SEP 27 2000

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
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5. Proj./Prog./Dept./Div.:	**6. Design Authority/Design Agent/Cog. Engr.:**	**7. Purchase Order No.:**
Retrieval Engineering	~~RB Thomp~~ R.A. Kirkbride	NA
8. Originator Remarks:		**9. Equip./Component No.:**
For approval and release.		NA
		10. System/Bldg./Facility:
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Single-Shell Tank Retrieval Sequence: Fiscal Year 2000 Update

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Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-99RL14047

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Abstract: This document describes the baseline single-shell tank (SST) waste retrieval sequence for the River Protection Project (RPP) updated for Fiscal Year 2000. The SST retrieval sequence identifies the proposed retrieval order (sequence), the tank selection and prioritization rationale, and planned retrieval dates for Hanford SSTs. In addition, the tank selection criteria and reference retrieval method for this sequence are discussed.

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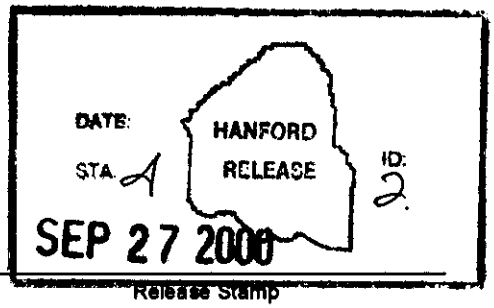

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RPP-7087
Revision 0

Single-Shell Tank Retrieval Sequence: Fiscal Year 2000 Update

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

CH2MHILL
Hanford Group, Inc.

Richland, Washington

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC06-99RL14047

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Single-Shell Tank Retrieval Sequence: Fiscal Year 2000 Update

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APPENDIX

FIGURES

TABLES

TERMS

BBI	Best-Basis Inventory
DST	double-shell tank
FY	fiscal year
HLW	high-level waste
HTWOS	Hanford Tank Waste Operation Simulator
LAW	low-activity waste
SST	single-shell tank
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
WRF	Waste Receiver Facility

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1.0 INTRODUCTION

This report documents the baseline single-shell tank (SST) waste retrieval sequence for the River Protection Project updated for fiscal year (FY) 2000. The SST retrieval sequence identifies the proposed retrieval order (sequence) and retrieval dates for SSTs at the Hanford Site. In addition, the tank selection criteria, rationale, and reference retrieval methods for this sequence are discussed.

This document satisfies the requirements of the *Hanford Federal Facility Agreement and Consent Order* (commonly called the Tri-Party Agreement) Milestone M-45-02E, "Submit Annual Updates to SST Retrieval Sequence Document," and the revised Milestone M-45-02 under the August 30, 2000, "Conclusion Agreement on Negotiation of Requirements Governing the Near Term Retrieval of Wastes from the Department of Energy's Single-Shell Tanks," as defined in Figure 1-1

Figure 1-1. Milestone M-45-02
August 30, 2000, Tri-Party Conclusion Agreement.

M-45-02	SUBMIT ANNUAL UPDATES TO SST RETRIEVAL SEQUENCE DOCUMENT. THIS PROVIDES FOR AN ANNUAL UPDATE OF A SST RETRIEVAL SEQUENCE DOCUMENT THAT WILL DEFINE THE TANK RETRIEVAL SEQUENCE, SELECTION CRITERIA AND RATIONALE, REFERENCE RETRIEVAL METHOD(S) FOR EACH TANK, AND THE ESTIMATED RETRIEVAL SCHEDULES. THE RETRIEVAL SEQUENCE DOCUMENT WILL DETAIL RETRIEVAL METHODOLOGIES TO BE EMPLOYED AND ESTIMATED WASTE VOLUMES TO BE GENERATED DURING RETRIEVAL (TO BE TRANSFERRED TO THE DST's OR OTHER AVAILABLE SAFE STORAGE). THE REPORT WILL ALSO DETAIL TANK SELECTION RATIONALE BASED ON THE PRIMARY OBJECTIVE OF MAXIMIZING RISK REDUCTION THROUGH THE RETRIEVAL OF MOBILE, LONG-LIVED RADIONUCLIDES AND PRINCIPLE NON RADIOLOGICAL HAZARDOUS CONSTITUENTS IN A MANNER WHICH IS SENSITIVE TO WASTE TREATMENT FACILITY REQUIREMENTS AND INFRASTRUCTURE CONSTRAINTS. THE ANNUAL UPDATES WILL BE SUBMITTED TO ECOLOGY FOR APPROVAL AS AGREEMENT PRIMARY DOCUMENTS.	9/30/2000 and annually thereafter.

The retrieval sequence was modeled with the Hanford Tank Waste Operation Simulator (HTWOS) based on the latest Project Integration Office guidance case with the inclusion of specific Phase 2 assumptions detailed in Section 3.2. The modeling also incorporated the near-term retrieval activities provided under the Milestone M-45-00A negotiated agreement. The near-term retrievals included in the sequence modeling are summarized in Table 1-1.

Table 1-1. Single-Shell Tank Retrieval Technologies Demonstrations, Locations, and Goals.

Single-shell tank retrieval technology	Location of demonstration	Goals of demonstration*
Saltcake Dissolution	Tank 241-S-112	Meet Milestone M-45-03C date of September 30, 2005, for complete demonstration
Fluidic mixer	Tank 241-S-102	Meet Milestone M-45-05A date of September 30, 2006, for complete retrieval
Confined sluicing/ robotic technology	Tank 241-C-104	Meet Milestone M-45-03I date of September 30, 2006, for complete construction

*Milestones are derived from the Tri-Party Agreement (*Hanford Federal Facility Agreement and Consent Order*, 1996, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympic, Washington). The Tri-Party Agreement milestone numbers and dates presented in this table are taken from the August 30, 2000, *Conclusion Agreement on Negotiation of Requirements Governing the Near Term Retrieval of Wastes from the Department of Energy's Single Shell Tanks.*

2.0 RISK REDUCTION

Reduction in long-term risk to workers, the public, and the environment was the major concern in formulating the retrieval strategy employed in developing the current retrieval sequence. There are two types of long-term risk concerns—(1) protection of the groundwater and (2) protection from airborne-contamination. Because of the nature of the wastes in the SSTs, these concerns reside principally in the different waste types.

The contaminants of concern from a groundwater-protection standpoint are long-lived, mobile radionuclides and mobile, cancer-causing chemicals. Laboratory data and computer modeling of groundwater contamination movement have determined that these contaminates are technitium-99, carbon-14, iodine-129, selenium-79, and uranium-238 for mobile radionuclides with very long half-lives; and nitrate, nitrite, and chromium for mobile, cancer-causing chemicals. These radionuclides and chemicals are found primarily in the saltcake tanks. The waste in the saltcake tanks looks and acts very much like course table salt exposed to moisture (e.g., the waste dissolves easily in liquids and moves with the water).

The contaminants of concern from an airborne-contamination standpoint are the long-lived, alpha–emitting, radioactive elements, primarily plutonium. These materials are found primarily in the sludge tanks. Sludge, which contains most of the metals, looks like fine mud and dries very hard. Sludge tends to be very insoluble in most liquids.

The SST Program has prioritized the tank retrieval sequence to meet the objective of maximizing risk reduction through retrieval of the mobile, long-lived radionuclides; the long-lived, alpha–emitting, radioactive element of concern—plutonium; and the principal nonradiological hazardous constituents. Consideration in the sequence was also given to the waste treatment facility requirements, infrastructure constraints, tank leak integrity assessments, and suitability for technology demonstration deployments provided for in the August 30, 2000, Milestone M-45-00A negotiated agreement.

To assess performance of the current sequence in attaining this objective, the program selected several key parameters as measurable indicators of success. The parameters selected for risk-reduction assessment of the sequence identified in this report are as follows:

- Waste inventory reduction by volume (kgal)] (Figure 2-1)
- Combined radionuclide inventory reduction by curies (Ci) (Figure 2-2)
- Combined plutonium inventory reduction by curies (Ci) (Figure 2-3)
- Combined nitrate, nitrite, and chromium inventory reduction by mass (kg) (Figure 2-4)
- Mobile, long-lived, radionuclide reduction by curies (Ci) (Figure 2-5).

The volume inventory is based on the *Waste Tank Summary Report for Month Ending May 31, 2000* (HNF-EP-0182-146). The inventory information for curie content, plutonium content, and nonradiological hazardous constituent content is based on the August 31, 2000, Best-Basis Inventory (BBI) data. The supporting data for the figures in this section are included in Appendix A of this document.

The BBI is a detailed source for tank content information. The BBI is generated by scientists and engineers at the Hanford Site and in the National Laboratory System and provides their best estimate of the contents of the tank wastes. Process knowledge and actual sample data are used to generate the BBI. The BBI has been extensively peer reviewed by experts across the nation. Staff from the Washington State Department of Ecology and the U.S. Environmental Protection Agency have been involved in these reviews and have required general access to the data. The BBI is posted in a relational database on the Tank Waste Information Network System (TWINS) and is accessible for review at http://twins.pnl.gov:8001/. The BBI is routinely updated as new laboratory data are obtained.

The relative inventories of the identified contaminants for each of the tanks selected for near-term retrieval are depicted in Table 2-1.

Table 2-1 Near-Term Tank Retrieval Inventories.

Tank	Total nuclide inventory (Ci)	Combined plutonium (Ci)	Combined mobile radionuclides (Tc, I, C, Se, U) (Ci)	Nitrate, nitrite, chromium (kg)	Volume (kgal)
241-C-104	~1,470,000	22,404	57.8	58,280	263
241-S-112	~1,030,000	287	551	1,049,200	523
241-S-102	~860,000	407	478	712,820	492
TOTAL:	**~3,360,000**	**23,098**	**1087.6**	**1,820,300**	**1,278**

To prioritize tanks for risk-reduction effectiveness in the current sequence, the SSTs have been sorted by the amount of mobile radionuclides contained in the tanks (see Appendix A) because groundwater radiological protection is the greatest concern from potential leaks. Tanks 241-S-112 and 241-S-102 were ranked No. 8 and No. 9 on the priority-ranking list (based on total curies, highest-to-lowest-value ranking).

The highest-ranking tank was Tank 241-U-107. However, the U Farm has the worst infrastructure of the SST farms and will require significant upgrades and new construction. There are no suitable pipelines nearby to transport the wastes; transporting the wastes to the double-shell tank (DST) receiver tanks requires construction of intermediate Waste Receiver Facilities (WRF). Electricity and other utilities are currently not available at the U Farm, and other upgrades are needed as well. These upgrades add substantially to the cost of a retrieval project in the U Farm. Therefore, Tank 241-U-107 was eliminated from the priority sequence. These issues with the U Farm also eliminated Tank 241-U-108, ranked No. 7 on the priority-ranking list, from the priority sequence.

Tanks 241-SX-105, 241-SX-103, and 241-SX-102 were ranked No. 3, 4, and 5 on the priority-ranking list, respectively. These tanks were eliminated from the priority sequence because they are located in the SX Farm, which has had the most historical leaks and spills and has the worst soil contamination of the farms. It would be very difficult to test and prove the initial leak-detection systems in this farm. Also, because of the large number of SX tanks that have leaked, all tanks in the SX Farm are more suspect than tanks in other farms. Tank 241-TX-113, ranked No. 6 in the priority-ranking list, is listed as an assumed leaker and has similar infrastructure upgrade and construction issues as have the tanks in U Farm.

Eliminating these tanks from the priority sequence leaves Tank 241-A-101 (No. 2), Tank 241-S-112 (No. 8), and Tank 241-S-102 (No. 9) in the priority sequence. Tank 241-A-101 is quite full, and the waste in Tank 241-A-101 has a high aluminum content and chemical mix. This material forms a gel-like material that has been know to plug lines, requiring significantly more dilution in the pipelines. The material in Tank 241-A-101 also is not purely saltcake or sludge, making it less desirable for demonstrations. Given the volume of waste generation from the retrieval of Tank 241-A-101 and the amount of DST space available, use of Tank 241-A-101 would limit the SST Retrieval Project to only one retrieval technology demonstration.

Tanks 241-S-112 and 241-S-102, when added together, have more contaminants of concern than Tank 241-A-101, representing a higher combined risk reduction and broader opportunity for technology assessments and demonstration deployments. Tank 241-S-112 contains mostly saltcake (with only 2.5 to 5.0 cm [1-2 in.] of sludge in the very bottom). Both Tanks 241-S-102 and 241-S-112 are also very good early feed for the low-activity waste (LAW) vitrification plant as well as excellent demonstrations tanks. The S Farm is close to the main DST receiver tanks in the 200 West Area, allowing temporary over-ground lines to be used, and has other necessary infrastructure in place. Tank 241-S-112 has been selected for the first "limits of technology" demonstration under Milestone M-45-00B, employing a saltcake dissolution retrieval technology. Tank 241-S-102 has been selected as the baseline-planning tank for initial SST waste retrieval under Milestone M-45-05A.

The criteria for the second "limits of technology" demonstration tank was that it contain mostly sludge and be located in the 200 East Area. Options quickly narrowed to Tank 241-C-104. Tank 241-C-104 has more plutonium than any other tank (SST or DST), with a total of 89 kg of plutonium or 16% of the plutonium found in all the SSTs. The waste in Tank 241-C-104 is also excellent feed for the high-level waste (HLW) vitrification plant and is currently planned for Phase 1 feed delivery. Infrastructure had been installed to support retrieval of Tank 241-C-106, which is close to Tank 241-C-104; much of the infrastructure also can be used for retrieval of Tank 241-C-104. Tank 241-C-104 has been selected for the second "limits of technology" demonstration under Milestone M-45-00B, employing a confined sluicing, robotic retrieval technology.

In developing the retrieval prioritization and sequence, the tanks that are known or assumed to have leaked were not considered for early retrieval to allow further performance demonstrations and operational experience of retrieval and leak-protection technologies and deployed systems. All of the 67 tanks listed as known or assumed to have leaked have been or are in the process of being interim stabilized, which removes as much of the pumpable liquids as possible. Also, the tanks that have had large leaks were pumped shortly after the leak was identified and therefore do not have large inventories remaining. Although the regulators concurred with the decision to start retrieval with sound tanks to develop the necessary retrieval tools, eliminating unsound or questionable tanks removed only one tank from the near-term priority tanks, based on risk.

Based on the above selection rationale and the risk-reduction performance depicted in Figures 2-1 through 2-5, the current sequence is considered to meet the objectives for near-term risk reduction contained in the Milestone M-45-00A negotiated agreement.

Figure 2-1. Single-Shell Volume Reduction by Tank Retrieved.

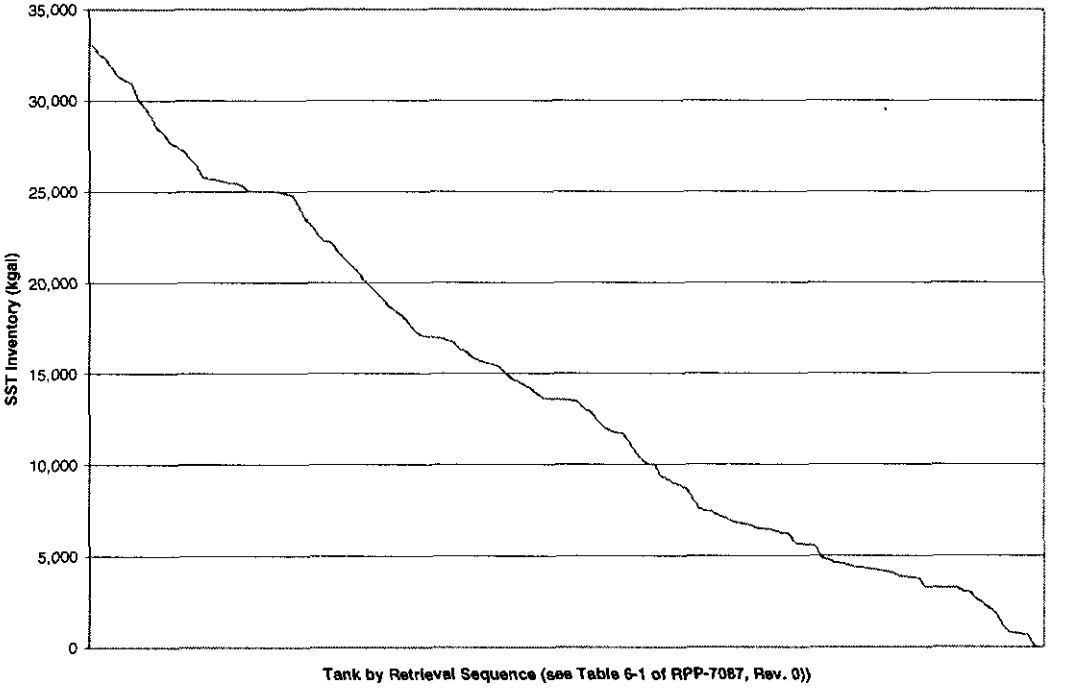


Figure 2-2. Single-Shell Tank Inventory Reduction by Tank Retrieved, Combined Curies Ranking.

