorized into groups having similar treatment or processing options, and annual processing rates for each group have been estimated. The annual processing rates were developed based on TPA milestone commitments, budget considerations, and treatment availability. The charts in appendices P, Q, and R provide processing rates and available waste volumes in inventory for each waste group. A brief description is provided of how the rates were developed.

Volume Determination

The following descriptions clarify how volumes are determined in different cases:

- Retrieval volumes are 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 towards "retrieval" would be 55-gallons (0.208 m^3), even if in the process of retrieval, the drum needed to be over-packed into an 85-gallon drum.
- The volumes of waste in "storage" are listed as the container size that the waste is stored within. For example, a 55-gallon drum over-packed in an 85-gallon drum would be counted as 85-gallons in storage.
- The volumes of "treated" MLLW are counted as the retrieval volume (for wastes generated from retrieval), or the MLLW pre-treatment container volume (for newly generated and stored waste).
- The volume of transuranic waste counted as "certified" is 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 is counted.

MLLW

<u>LDR Treatability Groups MLLW-02 through MLLW-06, and MLLW-08 and MLLW-10</u>

Processing schedules are provided in Appendix P for M-91-42 CH MLLW (LDR 02-06 and 08-10).

The waste in this processing group includes newly generated CH MLLW, retrieved CH MLLW (excluding large boxes), and CH MLLW in above-ground storage (excluding large containers and LDR treatment group MLLW-01). Approximately 6,500 m^3 of waste is estimated to be part of this group with an additional 4,900 m^3 of waste that may be reclassified or generated during the processing of other waste streams.

<u>LDR Treatability Group MLLW-07</u>

Processing schedules are provided in Appendix P for M-91-43 CH MLLW in large containers and RH MLLW. Commercial facilities will be used to process M-91-43 waste containers of CH MLLW. The March 2008 study will also evaluate alternatives for processing this waste. The SWPC will be used to process RH MLLW or large containers of CH MLLW that cannot be processed in-trench or off-site.

This processing group includes waste in LDR Treatment Group MLLW-07, which includes CH MLLW in large boxes (greater than 10 m^3) and RH MLLW requiring treatment prior to disposal. Approximately 4,100 m^3 of waste is estimated to be part of this group. As of August 2007, 194 m^3 of this large CH MLLW has been processed. Expanded use of commercial capabilities will be used to treat M-91-43 MLLW to support the M-91-43 treatment rate of 300 m^3 per year. Processing of the remaining waste will

begin in 2017 at 300 m^3 per year and remain constant until backlog inventory is completed, at which time the processing rate is equal to the forecasted volume.

TRU Waste

M-91-42 CH TRU Waste

Appendix Q includes processing schedules for processing CH TRU waste in drums and SWBs and CH TRUM waste in drums and SWBs.

This processing group includes CH TRU waste in 55-gallon drums (including over-packed drums), containers smaller than a 55-gallon drum, and SWBs. Approximately 10,600 m^3 of waste is estimated to be part of this waste group.

The annual certification rates for this group are 400 m^3 in 2007, 600 m^3 in 2008, 700 m^3 per year for 2009, 800 m^3 per year for 2010, and 1,100 m^3 in 2011.

Beginning in 2012, the annual volume certified is a direct result of the volume forecast for that year.

M-91-44 TRU Waste

Appendix Q includes processing schedules for processing CH TRUM waste in large containers and RH TRUM waste, and CH TRU waste in large containers and RH TRU waste.

This processing group includes CH TRU waste in containers larger than 55-gallon drums (excluding SWB and over-packed 55-gallon drums in 85-gallon drums) and RH TRU waste. Approximately 7,800 m^3 of waste is estimated to be in this group.

Certification of waste in this group commences in 2012 at a rate of 150 m^3 per year, continues at a rate of 300 m^3 per year through 2019, and increases to 800 m^3 per year through completion of certification. A variety of capabilities are used to certify this waste for WIPP disposal. Commercial capabilities are introduced in 2012 at a rate of 150 m^3 per year with a total of 600 m^3 of waste certified. "Hands-on" processing capabilities begin in 2013 at a rate of 150 m^3 and are used to certify 1,000 m^3 of waste. The SWPC provides certification capability for CH waste starting in 2018 at a rate of 150 m^3 per year and increase to 600 m^3 per year to process the remainder of the CH waste. Direct loading of certified RH TRU waste begins in 2015 at a rate of 50 m^3 per year. The SWPC provides an additional 200 m^3 per year certification capability for RH waste starting in 2020.

Inventory of Non-Processed Waste

An inventory of non-processed waste is provided in Appendix R. Most of this waste inventory is in storage at CWC.

Appendix R provides the annual inventory of MLLW and TRU waste in above-ground storage that has not been processed or certified. Waste in retrievable storage is not included in the inventory until after it has been retrieved. In a given year, the inventory is a function of the waste volume in storage from the previous year, the waste added from forecasted waste and retrieved waste, minus the waste processed in that year. Waste that has been processed, but not disposed (e.g., TRU waste processed awaiting shipment to WIPP) is not included in the inventory.

4.0 PROJECT CONSTRAINTS

4.1 M-91 Series Milestones

The TPA contains milestones for treatment of mixed waste, retrieval of RSW, and acquisition of capabilities and/or facilities to treat RH and large container CH MLLW and large CH TRU waste. Appendix S includes M-91 milestones

with draft Change Package M-91-07-01.

The M-91 series milestones include 1) retrieval of post-1970 retrievably stored "suspect" TRU waste, 2) acquisition of capabilities and/or facilities to process/treat MLLW and TRU waste, and 3) treatment/processing of MLLW and TRU waste.

Since completion of the M-91 negotiations in 2003, DOE has met 37 of 39 M-91 requirements on or ahead of schedule. Accomplishments include 5,600 m^3 of "suspect" TRU waste retrieved, over 5,600 m^3 of MLLW treated, and 600 m^3 of MLLW thermally treated (M-91-12). Only the December 31, 2006 M-91-42I milestone of 3,000 m^3 has not been completed. Over 2,600 m^3 of CH TRU waste has been certified as July 26, 2007. A strategy change is being implemented to increase capacity to certify CH TRU waste.

4.2 Building Blocks of Scope and Cost for FY 2008

Building blocks of scope and funding are estimated to assist possible adjustments needed if FY 2008 funding obtained is different than the identified funding profile. This PMP assumes the President's budget for FY 2008. FY 2009 funding and beyond is assumed to be unconstrained. A life-cycle funding profile is provided in Appendix O. Building blocks for FY 2008, both higher and lower than the President's budget, are as follows:

Higher:

- Three building blocks of 500 m^3 of M-91-42 MLLW treatment at $10.3M each

Lower:

- TRU Certification of 100 m^3 at $4.5M
- TRU Retrieval of 100 m^3 at $1.5M
- Deferral of Acquisition of M-91 Processing Capabilities
  - Defer conceptual design at $6.0M
  - Defer technology development at $2.7M
  - Defer on-site large container CH TRU processing at $2.0M

4.3 External Schedule Requirements

Waste Volumes and Treatment Capacities

Total forecast volumes through 2035 and waste volumes currently in storage at the Hanford Site form the basis for the evaluation of TRU waste and MLLW processing capabilities discussed in this PMP. The evaluation determined that the current and planned capabilities for TRU waste and MLLW processing are "reasonable" based on the current and future waste generation volumes. However, there is inherent uncertainty associated with waste forecasts due to changes experienced in the waste generator's program baselines.

Regulatory Requirements

Regulatory requirements for permitting and NEPA documentation will be coordinated to minimize potential impacts to the TPA schedule and achievement of milestones. Environmental impacts from performing M-91-00 activities, such as construction or modification of an existing facility, have been analyzed in the Hanford Site Solid Waste Program Environmental Impact Statement (HSW-EIS). Revisions to air permits will be completed to support start up of operations.

Funding Constraints

The M-91 work scope baseline is limited to, and consistent with, the President's FY 2008 budget, and unconstrained in FY 2009 and beyond. Section 4.2 provides building blocks of scope and funding to identify possibilities for how the

baseline might be changed, based on actual funding levels obtained in FY 2008. This guidance is incorporated into the life-cycle baseline when received.

Technology Development/Constraints

Characterization Constraints

Characterization of some of the waste in storage, RSW, and waste from other cleanup operations is limited by available technology and facilities. Specifically, non-destructive examination (x-ray) and nondestructive assay capability for RH waste will need to be developed to support characterization efforts. The SWPC design will address this technology constraint.

Treatment Technology/Capacity Constraints

MLLW

Some of the stored waste and potentially some of the waste forecasted to come from generators and/or RSW have attributes for which there is limited treatment capability/capacity or no treatment capability in the United States. The following LDR Treatability Groups may have waste with treatment constraints:

- MLLW-03, Organic Non-Debris Wastes

From a volume standpoint, commercially available thermal treatment of MLLW is very limited, especially for MLLW containing TSCA PCBs. Currently, only two companies offer thermal treatment serves for MLLW, none for TSCA PCB MLLW. All have their own specific permit/license limitations.

The commercial operation in Richland has been performing MLLW thermal treatment since 2005 under treatability study provisions. The quantity of waste it could process was significantly restricted. In December 2006, the Richland firm ceased treatability studies so it could initiate the permitting process on its thermal treatment units. It cannot operate its thermal treatment units until the permitting process is complete (typically requires one to two years to complete).

Another commercial firm located in Utah can only receive Nuclear Regulatory Commission (NRC) Class A waste. Since the majority of the Hanford MLLW exceeds Class A limits, its thermal treatment processing capability is of limited benefit. In addition, since the Utah firm does not have a way to destruct the thermal desorption condensate it generates, it needs to rely on the TSCA Incinerator or a commercial MLLW treatment facility to disposition this condensate.

The Oak Ridge-headquartered commercial firm has the most extensive thermal treatment capability available; however, it has a significant backlog of MLLW to process from other DOE and commercial MLLW generators. This back-log limits the amount of Hanford waste it can receive at any given time. In addition, the Oak Ridge firm has fairly low dose rate limits that it can accept and process, which further restricts the type and amount of Hanford MLLW it can receive.

- MLLW-08, Unique Wastes

As discussed in Section 3.2, Planned Approach for MLLW and TRU Waste Management, mixed waste in LDR Treatability Group MLLW-08 will require regulatory involvement to find an effective disposition path. Alternative treatment and/or variances currently will be required before the waste can be disposed.

TRU Waste

Critical to the successful design, construction, startup and operation of the SWPC is the selection, adaptation, testing, and integration of systems, equipment and tools for the SWPMs. While many of the systems and equipment that will be used to process this waste are commercially available, they are almost all

custom manufactured for the payload size, type, and motion required for the SWPC and have not all been used in an integrated fashion similar to the one being proposed. Selection of remote systems, equipment, and tools will require analysis of how a given system must interact with other systems and its mechanical, electrical/ utility, vision, communications, and operator interfaces. A cold mockup will be required for testing the integrated system, selecting and testing of individual tools, operator training, and task/operational planning.

Technologies for retrieval and assay of RH RSW need to be developed.

5.0 SCHEDULE AND CRITICAL PATH ANALYSIS

5.1 Logic-Tied Life-Cycle Schedule

The M-91 PMP Schedule is presented in Appendix T. The schedule includes logic ties from Waste Retrieval and Acquisition of New Capabilities into the Waste Processing section of the schedule. The schedule is grouped into the four sections discussed below.

Suspect TRU Waste Retrieval

Retrieval activities for CH and RH wastes are presented, and are covered by TPA Milestones M-91-40 and M-91-41. Proposed retrieval schedules and commitments have not changed from existing TPA requirements. Retrieval operations will generate CH and RH wastes in a variety of packages, which input into waste processing.

Waste Processing

Waste processing activities are presented in the second section of the M-91 PMP schedule. TPA Milestones M-91-12, M-91-42, M-91-43, and M-91-44 are covered. Wastes to be processed are generated from retrieval operations, as well as waste already in storage and wastes to be generated. Production rates are included, as well as specific completion dates. The baseline completion date for waste processing of 2028 has not changed.

Acquisition of New Processing Capabilities

This section of the M-91 PMP schedule presents plans consistent with the TPA to acquire new processing capabilities. Included are plans to expand commercial processing capabilities for treatment of MLLW and TRU waste. Commercial capabilities for processing MLLW 02-06 and MLLW Treatability Groups 08-10 are also being expanded under the M-91-42 milestone. This section also includes plans for in-trench treatment of M-91-43 MLLW, establishing on-site capability to process CH TRU waste in containers generally less than 10 m^3, establishing on-site capability to load RH TRU waste for shipment to WIPP, and establishing on-site capability to process the remaining CH and RH waste at the SWPC.

Reporting

The fourth section of the M-91 PMP schedule provides a summary of significant reporting requirements for the M-91 series milestones.

5.2 Critical Path Analysis

The M-91 PMP schedule identifies the acquisition of SWPC capabilities as the critical path. SWPC will begin operations June 2017. The scheduled date for completion of waste processing has not changed.

6.0 KEY DELIVERABLES /PRODUCTS

Key deliverables/products that will be developed in support of M-91 work scope include:

- Annual reports describing completed and scheduled work relating to M-91 milestones, including status against the commitments in the schedule (M-91-45).
- Annual revisions of this PMP will be submitted on June 30 every year starting in 2008 and continuing until the M-91 milestones are completed. The President's budget, which is issued each February, will be incorporated in the June PMP revisions.

7.0 PERFORMANCE MEASUREMENT

7.1 Milestones and Accomplishments

Performance to meet the M-91 milestones is measured using a combination of traditional project management metrics such as cost and schedule performance. In addition, monthly metrics of mixed waste and TRUM waste retrieval, treatment, certification, and storage are tracked against the milestones to ensure that regulatory commitments are met.

8.0 PROJECT CONTROL

System and technical requirements will be made consistent and traceable throughout the WBS as these requirements are developed during the engineering and planning phases of the project. The control system activities will be compatible with DOE 413.3A and related project management activities.

8.1 Project Interface Control

Project interfaces will be controlled by interface control document (ICD), Memorandum of Agreement (MOA) or the MOU process when applicable. The definition of roles, responsibilities, and authorities will be negotiated based on the type of interface management documentation to be developed.

Interface among the M-91-03 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 is a list of waste activities and projects that will require interface:

- Waste Generating Programs
- Office of River Protection
- WRAP Facility
- Suspect TRU Waste Retrieval
- ERDF
- IDF.

The waste forecasting system and the WAC are operating as interface controls.

8.2 Reporting and Notification Requirements and Processes

Reporting requirements in the TPA are described in TPA Section 4.0, Agreement Management. The primary interface for reporting and notifications is through the DOE Project Managers and to their regulator counterparts or through the Interagency Management and Integration Team (IAMIT). Monthly M-91 Project Manager Meetings are held. The roles and responsibilities for the Project Manager and IAMIT are contained in TPA Sections 4.1 and 4.2, respectively.

A reporting system has been implemented to provide the status relative to meeting all TPA milestones associated with M-91-03 TRUM Waste and MLLW. Currently, the report is called the Waste Activity Report, and is typically provided to the Ecology Project Manager on a monthly basis. The system will maintain a standardized structure to measure progress against established schedules.

9.0 CHANGE MANAGEMENT

TPA Change Management

Changes to the M-91 PMP will be in accordance with the TPA Action Plan, Section 9, Documentation and Records, Section 9.3, Document Revision. 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 Action Plan.

Annual revisions of this PMP will be submitted on June 30 every year starting in 2008 and continuing until the M-91 milestones are completed. The President's budget, which is issued each February, will be incorporated in the June revisions to the PMP. The PMP revisions shall include plans and schedules to address all the requirements set forth in the M-91 milestone series. Each revision of the M-91-03 PMP shall, upon approval by Ecology, supersede previous M-91-03 PMPs. Each revision is a distinct work requirement independently subject to the enforcement provisions of this agreement.

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.

Life-Cycle Baseline Change Management

The Baseline Change Management process includes uniform mechanisms by which changes to the project are identified, quantified, approved, and implemented. The processes include the use of both Deviation Notices (DN) and Baseline Change Requests (BCRs).

A DN is the formal documentation of a potential deviation from the FH expected cost, schedule, or scope but does not change FH's current baseline documents (technical baseline, cost baseline, schedule baseline, and related elements of the contract, i.e., the Project Hanford Management Contract [PHMC] plus approved changes). The DN is used as a communication tool and a decision-making tool. The deviation may be the result of changes in planned productivity, rates, or rework. The deviation may be an increase, a decrease, or a change in cost-time phasing. A DN may result in preparation of a BCR.

BCR is the formal documentation that identifies a change to the FH baseline (technical baseline, cost baseline, schedule baseline, and related elements of the PHMC). The BCR may be the result of DOE-initiated changes, changes to laws and other governing documents, the result of changed conditions (e.g., safety issues, preexisting conditions), or in accordance with

other changes as defined in the PHMC.

Logs are maintained to track changes documented in DNs and BCRs. The logs contain, at a minimum, the assigned numbers, description of the change, impacts, and document status dates. Other pertinent information is included as appropriate. A master log is maintained by the projects and/or functional organization code (FOC) managers. Those BCRs that can be approved and implemented by FH without DOE approval are referred to as internal BCRs. Those BCRs that require DOE approval are referred to as external BCRs.

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APPENDIX A

GLOSSARY AND DEFINITION OF ACRONYMS AND TERMS

Definitions as discussed in this plan are as follows:

- Small Containers and Large Containers

  Small containers and large containers have different meanings depending on whether they are used in reference to MLLW/LLW or transuranic waste.

  When referring to MLLW/LLW, small containers are containers less than 10 m^3, including 55-gallon drums. A large container is anything not defined as a small container.

  When referring to transuranic waste, small containers are 55-gallon drums or smaller containers even if over-packed in 85-gallon drums, and newly generated WIPP SWBs. A large container is anything not defined as a small container.

- Certification

  Certification is completion of all certification activities required by the WIPP Hazardous Waste Permit for acceptance into WIPP and entry into the WIPP Waste Information System.

- Designation

  Designation is the process for determining: (1) which containers of LLW are MLLW; and, (2) which containers of transuranic waste are transuranic mixed waste (CH TRUM or RH TRUM). Designation of waste will be performed pursuant to WAC 173-303-070 through 100. These regulations allow the use of "Acceptable Knowledge," surrogate sampling and other measures for designation to minimize workers' radiation exposure and to reduce costs. Where applicable, DOE intends to use information gathered through the certification of transuranic waste in support of its designation of related LLW streams. Where appropriate, DOE will use measures allowed under state and federal regulations to perform accurate and cost effective designations of LLW.

- Low-Level Waste

  Low-level waste (LLW) is radioactive waste that is not spent fuel, high-level waste, transuranic waste, byproduct material, or naturally occurring radioactive material. LLW includes both MLLW and non-MLLW. LLW can be CH or RH.

- Mixed Low-Level Waste

  Mixed Low-Level Waste (MLLW) is LLW that is subject to RCRA or Chapter 70.105 of the RCW. Non-MLLW is LLW that is not subject to RCRA or Chapter 70.105 of the RCW. MLLW can be CH or RH.

- Contact-Handled Waste

  Contact-handled (CH) waste is a waste package with a surface dose rate of less than or equal to 200 millirem per hour.

- Remote-Handled Waste

  Remote-handled (RH) waste is a waste package with a surface dose rate greater than 200 millirem per hour.

- Retrievably Stored Waste

  Retrievably stored waste (RSW) is waste that is or was believed to be contaminated with significant concentrations of transuranic isotopes 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. During the retrieval process, containers of RSW will be segregated into two categories: (1) CH RSW and (2) RH RSW. Subsequent analysis and categorization of the RSW pursuant to RCRA, Chapter 70.105 of the RCW, the Atomic Energy Act, and

the WIPP Land Withdrawal Act will result in most or all of this waste being classified as one of the following types of waste: CH LLW, RH LLW, CH MLLW, RH MLLW, CH TRU, CH TRUM, RH TRU, or RH TRUM. 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, the decision as to how to move forward will be determined through the cleanup process set forth in RCRA, Chapter 70.105 of the RCW, and/or CERCLA as appropriate. Those processes may result in additional requirements for the remediation of such wastes.

- Caisson Waste

  Caisson waste is RSW in the 218-W-4B burial ground caissons alpha-1 through alpha-4.

- Transuranic Waste

  Transuranic waste is waste that meets the definition in subsection (18) of Section 2 of the WIPP Land Withdrawal Act, Pub. L. 102-579. Transuranic waste includes both mixed transuranic (TRUM) waste and non-mixed transuranic (TRU) waste, and comprises the following categories: CH TRU, CH TRUM, RH TRU, and RH TRUM.

- Retrieval of CH RSW

  Retrieval of CH RSW is uncovering CH wastes within DOE's RSW trenches, removing such CH wastes from the trenches, and transfer to a permitted and compliant treatment, storage or disposal facility, ERDF or for waste designated in accordance with WAC 173-303-070 through -100 as non-mixed to a storage or disposal facility that DOE determines is appropriate. Storage of any retrieved CH RSW that has not been designated as non-mixed pursuant to WAC 173-303-070 through -100 shall include secondary containment pursuant to WAC 173-303-630(7).

- Retrieval of RH RSW

  Retrieval of RH RSW is uncovering RH wastes within DOE's RSW trenches and caissons, removing such RH wastes from the trenches and caissons, transfer to permitted and compliant treatment, storage or disposal facility, ERDF or for waste designated in accordance with WAC 173-303-070 through -100 as non-mixed to a storage or disposal facility that DOE determines is appropriate. Storage of any retrieved CH RSW that has not been designated as non-mixed pursuant to WAC 173-303-070 through -100 shall include secondary containment pursuant to WAC 173-303-630(7).

- Volume Determination

  The following descriptions are provided to clarify how volumes are determined in different M-91 contexts and to be consistent with the volumes of wastes listed in the Hanford Site SWITS:

  - 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 towards "retrieval" would be 55-gallons (0.208 m^3), even if in the process of retrieval the drum needed to be over-packed into an 85-gallon drum.

  - The volumes of waste in "storage" will be listed as the container size that the waste is stored within. For example, a 55-gallon drum over-packed in an

85-gallon drum would be counted as 85-gallons in storage.

- The volume of MLLW "treated" will be counted as the retrieval volume or the MLLW pre-treatment container volume for newly generated and stored waste.

- The volume of transuranic 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.

Acronyms and Definitions

AEA – Atomic Energy Act

AEC – Atomic Energy Commission

BCR – Baseline Change Request

BDAT – Best Demonstrated Available (treatment) Technology

CBFO – Carlsbad Field Office

CD – Critical Decision

CERCLA – Comprehensive Environmental Response, Compensation and Liability Act

CFFD – Kerr McGee

CFR – Code of Federal Regulations

CH – Contact-Handled

CWC – Central Waste Complex

CY – Calendar Year

D&D – Decontamination and Decommissioning

DETs – Determination of Equivalent Treatments

DN – Deviation Notices

DOE – U.S. Department of Energy

DOE-HQ – U.S. Department of Energy Headquarters

DOE-RL – U.S. Department of Energy Richland Operations Office

DOT – U.S. Department of Transportation

DQO – Data Quality Objective

Ecology – Washington State Department of Ecology

ETF – Effluent Treatment Facility

EIS – Environmental Impact Statement

EPA – U.S. Environmental Protection Agency

ERDF – Environmental Restoration Disposal Facility

ESG – Rockwell International Energy Systems

FH – Fluor Hanford, Incorporated

FFTF – Fast Flux Test Facility

FOC – Functional Organization Code

FY – Fiscal Year

GASVIT – Gasification/Vitrification

HASH – Hanford Incinerator Ash

HFFACO – Hanford Federal Facility Agreement and Consent Order

HIC – High Integrity Container

HSGS – Head-Space Gas Sampling

HSW-EIS – Hanford Solid Waste Environmental Impact Statement

HSSWAC – Hanford Site Solid Waste Acceptance Criteria

HWMA – Hazardous Waste Management Act

ICD – Interface Control Document

IDF – Integrated Disposal Facility

IAMIT – Interagency Management and Integration Team

INEEL – Idaho National Engineering and Environmental Laboratory (today INL – Idaho National Laboratory)

KEBASIN01 – NLOP Sludge from K Basin

LDR – Land Disposal Restriction

LLBG – Low-Level Burial Grounds

LLW – Low-Level Waste

MLLW – Mixed Low-Level Waste

MOA – Memorandum of Agreement

MOU – Memorandum of Understanding

MPFPD – Mixed PFP Debris

MPFPD-F00X – Mixed PFP Debris with F00X HWNs

MPUREXD – Mixed PUREX Debris

MWDT – Mixed Waste Disposal Trench

NDA – Non-Destructive Assay

NDE – Non-Destructive Examination

NEPA – National Environmental Policy Act

NOC – Notice of Compliance

NPFPD – Non-mixed PFP Debris

NPUREXD – Non-mixed PUREX Debris

NRC – U.S. Nuclear Regulatory Commission

O/C – Organic/Carbonaceous

PAAA – Price-Anderson Amendment Act of 1988

PBS – Project Baseline Summaries

PCBs – Polychlorinated Biphenyls

PFP – Plutonium Finishing Plant

PHMC – Project Management Hanford Contract

PMP – Project Management Plan

PNNL – Pacific Northwest National Laboratory

PUREX – Plutonium Uranium Extraction

RCRA – Resource Conservation and Recovery Act of 1976

RCW – Revised Code of Washington

RFASH – Rocky Flats Ash

RFP – Request for Proposal

RH – Remote-Handled

RL216Z9 – Homogeneous Waste from 216Z-9 Crib

RLCBWD – Consolidated Babcock and Wilcox Debris

RLETECD – ETEC/ESG Debris

RLM209ED – Mixed 209E Debris

RLM231ZD – Mixed 231-Z Debris

RLM233SD – Mixed 233S Debris

RLM300D – Mixed 300 Area Debris

RLM308D – Mixed 308 Debris

RLM325D – Mixed 325 Debris

RLMGEVALD – Mixed GE Vallecitos Debris

RLMPUNIT – Absorbed Pu Nitrate Solutions from PFP

RLMVIPAC – Vibratory Packed Fuel Debris

RLMWARD – WARD Debris

RLSWOCD – Solid Waste Operations Complex Debris

ROD – Record of Decision

RSW – Retrievably Stored Waste

SAP – Sampling and Analysis Plan

SSC – Sand, Slag and Crucible

SWB – Standard Waste Box (1.80 m in length, 1.38 m wide, and 0.94 m high)

