ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN № 618789

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	T. M. Brown, R2-12, 373-4437	[] Yes [X] No	02/13/97
	6. Project Title/No./Work Order No.: Historical Tank Content Estimate for the Southwest Quadrant of the Hanford 200 West Area	7. Bldg./Sys./Fac. No.: 2750/200E	8. Approval Designator: N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.): WHC-SD-WM-ER-352, Rev. 0b	10. Related ECN No(s).: N/A	11. Related PO No.: N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change — 13b. Design Baseline Document? [] Yes [X] No

1. Performed a complete rewrite and reformat of all pages of the HTCE document.
2. Almost all of the narrative description of the tank farm section and the individual tank sections were replaced by summary tables.
3. The single solids composite inventory table provided by Los Alamos National Laboratory has been replaced by 3 tables:
   - Total Inventory Estimate table of 33 the chemical analytes and 46 radionuclides
   - Tank Layer Model Solids Composite Inventory Estimate table
   - Supernatant Mixing Model table.
4. The Tank Layer Model graph is enlarged and on a separate page.
5. The Tank Riser Location and Tank Cross Section sketches are enlarged.
6. The glossary and reference sections are placed in Appendix A and B, respectively.
7. The document prefix number has changed from WHC-SD-WM-ER-352, Rev. 0b to HNF-SD-WM-ER-352, Rev. 1

14a. Justification (mark one)

Criteria Change	[]	Design Improvement	[X]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

To update historical tank content estimate documents with more recent tank waste characterization information and expanded radionuclides and updated chemical analyte information for the inventory estimates.

15. Distribution (include name, MSIN, and no. of copies)

See attached distribution sheet.

RELEASE STAMP

DATE: MAR 06 1997

HANFORD RELEASE ID: 3

A-7900-013-2 (05/96) GEF095

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 618789

16. Design Verification Required: [] Yes [X] No

17. Cost Impact

	ENGINEERING		CONSTRUCTION	
Additional	[]	$	[]	$
Savings	[]	$	[]	$

18. Schedule Impact (days)

Improvement [] Delay []

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]	N/A	[X]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

21. Approvals

Signature		Date	Signature		Date
Design Authority			Design Agent J. L. Stroup	J L Stroup	3-4-97
Cog. Eng. T. M. Brown	Todd Brown	3/4/97	PE		
Cog. Mgr. J. W. Cammann	J W Cammann	3/4/97	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other			Other		
			Lead Engineer J. W. Funk	J W Funk	3/4/97
			Project Mgr C. H. Brevick	C H Brevick	03/04/97
			DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

Historical Tank Content Estimate for the Southwest Quadrant of the Hanford 200 West Area

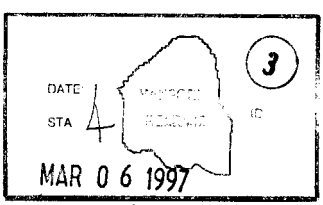
C. H. Brevick, J. L. Stroup, J. W. Funk
Fluor Daniel Northwest Inc., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 618789 UC: 2070
Org Code: 408 Charge Code: E18675
B&R Code: EW3120074 Total Pages: ~~237~~ 527

Key Words: Southwest quadrant, Historical Tank Content Estimate, tank farms, tank level, tank temperature, tank farm aerial photos, in-tank montages, TLM, SMM, inventory estimates, riser locations

Abstract: The Historical Tank Content Estimate for the Quadrant provides historical information on a tank-by- tank basis of the radioactive mixed wastes stored in the underground single-shell tanks for the Hanford 200 West Area. This report summarized historical information such as waste history, level history, temperature history, riser configuration, tank integrity, and inventory estimates on a tank-by-tank basis. Tank farm aerial photographs and interior tank montages are also provided for each tank. A description of the development of data for the document of the inventory estimates provided by Los Alamos National Laboratory are also given in this report.

Marcil Willsen 3/6/97
Release Approval Date



Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-SD-WM-ER-352	Page 1

(2) Title

Historical Tank Content Estimate for the Northwest Quadrant of the Hanford 200 West Area

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Initial issue, EDT 136992		C. S. Haller 6/30/94
Oa	1. Mark out inventory estimates on pages 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 106, 111, 116, 126, 131, 136, 141, 146, 151, 156, 161, 166, 171, 176, 181, 186, 191, 196, 201, 206, 211, 221, 226, 231, 236, 241, and 246. 2. Add pages 41a, 41b, 41c, 41d, 41e, 46a, 46b, 46c, 46d, 46e, 51a, 51b, 51c, 51d, 51e, 56a, 56b, 56c, 56d, 56e, 61a, 61b, 61c, 61d, 61e, 66a, 66b, 66c, 66d, 66e, 71a, 71b, 71c, 71d, 71e, 76a, 76b, 76c, 76d, 76e, 81a, 81b, 81c, 81d, 81e, 86a, 86b, 86c, 86d, 86e, 91a, 91b, 91c, 91d, 91e, 96a, 96b, 96c, 96d, 96e, 101a, 101b, 101c, 101d, 101e, 106a, 106b, 106c, 106d, 106e, 111a, 111b, 111c, 111d, 111e, 116a, 116b, 116c, 116d, 116e, 126a, 126b, 126c, 126d, 126e, 131a, 131b, 131c, 131d, 131e, 136a, 136b, 136c, 136d, 136e, 141a, 141b, 141c, 141d, 141e, 146a, 146b, 146c, 146d, 146e, 151a, 151b, 151c, 151d, 151e, 156a, 156b, 156c, 156d, 156e, 161a, 161b, 161c, 161d, 161e, 166a, 166b, 166c, 166d, 166e, 171a, 171b, 171c, 171d, 171e, 176a, 176b, 176c, 176d, 176e, 181a, 181b, 181c, 181d, 181e, 186a, 186b, 186c, 186d, 186e, 191a, 191b, 191c, 191d, 191e, 196a, 196b, 196c, 196d, 196e, 201a, 201b, 201c, 201d, 201e, 206a, 206b, 206c, 206d, 206e, 211a, 211b, 211c, 211d, 211e, 221a, 221b, 221c, 221d, 221e, 226a, 226b, 226c, 226d, 226e, 231a, 231b, 231c, 231d, 231e, 236a, 236b, 236c, 236d, 236e, 241a, 241b, 241c, 241d, 241e, 246a, 246b, 246c, 246d, 246e 3. Add pages A-1 and A-2 as Appendix A Incorporates ECN 624856	B. Carpenter	S. J. Eberlein 02/16/95
1 RS	1. Preformed a complete rewrite and reformat of all pages of the HTCE document. 2. Almost all of the narrative description of the tank farm section and the individual tank sections were replaced by summary tables. 3. The single solids composite inventory table provided by Los Alamos National Laboratory has been replaced by 3 tables: • Total Inventory Estimate Table of 33 chemical analytes and 46 radionuclides • Tank Layer Model Solids Composite Inventory Estimate Table • Supernatant Mixing Model table. 4. The Tank Layer model graph is enlarged and on a separate page. 5. The Tank Riser Location and Tank Cross Section sketches are enlarged. 6. The glossary and reference sections are placed in Appendix A and B, respectively. 7. The document prefix number has changed from WHC-SD-WM-ER-352, Rev. Oa to HNF-SD-WM-ER-352, Rev. 1 Incorporates ECN No. 618789	T. M. Brown Todd Brown	J. W. Cammann ~~09/27/96~~ JW Cammann 3/4/97

HISTORICAL TANK CONTENT ESTIMATE FOR THE SOUTHWEST QUADRANT OF THE HANFORD 200 WEST AREA

Prepared for

Lockheed Martin Hanford Corporation

January 1997

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Richland, Washington

HISTORICAL TANK CONTENT ESTIMATE FOR THE SOUTHWEST QUADRANT OF THE HANFORD 200 WEST AREA

WORK ORDER E18675

APPROVED:

Fluor Daniel Northwest, Inc.

J R Zimmerman — Technical Documents — 3/4/97 — Date

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L L Stroup — Design Agent — 3/4/97 — Date

Chris W Brevick — Project Manager — 03/04/97 — Date

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J W Cammann — Technical Lead, TWRS DQO, Models and Inventory — 3/4/97 — Date

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INFORMATION FEEDBACK CARD

HISTORICAL TANK CONTENT ESTIMATE FOR THE SOUTHWEST QUADRANT OF THE HANFORD 200 WEST AREA

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Send Comments to: Mr. Jerry W. Cammann
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1.0 Introduction

1.0.1 Purpose

The purpose of this historical characterization document is to present the synthesized summaries of the historical records concerning the physical characteristics, and the radiological, and chemical composition of mixed wastes stored in underground single-shell tanks and the physical conditions of these tanks. The single-shell tanks are located on the United States Department of Energy's Hanford Site, approximately 25 miles northwest of Richland, Washington. The document will be used to assist in characterizing the waste in the tanks in conjunction with the current program of sampling and analyzing the tank wastes. Los Alamos National Laboratory (LANL) developed computer models that used the historical data to attempt to characterize the wastes and to generate estimates of each tank's inventory. A historical review of the tanks may reveal anomalies or unusual contents that could be critical to characterization and post characterization activities.

This document was developed by reviewing the operating plant process histories, waste transfer data, and available physical and chemical data from numerous resources. These resources were generated by numerous contractors from 1945 to the present.

Waste characterization, the process of describing the character or quality of a waste, is required by Federal law (Resource Conservation and Recovery Act [RCRA]) and state law (Washington Administrative Code [WAC] 173-303, Dangerous Waste Regulations). Characterizing the waste is necessary to determine methods to safely retrieve, transport, and/or treat the wastes.

This document is not intended for use as a total design basis document. Further investigations of the information may be required before using this data for design purposes or safety analysis.

1.0.2 Scope

The scope of this document is to provide a summary of the supporting documents (Brevick et al.,1997a, b, c) for the Southwest Quadrant (SW). The SW Quadrant covers three single-shell tank farms. These three tank farms, S, SX, and U, are located in the 200 West Area and are shown on the map in Figure 1. This summary includes waste transfer and level data, tank physical information, and surveillance data of the tanks and wastes for the SW Quadrant. The inventory estimates of waste types and volumes generated by the computer modeling programs developed by LANL are also included. A flow diagram showing the relationships between the sources of data, the HTCE, and the supporting documents is in Figure 2. The HTCE document also includes information on the safety issues affecting the tanks and the plants and processes that produced the waste in the underground waste storage tanks. For further explanation and development of the information, see the supporting documents.

1.0.3 Approach

This document was compiled from work performed by Fluor Daniel Northwest, Inc. (FDNW), LANL, and Lockheed Martin Hanford Corporation (LHMC), as well as work performed by

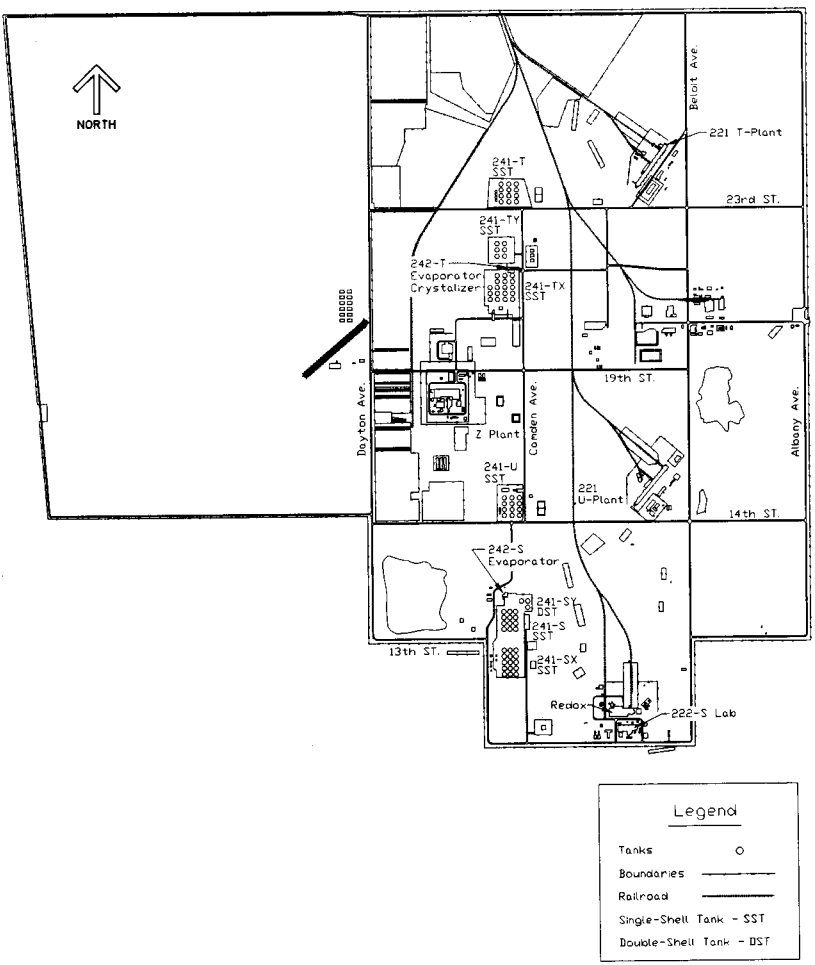


Figure 1. 200 West Area.

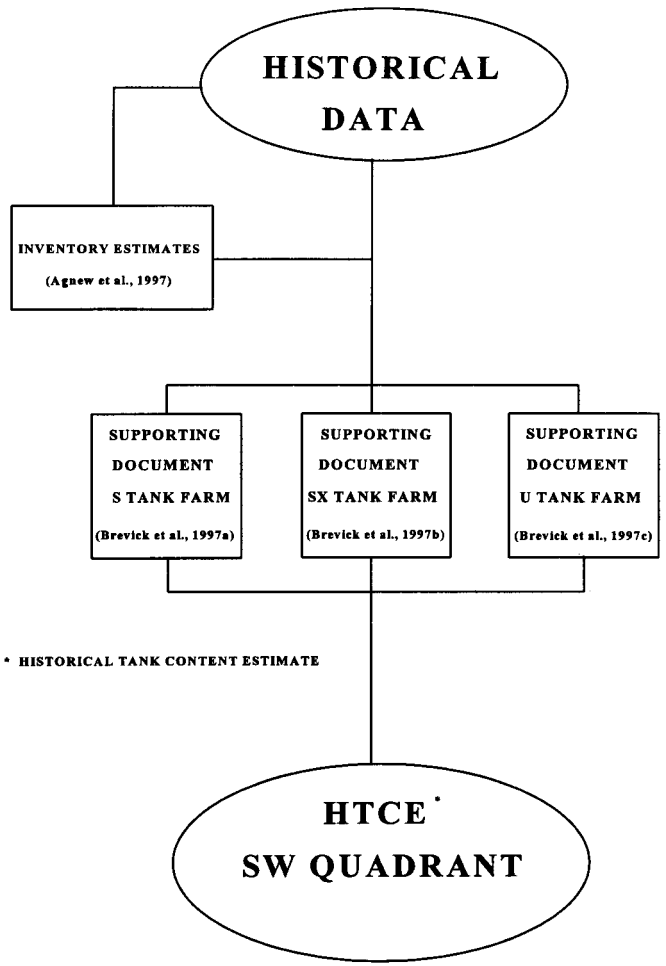


Figure 2. HTCE and Supporting Document Flow Diagram.