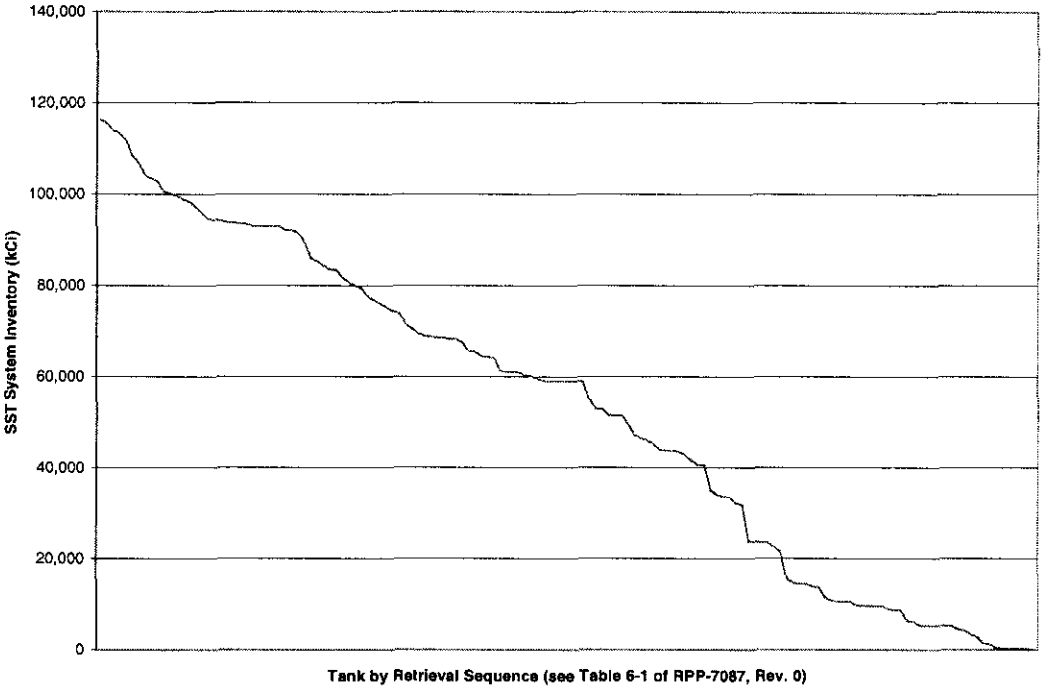


Figure 2-3. Single-Shell Tank Plutonium Inventory Reduction by Tank Retrieved, Combined Plutonium Inventory.

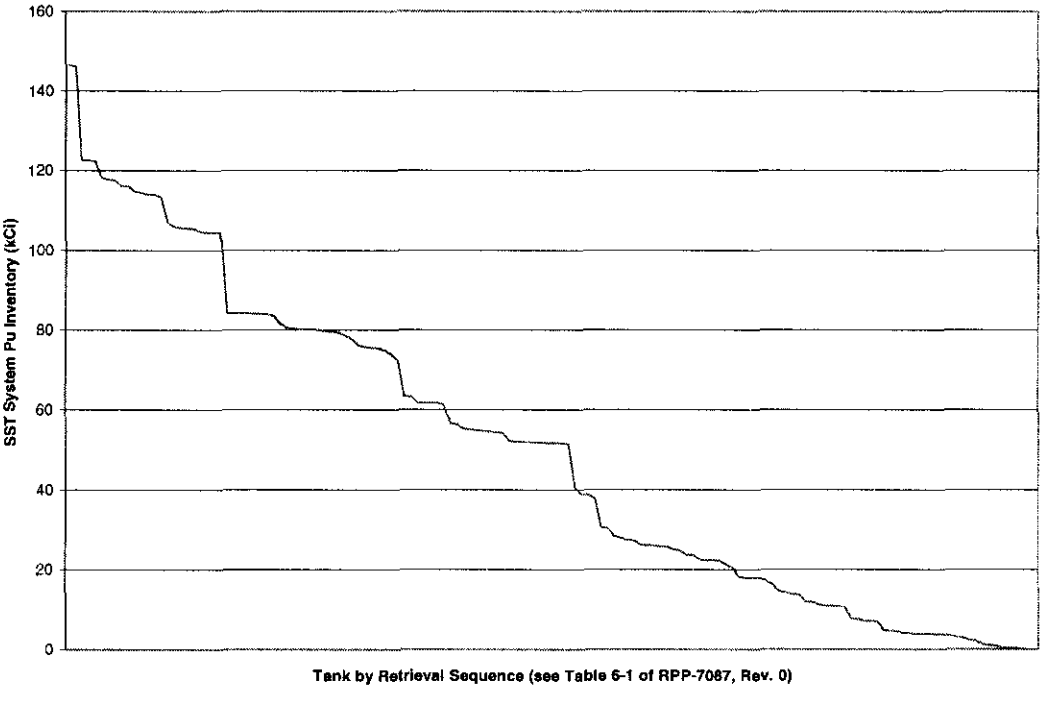


Figure 2-4. Single-Shell Tank Inventory Reduction by Tank Retrieved, Combined Nitrate, Nitrite, and Chromium Inventory.

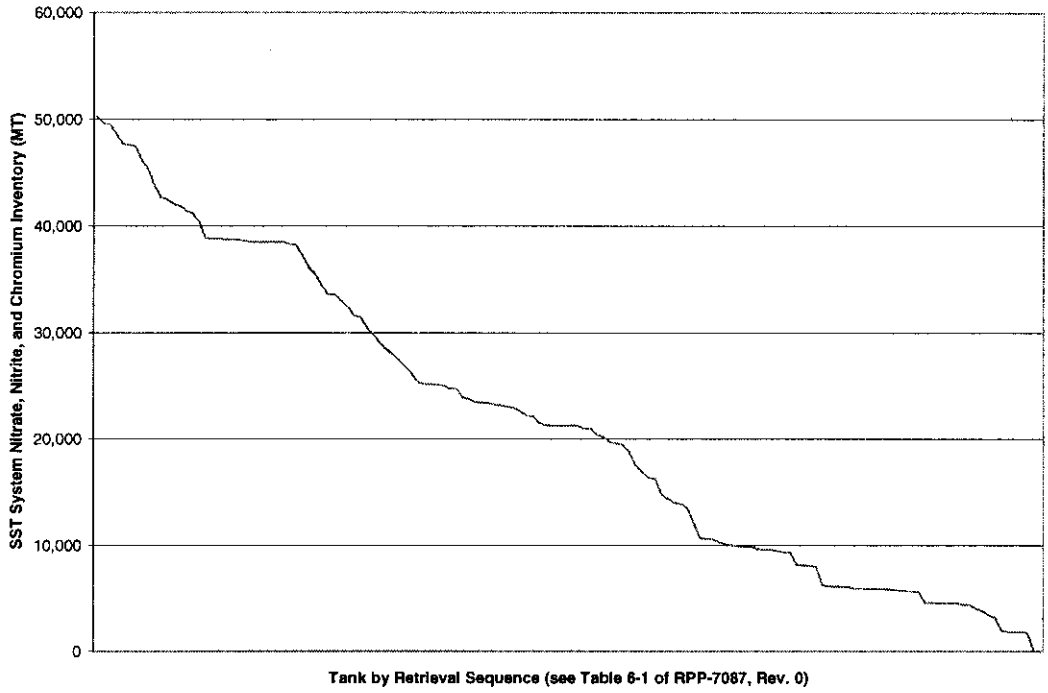
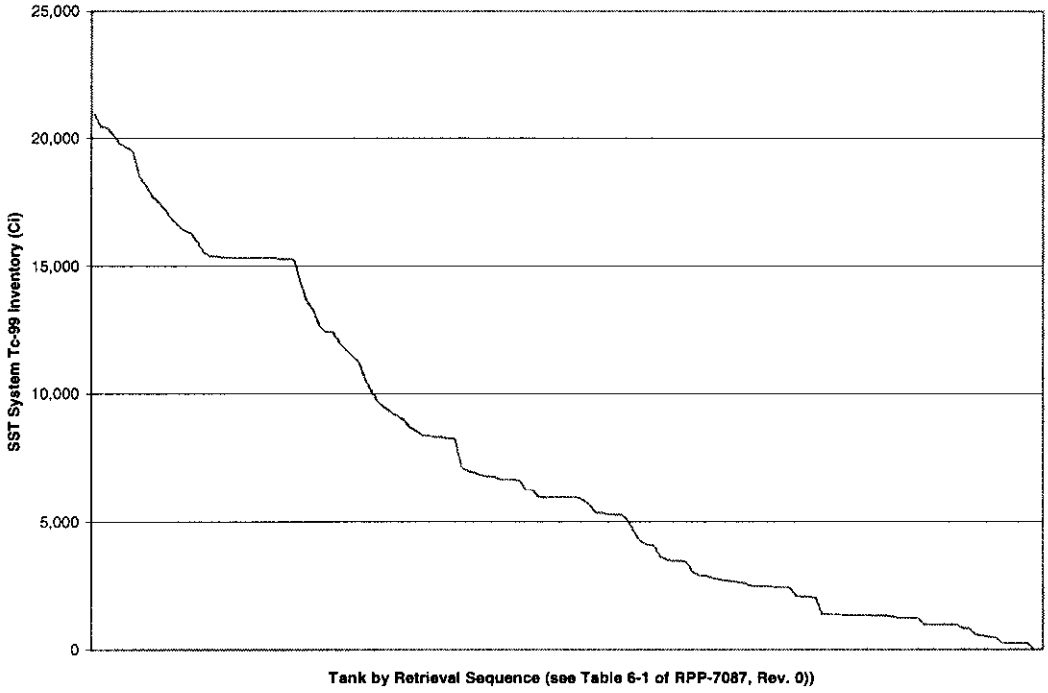


Figure 2-5. Mobile Long-Lived Radionuclide Reduction by Tank Retrieved.



3.0 WASTE RETRIEVAL AND TRANSFER SYSTEM

3.1 SINGLE-SHELL TANK FARM BACKGROUND

The SST farms consist of 149 tanks grouped in 12 tank farms at 6 different locations. In order to retrieve waste from the SSTs, a receiver facility must be available within a few hundred feet of the SST. Some of the SST farms are in proximity to DST, and waste from the SSTs can be retrieved into available DSTs. Retrieving waste from the remote SST farms requires the construction of interim receiver facilities, referred to as WRFs, to transport the wastes to the DST system. The current waste receiver strategy is summarized in Table 3-1. The process flow is depicted graphically in Figure 3-1.

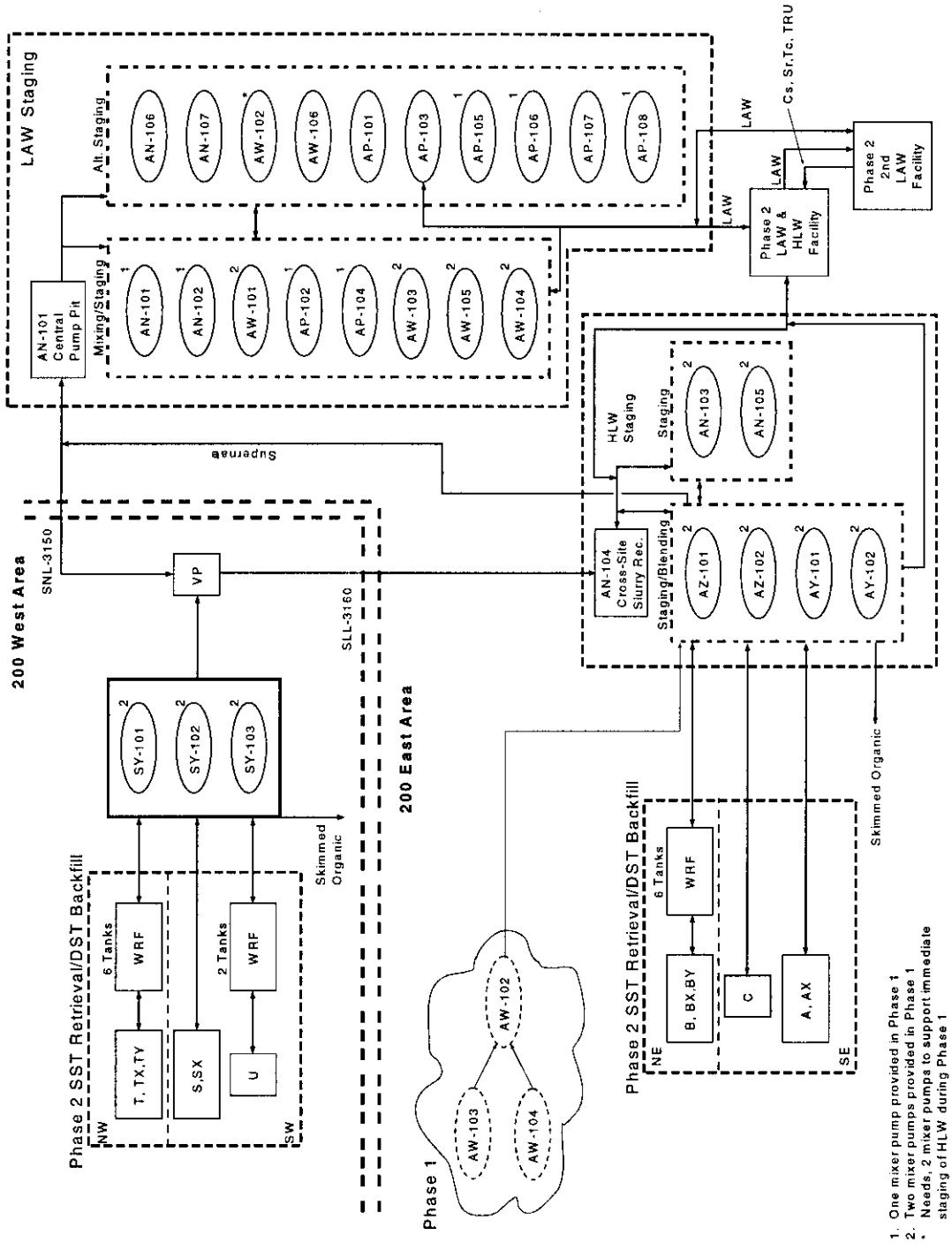
Table 3-1. Designated Receivers and Quadrants of Single-Shell Tank Farms.

Quadrant	Designated receiver	Single-shell tank farms
NW	NW WRF (six 570-m^3 [150,000-gal] tanks)	T, TX, TY
NE	NE WRF (six 570-m^3 [150,000-gal] tanks)	B, BX, BY
SW	SY Tank Farm (modeled as SY-101)*	SX
	SW WRF (two 570-m^3 [150,000-gal] tanks)	U
	SY Tank Farm (modeled as SY-103)*	S
SE	Tank 241-AY-102, Tank 241-AY-101	A, AX, C

NE = Northeast.
NW = Northwest.
SE = Southeast.
SW = Southwest.
WRF = Waste Retrieval Facility.

* NOTE: The S and SX Tank Farm designated double-shell tank receiver tank is Tank 241-SY-102. Neither Tank 241-SY-101 or Tank 241-SY-103 can receive waste today. Success of the sequence modeling for S Farm retrievals and transfer is dependant on removal of Tank 241-SY-101 and Tank 241-SY-103 from the Watch List and construction of the required piping systems.

Figure 3-1. Process Flow.



3.2 INFRASTRUCTURE REQUIREMENTS

As described in Table 1-1, the SST Retrieval Program is in a developmental stage and three options are being planned for initial implementation in three different tanks:

- Saltcake Dissolution
- Fluidic mixing
- Confined sluicing with a robotic crawler.

The saltcake dissolution process introduces water to dissolve the salts and remove the waste by a pumping process similar to salt well pumping. The fluidic mixing process and the confined sluicer or robotic crawler process employ the addition of water to dislodge and suspend the tank solids for transfer as a slurry solution. The required infrastructure concept handles the solutions and slurries in tanks and piping systems.

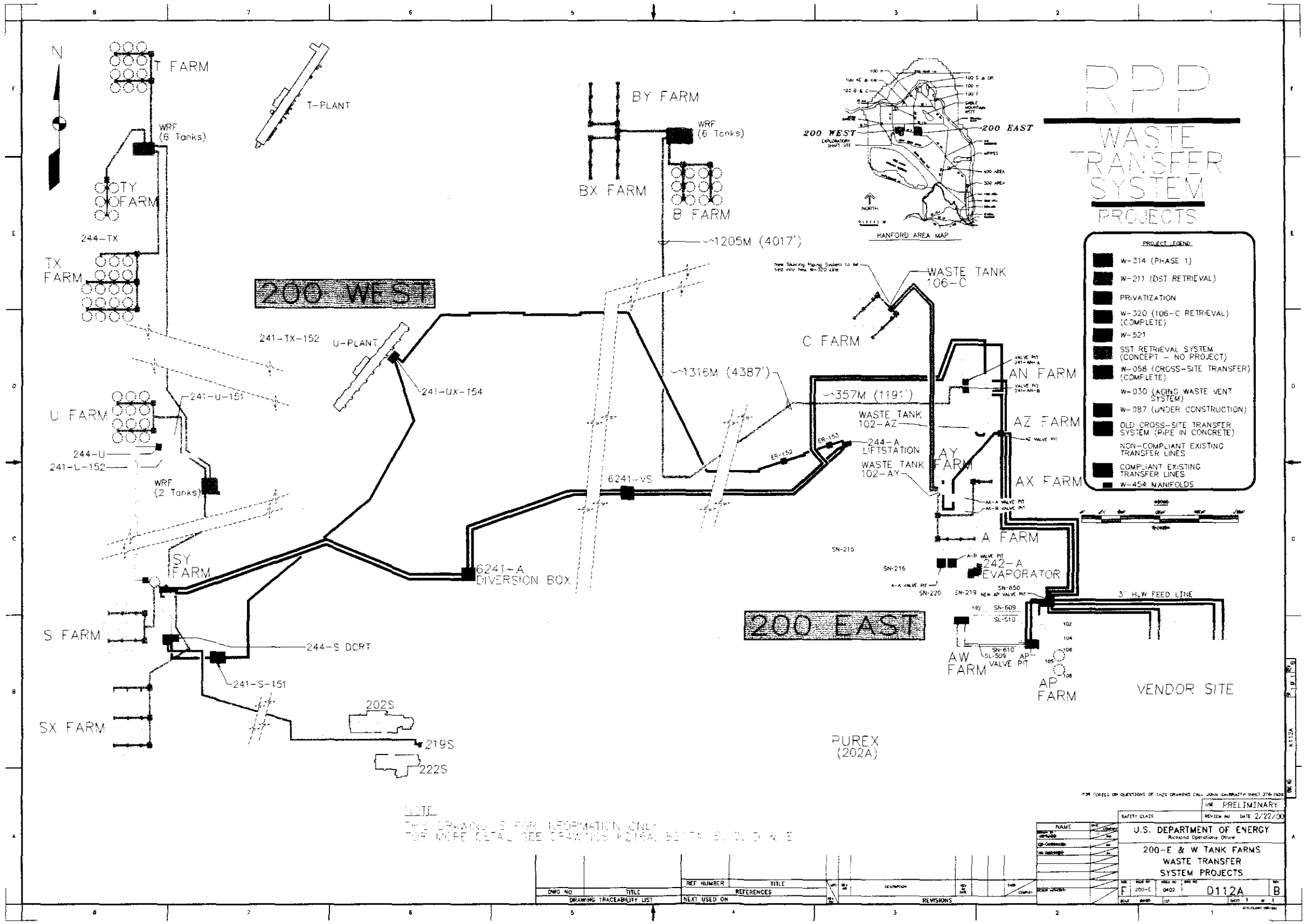
The following types of infrastructure hardware are required to functionally support pumping of solutions/slurries from SSTs:

- Tank-related retrieval systems
  - In-tank hardware and support systems
  - Monitoring and control systems for leak detection, mitigation, and retrieval controls
  - Jumper/pit upgrades, confinement systems, maintenance features
  - In-farm piping to waste receiver DSTs, (including WRFs)
- Waste retrieval facilities
  - Northwest Facility, consisting of six 570-m^3 (150,000-gal) tanks and associated piping systems, to support retrieval of the T, TX, and TY Tank Farms.
  - Northeast Facility, consisting of six 570-m^3 (150,000-gal) tanks and associated piping systems, to support retrieval of the B, BY, and BX Tank Farms.
  - Southwest Facility, consisting of two 570-m^3 (150,000-gal) tanks and associated piping systems, to support retrieval of the U Tank Farm.
  - Facility features include instrumentation, control systems, ventilation, and personnel features.