SWHF – Solid Waste Handling Facility

SWITS – Solid Waste Inventory Tracking System

SWIFT – Solid Waste Information Forecasting Tool

SWOC – Solid Waste Operations Complex

SWPC – Solid Waste Processing Center

SWPMs – Solid Waste Processing Modules

TPA – Tri-Party Agreement

TRU – Transuranic Waste

TRUM – Mixed Transuranic Waste

TRUPACT – Transuranic Package Transporter

TSCA – Toxic Substances Control Act

TSD – Treatment, storage, and/or disposal

UHC – Underlying Hazardous Constituents

UTS – Universal Treatment Standards

UV – Ultra-Violet

WAC – Washington Administrative Code and Waste Acceptance Criteria

WAP – Waste Analysis Plan

WARD – Westinghouse Advanced Reactor Division

WBS – Work Breakdown Structure

WERF – Waste Experimental Reduction Facility

WHC – Westinghouse Hanford Company

WIPP – Waste Isolation Pilot Plant

WRAP – Waste Receiving and Processing Facility

WSCF – Waste Sampling and Characterization Facility

WSRd – Waste Specification Record

APPENDIX B

ENLARGEMENTS OF FIGURES 1, 5, 6, 7, AND 8

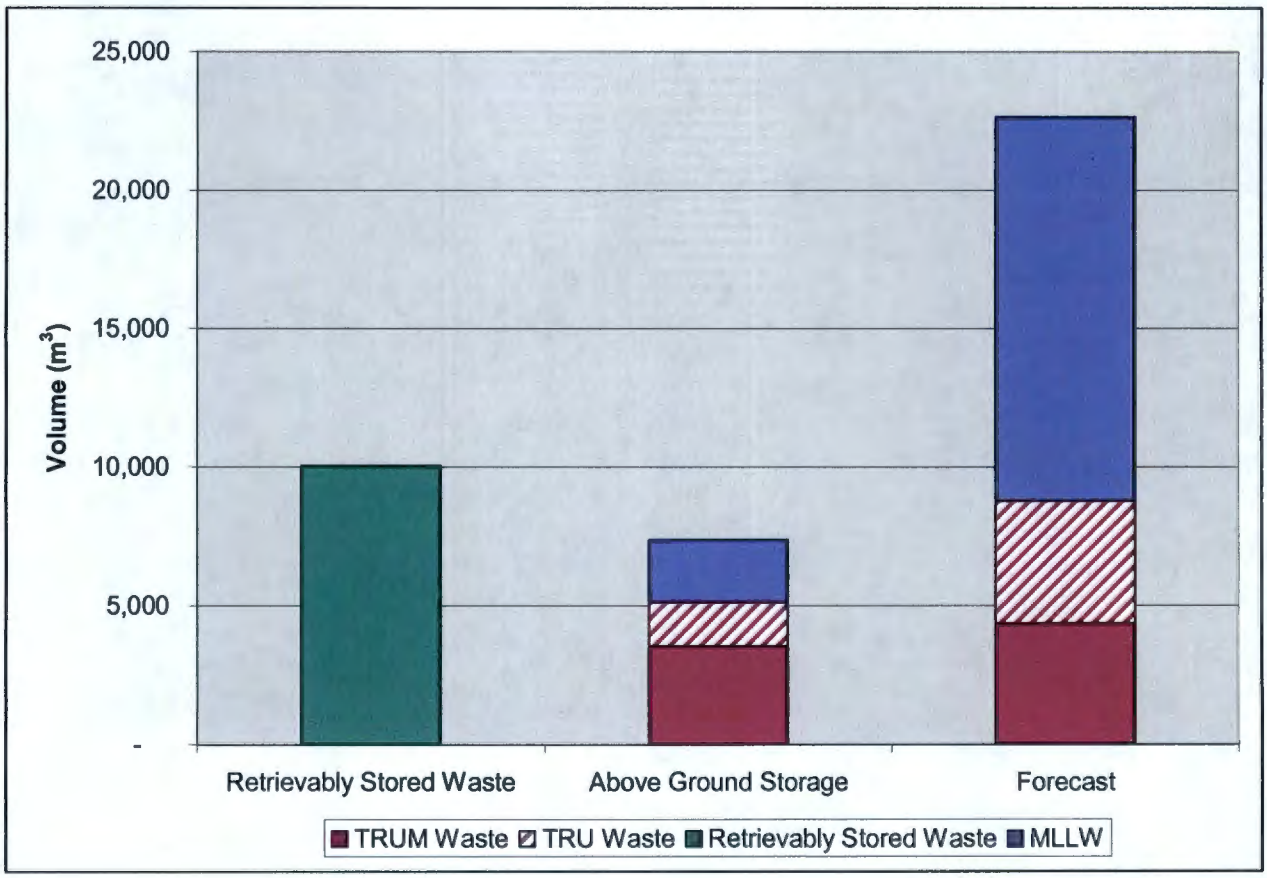


Figure 1. Hanford MLLW/TRU Waste Sources.

Data Sources:

- Retrievably Stored Waste and Above Ground Storage Data from SWITS as of January 3, 2007
- Waste marked as LLW TSCA is not included in the MLLW volumes
- Classified waste is not included in data
- Waste identified as "German Logs" is not included. Includes packages CASTOR-GSF-001, -002, -003, -005, -006, -007, GNS-12-1, and GNS-12-2
- Forecast data taken from SWIFT 2007.0, represents life-cycle forecast January 2007 through September 30, 2035 with the exception of RH TRU tank waste
- Volumes for Retrieval and Storage are internal, volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste, 0.257 m^3 external)

Retrievably Stored Waste:

- Containers identified as Reactor Irradiated Nuclear Material based on process knowledge and SWITS record information
- Retrievably Stored Waste consists of Suspect TRU waste in burial grounds 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B

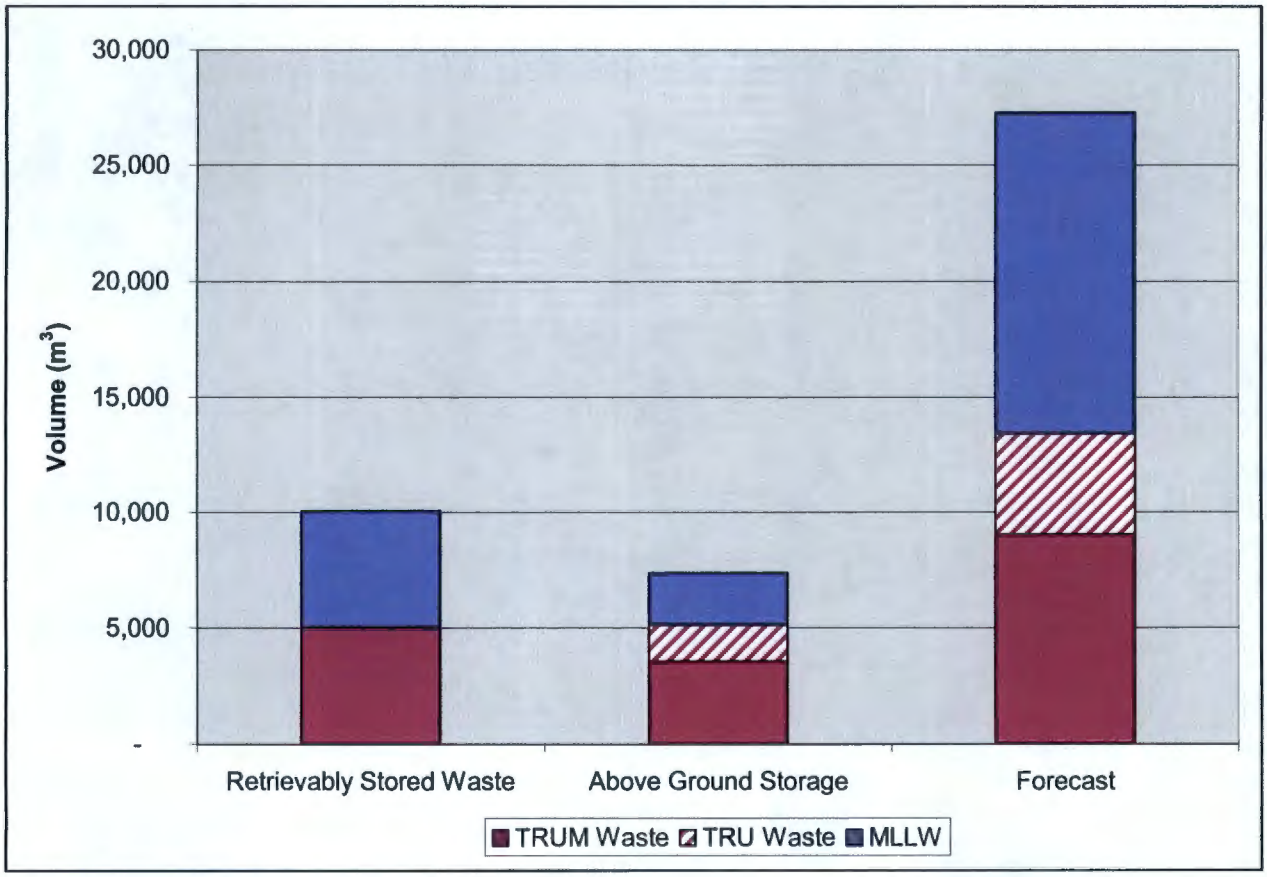


Figure 5. Hanford MLLW/TRU Waste with Retrieval Split.

Data Sources:

- Retrievably Stored Waste and Above Ground Storage Data from SWITS as of January 3, 2007
- Waste marked as LLW TSCA is not included in the MLLW volumes
- Classified waste is not included in data
- Waste identified as "German Logs" is not included. Includes packages CASTOR-GSF-001, -002, -003, -005, -006, -007, GNS-12-1, and GNS-12-2
- Forecast data taken from SWIFT 2007.0, represents life-cycle forecast January 2007 through September 30, 2035 with the exception of RH TRU tank waste
- Volumes for Retrieval and Storage are internal, volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste, 0.257 m^3 external)

Retrievably Stored Waste:

- Containers identified as Reactor Irradiated Nuclear Material based on process knowledge and SWITS record information
- Assumes 50/50 MLLW/TRUM waste split by volume and container count for retrieved suspect TRU waste
- Retrievably Stored Waste consists of Suspect TRU in burial grounds 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B

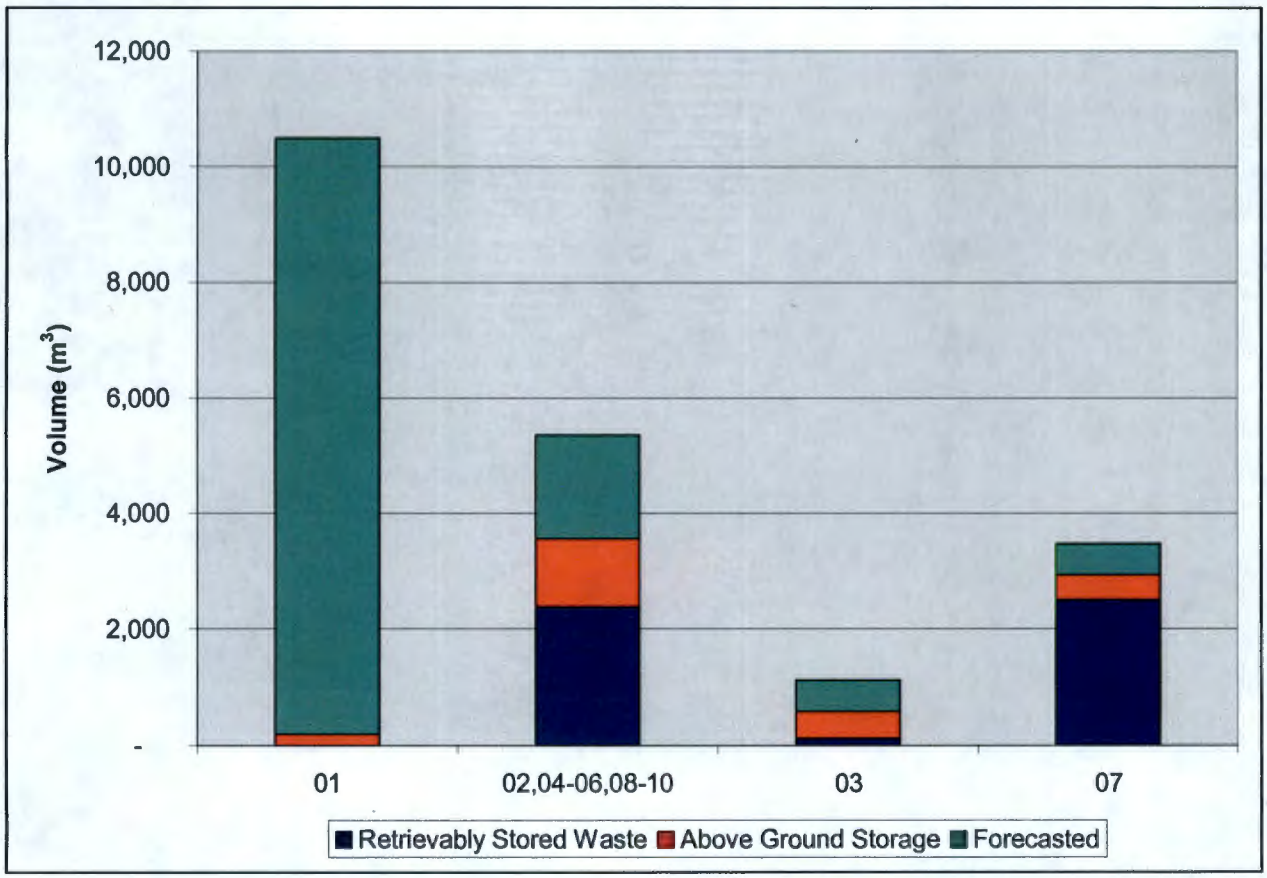


Figure 6. MLLW Treatability Group Sources.

Data Sources:

- Retrievably Stored Waste and Above Ground Storage Data from SWITS as of January 3, 2007
- Waste marked as LLW TSCA is not included in the MLLW volumes
- Classified waste is not included in data
- Forecast data taken from SWIFT 2007.0, represents life-cycle forecast January 2007 through September 30, 2035 with the exception of RH TRU tank waste
- Volumes for Retrieval and Storage are internal, volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste, 0.257 m^3 external)
- Rules for re-assigning packages listed as CH in SWITS as RH are:
  1. Containers with a dose rate of >200 mR/hr
  2. Containers containing lead shielding
- Assumes all waste reclassified as RH is LDR-07

Retrievably Stored Waste:

- Assumes 50/50 MLLW/TRUM split by volume and container count for retrieved suspect TRU waste
- Assumes 95% of the CH MLLW small portion from TRU Retrieval is MLLW-04, 5% is MLLW-03
- Retrievably Stored Waste consists of Suspect TRU in burial grounds 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B

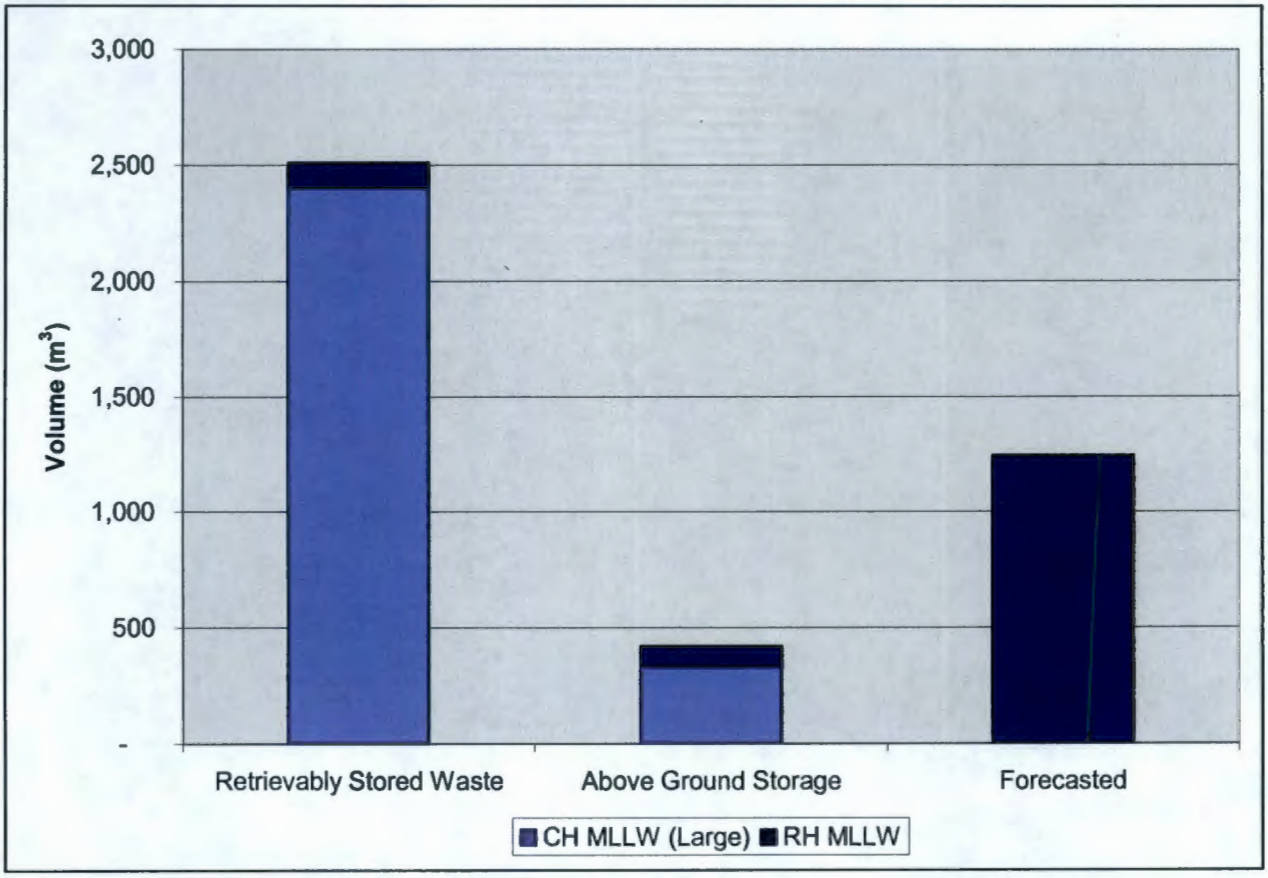


Figure 7. MLLW-07 Sources.

Data Sources:

- Retrievably Stored Waste and Above Ground Storage Data from SWITS as of January 3, 2007
- Waste marked as LLW TSCA is not included in the MLLW volumes
- Classified waste is not included in data
- Forecast data taken from SWIFT 2007.0, represents life-cycle forecast January 2007 through September 30, 2035 with the exception of RH TRU tank waste
- Volumes for Retrieval and Storage are internal, volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste, 0.257 m^3 external)
- Rules for re-assigning packages listed as CH in SWITS as RH are:
  1. Containers with a dose rate of >200 mR/hr
  2. Containers containing lead shielding

Retrievably Stored Waste:

- Assumes 50/50 MLLW/TRUM split by volume and container count for retrieved suspect TRU waste
- Retrievably Stored Waste consists of Suspect TRU in burial grounds 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B

Container Definitions:

- CH MLLW Large - Containers with a volume greater than 10 m^3

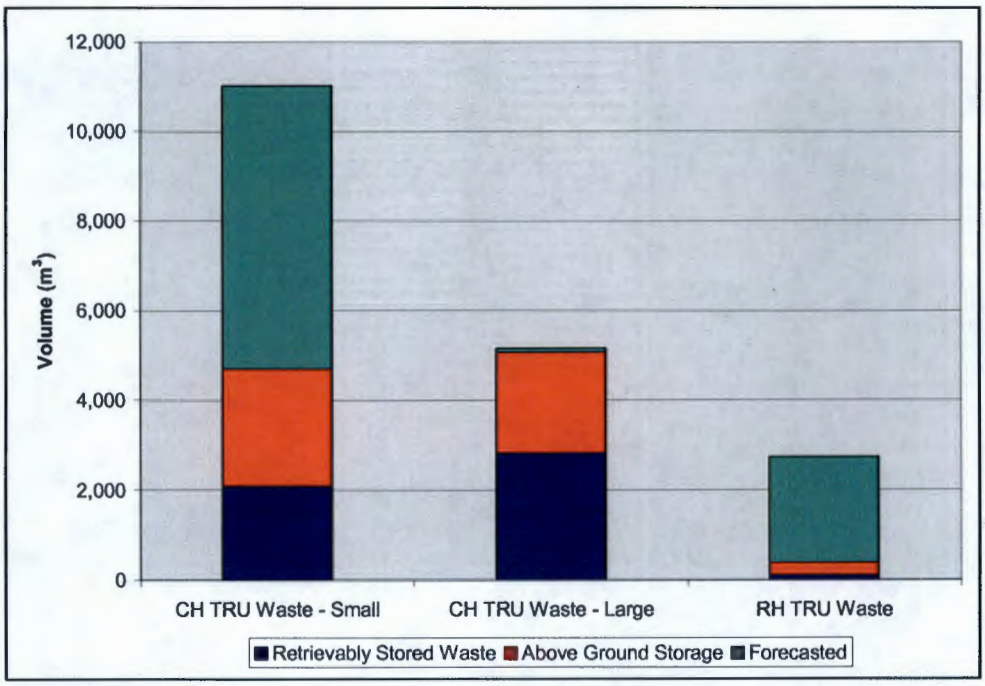


Figure 8. TRU Waste Sources.

Data Sources:

- Retrievably Stored Waste and Above Ground Storage Data from SWITS as of January 3, 2007
- Waste marked as LLW TSCA is not included in the MLLW volumes
- Classified waste is not included in data
- Waste identified as "German Logs" is not included. Includes packages CASTOR-GSF-001, -002, -003, -005, -006, -007, GNS-12-1, and GNS-12-2
- Forecast data taken from SWIFT 2007.0, represents life-cycle forecast January 2007 through September 30, 2035 with the exception of RH TRU tank waste
- Volumes for Retrieval and Storage are internal, volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste, 0.257 m^3 external)
- Rules for re-assigning packages listed as CH in SWITS as RH are:
  1. Containers with a dose rate of >200 mR/hr
  2. Containers containing lead shielding

Retrievably Stored Waste:

- Containers identified as Reactor Irradiated Nuclear Material based on process knowledge and SWITS record information
- Assumes 50/50 MLLW/TRUM split by volume and container count for retrieved suspect TRU waste
- Retrievably Stored Waste consists of Suspect TRU in burial grounds 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B

Container Definitions:

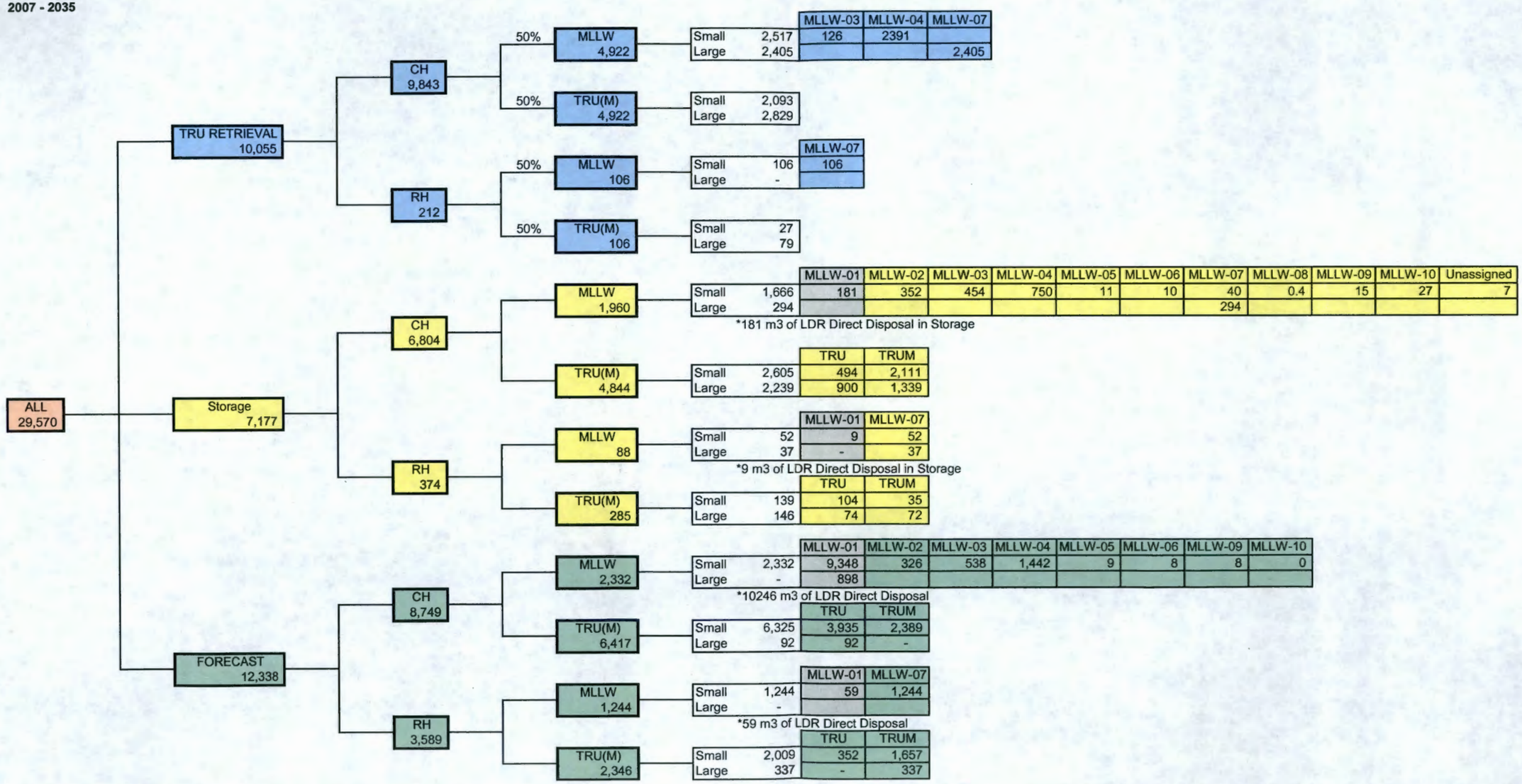
- TRU(M) Small – 55-gallon drums, containers smaller than a 55-gallon drum, 85-gallon over-packs, and SWBs
- TRU(M) Large – Non-small containers