Westinghouse Hanford Company. FDNW reviewed the historical records of the tanks and incorporated the inventory estimates and models of waste layers in the tanks being developed by LANL into this document.

1.1 Safety Issues

The safety issues that affect the tanks can be divided into two groups: watch list and non-watch list. The watch lists are listings of tanks believed to pose potential safety hazards to workers, the environment, and the public. Non-watch list issues are of concern because of their possible effect on workers and the environment. Occurrences are unusual events on the Hanford Site that sometimes are related to safety issues.

1.1.1 Watch List Safety Issues

Watch list safety issues for these tanks were identified as "issues/situations that contain most of the necessary conditions that could lead to worker (onsite) or offsite radiation exposure through an uncontrolled release of fission products" under Public Law 101-510, Section 3137, of the *National Defense Authorization Act of Fiscal Year 1991* (i.e., the Wyden Amendment). As of June 30, 1996, 44 single-shell tanks and 6 double-shell tanks are on watch lists (Hanlon, 1996i). See the *Approach for Tank Safety Characterization of Hanford Site Waste*(Eberlein et al., 1995) for more information on the watch list issues.

1.1.2 Non-Watch List Safety Issues

Non-watch list issues include safety hazards such as leaking tanks. Tank leaks are a safety hazard because of their potential to release chemicals and radioactive liquids into the ground. Corrosion is the main cause of tank leaks. Three other safety issues that do not require a watch list and continual monitoring under the Wyden Amendment include criticality, tank bumps, and toxic vapor releases. The following sections provide a general description of the different non-watch list safety issues. See the *Hanford Site Tank Farm Facilities Interim Safety Basis*(Leach and Stahl, 1993) for more information.

- **Corrosion**

Corrosion is the most probable degradation mechanism of the steel tank liners resulting from contact with liquid, liquid-vapor, vapor, and solid phases of the wastes. The corrosion mechanisms that reduce the thickness of the carbon steel liners can be divided into two categories: localized and general or uniform. Localized corrosion occurs on a localized area of the liner surface. Some of the localized corrosion mechanisms include pitting corrosion, stress corrosion cracking, and crevice corrosion. General or uniform corrosion occurs over the entire liner surface. Corrosion of the steel tank liners may involve more than one of these mentioned mechanisms. Corrosion is a safety issue because it has the potential to degrade the tank liner to the point of causing a leak or, more seriously, structural failure of the tank. Either condition could release contamination to the environment.

- **Criticality**

Criticality is a self-sustained, nuclear chain reaction that can occur when a sufficient mass of fissile material is present in the proper configuration along with a neutron source to start the nuclear

reaction. Criticality in the tank farms has been declared an unreviewed safety question, even though the *Hanford Site Tank Farm Facilities Interim Safety Basis* (Leach and Stahl, 1993) indicates that a "nuclear criticality accident in the tank farms is probably not an imminent risk." The unreviewed safety question on criticality in the tank farms remains because the inventory of fissile material and its distribution within the tanks cannot be confirmed as being within the approved safety envelope defined in the current safety analysis reports. Criticality is a safety issue because of the potential to release contamination to the environment.

- **Tank Bumps**

A tank bump is the sudden pressurization of the tank. This phenomenon occurs when solids overheat in the lower portion of the tank followed by uncontrolled mixing of these solids. The stirred hot solids rapidly transfer heat to the liquid in the tank, some of which quickly vaporizes. The rapid vapor generation causes a sudden internal tank pressurization that causes a bump. Uncontrolled mixing of heated solids can occur when an airlift circulator fails allowing the solids to heat up followed by rapid startup of the airlift circulator which causes rapid mixing. Uncontrolled mixing can also occur when a natural "rollover" of waste occurs in the tank. Tank bumps are a safety issue because of their potential to release contamination to the environment.

- **Toxic Vapor Releases**

Toxic vapor releases are a recently analyzed safety concern at the Hanford Site. The entire issue of toxic gas releases at the tank farms is being investigated (Leach and Stahl, 1993).

1.1.3 Occurrences

Over the years, unusual events (occurrences) have occurred at several tanks in the SW Quadrant tank farms. An occurrence is an event that falls outside the normal operating, maintenance and/or construction procedures of the tank farm. Occurrences have been documented by various reporting methods including unusual occurrences reports, off-normal reports, event fact sheets, and occurrence reports. Before it was included in the supporting document, the occurrence documentation that could be located was evaluated for its significance in determining the waste content of the tanks. The types of significant occurrences included in the supporting documents are occurrences written about surface level changes, temperature changes, and radioactivity changes (activity in the drywells). This document does not contain information from the reports. For more information on occurrences, refer to the Occurrences Section for the specific tank in the supporting documents.

1.2 Waste Generating Plants and Processes

1.2.1 Plants Processes

Brief descriptions and histories of the plants and processes that generated waste now contained in the single-shell and double-shell tanks are presented in alphabetical order. Typically, the name of the plant and the process are synonymous. The dates and events described in the following brief histories are presented on time lines in Figures 3 and 4. Although not all of the processes listed below contributed waste directly to tanks in the Southwest Quadrant, the waste they generated could have been transferred indirectly from tank to tank.

- **A Plant (PUREX)**

The Plutonium Uranium Extraction (PUREX) plant (i.e., A Plant) began operating in January 1956 (Gerber, 1993a). "The PUREX process is an advanced solvent extraction process that uses a tributyl phosphate in kerosene solvent for recovering uranium and plutonium from nitric acid solutions of irradiated uranium. Nitric acid is used instead of metallic nitrates to promote the extraction of uranium and plutonium from aqueous phase to an organic phase." (Wilson and Reep, 1991, p. B-4). Two campaigns of the Thorex process were conducted in 1966 and 1971 (Jungfleisch, 1984). The Thorex process recovered ^{233}U from thorium irradiated in the Hanford Site reactors (Wilson and Reep, 1991). PUREX reprocessed aluminum-clad fuel elements and zirconium alloy-clad fuel elements, and provided plutonium for research reactor development, safety programs, and defense. Also, PUREX recovered slightly enriched uranium to be recycled as fuel in reactors generating electricity and plutonium (Rockwell, 1985). PUREX was put on standby in 1972 (Gerber, 1993a).

The PUREX plant was restarted in November 1983 but was shut down in December 1988 (see Figure 3). The plant was shut down due to the lack of steam pressure needed to operate the support backup safety equipment. There was a brief stabilization run in early 1990. In October 1990, PUREX was placed on standby by Secretary of Energy James Watkins. DOE issued the final closure order in December 1992 (Gerber, 1993b).

- **B Plant**

B Plant used the bismuth phosphate process at first, and later changed its processing capabilities to strontium and cesium fractionation. The bismuth phosphate process "separated plutonium from uranium and the bulk of fission products in irradiated fuel by co-precipitation with bismuth phosphate from a uranium nitrate solution. The plutonium was then separated from fission products by successive precipitation cycles using bismuth phosphate and lanthanum fluoride. The plutonium was isolated as a peroxide and, after dissolving in nitric acid, was concentrated as plutonium nitrate. The waste containing the uranium from which the plutonium had been separated, was made alkaline (neutralized) and stored in underground single-shell tanks. Other acid waste (which included most of the fission products) generated by this process was neutralized and stored in other single-shell tanks" (Wilson and Reep, 1991, p. B-3). "Some of the strontium and cesium fission products were removed (fractionated) from the waste and separately isolated to reduce the heat generation in the tanks. B Plant . . . was modified in 1968 to permit removal of these fission products by a combination of precipitation, solvent extraction, and ion-exchange steps. The residual acid waste from the processing was neutralized and stored in single-shell tanks" (Wilson and Reep, 1991, pp. B-4 and B-5).

B Plant began its first batch run on April 13, 1945 (Anderson, 1990), and was shutdown in 1952 (Gerber, 1993b) (see Figure 3). Shortly after the renovations to B Plant were completed in December 1955, the 4X Program was abandoned. The 4X Program "planned to utilize the capabilities of all four Hanford processing plants (B, T, REDOX, and PUREX)" (Gerber, 1993b, p. 12); however, the large production and economic efficiency of the PUREX plant caused the 4X Program to be abandoned (Gerber, 1993b). B Plant restarted in 1968 to recover cesium and strontium from stored liquid waste. Cesium and strontium recovery was completed in September 1983 and February 1985, respectively (Rockwell, 1985).

- **225-B (WESF)**

The Waste Encapsulation and Storage Facility (WESF) converted solutions of cesium and strontium nitrates recovered in B Plant to strontium fluoride and cesium chloride solids that are doubly encapsulated in metal (Ballinger and Hall, 1991). "Strontium and cesium capsules have been used in applications of fission byproducts for gamma and heat sources" (Wilson and Reep, 1991, p. B-5).

WESF was constructed in 1974 (see Figure 3). The process optimization for cesium and strontium was completed in 1978 and 1981, respectively (Rockwell, 1985). The cesium processing ended in 1983 and strontium encapsulation in 1985. The capsule return program started in 1988 and ended in 1995 (Gerber, 1996).

- **C Plant (Strontium Semiworks)**

The Strontium or Hot Semiworks Facility (i.e., C Plant) began operating in 1952 as a hot pilot plant for the REDOX process (see Figure 3). In 1954, the plant was converted to a pilot plant for the PUREX process and continued operating until 1956 (Ballinger and Hall, 1991). "The process building (201-C) contains three hot cells equipped only for contact maintenance and is supported by an aqueous makeup and control building (271-C) and a solvent handling building (276-C). The facility also includes a fiberglass exhaust filter and a 200-ft stack." (PNL, 1991, Vol. 1, p. 3.6). In 1960, the plant was reactivated as a pilot plant used to recover ^{90}Sr, ^{147}Pm, and ^{144}Cs from PUREX waste. The plant was shut down in 1967 and the building and the site have been decontaminated and decommissioned (PNL, 1991).

- **S Plant (REDOX)**

The Reduction and Oxidation extraction (REDOX) plant (i.e., S Plant) began processing on January 9, 1952 (Anderson, 1990) (see Figure 3). "The REDOX extraction process was a second-generation recovery process and the first process to recover both plutonium and uranium. It used a continuous solvent extraction process to extract plutonium and uranium from dissolved fuel into a methyl isobutyl ketone (hexone) solvent. The slightly acidic wastestream contained the fission products and large quantities of aluminum nitrate that were used to promote the extraction of plutonium and uranium. This waste was neutralized and stored in single-shell tanks. The volume of high-level waste from this process was much smaller than that from the bismuth phosphate process, but larger than that from the PUREX process" (Wilson and Reep, 1991, pp. B-3 and B-4). REDOX operated until 1967 (Rockwell, 1985).

- **T Plant**

T Plant was the first full-scale separations plant at the Hanford Site. T Plant used the bismuth phosphate process to separate plutonium from uranium and the bulk of fission products in irradiated fuel (B Plant used the same process). "The waste containing the uranium from which the plutonium had been separated was made alkaline (neutralized) and stored in underground single-shell tanks. Other acid waste (which included most of the fission products) generated by this process was neutralized and stored in other single-shell tanks" (Wilson and Reep, 1991, p. B-3).

T Plant began operating in 1944 (Rockwell, 1985) as a separations plant and continued until March 1956 (Gerber, 1994) (see Figure 4). T Plant's mission was changed in 1957 to the repair and high-level decontamination of equipment (Rockwell, 1985). T Plant was converted to a "central decontamination facility for the site. As such, failed and contaminated equipment was assessed and

either repaired or discarded there for over three decades" (Gerber, 1994, p. 1). Early decontamination operations used steam, sand, chemicals, and detergents. "Smaller equipment pieces were immersed in decontamination solutions in 'thimble tanks,' and larger pieces were flushed with water, chemical solutions, sand-blasted, steam-blasted, high-pressure sprayed (using pressures up to 10,000 pounds per square inch), and/or scrubbed with detergents. During the initial years, a strong nitric acid flush (approximately 60%) usually began the decontamination process, followed by a caustic wash with sodium hydroxide combined with sodium phosphate, boric acid, versene, sodium dichromate, sodium tartrate, or sodium citrate. However, it was learned that versene and tartrate, in particular, adversely affected the ability of soil cribs to absorb the rinsate materials. High-pressure sprays often used 1,1,1 trichloroethane or perchloroethylene, and detergents generally were chloride-based. By the mid-1960s, commercially prepared and trademarked chemical mixtures had replaced most of the simpler chemicals used in the early years. Many commercial products were based on oxalic acid, phosphates, nitric acid-ferrous ammonium sulfate combinations, potassium permanganate, and sodium bisulfate, with some unknown additives" (Gerber, 1994, pp. 40–42). The facility was modified in 1978 to store pressurized water reactor (PWR) core II fuel assemblies (Rockwell, 1985).

- **U Plant**

U Plant (221-U) was built as one of three original bismuth phosphate process facilities, but it was not used for that purpose. U Plant was modified extensively and used for the uranium recovery process, operating from 1952 to 1958 (see Figure 4). Uranium in waste from the bismuth phosphate process initially was stored in the single-shell tanks. Later, the waste was sluiced, dissolved in nitric acid, and processed through a solvent extraction process using tributyl phosphate in kerosene to recover the uranium. The process was similar to that used later in the plutonium-uranium extraction (PUREX) process except that plutonium was not recovered. The acid waste from the uranium recovery process was made alkaline and returned to single-shell tanks. The tributyl phosphate waste was treated with potassium ferrocyanide as a cesium and strontium scavenger. The recovery process resulted in an increase in nonradioactive salts and a small increase in waste volume (Wilson and Reep, 1991).

- **224-U (UO_3, Uranium Trioxide Plant)**

The 224-U Building was converted to a uranium trioxide (UO_3) plant that began operating in 1952 (see Figure 4). The UO_3 plant was capable of handling the uranyl nitrate hexahydrate (UNH) stream from REDOX, U Plant, and PUREX. "The basic UO_3 process, calcining, consisted of concentrating and then heating liquid UNH until it converted to a stable, orange-yellow powder. The nitric acid in the UNH solution could be recovered in the same process. The UO_3 powder was the base material needed for the manufacture of uranium hexafluoride (UF_6), the primary feed material for the United States' gaseous diffusion plants. Because the largest of these plants was located in Ohio and Tennessee, it was considered safer to ship the material across the country in powder rather than in liquid form" (Gerber, 1993b, pp. 33–34). The UO_3 plant was shut down in 1972, but restarted in 1984. Since 1984, there have been 17 campaigns at the plant averaging 8 days each. Final deactivation of the plant was ordered in 1992. In April 1993, the UO_3 plant resumed operations to convert 200,000 gallons of remaining UNH to UO_3 powder. A final deactivation plan was written in the summer of 1993 (Gerber, 1993b).

- **Z Plant (PFP, Plutonium Finishing Plant)**

The Plutonium Finishing Plant (PFP) or Z Plant, previously called Plutonium Recovery and Finishing Operations, processed plutonium and prepared plutonium products. "Waste from this plant

contained only minor amounts of fission products but did contain low concentration of plutonium and other transuranic elements and was high in metallic nitrates. Initially, this waste was discharged via cribs to soil columns, which absorbed the transuranic elements and retained them close to the point of discharge. Beginning in 1973, waste from PFP was stored with other waste in underground tanks" (Wilson and Reep, 1991, p. B-4). "Three types of feed materials are processed at the PFP to produce plutonium metal. Feed material types are handled differently in different process lines . . . . Historically, the main feed for the PFP was purified plutonium nitrate solution that was produced elsewhere in a fuel reprocessing plant. This feed was charged directly to one of the main process lines, which was initially a glovebox line. The glovebox line was replaced by remote mechanical lines, which were upgraded over the years. In time, processes were added to handle rework and scrap plutonium. These processes were used to convert the rework and scrap materials into a purified plutonium nitrate solution that could be handled by the main process" (Duncan and Mayancsik, 1993, pp. 2-1–2-2).