- New transfer lines (temporary aboveground lines or newly installed lines)
  - Connections from farms to DSTs or WRFs
  - Connections from WRFs to DST receivers.

Figure 3-2 shows the layout of the existing farms, the WRFs to be built, and the new piping required.

Figure 3-2. Layout Schematic of the Single-Shell Tank Farms.



4.0 HANFORD TANK WASTE OPERATION SIMULATOR MODELING

4.1 MODEL DESCRIPTION

The HTWOS is a computer simulation that models the dynamic operation of the tank farm systems within the 200 East and 200 West Areas. HTWOS simulates Phase 1 feed retrieval and staging activities, Phase 1 SST retrieval and DST backfill activities, and Phase 2 SST retrieval activities providing a common assumption basis for all activities as well as accounting for operational conflicts. Tank farm operational constraints as well as physical equipment capacities are also modeled.

HTWOS is a chemical/radionuclide, component-based model that maintains a dynamic, mass-balanced inventory of liquid and solid components in tanks by accounting for all transfers. The original inventory is derived from the BBI maintained by CH2M HILL Hanford Group, Inc. HTWOS models pumping of wastes through the tanks using partitioning factors to predict the composition of the waste as it is retrieved from the tanks and delivered to the waste treatment facility and applying glass-formulation rules to predict the amount and composition of glass product produced. The availability and capacities for various systems and processes can be set to determine a processing schedule for waste retrieval and treatment based on current or projected budget profiles and project schedules.

4.2 SEQUENCE MODELING ASSUMPTIONS

4.2.1 Single-Shell Tank Retrieval Durations/Rates

The critical Milestone M-45-00A negotiated agreement milestones incorporated into the near-term planning requirements for the modeling are shown in Table 4-1.

Table 4-1. Key Early Tri-Party Agreement Milestone Dates for Single-Shell Tank Retrieval.*

Action	Date	Tri-Party Agreement milestone number
Complete full-scale saltcake waste retrieval technology demonstration of Tank 241-S-112	September 30, 2005	M-45-03C
Complete initial waste retrieval from Tank 241-S-102	September 30, 2006	M-45-05A
Complete construction of Tank 241-C–104 retrieval systems	September 30, 2006	M-45-03I

* Tri-Party Agreement milestone numbers and dates are taken from the August 30, 2000, "Conclusion Agreement on Negotiation of Requirements Governing the Near Term Retrieval of Wastes from the Department of Energy's Single Shell Tanks."

For the current sequence the model used available data for retrieval rates for the three planned technology deployments shown in Table 4-1. For the balance of the SST retrievals, the model assumes the parameters for past-practice sluicing as the baseline retrieval technology for planning purposes. The locations and durations of the SST retrieval technology demonstrations are presented in Table 4-2.

Table 4-2. Near-Term Single-Shell Tank Retrievals and Retrieval Durations.

Single-shell tank retrieval technology	Location of demonstration	Duration (days)
Saltcake dissolution	Tank 241-S-112	196
Fluidic mixer	Tank 241-S-102	69
Confined sluicing/robotic technology	Tank 241-C-104	185

The complete modeling basis is documented in HNF-SD-WM-SP-012, *Tank Farm Contractor Operation and Utilization Plan.*

The U.S. Department of Energy, Office of River Protection, through the Project Integration Office, has provided the key interface assumptions listed below regarding Phase 1 vitrification operations dates. These assumptions were provided as the basis for the integrated baseline schedule as detailed in HNF-SD-WM-SP-012.

- Ready to deliver first LAW batch — September 18, 2005
- Ready to deliver first HLW batch — April 30, 2006
- Start pretreatment facility hot commissioning — May 2, 2007
- Start LAW facility hot commissioning — October 16, 2007
- Start HLW facility hot commissioning — July 2, 2008
- Start pretreatment facility services — November 28, 2007
- Start LAW vitrification services — October 15, 2008
- Start HLW vitrification services — July 6, 2009.

4.2.2 Tank Spare Space Allocations

DOE Order 435.1, *Radioactive Waste Management,* requires that emergency space be reserved to store waste in case a leak should occur in a DST. In compliance with DOE Order 435.1, emergency space, approximately 4,315 m^3 (1.14 Mgal), was reserved to store waste in case of a leak in a DST. However, in addition to the emergency space to respond to potential DST leaks, the tank farm contractor also has been requested to provide the capability to receive up to one tank of either LAW or HLW return from the waste treatment facility on an emergency basis (Taylor 1999). Accordingly, an additional 4,315 m^3 (1.14 Mgal) of space has been reserved to accommodate LAW or HLW return if required by a tank failure in the waste treatment facility.

In order to meet the requirements for storing HLW returns, the space in Tank 241-AY-101 is designated as dedicated emergency space until receipt of wastes from Tank 241-C-104 in FY 2007. In FY 2007, Tank 241-AZ-102 will be designated as the dedicated emergency tank through the end of the SST retrieval project and will provide approximately 3,800 m^3 (1.12 Mgal) of the required emergency space. The remaining emergency space allocation is distributed primarily within the waste receiver tanks (Tanks 241-AP-108, 241-AW-105, and 241-SY-102) (HNF-SD-WM-ER-029).

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5.0 TANK SELECTION CRITERIA AND RATIONALE

The SST Program has embarked on a retrieval strategy, summarized in Section 2.0, that addresses risk in a reasonable manner. This strategy is discussed in detail in the *Single-Shell Tank Retrieval Program Mission Analysis Report* (HNF 2974) and the *Single-Shell Tank Program Plan* (HNF-5095). Section 2.0 also provided details on how the first three tanks in the retrieval sequence were selected. For the remaining tanks, the following general criteria were used.

1. First, focus on high-risk waste (defined as high technetium-99 content, which dominates the long-lived, mobile radionuclides) in sound, saltcake waste tanks.

2. Next, focus on sound tanks that contain mixed sludge and saltcake wastes.

3. Finally, focus on tanks that have leaked or are assumed to have leaked. Interim stabilization will have reduced the risk of release from such tanks, providing time to develop retrieval technologies and experience and minimize the risk of leakage during retrieval.

Other elements employed in creating retrieval sequence are as follows.

- The waste types will be retrieved as necessary to keep the LAW and HLW processing plants operating.

- Retrieval of waste is prioritized by category (see below) unless constrained by other programmatic considerations.

- Consideration to infrastructure upgrades and transfer system construction requirements are included in the retrieval sequence development.

- Once retrieval in a tank begins, retrieval from that tank will continue until the tank waste volume is reduced to 0.4 m^3 (100 gal) or less.

- Waste will be retrieved simultaneously from up to seven tanks.

- Waste from multiple SSTs will be mixed in the staging tanks to increase incidental blending.

Ten categories of waste were established based on the results of these criteria and elements, on inventory changes, and on the *Single-Shell Tank Program Plan* (HNF-5095). These categories are presented in Table 5-1.

Table 5-1. Single-Shell Tank Waste Retrieval Categories in Order of Retrieval Priority.

Retrieval priority	Category
1	Category 1—Sound saltcake tanks with elevated levels of ^{99}Tc
2	Category 2—Sound sludge tanks with less than 1.83 m (6 ft) of sludge
3	Category 3—Sound saltcake tanks with lower levels of ^{99}Tc.
4	Category 4—Sound saltcake/sludge mixed tanks with less than 1.83 m (6 ft) of sludge
5	Category 5—Sound sludge tanks with more than 1.83 m (6 ft) of sludge
6	Category 6—Sound saltcake/sludge mixed tanks
7	Category 7—Leaking saltcake tanks
8	Category 8—Leaking saltcake/sludge mixed tanks
9	Category 9—Leaking sludge tanks with less than 1.83 m (6 ft) of sludge
10	Category 10—Leaking sludge tanks with more than 1.83 m (6 ft) of sludge

NOTE: The discriminator of 1.83 m (6 ft) for sludge depth was selected as a preliminary value to discriminate the difficulty of sludge retrieval pending further evaluation.

In FY 2001, these criteria are going to be modified, as necessary, to eliminate categories based on volume versus risk, and to develop an appropriate balance between groundwater concerns and airborne contamination. In addition, worker exposure and infrastructure issues, as well as waste treatment facility feed needs will be factored into the retrieval prioritization process.

Using the current BBI as the primary source and HNF-EP-0182-140, *Waste Tank Summary Report for Month Ending November 30, 1999,* for supplemental information, the out-year SSTs were placed into appropriate categories. The first three tanks scheduled between FY 2001 and FY 2008 for demonstration and for early retrieval (as described in Section 2.0) are not listed.

Table 5-2 shows the "out-year" SSTs listed by category. This listing becomes the input for sequencing the SST waste retrievals for FY 2008 and beyond, using the HTWOS model.

Table 5-2. Category Tank Listing.

Category	Tanks			
Category 1—Sound saltcake tanks with elevated levels of ^{99}Tc	241-TX-112	241-S-106	241-BY-102	241-AX-101
	241-S-103	241-S-108	241-BY-111	241-AX-103
	241-S-105	241-S-109	241-BY-112	241-A-101
Category 2—Sound sludge tanks with less than 1.83 m (6 ft) of sludge	241-T-102	241-U-202	241-BX-104	241-C-108
	241-T-105	241-U-203	241-BX-106	241-C-109
	241-TX-101	241-U-204	241-B-106	
	241-U-201	241-BX-103	241-C-102	
Category 3—Sound saltcake with lower levels of ^{99}Tc	241-TY-102	241-TX-104	241-TX-108	241-TX-118
	241-TX-102	241-TX-106	241-TX-111	
Category 4—Sound saltcake/sludge mixed tanks with less than 1.83 m (6 ft) of sludge	241-U-102	241-U-109	241-SX-102	241-BY-109
	241-U-103	241-U-111	241-SX-103	241-BY-110
	241-U-105	241-S-107	241-SX-105	241-BX-105
	241-U-106	241-S-110	241-SX-106	241-A-102
	241-U-107	241-S-111	241-BY-101	241-B-102
	241-U-108	241-SX-101	241-BY-104	241-B-108
Category 5—Sound sludge tanks with more than 1.83 m (6 ft) of sludge	241-T-104	241-T-204	241-BX-112	241-C-105
	241-T-110	241-TX-103	241-B-109	241-C-107
	241-T-201	241-TX-109	241-B-202	241-C-112
	241-T-202	241-BX-107	241-A-106	
	241-T-203	241-BX-109	241-C-103	
Category 6—Sound saltcake/ sludge mixed tanks with more than 1.83 m (6 ft) of sludge	241-S-101	241-B-104		
Category 7—Assumed leaker saltcake tanks	241-TX-105	241-TX-113	241-TX-116	241-B-101
	241-TX-107	241-TX-114	241-TX-117	241-B-103
	241-TX-110	241-TX-115	241-SX-109	
Category 8—Assumed leaker saltcake/sludge mixed tanks	241-SX-104	241-BY-105	241-BY-108	241-AX-102
	241-SX-114	241-BY-106	241-BX-110	241-B-105
	241-BY-103	241-BY-107	241-BX-111	241-B-107
Category 9—Assumed leaker sludge tanks with less than 1.83 m (6 ft) of sludge	241-T-101	241-TY-104	241-SX-111	241-C-101
	241-T-103	241-TY-106	241-SX-112	241-C-110
	241-T-106	241-U-101	241-SX-113	241-C-111
	241-T-107	241-U-104	241-SX-115	241-C-201
	241-T-108	241-U-110	241-BX-101	241-C-202
	241-T-109	241-U-112	241-BX-102	241-C-203
	241-T-112	241-SX-107	241-BX-108	241-C-204
	241-TY-101	241-SX-108	241-AX-104	241-A-104
	241-TY-103	241-SX-110	241-B-112	241-A-105
Category 10—Assumed leaker sludge tanks with more than 1.83 m (6 ft) of sludge	241-T-111	241-B-110	241-B-201	241-B-204
	241-TY-105	241-B-111	241-B-203	241-A-103
	241-S-104			

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6.0 SINGLE-SHELL TANK RETRIEVAL SEQUENCE

6.1 RETRIEVAL SEQUENCE AND SCHEDULE

An HTWOS model run was made to integrate the U.S. Department of Energy's Phase 1 guidance with the risk-based SST retrieval strategy to develop the current retrieval sequence. The HTWOS scenario supports completion of the recently negotiated SST retrieval Tri-Party Agreement milestones and satisfies the Phase 1 feed delivery commitments through FY 2018. The SST waste will be retrieved and transferred into DSTs as space becomes available or into WRFs as those facilities come on line. At the beginning of Phase 2, the design capacity of the existing HLW and LAW glass plants will be increased, and additional higher capacity LAW and HLW glass plants will be added as well. On March 1, 2018, the assumption is that the two LAW glass plants will have a design capacity of 60 MT/day each (120 MT/day total), and the two HLW glass plants will have a design capacity of 6 MT/day each (12 MT/day total).

Under these constraints, SST waste retrieval will be completed in FY 2030. Processing of LAW will be completed in FY 2033, and HLW processing will be completed in FY 2034. The projected retrieval sequence and timing for this scenario are presented in Figure 6-1. The SST waste retrieval data associated with Figure 6-1, including the timing, duration, and quantity of waste retrieved, are presented in Table 6-1.

6.2 LIMITATIONS ON SINGLE-SHELL TANK RETRIEVAL SEQUENCE AND SCHEDULE

There are some practical limitations within the Hanford Site tank waste system that will drive the SST retrieval sequence and schedule. These limitations are discussed below.

- There is limited physical space available in the tank farms for simultaneously performing construction and retrieval operations.
- There is limited piping available between tanks within a farm and between tank farms. This limits the number of simultaneous waste transfers that can be made, and the presence of contaminated soils limits greatly increases the cost to add more transfer lines to overcome this limitation.
- The layout of the farms on the Hanford Site limits the number of simultaneous transfers that can be made because of the size of operating staff required to effectively monitor and control waste transfers.
- The ability to transfer waste across the site is limited by the availability of the SY Farm tanks, the availability of Tank 241-AN-104 to receive slurry transfers, and the lack of space in the 200 West Area in which to separate liquids from insoluble solids to be able to transfer supernatants to Tank 241-AN-101.

- The use of DSTs to store retrieved SST waste may be limited by the equipment installed in the DST.

- The DST system must be managed to accommodate SST waste transfers. Although not all DSTs are being equipped with the two mixer pumps needed to mobilize insoluble solids, the SST wastes contain a significant portion of soluble solids and therefore may not require a mixer pump to transfer SST wastes.

6.3 RETRIEVAL WASTE GENERATION

Retrieval of the approximately 127,300 m^3 (33,630,000 gal) of SST waste will produce approximately 386,400 m^3 (102,100,000 gal) of retrieved waste because of the addition of retrieval and transport liquids. This three-fold volume increase is a result of the need to add liquids to the SST waste in a controlled manner to dislodge insoluble solids and to dissolve soluble salts. Additional liquid will be added outside the tank to dilute solutions and slurries so the waste can be transferred from the SSTs to the DSTs and, ultimately, to the waste treatment facility. The amount of water that needs to be added to retrieve and transport waste from a specific SST to a WRF tank or DST depends on the composition of waste in that SST.

Currently, it is assumed that enough water will be added to the SST waste to result in a sodium concentration $\leq$5 M/L or an insoluble solids loading $\leq$10 wt%. Solutions or slurries meeting these two criteria can be transferred reliably within the existing waste transfer system. The amount of water needed to retrieve and transport the waste from a specific SST can be adjusted in the future when better information about the waste and the specific transfer route are available.

6.4 DOUBLE-SHELL TANK SPACE UTILIZATION

The projected DST space needs for this scenario are depicted in Figure 6-2. Available DST space was filled with retrieved SST to the maximum extent possible without violating spare space and Phase 1 feed delivery requirements and within known limitations of the DSTs and associated piping systems. Figure 6-3 shows the liquid volume in each of the 28 DSTs during the Phase 1 period.