APPENDIX C

TREE CHART OF THE WASTE REQUIRING PROCESSING

TREE CHART

2007 - 2035



TREE CHART ASSUMPTIONS:

- TRU Retrieval/Storage Data taken from SWITS run dated January 3, 2007
- Forecast Data taken from SWIFT 2007.0
- 4,653 m^3 of RH Waste from Tank Closure contractor is not included
- Large/Small Definitions are dependent on waste type:
  1. TRU Small is 55-gallon drums, containers smaller than a 55-gallon drum, 85-gallon over-packs, and SWBs
  2. TRU Large is non-small containers
  3. MLLW Small is containers with a volume of less than 10 cubic meters
  4. MLLW Large is containers with a volume of more than 10 cubic meters
- Rules for re-assigning packages listed as CH in SWITS as RH are:
  1. Containers with a dose rate of >200 mR/hr
  2. Containers containing lead shielding
- Assumes all waste MLLW reclassified as RH is MLLW-07
- Waste marked as LLW TSCA is not included in the MLLW volumes
- 50% of the retrieved Suspect TRU from the TRU Retrieval Burial Grounds is assumed to be MLLW
- Retrieval and storage data as of 1/03/07. Forecast data from SWIFT2007.0 (excludes 1st qtr FY 2006)
- Retrieval and storage numbers include packages without a TSD accept date
- Volumes for Retrieval and Storage are internal, volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste, 0.257 m^3 external)
- Does not include shipped or already disposed waste

APPENDIX D

MLLW TREATABILITY GROUPS DATA TABLES

Mixed Low-Level Waste Inventory
(Volumes in cubic meters)

Location	MLLW-01	MLLW-02	MLLW-03	MLLW-04A/B	MLLW-05	MLLW-06	MLLW-07	MLLW-08	MLLW-09	MLLW-10	Unassigned
214T	0.2	0.3	1.5	0.2							0.4
221T	0.9		7.7	10.3							0.8
2336W	0.2			4.3		0.7					1.3
2402WB	0.6	2.7	28.8	5.0						0.2	
2402WC		31.7	31.0	2.1					0.2		
2402WD		10.7	17.2	1.9		0.4					
2402WE		24.2	7.5	1.9		1.7			0.8		
2402WF		0.6		-							
2402WH	0.6	22.6	6.5	1.7					8.1		
2402WJ		40.6	14.9	1.6	0.6	0.2	0.2		3.0	0.0	
2403WA	0.8	53.2	40.7	11.1	0.2	0.8	0.2		0.6		
2403WB	8.6	7.2	76.8	112.2	0.6	0.6	73.6				
2403WC	21.3	72.9	103.3	44.1	4.7	4.3	59.6		1.0		
2403WD	156.2	42.6	49.1	527.1	4.8	1.5	91.2		0.8		
2404WA		25.9	42.0	6.1							
2404WB			0.6	13.2					0.2		3.6
2404WC				0.2							
2706T	0.3		4.8	0.4	0.4		1.2				0.6
AMW1				-						7.5	
AMW2		0.2		-						4.8	
AMW3		0.2	0.2	-						7.8	
AMW4				-						5.3	
CWC				5.8			187.6				
FS01		2.3	0.6	0.2							
FS02		0.8	0.2	0.4							
FS03		0.8	0.2	-		0.2					
FS04			0.9	-							
FS05			0.2	-							
FS06		0.2		-				0.2		0.2	
FS07		0.4	0.8	0.2							
FS08		0.2	0.8	-							
FS09		0.6	0.4	-							
FS10		2.3	0.2	-							
FS11		0.2	0.2	-							
FS12				0.2							
FS13		0.4	1.5	-							
FS14		0.8	4.1	0.2							
FS15		1.2	0.4	-							
FS16		1.5	1.8	1.5							
FS17		2.1	1.3	-							
FS18		0.7	1.4	0.4		0.0					
FS19				-						0.8	
FS20			0.2	-							
FS21		0.8	1.2	0.2							
FS22		0.2	2.5	-							
FS23		0.4	1.7	-				0.2			
FS24		0.4	0.9	-							
FS25			0.4	-							
FS27		2.0	2.7	-							
Total	189.8	354.2	457.4	752.5	11.4	10.4	413.6	0.4	14.9	26.7	6.7

Mixed Low-Level Waste Inventory
(Container Count)

Location	MLLW-01	MLLW-02	MLLW-03	MLLW-04A/B	MLLW-05	MLLW-06	MLLW-07	MLLW-08	MLLW-09	MLLW-10	Unassigned
214T	1	1	7	1							2
221T	3		15	20							4
2336W	1			19		4					6
2402WB	2	6	134	24						1	
2402WC		142	149	10					1		
2402WD		51	83	10		2					
2402WE		115	36	9		8			4		
2402WF		3									
2402WH	3	109	33	8					40		
2402WJ		204	72	8	3	1	1		14	1	
2403WA	4	256	202	40	2	4	1		3		
2403WB	8	34	148	48	3	3	17				
2403WC	19	336	432	171	22	22	13		5		
2403WD	392	159	225	2,105	25	7	10		4		
2404WA		125	202	29							
2404WB			3	53					1		16
2404WC				1							
2706T	1		22	2	2		5				3
AMW1										2	
AMW2		1								23	
AMW3		1	1							8	
AMW4										27	
CWC				1			16				
FS01		11	3	1							
FS02		4	1	2							
FS03		3	1			1					
FS04			4								
FS05			1								
FS06		1						1		1	
FS07		2	4	1							
FS08		1	4								
FS09		3	2								
FS10		11	1								
FS11		1	1								
FS12				1							
FS13		2	7								
FS14		4	18	1							
FS15		6	2								
FS16		8	9	8							
FS17		12	6								
FS18		5	8	4		1					
FS19										4	
FS20			1								
FS21		4	6	1							
FS22		1	12								
FS23		2	8					1			
FS24		2	4								
FS25			2								
FS27		10	13								
Grand Total	434	1,636	1,882	2,578	57	53	63	2	72	67	31

Mixed Low-Level Waste Forecast
(Volumes in cubic meters)

Generator	MLLW-01	MLLW-02	MLLW-03	MLLW-04A/B	MLLW-05	MLLW-06	MLLW-07	MLLW-09	MLLW-10
Central Waste Complex				2					
Fast Flux Test Facility									0.3
Ground Water Monitoring				35					
Hanford Site Operations (Infrastructure)	0.3	1	1		1				
Liquid Waste Processing Facilities, 200 Area		6	24	6					
MLLW Disposal Trench				7					
Pacific Northwest National Laboratory	124								
Plutonium Finishing Plant, 234-5 Z	8	138	195	41	8	8		8	
RH and Oversized MLLW/TRU(M) Facilities (M-91)		51	51	293					
T Plant Operations, 221-T/2706-T		0.4	2	41					
Tank Closure	3,550						187		
Waste Encapsulation & Storage Facility			9				6		
Waste Receiving and Processing Facility, 2336-W			7						
Waste Sampling & Characterization Facility, 6266		130	195						
Waste Treatment Plant - Operations	6,622		55	1,017			1,050		
Total	10,304	326	538	1,442	9	8	1,244	8	0.3

Mixed Low-Level Waste Forecast
(Container Count)

Generator	MLLW-01	MLLW-02	MLLW-03	MLLW-04A/B	MLLW-05	MLLW-06	MLLW-07	MLLW-09	MLLW-10
Central Waste Complex				9					
Fast Flux Test Facility									1
Ground Water Monitoring				136					
Hanford Site Operations (Infrastructure)	1	2	2		2				
Liquid Waste Processing Facilities, 200 Area		25	6	25					
MLLW Disposal Trench				28					
Pacific Northwest National Laboratory	274								
Plutonium Finishing Plant, 234-5 Z	32	538	759	158	32	32		32	
RH and Oversized MLLW/TRU(M) Facilities (M-91)		13	13	74					
T Plant Operations, 221-T/2706-T		1	7	159					
Tank Closure	751						26		
Waste Encapsulation & Storage Facility			34				25		
Waste Receiving and Processing Facility, 2336-W			26						
Waste Sampling & Characterization Facility, 6266		506	760						
Waste Treatment Plant - Operations	17,541		216	3,940			1,047		
Total	18,598	1,085	1,823	4,529	34	32	1,098	32	1

APPENDIX E

TRU WASTE TREATABILITY GROUPS DATA TABLES

Transuranic Waste Inventory
(Volumes in cubic meters)

	CH TRU		CH TRUM		RH TRU		RH TRUM	
Location	Small	Large	Small	Large	Small	Large	Small	Large
212N		217						
214T			2					
218E12B	588	28			20	2		
218W3A	692	3,274	2	14	4	120		1
218W3AE	0.2				4	50		
218W4B	2,603	576	4	2	26	29		
218W4C	224	1,261	74	501	0.2	1	4	6
221T	3	17	29			9	0.2	9
2336W	7		33	5				
2402W			32					
2402WB			0.2					
2402WC			0.4					
2402WD	4	0.3	1	0.3			1	
2402WE	1		18					
2402WH			2					
2402WI	1	2	107		1			
2402WJ			2	9				
2402WK			7					
2402WL	69				1			0.4
2403WA	29	1	984	50	0.4		9	
2403WB	23	184	59	993	0.2	15	2	10
2403WC	13	77	160	53	1	1	4	0.3
2403WD	194	183	59	54	10	27	1	
2404WA	15		177	23	5		12	56
2404WB	67	0.3	292	5	2		3	
2404WC	64	2	100	5		50	0	
2420W						1		
2706T	2	0.3	42	52				
CWC		218		88				
FS04			1					
FS05			1					
FS06			0.2					
FS11				1				
FS14			1					
FS20	1		1	1				
FS21			2					
FS25			1					
Total	4,601	6,040	2,190	1,856	75	304	36	82

Transuranic Waste Inventory
(Container Count)

	CH TRU		CH TRUM		RH TRU		RH TRUM	
Location	Small	Large	Small	Large	Small	Large	Small	Large
212N		15						
214T			1					
218E12B	2,808	39			95	1		
218W3A	3,334	176	9	6	20	32		1
218W3AE	1				20	35		
218W4B	12,410	172	17	1	823	21		
218W4C	1,024	48	327	34	1	9	13	12
221T	6	2	124			1	1	1
2336W	33		158	1				
2402W			150					
2402WB			1					
2402WC			2					
2402WD	15	1	4	1			2	
2402WE	5		86					
2402WH			8					
2402WI	5	1	67		2			
2402WJ			11	3				
2402WK			25					
2402WL	330				2			1
2403WA	138	2	3,080	10	2		31	
2403WB	82	32	180	176	1	3	9	3
2403WC	58	15	597	10	7	4	18	1
2403WD	164	46	151	9	94	15	4	
2404WA	70		821	7	24		58	11
2404WB	318	1	1,382	3	12		14	
2404WC	108	1	403	1		28	1	
2420W						1		
2706T	8	1	172	6				
CWC		6		8				
FS04			5					
FS05			3					
FS06			1					
FS11				2				
FS14			2					
FS20	5		4	2				
FS21			5					
FS25			3					
Total	20,922	558	7,799	280	1,103	150	151	30

Transuranic Waste Forecast
(Volumes in cubic meters)

	CH_TRU		CH_TRUM	RH_TRU	RH_TRUM	
Generator	Small	Large	Small	Small	Small	Large
618-10/11 Burial Grounds			89		1,227	
Balance of Sludge				347		
Ground Water Monitoring			29			
K-Basins and Cold Vacuum Drying Facility		18				
Pacific Northwest National Laboratory	46		8	5	5	
Plutonium Finishing Plant, 234-5 Z	3,783		17			
RH and Oversized MLLW/TRU(M) Facilities (M-91)			13		25	
River Corridor Closure Contract	7					
T Plant Operations, 221-T/2706-T		75	23			
Tank Closure			2,210			337
Waste Receiving and Processing Facility, 2336-W	99					
Waste Treatment Plant - Operations					399	
Total	3,935	92	2,389	352	1,657	337

Transuranic Waste Forecast
(Container Count)

APPENDIX F

NUMBER OF CONTAINERS AND VOLUMES

Container Type for CH MLLW Large, RH MLLW (non-LDR-01), CH TRU(M) (Excludes 55 Gallon Drums, 85 Gallon Overpacks from Retrieval, and SWBs), and RH TRU(M) Waste (Data from 1/3/07)

Volumes (m^3)

TC_LVL1	Modified Handling	CON_RAD_CD	CONT_GROUP	BURLAP, CLOTH, PAPER OR PLASTIC BAGS, W	FIBERGLASS REINFORCED PLYWOOD (FRP) B	CONCRETE BOXES	CONCRETE CYLINDERS, CASKS	METAL CYLINDER, CASKS	SELF CONTAINED, EQUIPMENT	FIBERBOARD/PLASTIC BOXES, CARTONS, CAS	MISCELLANEOUS SCRAP	METAL, CONTAINERS	OAK RIDGE CONCRETE VAULT	WOODEN BOXES, CARTONS, CASES	TRUCKS, FLATBEDS, COMPACTOR, LOADLUG	METAL DRUMS, BARRELS, KEGS	MISC. SMALL METAL CONTAINERS	5320 CASK	EBR II CASKS	HEPA FILTERS	GLOVE BOXES	ION EXCHANGE COLUMNS	SEA-LAND CONTAINER	SPECIAL CONFIGURATION CONTAINER	TANKS, PORTABLE
STORAGE	CH	TRU	<55 Gallon															0.1							
STORAGE	CH	TRU	>10 m3		81							559	15	180											
STORAGE	CH	TRU	55 Gal < x < SWB									7				48									
STORAGE	CH	TRU	SWB < x < 10 m3		7		9	5				1,284		36										22	17
STORAGE	RH	TRU	55 Gal < x < SWB					56								11									
STORAGE	RH	TRU	55 Gallon													47									
STORAGE	RH	TRU	SWB									83													
STORAGE	RH	TRU	SWB < x < 10 m3					9				75		9											
TRU RETRIEVAL	CH	TRU	<55 Gallon						0.0	3	1					13									1
TRU RETRIEVAL	CH	TRU	>10 m3		4,177	94	13		24			407									25		53		16
TRU RETRIEVAL	CH	TRU	55 Gal < x < SWB	0.3		10			6		2	35				24			25	17	4				1
TRU RETRIEVAL	CH	TRU	SWB < x < 10 m3		280	122			8			240		35							31	2			8
TRU RETRIEVAL	RH	TRU	<55 Gallon						0.1	0.4	0.2					2	22								
TRU RETRIEVAL	RH	TRU	55 Gal < x < SWB			10		5		1					1	3			3						
TRU RETRIEVAL	RH	TRU	55 Gallon													27									
TRU RETRIEVAL	RH	TRU	SWB < x < 10 m3		22	11		68				6		25						7					
TRU Total				*0.3*	*4,568*	*247*	*22*	*143*	*38*	*4*	*3*	*2,697*	*15*	*286*	*1*	*175*	*22*	*0.1*	*27*	*24*	*61*	*2*	*53*	*22*	*43*
STORAGE	CH	LLW	>10 m3		188							106													
STORAGE	RH	LLW	>10 m3									37													
STORAGE	RH	LLW	55 Gal < x < SWB									2													
STORAGE	RH	LLW	55 Gal < x < SWB									1				1									
STORAGE	RH	LLW	55 Gallon													0.4									
STORAGE	RH	LLW	55 Gallon													2									
STORAGE	RH	LLW	55 Gallon													1									
STORAGE	RH	LLW	55 Gallon													0.4									
STORAGE	RH	LLW	55 Gallon													1									
STORAGE	RH	LLW	55 Gallon													2									
STORAGE	RH	LLW	SWB									2													
STORAGE	RH	LLW	SWB < x < 10 m3									2													
STORAGE	RH	LLW	SWB < x < 10 m3									39													
MLLW Total				*-*	*188*	*-*	*-*	*-*	*-*	*-*	*-*	*188*	*-*	*-*	*-*	*6*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*
Total				*0.3*	*4,755*	*247*	*22*	*143*	*38*	*4*	*3*	*2,885*	*15*	*286*	*1*	*181*	*22*	*0.1*	*27*	*24*	*61*	*2*	*53*	*22*	*43*

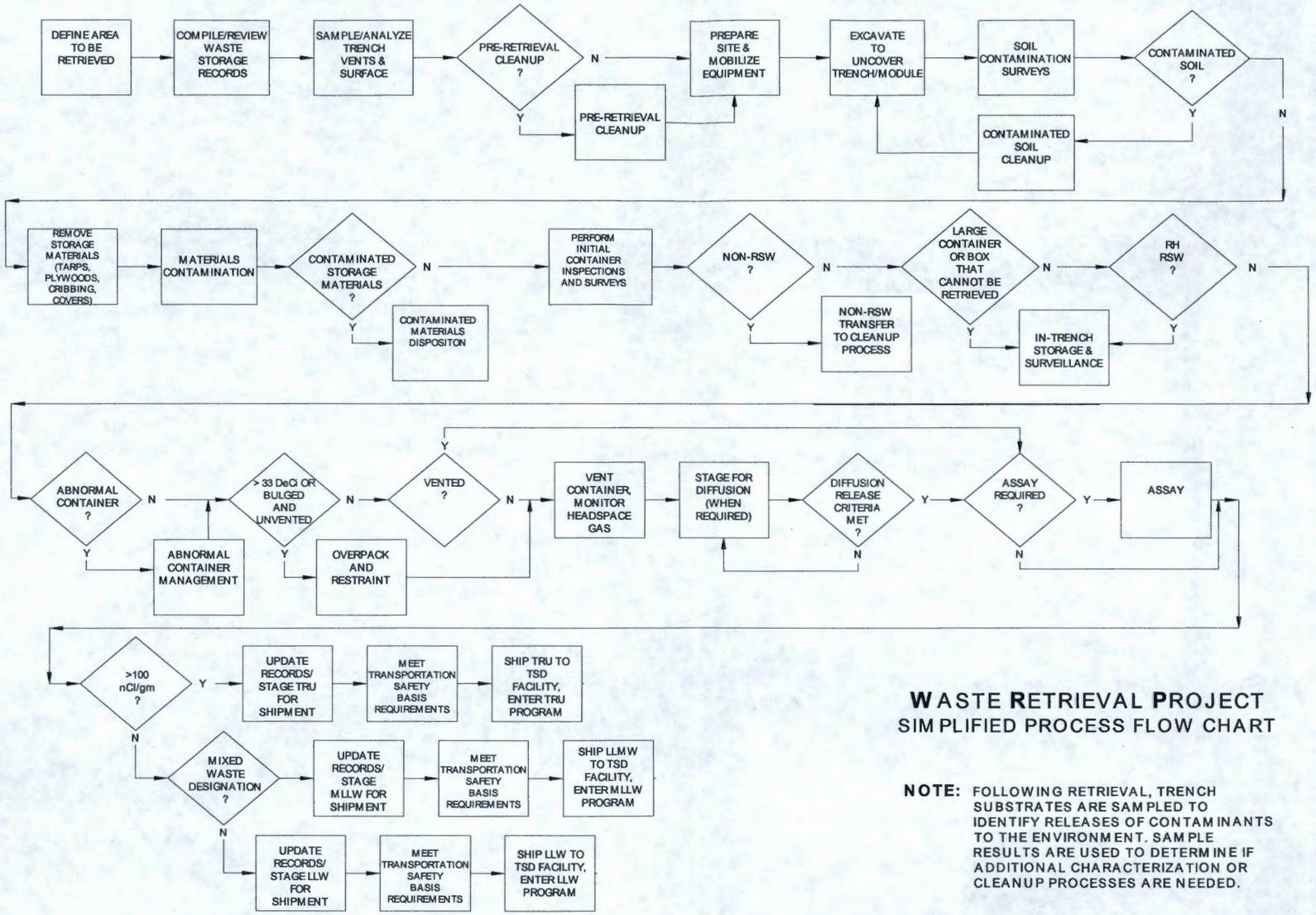
Container Type for CH MLLW Large, RH MLLW (non-LDR-01), CH TRU(M) (Excludes 55 Gallon Drums, 85 Gallon Overpacks from Retrieval, and SWBs), and RH TRU(M) Waste (Data from 1/3/07)

Container Count

TC_LVL1	Modified Handling	CON_RAD_CD	CONT_GROUP	BURLAP, CLOTH, PAPER OR PLASTIC BAGS, W	FIBERGLASS REINFORCED PLYWOOD (FRP) B	CONCRETE BOXES	CONCRETE CYLINDERS, CASKS	METAL CYLINDER, CASKS	SELF CONTAINED, EQUIPMENT	FIBERBOARD/PLASTIC BOXES, CARTONS, CAS	MISCELLANEOUS SCRAP	METAL, CONTAINERS	OAK RIDGE CONCRETE VAULT	WOODEN BOXES, CARTONS, CASES	TRUCKS, FLATBEDS, COMPACTOR, LOADLUG	METAL DRUMS, BARRELS, KEGS	MISC. SMALL METAL CONTAINERS	5320 CASK	EBR II CASKS	HEPA FILTERS	GLOVE BOXES	ION EXCHANGE COLUMNS	SEA-LAND CONTAINER	SPECIAL CONFIGURATION CONTAINER	TANKS, PORTABLE
STORAGE	CH	TRU	<55 Gallon															1							
STORAGE	CH	TRU	>10 m3		7							29	1	8											
STORAGE	CH	TRU	55 Gal < x < SWB									7				142									
STORAGE	CH	TRU	SWB < x < 10 m3		1		2	1				236		7										13	6
STORAGE	RH	TRU	55 Gal < x < SWB					44								36									
STORAGE	RH	TRU	55 Gallon													272									
STORAGE	RH	TRU	SWB									46													
STORAGE	RH	TRU	SWB < x < 10 m3					1				14		1											
TRU RETRIEVAL	CH	TRU	<55 Gallon						1	23	13					110									6
TRU RETRIEVAL	CH	TRU	>10 m3		107	2	1		1			26									1		3		1
TRU RETRIEVAL	CH	TRU	55 Gal < x < SWB	1		16			5		2	58				54			36	26	7				1
TRU RETRIEVAL	CH	TRU	SWB < x < 10 m3		51	24			2			46		8							8	1			1
TRU RETRIEVAL	RH	TRU	<55 Gallon						4	3	13					60	735								
TRU RETRIEVAL	RH	TRU	55 Gal < x < SWB			13		11		1					1	9			11						
TRU RETRIEVAL	RH	TRU	55 Gallon													128									
TRU RETRIEVAL	RH	TRU	SWB < x < 10 m3		7	4		11				3		13						1					
TRU Total				*1*	*173*	*59*	*3*	*68*	*13*	*27*	*28*	*465*	*1*	*37*	*1*	*811*	*735*	*1*	*47*	*27*	*16*	*1*	*3*	*13*	*15*
STORAGE	CH	LLW	>10 m3		16							4													
STORAGE	RH	LLW	>10 m3									3													
STORAGE	RH	LLW	55 Gal < x < SWB									1													
STORAGE	RH	LLW	55 Gal < x < SWB									2				2									
STORAGE	RH	LLW	55 Gallon													2									
STORAGE	RH	LLW	55 Gallon													8									
STORAGE	RH	LLW	55 Gallon													3									
STORAGE	RH	LLW	55 Gallon													2									
STORAGE	RH	LLW	55 Gallon													3									
STORAGE	RH	LLW	55 Gallon													10									
STORAGE	RH	LLW	SWB									1													
STORAGE	RH	LLW	SWB < x < 10 m3									1													
STORAGE	RH	LLW	SWB < x < 10 m3									6													
MLLW Total				*-*	*16*	*-*	*-*	*-*	*-*	*-*	*-*	*18*	*-*	*-*	*-*	*30*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*
Total				*1*	*189*	*59*	*3*	*68*	*13*	*27*	*28*	*483*	*1*	*37*	*1*	*841*	*735*	*1*	*47*	*27*	*16*	*1*	*3*	*13*	*15*

APPENDIX G

WASTE RETRIEVAL PROCESS FLOW CHART AND PROCESS OVERVIEW



WASTE RETRIEVAL PROJECT
SIMPLIFIED PROCESS FLOW CHART

NOTE: FOLLOWING RETRIEVAL, TRENCH SUBSTRATES ARE SAMPLED TO IDENTIFY RELEASES OF CONTAMINANTS TO THE ENVIRONMENT. SAMPLE RESULTS ARE USED TO DETERMINE IF ADDITIONAL CHARACTERIZATION OR CLEANUP PROCESSES ARE NEEDED.

WASTE RETRIEVAL PROCESS OVERVIEW

Retrieval end-points are identified and estimates of the waste volumes to be generated by the project are summarized. Some process steps may be performed in a different order or in combination with other steps as determined by site-specific conditions. For example, retrieved drums may be non-destructively assayed prior to venting in some instances to balance and expedite the overall processing schedule. Also, some steps such as trench excavation may be performed iteratively to provide improved access and safety of container recovery operations. Nonetheless, the flow chart depicts the general process used to retrieve CH RSW from each of the suspect TRU waste storage trenches. A description of each activity and decision point follows:

Define Area to be Retrieved – The project team maintains a production plan including the locations and rates of future retrieval operations based on achieving the M-91-40 enforceable milestones. Production plans are frequently updated to respond to changing site conditions and other performance risks, and to respond to the needs of downstream waste disposition programs such as the TRU Program or Mixed Waste Treatment Program. Authorizations, including nuclear facility safety basis requirements, facility startup requirements, air permits, etc. must be in place before work may be performed in each location. Support facility needs are determined. Work planning is initiated.

Compile/Review Waste Storage Records – Archived waste storage records are reviewed for each container or waste stream to be retrieved. The records are researched to identify special safety or handling requirements and to begin the waste designation process. In some cases, the processes of the waste generating facility are reviewed or personnel familiar with the targeted waste stream are interviewed to gather additional information. Data packages are developed for use by retrieval personnel and by waste disposition programs.

Sample/Analysis Trench Vents & Surface – As retrieval proceeds, the M-91-40 requires that burial ground vents and substrate be sampled and analyzed after retrieval to determine whether or not releases of contaminants to the environment have occurred. A Sample and Analysis Plan must be submitted and approved, and results documented and transmitted to the regulators. In addition, chemical and radiation surveys are conducted of the trench surface to identify worker industrial hygiene or radiological concerns that must be addressed prior to initiation of retrieval.