In July 1949, PFP began operations with a glovebox line (see Figure 4). The remote mechanical A line replaced the glovebox line in May 1953. Installment of the Recuplex Facility at PFP was completed in April 1955. The remote mechanical C line was installed in July 1960. In September 1961, the 232-Z Building had an incinerator and leaching equipment installed. In June 1964, the Plutonium Reclamation Facility (PRF) replaced the functions of the Recuplex Facility. Fabrication of plutonium metal nuclear weapon components ceased at the PFP in December 1965. In April 1973, the 232-Z Incinerator was shut down and the remote mechanical C line was placed on standby. The PRF was placed on standby in February 1979, and the remote mechanical A line was shutdown in December 1979. In January 1984, the PRF was restarted for a series of campaigns. The remote mechanical C line was restarted in June 1985 for a series of campaigns. In September 1986, operations at PFP were halted for nine months. This partial listing of the process history in the PFP is from Duncan et al. (1993).

1.2.2 Waste Management Operations

This section describes the different methods used to concentrate waste in the 200 Areas. Evaporating, and in-tank solidification are methods used to reduce the volumes of supernate. Brief descriptions and histories of the operations are presented in alphabetical order. The events and dates described in the brief histories are presented on a time line (Figure 5).

- **242-A Evaporator-Crystallizer**

"The program objective was to reduce the volume of tanked waste liquors through the boiloff of water. This was accomplished by boiling the liquor in an enclosed vessel at reduced pressure. The evaporation was carried out until a slurry containing about 30 wt% solids was formed. The slurry was returned to underground waste tanks for cooling, crystallization, and settling. The principal products of waste solidification have been large volumes of sodium nitrate salt cakes and waste liquors that are rich in sodium hydroxide and sodium aluminate" (Wilson and Reep, 1991, p. B-5).

The 242-A Evaporator-Crystallizer began operating on March 18, 1977 (Anderson, 1990) (see Figure 5). In 1981, the evaporator was shut down for ten months to tie AW Tank Farm into the process (Rockwell, 1985). The evaporator was shut down in 1989 because of regulatory issues, but was restarted in 1994 after extensive modifications (Gerber, 1996).

■ **242-B Evaporator**

"The first type of waste solidification facility, the 242-B and 242-T Concentrators, was originally used for concentration of bismuth phosphate process waste. In 1951, they began to concentrate cladding/first cycle waste. These concentrators were steam-heated pot evaporators operated outside the waste tanks and at atmospheric pressure. The liquors were partially boiled down and cycled to underground waste storage tanks" (Jungfleisch, 1984, p. 1-5). This evaporator ran for approximately four years (Anderson, 1990) (see Figure 5).

■ **242-S Evaporator-Crystallizer**

The 242-S Evaporator-Crystallizer was designed to boil off water from the waste in an enclosed vessel at reduced pressure, similar to the 242-A Evaporator-Crystallizer. "The evaporation was carried out until a slurry containing about 30 wt% solids was formed. The slurry was returned to underground waste tanks for cooling, crystallization, and settling. The principal products of waste solidification have been large volumes of sodium nitrate salt cakes and waste liquors that are rich in sodium hydroxide and sodium aluminate" (Wilson and Reep, 1991, p. B-5). The evaporator began operating on November 1, 1973 (Anderson, 1990) and was shut down in 1981 (Gerber, 1996) (see Figure 5).

■ **242-T Evaporator**

The 242-T Evaporator, like the 242-B Evaporator, began operating in 1951 (Gerber, 1992) to reclaim nonboiling waste storage capacity in existing tanks (see Figure 5). The evaporator was shut down in the summer of 1955 and modified for tributyl phosphate scavenging (Godfrey, 1965), although scavenging was never performed in this evaporator. The evaporator was restarted on December 3, 1965, and operated until April 15, 1976 (Anderson, 1990).

■ **In-Tank Solidification**

The in-tank solidification systems immobilized high level wastes, that were not self-boiling, by concentrating the waste directly inside the tanks to form radionuclide-bearing salt cakes (Shefcik, 1964). The first in-tank solidification unit (ITS-1) and the second in-tank solidification unit (ITS-2) operated in tanks in the BY Tank Farm (Caudill, 1965 and 1967). "...[O]ne used a hot air sparge (ITS-1) and the other used an immersed electrical heater (ITS-2). The ITS-1 operations were conducted in individual tanks. The ITS-2 concentrations were performed by heating the contents of one tank and moving the heated liquor through a series of other tanks" (Wilson and Reep, 1991, p. B-5).

ITS units 1 and 2 began operating on March 19, 1965, and February 17, 1968, respectively (see Figure 5). ITS-1 was converted to a cooler for ITS-2 on August 24, 1971. Both units were shut down on June 30, 1974 (Anderson, 1990).

1.2.3 Miscellaneous Waste Sources and Equipment

Wastes from various other sources on the Hanford Site have been added to the tanks. Some wastes are from the 300 Area, the 100 Area production reactors, various laboratories, and catch tanks.

■ **Critical Mass Laboratories**

The critical mass laboratories were used to study the physics of plutonium solutions and solids to avoid accidently creating a criticality or self-sustained nuclear reaction. The first facility began operating in the 120 Building near 100 F in April 1950 and closed in December 1951. The second

facility, the 209-E Building, was located next to the Strontium Semiworks and began operating in July 1961 (Ballinger and Hall, 1991). The plutonium used in the lab was reprocessed in PUREX.

- **244-AR, -BXR, and -CR Process Vaults**

Three of the process vaults are the 244-AR Vault, the 244-BXR Vault, and the 244-CR Vault. These vaults were composed of several process vessels or tanks used to prepare waste for treatment or storage. Specific wastes from tanks can be pumped temporarily to the vaults and later sent directly to desired tanks or processing facilities.

The AR Vault, located north and west of the A Tank Farm, was constructed in 1966. The vault facilities include a canyon building with process cells containing tanks. The AR Vault has been on standby since 1978 (Leach and Stahl, 1993).

The 244-BXR Vault, located south of the BX Tank Farm, began operating in 1952 (Rodenhizer, 1987) and became inactive in 1956. The waste in the vault was difficult to handle, so the vault was jetted with high-pressure steam in 1976. The 244-BXR Vault was used to process sludge in the recovery of uranium from bismuth phosphate metal waste in the tanks (Rodenhizer, 1987).

The 244-CR Vault, constructed in 1952, is located south of the C Tank Farm (Leach and Stahl, 1993). Salt-well waste from the C Tank Farm is interimly stored in the CR Vault. The 244-CR Vault was used to process sludge in the recovery of uranium from bismuth phosphate metal waste in the tanks (Rodenhizer, 1987).

- **204-AR and 204-S Railroad Car Facilities**

The 204-AR rail car unloading facility built in 1981 (Leach and Stahl, 1993), replaced the 204-S rail car unloading facility. The facilities were built for pumping liquid radioactive waste from tank cars and sending the waste to 200 East Area tank farms (Leach and Stahl, 1993).

1.2.4 Time Lines

Time lines presented on the following pages represent many of the events that occurred during the history of the major plants and waste management operations on the Hanford Site. These are the same events as those described in the description of each facility. The plants, associated processes, and methods for managing waste are the main sources of the wastes stored in the tanks. Abbreviations are defined in the preceding text and in the glossary in Appendix A.

One time line represents the history of each of the tank farms in the Southwest Quadrant of the 200 West Area (Figure 6). The events represented include the dates of construction, the individual tank's entry into service and removal from service, and the deactivation of each tank farm.