Actions for optimizing tank use are being reviewed under Tri-Party Agreement Milestone M-45-12A. These actions could free additional tank space by reducing the number of feed staging tanks and operational tanks. Other options planned to be evaluated under Milestone M-45-12A include identifying options for additional compliant storage for SST retrievals. It is too early to predict the exact magnitude of the space saving that might be accomplished.

Figure 6-1. Single-Shell Tank Retrieval Sequence and Schedule.

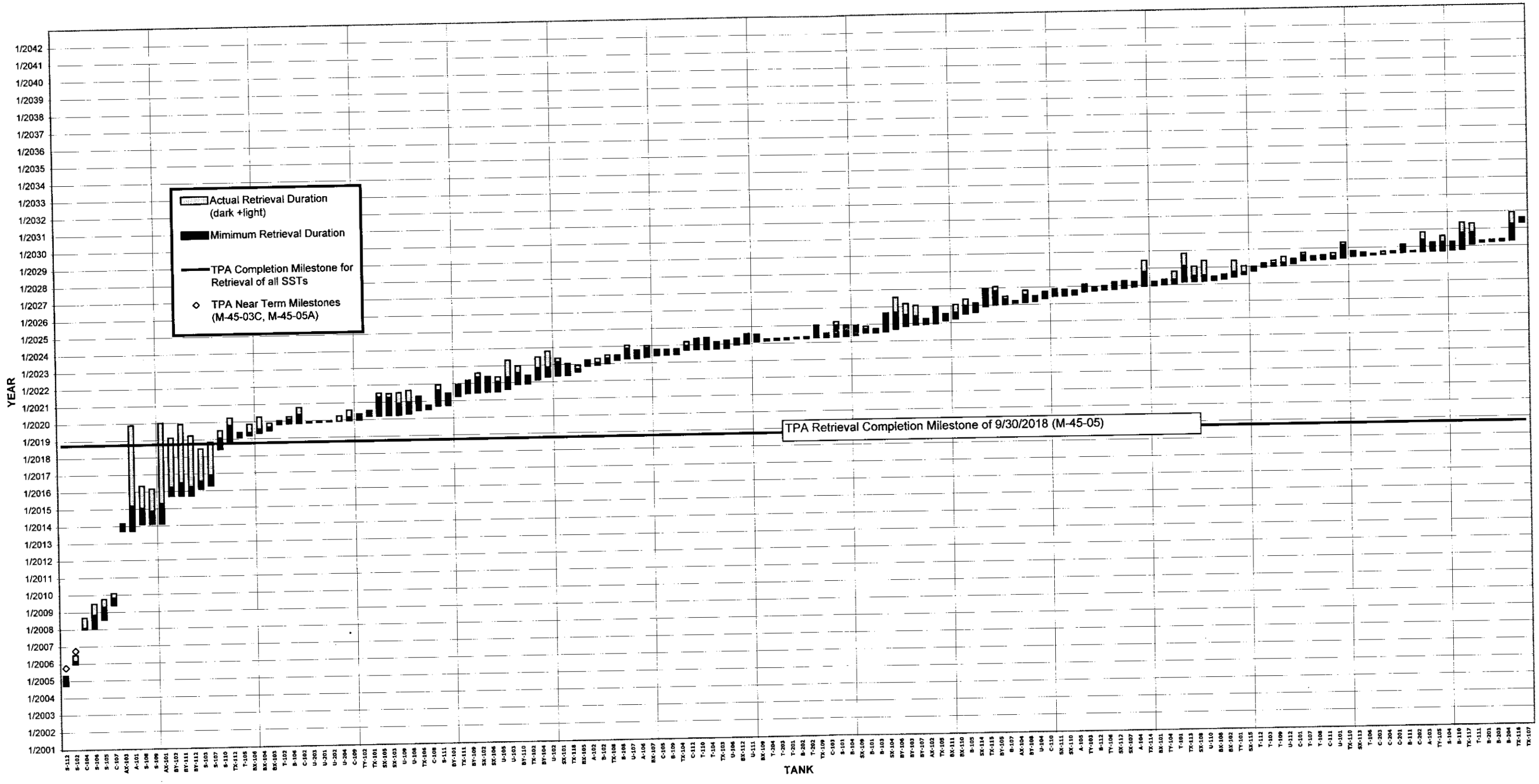


Table 6-1. Single-Shell Retrieval Sequence Data. (5 sheets)

Tank	Retrieval start date	Retrieval duration (days)	Retrieval end date	Retrieved liquid vol. (gal)	Retrieved solids vol. (gal)	Total retrieved vol. (gal)
241-S-112	10/1/2004	193	4/12/2005	1,317,156	7,919	1,325,075
241-S-102	1/3/2006	168	6/20/2006	999,799	11,055	1,010,853
241-C-104	1/16/2008	222	8/25/2008	845,286	56,553	901,839
241-S-106	1/31/2008	504	6/18/2009	1,285,715	5,897	1,291,611
241-S-105	7/31/2008	418	9/22/2009	1,417,154	3,535	1,420,688
241-C-107	6/2/2009	232	1/20/2010	549,432	32,236	581,668
241-AX-103	9/30/2013	139	2/16/2014	331,125	3,088	334,213
241-A-101	9/30/2013	2236	11/14/2019	1,543,632	21,464	1,565,097
241-S-108	2/16/2014	798	4/24/2016	1,458,451	2,005	1,460,456
241-S-109	2/16/2014	732	2/18/2016	1,575,337	3,159	1,578,496
241-AX-101	2/16/2014	2139	12/26/2019	1,157,295	3,759	1,161,053
241-BY-102	9/29/2015	1223	2/3/2019	1,068,473	18,570	1,087,043
241-BY-111	9/29/2015	1514	11/21/2019	1,718,880	21,470	1,740,350
241-BY-112	9/29/2015	1265	3/17/2019	1,351,224	21,477	1,372,701
241-S-103	2/18/2016	839	6/6/2018	666,965	3,504	670,469
241-S-107	4/24/2016	918	10/29/2018	992,421	33,849	1,026,270
241-S-110	6/6/2018	383	6/24/2019	1,251,351	41,040	1,292,391
241-TX-112	10/29/2018	506	3/18/2020	2,225,306	24,700	2,250,006
241-T-105	2/3/2019	92	5/6/2019	286,747	9,433	296,180
241-BX-106	3/17/2019	230	11/2/2019	154,824	5,452	160,276
241-BX-104	5/6/2019	327	3/28/2020	695,856	25,638	721,494
241-BX-103	6/24/2019	139	11/10/2019	175,941	6,703	182,644
241-T-102	11/2/2019	58	12/30/2019	294,928	10,973	305,901
241-B-106	11/10/2019	134	3/23/2020	162,875	5,311	168,186
241-C-102	11/14/2019	321	9/30/2020	830,631	30,453	861,085
241-U-203	11/21/2019	6	11/27/2019	11,629	394	12,023
241-U-201	11/27/2019	7	12/4/2019	22,998	780	23,778
241-U-202	12/4/2019	7	12/11/2019	22,997	780	23,777

Table 6-1. Single-Shell Retrieval Sequence Data. (5 sheets)

Tank	Retrieval start date	Retrieval duration (days)	Retrieval end date	Retrieved liquid vol. (gal)	Retrieved solids vol. (gal)	Total retrieved vol. (gal)
241-U-204	12/11/2019	102	3/22/2020	15,706	576	16,282
241-C-109	12/26/2019	201	7/14/2020	301,820	11,509	313,329
241-TY-102	12/30/2019	116	4/24/2020	247,297	578	247,875
241-TX-101	3/18/2020	105	7/1/2020	408,984	12,865	421,849
241-SX-105	3/22/2020	465	6/30/2021	1,058,737	10,761	1,069,498
241-SX-103	3/23/2020	450	6/16/2021	1,141,170	7,314	1,148,484
241-U-109	3/28/2020	462	7/3/2021	1,337,014	24,589	1,361,602
241-U-108	4/24/2020	483	8/20/2021	1,453,010	26,237	1,479,247
241-TX-106	7/1/2020	280	4/7/2021	1,230,690	6,728	1,237,419
241-C-108	7/14/2020	77	9/29/2020	202,255	7,566	209,821
241-S-111	9/29/2020	427	11/30/2021	1,438,255	49,413	1,487,668
241-BY-101	9/30/2020	248	6/5/2021	1,068,279	20,654	1,088,933
241-TX-111	4/7/2021	241	12/4/2021	1,170,454	14,212	1,184,666
241-BY-109	6/5/2021	265	2/25/2022	950,744	14,211	964,955
241-SX-102	6/16/2021	405	7/26/2022	1,305,564	11,519	1,317,083
241-SX-106	6/30/2021	316	5/12/2022	688,347	10,402	698,749
241-U-105	7/3/2021	297	4/26/2022	1,159,998	10,855	1,170,853
241-U-103	8/20/2021	602	4/14/2023	1,313,989	5,727	1,319,716
241-BY-110	11/30/2021	372	12/7/2022	1,416,878	16,925	1,433,803
241-TX-102	12/4/2021	168	5/21/2022	736,228	7,861	744,088
241-BY-104	2/25/2022	471	6/11/2023	1,257,091	11,397	1,268,488
241-U-102	4/26/2022	531	10/9/2023	1,385,858	14,975	1,400,833
241-SX-101	5/12/2022	359	5/6/2023	1,024,292	12,054	1,036,346
241-TX-118	5/21/2022	230	1/6/2023	903,592	17,747	921,339
241-BX-105	7/26/2022	122	11/25/2022	154,705	5,135	159,841
241-A-102	11/25/2022	111	3/16/2023	99,955	2,315	102,269
241-B-102	12/7/2022	131	4/17/2023	137,291	2,774	140,065
241-TX-108	1/6/2023	170	6/25/2023	445,782	7,076	452,857
241-B-108	3/16/2023	90	6/14/2023	259,268	8,907	268,175
241-U-107	4/14/2023	265	1/4/2024	605,307	8,330	613,638

Table 6-1. Single-Shell Retrieval Sequence Data. (5 sheets)

Tank	Retrieval start date	Retrieval duration (days)	Retrieval end date	Retrieved liquid vol. (gal)	Retrieved solids vol. (gal)	Total retrieved vol. (gal)
241-A-106	4/17/2023	161	9/25/2023	204,790	7,734	212,525
241-BX-107	5/6/2023	229	12/21/2023	791,157	31,795	822,951
241-C-105	6/11/2023	108	9/27/2023	398,129	13,157	411,286
241-B-109	6/14/2023	107	9/29/2023	547,332	17,758	565,091
241-TX-104	6/25/2023	99	10/2/2023	123,334	3,892	127,226
241-C-112	9/25/2023	157	2/29/2024	496,404	19,446	515,850
241-T-110	9/27/2023	224	5/8/2024	293,861	10,934	304,795
241-T-104	9/29/2023	236	5/22/2024	516,014	17,857	533,871
241-TX-103	10/2/2023	140	2/19/2024	533,748	5,472	539,220
241-U-106	10/9/2023	156	3/13/2024	647,403	2,725	650,128
241-BX-112	12/21/2023	123	4/22/2024	330,512	11,976	342,487
241-U-111	1/4/2024	204	7/26/2024	946,667	7,564	954,231
241-BX-109	2/19/2024	138	7/6/2024	278,361	10,642	289,002
241-T-204	2/29/2024	23	3/23/2024	56,968	2,198	59,165
241-T-203	3/13/2024	21	4/3/2024	59,034	2,243	61,277
241-T-201	3/23/2024	18	4/10/2024	111,846	4,107	115,952
241-B-202	4/3/2024	18	4/21/2024	29,815	1,123	30,938
241-T-202	4/10/2024	15	4/25/2024	33,473	1,280	34,753
241-TX-109	4/21/2024	247	12/24/2024	567,328	15,561	582,890
241-C-103	4/22/2024	75	7/6/2024	424,747	16,738	441,484
241-S-101	4/25/2024	310	3/1/2025	1,630,563	48,333	1,678,896
241-B-104	5/8/2024	222	12/16/2024	612,264	12,584	624,847
241-SX-109	5/22/2024	205	12/13/2024	1,137,708	33,475	1,171,183
241-B-101	7/6/2024	127	11/10/2024	442,749	2,433	445,182
241-B-103	7/6/2024	74	9/18/2024	193,625	3,955	197,580
241-SX-104	7/26/2024	386	8/16/2025	1,198,331	9,463	1,207,794
241-BY-106	9/18/2024	660	7/10/2026	2,227,488	26,940	2,254,428
241-BY-103	11/10/2024	469	2/22/2026	1,257,895	17,577	1,275,472
241-BY-107	12/13/2024	397	1/14/2026	1,118,471	18,080	1,136,551
241-AX-102	12/16/2024	110	4/5/2025	76,024	1,132	77,156

Table 6-1. Single-Shell Retrieval Sequence Data. (5 sheets)

Tank	Retrieval start date	Retrieval duration (days)	Retrieval end date	Retrieved liquid vol. (gal)	Retrieved solids vol. (gal)	Total retrieved vol. (gal)
241-TX-105	12/24/2024	354	12/13/2025	2,069,790	21,843	2,091,633
241-BX-111	3/1/2025	134	7/13/2025	523,498	6,832	530,330
241-BX-110	4/5/2025	290	1/20/2026	696,754	13,704	710,458
241-B-105	7/13/2025	301	5/10/2026	393,787	2,531	396,318
241-SX-114	8/16/2025	176	2/8/2026	870,767	27,350	898,117
241-TX-115	12/13/2025	368	12/16/2026	1,928,583	21,060	1,949,643
241-BY-105	1/14/2026	369	1/18/2027	1,535,622	28,253	1,563,875
241-B-107	1/20/2026	153	6/22/2026	442,438	17,857	460,295
241-AX-104	2/8/2026	36	3/16/2026	92,321	3,417	95,739
241-BY-108	2/22/2026	239	10/19/2026	536,711	12,690	549,402
241-U-104	3/16/2026	103	6/27/2026	265,763	6,950	272,712
241-C-110	5/10/2026	129	9/16/2026	278,985	10,999	289,985
241-SX-111	6/22/2026	145	11/14/2026	609,989	18,867	628,856
241-SX-110	6/27/2026	125	10/30/2026	309,041	9,579	318,620
241-A-105	7/10/2026	84	10/2/2026	333,899	7,646	341,545
241-TY-103	9/16/2026	142	2/5/2027	410,335	17,007	427,343
241-B-112	10/2/2026	65	12/6/2026	39,326	1,502	40,827
241-TY-106	10/19/2026	70	12/28/2026	132,395	4,984	137,379
241-SX-112	10/30/2026	136	3/15/2027	536,807	16,619	553,425
241-SX-107	11/14/2026	140	4/3/2027	543,056	17,399	560,455
241-A-104	12/6/2026	101	3/17/2027	240,047	7,928	247,975
241-TX-114	12/16/2026	537	6/5/2028	1,859,616	18,633	1,878,249
241-BX-101	12/28/2026	70	3/8/2027	286,490	10,706	297,195
241-TY-104	1/18/2027	93	4/21/2027	160,042	5,458	165,500
241-T-101	2/5/2027	241	10/4/2027	760,534	30,058	790,592
241-TX-113	3/8/2027	593	10/21/2028	1,696,642	23,009	1,719,651
241-SX-108	3/15/2027	306	1/15/2028	363,673	10,518	374,190
241-U-110	3/17/2027	424	5/14/2028	1,391,384	48,570	1,439,954
241-BX-108	4/3/2027	63	6/5/2027	43,667	1,884	45,550
241-BX-102	4/21/2027	91	7/21/2027	184,683	6,575	191,258

Table 6-1. Single-Shell Retrieval Sequence Data. (5 sheets)

Tank	Retrieval start date	Retrieval duration (days)	Retrieval end date	Retrieved liquid vol. (gal)	Retrieved solids vol. (gal)	Total retrieved vol. (gal)
241-TY-101	6/5/2027	332	5/2/2028	766,317	26,658	792,975
241-SX-115	7/21/2027	169	1/6/2028	53,006	1,351	54,357
241-T-112	10/4/2027	74	12/17/2027	111,485	3,604	115,089
241-T-103	12/17/2027	68	2/23/2028	253,681	9,409	263,089
241-T-109	1/6/2028	108	4/23/2028	217,276	1,705	218,981
241-U-112	1/15/2028	173	7/6/2028	294,992	10,318	305,310
241-C-101	2/23/2028	87	5/20/2028	224,174	7,197	231,370
241-T-107	4/23/2028	156	9/26/2028	394,224	13,550	407,774
241-T-108	5/2/2028	69	7/10/2028	128,229	5,244	133,472
241-C-111	5/14/2028	73	7/26/2028	366,985	13,317	380,303
241-U-101	5/20/2028	108	9/5/2028	108,907	3,366	112,274
241-TX-110	6/5/2028	317	4/18/2029	1,496,609	18,114	1,514,723
241-SX-113	7/6/2028	98	10/12/2028	174,972	6,353	181,325
241-T-106	7/10/2028	58	9/6/2028	128,367	4,660	133,026
241-C-203	7/26/2028	10	8/5/2028	26,929	1,133	28,062
241-C-204	8/5/2028	46	9/20/2028	45,422	1,781	47,203
241-C-201	9/5/2028	14	9/19/2028	15,841	610	16,450
241-B-111	9/6/2028	157	2/10/2029	316,533	12,104	328,637
241-C-202	9/19/2028	5	9/24/2028	6,732	280	7,011
241-A-103	9/20/2028	397	10/22/2029	1,127,777	4,893	1,132,671
241-TY-105	9/24/2028	175	3/18/2029	471,071	19,761	490,831
241-S-104	9/26/2028	308	7/31/2029	1,689,491	54,864	1,744,355
241-B-110	10/12/2028	162	3/23/2029	356,517	15,104	371,621
241-TX-117	10/21/2028	559	5/3/2030	2,107,643	17,314	2,124,958
241-T-111	2/10/2029	426	4/12/2030	618,496	23,155	641,651
241-B-201	3/18/2029	18	4/5/2029	93,356	3,500	96,857
241-B-203	3/23/2029	28	4/20/2029	81,667	3,167	84,833
241-B-204	4/5/2029	28	5/3/2029	67,412	2,758	70,170
241-TX-116	4/18/2029	588	11/27/2030	2,032,725	30,388	2,063,113
241-TX-107	5/3/2030	89	7/31/2030	106,826	1,781	108,608