Pre-Retrieval Cleanup Decision – The results of burial ground vent/substrate sample analysis and trench surface field surveys are reviewed to determine if additional cleanup work is required. The objective of additional cleanup is to remove hazards prior to safely performing retrieval operations, or to address a newly discovered contamination release that posses a threat to human health and the environment. Information about a newly discovered contamination release is communicated to regulatory agencies and other affected cleanup programs.

Pre-Retrieval Cleanup – Common pre-retrieval cleanup issues include radiological or volatile organic compound releases from historic burial ground operations. Minor surface contamination cleanup is typically resolved by removal of contaminated soils, packaging, and disposition as secondary waste utilizing facility operation authorities and procedures. Cleanup objectives are established to protect worker safety and health during retrieval operations. Response actions for a newly discovered contamination release that posses a threat to human health and the environment are coordinated with

effected programs that have remediation responsibilities, e.g., Groundwater Protection, CERCLA cleanup. The authority, objectives, and approach to perform cleanup of releases to the environment are negotiated with regulatory agencies. Secondary waste generated by pre-retrieval cleanup is designated, staged, and transferred to a TSD facility for final disposition.

Prepare Site and Mobilize Equipment – Retrieval equipment, support facilities, and personnel are mobilized to the retrieval site(s). Support utilities and services are provided, and access control is established. Readiness activities are completed and operation startup is performed. Site clearing is completed to access retrieval trenches.

Excavate to Uncover Trench/Module – Overburden soil is removed to access trenches. Conventional construction equipment including excavators, front-end loaders, and dump trucks are typically utilized and operated using procedures that minimize the potential of damaging waste containers or spreading contamination. Excavation continues to access the specific storage module where containers will be retrieved. Incidental excavation may occur to support placement of support structures, construct storage pads, or other operational needs. Excess soils are hauled to spoil piles or used as backfill materials. Excavation activities may include trench sidewall stability features, (e.g., shoring), etc.

Soil Contamination Surveys – Chemical and radiological monitoring is performed during the excavation of trench/module overburden materials. Survey plans are developed, based on historical information about contamination levels and any information derived from pre-retrieval sample/analysis of trench vents/substrate and surface surveys.

Contaminated Soil Decision – Soil contamination survey data is evaluated to determine whether or not any overburden material is contaminated and must be segregated and managed as secondary waste.

Contaminated Soil Cleanup – Small volumes of contaminated soil that are identified during trench/ module excavation are segregated, packaged, a waste designation is completed, and the secondary waste is transferred to an appropriate TSD facility for treatment/disposal. In the event that a large release to the environment is identified, a response action is followed similar to that described under Pre-Retrieval Cleanup for a contamination release that poses a threat to human health and the environment.

Remove Storage Materials – Various storage configurations were used during the period in which RSW was placed in the LLBG. Some configurations utilized storage materials including tarps, plywood, cribbing, metal cover, etc. to facilitate the safe placement of RSW and/or to improve the effectiveness of long-term storage. The removal of common storage materials such as plywood between container storage levels or tarp covers is integrated into retrieval operations procedures. The removal of storage materials that could impact the structural integrity of containers or the safety of workers such as pilings, cribbing, metal covers, etc. requires the development of engineered demolition and/or hoisting and rigging plans. Excavation is often necessary during the removal process to facilitate access.

Materials Contamination Surveys – Chemical and radiological monitoring is performed during the removal of storage materials. Survey plans are developed based on known or anticipated contamination levels within the trench/module.

Contaminated Storage Materials Decision – Storage materials contamination survey data are evaluated to determine whether or not any of the materials are contaminated and must be segregated and managed as secondary waste.

Contaminated Storage Materials Disposition – Contaminated storage materials are segregated, packaged, a waste determination is completed, and the secondary waste is transferred to an appropriate TSD facility for treatment/disposal.

Perform Initial Container Inspection & Surveys – An initial inspection of the uncovered RSW containers is performed. Radcon/IH surveys are completed to identify contamination and radiological dose rate information. Container integrity is evaluated to determine if structural repairs or special handling is needed to facilitate retrieval. Container identification markings (when available) are compared with historical record data packages to identify the container.

Non-Retrievably Stored Waste Decision – Waste with no container or containers that have deteriorated to the point that they cannot be retrieved without posing significant risks to workers, the public or the environment are not considered RSW, (i.e., non-RSW). Non-RSW containers will not be retrieved. The extent of non-RSW containers is determined and may include RSW containers below or adjacent to the non-RSW containers that cannot be retrieved without disturbing the non-RSW.

Non-Retrievably Stored Waste Transfer to Cleanup Process – Disposition of non-RSW will be determined through the cleanup process set forth in RCRA, Chapter 70.105 RCW, and/or CERCLA as appropriate.

Large Container or Box That Cannot be Retrieved Decision – Large containers or boxes that are determined to be unsafe for retrieval and/or storage until future processing facilities are available will be left in the trenches, with concurrence from Ecology as specified in M-91-40. These containers must be uncovered, 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 must not indicate the presence of free liquids. The extent of non-retrievable large containers and boxes is determined and may include RSW containers below or adjacent to them that cannot be retrieved without disturbing the large containers and boxes.

In-Trench Storage & Surveillance – Large containers or boxes determined to be non-retrievable will be left in the trenches. Regulatory agencies will be notified and a plan will be developed for the safe storage of the containers in the LLBG including surveillance plans, repairs, over-packing, and/or covers necessary to prevent releases to the environment pending ultimate disposition of the waste.

Remote-Handled Retrievably Stored Waste Decision – RH RSW is not currently being retrieved by the WRP and may remain in the trenches until future processing capabilities are available. In some circumstances, the project may elect to shield and over-pack RH RSW containers in a manner that they may be handled and further processed as CH RSW.

RH RSW In-Trench Storage & Surveillance – RH RSW that will not be retrieved during the CH retrieval process will be left in the trenches. A plan will be developed for the safe storage of the containers in the LLBG including surveillance plans, repairs, over-packing, and/or covers necessary to prevent releases to the environment..

Abnormal Container Decision – Each waste container is inspected in accordance with safety criteria to determine whether or not it has abnormal conditions (e.g., bulged, breached, heavily corroded). Containers with abnormal conditions are entered into the Abnormal Container Management Program (ACMP).

Abnormal Container Management – Containers placed in the ACMP are evaluated and mitigation actions selected and applied to address the safety hazards of the container (e.g., install bracing fixtures, bagging, over-packing). ACMP containers are tracked until the abnormal condition is remedied. The container is returned to processing after the safety hazards are addressed.

Greater than 33 DE-Ci or Bulged, and Unvented Decision – Waste containers are reviewed to identify containers having high radionuclide inventories (>33 DeCi) or that are bulged AND are unvented. These containers are considered a special safety concern due to the increased potential consequences of a drum deflagration event during venting operations.

Over-pack and Restraint Installed – Waste containers that pose special safety concerns due to high radionuclide inventory or bulging are over-packed and an engineered restraint device is installed. These additional safety features remain on the container until it is vented, and flammable gas diffusion criteria are met.

Vented Decision – Each waste container is inspected to determine whether or not it is vented in accordance with safety criteria. Containers with functioning vent clips or vent filter devices, or that are visibly breached are considered vented.

Vent Container, Monitor Head-Space Gas – Containers that require venting are staged for venting unit operations. Venting is achieved by inserting a nuclear filter device utilizing equipment designed to minimize the potential of igniting any flammable head-space gasses. Techniques include cold drilling, sparkless dart gun, sparkless hole saw drilling, etc. A head-space gas sample is collected at the time of venting to determine initial flammable gas concentrations.

Stage for Diffusion (when required) – Newly vented containers that exceed flammable head-space gas safety criteria are placed in a gas diffusion zone where container movement is minimized. A diffusion period is selected and tracked based on the measured initial gas concentration of the container and factors that control the rate of diffusion, e.g., container type, filter, etc. Containers that do not exceed safety criteria at time of venting are immediately released for further processing.

Diffusion Release Criteria Met Decision – Containers staged for diffusion are reviewed to determine if flammable head-space gas diffusion criteria have been met and the containers can be released for further processing. The determination may be made through re-sampling of the container or through calculated diffusion curves.

Assay Required Decision – Acceptable knowledge data packages from suspect TRU waste generation/storage records are reviewed to determine if sufficient information exists to designate the waste as TRU. Containers that cannot conclusively be designated as TRU waste are assayed to complete the TRU waste or LLW designation.

Assay – NDA is performed using gamma and/or neutron detection equipment. The data is analyzed and reviewed through the project quality assurance process. Assay data records are generated for use by the waste disposition programs (e.g., TRU Program, LLW Program).

Greater than 100 nCi/g Decision – NDA data, or acceptable knowledge data packages from waste generation/storage records are reviewed to determine if the waste meets the criteria for TRU waste or

LLW designation (i.e., >100 nCi/g = TRU waste).

Mixed Waste Designation Decision – Waste generation and storage records for LLW are reviewed to determine if any Washington State dangerous waste codes apply. Waste designations are updated and MLLW is segregated from LLW for further disposition. A receiving TSD facility is determined.

Update Records/Stage TRU Waste or LLW for Shipment – Waste containers are sorted based on TRU waste vs. LLW designation. Waste container labeling and SWITS database records are updated.

Meet Transportation Safety Basis Requirements – Each waste container is reviewed against transportation requirement documents to determine preparation needs and method of transport from the LLBG. Preparations may include over-packing, placing in shipping containers (e.g., IP-2, install cribbing/blocking materials). Selection of transport method may include road closure plans, selection of conveyance, and scheduling of transportation resources.

Ship TRU Waste to TSD Facility, Enter TRU Program – Retrieved TRU waste containers are transported to an appropriate TSD facility and enter the TRU Program for further processing and certification for shipment to the WIPP facility for permanent disposal. Transfer to the TRU Program is the WRP end point for CH TRU Waste.

Ship LLW to TSD Facility, Enter LLW Program – Retrieved LLW containers are transported to an appropriate TSD facility and enter the LLW Program for further processing and disposition at an on-site disposal facility selected by the DOE. Transfer to the LLW Program is the WRP end-point for CH LLW.

Ship MLLW to TSD Facility, Enter MLLW Program – Retrieved MLLW containers are transported to an appropriate TSD facility and enter the MLLW Program for further processing and disposition. Transfer to the MLLW Program is the WRP end-point for CH MLLW.

Post-Retrieval Trench Substrate Sampling and Analysis – Following retrieval, trench substrates are sampled to determine whether or not releases of contaminants to the environment have occurred, and if so, the nature and extent of contamination. A sample and analysis plan is developed and submitted to the state for approval prior to sampling. Sampling and analysis results are reported to the state. If contamination is identified a determination is made whether or not follow-on characterization or cleanup response actions are needed.

Assumptions:

1. Retrieval is defined as uncovering CH waste within the trenches and removing the CH waste from the trenches to a permitted and compliant TSD unit, or, for non-mixed waste, to a storage or disposal facility that DOE determines is appropriate.

2. Waste is designated no later than 90 days following transfer from the LLBG.

3. CERCLA authority documents are approved for disposition of all non-TRU waste and secondary waste streams by the end of FY 2007.

4. Environmental documents (NEPA, CERCLA, NTCRA, Notice of Compliance [NOC], TAPs, and FHA SB) required to retrieve waste are completed and approved.

5. The requirements of DOE-EIS-0113-SA04, *Supplement Analysis, Waste Retrieval from the 218-W-4C, 218-E-12B, 218-W-3A and 218-W-4B Low-Level Burial Grounds, 200 Area Hanford Site, Richland, Washington*, remain valid for drums and boxes.

6. Where waste designation cannot be made based on Acceptable Knowledge (AK) data, additional activities to achieve waste designation include:
   - Processing at T Plant, WRAP, or SWOC
   - Transfer between WRAP and T Plant
   - NDE/Linear Detector Array (LDA) analysis at WRAP
   - Sample analysis at 222-S
   - Characterization & remediation processing will be performed at T Plant., WRAP, or SWOC

7. Fiberglass Reinforced Plywood (FRP) boxes and plywood boxes are structurally stable to ensure safe lifting, transporting, and long-term storage while exposed to the environment. Waste boxes retrieved will be evaluated and where necessary minor repairs and/or protective coverings applied to fix breaches.

8. DOE-RL will develop plans to address non-RSW before it is encountered in Waste Retrieval operations.

9. Sampling of non-RSW for use in the 200-SW-2 data collection will be in accordance with the 200-SW-2 Data Quality Objective (DQO) Sampling and Analysis Plan (SAP) or other applicable agreements. Opportunistic sampling may be conducted as appropriate based on the plans and objectives specified in those documents.

10. Drums with greater than 1 g fissile gram equivalent (FGE) TRU content, based on SWITS records, and drums containing only uranium are handled as TRU waste and do not have to be assayed.

11. Drum movements within a burial ground will be treated as intra-facility transfers and are not subject to DOT criteria.

12. Drum management, retrieval, movement and shipment can be accomplished using commercial practices (e.g., wood pallets, standard fuel powered equipment, standard transfer/trailer systems) and associated generally accepted risks.

13. Wastes will be designated via process knowledge and burial record information with limited intrusive sampling. When process knowledge is not adequate, sampling will be conducted as required.

14. Based on the start-up readiness activities associated the start-up in 218-W-4B, it is assumed that a contractor-level Readiness Assessment will be required to commence waste retrieval operations in 218-E-12B and 218-W-3A.

15. For 218-E-12B, 100 percent of RSW drums will require over-pack. 100 percent of RSW boxes will require repair/stabilization or over-packing prior to retrieval.

16. For 218-W-4C, 60 percent of the drums retrieved will be TRU waste, and 40 percent will be LLW/MLLW.

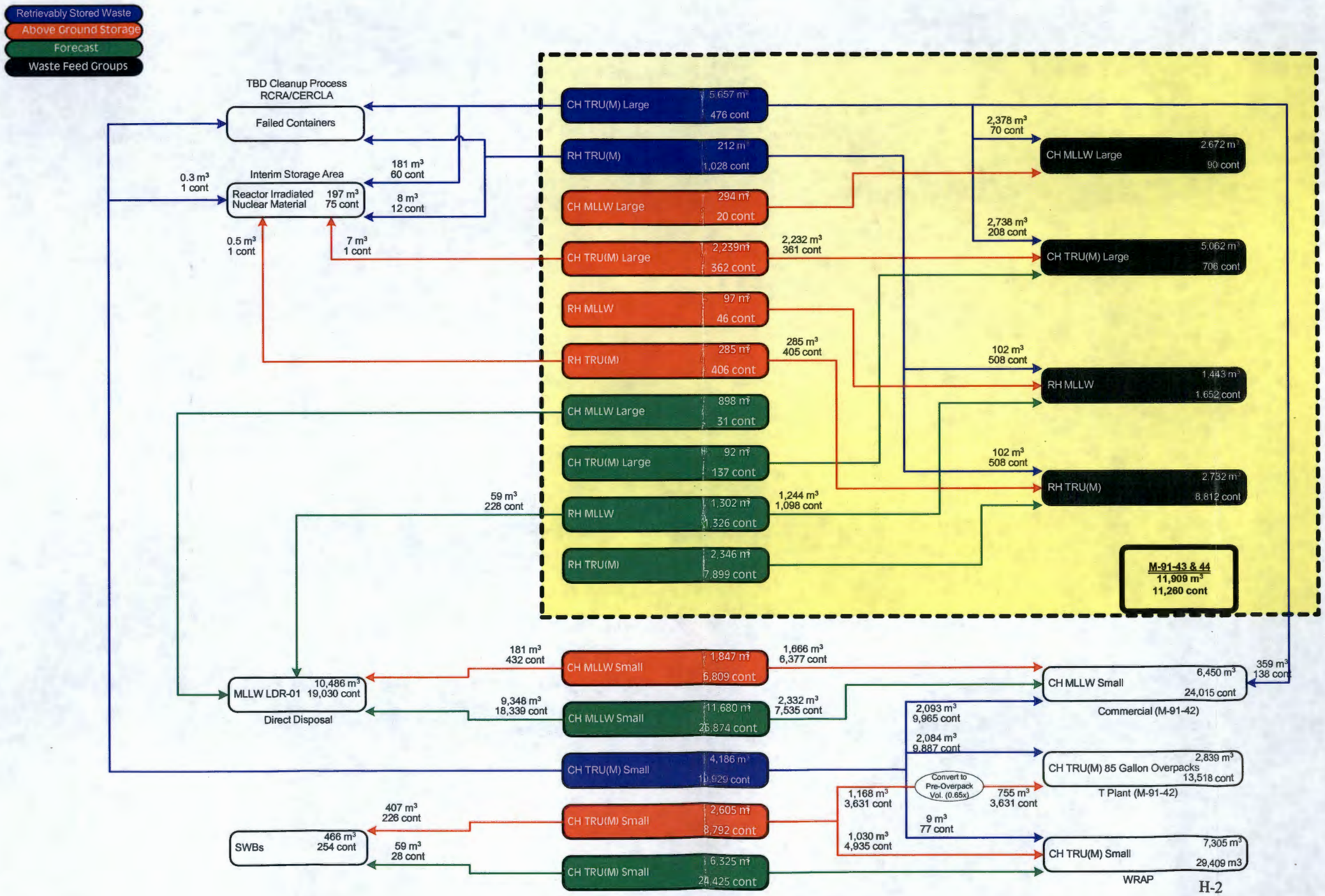
17. For 218-W-4B, 48 percent of the drums retrieved will be TRU waste and 52 percent will be LLW/MLLW.

18. For 218-W-4B, 100 percent of the drums will be over-packed.

APPENDIX H

PROCESSING FLOW DIAGRAM

2007 - 2035, Data as of 1/03/07



YELLOW CHART ASSUMPTIONS

Data Sources:

- TRU Retrieval and Storage Data from SWITS as of January 3, 2007
- Rules for re-assigning packages listed as CH in SWITS as RH are:
    1. Containers with a dose rate of >200 mR/hr
    2. Containers containing lead shielding
- Waste marked as LLW TSCA is not included in the MLLW volumes
- Classified waste is not included in data
- Waste identified as "German Logs" is not included. Includes packages CASTOR-GSF-001, -002, -003, -005, -006, -007, GNS-12-1, and GNS-12-2
- Forecast data taken from SWIFT 2007.0, represents life-cycle forecast January 2007 through September 30, 2035 with the exception of RH TRU tank waste
- Volumes for Retrieval and Storage are internal, volumes for forecast are external (e.g., 55-gallon drum is 0.208 m^3 internal waste, 0.257 m^3 external)

TRU Retrieval:

- Containers identified as Reactor Irradiated Nuclear Material based on process knowledge and SWITS record information
- Assumed 50/50 MLLW/TRUM split by volume and container count for retrieved suspect TRU waste
- Although there are assumed to be failed containers from the TRU Retrieval burial grounds, no assumptions regarding volume or count of containers have been made
- TRU Retrieval burial grounds consist of 218-W-3A, 218-W-4B, 218-W-4C, and 218-E-12B

Other:

- Container definitions are as follows:
    1. MLLW Small is containers with a volume less than 10 m^3
    2. MLLW Large is containers with a volume greater than 10 m^3
    3. TRU(M) Small is 55-gallon drums, containers smaller than a 55-gallon drum, 85-gallon over-packs, and SWBs
    4. TRU(M) Large is non-small containers

APPENDIX I

VOLUME CHANGES BETWEEN PMP REVISION 3 AND REVISION 2

Location	Waste Streams	2006 Volume (m^3)	Waste Retrieved	MLLW Disposal/TRU(M) Certification	Reclassified/Newly Generated	2007 Volume (m^3)
STORAGE	CH MLLW Small	2,528	NA	672	159	1,847
STORAGE	CH MLLW Large	126	NA			294
STORAGE	RH MLLW	148	NA	0	(51)	97
STORAGE	CH TRU(M) Small	1,132	NA	904	2,377	2,605
STORAGE	CH TRU(M) Large	2,764	NA	0	(525)	2,239
STORAGE	RH TRU(M)	261	NA	0	24	285
TRU RETRIEVAL	CH TRU(M) Small	4,905	1,499	NA	120	4,186
TRU RETRIEVAL	CH TRU(M) Large <10 m^3)	1,156		NA		5,657
TRU RETRIEVAL	CH TRU(M) Large >10 m^3)	5,161		NA		
TRU RETRIEVAL	RH TRU(M)	251	0	NA	(39)	212
FORECAST	CH MLLW Small	7,131				11,680
FORECAST	CH MLLW Large	820				898
FORECAST	RH MLLW	4,391				1,302
FORECAST	CH TRU(M) Small	7,169				6,325
FORECAST	CH TRU(M) Large	10,024				92
FORECAST	RH TRU(M)	1,009				2,346

Assumptions/Notes

1. The data sources for the 2006 and 2007 volumes are:
   a. Inventory - SWITS with data queries performed on 12/27/05 and 1/3/07
   b. Forecast - SWIFT2006.0 and SWIFT2007.0 datasets
   c. Waste retrieval, disposal, and certification numbers are as reported by the contractor.
2. The 2007 data run assigns TRU(M) 55 gallon drums packaged in 85 gallon overpacks to the "Small" category, the 2006 data run assigns them to the CH TRU(M) "Large <10 m^3" category
3. Waste in the "Reclassified/Newly Generated" includes:
   a. Waste assayed and/or recalculated resulting in change in waste type designation (e.g. TRU(M) assayed as to MLLW or LLW)
   b. Waste surveyed and/or recalculated resulting in change in change in waste handling designation
   c. Waste moved to another location (e.g. waste retrieved and placed in storage)
   d. Newly generated waste received for storage

APPENDIX J

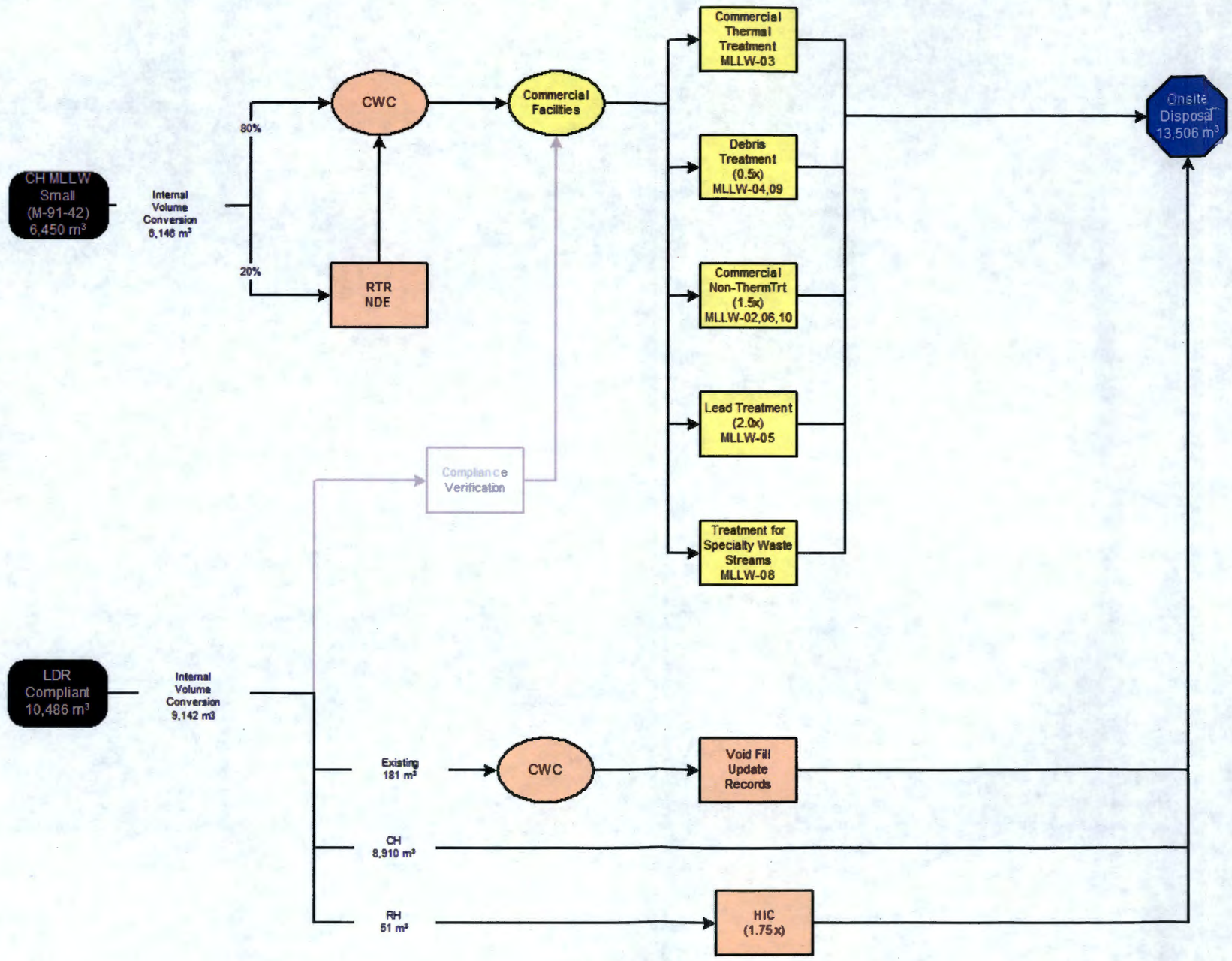
ESTIMATED VOLUMES GENERATED FROM WASTE PROCESSING