PLANTS / PROCESS - TIME LINE

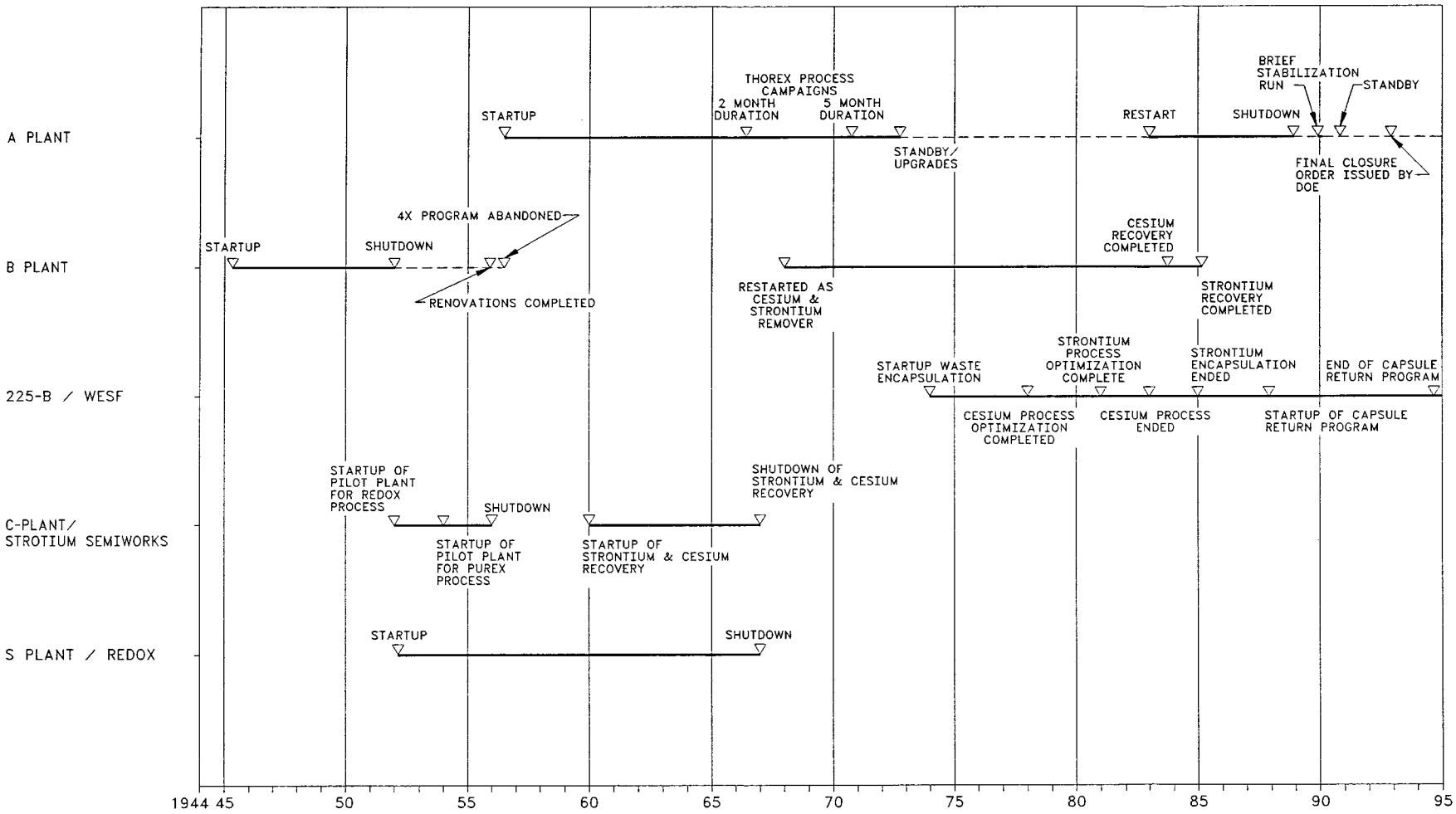


FIGURE 3

PLANTS / PROCESS - TIME LINE

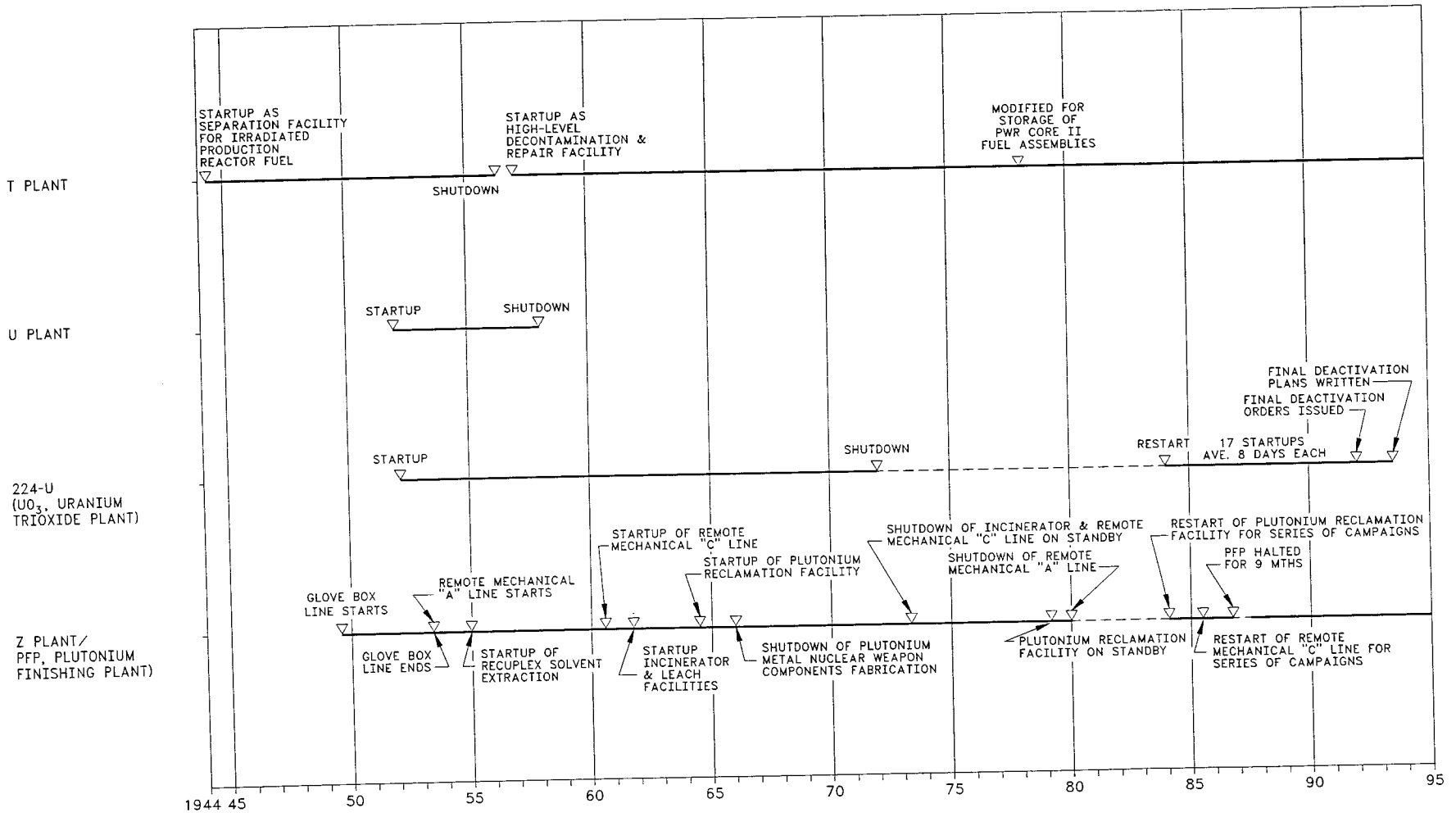


FIGURE 4

WASTE MANAGEMENT - TIME LINE

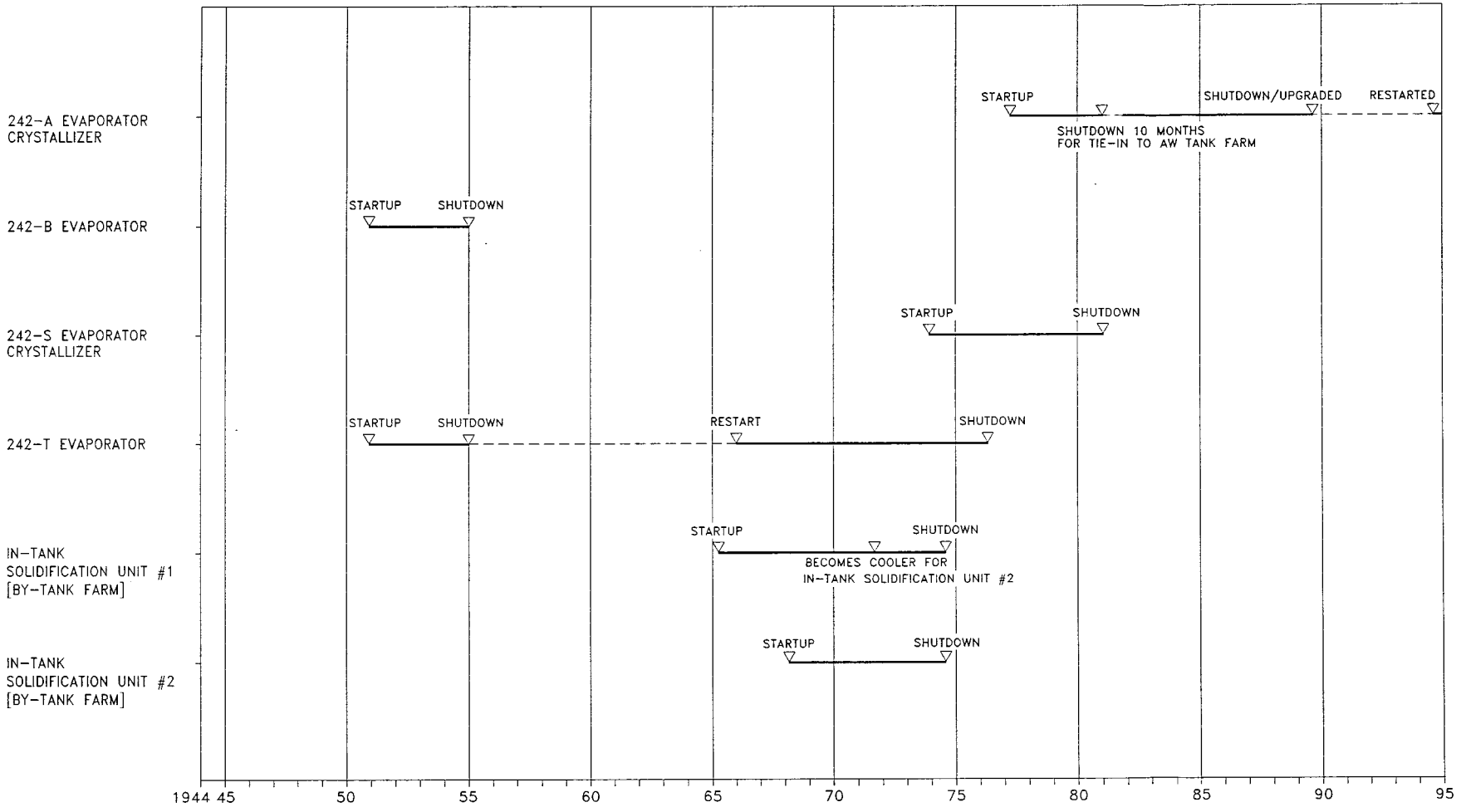


FIGURE 5

SW QUADRANT TANK FARMS - TIMELINE

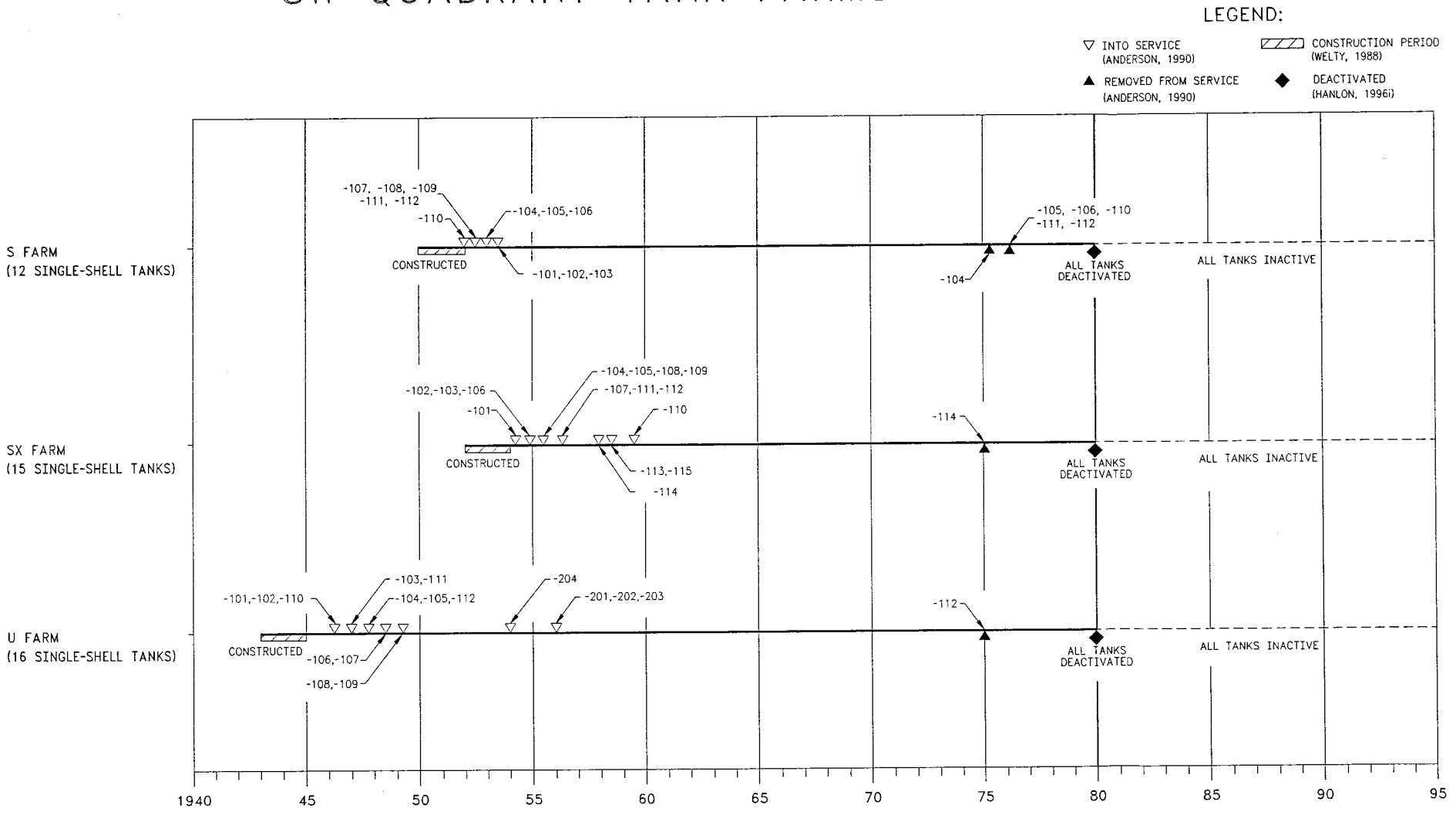


FIGURE 6

1.3 Tank and Tank Farm Summary Tables: Source and Development

The summary tables for each tank farm and each tank in the SW Quadrant comprise information from the supporting documents and the *Waste Tank Summary Report for Month Ending June 30, 1996* (Hanlon, 1996i).

The information on the Tank Farm Summary tables includes the Tank Farm Description, Integrity, Tank Volumes, and Watch Lists sections selected from the supporting documents. The Waste Volume Section information was taken from the *Waste Tank Summary Report for Month Ending June 30, 1996* (Hanlon, 1996i).

The information on the Tank Summary tables includes the Tank History, Tentatively Available Risers, Tank temperature, Tank Description, Interior Photographs and Waste Surface Level sections selected from the supporting documents. The Waste Volume section information was taken from the *Waste Tank Summary Report for Month Ending June 30, 1996* (Hanlon, 1996i).

The "-" in the tank summary tables indicates the information is unknown, not applicable, and/or not available in the supporting documents.

The risers referred to in the Tentatively Available Riser section are risers that are available for interior tank waste sampling (Lipnicki, 1996). For more information, see the supporting documents.

The temperature and waste surface level data presented in the Tank Summary tables are from a continually updated database. Therefore, there are limits on the temperature and waste surface level data presented in the tables. All other information on the Tank Summary tables is from referenced documents.

The temperature data were queried from the Surveillance Analysis Computer System (SACS) database. The temperature data were queried for the period from January 1, 1950, through October 2, 1996. The end date for the queries varies for each tank farm (see supporting documents for further information). Temperature data prior to 1975 were not located . The temperature information presented is for data from 1975 through the date of the query for the specific tank. For a graphical representation of the data, further explanation about the development of the data, and the references, see the supporting documents.

The waste surface level data also were queried from the Surveillance Analysis Computer System (SACS) database. The waste surface level data were queried for the period from January 1, 1991, through October 14, 1996. The end date for the queries varies for each tank farm (see supporting documents for further information). The waste surface level information presented is for data from January 1, 1991 through the date of the query for the specific tank. The waste surface level device indicated on the Tank Summary tables is the most recent device being used based on the queried data. The maximum and minimum waste surface levels indicated on the Tank Summary tables do not always correlate to the most recent device indicated on the Tank Summary tables. For a graphical representation of the data, further explanation about the development of the data, and the references, see the supporting documents.

For further information on the development of the data and more specific references on the Farm Summary tables and Tank Summary tables see the supporting documents.

1.4 Waste and Level History: Source and Development

The Waste and Level Histories combine the level history of the tank and the wastes added to the tank through out history. The Waste and Level Histories were incorporated from the Supporting Document for each tank. The supporting data were not included in this document. For the supporting data, further information on the development of the Waste and Level History sketches, and the references, see the supporting documents.

1.5 Riser Configuration: Source and Development

The riser configurations were incorporated directly from the supporting documents for each particular farm. The riser configurations were developed from numerous drawings and documents. For further information on the sizes of the risers, uses of the risers, references and the development of the riser configurations, see the supporting documents.

1.6 Tank Layer Model: Source and Development

The Tank Layer Model(TLM) graphs present the estimated waste types from the *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997). The Tank Layer Model graphs were reformatted into individual tank graphs from Agnew's document to better illustrate what waste types Agnew has estimated. For further information on the TLM, see the supporting documents and Agnew's document..

1.7 Inventory Estimates: Source and Development

The Inventory Estimates present the estimated waste contents of the tanks from the *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997). The inventory estimates predict the physical characteristics and the chemical, and radiological constituents of the supernatant, the solids and the total volume for each tank. The inventory estimates for each tank include a Supernatant Mixing Model (SMM) Composite Inventory Estimate, a Tank Layer Model (TLM) Solids Composite Inventory Estimate and a Total Inventory Estimate. The SMM Composite Inventory Estimate is based on the output of the Supernatant Mixing Model and the TLM Solids Composite Inventory Estimate is based on the output of the Tank Layer Model. The Total Inventory Estimate is a combination of the SMM Composite Inventory Estimate and the TLM Solids Composite Inventory Estimate. The Inventory Estimates were incorporated directly from the supporting document which were incorporated directly from Agnew's document for each tank. For further information on the Inventory Estimates, see the supporting documents and Agnew's document..

1.8 Tank Farm Photographs and Tank Montages: Source and Development

The tank farm photographs and tank montages were incorporated directly from the supporting documents for each particular farm. The tank farm photographs and interior tank montages were

reviewed in January 1996 to determine the clearest and most recent representation. For further information on the tank farm photograph and the interior tank montages, see the supporting documents.

S TANK FARM

2.0 241-S Tank Farm

The S Tank Farm is located in the 200 West Area west of Beliot Avenue and north of 13th Street. The farm contains twelve 100 series, dish bottom design, single-shell tanks built in 1950 and 1951. The 100 series tanks are 75 feet in diameter with an operating capacity of 758,000 gallons. The tanks were designed to store non-boiling waste at a fluid temperature of 220°F. The twelve tanks were constructed at different elevations with connecting overflow lines that allowed waste to cascade from tank to tank. The tank farm has four cascades of three tanks each. For more information on the design, construction, and waste contents of the tanks, refer to the S Tank Farm Supporting Document, HNF-SD-WM-ER-323, Rev. 1 (Brevick et al., 1997a).

The S Tank Farm tanks were built to store wastes from S Plant (the Reduction and Oxidation extraction plant [REDOX]). All the tanks were used to store the evaporator bottoms waste from the evaporator operations. Tank 241-S-102 was also used as a feed tank for the 242-S Evaporator (Agnew et al., 1997). The primary additions to the tanks were REDOX high-level waste (R1), REDOX cladding waste (CWR1, CWR2), water (WTR), REDOX saltcake (RsltCk) and partial nuetralization feed (NIT). (Agnew et al., 1995).

In 1953, surface condensers were installed to concentrate the waste in the first two cascades. The vapor condensate from the surface condensers was disposed of to the cribs (Leach and Stahl, 1993). Two of those cribs where the vapor condensate was disposed were 216-S-3 and 216-S-4 (Brevick et al., 1996). Tank 241-S-103 served as the emergency dump tank to the 242-S Evaporator and as a receiver for the 242-S cell sump drainage (Leach and Stahl, 1993).

The following table presents a summary of the 241-S Tank Farm. Refer to the glossary for waste type terminology.