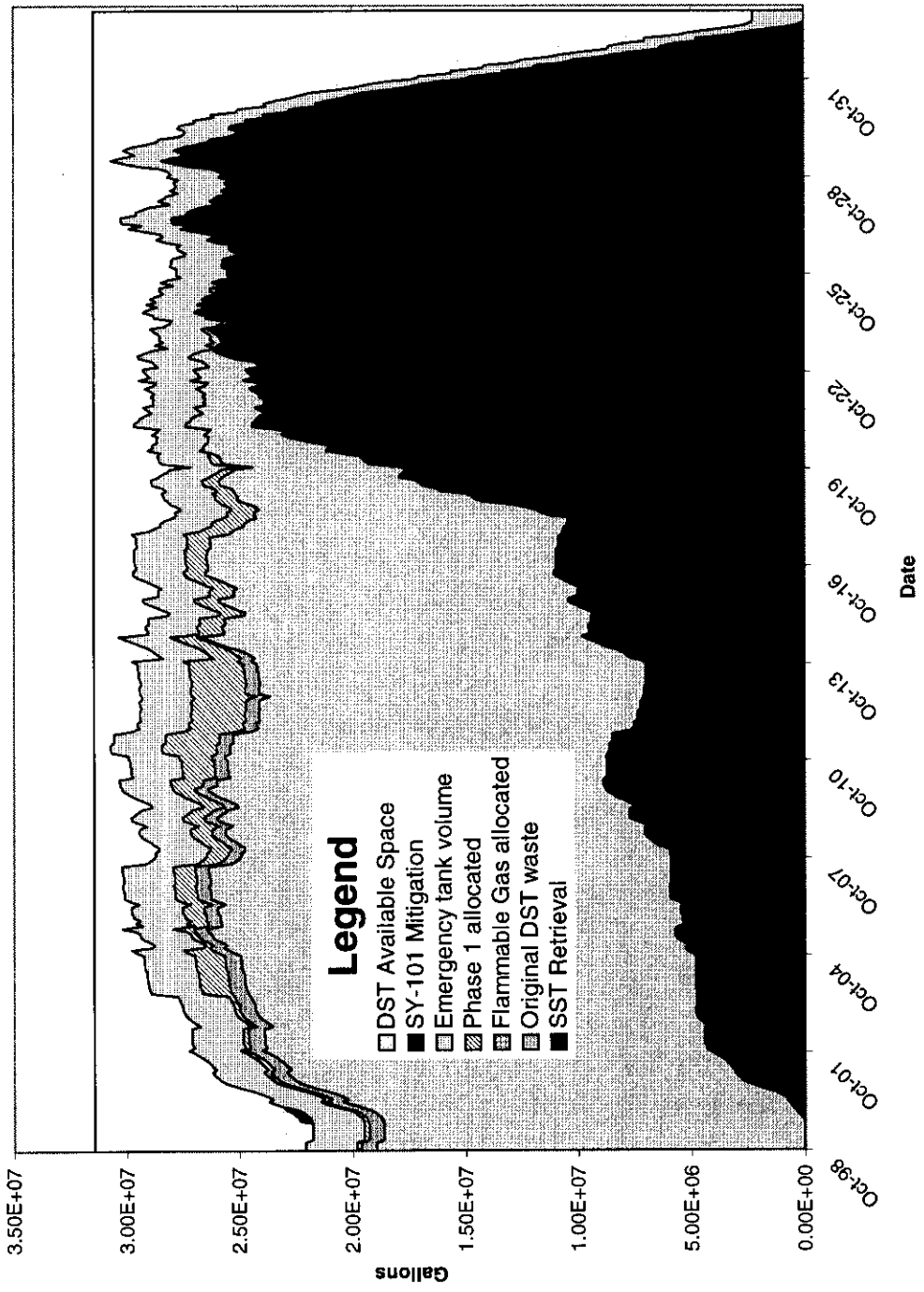
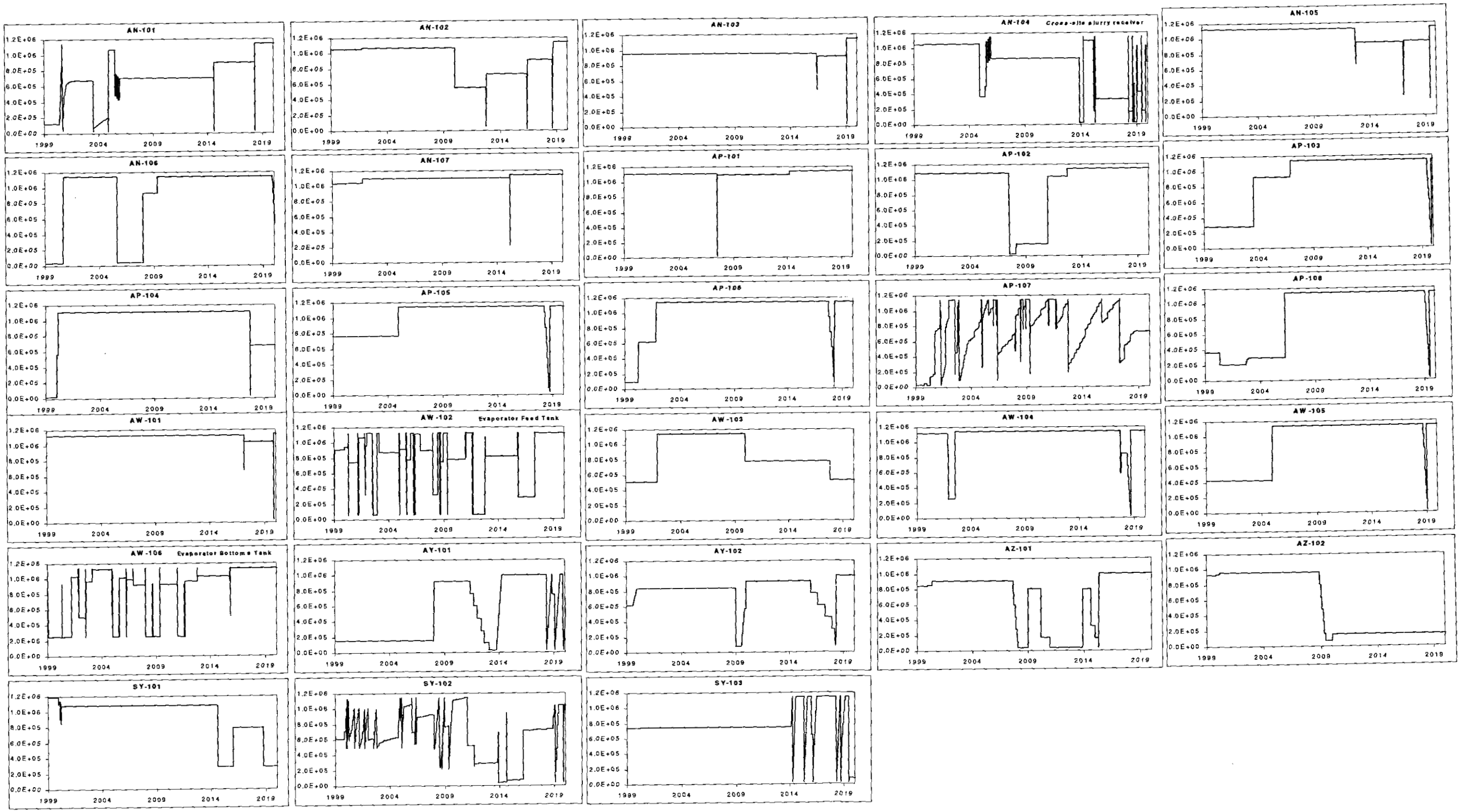


Figure 6-2. Total Double-Shell Tank Volume—Single-Shell Retrieval Sequence.

Figure 6-3. Double-Shell Tank Volume Plots.



7.0 SINGLE-SHELL TANK RETRIEVAL METHODS

7.1 SINGLE-SHELL TANK RETRIEVAL SYSTEMS

The SST Retrieval Program, and its predecessor organizations, have reviewed and evaluated numerous technologies for potential applications to retrieval of SSTs (RPP-6947, *Hanford Tank Initiative/Acquire Commercial Technology for Retrieval Report and Database*). Of the many systems and potential configuration options evaluated, the only system with recent experience in retrieval of SSTs is the traditional approach, "Past-Practice Sluicing." This system was successfully applied in the retrieval of Tank 241-C-106 in FY 1999.

In order to evaluate the potential for cost and/or performance improvements, the program has elected to test and deploy several alternative technologies in "near-term" retrieval applications committed to in the August 30,2000, Milestone M-45-00A negotiated agreement. Below is a brief description of the Past-Practice Sluicing system and the alternative technology systems, which are planned for deployment in the first three SSTs planned for retrieval under the Milestone M-45-00A negotiated agreement.

7.1.1 Past-Practice Sluicing

Introduction of a liquid, typically recycled supernatant, at high pressures and volumes into the waste matrix to break apart and suspend the solids materials into the sluicing fluid for subsequent transport out of the tank. The sluicing liquid is introduced through a nozzle or nozzles inserted through risers on the perimeter of the tank. The slurry is retrieved from the tank by a pump, lowered through an available riser, into the slurry pool formed by the sluicing action on the top of the solids. The pump is incrementally worked to the bottom of the tank as the sluicing action dislodges and suspends the solids. This system proved quite effective in the retrieval of Tank 241-C-106, retrieving an estimated 97% of the solids (RPP-6696, *Data to Support C-106 Waste Retrieval Determination*) of the tank wastes.

7.1.2 Saltcake Dissolution

This system transitions the wastes to a pumpable form by dissolution of solids (primarily sodium salts) using water as the diluent. Dissolution, based on a low volume density gradient method, is planned for deployment. There are several configuration variations and operations approaches available under this approach that are being evaluated for deployment at the Hanford Site. This method is planned for use in Tank 241-S-112.

7.1.3 Fluidic Mixing

Pulse jet mixing typically involves the use of large-diameter pulse tubes vertically mounted in the tank and immersed in the tank fluid. A vacuum is applied to the pulse tube, using a jet pump with air as the motive fluid. Sludge and liquid fill the pulse tube, and when the tube is full, the jet is turned off and the tube is vented or charged. The fluid in the tube falls back into the tank and imparts the mixing action or is directed to a receiving tank for transfer and processing. The system operates with no moving parts in contact with the wastes and very low maintenance. The system was successfully deployed at Oak Ridge and is being demonstrated at Los Alamos National Laboratory. This method is currently planned for use in Tank 241-S-102.

7.1.4 Confined Sluicing Robotic Crawler

Waste mobilization and retrieval is accomplished by introduction of a small (sometimes collapsible or foldout) vehicle into the tank environment. In a confined sluicing approach, sluicing nozzles are mounted on the vehicle and direct high pressure, low volume sluicing fluid streams on the wastes in the immediate proximity of the vehicle. The vehicle contains a slurry pump, which draws the waste slurry to the pump for transfer out of the tank. This approach reduces the amount of freestanding liquids in the tank and thereby reduces the potential for leaks during retrieval. In the most common applications, the vehicle serves as a platform to mount other tools to dislodge compacted wastes or wastes adhering to sidewalls or appendages. For the SST application, the sluicing fluid will be, primarily, recycled supernatant. This method is currently planned for use in Tank 241-C-104.

7.1.5 Manipulator or Arm

A mechanical device, typically folded in several sections, is used to deliver various tools to specified locations within the interior of the tank. The arm is fixed at one end, often from or above the tank risers, and as with the crawler, various tools are often mounted to the opposite end of the arm. One application is to mount a sluicing nozzle at the working end of the arm and use this device in conjunction with a crawler serving as a pump function to retrieve and transfer the waste slurry out of the tank.

8.0 REFERENCES

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Taylor, W. J., 1999, (Letter 99-AMPD-006, *Contract No. DE-AC06-96RL13200—Planning Guidance Revision for Development of Contract Deliverables Required by Performance Agreement TWR1.3.5*, to R. D. Hanson, Fluor Hanford, Inc., dated April 1), U.S. Department of Energy, Office of River Protection, Richland, Washington.

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APPENDIX A

DATA TABLES

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Table A-1. Combined Curies Ranking. (5 sheets)

Combined Curies Ranking

Prepared from Best Basis Inventory 8/31/2000 by Ivar Husa

Tank	Farm	August 31, 2000 Combined Radioactive Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Former Over All Rank	Percentage of Total Amount	Change in Over All Rank	Combined Radioactive Inventory From March 22, 2000	Percentage change from March to August
241-U-101	U-	208,667	25	11	91	104	0.18%	-13	107,308	94%
241-SX-113	SX	19,054	31	15	126	131	0.02%	-5	9,820	94%
241-SX-112	SX	1,037,678	108	8	35	71	0.88%	-36	541,880	91%
241-SX-111	SX	1,183,566	122	7	29	65	1.00%	-36	623,268	90%
241-SX-110	SX	608,967	62	14	68	84	0.52%	-16	323,669	88%
241-U-112	U-	24,686	49	12	122	97	0.02%	25	164,528	85%
241-U-202	U-	2,540	5	14	138	129	0.00%	9	11,582	78%
241-U-201	U-	2,540	5	13	137	128	0.00%	9	11,582	78%
241-U-203	U-	1,291	3	15	140	136	0.00%	4	5,809	78%
241-TX-113	TX	207,957	607	14	92	47	0.18%	45	884,215	76%
241-T-108	T-	9,017	44	9	130	137	0.01%	-7	5,186	74%
241-U-104	U-	444,653	122	10	79	88	0.38%	-9	257,453	73%
241-SX-107	SX	875,795	104	11	46	75	0.74%	-29	515,940	70%
241-SX-109	SX	1,309,519	250	6	24	9	1.11%	15	2,731,112	52%
241-TX-109	TX	120,078	384	16	100	89	0.10%	11	244,934	51%
241-T-106	T-	6,063	21	11	134	132	0.01%	2	9,478	36%
241-S-112	S-	1,031,783	523	7	37	21	0.87%	16	1,582,584	35%
241-S-109	S-	528,601	507	12	73	53	0.45%	20	782,511	32%
241-U-111	U-	732,039	329	6	57	34	0.62%	23	1,029,545	29%
241-A-105	A	7,839,278	51	1	1	1	6.65%	0	10,674,883	27%
241-S-111	S-	1,622,320	472	2	19	17	1.38%	2	2,068,364	22%
241-U-105	U-	826,972	338	3	51	40	0.70%	11	1,002,958	18%
241-SX-106	SX	832,956	397	12	50	39	0.71%	11	1,005,705	17%
241-BY-102	BY	341,996	277	12	83	82	0.29%	1	402,997	15%
241-C-105	C-	1,162,487	134	6	31	35	0.99%	-4	1,029,214	13%
241-BX-111	BX	176,461	162	4	95	94	0.15%	1	195,257	10%
241-TX-116	TX	297,325	631	12	85	86	0.25%	-1	272,507	9%
241-U-102	U-	1,166,319	342	1	30	27	0.99%	3	1,280,404	9%

Table A-1. Combined Curies Ranking. (5 sheets)

Combined Curies Ranking

Prepared from Best Basis Inventory 8/31/2000 by Ivar Husa

Tank	Farm	August 31, 2000 Combined Radioactive Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Former Over All Rank	Percentage of Total Amount	Change in Over All Rank	Combined Radioactive Inventory From March 22, 2000	Percentage change from March to August
241-SX-114	SX	889,833	181	10	44	43	0.75%	1	961,360	7%
241-T-201	T-	180	29	13	145	145	0.00%	0	192	6%
241-T-203	T-	47	35	14	147	147	0.00%	0	50	6%
241-T-204	T-	38	38	15	148	148	0.00%	0	40	6%
241-TX-107	TX	53,827	36	18	116	118	0.05%	-2	50,727	6%
241-SX-104	SX	1,821,037	446	5	17	20	1.54%	-3	1,718,530	6%
241-U-103	U-	623,085	369	9	65	60	0.53%	5	662,284	6%
241-S-103	S-	583,700	237	11	69	66	0.49%	3	613,916	5%
241-C-106	C-	544,495	74	9	71	74	0.46%	-3	519,165	5%
241-S-102	S-	857,619	492	9	48	46	0.73%	2	896,124	4%
241-T-104	T-	10,734	317	8	129	130	0.01%	-1	10,295	4%
241-TX-111	TX	702,851	370	8	60	59	0.60%	1	676,902	4%
241-TX-110	TX	879,896	462	5	45	49	0.75%	-4	848,896	4%
241-U-109	U-	706,372	431	7	59	57	0.60%	2	732,990	4%
241-B-204	B	201	50	15	143	143	0.00%	0	208	3%
241-SX-105	SX	2,036,242	637	3	15	15	1.73%	0	2,108,258	3%
241-TX-108	TX	244,278	134	13	88	90	0.21%	-2	237,077	3%
241-TX-115	TX	1,159,087	568	3	32	31	0.98%	1	1,126,079	3%
241-TX-105	TX	1,241,491	609	2	27	30	1.05%	-3	1,207,489	3%
241-TX-112	TX	1,278,217	649	1	26	28	1.08%	-2	1,243,212	3%
241-TX-106	TX	731,154	341	7	58	58	0.62%	0	711,154	3%
241-TX-114	TX	990,196	535	4	40	42	0.84%	-2	963,194	3%
241-S-106	S-	635,718	479	10	62	61	0.54%	1	653,351	3%
241-TX-117	TX	768,653	626	6	54	55	0.65%	-1	748,651	3%
241-TX-102	TX	462,127	217	11	78	78	0.39%	0	450,126	3%
241-TX-101	TX	609,122	87	9	67	68	0.52%	-1	594,823	2%
241-BY-101	BY	1,037,875	387	4	34	37	0.88%	-3	1,014,756	2%
241-C-201	C-	2,663	2	15	136	139	0.00%	-3	2,683	1%
241-AX-103	AX	1,475,408	112	3	20	23	1.25%	-3	1,465,229	1%
241-BY-103	BY	611,546	400	8	66	67	0.52%	-1	608,908	0%