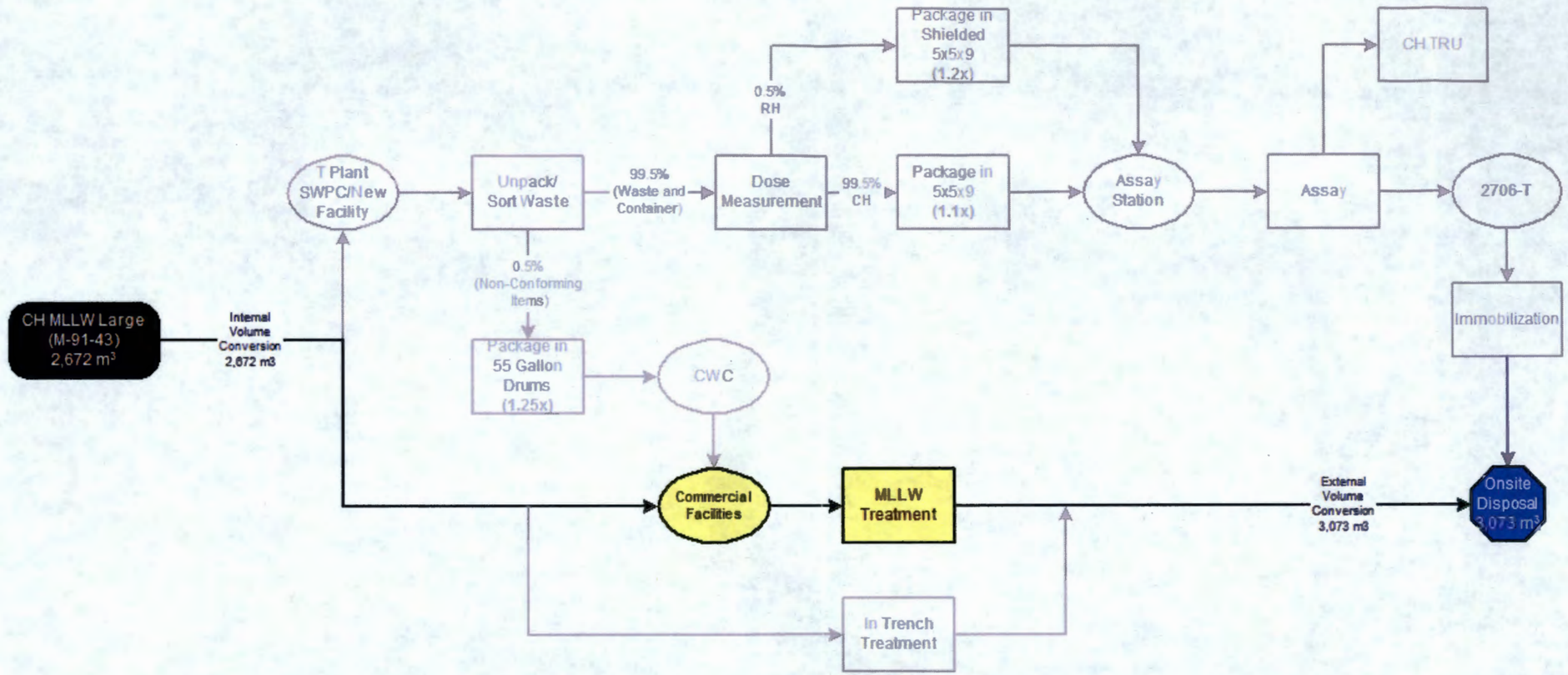
Estimated Volumes

Category	Feed Volumes (int)	Ending Volumes (int)					
		MLLW LDR-01	CH MLLW	RH MLLW	CH TRU(M)	RH TRU(M)	Totals
MLLW LDR-01	9,142	9,180					9,180
CH MLLW Small	6,146		4,326				4,326
CH MLLW Large	2,672		2,672				2,672
RH MLLW	1,281		769	768			1,537
CH TRU(M) Small	9,732		1,687		7,734		9,421
CH TRU(M) Large	5,050		1,492		5,978	11	7,481
RH TRU(M)	2,427		431	418	861	1,146	2,855
	36,450	9,180	11,377	1,186	14,573	1,157	37,473

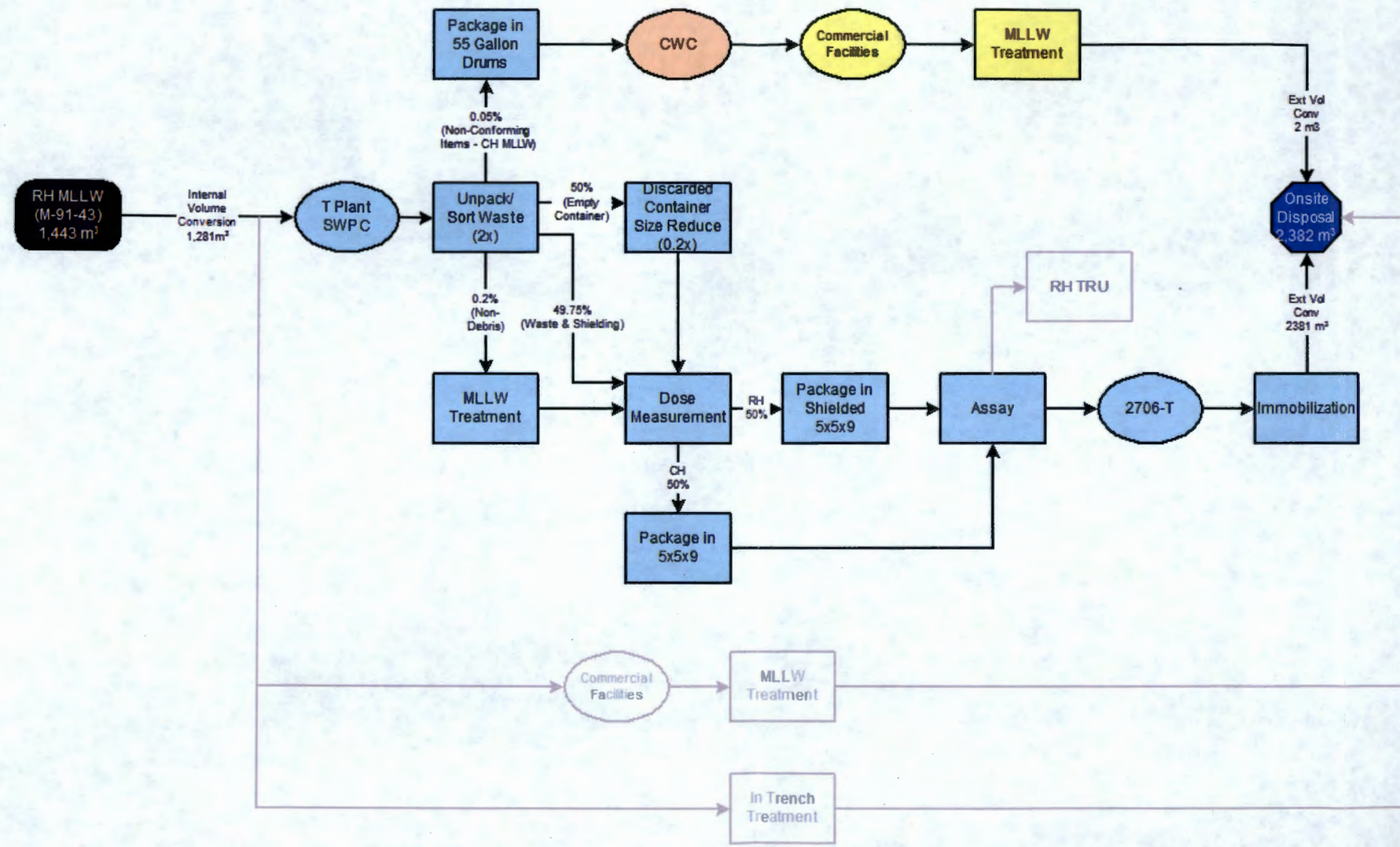
APPENDIX K

MLLW TREATABILITY GROUPS PROCESS FLOW DIAGRAMS


CH MLLW
Small
(M-91-42)
6,450 m³
Internal
Volume
Conversion
6,146 m³
80%
20%
CWC
RTR
NDE
Commercial
Facilities
Commercial
Thermal
Treatment
MLLW-03
Debris
Treatment
(0.5x)
MLLW-04,09
Commercial
Non-ThermTrt
(1.5x)
MLLW-02,06,10
Lead Treatment
(2.0x)
MLLW-05
Treatment for
Specialty Waste
Streams
MLLW-08
Onsite
Disposal
13,506 m³
Compliance
Verification
LDR
Compliant
10,486 m³
Internal
Volume
Conversion
9,142 m3
Existing
181 m³
CWC
Void Fill
Update
Records
CH
8,910 m³
RH
51 m³
HIC
(1.75x)



Note: Onsite disposal may consist of MWDT, ERDF, and/or IDF. This waste stream may also include offsite disposal.



Note: Onsite disposal may consist of MWDT, ERDF, and/or IDF.

Assumptions for MLLW Treatability Groups Process Flow Diagrams

CH MLLW Small (M-91-42)

- Twenty percent of newly generated or stored waste requires NDE before processing
- Volume multipliers are dependant on LDR waste code. Multipliers based on prior experience with current treatment techniques if applicable

LDR Compliant

- Waste is assumed to be disposed directly to the MWDT (or ERDF) with the exception of RH waste, which requires placement in a high integrity container (HIC)
- Multiplier on HIC accounts for increased volume required in the MWDT

CH MLLW Large (M-91-43)

- All CH MLLW containers greater than 10 m^3 are assumed to be able to be treated commercially. Experience with similar containers indicates no net increase or decrease in disposal volume
- In-trench treatment may be suitable for a portion of this waste stream

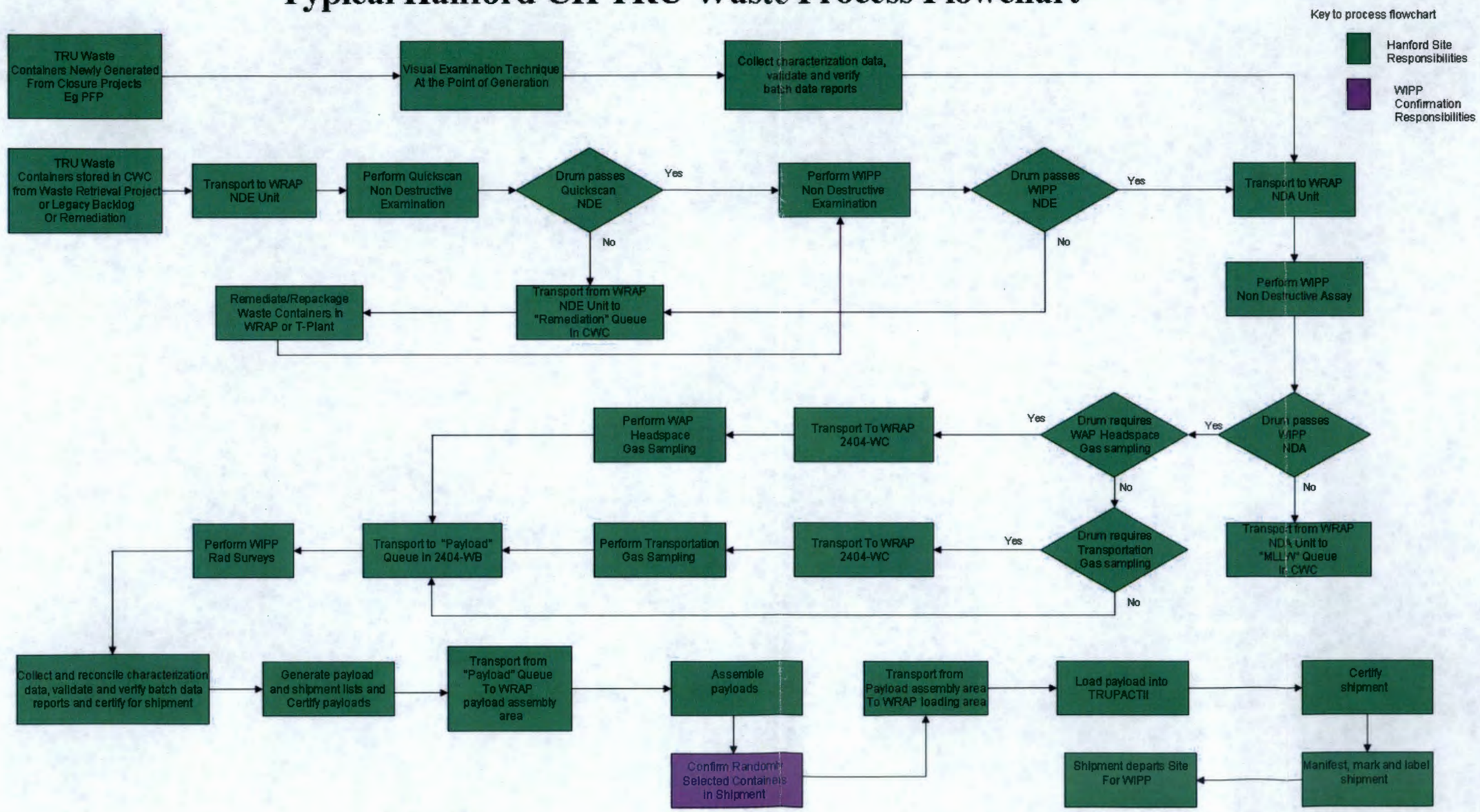
RH MLLW (M-91-42)

- All RH MLLW is unpacked and sorted with the discarded container size reduced to 20 percent of the original size
- A small portion (0.05 percent) of the waste items assumed to be non-conforming items or non-debris (0.2 percent) and segregated from other waste for treatment
- Waste unpacked from containers are assumed to be 50 percent RH and 50 percent CH
- The waste will then be treated using immobilization techniques
- A possibility exists that a portion of the waste could be identified as TRU following assay. It is assumed the likelihood of this occurring is small
- Capabilities may be available at a later date to be process part or all of this waste stream at commercial facilities
- In-trench treatment may be suitable for a portion of this waste stream

APPENDIX L

WIPP CERTIFICATION CH TRU WASTE PROCESS FLOWCHART AND ASSUMPTIONS

Typical Hanford CH TRU Waste Process Flowchart



Assumptions for FY 2007 and FY 2008:

1. WIPP Certification is maintained. The WIPP Central Characterization Project provides support to the Hanford TRU Project.

2. Resources are maintained to operate three drum repackaging lines (one at WRAP and two at T Plant). In FY 2008 two additional repackaging crews will be added to T Plant

3. Resources are maintained to operate WRAP NDE, NDA, HSG and associated drum movement at a throughput rate of 80 drums per week. Also resources to support transport of waste between CWC, WRAP and T Plant to meet the above operations. A second shift will be added to WRAP in mid-FY 2008 to perform characterization and waste transport

4. Current planning assumes resources to characterize, verify, validate, and certify 400 m^3 of compliant CH TRU waste in FY 2007. This 400 m^3 of certified waste constitutes 300 m^3 from three repackaging process lines and 100 m^3 from sources that do not require repack (for example, non-overpacked drums from retrieval, newly generated waste, new waste stream approvals and carry-over from previous year processing). In FY 2008, production will be increased to 600 m^3 by adding additional crews at T Plant

5. Sufficient resources are available to prepare the waste streams slated for near-term approval.

6. Solids sampling and analysis performed at INL will support the plan to have all waste streams approved by 2011

7. Resources to ship up to eight shipments per month through September 2008

8. Funding will be provided to meet production goals

9. Estimates are based on Hanford self-performing all characterization activities

10. WIPP provides TRUPACT trailers and shipping containers at a rate sufficient to meet shipping requirements (i.e., shipments to WIPP and shipments to other sites such as INL for coring and analysis)

11. Waste will be packaged in 55-gallon drums, SWBs, and TDOPs

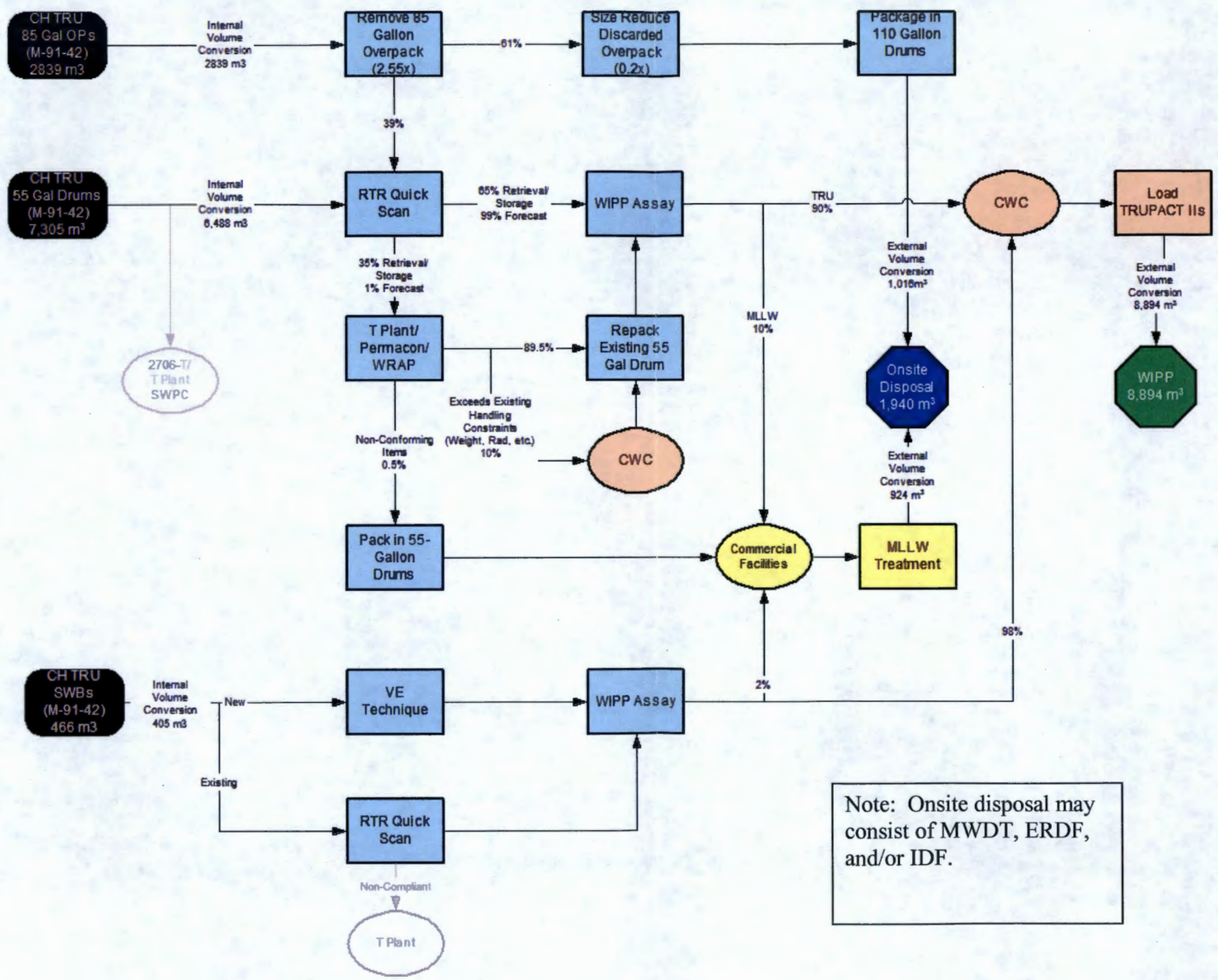
12. CH TRU waste is acceptable for WIPP and does not include:
    a. Shielded containers to CH levels
    b. RH waste
    c. LabPacks

13. Head-Space Gas Sampling and/or flammable gas sampling and analysis will be fully funded for FY 2007 and FY 2008 including the use of WSCF

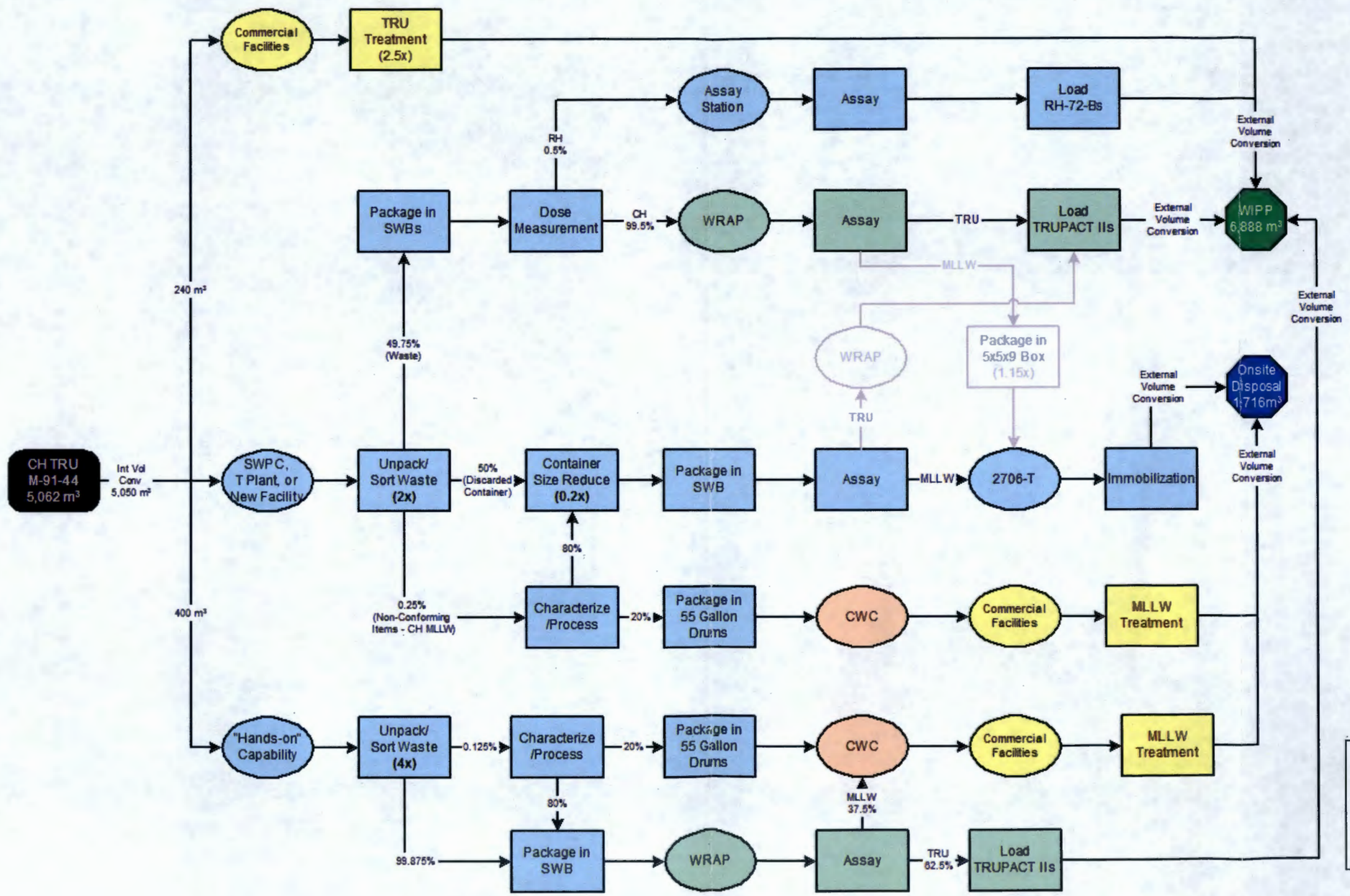
14. There are no significant revisions to the regulatory and requirements documents that are relevant to WIPP processing and shipping

APPENDIX M

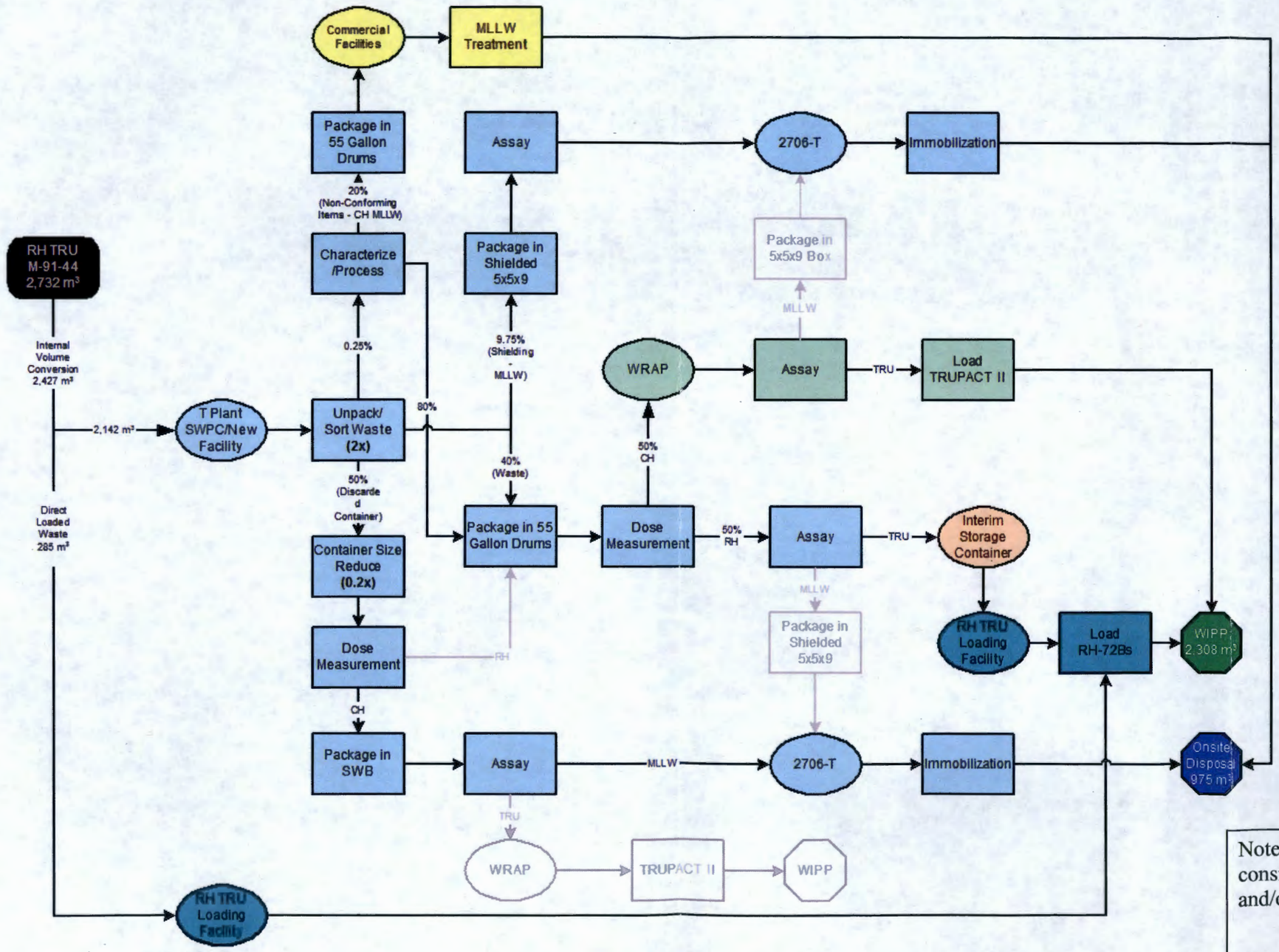
TRU WASTE TREATABILITY GROUPS PROCESS FLOW DIAGRAMS



Note: Onsite disposal may consist of MWDT, ERDF, and/or IDF.