241-S TANK FARM SUMMARY

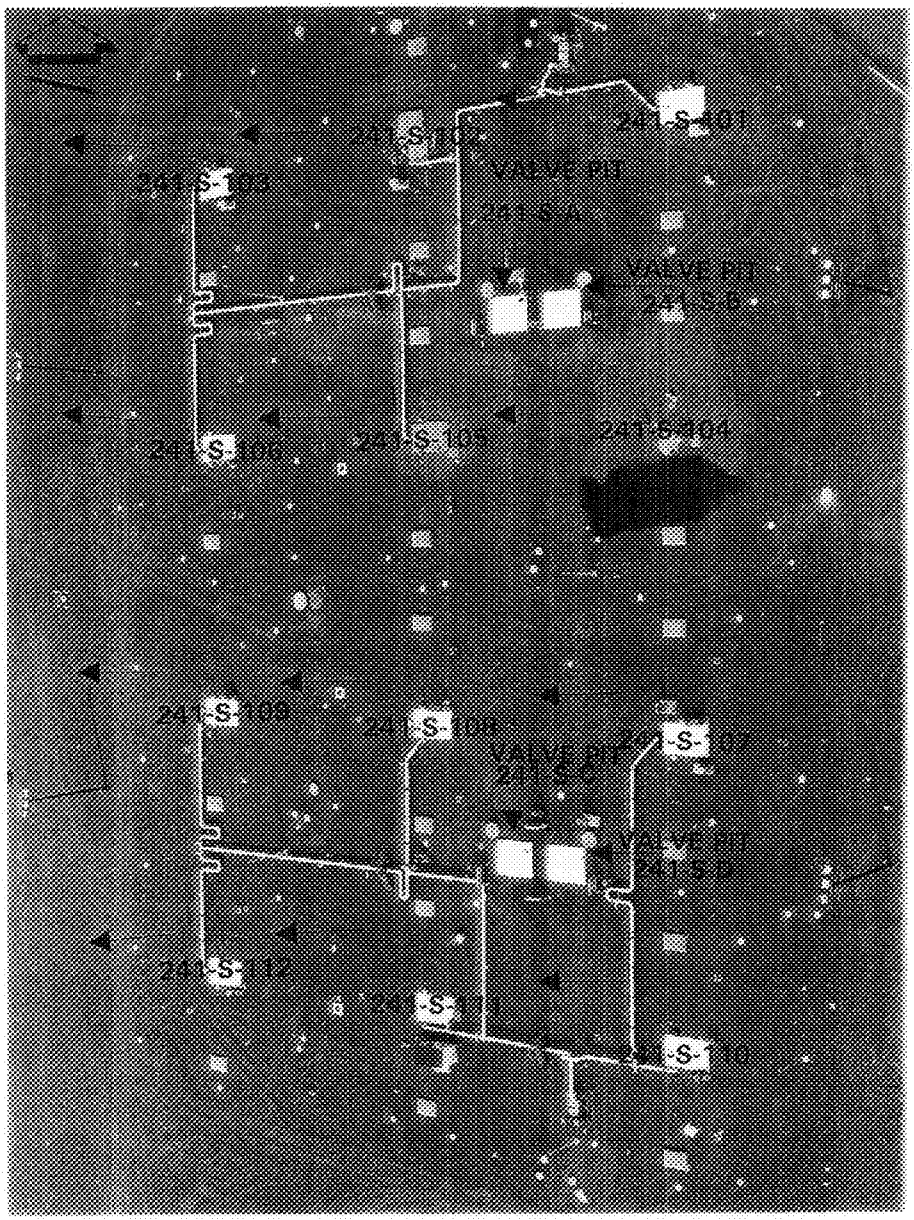
TANK FARM DESCRIPTION		WASTE VOLUME (HANLON 1996i)	
Shell Type	Single	Total Waste Volume	5,510,000 gal
Number of Tanks	12	Waste Type	DSSF, NCPLX
Construction Date	1950 - 1951	Drainable Interstitial Liquids	1,327,000 gal
INTEGRITY		Pumpable Liquids	1,323,000 gal
Sound	101, 102, 103,105	Saltcake	4,286,000 gal
	106, 107, 108, 109	Sludge	1,166,000 gal
	110, 111, 112	Supernatant	58,000 gal
Assumed Leaker	104	WATCH LISTS	
TANK VOLUMES		Hydrogen	102,111,112
12 @ 758,000 gal		Organic	102,111
		High Heat	none
		Ferrocyanide	none

The historical characterization and waste inventory information for each tank is assembled into a set of tables, sketches, graphs, and interior tank montage. The set consists of the following for each tank in S Tank Farm:

- Tank Summary table
- Waste and Level History sketch
- Riser Configuration sketch
- Tank Layer Model Estimate graph
- Total Inventory Estimate tables
- TLM Solids Composite Inventory Estimate tables
- SMM Composite Inventory Estimate tables
- Interior tank montage

The supporting document for S Tank Farm provides backup data and further explanation of the above tables, sketches, and graphs.

S TANK FARM


241-S-101
241-S-102
241-S-103
VALVE PIT
241-S-A
VALVE PIT
241-S-B
241-S-104
241-S-105
241-S-106
241-S-107
241-S-108
241-S-109
VALVE PIT
241-S-C
VALVE PIT
241-S-D
241-S-110
241-S-111
241-S-112

TANK 241-S-101 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1953
Removed from Service	-
Inactive	-
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
4,11,16	4 in
6	12 in
TANK TEMPERATURE	
Average Tank Temperature	110°F
Maximum Temperature	136.8°F
Date	Feb 6, 1989
Elevation from tank bottom	0.48 ft
Riser Number	14
Minimum Temperature	82.8°F
Date	July 25, 1994
Elevation from tank bottom	24.44 ft
Riser Number	14

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-102
Total Risers	12
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	427,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	84,000 gal
Pumpable Liquids	127,000 gal
Saltcake	171,000 gal
Sludge	244,000 gal
Supernatant	12,000 gal
INTERIOR PHOTOGRAPHS	
Date	March 18, 1988
Montage Number	94041033-40CN
Photo Set Number	8801412
WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	162.4 in
Date	Aug 31, 1992 - Sept 23, 1992*
Min Level	160.82 in
Date	March 27 and 28, 1992

* Numerous dates in this time span.

WASTE TYPES
TIME LINE
(ANDERSON 1990)

R:

B: IX: EB: DSSF:
BNW: LW: EVAP: PNF:
CW: N: HDRL:
DW: PL: PNF:
EB: TL: RESID:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995)

CWR1:
R1:
WTR:

RSLTCK:

WTR:

TANK INFO:

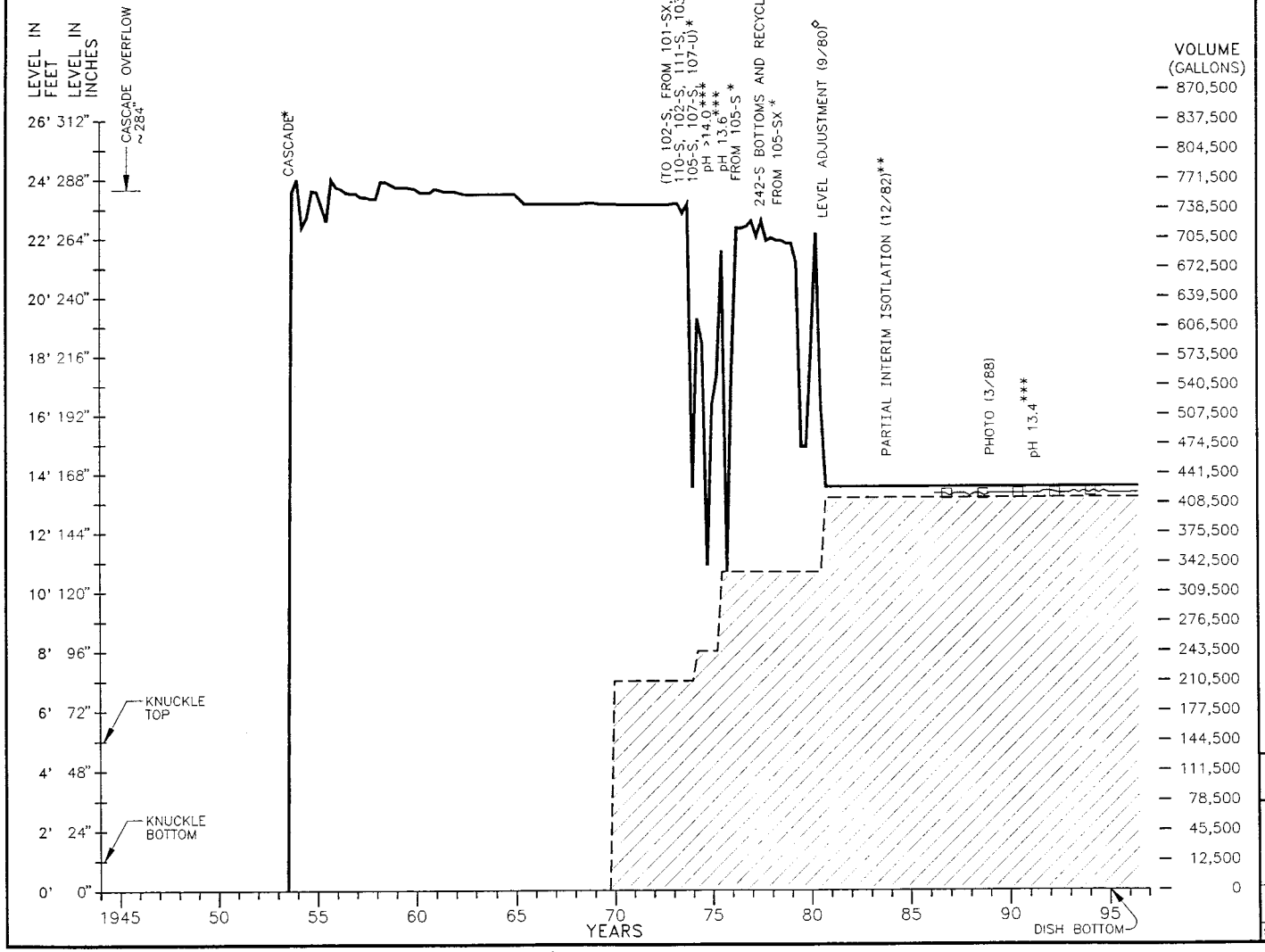
CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.



GLOSSARY OF WASTE TERMS:

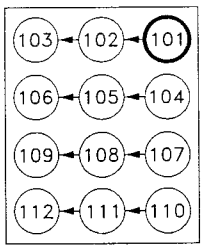
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

B:	B-PLANT HIGH-LEVEL WASTE
BNW:	BATTELLE NW LABORATORY WASTE
CW:	COATING (CLADDING) WASTE
CWR1:	COATING (CLADDING) WASTE 1952-60
DSSF:	DOUBLE-SHELL SLURRY FEED
DW:	DECOMTAMINATION WASTE
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HDRL:	HANFORD DEFENSE RESIDUAL LIQUOR
IX:	ION EXCHANGE
LW:	LABORATORY WASTE
N:	N-REACTOR WASTE
PL:	PUREX LOW-LEVEL WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RSLTCK:	SALTCAKE
R1:	REDOX WASTE 1952-57
TL:	TERMINAL LIQUOR
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

S TANK FARM
CASCADE

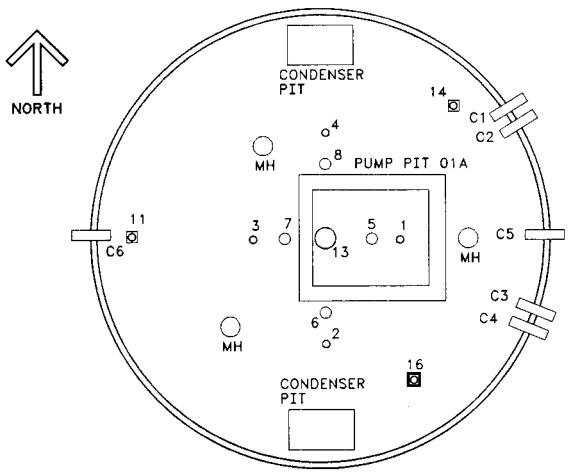


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-101 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1953-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: N/A

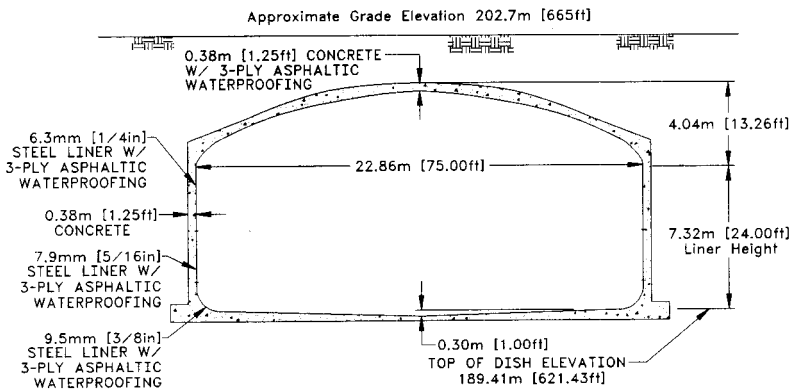
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E67	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-101



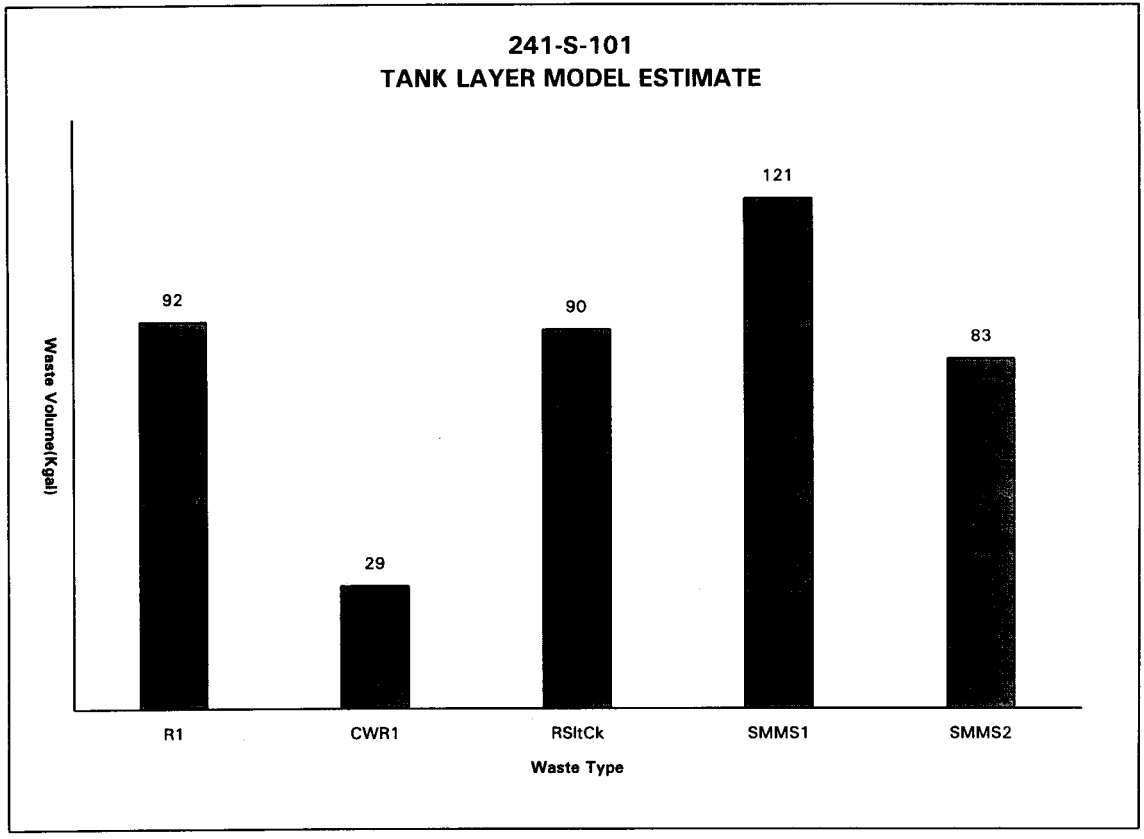
Ref: Alstad 1993
H-2-73181, Rev. 4
H-2-37524, Rev. 1