Table A-1. Combined Curies Ranking. (5 sheets)

Combined Curies Ranking

Prepared from Best Basis Inventory 8/31/2000 by Ivar Husa

Tank	Farm	August 31, 2000 Combined Radioactive Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Former Over All Rank	Percentage of Total Amount	Change in Over All Rank	Combined Radioactive Inventory From March 22, 2000	Percentage change from March to August
241-U-107	U-	806,649	408	4	52	51	0.68%	1	808,603	0%
241-T-110	T-	158,901	369	4	97	98	0.13%	-1	159,202	0%
241-C-203	C-	19,425	5	14	125	125	0.02%	0	19,441	0%
241-B-105	B	61,533	158	7	113	114	0.05%	-1	61,550	0%
241-BY-106	BY	2,486,569	562	1	9	10	2.11%	-1	2,486,703	0%
241-C-204	C-	1,755	3	16	139	140	0.00%	-1	1,755	0%
241-B-108	B	38,016	94	10	120	121	0.03%	-1	38,015	0%
241-B-106	B	102,548	117	4	105	106	0.09%	-1	102,547	0%
241-TX-118	TX	487,627	286	10	77	77	0.41%	0	487,622	0%
241-TX-103	TX	153,583	157	15	98	99	0.13%	-1	153,581	0%
241-U-108	U-	1,019,720	468	2	38	36	0.86%	2	1,019,724	0%
241-S-105	S-	1,435,927	456	3	22	24	1.22%	-2	1,435,928	0%
241-B-112	B	77,760	33	6	111	112	0.07%	-1	77,760	0%
241-SX-103	SX	3,426,714	634	1	6	6	2.91%	0	3,426,715	0%
241-TY-104	TY	85,138	43	3	108	109	0.07%	-1	85,138	0%
241-SX-108	SX	2,328,214	87	2	11	12	1.97%	-1	2,328,214	0%
241-BX-110	BX	172,728	207	5	96	96	0.15%	0	172,728	0%
241-B-107	B	118,789	165	3	101	101	0.10%	0	118,789	0%
241-C-110	C-	45,130	178	12	118	119	0.04%	-1	45,130	0%
241-TY-106	TY	22,657	21	4	124	124	0.02%	0	22,657	0%
241-TY-101	TY	15,610	118	5	127	126	0.01%	1	15,610	0%
241-B-202	B	1,013	27	13	141	141	0.00%	0	1,013	0%
241-B-103	B	12,374	59	11	128	127	0.01%	1	12,374	0%
241-BX-105	BX	103,280	51	7	104	105	0.09%	-1	103,280	0%
241-AX-101	AX	2,318,858	684	2	12	13	1.97%	-1	2,318,858	0%
241-T-202	T-	36	21	16	149	149	0.00%	0	36	0%
241-C-109	C-	904,207	66	7	42	44	0.77%	-2	904,207	0%
241-BX-106	BX	79,225	38	10	110	111	0.07%	-1	79,225	0%
241-SX-101	SX	1,032,553	448	9	36	33	0.88%	3	1,032,553	0%
241-A-101	A	2,781,590	891	3	8	8	2.36%	0	2,781,590	0%

Table A-1. Combined Curies Ranking. (5 sheets)

Combined Curies Ranking

Prepared from Best Basis Inventory 8/31/2000 by Ivar Husa

Tank	Farm	August 31, 2000 Combined Radioactive Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Former Over All Rank	Percentage of Total Amount	Change in Over All Rank	Combined Radioactive Inventory From March 22, 2000	Percentage change from March to August
241-C-104	C-	1,465,448	263	5	21	22	1.24%	-1	1,465,448	0%
241-BX-112	BX	92,082	165	9	107	108	0.08%	-1	92,082	0%
241-U-110	U-	740,044	186	5	56	56	0.63%	0	740,044	0%
241-C-108	C-	195,518	66	11	93	93	0.17%	0	195,518	0%
241-B-203	B	199	51	16	144	144	0.00%	0	199	0%
241-S-108	S-	863,898	432	8	47	48	0.73%	-1	863,898	0%
241-T-103	T-	110,128	27	5	103	103	0.09%	0	110,128	0%
241-B-111	B	899,192	237	1	43	45	0.76%	-2	899,192	0%
241-T-109	T-	7,219	58	10	132	134	0.01%	-2	7,219	0%
241-T-107	T-	233,580	173	3	89	91	0.20%	-2	233,580	0%
241-BX-102	BX	59,179	96	11	114	115	0.05%	-1	59,179	0%
241-B-201	B	959	29	14	142	142	0.00%	0	959	0%
241-C-102	C-	508,396	316	10	76	76	0.43%	0	508,396	0%
241-T-105	T-	260,213	98	2	87	87	0.22%	0	260,213	0%
241-S-101	S-	2,099,768	427	1	14	16	1.78%	-2	2,099,768	0%
241-TY-105	TY	524,951	231	1	74	72	0.45%	2	524,951	0%
241-BY-107	BY	543,576	266	10	72	70	0.46%	2	543,576	0%
241-BX-103	BX	136,000	71	6	99	100	0.12%	-1	136,000	0%
241-B-102	B	8,603	32	12	131	133	0.01%	-2	8,603	0%
241-BY-104	BY	2,202,973	326	2	13	14	1.87%	-1	2,202,973	0%
241-B-110	B	289,211	246	2	86	85	0.25%	1	289,211	0%
241-BY-111	BY	582,715	459	9	70	69	0.49%	1	582,715	0%
241-C-111	C-	2,364,131	57	4	10	11	2.00%	-1	2,364,131	0%
241-S-107	S-	1,238,117	376	6	28	29	1.05%	-1	1,238,117	0%
241-A-102	A	331,357	41	6	84	83	0.28%	1	331,357	0%
241-AX-104	AX	5,441,886	8	1	3	3	4.61%	0	5,441,886	0%
241-C-112	C-	2,983,793	104	3	7	7	2.53%	0	2,983,793	0%
241-A-104	A	6,060,001	28	2	2	2	5.14%	0	6,060,001	0%
241-AX-102	AX	763,531	30	4	55	54	0.65%	1	763,531	0%
241-SX-115	SX	802,343	12	13	53	52	0.68%	1	802,343	0%

Table A-1. Combined Curies Ranking. (5 sheets)

Combined Curies Ranking

Prepared from Best Basis Inventory 8/31/2000 by Ivar Husa

Tank	Farm	August 31, 2000 Combined Radioactive Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Former Over All Rank	Percentage of Total Amount	Change in Over All Rank	Combined Radioactive Inventory From March 22, 2000	Percentage change from March to August
241-BX-104	BX	406,294	93	2	82	81	0.34%	1	406,294	0%
241-T-101	T-	419,261	102	1	81	80	0.36%	1	419,261	0%
241-BY-105	BY	845,505	503	6	49	50	0.72%	-1	845,505	0%
241-U-204	U-	53	3	16	146	146	0.00%	0	53	0%
241-C-107	C-	3,514,351	257	2	5	5	2.98%	0	3,514,351	0%
241-TY-102	TY	7,027	64	6	133	135	0.01%	-2	7,027	0%
241-C-202	C-	29,565	1	13	121	122	0.03%	-1	29,565	0%
241-A-103	A	1,013,344	371	5	39	38	0.86%	1	1,013,344	0%
241-A-106	A	1,782,687	125	4	18	19	1.51%	-1	1,782,687	0%
241-B-101	B	51,465	113	9	117	117	0.04%	0	51,465	0%
241-B-104	B	58,385	371	8	115	116	0.05%	-1	58,385	0%
241-B-109	B	80,178	127	5	109	110	0.07%	-1	80,178	0%
241-BX-101	BX	176,522	43	3	94	95	0.15%	-1	176,522	0%
241-BX-107	BX	98,074	345	8	106	107	0.08%	-1	98,074	0%
241-BX-108	BX	38,084	26	12	119	120	0.03%	-1	38,084	0%
241-BX-109	BX	425,546	193	1	80	79	0.36%	1	425,546	0%
241-BY-108	BY	1,071,423	228	3	33	32	0.91%	1	1,071,423	0%
241-BY-109	BY	521,301	290	11	75	73	0.44%	2	521,301	0%
241-BY-110	BY	972,896	398	5	41	41	0.82%	0	972,896	0%
241-BY-112	BY	631,747	291	7	64	64	0.54%	0	631,747	0%
241-C-101	C-	632,948	88	8	63	63	0.54%	0	632,948	0%
241-C-103	C-	3,937,291	198	1	4	4	3.34%	0	3,937,291	0%
241-S-104	S-	1,328,593	294	4	23	25	1.13%	-2	1,328,593	0%
241-S-110	S-	1,288,822	390	5	25	26	1.09%	-1	1,288,822	0%
241-SX-102	SX	1,852,324	514	4	16	18	1.57%	-2	1,852,324	0%
241-T-102	T-	75,807	32	6	112	113	0.06%	-1	75,807	0%
241-T-111	T-	23,384	446	7	123	123	0.02%	0	23,384	0%
241-T-112	T-	3,193	67	12	135	138	0.00%	-3	3,193	0%
241-TX-104	TX	110,891	65	17	102	102	0.09%	0	110,891	0%
241-TY-103	TY	220,532	162	2	90	92	0.19%	-2	220,532	0%
241-U-106	U-	653,005	226	8	61	62	0.55%	-1	653,005	0%
		117,955,934								

Table A-2. Combined Plutonium Inventory. (6 sheets)

Combined Plutonium Inventory

Prepared From Best Basis Inventory
26SEPT2000 by Ivar Husa

Tank	Farm	*Combined* Plutonium Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-A-101	A	223	891	6	73	0.23
241-A-102	A	1601	41	4	19	1.62
241-A-103	A	791	371	5	35	0.80
241-A-104	A	1852	28	3	15	1.88
241-A-105	A	2316	51	2	10	2.35
241-A-106	A	4701	125	1	7	4.77
241-AX-101	AX	1310	684	1	22	1.33
241-AX-102	AX	1014	30	3	28	1.03
241-AX-103	AX	389	112	4	52	0.39
241-AX-104	AX	1138	8	2	24	1.15
241-B-101	B	7281	113	1	5	7.38
241-B-102	B	6	32	14	138	0.01
241-B-103	B	90	59	8	109	0.09
241-B-104	B	95	371	7	106	0.10
241-B-105	B	121	158	5	96	0.12
241-B-106	B	24	117	13	130	0.02
241-B-107	B	48	165	11	120	0.05
241-B-108	B	4	94	15	140	0.00
241-B-109	B	119	127	6	98	0.12
241-B-110	B	186	246	4	80	0.19
241-B-111	B	305	237	2	56	0.31
241-B-112	B	1	33	16	145	0.00
241-B-201	B	198	29	3	76	0.20
241-B-202	B	38	27	12	122	0.04
241-B-203	B	62	51	10	118	0.06
241-B-204	B	66	50	9	116	0.07
241-BX-101	BX	456	43	2	48	0.46
241-BX-102	BX	132	96	9	95	0.13

Table A-2. Combined Plutonium Inventory. (6 sheets)

Combined Plutonium Inventory

Prepared From Best Basis Inventory
26SEPT2000 by Ivar Husa

Tank	Farm	Combined Plutonium Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-BX-103	BX	293	71	3	60	0.30
241-BX-104	BX	627	93	1	40	0.64
241-BX-105	BX	172	51	7	82	0.17
241-BX-106	BX	251	38	4	66	0.25
241-BX-107	BX	133	345	8	93	0.13
241-BX-108	BX	7	26	12	137	0.01
241-BX-109	BX	24	193	11	127	0.02
241-BX-110	BX	190	207	5	78	0.19
241-BX-111	BX	84	162	10	111	0.08
241-BX-112	BX	186	165	6	79	0.19
241-BY-101	BY	294	387	5	59	0.30
241-BY-102	BY	260	277	7	65	0.26
241-BY-103	BY	582	400	3	43	0.59
241-BY-104	BY	625	326	2	41	0.63
241-BY-105	BY	1124	503	1	26	1.14
241-BY-106	BY	230	562	8	71	0.23
241-BY-107	BY	109	266	12	101	0.11
241-BY-108	BY	164	228	10	88	0.17
241-BY-109	BY	264	290	6	64	0.27
241-BY-110	BY	195	398	9	77	0.20
241-BY-111	BY	421	459	4	50	0.43
241-BY-112	BY	121	291	11	97	0.12
241-C-101	C	2247	88	5	11	2.28
241-C-102	C	20230	316	2	2	20.51
241-C-103	C	11111	198	3	3	11.26
241-C-104	C	23504	263	1	1	23.83
241-C-105	C	1131	134	6	25	1.15
241-C-106	C	97	74	11	105	0.10
241-C-107	C	4167	257	4	8	4.22
241-C-108	C	4	66	15	141	0.00

Table A-2. Combined Plutonium Inventory. (6 sheets)

Combined Plutonium Inventory

Prepared From Best Basis Inventory
26SEPT2000 by Ivar Husa

Tank	Farm	Combined Plutonium Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-C-109	C	265	66	9	63	0.27
241-C-110	C	81	178	13	112	0.08
241-C-111	C	479	57	7	47	0.49
241-C-112	C	158	104	10	89	0.16
241-C-201	C	342	2	8	55	0.35
241-C-202	C	94	1	12	107	0.09
241-C-203	C	71	5	14	113	0.07
241-C-204	C	1	3	16	146	0.00
241-S-101	S	1436	427	2	20	1.46
241-S-102	S	431	492	7	49	0.44
241-S-103	S	508	237	6	45	0.52
241-S-104	S	986	294	5	29	1.00
241-S-105	S	172	456	9	83	0.17
241-S-106	S	101	479	11	103	0.10
241-S-107	S	6169	376	1	6	6.25
241-S-108	S	1370	432	3	21	1.39
241-S-109	S	171	507	10	84	0.17
241-S-110	S	1304	390	4	23	1.32
241-S-111	S	64	472	12	117	0.06
241-S-112	S	304	523	8	57	0.31
241-SX-101	SX	1637	448	4	17	1.66
241-SX-102	SX	761	514	10	36	0.77
241-SX-103	SX	976	634	6	31	0.99
241-SX-104	SX	2200	446	2	12	2.23
241-SX-105	SX	1956	637	3	14	1.98
241-SX-106	SX	800	397	9	34	0.81
241-SX-107	SX	932	104	7	32	0.95
241-SX-108	SX	616	87	14	42	0.62
241-SX-109	SX	932	250	8	33	0.94
241-SX-110	SX	681	62	12	38	0.69

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Table A-2. Combined Plutonium Inventory. (6 sheets)

Combined Plutonium Inventory

Prepared From Best Basis Inventory
26SEPT2000 by Ivar Husa

Tank	Farm	Combined Plutonium Inventory [Ci]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-TX-110	TX	167	462	10	86	0.17
241-TX-111	TX	37	370	15	123	0.04
241-TX-112	TX	242	649	4	69	0.25
241-TX-113	TX	67	607	14	115	0.07
241-TX-114	TX	207	535	8	75	0.21
241-TX-115	TX	213	568	7	74	0.22
241-TX-116	TX	171	631	9	85	0.17
241-TX-117	TX	166	626	11	87	0.17
241-TX-118	TX	8729	286	1	4	8.85
241-TY-101	TY	184	118	2	81	0.19
241-TY-102	TY	1	64	6	144	0.00
241-TY-103	TY	293	162	1	61	0.30
241-TY-104	TY	70	43	3	114	0.07
241-TY-105	TY	39	231	4	121	0.04
241-TY-106	TY	4	21	5	139	0.00
241-U-101	U	137	25	8	92	0.14
241-U-102	U	977	342	3	30	0.99
241-U-103	U	414	369	5	51	0.42
241-U-104	U	21	122	12	132	0.02
241-U-105	U	1607	338	2	18	1.63
241-U-106	U	2111	226	1	13	2.14
241-U-107	U	484	408	4	46	0.49
241-U-108	U	297	468	6	58	0.30
241-U-109	U	107	431	9	102	0.11
241-U-110	U	267	186	7	62	0.27
241-U-111	U	85	329	10	110	0.09
241-U-112	U	50	49	11	119	0.05
241-U-201	U	0	5	14	147	0.00
241-U-202	U	0	5	15	148	0.00
241-U-203	U	0	3	16	149	0.00
241-U-204	U	2	3	13	143	0.00
	Total [Ci]	146,965.47				

Table A-2. Combined Plutonium Inventory. (6 sheets)

Statistics

Tank by Tank		
Average (mean)	986	[Ci]
Median	207	[Ci]

Farm	Average Over All Ranking	Worst Ranking in Farm	Total Plutonium [Ci]	Farm Rank Based on Average Over All Ranking	Farm Rank Based on Worst Over All Ranking	Farm Rank Based on Total Curies Pu
A	27	7	11,483	1	5	4
AX	32	22	3,850	2	9	9
B	103	5	8,642	11	**3**	6
BX	85	40	2,555	7	11	11
BY	65	26	4,389	6	10	8
C	64	1	63,981	5	1	1
S	53	6	13,016	4	4	3
SX	36	9	16,742	3	6	2
T	99	16	3,753	10	8	10
TX	87	4	11,402	8	2	5
TY	110	61	592	**12**	**12**	**12**
U	89	13	6,559	9	7	7

Notes:
In these rankings, "1" represents the most Plutonium and consequently the worst rank.
The combined inventory includes Pu238, Pu239, Pu240, Pu241, and Pu242 content estimates.