Note: Onsite disposal may consist of MWDT, ERDF, and/or IDF.



Note: Onsite disposal may consist of MWDT, ERDF, and/or IDF.

Assumptions for TRU Waste Treatability Groups Process Flow Diagrams

CH TRU 85-Gallon Overpacks (M-91-42)

- Overpacks are separated from the 55-gallon drum, size reduced, and discarded as MLLW
- The remainder of the processing steps for the 55-gallon drum removed from the overpack are identical for drums in storage

CH TRU 55-Gallon Drums (M-91-42)

- 129 m^3 of CH TRU Drums in storage are assumed to be certified as of January 3, 2007
- Thirty-five percent of the drums from storage/retrieval and one percent of newly generated drums are assumed to require sorting/repackaging following a NDE quick scan
- During drum repack, it is assumed that five percent of the waste volume will be segregated, repacked in drums and treated as MLLW
- Ten percent of the drums requiring repack will not meet specifications of current capabilities and will require modification of WRAP
- Ten percent of the waste is assumed to be reclassified as MLLW following NDA

CH TRU SWB (M-91-42)

- All newly generated SWBs are assumed to be packaged using Visual Examination and do not require NDE or rework. SWBs not packaged using Visual Examination require an NDE
- Two percent of the SWBs are assumed to be reclassified as MLLW following NDA

CH TRU Large (M-91-44)

- Waste to be treated either commercially, using "hands-on" capability or through future on-site capabilities (i.e., SWPC, T Plant, new facilities)
- Volume increases from commercial and "hands-on" processing are due to waste generated from the discarded container, failed process equipment, and processing consumables (protective clothing, plastic, etc.)
- 37.5 percent of waste processed using "hand-on" capability is assumed to assay as MLLW
- Waste processed through future capabilities (i.e., SWPC, T Plant, or new facilities) is unpacked/sorted with the discarded container sized reduced and treated as MLLW. The remainder of the waste is packaged in SWBs
- 0.5 percent of the repackaged waste is assumed to be RH
- A possibility exists that a portion of the waste could be identified as TRU following assay and that repackaged waste could assay as MLLW. It is assumed the likelihood of this occurring is small

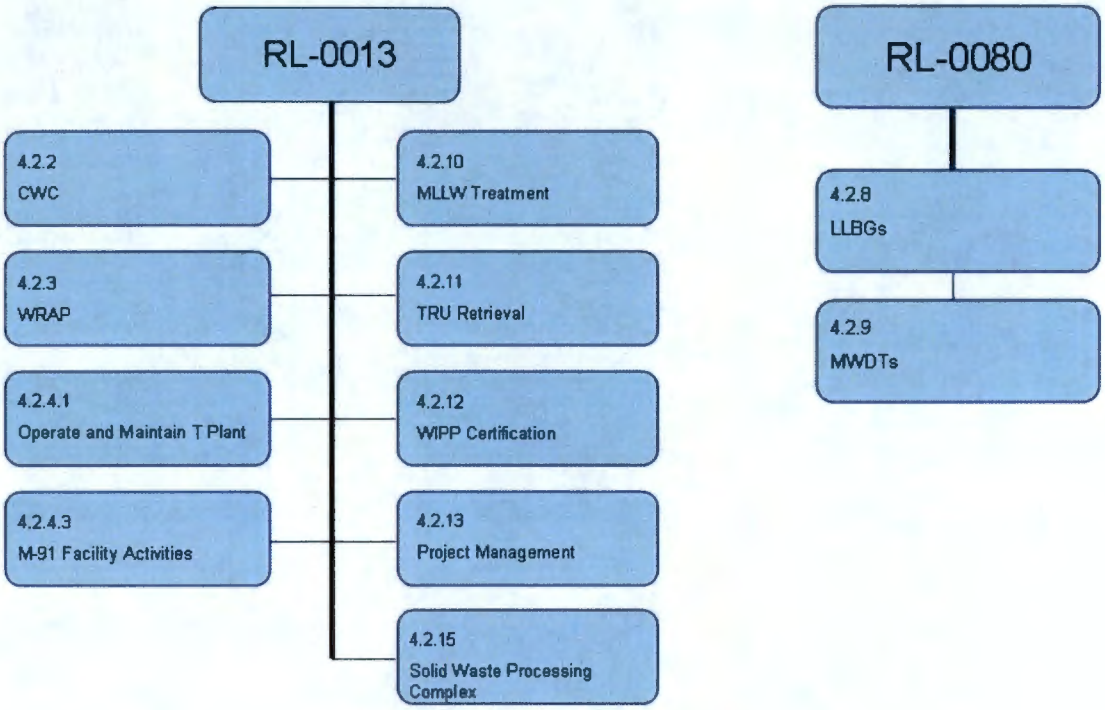
RH TRU (M-91-44)

- A portion (285 m^3) of the forecasted RH waste will be certified and can be loaded into RH-72Bs for disposal without rework
- RH TRU waste is assumed to be processed at the SWPC
- Discarded containers and non-conforming items are assumed to be CH MLLW
- Shielding from existing containers is assumed to be five percent of the original volume and is assumed to assay as RH MLLW
- Waste will be repacked into 55-gallon drums, with 50 percent assumed to be CH TRU and 50 percent RH TRU
- A possibility exists that a portion of the waste could be identified as TRU following assay and that repackaged waste could assay as MLLW. It is assumed the likelihood of this occurring is small

APPENDIX N

WBS ELEMENTS APPLICABLE TO THE PROJECT MANAGEMENT PLAN

WBS Hierarchy



Description of Work Scope

WBS 4.2.2 CWC – This activity provides for the safe and compliant interim storage of CH LLW, MLLW, TRU waste, and waste from onsite and offsite generators at the CWC (see Figure M-1). The CWC will operate through FY 2032 and then be RCRA clean-closed in FY 2033 for transfer to D&D.

Figure M-1. Central Waste Complex

WBS 4.2.3 WRAP – This activity provides for the safe and compliant receipt, verification, storage, repackaging or treatment (if necessary), certification, and shipment of LLW, MLLW and TRU waste. WRAP (see Figure M-2) receives containers of CH waste from generators, staging areas, CWC, Waste Retrieval Operations, LLBG, and T Plant. Radioactive waste is processed in three operational areas (the Shipping and Receiving Area, the NDE and NDA Area, and the Process Area), and staged in an outside storage area.

Figure M-2. WRAP

WRAP activities include:

- Shipping and receiving
- Waste container handling
- Waste staging and storage NDE and NDA (see Figure M-3)
- Waste treatment (e.g., noncompliant item removal [see Figure M-4])
- Verification, packaging and repackaging, head-space gas sampling (HSGS), and drum venting
- TRUPACT II loading

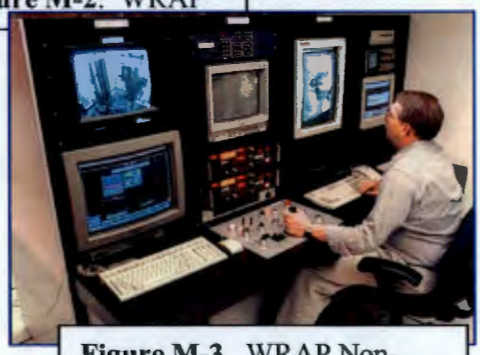


Figure M-3. WRAP Non-Destructive Measurements

After completion of CH retrieval waste repackaging activities, WRAP will continue to support WIPP waste certification and waste loading activities. WRAP will be operated through FY 2032 and then be transitioned to D&D. Expanded waste certification and waste loading capacity for TRUPACT II's will be evaluated to meet M-91-42 and M-91-44 needs.

WBS 4.2.4.1 Operate and Maintain and T Plant – This activity provides for the safe and compliant operation of the T Plant Complex (see Figure M-5). T Plant performs waste processing (i.e., characterization, segregation, and repacking services) in support of Hanford Site closure and provides interim storage for K Basins Sludge until its final disposition. T Plant will be operated through FY 2028 and then be transitioned to D&D in FY 2029.

WBS 4.2.4.3 M-91 Facility Activities (Note: In FY 2008 this work scope moves to WBS 4.2.15) – This activity includes the SWPC that will provide capability to treat and process RH MLLW, RH TRU waste, MLLW in large containers, and TRU waste in large containers. This waste is either 1) forecast to be generated during Hanford Site cleanup, 2) currently in above-ground storage, or 3) planned to be retrieved from storage in the Low Level Burial Grounds. Approximately 10,000 m^3 of this MLLW and TRU waste will require treatment and processing through the SWPC prior to disposal. The SWPC will process containers ranging in size from one gallon cans to 20 ft x 13 ft x 11 ft boxes. Waste containers can be as heavy as 83,000 pounds. External radiation levels on individual packages identified as M-91 feed could be as high as 20,000 R/hr. The treated MLLW will be disposed at Hanford in the existing Hanford MWDTs, ERDF, or the future IDF. The processed and certified TRU waste will be disposed in WIPP.

Figure M-4. WRAP Glovebox

The current baseline is to modify T Plant to include the SWPC. The SWHF will be an addition to the south end of the 221-T Canyon. Located in the SWHF will be airlocks that provide access to the 221-T Canyon waste processing modules. Waste containers, spare parts, and supplies for the SWPC will be received, shipped, and stored in the SWHF. In addition, the SWHF will have the Process Control/Support Area for the SWPC. During construction, the SWHF will provide access to the 221-T Canyon for removal of debris from canyon cleanup and for insertion of processing modules components.

Figure M-5. T Plant Waste Processing

In addition, the 2706-T Facility (another T Plant complex building) will be used to microencapsulate (treat) MLLW that has been processed in the SWPMs. The SWPC will sort, size-reduce, and package a minimum of 600 m^3 of TRU waste and 300 m^3 of MLLW waste per year. The facility is expected to commence operations by June 2017.

Other activities supported by this WBS include:

- Establishing off-site and on-site processing capability for selected CH TRU waste in containers (generally less than 10 m^3) prior to the construction of capabilities to process the remainder of the RH and/or large TRUM waste. This future capability is being pursued to support the M-91-44 commitment to treat/certify TRUM waste at a rate of 300 m^3 per year by June 30, 2012.
- Establishing on-site capability for direct-loading of certified RH TRU waste into WIPP shipping containers/casks that is independent from future capabilities to process RH TRU waste. This supports a WIPP need for earlier shipment of RH waste from Hanford as well as the M-91-44 300 m^3 per year processing rate.
- Expanding use of commercial capabilities to treat M-91-43 MLLW to support the M-91-43 treatment rate of 300 m^3 per year.

- Evaluating benefits of constructing a SWPC facility to process large container and RH waste rather than modifying T Plant to house the SWPC. The evaluation includes early integration of safety into the SWPC design as well as benefits of both sites. This study is planned to be complete by March 2008.

WBS 4.2.8 LLBGs – This activity provides for the safe and compliant operation of the LLBG (Figure M-6). The LLBG contains LLW, suspect TRU waste, and Reactor Irradiated Nuclear Materials. The suspect TRU waste is retrievably stored.

Figure M-6. Low-Level Burial Grounds.

The LLBG contains two lined mixed waste trenches (#31 and #34) which are included in WBS 4.2.9. The formerly active unlined trenches, within seven burial grounds, are no longer used. The unlined trenches are monitored and maintained. Maintenance includes subsidence, contamination control, caisson filter maintenance, access control, and fire control. LLBG operations will continue through FY 2033 and then transfer to D&D and be closed.

WBS 4.2.9 MWDTs – This activity provides for the safe and compliant operation of the MWDT (see Figure M-7) for receipt and/or disposal of LLW and MLLW from generators approved by DOE-RL, management of leachate generated at the MWDT, and maintenance of the leachate transport tanker. There are currently two operational trenches, Trench 34 and Trench 31, located within the 218-W-5 Burial Ground, 200 West Area. MLLW disposal in the MWDT requires maintaining the capacity to transport leachate to the 200 ETF for treatment and disposal. Waste treatment/ storage/disposal requests from generators are approved by DOE-RL. Operation of the MWDT will continue through FY 2032, and then be closed.

Figure M-7. Mixed Waste Disposal Trenches.

WBS 4.2.10 MLLW Treatment – This activity provides for preparation of MLLW packages in storage (above-ground or retrieved from the LLBG) for thermal and non-thermal treatment, as required. Activities include establishing off-site MLLW treatment/disposal contracts, shipping MLLW packages that have been determined to be LDR compliant to the MWDTs or ERDF for disposal, and in-treatment treatment of selected waste containers when approved. Figure M-8 shows MLLW treatment. MLLW Treatment is on-going and will be completed in FY 2032.

WBS 4.2.11 TRU Retrieval – This activity provides for retrieval of suspect TRU waste from the LLBG (218-W-4C, 218-W-4B, 218-E-12B, and 218-W-3A). Retrieval (see Figure M-9) consists of:

- Removing soil over CH waste containers within the trenches
- Removing the CH waste containers from the trenches
- Assaying/venting the containers as required
- Waste designation and sampling
- Shipping the containers to the appropriate TSD facility.

Figure M-8. MLLW Treatment.

Removal of the CH Waste will continue through the end of calendar year 2010. Remaining retrieval activities for RH waste are scheduled to commence in 2011 and be completed by 2018.

Figure M-9. Waste Retrieval

WBS 4.2.12 WIPP Certification – This activity provides for maintaining WIPP Certification, compliant with Carlsbad Field Office (CBFO) requirements, to allow shipments of TRU waste (see Figure M-10) to New Mexico.

Activities support meeting production and program requirements for shipment of TRU waste to WIPP in Carlsbad, New Mexico. The TRU waste has to meet rigorous WIPP WAC, which requires that each container be processed through visual examination (VE) technique, NDE, NDA, and HSGS, verified, validated and certified before shipment to WIPP. A data package for each container is also prepared. WIPP performs an audit annually to determine if the program at Hanford to certify wastes to meet WIPP WAC is compliant.

Figure M-10. Waste Shipments to WIPP

Shipment of RH TRU waste will begin after capabilities are added for shipment (Not included in WBS 4.2.12). The primary facilities for these operations are CWC, WRAP and T Plant or new facilities. This activity continues through FY 2032.

WBS 4.2.13 Project Management – This activity provides for "cross cutting" project management and technical support activities for the WSD Sub-Project and includes both labor and non-labor resources.

The centralized "cross-cutting" management staff includes senior-level WSD management. Also included are "cross cutting" support management and staff to the overall Project, such as strategic planning, human resources, Buyer/Procurement staff, Project Controls (e.g., schedulers/cost analysts),

WSD Work Management managers and administrative, secretarial and clerical support, waste services, safety and regulatory leadership, and ensuring required interfaces with other contractors or subprojects are appropriately identified and managed. In addition to "cross cutting" staff, there are a variety of "cross cutting" assessments, such as radiation dosimetry, HLAN support services, telephones, medical and laundry support. Waste Services provides waste management and transportation services to expedite waste handling from generation to disposal. These services are provided to Hanford Site waste generators, solid waste facilities, and waste generators at other DOE sites that send waste to the Hanford Site for disposal, as directed by DOE-RL.

The technical support provides for managing WSD engineering functions, including nuclear and criticality safety engineering, and provides direction and oversight management to all engineering activities, including occurrence reporting support, Price-Anderson Amendment Act of 1988 (PAAA) compliance oversight, and management of self-assessments and corrective action management support. This activity includes development and maintenance of all WSD procedures, including transportation and packaging, records management, issues management reporting and tracking, sub-project management oversight and program support and preparation of the annual LDR Report and maintenance of a LDR database. Furthermore, this activity develops and issues the annual Quality Improvement Plan and manages the overall Quality Assurance Program being implemented and maintained to detect and prevent quality assurance problems at WSD Facilities.

The WSD Sub-Project Management activities continue through FY 2033.

APPENDIX O

FUNDING PROFILE

Funding Profile
(Thousands of Dollars)

WBS	SCOPE	Lifecycle	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
4.2.2	CWC	$282,667	$7,912	$8,230	$8,483	$8,678	$8,878	$9,082	$9,291	$9,504	$9,723	$9,947	$10,175	$10,409	$10,649	$10,813
4.2.3	WRAP	$422,539	12,474	12,788	13,049	16,153	13,219	14,510	13,834	14,152	14,478	14,814	15,154	15,503	15,859	16,105
4.2.4.1	Operate and Maintain the T Plant Facility	$428,092	17,202	15,021	19,657	20,330	23,225	16,218	15,711	16,073	16,442	16,820	17,207	17,603	18,008	18,287
4.2.4.3 / 4.2.15	M-91 Facility Activities / SWPC	$1,082,358	3,295	19,562	42,504	58,224	51,908	81,464	103,228	98,851	81,960	65,180	50,844	34,460	35,448	35,997
4.2.8	LLBGs	$53,864	1,763	1,890	1,669	1,545	1,581	1,617	1,655	1,693	1,732	1,771	1,812	1,854	1,896	1,926
4.2.9	MWDTs	$18,123	1,005	412	1,025	439	1,072	5,234	470	5,478	137	140	143	146	150	152
4.2.10	MLLW Treatment	$242,570	13,670	13,943	73,167	19,056	7,338	7,707	7,838	8,101	8,483	8,506	8,307	8,273	6,535	3,760
4.2.11	TRU Retrieval	$298,079	32,506	40,999	50,575	60,758	36,931	25,539	6,521	6,684	6,851	7,009	7,170	16,536		
4.2.12	WIPP Certification	$773,689	21,854	30,057	35,794	37,703	42,936	28,031	23,062	23,592	24,135	24,690	25,258	25,839	26,433	27,035
4.2.13	Project Management	$630,802	19,091	20,403	21,207	21,695	22,194	22,705	22,944	23,472	24,012	24,564	25,129	25,707	26,298	26,705
	TOTAL	**$4,232,784**	**$130,771**	**$163,306**	**$267,129**	**$244,583**	**$209,281**	**$212,107**	**$204,554**	**$207,600**	**$187,952**	**$173,441**	**$161,200**	**$156,330**	**$141,276**	**$140,779**

WBS	SCOPE	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35
4.2.2	CWC	$11,062	$11,317	$11,577	$11,843	$12,116	$12,394	$12,679	$12,971	$13,269	$13,574	$13,887	$14,206			
4.2.3	WRAP	16,475	16,854	17,242	17,638	17,550	17,954	18,367	18,789	19,222	19,664	20,116	20,578			
4.2.4.1	Operate and Maintain the T Plant Facility	18,707	19,137	19,578	20,028	20,488	19,891	20,348	20,816	21,295						
4.2.4.3 / 4.2.15	M-91 Facility Activities / SWPC	36,824	37,671	38,538	39,424	40,331	41,259	42,208	43,178							
4.2.8	LLBGs	1,970	2,015	2,062	2,109	2,158	2,207	2,258	2,310	2,363	2,417	2,473	2,530	2,588		
4.2.9	MWDTs	155	159	163	166	170	174	178	182	186	191	195	200			
4.2.10	MLLW Treatment	3,497	4,635	4,658	5,378	5,101	5,022	5,029	5,331	2,134	2,515	1,994	2,591			
4.2.11	TRU Retrieval															
4.2.12	WIPP Certification	27,657	28,293	28,944	29,610	30,291	30,989	31,701	32,429	33,176	33,940	34,720	35,518			
4.2.13	Project Management	27,319	27,947	28,590	29,248	29,920	27,627	23,484	24,025	22,673	18,166	15,432	15,665	6,127	4,178	4,275
	TOTAL	**$143,667**	**$148,029**	**$151,350**	**$155,445**	**$158,126**	**$157,517**	**$156,252**	**$160,031**	**$114,319**	**$90,467**	**$88,817**	**$91,289**	**$8,715**	**$4,178**	**$4,275**

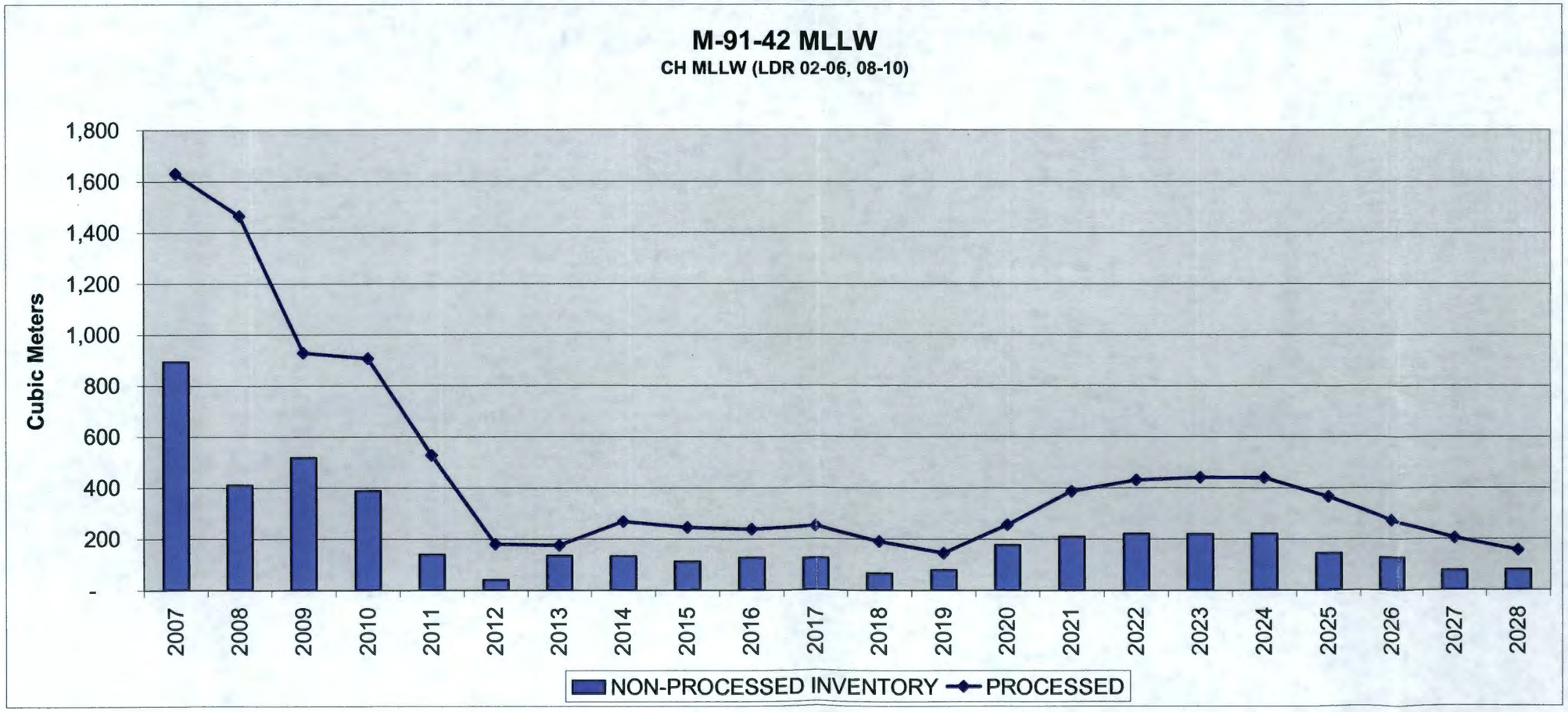
Notes:

1. Dollars are escalated
2. MLLW Treatment with requested additional FY 2008 funding would be $45.9M ($13.9M + $32.0M). This additional FY 2008 funding would reduce FY 2009 funding to $41.2M.