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-101							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	1.39E+06 (kg)	(211 kgal)	—	—	—	—	—
Heat Load	3.39 (kW)	(1.16E+04 BTU/hr)	—	2.77	3.13	3.56	3.64
Bulk Density	1.74 (g/cc)	—	—	1.62	1.64	1.89	1.95
Void Fraction	0.658	—	—	0.450	0.519	0.746	0.748
Water wt%	29.9	—	—	17.4	21.4	36.4	38.2
TOC wt% C (wet	2.21E-03	—	—	1.97E-03	2.03E-03	2.38E-03	2.57E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	10.4	1.37E+05	1.90E+05	8.15	8.37	13.2	14.8
Al3+	6.03	9.36E+04	1.30E+05	5.20	5.44	6.67	7.32
Fe3+ (total Fe)	0.472	1.51E+04	2.10E+04	0.464	0.468	0.476	0.480
Cr3+	0.378	1.13E+04	1.57E+04	0.232	0.302	0.578	0.813
Bi3+	2.93E-06	0.352	0.489	2.48E-06	2.70E-06	3.23E-06	3.55E-06
La3+	7.22E-12	5.76E-07	8.01E-07	6.33E-12	6.83E-12	7.98E-12	8.77E-12
Hg2+	5.61E-04	64.7	89.9	5.53E-04	5.58E-04	5.64E-04	5.65E-04
Zr (as ZrO(OH)2)	2.93E-07	1.53E-02	2.13E-02	2.69E-07	2.80E-07	3.07E-07	3.31E-07
Pb2+	1.62E-02	1.93E+03	2.69E+03	1.49E-02	1.57E-02	1.68E-02	1.74E-02
Ni2+	2.87E-02	968	1.34E+03	2.25E-02	2.60E-02	3.07E-02	3.03E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.13E-05	0.674	0.936	1.52E-05	1.82E-05	2.45E-05	2.76E-05
Ca2+	0.145	3.35E+03	4.65E+03	0.113	0.129	0.162	0.178
K+	1.88E-02	422	586	1.44E-02	1.62E-02	2.05E-02	2.13E-02
OH-	24.9	2.43E+05	3.38E+05	21.0	22.3	27.6	30.3
NO3-	4.62	1.65E+05	2.29E+05	2.35	2.35	8.19	10.1
NO2-	1.57	4.14E+04	5.75E+04	0.987	1.19	1.87	1.87
CO32-	0.147	5.08E+03	7.06E+03	0.115	0.131	0.164	0.180
PO43-	1.90E-04	10.4	14.4	1.76E-04	1.84E-04	1.97E-04	2.15E-04
SO42-	2.29E-02	1.27E+03	1.76E+03	1.89E-02	2.05E-02	2.45E-02	2.61E-02
Si (as SiO32-)	6.17E-02	997	1.38E+03	4.14E-02	5.40E-02	7.02E-02	8.31E-02
F-	1.51E-04	1.65	2.29	1.29E-04	1.42E-04	1.66E-04	1.79E-04
Cl-	8.04E-02	1.64E+03	2.28E+03	5.41E-02	6.70E-02	8.84E-02	0.126
C6H5O73-	1.56E-04	17.0	23.6	1.51E-04	1.54E-04	1.63E-04	1.77E-04
EDTA4-	6.08E-06	1.01	1.40	4.28E-06	5.26E-06	7.16E-06	8.24E-06
HEDTA3-	5.05E-06	0.796	1.11	1.62E-06	3.47E-06	6.74E-06	8.39E-06
glycolate-	2.20E-04	9.51	13.2	1.20E-04	1.74E-04	2.74E-04	3.26E-04
acetate-	2.29E-05	0.776	1.08	2.22E-05	2.25E-05	2.43E-05	2.60E-05
oxalate2-	9.46E-12	4.78E-07	6.65E-07	8.38E-12	8.90E-12	1.04E-11	1.14E-11
DBP	1.39E-04	16.7	23.3	1.29E-04	1.35E-04	1.50E-04	1.62E-04
butanol	1.39E-04	5.90	8.20	1.29E-04	1.35E-04	1.50E-04	1.62E-04
NH3	0.127	1.24E+03	1.72E+03	4.40E-02	5.57E-02	0.133	0.139
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-101							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	1.26E+06 (kg)	(216 kgal)	---	---	---	---	---
Heat Load	1.51 (kW)	(5.17E+03 BTU/hr)	---	1.42	1.47	1.56	1.60
Bulk Density*	1.54 (g/cc)	---	---	1.49	1.51	1.55	1.57
Water wt%	38.2	---	---	35.5	36.7	39.7	41.6
TOC wt% C (wet	0.692	---	---	0.466	0.577	0.808	0.921
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	12.5	1.88E+05	2.36E+05	11.4	12.0	13.0	13.5
Al3+	1.49	2.62E+04	3.29E+04	1.38	1.44	1.56	1.60
Fe3+ (total Fe)	9.64E-03	351	440	7.79E-03	8.70E-03	1.06E-02	1.15E-02
Cr3+	0.133	4.52E+03	5.67E+03	0.111	0.123	0.137	0.141
Bi3+	1.09E-03	148	186	9.94E-04	1.04E-03	1.14E-03	1.18E-03
La3+	3.30E-05	2.99	3.75	2.39E-05	2.83E-05	3.77E-05	4.22E-05
Hg2+	7.80E-06	1.02	1.28	7.30E-06	7.58E-06	7.92E-06	8.03E-06
Zr (as ZrO(OH)2)	2.00E-04	11.9	14.9	1.83E-04	1.89E-04	2.07E-04	2.17E-04
Pb2+	8.81E-04	119	149	7.15E-04	7.97E-04	9.66E-04	1.05E-03
Ni2+	5.65E-03	216	271	5.40E-03	5.52E-03	5.72E-03	5.79E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.44E-03	123	154	2.55E-03	2.98E-03	3.89E-03	4.32E-03
Ca2+	2.96E-02	772	970	2.69E-02	2.82E-02	3.09E-02	3.22E-02
K+	5.75E-02	1.47E+03	1.84E+03	5.21E-02	5.47E-02	6.05E-02	6.33E-02
OH-	9.00	9.97E+04	1.25E+05	8.32	8.64	9.37	9.57
NO3-	4.33	1.75E+05	2.20E+05	4.03	4.21	4.40	4.45
NO2-	2.20	6.59E+04	8.27E+04	1.82	1.99	2.40	2.58
CO32-	0.379	1.48E+04	1.86E+04	0.343	0.361	0.403	0.410
PO43-	7.74E-02	4.79E+03	6.01E+03	6.73E-02	7.08E-02	7.92E-02	8.09E-02
SO42-	0.213	1.34E+04	1.68E+04	0.164	0.188	0.240	0.263
Si (as SiO32-)	6.88E-02	1.26E+03	1.58E+03	5.61E-02	6.23E-02	7.53E-02	8.15E-02
F-	5.34E-02	661	830	4.52E-02	4.86E-02	5.75E-02	6.07E-02
Cl-	0.215	4.97E+03	6.24E+03	0.194	0.204	0.225	0.234
C6H5O73-	2.57E-02	3.17E+03	3.98E+03	2.37E-02	2.47E-02	2.68E-02	2.78E-02
EDTA4-	1.26E-02	2.37E+03	2.97E+03	4.01E-03	8.22E-03	1.71E-02	2.14E-02
HEDTA3-	2.33E-02	4.15E+03	5.22E+03	6.06E-03	1.45E-02	3.21E-02	4.08E-02
glycolate-	7.68E-02	3.75E+03	4.71E+03	4.99E-02	6.30E-02	9.06E-02	0.104
acetate-	6.32E-03	243	305	5.16E-03	5.73E-03	6.91E-03	7.47E-03
oxalate2-	4.32E-05	2.48	3.11	3.83E-05	4.07E-05	4.58E-05	4.82E-05
DBP	1.72E-02	2.35E+03	2.95E+03	1.40E-02	1.56E-02	1.87E-02	2.02E-02
butanol	1.72E-02	829	1.04E+03	1.40E-02	1.56E-02	1.87E-02	2.02E-02
NH3	7.38E-02	817	1.03E+03	5.94E-02	6.51E-02	8.48E-02	9.77E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-101							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.64E+06 (kg)	(427 kgal)	---	---	---	---	---
Heat Load	4.90 (kW)	(1.67E+04 BTU/hr)	---	4.24	4.62	5.10	5.14
Bulk Density†	1.64 (g/cc)	---	---	1.57	1.58	1.72	1.74
Water wt%†	33.8	---	---	27.0	28.8	37.6	38.4
TOC wt% C (wet	0.330	---	---	0.222	0.275	0.385	0.439
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	11.5	1.61E+05	4.26E+05	10.1	10.3	13.0	13.5
Al3+	3.74	6.16E+04	1.63E+05	3.31	3.45	4.05	4.37
Fe3+ (total Fe)	0.238	8.12E+03	2.15E+04	0.234	0.236	0.240	0.242
Cr3+	0.254	8.08E+03	2.14E+04	0.182	0.217	0.348	0.458
Bi3+	5.53E-04	70.6	187	5.05E-04	5.28E-04	5.77E-04	6.01E-04
La3+	1.67E-05	1.42	3.75	1.21E-05	1.43E-05	1.91E-05	2.13E-05
Hg2+	2.81E-04	34.5	91.2	2.77E-04	2.80E-04	2.82E-04	2.83E-04
Zr (as ZrO(OH)2)	1.01E-04	5.65	14.9	9.26E-05	9.57E-05	1.05E-04	1.10E-04
Pb2+	8.47E-03	1.07E+03	2.84E+03	7.82E-03	8.20E-03	8.74E-03	9.00E-03
Ni2+	1.70E-02	611	1.62E+03	1.40E-02	1.57E-02	1.80E-02	1.78E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	1.75E-03	58.7	155	1.30E-03	1.52E-03	1.98E-03	2.20E-03
Ca2+	8.67E-02	2.12E+03	5.62E+03	7.15E-02	7.90E-02	9.45E-02	0.102
K+	3.84E-02	917	2.43E+03	3.56E-02	3.69E-02	3.99E-02	4.13E-02
OH-	16.8	1.75E+05	4.63E+05	14.8	15.5	18.2	19.6
NO3-	4.48	1.70E+05	4.49E+05	3.30	3.34	6.22	7.11
NO2-	1.89	5.30E+04	1.40E+05	1.56	1.71	2.05	2.08
CO32-	0.265	9.71E+03	2.57E+04	0.246	0.255	0.277	0.280
PO43-	3.92E-02	2.28E+03	6.02E+03	3.41E-02	3.59E-02	4.01E-02	4.10E-02
SO42-	0.119	7.00E+03	1.85E+04	9.45E-02	0.106	0.133	0.144
Si (as SiO32-)	6.53E-02	1.12E+03	2.97E+03	5.66E-02	6.15E-02	6.93E-02	7.52E-02
F-	2.71E-02	315	832	2.29E-02	2.47E-02	2.92E-02	3.08E-02
Cl-	0.149	3.22E+03	8.51E+03	0.129	0.139	0.154	0.170
C6H5O73-	1.31E-02	1.51E+03	4.00E+03	1.21E-02	1.26E-02	1.36E-02	1.41E-02
EDTA4-	6.39E-03	1.12E+03	2.97E+03	2.03E-03	4.16E-03	8.63E-03	1.08E-02
HEDTA3-	1.18E-02	1.97E+03	5.22E+03	3.07E-03	7.32E-03	1.63E-02	2.06E-02
glycolate-	3.90E-02	1.79E+03	4.72E+03	2.53E-02	3.20E-02	4.60E-02	5.26E-02
acetate-	3.21E-03	116	306	2.62E-03	2.91E-03	3.51E-03	3.79E-03
oxalate2-	2.19E-05	1.18	3.11	1.94E-05	2.06E-05	2.31E-05	2.44E-05
DBP	8.75E-03	1.12E+03	2.97E+03	7.17E-03	7.95E-03	9.54E-03	1.03E-02
butanol	8.75E-03	397	1.05E+03	7.17E-03	7.95E-03	9.54E-03	1.03E-02
NH3	1.00E-01	1.04E+03	2.75E+03	5.75E-02	6.41E-02	0.106	0.112
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-101							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	1.39E+06 (kg)	(211 kgal)	---	---	---	---	---
Heat Load	3.39 (kW)	(1.16E+04 BTU/hr)	---	2.77	3.13	3.56	3.64
Bulk Density	1.74 (g/cc)	---	---	1.62	1.64	1.89	1.95
Void Fraction	0.658	---	---	0.450	0.519	0.746	0.748
Water wt%	29.9	---	---	17.4	21.4	36.4	38.2
TOC wt% C (wet	2.21E-03	---	---	1.97E-03	2.03E-03	2.38E-03	2.57E-03

Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	1.08E-04	6.21E-02	86.2	1.29E-05	1.29E-05	1.13E-04	1.21E-04
C-14	5.88E-06	3.38E-03	4.70	1.00E-06	1.00E-06	6.23E-06	6.53E-06
Ni-59	9.39E-06	5.40E-03	7.50	6.48E-06	6.48E-06	9.99E-06	9.88E-06
Ni-63	8.88E-04	0.510	709	6.05E-04	6.05E-04	9.44E-04	9.33E-04
Co-60	4.79E-06	2.75E-03	3.82	3.96E-07	3.96E-07	4.98E-06	5.38E-06
Se-79	3.18E-06	1.83E-03	2.54	2.13E-07	2.13E-07	3.25E-06	6.09E-06
Sr-90	0.517	297	4.13E+05	0.401	0.467	0.556	0.563
Y-90	0.517	297	4.13E+05	0.401	0.405	0.556	0.563
Zr-93	1.50E-05	8.64E-03	12.0	1.00E-06	1.00E-06	1.54E-05	2.73E-05
Nb-93m	1.22E-05	7.02E-03	9.75	8.21E-07	8.21E-07	1.25E-05	2.54E-05
Tc-99	4.49E-05	2.58E-02	35.9	3.88E-05	4.13E-05	4.78E-05	5.11E-05
Ru-106	1.02E-09	5.84E-07	8.11E-04	1.13E-12	1.13E-12	1.06E-09	1.15E-09
Cd-113m	2.29E-05	1.31E-02	18.3	3.10E-06	3.10E-06	4.70E-05	4.55E-05
Sb-125	1.63E-05	9.35E-03	13.0	5.83E-07	5.83E-07	1.70E-05	1.84E-05
Sn-126	4.88E-06	2.80E-03	3.89	3.27E-07	3.27E-07	4.99E-06	9.55E-06
I-129	8.54E-08	4.91E-05	6.82E-02	7.37E-08	7.84E-08	9.09E-08	9.71E-08
Cs-134	9.93E-07	5.71E-04	0.793	1.21E-08	1.21E-08	1.03E-06	1.11E-06
Cs-137	0.163	93.6	1.30E+05	0.145	0.152	0.173	0.184
Ba-137m	0.154	88.6	1.23E+05	2.34E-02	2.34E-02	0.161	0.169
Sm-151	1.13E-02	6.51	9.05E+03	7.59E-04	7.59E-04	1.16E-02	2.21E-02
Eu-152	6.86E-06	3.94E-03	5.48	3.08E-06	3.08E-06	6.89E-06	6.93E-06
Eu-154	1.15E-04	6.58E-02	91.5	9.57E-06	9.57E-06	1.19E-04	1.48E-04
Eu-155	3.37E-04	0.194	269	1.45E-04	1.45E-04	3.38E-04	3.41E-04
Ra-226	6.72E-10	3.86E-07	5.36E-04	2.65E-10	4.64E-10	8.79E-10	1.08E-09
Ra-228	6.72E-09	3.86E-06	5.37E-03	4.08E-15	4.08E-15	6.78E-09	6.86E-09
Ac-227	3.25E-09	1.87E-06	2.60E-03	1.31E-09	2.04E-09	4.46E-09	5.61E-09
Pa-231	4.73E-09	2.72E-06	3.78E-03	3.18E-10	3.18E-10	5.31E-09	1.17E-08
Th-229	1.62E-10	9.30E-08	1.29E-04	7.76E-13	7.76E-13	1.63E-10	1.65E-10
Th-232	9.01E-11	5.18E-08	7.19E-05	2.63E-16	2.63E-16	1.14E-10	1.37E-10
U-232	3.01E-08	1.73E-05	2.40E-02	1.07E-08	1.97E-08	4.29E-08	5.71E-08
U-233	1.15E-07	6.60E-05	9.18E-02	4.06E-08	7.50E-08	1.64E-07	2.18E-07
U-234	2.63E-06	1.51E-03	2.10	2.32E-06	2.47E-06	2.80E-06	2.97E-06
U-235	1.11E-07	6.36E-05	8.83E-02	9.82E-08	1.04E-07	1.17E-07	1.24E-07
U-236	6.81E-08	3.91E-05	5.44E-02	5.59E-08	6.19E-08	7.45E-08	8.09E-08
U-238	2.51E-06	1.44E-03	2.00	2.24E-06	2.37E-06	2.66E-06	2.81E-06
Np-237	2.11E-07	1.21E-04	0.169	1.71E-07	1.87E-07	2.27E-07	2.40E-07
Pu-238	7.34E-06	4.22E-03	5.86	6.53E-06	6.92E-06	7.75E-06	8.15E-06
Pu-239	4.59E-04	0.264	367	4.01E-04	4.30E-04	4.89E-04	5.17E-04
Pu-240	6.60E-05	3.79E-02	52.7	5.77E-05	6.18E-05	7.03E-05	7.43E-05
Pu-241	4.15E-04	0.239	332	3.66E-04	3.90E-04	4.40E-04	4.64E-04
Pu-242	1.88E-09	1.08E-06	1.50E-03	1.65E-09	1.76E-09	1.99E-09	2.10E-09
Am-241	5.34E-05	3.07E-02	42.6	3.18E-05	4.66E-05	6.06E-05	1.12E-04
Am-243	1.62E-09	9.33E-07	1.30E-03	7.64E-10	1.41E-09	1.78E-09	2.17E-09
Cm-242	7.14E-08	4.10E-05	5.70E-02	6.99E-08	7.05E-08	7.20E-08	7.20E-08
Cm-243	1.63E-09	9.39E-07	1.30E-03	1.60E-09	1.61E-09	1.65E-09	1.65E-09
Cm-244	1.28E-09	7.34E-07	1.02E-03	2.33E-10	6.51E-10	1.70E-09	1.70E-09

Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.68E-03 (g/L)	---	6.13	6.71E-03	7.18E-03	8.17E-03	8.65E-03
U	3.15E-02	4.31E+03	5.98E+03	2.81E-02	2.97E-02	3.33E-02	3.52E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-101							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	1.26E+06 (kg)	(216 kgal)	—	—	—	—	—
Heat Load	1.51 (kW)	(5.17E+03 BTU/hr)	—	1.42	1.47	1.56	1.60
Bulk Density*	1.54 (g/cc)	—	—	1.49	1.51	1.55	1.57
Water wt%†	38.2	----	----	35.5	36.7	39.7	41.6
TOC wt% C (wet	0.692	----	----	0.466	0.577	0.808	0.921
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.29E-04	0.149	187	1.15E-04	1.15E-04	2.35E-04	2.44E-04
C-14	3.31E-05	2.16E-02	27.1	9.45E-06	9.45E-06	3.36E-05	3.40E-05
Ni-59	2.10E-06	1.37E-03	1.72	9.85E-07	9.85E-07	2.16E-06	2.21E-06
Ni-63	2.06E-04	0.134	168	9.55E-05	9.55E-05	2.11E-04	2.17E-04
Co-60	3.67E-05	2.39E-02	30.0	9.56E-06	9.56E-06	3.73E-05	3.79E-05
Se-79	3.23E-06	2.11E-03	2.64	1.72E-06	1.72E-06	3.78E-06	4.31E-06
Sr-90	0.107	70.0	8.79E+04	0.100	0.104	0.111	0.115
Y-90	0.108	70.0	8.79E+04	5.52E-02	5.52E-02	0.111	0.115
Zr-93	1.59E-05	1.03E-02	13.0	8.31E-06	8.31E-06	1.86E-05	2.12E-05
Nb-93m	1.15E-05	7.50E-03	9.42	6.22E-06	6.22E-06	1.34E-05	1.53E-05
Tc-99	2.36E-04	0.154	193	1.48E-04	1.91E-04	2.81E-04	3.25E-04
Ru-106	6.45E-09	4.20E-06	5.27E-03	2.94E-09	2.94E-09	7.23E-09	7.95E-09
Cd-113m	8.36E-05	5.44E-02	68.3	3.82E-05	3.82E-05	1.00E-04	1.16E-04
Sb-125	1.58E-04	0.103	129	4.02E-05	4.02E-05	1.60E-04	1.63E-04
Sn-126	4.89E-06	3.18E-03	4.00	2.62E-06	2.62E-06	5.71E-06	6.49E-06
I-129	4.55E-07	2.96E-04	0.372	2.84E-07	3.68E-07	5.43E-07	6.28E-07
Cs-134	2.31E-06	1.51E-03	1.89	1.66E-06	1.91E-06	2.65E-06	2.98E-06
Cs-137	0.240	157	1.97E+05	0.218	0.229	0.252	0.263
Ba-137m	0.227	148	1.86E+05	0.174	0.174	0.238	0.249
Sm-151	1.14E-02	7.41	9.31E+03	6.09E-03	6.09E-03	1.33E-02	1.51E-02
Eu-152	3.70E-06	2.41E-03	3.03	1.83E-06	1.83E-06	3.94E-06	4.17E-06
Eu-154	5.91E-04	0.385	483	2.13E-04	2.13E-04	7.28E-04	7.82E-04
Eu-155	2.18E-04	0.142	179	1.07E-04	1.07E-04	2.33E-04	2.47E-04
Ra-226	1.36E-10	8.88E-08	1.12E-04	8.95E-11	8.95E-11	1.53E-10	1.70E-10
Ra-228	1.26E-07	8.20E-05	0.103	5.28E-08	8.85E-08	1.69E-07	2.15E-07
Ac-227	8.62E-10	5.62E-07	7.05E-04	5.90E-10	5.90E-10	9.61E-10	1.06E-09
Pa-231	3.98E-09	2.59E-06	3.26E-03	2.47E-09	2.47E-09	4.53E-09	5.06E-09
Th-229	2.96E-09	1.93E-06	2.42E-03	1.36E-09	2.14E-09	3.91E-09	4.93E-09
Th-232	8.44E-09	5.50E-06	6.90E-03	4.40E-09	6.38E-09	1.05E-08	1.25E-08
U-232	6.55E-07	4.26E-04	0.535	3.62E-07	5.05E-07	8.28E-07	1.01E-06
U-233	2.51E-06	1.63E-03	2.05	1.39E-06	1.94E-06	3.18E-06	3.88E-06
U-234	7.62E-07	4.96E-04	0.623	7.34E-07	7.47E-07	7.78E-07	7.88E-07
U-235	3.09E-08	2.02E-05	2.53E-02	2.97E-08	3.03E-08	3.16E-08	3.20E-08
U-236	2.38E-08	1.55E-05	1.94E-02	2.29E-08	2.34E-08	2.42E-08	2.46E-08
U-238	8.82E-07	5.75E-04	0.721	8.53E-07	8.67E-07	8.99E-07	9.06E-07
Np-237	8.61E-07	5.61E-04	0.704	5.73E-07	7.13E-07	1.01E-06	1.15E-06
Pu-238	1.32E-06	8.59E-04	1.08	9.80E-07	1.15E-06	1.49E-06	1.66E-06
Pu-239	4.49E-05	2.93E-02	36.7	3.62E-05	4.05E-05	4.94E-05	5.36E-05
Pu-240	7.64E-06	4.97E-03	6.24	6.02E-06	6.81E-06	8.46E-06	9.25E-06
Pu-241	8.93E-05	5.82E-02	73.0	6.62E-05	7.75E-05	1.01E-04	1.12E-04
Pu-242	4.91E-10	3.20E-07	4.01E-04	3.53E-10	4.20E-10	5.61E-10	6.29E-10
Am-241	5.44E-05	3.54E-02	44.5	3.83E-05	4.62E-05	6.26E-05	7.05E-05
Am-243	1.90E-09	1.23E-06	1.55E-03	1.39E-09	1.63E-09	2.16E-09	2.42E-09
Cm-242	1.40E-07	9.14E-05	0.115	6.34E-08	6.34E-08	1.49E-07	1.58E-07
Cm-243	1.30E-08	8.48E-06	1.06E-02	5.69E-09	5.69E-09	1.38E-08	1.46E-08
Cm-244	1.30E-07	8.45E-05	0.106	5.41E-08	5.41E-08	1.55E-07	1.72E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.60E-04 (g/L)	—	0.458	3.95E-04	4.76E-04	6.43E-04	7.23E-04
U	8.75E-03	1.36E+03	1.70E+03	8.38E-03	8.56E-03	8.95E-03	9.05E-03

*Density is calculated based on Na, OH-, and AlO2-.

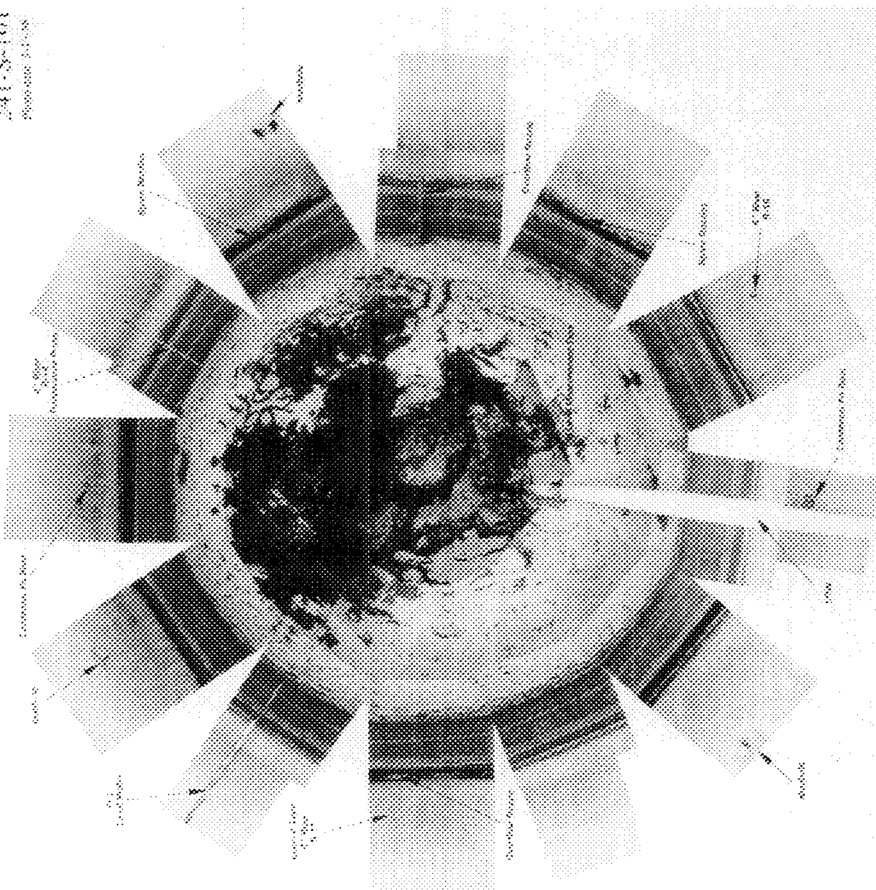
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-101							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.64E+06 (kg)	(427 kgal)	---	---	---	---	---
Heat Load	4.90 (kW)	(1.67E+04 BTU/hr)	---	4.24	4.62	5.10	5.14
Bulk Density†	1.64 (g/cc)	---	---	1.57	1.58	1.72	1.74
Water wt%†	33.8	---	---	27.0	28.8	37.6	38.4
TOC wt% C (wet	0.330	---	---	0.222	0.275	0.385	0.439
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	1.69E-04	0.103	273	9.97E-05	9.97E-05	1.72E-04	1.77E-04
C-14	1.97E-05	1.20E-02	31.8	7.69E-06	7.69E-06	1.99E-05	2.01E-05
Ni-59	5.70E-06	3.48E-03	9.22	4.20E-06	4.20E-06	6.00E-06	5.93E-06
Ni-63	5.43E-04	0.332	877	3.97E-04	3.97E-04	5.70E-04	5.64E-04
Co-60	2.09E-05	1.28E-02	33.8	7.20E-06	7.20E-06	2.12E-05	2.15E-05
Se-79	3.21E-06	1.96E-03	5.18	1.58E-06	1.58E-06	3.48E-06	4.57E-06
Sr-90	0.310	189	5.01E+05	0.253	0.285	0.329	0.331
Y-90	0.310	189	5.01E+05	0.252	0.252	0.329	0.331
Zr-93	1.55E-05	9.45E-03	25.0	7.74E-06	7.74E-06	1.68E-05	2.12E-05
Nb-93m	1.19E-05	7.25E-03	19.2	5.68E-06	5.68E-06	1.28E-05	1.80E-05
Tc-99	1.42E-04	8.65E-02	229	9.69E-05	1.19E-04	1.65E-04	1.87E-04
Ru-106	3.76E-09	2.30E-06	6.08E-03	1.99E-09	1.99E-09	4.16E-09	4.52E-09
Cd-113m	5.36E-05	3.27E-02	86.6	3.06E-05	3.06E-05	6.39E-05	6.99E-05
Sb-125	8.78E-05	5.37E-02	142	2.84E-05	2.84E-05	8.92E-05	9.06E-05
Sn-126	4.88E-06	2.98E-03	7.89	2.40E-06	2.40E-06	5.30E-06	7.07E-06
I-129	2.72E-07	1.66E-04	0.440	1.86E-07	2.28E-07	3.17E-07	3.60E-07
Cs-134	1.66E-06	1.02E-03	2.69	9.74E-07	9.74E-07	1.83E-06	2.00E-06
Cs-137	0.202	124	3.27E+05	0.191	0.196	0.210	0.219
Ba-137m	0.191	117	3.09E+05	9.96E-02	9.96E-02	0.197	0.202
Sm-151	1.14E-02	6.94	1.84E+04	5.58E-03	5.58E-03	1.23E-02	1.64E-02
Eu-152	5.26E-06	3.22E-03	8.50	3.30E-06	3.30E-06	5.38E-06	5.50E-06
Eu-154	3.56E-04	0.217	575	1.64E-04	1.64E-04	4.25E-04	4.52E-04
Eu-155	2.77E-04	0.169	448	1.78E-04	1.78E-04	2.85E-04	2.92E-04
Ra-226	4.01E-10	2.45E-07	6.48E-04	2.10E-10	2.97E-10	4.98E-10	5.91E-10
Ra-228	6.70E-08	4.09E-05	0.108	3.00E-08	4.81E-08	8.89E-08	1.12E-07
Ac-227	2.04E-09	1.25E-06	3.30E-03	1.13E-09	1.43E-09	2.61E-09	3.15E-09
Pa-231	4.35E-09	2.66E-06	7.03E-03	2.01E-09	2.01E-09	4.63E-09	7.63E-09
Th-229	1.58E-09	9.64E-07	2.55E-03	7.66E-10	1.16E-09	2.06E-09	2.57E-09
Th-232	4.31E-09	2.64E-06	6.97E-03	2.27E-09	3.27E-09	5.36E-09	6.36E-09
U-232	3.46E-07	2.11E-04	0.559	1.98E-07	2.70E-07	4.34E-07	5.28E-07
U-233	1.33E-06	8.11E-04	2.14	7.59E-07	1.04E-06	1.66E-06	2.02E-06
U-234	1.68E-06	1.03E-03	2.72	1.53E-06	1.61E-06	1.77E-06	1.85E-06
U-235	7.03E-08	4.30E-05	0.114	6.42E-08	6.71E-08	7.37E-08	7.71E-08
U-236	4.57E-08	2.79E-05	7.38E-02	3.97E-08	4.27E-08	4.88E-08	5.20E-08
U-238	1.69E-06	1.03E-03	2.73	1.55E-06	1.62E-06	1.76E-06	1.84E-06
Np-237	5.40E-07	3.30E-04	0.873	3.94E-07	4.65E-07	6.15E-07	6.88E-07
Pu-238	4.29E-06	2.62E-03	6.94	3.91E-06	4.10E-06	4.49E-06	4.67E-06
Pu-239	2.50E-04	0.153	404	2.22E-04	2.36E-04	2.64E-04	2.77E-04
Pu-240	3.65E-05	2.23E-02	59.0	3.26E-05	3.45E-05	3.85E-05	4.04E-05
Pu-241	2.50E-04	0.153	405	2.27E-04	2.39E-04	2.62E-04	2.73E-04
Pu-242	1.18E-09	7.18E-07	1.90E-03	1.07E-09	1.12E-09	1.23E-09	1.28E-09
Am-241	5.39E-05	3.29E-02	87.1	4.16E-05	4.97E-05	5.81E-05	8.15E-05
Am-243	1.76E-09	1.08E-06	2.85E-03	1.28E-09	1.62E-09	1.90E-09	2.03E-09
Cm-242	1.06E-07	6.49E-05	0.172	6.73E-08	6.73E-08	1.11E-07	1.15E-07
Cm-243	7.40E-09	4.52E-06	1.20E-02	3.68E-09	3.68E-09	7.81E-09	8.21E-09
Cm-244	6.63E-08	4.05E-05	0.107	2.80E-08	2.80E-08	7.92E-08	8.75E-08
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	4.08E-03 (g/L)	---	6.59	3.62E-03	3.84E-03	4.31E-03	4.53E-03
U	2.00E-02	2.91E+03	7.68E+03	1.83E-02	1.91E-02	2.09E-02	2.18E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-S-101