Table A-3. Combined Nitrate, Nitrite, and Chromium. (6 sheets)

Combined Nitrate, Nitrite, and Chromium

Prepared from Best Basis Inventory
31AUG2000 by Ivar Husa

Tank	Farm	Combined Inventory [kg]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-A-101	A	1,283,420	125	1	8	3.72
241-A-103	A	364,870	28	2	50	1.06
241-A-106	A	122,010	891	3	76	0.35
241-A-102	A	57,460	51	4	98	0.17
241-A-105	A	15,275	41	5	124	0.04
241-A-104	A	3,157	371	6	138	0.01
241-AX-101	AX	1,124,430	8	1	13	3.26
241-AX-103	AX	132,970	30	2	74	0.39
241-AX-102	AX	39,817	112	3	103	0.12
241-AX-104	AX	2,485	684	4	139	0.01
241-B-110	B	250,020	165	1	57	0.73
241-B-104	B	201,744	29	2	61	0.59
241-B-105	B	167,404	33	3	65	0.49
241-B-107	B	154,695	246	4	69	0.45
241-B-101	B	148,348	50	5	70	0.43
241-B-111	B	136,180	117	6	73	0.40
241-B-106	B	118,780	237	7	79	0.34
241-B-109	B	91,610	94	8	88	0.27
241-B-108	B	46,758	127	9	101	0.14
241-B-103	B	36,612	27	10	104	0.11
241-B-112	B	25,942	158	11	107	0.08
241-B-102	B	25,922	51	12	108	0.08
241-B-203	B	15,576	32	13	120	0.05
241-B-204	B	12,673	113	14	126	0.04
241-B-202	B	8,049	59	15	131	0.02
241-B-201	B	7,355	371	16	134	0.02
241-BX-111	BX	378,130	96	1	47	1.10
241-BX-110	BX	377,600	71	2	48	1.10

Table A-3. Combined Nitrate, Nitrite, and Chromium. (6 sheets)

Combined Nitrate, Nitrite, and Chromium

Prepared from Best Basis Inventory
31AUG2000 by Ivar Husa

Tank	Farm	Combined Inventory [kg]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-BX-107	BX	274,020	38	3	55	0.79
241-BX-109	BX	228,748	93	4	59	0.66
241-BX-112	BX	83,350	43	5	92	0.24
241-BX-104	BX	56,180	193	6	100	0.16
241-BX-108	BX	27,155	51	7	106	0.08
241-BX-105	BX	22,880	26	8	111	0.07
241-BX-101	BX	22,250	165	9	112	0.06
241-BX-103	BX	20,820	207	10	115	0.06
241-BX-106	BX	15,570	345	11	121	0.05
241-BX-102	BX	7,705	162	12	132	0.02
241-BY-105	BY	1,474,460	228	1	6	4.28
241-BY-106	BY	1,279,220	266	2	9	3.71
241-BY-103	BY	660,950	398	3	31	1.92
241-BY-104	BY	649,290	290	4	32	1.88
241-BY-101	BY	557,010	291	5	39	1.62
241-BY-110	BY	528,530	400	6	40	1.53
241-BY-107	BY	514,080	562	7	42	1.49
241-BY-111	BY	461,320	277	8	44	1.34
241-BY-108	BY	297,932	503	9	54	0.86
241-BY-102	BY	185,180	459	10	63	0.54
241-BY-112	BY	178,900	387	11	64	0.52
241-BY-109	BY	164,190	326	12	67	0.48
241-C-110	C	114,179	257	1	81	0.33
241-C-102	C	90,283	5	2	89	0.26
241-C-112	C	84,688	134	3	91	0.25
241-C-107	C	73,332	178	4	95	0.21
241-C-104	C	58,280	2	5	97	0.17
241-C-101	C	43,049	3	6	102	0.12
241-C-108	C	24,344	66	7	109	0.07
241-C-109	C	23,472	66	8	110	0.07

Table A-3. Combined Nitrate, Nitrite, and Chromium. (6 sheets)

Combined Nitrate, Nitrite, and Chromium

Prepared from Best Basis Inventory
31AUG2000 by Ivar Husa

Tank	Farm	Combined Inventory [kg]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-C-103	C	21,065	1	9	114	0.06
241-C-105	C	20,739	104	10	116	0.06
241-C-111	C	16,262	74	11	119	0.05
241-C-203	C	2,307	316	12	140	0.01
241-C-106	C	1,681	57	13	142	0.00
241-C-204	C	844	88	14	145	0.00
241-C-202	C	815	198	15	146	0.00
241-C-201	C	515	263	16	147	0.00
241-S-109	S	1,531,820	294	1	4	4.44
241-S-112	S	1,049,200	427	2	15	3.04
241-S-106	S	935,100	376	3	18	2.71
241-S-105	S	917,200	432	4	20	2.66
241-S-108	S	865,400	456	5	21	2.51
241-S-110	S	778,800	237	6	26	2.26
241-S-102	S	712,820	472	7	29	2.07
241-S-111	S	610,000	492	8	35	1.77
241-S-101	S	578,800	523	9	38	1.68
241-S-103	S	428,510	390	10	45	1.24
241-S-104	S	400,590	507	11	46	1.16
241-S-107	S	225,010	479	12	60	0.65
241-SX-103	SX	1,138,900	31	1	12	3.30
241-SX-105	SX	960,950	122	2	17	2.79
241-SX-102	SX	924,900	181	3	19	2.68
241-SX-101	SX	863,000	12	4	22	2.50
241-SX-104	SX	762,400	108	5	27	2.21
241-SX-106	SX	725,670	62	6	28	2.10
241-SX-109	SX	466,230	104	7	43	1.35
241-SX-114	SX	302,930	514	8	53	0.88
241-SX-107	SX	118,840	250	9	78	0.34
241-SX-111	SX	118,710	637	10	80	0.34

Table A-3. Combined Nitrate, Nitrite, and Chromium. (6 sheets)

Combined Nitrate, Nitrite, and Chromium

Prepared from Best Basis Inventory
31AUG2000 by Ivar Husa

Tank	Farm	Combined Inventory [kg]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-SX-112	SX	104,790	446	11	83	0.30
241-SX-108	SX	99,550	87	12	86	0.29
241-SX-110	SX	60,280	397	13	96	0.17
241-SX-115	SX	15,265	448	14	125	0.04
241-SX-113	SX	1,957	634	15	141	0.01
241-T-101	T	137,839	38	1	72	0.40
241-T-110	T	112,600	173	2	82	0.33
241-T-104	T	101,220	29	3	85	0.29
241-T-111	T	95,220	21	4	87	0.28
241-T-107	T	86,650	369	5	90	0.25
241-T-108	T	74,476	58	6	94	0.22
241-T-105	T	31,274	67	7	105	0.09
241-T-112	T	15,501	98	8	123	0.04
241-T-102	T	12,218	35	9	127	0.04
241-T-203	T	11,166	32	10	128	0.03
241-T-204	T	10,430	102	11	129	0.03
241-T-109	T	8,153	44	12	130	0.02
241-T-201	T	7,530	317	13	133	0.02
241-T-202	T	6,893	27	14	135	0.02
241-T-106	T	4,846	446	15	136	0.01
241-T-103	T	4,501	21	16	137	0.01
241-TX-116	TX	1,734,966	157	1	1	5.03
241-TX-113	TX	1,713,890	341	2	2	4.97
241-TX-112	TX	1,542,960	36	3	3	4.48
241-TX-105	TX	1,478,780	535	4	5	4.29
241-TX-115	TX	1,371,820	65	5	7	3.98
241-TX-114	TX	1,227,400	609	6	10	3.56
241-TX-117	TX	1,220,030	217	7	11	3.54
241-TX-110	TX	1,055,190	384	8	14	3.06
241-TX-106	TX	826,090	607	9	23	2.40

Table A-3. Combined Nitrate, Nitrite, and Chromium. (6 sheets)

Combined Nitrate, Nitrite, and Chromium

Prepared from Best Basis Inventory
31AUG2000 by Ivar Husa

Tank	Farm	Combined Inventory [kg]	Hanlon Waste Volumes May 2000 [kgal]	Rank in Farm	Over All Rank	Ratio to Average
241-TX-111	TX	821,930	134	10	25	2.38
241-TX-102	TX	525,910	626	11	41	1.53
241-TX-103	TX	376,710	631	12	49	1.09
241-TX-108	TX	317,630	370	13	52	0.92
241-TX-109	TX	258,800	462	14	56	0.75
241-TX-118	TX	166,440	87	15	66	0.48
241-TX-104	TX	122,050	568	16	75	0.35
241-TX-101	TX	103,490	286	17	84	0.30
241-TX-107	TX	75,639	649	18	93	0.22
241-TY-105	TY	245,908	64	1	58	0.71
241-TY-103	TY	197,289	43	2	62	0.57
241-TY-102	TY	157,106	231	3	68	0.46
241-TY-101	TY	120,680	21	4	77	0.35
241-TY-104	TY	17,705	162	5	118	0.05
241-TY-106	TY	15,529	118	6	122	0.05
241-U-108	U	1,049,200	431	1	16	3.04
241-U-107	U	824,910	186	2	24	2.39
241-U-105	U	703,030	49	3	30	2.04
241-U-109	U	645,820	468	4	33	1.87
241-U-102	U	623,430	3	5	34	1.81
241-U-111	U	592,070	226	6	36	1.72
241-U-103	U	581,340	5	7	37	1.69
241-U-106	U	358,220	329	8	51	1.04
241-U-104	U	142,770	5	9	71	0.41
241-U-110	U	56,439	408	10	99	0.16
241-U-101	U	21,398	3	11	113	0.06
241-U-112	U	19,081	338	12	117	0.06
241-U-201	U	927	122	13	143	0.00
241-U-202	U	927	369	14	144	0.00
241-U-203	U	464	342	15	148	0.00
241-U-204	U	153	25	16	149	0.00
	Total	**51,367,147**				
	Average	**344,746**				

Table A-3. Combined Nitrate, Nitrite, and Chromium. (6 sheets)

Farm	Average Over All Ranking	Worst Ranking in Farm	Total Nitrate/ Nitrite/ Chromium Inventory [kg]	Farm Rank Based on Average Over All Ranking	Rank Based on Worst Tank in Farm Ranking	Farm Rank Based on Total Kgs Combined
A	82	8	1,846,192	7	4	6
AX	82	13	1,299,702	6	6	9
B	93	57	1,447,668	10	9	8
BX	92	47	1,514,408	9	8	7
BY	41	6	6,951,062	3	3	3
C	115	81	575,855	**12**	**12**	**12**
S	30	4	9,033,250	1	2	2
SX	61	12	6,664,372	4	5	4
T	112	72	720,518	11	11	11
TX	34	1	14,939,725	2	1	1
TY	84	58	754,217	8	10	10
U	78	16	5,620,179	5	7	5

Notes:
In these rankings, "1" represents the most Nitrate/Nitrite/Chromium and consequently the worst rank.

Table A-4. Long-Lived Mobile Radionuclides. (6 sheets)

Tank Type	Tank	14C (ci)	79Se (Ci)	99Tc (Ci)	129I (Ci)	238U (Ci)	Sum (Ci)	Volume (kL)
SST	241-A-101	1.15E+02	1.19E+01	8.69E+02	1.68E+00	5.34E-01	9.98E+02	3607
SST	241-A-102	2.84E-01	4.35E+00	2.47E+01	9.62E-03	1.91E+00	3.12E+01	155
SST	241-A-103	4.94E+00	5.22E+00	2.36E+02	4.41E-02	8.94E-01	2.47E+02	1461
SST	241-A-104	1.18E+00	5.34E+00	8.30E+00	1.60E-02	1.61E-02	1.48E+01	106
SST	241-A-105	8.01E+00	4.60E+01	5.70E+01	1.10E-01	8.58E-04	1.11E+02	139
SST	241-A-106	1.32E+01	4.25E+01	9.71E+01	1.88E-01	1.97E-01	1.53E+02	473
DST	241-AN-101	4.09E+00	4.13E-01	3.00E+01	5.79E-02	2.11E-03	3.46E+01	606
DST	241-AN-102	3.26E+00	3.25E+00	5.69E+02	3.17E+00	2.94E-01	5.79E+02	4126
DST	241-AN-103	1.05E+02	1.23E+01	7.00E+02	1.51E+00	4.71E-02	8.19E+02	3619
DST	241-AN-104	1.20E+00	1.13E+01	7.91E+02	1.51E+00	1.54E-01	8.05E+02	3982
DST	241-AN-105	1.98E+02	2.19E+01	1.17E+03	2.89E+00	8.64E-02	1.39E+03	4262
DST	241-AN-106	3.59E+00	4.58E-01	2.64E+01	5.09E-02		3.05E+01	165
DST	241-AN-107	1.11E+02	8.22E+00	3.93E+02	2.12E+00	2.01E-01	5.15E+02	3948
DST	241-AP-101	1.11E+00	2.45E-01	1.99E+02	3.39E-01	7.76E-02	2.01E+02	4216
DST	241-AP-102	2.05E+00	8.76E-01	3.53E+02	1.10E+00	6.27E-03	3.57E+02	4175
DST	241-AP-103	3.93E+01	2.37E+00	4.63E+02	8.97E-01	1.09E-02	5.05E+02	1071
DST	241-AP-104	3.21E+01	3.34E+00	6.38E+02	2.22E+00	2.97E-02	6.76E+02	4198
DST	241-AP-105	1.77E+00	1.12E+01	3.89E+02	1.58E+00	4.80E-02	4.04E+02	3653
DST	241-AP-106	1.12E+01	1.22E+00	3.04E+02	1.20E+00	2.39E-02	3.17E+02	2367
DST	241-AP-107	6.39E-02	3.67E-02	7.71E+00	1.19E-02	4.43E-04	7.83E+00	144
DST	241-AP-108	5.45E-02	4.47E-02	7.52E+00	8.69E-03	2.78E-04	7.62E+00	106
DST	241-AW-101	4.05E+01	6.17E+00	8.32E+02	9.32E+00	8.85E-01	8.89E+02	4167
DST	241-AW-102	3.42E+00	4.41E-01	1.52E+01	2.69E-02	1.04E+00	2.01E+01	235
DST	241-AW-103	5.32E-01	6.65E-02	2.31E+00	4.62E-03	2.18E+01	2.47E+01	2445
DST	241-AW-104	2.72E+01	2.46E+00	3.05E+02	3.99E-01	2.52E+00	3.38E+02	4232
DST	241-AW-105	1.07E+00	2.28E+00	8.35E+01	2.62E+00	1.35E+01	1.03E+02	3937
DST	241-AW-106	2.94E+01	5.08E+00	4.11E+02	4.32E-01	4.00E-01	4.46E+02	3445
SST	241-AX-101	4.79E+00	1.35E+01	2.15E+02	3.59E-02	4.31E-01	2.34E+02	2831
SST	241-AX-102	3.80E+00	1.20E+01	2.78E+01	5.36E-02	8.31E-02	4.37E+01	114

Table A-4. Long-Lived Mobile Radionuclides. (6 sheets)

Tank Type	Tank	14C (ci)	79Se (Ci)	99Tc (Ci)	129I (Ci)	238U (Ci)	Sum (Ci)	Volume (kL)
SST	241-AX-103	1.17E+01	7.04E+00	1.40E+02	6.95E-02	9.19E-02	1.59E+02	424
SST	241-AX-104	6.30E-01	5.00E-02	9.51E+01	8.64E-03	5.60E-02	9.58E+01	28
DST	241-AY-101	4.80E+00	9.10E+01	3.80E+01	6.34E-02	6.91E-02	1.34E+02	583
DST	241-AY-102	4.05E+01	4.94E+01	2.83E+02	5.50E-01	1.30E+00	3.75E+02	2290
DST	241-AZ-101							NA
DST	241-AZ-102	3.71E+00	5.17E+01	1.03E+03	1.66E-01	1.31E+00	1.09E+03	3626
SST	241-B-101	5.47E-01	4.92E+00	3.51E+00	6.75E-03	1.11E+00	1.01E+01	428
SST	241-B-102	1.34E-01	1.53E-02	7.59E-01	1.45E-03	3.90E-01	1.30E+00	121
SST	241-B-103	1.41E-01	2.40E-02	7.90E-01	1.49E-03	5.47E-01	1.50E+00	223
SST	241-B-104	2.09E-01	4.40E-02	1.45E+00	2.73E-03	1.24E+00	2.95E+00	1404
SST	241-B-105	2.68E-01	5.48E-02	3.08E+00	3.40E-03	6.25E-01	4.03E+00	662
SST	241-B-106	2.48E-01	4.98E-02	1.72E+00	3.25E-03	1.98E+00	4.01E+00	443
SST	241-B-107				7.07E-04	7.43E-01	7.44E-01	625
SST	241-B-108	1.29E-01	2.72E-02	8.95E-01	1.68E-03	1.25E+00	2.30E+00	356
SST	241-B-109	3.88E+00	3.02E-01	3.38E+01	6.53E-02	4.78E+00	4.28E+01	481
SST	241-B-110	1.54E+00	1.27E+00	2.08E+01	4.54E-02	8.75E-02	2.37E+01	931
SST	241-B-111	1.70E+00	1.10E+01	1.21E+02	3.41E-02	6.99E-02	1.34E+02	897
SST	241-B-112	2.54E-01	1.90E-01	1.04E+01	5.72E-03	1.07E-02	1.08E+01	125
SST	241-B-201	4.34E-02	3.68E-05	2.66E-01	2.29E-06	7.15E-03	3.17E-01	428
SST	241-B-202	1.68E-04	3.55E-05	1.17E-03	2.21E-06	1.34E-02	1.47E-02	102
SST	241-B-203	3.12E-04	6.58E-05	2.16E-03	4.09E-06	1.47E-02	1.73E-02	193
SST	241-B-204	3.05E-04	6.44E-05	2.12E-03	4.00E-06	4.75E-03	7.24E-03	189
SST	241-BX-101	1.45E-01	5.06E-02	9.91E+00	1.28E-02	3.53E+00	1.36E+01	163
SST	241-BX-102	2.30E-01	6.51E-03	5.99E+00	5.37E-03	2.63E-01	6.50E+00	363
SST	241-BX-103	5.30E-01	3.95E-02	1.59E+01	1.37E-02	5.83E-01	1.71E+01	257
SST	241-BX-104	3.55E-01	7.01E-01	2.51E+01	3.16E-02	8.06E+00	3.43E+01	398
SST	241-BX-105	3.89E-01	6.93E-02	1.20E+01	9.79E-03	4.32E-01	1.29E+01	193
SST	241-BX-106	3.03E-01	3.76E-01	7.89E+00	7.07E-03	3.46E-01	8.92E+00	174
SST	241-BX-107	4.87E-01	3.48E-02	6.92E+01	2.97E-03	3.03E+00	7.27E+01	1306
SST	241-BX-108	1.11E-02	2.34E-03	4.96E+00	1.45E-04	5.79E-01	5.56E+00	99