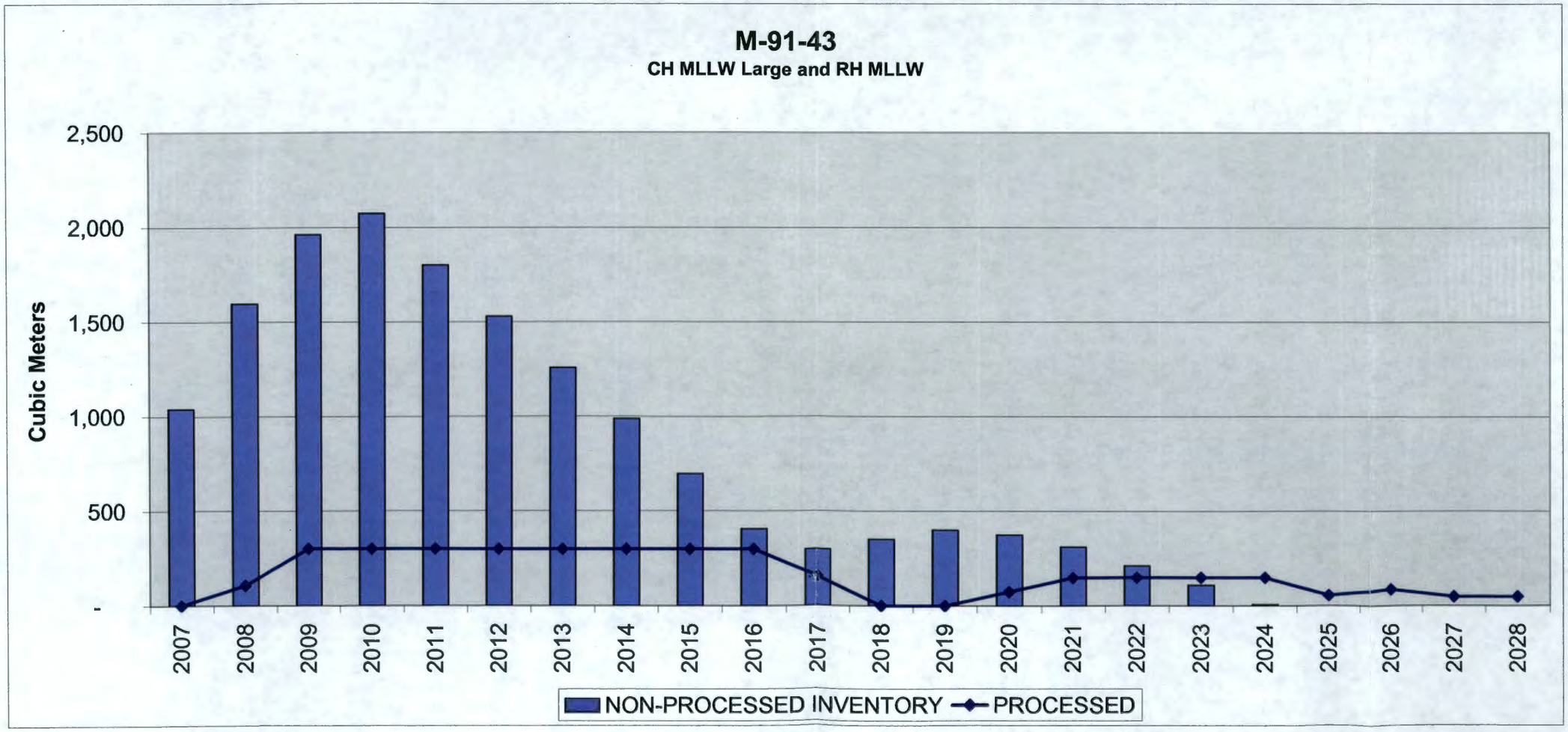
APPENDIX P

M-91 MLLW PROCESSING SCHEDULES

FEED	INV	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retrieval	-	679	679	679	416	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Storage	1,666	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast	-	10	28	28	33	30	29	24	24	28	55	82	101	99	104	99	122	118	121	120	122	116	122
From RH TRU Processing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45	90	90	90	90	33	52	29	29
From CH_TRU Large Processing	-	-	-	-	-	-	-	90	90	120	150	150	31	61	122	122	122	122	122	122	67	-	-
From RH TRU Processing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63	77	77	77	76	6	10	6	6
From CH TRU Small	-	170	275	329	329	250	53	157	154	78	49	19	0	0	21	32	33	33	33	10	4	3	3
PROCESSED																							
	-	1,630	1,465	929	907	529	181	177	270	247	240	253	192	146	258	387	431	441	441	367	273	204	157
NON-PROCESSED INVENTORY																							
	1,666	894	411	518	389	140	41	136	134	113	127	126	66	80	178	210	222	220	221	146	128	77	80



FEED	INV	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retrieval	-	658	658	658	404	23	23	23	23	3	3	3	3	-	-	-	-	-	-	-	-	-	-
Storage	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast	-	6	6	6	6	6	6	6	6	6	6	49	49	49	49	88	48	48	48	48	87	48	48
PROCESSED																							
	-	-	106	300	300	300	300	300	300	300	300	159	-	-	75	150	150	150	150	55	87	48	48
NON-PROCESSED INVENTORY																							
	375	1,039	1,598	1,962	2,072	1,801	1,530	1,258	987	696	405	299	351	400	375	313	211	109	7	0	0	0	0



Assumptions for M-91 MLLW Processing Schedules

M-91-42 MLLW

- Includes CH MLLW in LDR Waste Groups (LDR 02-06, 08-10)
- 1,630 m^3 are scheduled to be processed in 2007, 1,465 m^3 in 2008 and to be current by end of 2009. Note: "current" defined as processing waste within a year of receipt. Processing rates for 2010-2028 assume 50 percent of waste received in current year and 50 percent of previous year is processed with remainder of current year in inventory

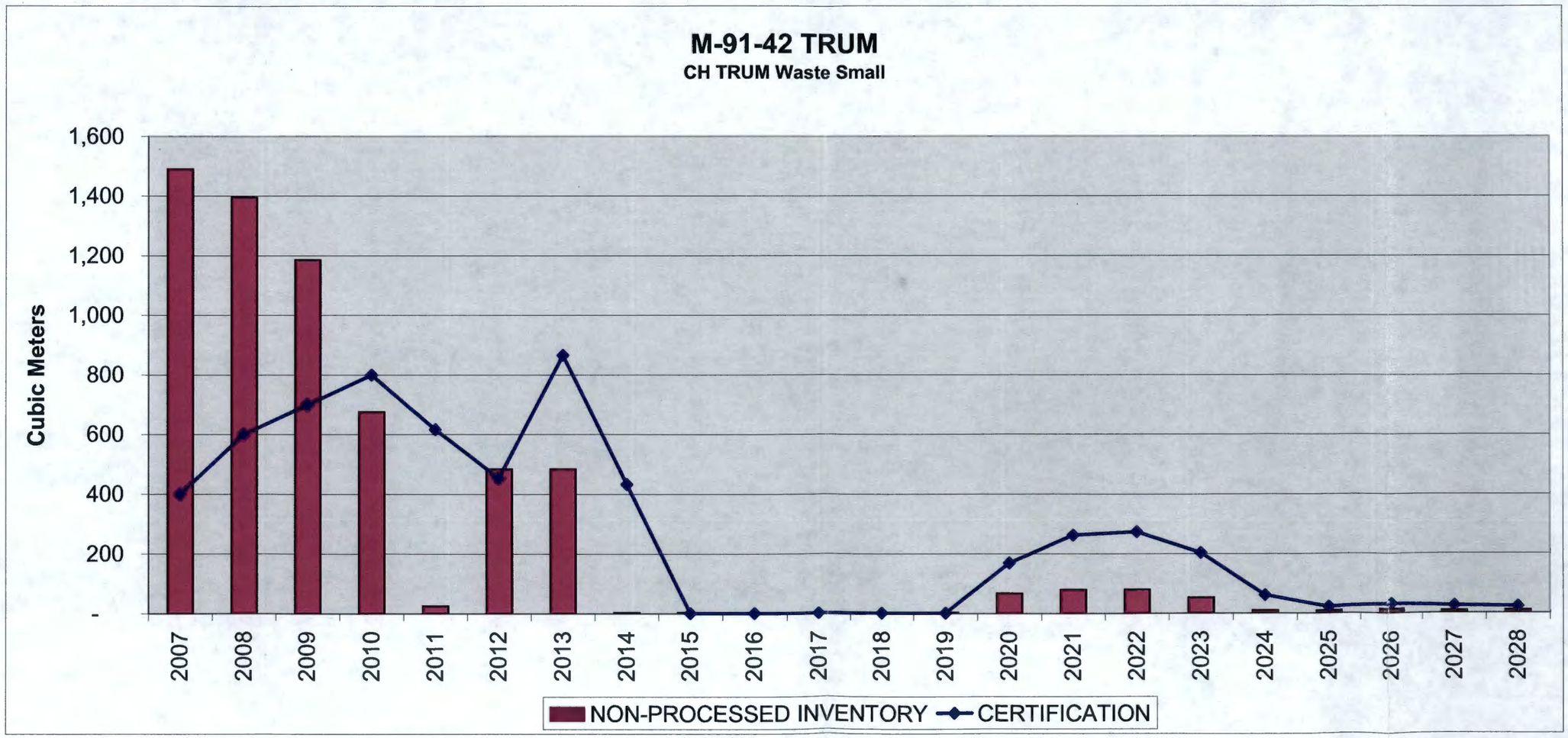
M-91-43

- Includes CH MLLW Large and RH MLLW excluding LDR Waste Group LDR-01
- Processing rates are:
    - CH MLLW Large – Process 106 m^3 commercially in 2008 for a cumulative total at end of year of 300 m^3. Continue processing at a rate of 300 m^3/yr through 2017 until end of inventory
    - RH MLLW – Process 75 m^3 in 2020 and increase maximum processing to 150 m^3/yr through completion of waste stream

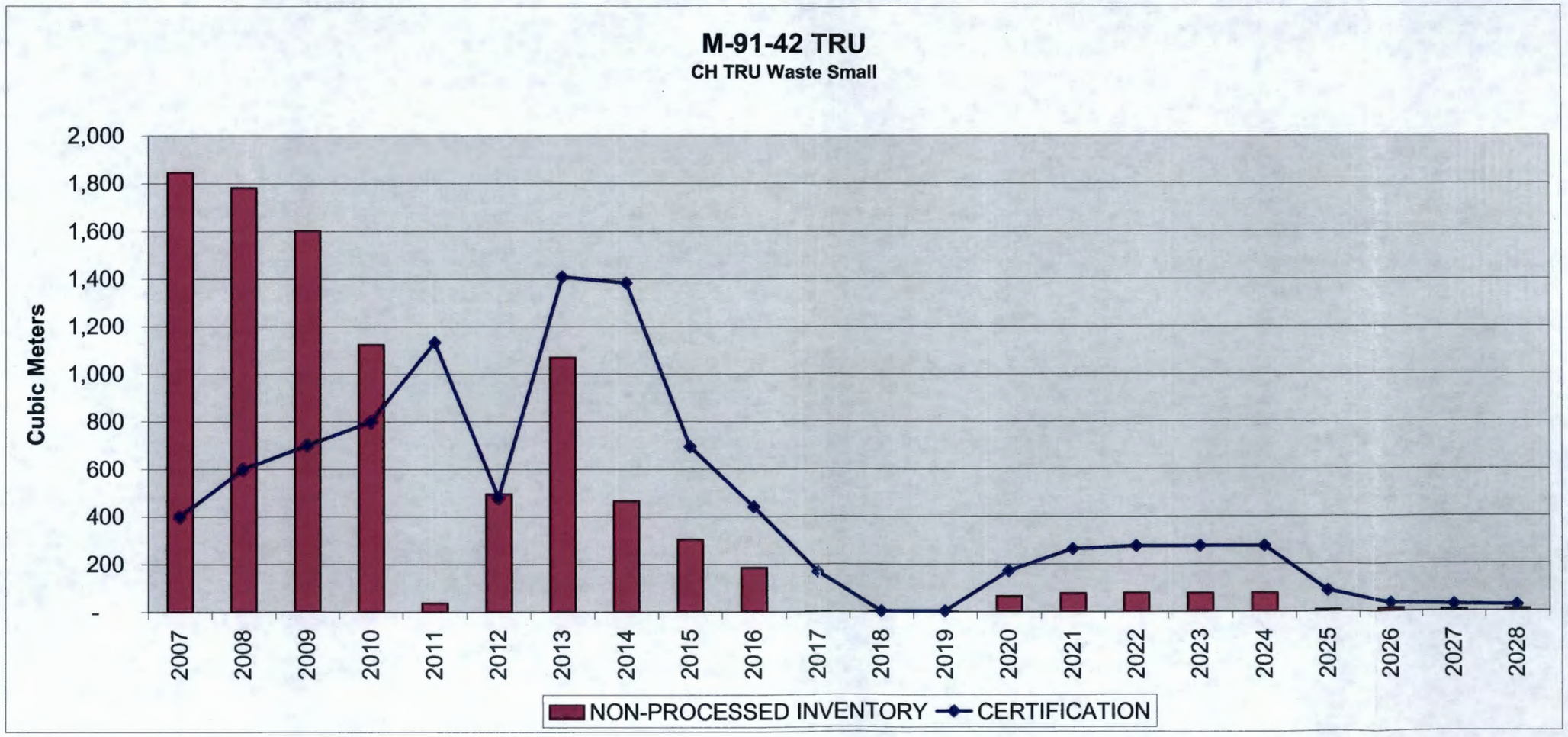
APPENDIX Q

M-91 TRU WASTE PROCESSING SCHEDULES

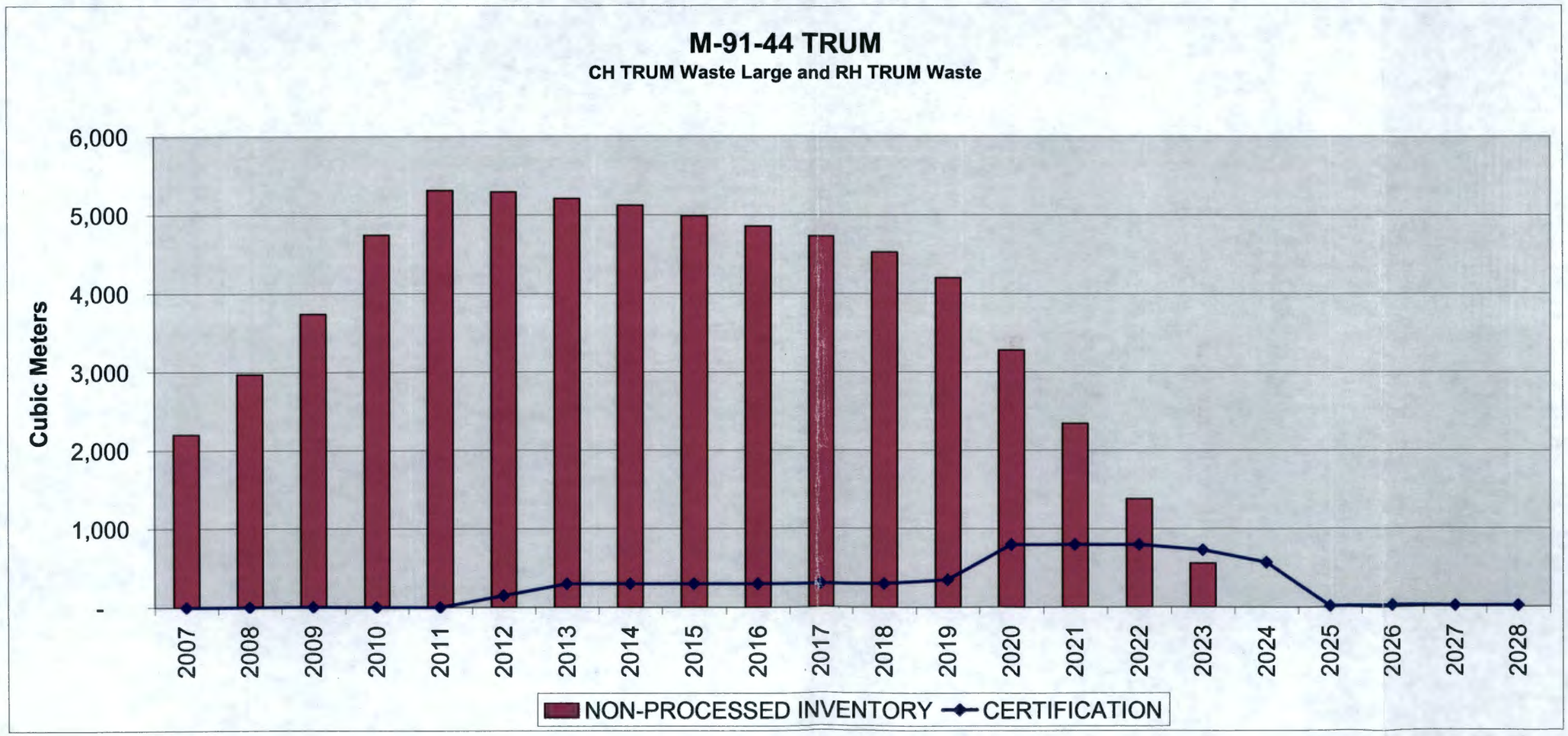
FEED																							
	INV	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retrieval	-	579	579	579	355	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Storage	1,348	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast	-	22	8	7	41	46	963	963	2	2	2	1	3	1	2	1	2	1	2	1	2	1	2
From RH TRU Processing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*126*	*153*	*153*	*100*	*11*	*12*	*19*	*11*	*12*
CERTIFICATION																							
	-	400	600	700	800	617	454	866	434	1	1	1	2	2	170	263	275	204	62	22	32	25	22
NON-PROCESSED INVENTORY																							
	1,344	1,491	1,396	1,186	676	26	484	484	4	4	4	3	4	3	67	80	81	54	10	9	14	9	10



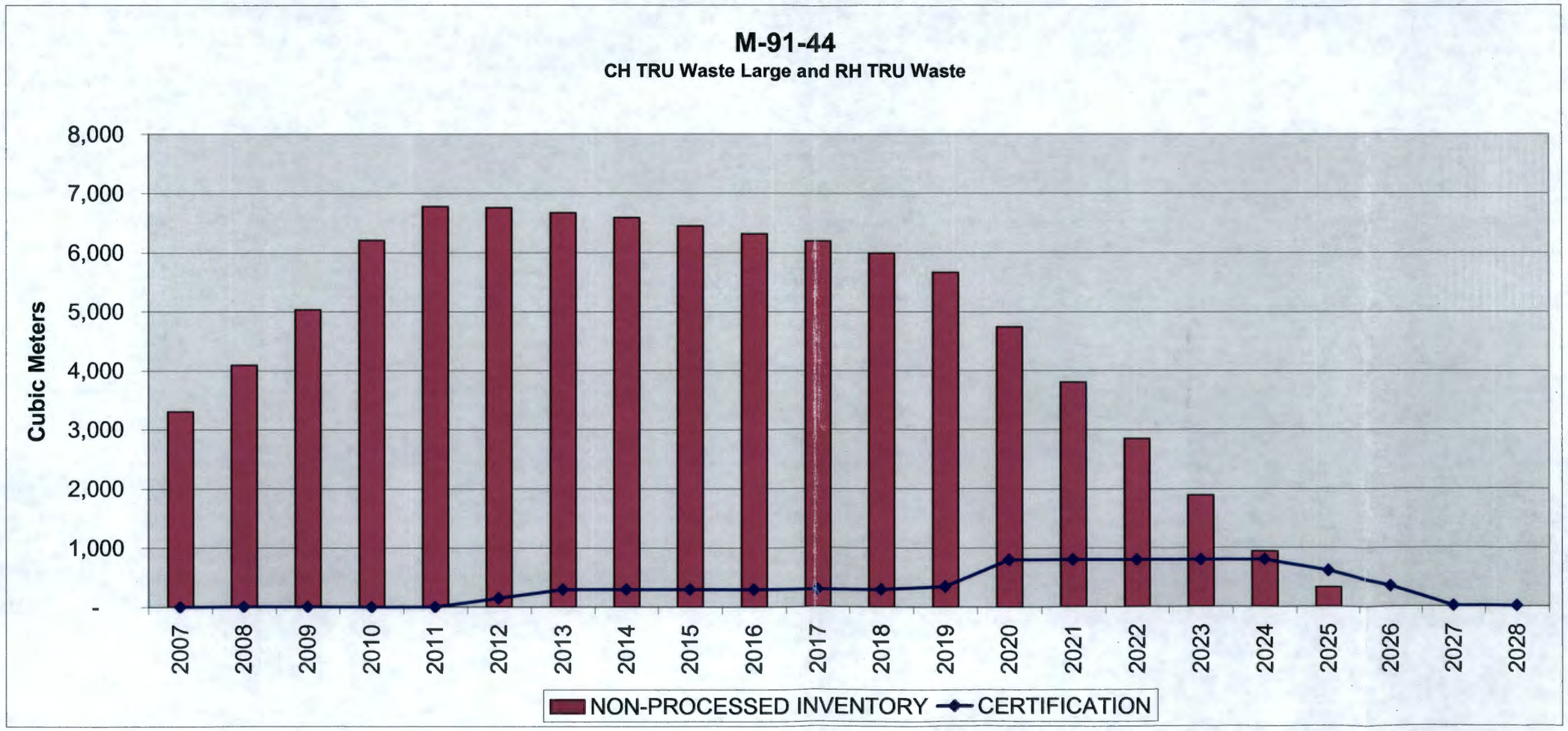
FEED	INV	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retrieval	-	579	579	579	355	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Storage	1,575	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast	-	145	38	38	71	76	993	2,141	936	610	374	4	6	4	6	4	6	4	6	4	6	4	6
From RH TRU Processing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*126*	*153*	*153*	*153*	*153*	*12*	*19*	*11*	*12*
CERTIFICATION																							
	-	400	600	700	800	1,134	482	1,409	1,384	695	443	170	5	5	173	266	278	278	277	89	35	28	25
NON-PROCESSED INVENTORY																							
	1,575	1,846	1,783	1,604	1,124	38	496	1,070	468	305	187	2	3	2	66	78	79	78	79	8	12	7	8



FEED	INV	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retrieval	-	758	758	758	465	23	23	23	23	3	3	3	3	-	-	-	-	-	-	-	-	-	-
Storage	1,439	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast	-	4	12	12	544	539	20	12	12	12	14	28	29	28	29	48	28	29	28	29	48	28	29
CERTIFICATION																							
	-	-	-	-	-	-	150	300	300	300	300	300	300	350	800	800	800	731	570	15	25	15	15
NON-PROCESSED INVENTORY																							
	1,439	2,201	2,971	3,740	4,750	5,311	5,294	5,209	5,123	4,989	4,856	4,737	4,528	4,203	3,279	2,342	1,384	560	1	1	1	1	1



FEED																							
	INV	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Retrieval	-	758	758	758	465	23	23	23	23	3	3	3	3	-	-	-	-	-	-	-	-	-	-
Storage	2,517	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast	-	33	30	181	713	539	21	12	12	12	14	28	29	28	29	48	28	29	28	29	48	28	29
CERTIFICATION																							
	-	-	-	-	-	-	150	300	300	300	300	300	300	350	800	800	800	800	800	615	354	15	15
NON-PROCESSED INVENTORY																							
	2,517	3,308	4,095	5,033	6,211	6,773	6,756	6,671	6,586	6,452	6,320	6,201	5,992	5,668	4,743	3,806	2,848	1,892	935	331	0	0	0



Assumptions for M-91 TRU Waste Processing Schedules

M-91-42 CH TRU(M) Waste

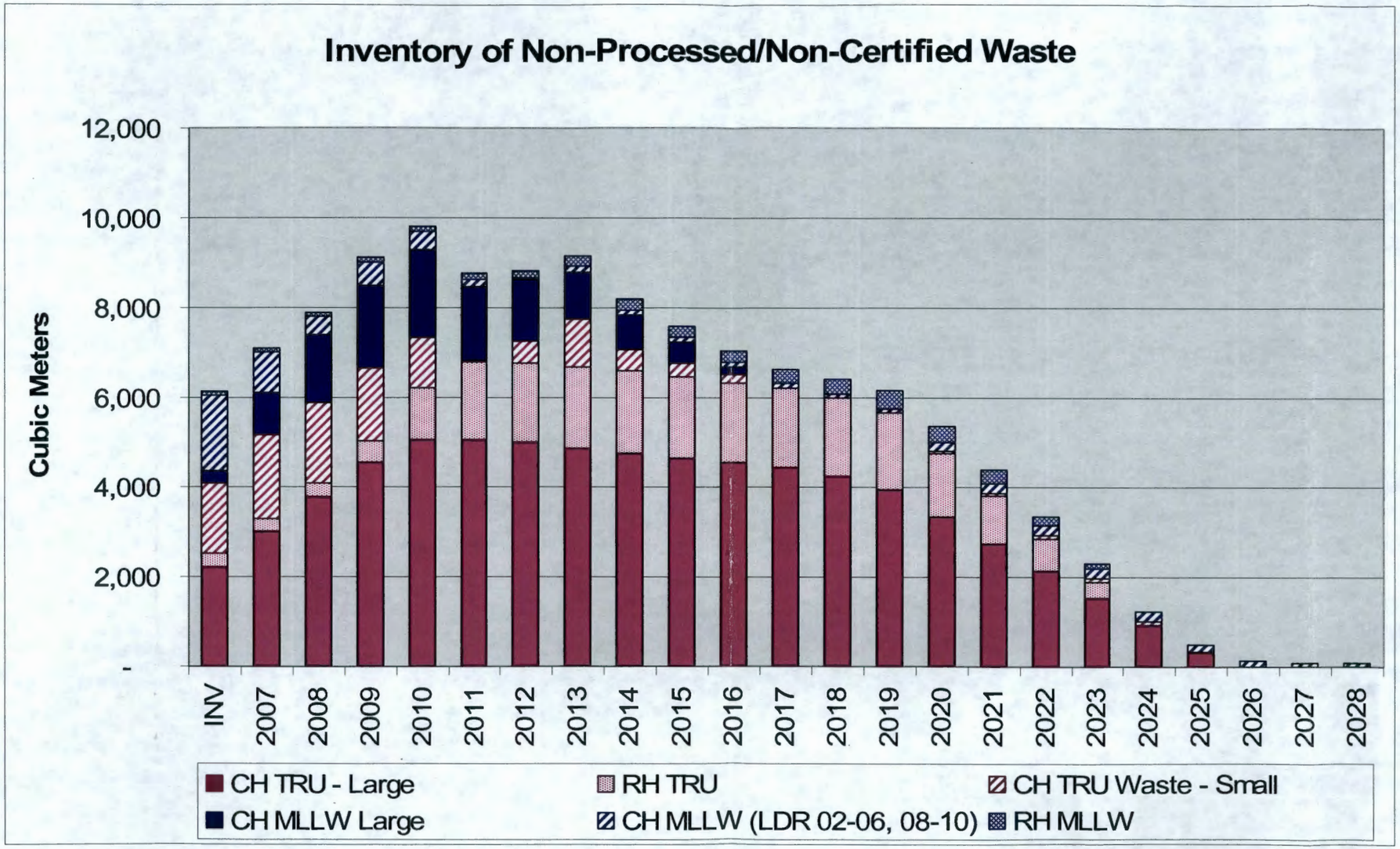
- Includes CH TRU waste in 55-gallon drums, 85-gallon overpacks, and SWBs
- Includes waste assumed to be reclassified as CH generated during the processing of RH TRU waste. Waste assumed to be packaged in 55 gallon drums
- Assumes 529 m^3 of storage volume (400 m^3 in SWBs and 129 m^3 in 55-gallon drums) is already certified and awaiting shipment. These volumes are not included in inventory or certification rates
- PFP waste forecast shifted from the early 2020's to 2013-2016
- Processing rates include:
    - 85-gallon overpacks – 400 m^3 in 2007, 500 m^3 in 2008, and 600 m^3 per year from 2009 through completion
    - Drums/SWB – 100 m^3/yr from 2008-2010 with an additional capability of 100 m^3 in 2010 to process drums requiring glovebox modification of WRAP (e.g., heavy drums). An additional 600 m^3 of capacity is available in 2011 to become current at the end of year. Note: "current" defined as processing waste within a year of receipt. Certification rates for 2012-2028 assume 50 percent of the waste received in current year and 50 percent of the previous year is certified with remainder of current year in inventory