Table A-4. Long-Lived Mobile Radionuclides. (6 sheets)

Tank Type	Tank	14C (ci)	79Se (Ci)	99Tc (Ci)	129I (Ci)	238U (Ci)	Sum (Ci)	Volume (kL)
SST	241-BX-109	2.09E-01	4.41E-02	1.45E+00	2.73E-03	5.92E+00	7.63E+00	731
SST	241-BX-110	5.47E+00	4.68E-01	3.06E+01	5.92E-02	2.93E+00	3.95E+01	760
SST	241-BX-111	1.76E+01	1.93E+00	9.82E+01	1.90E-01	2.31E-01	1.18E+02	798
SST	241-BX-112	2.32E-01	3.64E-02	1.74E+00	3.32E-03	2.83E-01	2.29E+00	624
SST	241-BY-101	4.54E+01	3.79E+00	2.51E+02	4.86E-01	3.77E+00	3.05E+02	1465
SST	241-BY-102	4.12E+01	3.45E+00	2.31E+02	4.48E-01	2.92E-01	2.77E+02	1291
SST	241-BY-103	5.03E+01	4.22E+00	2.80E+02	5.42E-01	6.73E-01	3.36E+02	1514
SST	241-BY-104	2.28E+01	1.94E+00	1.28E+02	2.47E-01	2.36E+00	1.55E+02	1234
SST	241-BY-105	4.37E+01	3.68E+00	8.86E+01	4.70E-01	3.16E+00	1.40E+02	1905
SST	241-BY-106	7.01E+01	5.90E+00	3.91E+02	7.57E-01	1.94E-01	4.68E+02	2430
SST	241-BY-107	1.93E+01	1.64E+00	1.08E+02	2.09E-01	2.85E+00	1.32E+02	1007
SST	241-BY-108	8.35E+00	7.33E-01	4.69E+01	9.07E-02	4.12E+00	6.02E+01	863
SST	241-BY-109	3.37E+01	2.82E+00	1.88E+02	3.65E-01	7.44E+00	2.33E+02	1192
SST	241-BY-110	2.70E+01	2.30E+00	1.51E+02	2.92E-01	4.76E+00	1.85E+02	1507
SST	241-BY-111	5.59E+01	4.68E+00	3.10E+02	6.01E-01	8.80E+00	3.81E+02	1738
SST	241-BY-112	3.64E+01	3.06E+00	2.03E+02	3.93E-01	3.34E+00	2.46E+02	1102
SST	241-C-101	2.76E-01	1.32E-02	4.01E+01	4.53E-02	1.71E+00	4.22E+01	458
SST	241-C-102	2.11E-01	4.42E-02	1.23E+00	2.57E-03		1.49E+00	1601
SST	241-C-103	4.37E-01	5.34E+00	2.13E+02	5.94E-02	1.13E+00	2.20E+02	751
SST	241-C-104	9.37E-01	1.34E+01	2.52E+01	1.39E-02	1.82E+01	5.78E+01	995
SST	241-C-105	8.00E-01	2.08E-02	8.47E+01	8.56E-02	2.16E+00	8.78E+01	496
SST	241-C-106	3.71E+00	5.54E-01	2.60E+01	5.04E-02	3.59E-02	3.04E+01	181
SST	241-C-107	5.95E-01	2.57E+01	1.05E+02	7.81E-03	1.29E+00	1.33E+02	973
SST	241-C-108	6.78E-02	1.43E-02	4.71E-01	8.85E-04	4.92E-02	6.03E-01	250
SST	241-C-109	5.69E-03	5.76E-02	3.06E+01	1.54E-03	1.24E+00	3.19E+01	250
SST	241-C-110	3.12E-01	1.81E+00	3.22E+01	7.90E-04	6.97E-01	3.50E+01	673
SST	241-C-111	3.15E-02	6.64E-03	2.19E-01	4.13E-04	1.42E+00	1.67E+00	216
SST	241-C-112	2.73E+00	2.39E-01	7.99E+01	2.40E-03	1.21E+01	9.50E+01	394
SST	241-C-201	1.14E-02	5.21E-03	1.68E-02	3.18E-05	7.22E-04	3.42E-02	8
SST	241-C-202	1.13E-03	4.94E-03	7.95E-03	1.54E-05	3.77E-04	1.44E-02	4

Table A-4. Long-Lived Mobile Radionuclides. (6 sheets)

Tank Type	Tank	14C (ci)	79Se (Ci)	99Tc (Ci)	129I (Ci)	238U (Ci)	Sum (Ci)	Volume (kL)
SST	241-C-203	4.24E-02	6.01E-03	4.33E-02	8.12E-05	1.30E-03	9.31E-02	19
SST	241-C-204	2.18E-02	5.48E-03	2.56E-02	4.83E-05	5.48E-04	5.35E-02	11
SST	241-S-101	3.18E+01	5.18E+00	2.29E+02	4.40E-01	4.05E+00	2.70E+02	1616
SST	241-S-102	6.08E+01	3.74E+00	4.21E+02	8.15E-01	1.51E+00	4.88E+02	1337
SST	241-S-103	2.90E+01	2.70E+00	1.63E+02	3.14E-01	2.86E-01	1.95E+02	810
SST	241-S-104	1.64E+00	4.44E+00	4.42E+01	1.16E-01	4.07E+00	5.44E+01	1113
SST	241-S-105	4.24E+01	4.63E+00	3.03E+02	5.83E-01	6.80E-01	3.51E+02	1726
SST	241-S-106	4.80E+01	6.38E+00	2.31E+02	4.46E-01	2.59E-01	2.87E+02	1416
SST	241-S-107	1.31E+01	1.74E+00	9.30E+01	1.79E-01	5.55E+00	1.14E+02	1423
SST	241-S-108	5.36E+01	7.28E+00	2.49E+02	4.80E-01	6.70E-01	3.11E+02	1634
SST	241-S-109	6.19E+01	7.23E+00	3.61E+02	6.96E-01	1.55E-01	4.31E+02	1919
SST	241-S-110	3.93E+01	3.89E+00	2.80E+02	5.39E-01	2.74E+00	3.26E+02	1476
SST	241-S-111	4.99E+01	5.22E+00	3.32E+02	6.40E-01	1.49E-01	3.88E+02	1718
SST	241-S-112	6.68E+01	6.97E+00	4.76E+02	9.17E-01	8.12E-01	5.52E+02	1980
SST	241-SX-101	1.77E+01	5.35E+00	1.31E+02	2.50E-01	1.05E+00	1.55E+02	1674
SST	241-SX-102	8.82E+01	8.54E+00	6.29E+02	1.21E+00	5.27E-01	7.27E+02	1946
SST	241-SX-103	9.06E+01	1.13E+01	6.48E+02	1.25E+00	5.22E-01	7.52E+02	2400
SST	241-SX-104	3.67E+01	6.07E+00	1.89E+02	3.63E-01	1.73E+00	2.34E+02	1688
SST	241-SX-105	1.09E+02	1.24E+01	7.75E+02	1.49E+00	5.13E-01	8.98E+02	2411
SST	241-SX-106	5.62E+01	3.44E+00	3.90E+02	7.55E-01	2.38E-01	4.51E+02	1447
SST	241-SX-107	1.20E+00	6.41E-01	8.85E+00	1.69E-02	9.32E-01	1.16E+01	394
SST	241-SX-108	1.02E+00	2.50E+00	7.66E+00	1.46E-02	2.17E+00	1.34E+01	329
SST	241-SX-109	7.57E+00	6.02E+00	5.85E+01	1.11E-01	1.61E+00	7.38E+01	946
SST	241-SX-110	2.07E+00	5.01E+00	1.63E+01	3.10E-02	6.12E-01	2.41E+01	235
SST	241-SX-111	3.16E+00	6.59E+00	2.47E+01	4.68E-02	1.21E+00	3.57E+01	462
SST	241-SX-112	1.97E+00	3.98E+00	1.53E+01	2.90E-02	1.06E+00	2.23E+01	408
SST	241-SX-113	1.71E-02	3.63E-03	1.20E-01	2.30E-04	1.99E-02	1.61E-01	443
SST	241-SX-114	4.87E+00	3.85E+00	3.76E+01	7.15E-02	1.09E+00	4.75E+01	685
SST	241-SX-115	3.11E-01	1.69E-01	2.38E+00	4.52E-03	1.99E-01	3.06E+00	45
DST	241-SY-101	2.94E+00	8.65E-01	5.93E+02	3.22E+00	6.60E-02	6.00E+02	3694

Table A-4. Long-Lived Mobile Radionuclides. (6 sheets)

Tank Type	Tank	14C (ci)	79Se (Ci)	99Tc (Ci)	129I (Ci)	238U (Ci)	Sum (Ci)	Volume (kL)
DST	241-SY-102	1.34E+01	1.81E+00	3.49E+02	1.39E+00	2.07E-01	3.66E+02	2529
DST	241-SY-103	1.05E+02	1.05E+01	7.66E+02	2.58E-01	5.58E-01	8.83E+02	2816
SST	241-T-101	1.18E+00	9.18E-02	8.24E+00	1.59E-02	6.21E+00	1.57E+01	386
SST	241-T-102	5.92E+00	1.65E-03	2.32E+00	1.04E-04	1.93E+00	1.02E+01	121
SST	241-T-103	3.78E-01	2.86E-02	2.54E+00	4.91E-03	2.02E-01	3.16E+00	102
SST	241-T-104	7.54E-02	2.17E-02	9.68E-01	1.34E-03	4.52E-01	1.52E+00	1200
SST	241-T-105	4.12E-01	3.57E-03	1.53E+02	2.22E-04	1.00E+00	1.55E+02	371
SST	241-T-106	9.25E-03	2.03E-03	6.70E-02	1.27E-04	1.50E-01	2.29E-01	80
SST	241-T-107	5.61E-02	1.18E-02	4.99E+01	7.22E-04	7.46E+00	5.75E+01	655
SST	241-T-108	4.57E-02	9.78E-03	3.22E-01	6.05E-04	4.68E+00	5.06E+00	167
SST	241-T-109	9.78E-02	2.10E-02	6.92E-01	1.30E-03	6.38E-02	8.76E-01	220
SST	241-T-110	1.65E-02	3.47E-03	1.14E-01	2.15E-04	4.39E-01	5.73E-01	1396
SST	241-T-111	1.98E-02	4.17E-03	1.71E+01	2.59E-04	2.56E+00	1.97E+01	1688
SST	241-T-112	2.83E-03	5.97E-04	2.28E+00	3.72E-05	3.10E-01	2.59E+00	254
SST	241-T-201	4.45E-02	3.68E-05	1.21E-03	2.29E-06	2.71E-03	4.85E-02	110
SST	241-T-202	3.14E-02	2.76E-05	9.09E-04	1.72E-06	3.36E-03	3.57E-02	80
SST	241-T-203	5.23E-02	4.60E-05	1.51E-03	2.86E-06	3.39E-03	5.73E-02	133
SST	241-T-204	5.55E-02	5.00E-05	1.64E-03	3.10E-06	3.68E-03	6.09E-02	144
SST	241-TX-101	1.80E+00	2.46E-01	1.25E+01	2.41E-02	7.57E-01	1.54E+01	329
SST	241-TX-102	1.79E+01	1.96E+00	1.28E+02	2.46E-01	4.19E-01	1.48E+02	821
SST	241-TX-103	6.12E+00	6.23E-01	4.36E+01	8.40E-02	3.01E-01	5.07E+01	594
SST	241-TX-104	4.01E+00	4.29E-01	2.74E+01	5.28E-02	9.18E-02	3.20E+01	246
SST	241-TX-105	5.06E+01	5.20E+00	3.60E+02	6.94E-01	1.18E+00	4.18E+02	2305
SST	241-TX-106	2.77E+01	2.94E+00	1.97E+02	3.80E-01	1.33E+00	2.30E+02	1291
SST	241-TX-107	5.17E-01	4.99E-02	3.16E+00	6.09E-03	1.33E-01	3.87E+00	136
SST	241-TX-108	8.21E+00	8.40E-01	5.85E+01	1.13E-01	3.72E-01	6.80E+01	508
SST	241-TX-109	4.71E-01	3.58E-02	1.11E+02	2.22E-03	1.36E+00	1.13E+02	1453
SST	241-TX-110	3.07E+01	3.40E+00	2.19E+02	4.22E-01	9.52E-01	2.54E+02	1749
SST	241-TX-111	2.58E+01	2.89E+00	1.84E+02	3.55E-01	7.84E-01	2.14E+02	1401
SST	241-TX-112	5.21E+01	5.37E+00	3.72E+02	7.17E-01	1.23E+00	4.31E+02	2457

Table A-4. Long-Lived Mobile Radionuclides. (6 sheets)

Tank Type	Tank	14C (ci)	79Se (Ci)	99Tc (Ci)	129I (Ci)	238U (Ci)	Sum (Ci)	Volume (kL)
SST	241-TX-113	9.70E+01	1.53E+01	5.50E+02	1.06E+00	1.10E+00	6.64E+02	2472
SST	241-TX-114	3.86E+01	4.16E+00	2.75E+02	5.30E-01	9.92E-01	3.19E+02	2025
SST	241-TX-115	4.70E+01	4.85E+00	3.35E+02	6.46E-01	1.10E+00	3.89E+02	2150
SST	241-TX-116	3.56E+01	5.74E+00	1.99E+02	3.84E-01	9.54E-01	2.42E+02	2389
SST	241-TX-117	2.44E+01	2.53E+00	1.74E+02	3.36E-01	9.91E-01	2.03E+02	2260
SST	241-TX-118	2.65E+01	4.26E+00	1.48E+02	2.85E-01	4.98E-01	1.79E+02	1083
SST	241-TY-101	6.38E-01	2.64E-02	5.39E+00	3.44E-02	5.72E-01	6.66E+00	447
SST	241-TY-102	3.98E-01	2.83E-01	3.59E-01	8.65E-03	2.68E-02	1.07E+00	242
SST	241-TY-103	1.04E+00	3.64E-01	1.69E+01	4.82E-02	6.19E+00	2.45E+01	613
SST	241-TY-104	9.36E-01	7.36E-03	9.06E+00	4.58E-04	1.92E+00	1.19E+01	174
SST	241-TY-105	1.05E+00	9.45E-02	4.40E+01	4.60E-02	2.41E+00	4.76E+01	874
SST	241-TY-106	1.02E-01	2.52E-04	1.07E+01	1.56E-05	2.42E-01	1.10E+01	80
SST	241-U-101	2.27E-01	5.92E-03	1.94E-01	3.62E-04	2.18E-01	6.45E-01	95
SST	241-U-102	3.83E+01	4.13E+00	2.35E+02	4.54E-01	5.54E-01	2.79E+02	1298
SST	241-U-103	3.59E+01	4.88E+00	1.67E+02	3.22E-01	4.98E-01	2.08E+02	1358
SST	241-U-104	4.88E+00	6.05E-01	3.27E+01	6.29E-02	4.78E-01	3.88E+01	462
SST	241-U-105	5.01E+01	3.74E+00	3.65E+02	7.05E-01	5.18E+00	4.24E+02	1276
SST	241-U-106	4.20E+01	4.07E+00	2.98E+02	5.74E-01	3.38E-01	3.44E+02	856
SST	241-U-107	7.23E+01	5.05E+00	1.02E+03	1.98E+00	3.54E-01	1.10E+03	1544
SST	241-U-108	7.63E+01	7.31E+00	5.42E+02	1.05E+00	1.39E+00	6.28E+02	1771
SST	241-U-109	4.90E+01	4.30E+00	2.96E+02	5.71E-01	1.23E-01	3.50E+02	1658
SST	241-U-110	2.77E-01	1.76E-02	7.40E+00	1.08E-03	3.77E+00	1.15E+01	704
SST	241-U-111	3.23E+01	3.24E+00	2.30E+02	4.44E-01	8.31E-01	2.67E+02	1245
SST	241-U-112	7.29E-02	1.55E-02	5.10E-01	9.76E-04	7.81E-01	1.38E+00	170
SST	241-U-201	1.66E-03	3.62E-04	1.19E-02	2.29E-05	9.88E-03	2.39E-02	19
SST	241-U-202	1.65E-03	3.59E-04	1.19E-02	2.27E-05	9.50E-03	2.34E-02	19
SST	241-U-203	2.55E-02	5.44E-03	1.79E-01	3.44E-04	4.67E-03	2.15E-01	11
SST	241-U-204	8.26E-04	1.80E-04	5.93E-03	1.14E-05	4.67E-03	1.16E-02	8

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