M-91-44

- Includes CH TRU waste not included in M-91-42 and all RH TRU waste
- CH TRU certification is a combination of commercial capabilities, "hands-on" processing, and future capabilities (SWPC, T Plant or new facilities)
    - Commercial – Starts at a rate of 150 m^3/yr in 2012 and supports a certification rate of 300 m^3/yr until SWPC becomes operational
    - "Hands-on" – Starts at a rate of 150 m^3/yr in 2013 with a total of 1,000 m^3 certified through 2017
    - (SWPC, T Plant, or new facilities) – Begins in 2018 at 150 m^3, increases to 300 m^3 in 2019 and certifies at a rate of 600 m^3 through completion of waste stream
- RH TRU certification is a combination of direct loading and future capabilities (SWPC, T Plant, or new facilities)
    - Direct loading – 285 m^3 of waste assumed to be candidate for direct loading, waste is loaded at 50 m^3/yr starting in 2015
    - (SWPC, T Plant, or new facilities) – Begins in 2020 at a rate of 165 m^3/yr and continues at 200 m^3/yr in following years through completion of the waste

APPENDIX R

M-91 INVENTORY OF NON-PROCESSED WASTE


Inventory of Non-Processed/Non-Certified Waste
Cubic Meters
12,000
10,000
8,000
6,000
4,000
2,000
-
INV
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
CH TRU - Large
RH TRU
CH TRU Waste - Small
CH MLLW Large
CH MLLW (LDR 02-06, 08-10)
RH MLLW

APPENDIX S

M-91 TPA MILESTONE LANGUAGE FROM THE JULY 3, 2007 DRAFT OF CHANGE PACKAGE M-91-07-01 DATED JULY 7, 2007

Milestone Number	Description
M-91-00	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 mixed and suspect MLLW and RCRA mixed and suspect mixed transuranic waste.
M-91-01	Complete the 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 post-1970 RH TRUM and suspect RH TRUM, TRUM in large containers, and suspect TRUM in large containers by June 30, 2012. The requirements of the M-91 milestone with regard to completing the acquisition of new facilities, modification of existing facilities and/or modification of planned facilities necessary for treatment/processing of Hanford Site post-1970 RH TRUM and suspect RH TRUM, TRUM in large containers do not apply as to capabilities and facilities for LDR treatment (or for certification in lieu of such treatment) of RH TRUM and TRUM in large containers prior to a final appealable judgment on the merits of the LDR storage and treatment claim in *Washington v. Abraham*, NO. CT 03 5018 AAM, and after such a judgment, only as set forth in the accompanying settlement agreement.
M-91-03	Submit revision of the Hanford Site TRUM and Mixed Low-Level Waste PMP to Ecology pursuant to and in compliance with the requirements of agreement Section 11.5. Revisions of the PMP shall address RCRA mixed and suspect mixed transuranic and low-level waste and will consider and expressly evaluate the impact on M-91 retrieval, treatment and processing capabilities, that may result from retrieval, treatment and/or processing of any other transuranic or suspect transuranic waste including but not limited to off-site transuranic waste and Hanford Site transuranic 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-91 milestones are completed. The PMP revisions shall include plans and schedules to address all the requirements set forth in the M-91 milestone series. Each revision of the M-91-03 PMP shall, upon approval by Ecology, supersede previous M-91-03 PMPs. Each revision is a distinct work requirement independently subject to the enforcement provisions of this agreement. With respect to RH mixed waste and mixed waste in large containers, the PMP submitted on December 31, 2003 specifically identified measurable actions to be taken by DOE to acquire capabilities to manage such wastes. The PMP shall identify such measurable actions at least yearly. With respect to PMP revisions, the requirements of this milestone concerning PMP revisions to address TRUM shall not apply prior to a final appealable judgment on the merits of the LDR storage and treatment claim in *Washington v. Abraham*, NO. CT 03 5018 AAM, and after such a judgment, only as set forth in the accompanying settlement agreement. The PMP submitted on December 31, 2003 will not be

Milestone Number	Description
	required to contain plans and schedules for the LDR treatment (or certification in lieu of such treatment as provided for in M-91-42 and M-91-44) of TRUM waste. DOE shall revise the PMP to include plans and schedules for LDR treatment (or certification in lieu of such treatment as provided in M-91-42 and M-91-44) of TRUM waste by December 28, 2006. 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-91-12	Complete thermal treatment of an additional 360 m^3 of CH mixed waste by November 16, 2007. This brings the cumulative total to at lest 600 m^3 of CH MLLW thermally treated.
M-91-15	Complete acquisition of facilities and/or capabilities and initiate treatment of RH MLLW and CH MLLW in large containers per the rates stipulated in M-91-43 by June 30, 2008.
M-91-40	Regarding the retrieval and designation of CH RSW and treatment of such wastes designated as mixed to meet applicable Federal and State LDR standards (all CH RSW waste regardless of package size): 1. DOE shall retrieve all CH RSW within burial grounds 218-W-4C, 218-W-4B, 218-W-3A, and 218-E-12B by December 31, 2010. In achieving this retrieval requirement, DOE shall first initiate retrieval at its burial ground 218-W-4C no later than November 15, 2003, and shall retrieve RSW at the following rates: • 1,200 m^3 (cumulative) by December 31, 2004, • 2,700 m^3 (cumulative) by December 31, 2005, • 4,700 m^3 (cumulative) by December 31, 2006, • 7,200 m^3 (cumulative) by December 31, 2007, • 9,700 m^3 (cumulative) by December 31, 2008, • 12,200 m^3 (cumulative) by December 31, 2009, • Complete retrieval of CH RSW by December 31, 2010. Concurrent retrieval actions can be conducted in multiple burial grounds. 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 container 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 container has been inspects 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

Milestone Number	Description
	with the purposes of determining whether or not releases of contaminates 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 SAP. The SAP will be developed using a DQO process to establish requirements for sampling of burial ground vent risers and substrate soils. Ecology approved the 218-W-4C SAP September 12, 2003, the 218-E-12B SAP January 20, 2005, the 218-W-3A SAP June 15, 2006, and the 218-W-4B SAP July 25, 2006. DOE will implement approved SAPs, as a requirement of this milestone, during the retrieval of all RSW. The results of burial ground vent and substrate sampling and analysis SAPs shall be submitted to Ecology by letter reports quarterly. 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 WAC 173-303-070 through -100, and shall specifically identify individual large containers that cannot be designated based on available process knowledge. For the large containers determined to be LLW that cannot be designated based on the available process knowledge, DOE shall designate said waste according to the requirements of WAC 173-303-070 through -100, by December 31, 2008. For large containers determined to be transuranic waste that cannot be designated based on available process knowledge, DOE shall designate said waste according to the requirements of WAC 173-303-070 through -100, by December 31, 2012 (six months after the facilities and/or capabilities are required to be operational). 4. For all retrieved CH RSW determined to be LLW and designated in accordance with WAC 173-303-070 through -100, as mixed and containing LDR restricted constituents, DOE shall treat such wastes to meet LDR requirements in accordance with the schedule provided in milestone M-91-42(2) and M-91-43(3). 5. In regard to carbon tetrachloride vapor plume in the vadose zone in the vicinity of trench 4 in burial ground 218-W-4C, DOE shall: • Start vapor extraction by November 15, 2003, to reduce carbon tetrachloride vapors, • Start retrieval in trench 4 by January 15, 2004, • Complete retrieval of trench 4 by December 31, 2006. Retrieval will continue in trench 4 until it is complete. Vapor extraction and

Milestone Number	Description
	retrieval operations in trench 4 will be integrated by DOE to minimize potential worker exposure to carbon tetrachloride vapors, and to mitigate any possible releases of carbon tetrachloride from trench 4 containers. 6. For all retrieved CH RSW determined to be transuranic waste and designated in accordance with WAC 173-303-070 through -100, as mixed and as containing LDR restricted constituents, DOE shall treat such waste in compliance with the schedule in M-91-42(4) and M-91-43(3). DOE may choose to complete certification of CH transuranic waste for disposal at WIPP in lieu of LDR treatment, provided that Ecology is notified in writing of such completion of certification, and only if, as of the time of certification, such waste is exempt from LDR treatment requirements when disposed at WIPP. If DOE chooses to certify in lieu of treatment, it may meet the volume requirements specified in this milestone for any given year by certifying CH TRU or CH TRUM. Notification of certification in lieu of treatment will be provided annually as part of the certification volume completion letter. The requirements of item 6 of this milestone do not apply prior to a final appealable judgment on the merits of the LDR storage and treatment claim in *Washington v. Abraham*, NO. CT 03 5018 AAM, and after such a judgment, only as set forth in the accompanying settlement agreement. 7. Each requirement of this milestone is considered a distinct work requirement independently subject to the enforcement provisions of the Agreement.
M-91-41	Regarding the retrieval and designation of RH RSW (all RSW RH waste regardless of package size), including the 200 Area caissons, and LDR treatment of such wastes determined to be mixed: 1. DOE shall initiate full-scale retrieval of RH RSW by January 1, 2011. Retrieval of non-caisson RH RSW shall be completed by December 31, 2014. Retrieval of the 200 Area caisson RH RSW in 218-W-4B burial ground shall be completed by December 31, 2018. 2. DOE shall designate all retrieved RH RSW pursuant to WAC 173-303-070 through -100, within 90 days of retrieval. 3. For all retrieved RH RSW determined to be LLW and designated in accordance with WAC 173-303-070 through -100, as mixed and as containing LDR restricted constituents, DOE shall treat such waste to meet LDR requirements in accordance with the schedule provided in milestone M-91-43(3). 4. For all retrieved RH RSW determined to be transuranic waste and designated in accordance with WAC 173-303-070 through -100, as mixed and as containing LDR restricted constituents, DOE shall treat such wastes to meet LDR

Milestone Number	Description
	requirements in accordance with the schedule provided in milestone M-91-44(3). DOE may choose to complete certification of such wastes for disposal at WIPP in lieu of LDR treatment, provided that Ecology is notified in writing of such completion of certification, and only if, as of the time of certification, such waste is exempt from LDR treatment requirements when disposed at WIPP. The requirements of item 4 of this milestone do not apply prior to a final appealable judgment on the merits of the LDR storage and treatment claim in Washington v. Abraham, NO. CT 03-5018 AAM, and after such a judgment, only as set forth in the accompanying settlement agreement. 5. Each requirement of this milestone is considered a distinct work requirement independently subject to the enforcement provisions of the Agreement.
M-91-42	Regarding small containers of: (1) newly generated CH waste; (2) CH RSW; and (3) CH waste currently in above-ground storage: 1. DOE shall designate all newly generated CH waste at the point of generation. Such designation shall comply with the requirements of WAC 173-303-070 through -100. 2. There were 5,066 m^3 of CH MLLW in permitted storage at Hanford as of December 31, 2002 (as identified in the DOE HFFACO milestone M-26-01 LDR report MLLW treatability groups MLLW-02 through MLLW-10, excluding MLLW-07) that had not been treated to meet LDR requirements. This volume does not include 600 m^3 of waste requiring thermal treatment, as that waste has separate treatment requirements per M-91-12 and M-91-12A. Approximately 4,422 m^3 of MLLW subject to this milestone was treated between December 31, 2002 and December 31, 2005. DOE's 2002 LDR report estimated generation of an additional annual volume of approximately 330 m^3 of CH MLLW (as waste types identified in DOE HFFACO milestone M-91-26-01 LDR report MLLW treatability groups MLLW-02 through MLLW-10, excluding MLLW-07). It was also estimated in 2002 that DOE would retrieve approximately 800 m^3 of CH MLLW by 2010. Based on the CY 2005 LDR Summary Report as of December 31, 2005 for MLLW subject to M-91-42, there were approximately 2,100 m^3 in permitted storage, and 280 m^3 forecast to be generated by the end of CY 2009. According to the M-91 PMP (HNF-19169 rev 2) approximately 2,550 m^3 of M-91-42 MLLW was expected to be retrieved between December 31, 2005 and December 31, 2009. In addition to meeting the requirements of M-91-12 and M-91-12A, DOE shall treat the waste described above to meet LDR requirements on a schedule meeting, at minimum, the following cumulative totals based on a start date of December 31, 2002: A. 1,630 m^3 (cumulative) shall be treated by December 31, 2004,

Milestone Number	Description
	B. 3,260 m^3 (cumulative) shall be treated by December 31, 2005, C. 4,890 m^3 (cumulative) shall be treated by December 31, 2006, D. 6,520 m^3 (cumulative) shall be treated by December 31, 2007, E. 8,150 m^3 (cumulative) shall be treated by December 31, 2008, and F. Complete treatment of all CH MLLW (5,066 m^3 in storage as of December 31, 2002 as described above, and retrieved CH MLLW and newly generated CH MLLW in the treatability groups described above, as of June 30, 2009, by December 31, 2009.) If CH MLLW in the treatability groups subject to this milestone generated during the period from December 31, 2002 through June 30, 2009 is treated to LDR standards prior to delivery to storage or disposal, the original pre-treatment volume of that waste shall be counted toward meeting the volume requirements of this milestone. Except for waste already in permitted storage as of December 31, 2002, treatment of CERCLA waste 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. If the actual volume of newly generated or 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. If the actual volume of newly generated or retrieved CH MLLW covered by this milestone is significantly more than the estimated volumes the parties' may agree to revise these requirements. 3. After June 30, 2009, DOE shall treat to meet LDR treatment requirements all small containers of newly generated CH MLLW containing LDR constituents in compliance with WAC 173-303-140 and by reference 40 CFR 268. 4. There are approximately 440 m^3 of CH TRUM in permitted storage at DOE's CWC and elsewhere at Hanford as of December 31, 2002. DOE's CY 2002 LDR report estimates that it will generate an additional volume of approximately 220 m^3 of CH TRUM and DOE estimates they will retrieve approximately 1,600 m^3 of CH TRUM by 2010. Considering these estimates and the considerable uncertainty associated with them DOE shall treat the waste categories described above to meet LDR requirements on the following cumulative schedule: • 700 m^3 by December 31, 2004, • 1,800 m^3 (cumulative) by December 31, 2005, • 3,000 m^3 (cumulative) by December 31, 2006, • 4,200 m^3 (cumulative) by December 31, 2007, • 5,400 m^3 (cumulative) by December 31, 2008, • 6,600 m^3 (cumulative) by December 31, 2009,

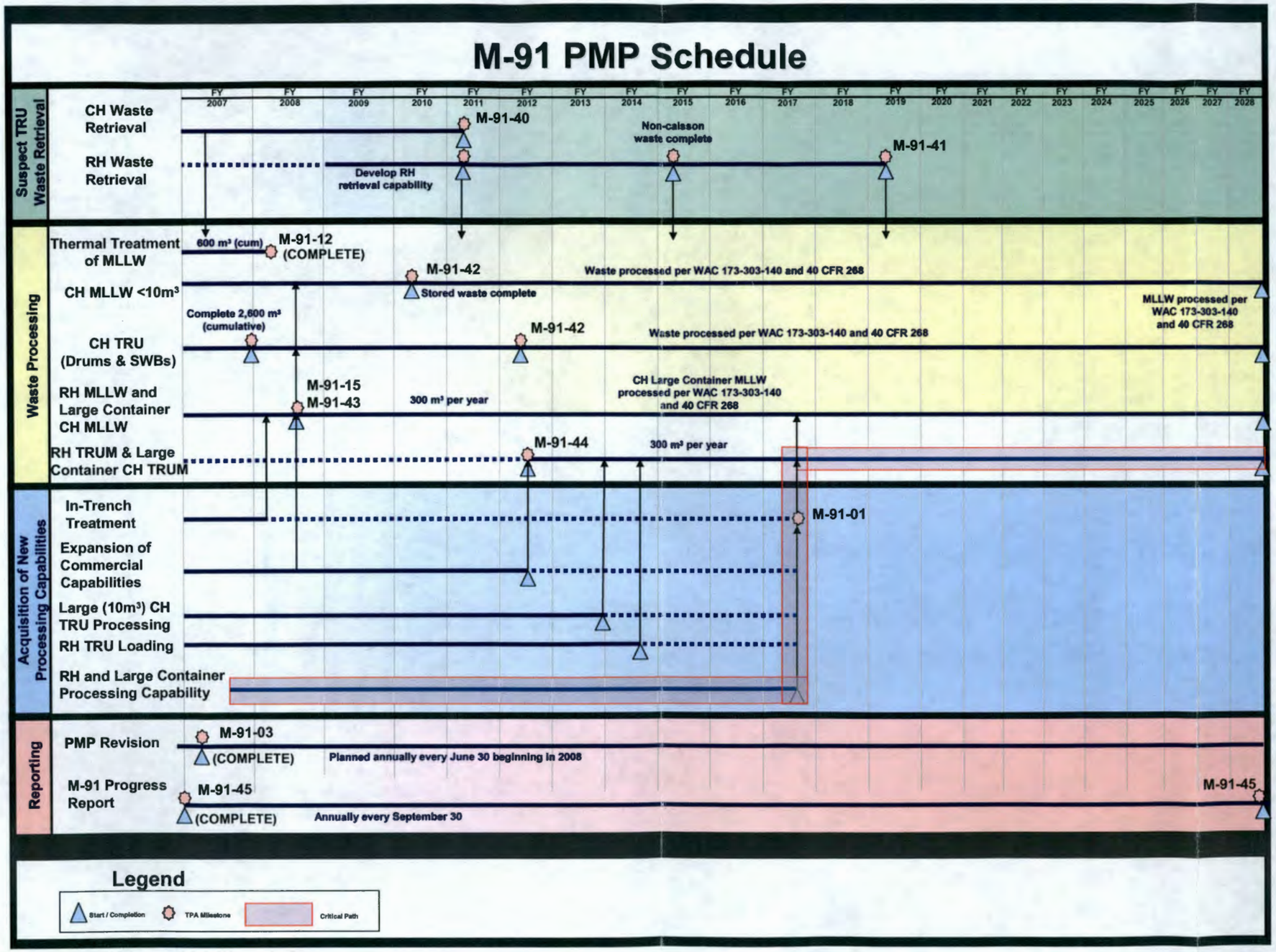
Milestone Number	Description
	• 7,600 m^3 (cumulative) by December 31, 2010, • 8,600 m^3 (cumulative) by December 31, 2011. If the actual volume of newly generated or retrieved CH TRUM covered by this milestone is lower than the estimated volumes anticipated by these milestones DOE will only be required to treat the volume of waste generated, retrieved and/or in storage. If the actual volume of newly generated or retrieved CH TRUM covered by this milestone is significantly more than the estimated volumes the parities' may agree to revise these requirements. 5. For CH transuranic waste generated on or after July 1, 2011 that is designated in accordance with WAC 173-303-070 through -100 as mixed and as containing LDR restricted constituents, DOE shall treat such wastes to meet LDR requirements pursuant to WAC 173-303-140 within one year of generation. DOE may choose to complete certification of CH transuranic waste for disposal at WIPP in lieu of LDR treatment, provided that ecology is notified in writing of such completion of certification, and only if, as of the time of certification, such waste is exempt from LDR treatment requirements when disposed at WIPP. If DOE chooses to certify in lieu of treatment, it may meet the volume requirements specified in this milestone for any given year by certifying CH TRU or CH TRUM, provided that 1) all CH TRUM in permitted storage as of December 31, 2002 is treated to meet LDR requirements or certified by December 31, 2006, and 2) all CH TRUM in permitted storage as of July 1, 2001 is treated to meet LDR requirements or is certified by December 31, 2011. The requirements of items 4 and 5 of this milestone do not apply prior to a final appealable judgment on the merits of the LDR storage and treatment claim in *Washington v. Abraham*, NO. CT 03 5018 AAM, and after such a judgment, only as set forth in the accompanying settlement agreement. In the event that items 4 or 5 become applicable, amounts of CH TRUM certified between December 31, 2002 and the date on which items 4 or 5 become applicable shall count towards satisfaction of the obligations in items 4 and 5. 6. Each requirement of this milestone is considered a distinct work requirement independently subject to the enforcement provisions of the agreement.
M-91-43	Regarding MLLW treatability group MLLW-07 waste as defined in the LDR report which includes the MLLW portion of: (1) newly generated RH LLW; (2) newly generated large containers of CH LLW; (3) RH LLW currently in above-ground storage; (4) Large containers of CH LLW currently in above-ground storage; and (5) RH or large container CH LLW from retrieval. As of December 31, 2005 there were approximately 305 m^3 of RH and large container MLLW (LDR treatability group MLLW-07) in permitted storage. Approximately 66 m^3 of this waste was

Milestone Number	Description
	forecast to be generated between December 31, 2005 and December 31, 2011. In addition, approximately 2,728 m^3 of MLLW-07 was expected to be obtained from retrieval between December 31, 2005 and December 31, 2011. 1. DOE shall designate all RH LLW and large containers of CH LLW currently in above-ground permitted storage (as of June 30, 2003) according to the requirements of WAC 173-303-070 through -100, by December 31, 2008. 2. DOE shall designate all newly generated RH LLW and newly generated large containers of CH LLW at the point of generation. Such designation shall comply with the requirements of WAC 173-303-070 through -100. 3. DOE shall begin treating RH MLLW and large containers of CH MLLW to meet LDR treatment requirements at a minimum rate of 300 m^3 per year beginning no later than June 30, of 2008. However, treatment may be started early such that any treatability group MLLW-07 waste treated between December 31, 2002 and June 30, 2009 shall count toward achieving the first 300 m^3 of treatment to be completed by June 30, 2009. If there are not 300 m^3 of RH MLLW and large containers of CH MLLW in storage in any given year, this milestone requires that DOE treat-only that amount that is in storage. If RH MLLW in the treatability groups subject to this milestone generated during the period from December 31, 2002 through June 30, 2009 is treated to LDR standards prior to delivery to storage or disposal, the original pre-treatment volume shall be counted toward meeting the volume requirements of this milestone. Except for waste already in permitted storage as of December 31, 2002, treatment of CERCLA waste will not be counted toward meeting the volume requirements of this milestone. If actual volume requirements of newly generated or retrieved RH and large container MLLW are significantly more than the estimated volumes, this milestone will be revised to reflect actual volumes. 4. Each element of this milestone is considered a distinct work requirement independently subject to the enforcement provisions of the Agreement.
M-91-44	Regarding: (1) newly generated RH transuranic waste; (2) newly generated large containers of CH transuranic waste; (3) RH transuranic waste currently in above-ground storage; (4) large containers of CH transuranic waste currently in above-ground storage; and (5) large container or RH transuranic waste from retrieval. 1. DOE shall designate all RH transuranic waste and large containers of CH transuranic waste currently in above-ground storage (as of June 30, 2003) according to the requirements of WAC 173-303-070 through -100, by December 31, 2012. 2. DOE shall designate all newly generated RH transuranic waste and large

Milestone Number	Description
	containers of transuranic waste at the point of generation. Such designation shall comply with the requirements of WAC 173-303-070 through -100. 3. DOE shall begin treating RH TRUM and large containers of CH TRUM to meet LDR treatment requirements at a minimum rate of 300 m^3 per year beginning no later than June 30, 2012. If there are not 300 m^3 of RH TRUM and large containers of CH TRUM in storage in any given year, this milestone requires that DOE treat only that amount that is in storage. If actual volumes of newly generated or retrieved RH TRUM and large container TRUM are significantly more than the estimated volumes, this milestone will be revised to reflect actual volumes. 4. As to newly generated RH TRUM generated after December 31, 2018 that is designated in accordance with WAC 173-303-070 through -100 as mixed and as containing LDR restricted constituents, DOE shall treat or certify in lieu of treatment to meet LDR requirements within one year of generation. 5. DOE may choose to complete certification of RH and large container transuranic waste for disposal at WIPP in lieu of LDR treatment, provided that Ecology is notified in writing of such completion of certification, and only if, as of the time of certification, such waste is exempt from LDR treatment requirements when disposed at WIPP. The requirements of items 3, 4, and 5 of this milestone do not apply prior to a final appealable judgment on the merits of the LDR storage and treatment claim in *Washington v. Abraham*, NO. CT 03 5018 AAM, and after such a judgment, only as set forth in the accompanying settlement agreement. 6. Each requirement of this milestone is considered a distinct work requirement independently subject to the enforcement provisions of the Agreement. If DOE to certify in lieu of treatment, it may meet the volume requirements specified in M-91-44 for any given year by certifying RH or large container TRU or RH or large container TRUM. Notification of certification in lieu of treatment will be provided annually as part of the certification volume completion letter
M-91-45	By September 30 of each year, DOE shall submit to Ecology a report describing completed and scheduled work relating to RH waste and large containers of RH and CH waste performed in accordance with the requirements of this milestone series. DOE's reports will document work completed during the previous Federal fiscal year and work scheduled for the coming fiscal year. DOE's reports shall identify by citation all publicly available reports describing pertinent project issues and accomplishments, and shall identify anticipated projects for the coming year.

APPENDIX T

M-91 PMP SCHEDULE


M-91 PMP Schedule
FY 2007
FY 2008
FY 2009
FY 2010
FY 2011
FY 2012
FY 2013
FY 2014
FY 2015
FY 2016
FY 2017
FY 2018
FY 2019
FY 2020
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025
FY 2026
FY 2027
FY 2028
Suspect TRU Waste Retrieval
CH Waste Retrieval
M-91-40
Non-calsson waste complete
M-91-41
RH Waste Retrieval
Develop RH retrieval capability
Waste Processing
Thermal Treatment of MLLW
600 m³ (cum)
M-91-12 (COMPLETE)
M-91-42
Waste processed per WAC 173-303-140 and 40 CFR 268
CH MLLW <10m³
Stored waste complete
MLLW processed per WAC 173-303-140 and 40 CFR 268
Complete 2,600 m³ (cumulative)
M-91-42
Waste processed per WAC 173-303-140 and 40 CFR 268
CH TRU (Drums & SWBs)
RH MLLW and Large Container CH MLLW
M-91-15
M-91-43
300 m³ per year
CH Large Container MLLW processed per WAC 173-303-140 and 40 CFR 268
RH TRUM & Large Container CH TRUM
M-91-44
300 m³ per year
Acquisition of New Processing Capabilities
In-Trench Treatment
M-91-01
Expansion of Commercial Capabilities
Large (10m³) CH TRU Processing
RH TRU Loading
RH and Large Container Processing Capability
Reporting
PMP Revision
M-91-03
(COMPLETE)
Planned annually every June 30 beginning in 2008
M-91 Progress Report
M-91-45
(COMPLETE)
Annually every September 30
M-91-45
Legend
Start / Completion
TPA Milestone
Critical Path