TANK 241-S-102 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1953
Removed from Service	-
Inactive	1980
Watch Lists	Hydrogen & Organics
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
1, 11, 14, 16	4 in
7	12 in

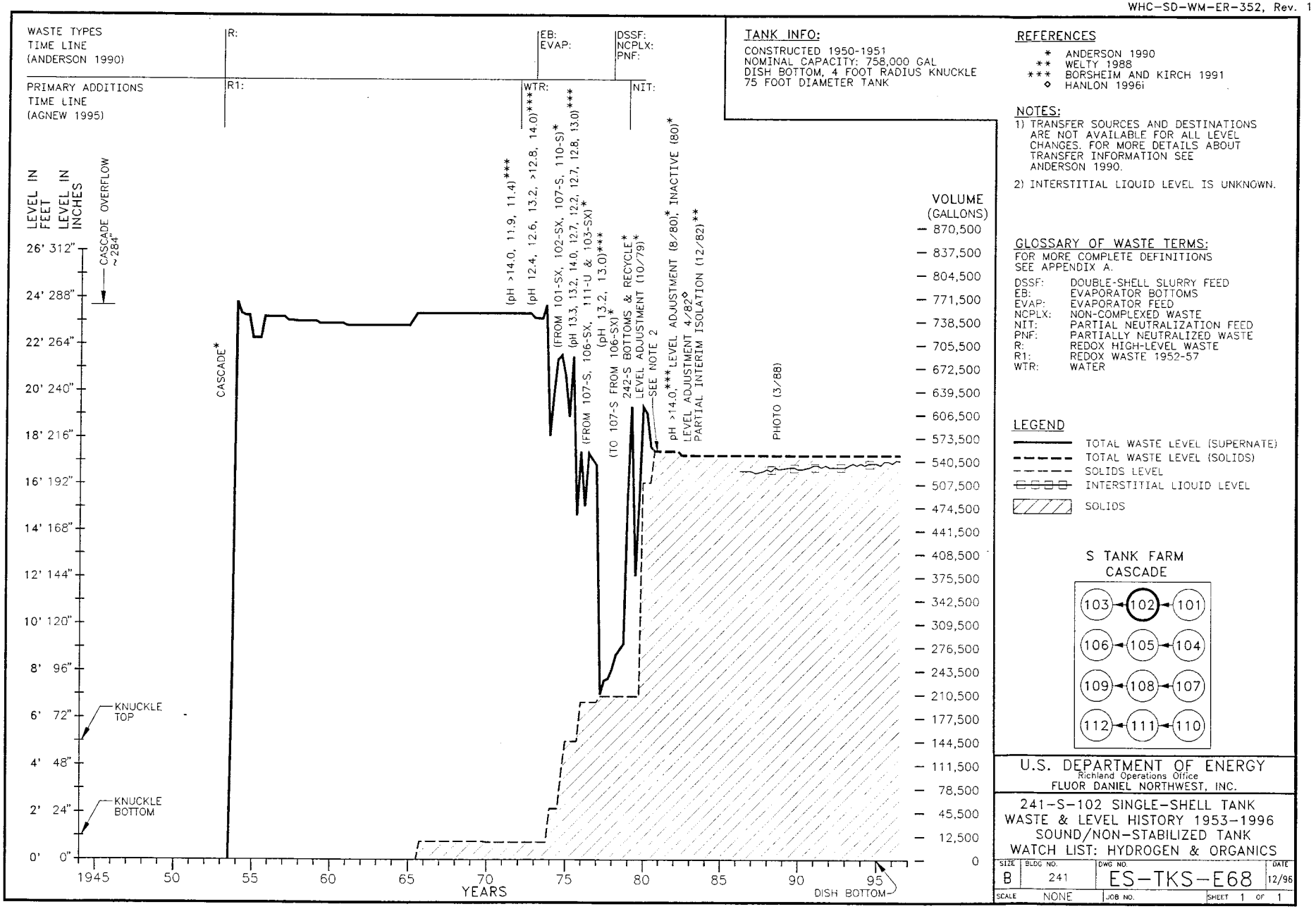
TANK TEMPERATURE	
Average Tank Temperature	102°F
Maximum Temperature	122°F
Date	May 2, and June 6, 1988
Elevation from tank bottom	2.44 ft, 4.44 ft, 6.44 ft
Riser Number	3
Minimum Temperature	71.2°F
Date	April 18, 1992
Elevation from tank bottom	24.44 ft
Riser Number	3

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-103
Total Risers	12

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	549,000 gal
Waste Type	DSSF
Drainable Interstitial Liquids	230,000 gal
Pumpable Liquids	239,000 gal
Saltcake	545,000 gal
Sludge	4,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	March 18, 1988
Montage Number	94041033-39CN
Photo Set Number	8801411

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	206.1 in
Date	June 13, 1994
Min Level	202 in
Date	Jan 21, 1991



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

DSSF:	DOUBLE-SHELL SLURRY FEED
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
NCPLX:	NON-COMPLEXED WASTE
NIT:	PARTIAL NEUTRALIZATION FEED
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
R1:	REDOX WASTE 1952-57
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

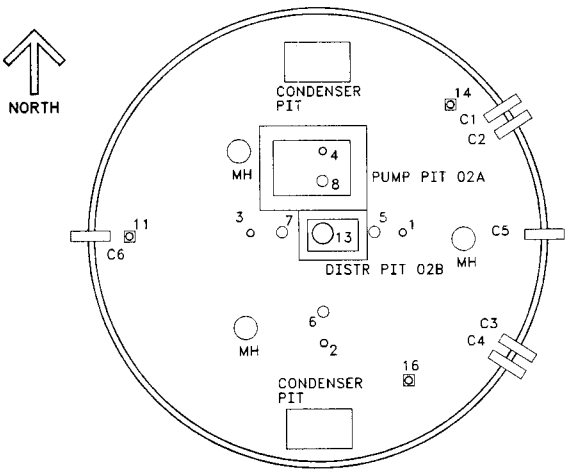
S TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-102 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1953-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: HYDROGEN & ORGANICS

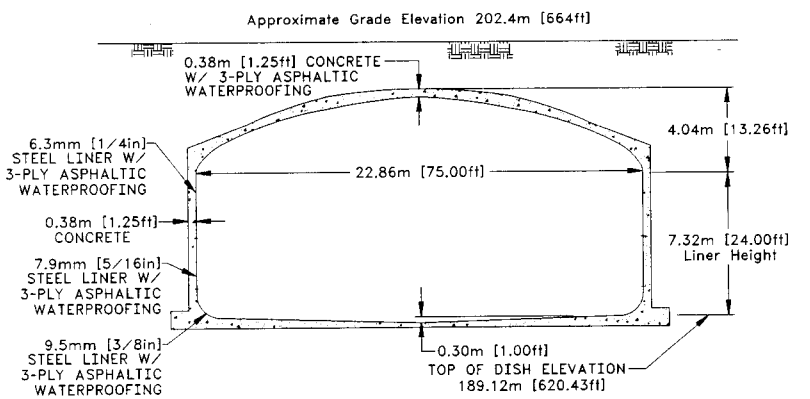
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E68	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-102



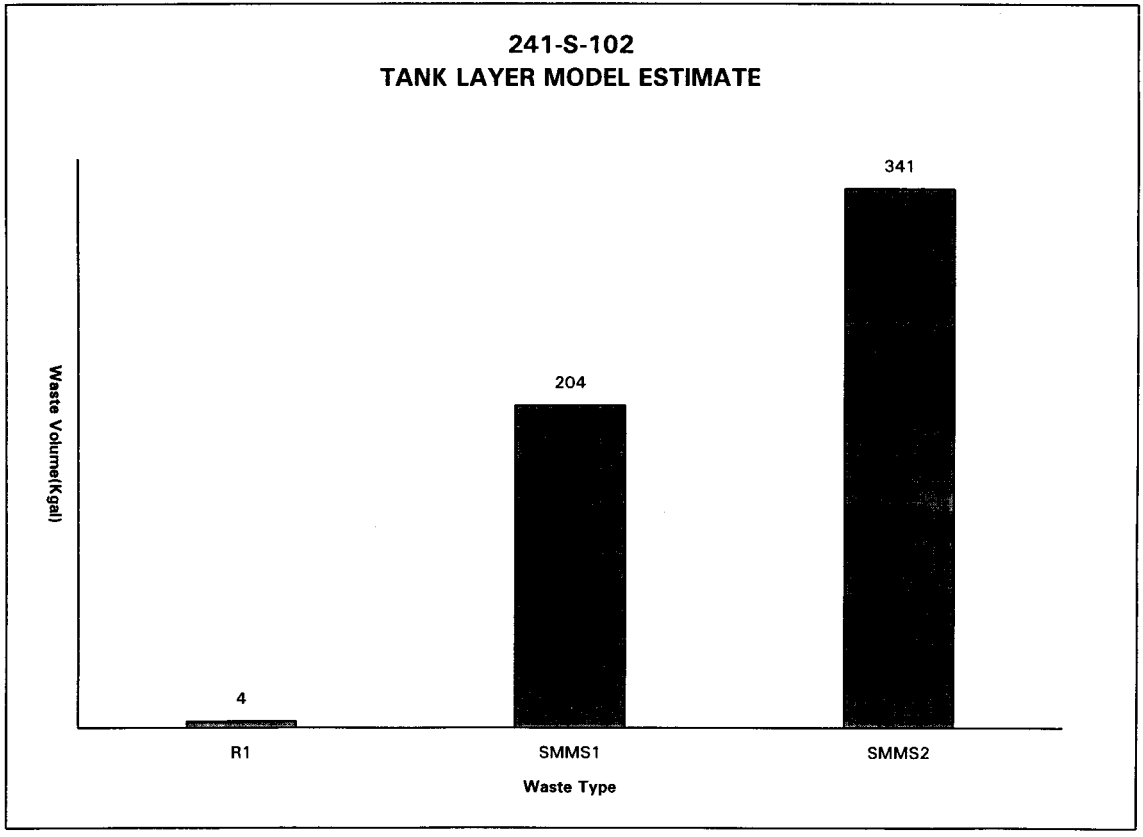
Ref: Alstad 1993
H-2-73182, Rev. 4
H-2-37525, Rev. 1

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-102

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	2.66E+04 (kg)	(4.00 kgal)	—	—	—	—	—
Heat Load	9.86E-02 (kW)	(337 BTU/hr)	—	7.15E-02	8.74E-02	0.106	0.109
Bulk Density	1.76 (g/cc)	—	—	1.51	1.53	2.11	2.24
Void Fraction	0.536	—	—	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	—	—	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	—	—	0	0	0	0

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	8.13	1.06E+05	2.83E+03	3.05	3.56	14.7	18.2
Al3+	6.99	1.07E+05	2.85E+03	6.58	6.74	7.15	7.15
Fe3+ (total Fe)	1.01	3.22E+04	856	0.994	1.00	1.02	1.03
Cr3+	6.19E-02	1.83E+03	48.7	7.08E-03	3.39E-02	0.522	1.06
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	5.07E-01	1.69E+03	45.0	3.66E-02	4.45E-02	5.54E-02	5.45E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.220	5.02E+03	133	0.146	0.182	0.258	0.294
K+	1.12E-02	250	6.64	1.28E-03	5.25E-03	1.52E-02	1.52E-02
OH-	25.6	2.48E+05	6.59E+03	23.1	24.3	26.9	28.4
NO3-	5.29	1.87E+05	4.96E+03	6.03E-02	6.03E-02	13.5	17.9
NO2-	1.46	3.82E+04	1.01E+03	0.132	0.595	2.15	2.15
CO32-	0.220	7.51E+03	200	0.146	0.182	0.258	0.294
PO43-	0	0	0	0	0	0	0
SO42-	1.04E-02	569	15.1	1.19E-03	4.87E-03	1.41E-02	1.41E-02
Si (as SiO32-)	8.06E-03	129	3.42	9.21E-04	3.77E-03	1.09E-02	1.09E-02
F-	0	0	0	0	0	0	0
Cl-	5.16E-02	1.04E+03	27.7	5.91E-03	2.42E-02	7.00E-02	0.157
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.256	2.47E+03	65.7	6.55E-02	9.25E-02	0.270	0.284
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-102							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	2.64E+06 (kg)	(545 kgal)	---	---	---	---	---
Heat Load	1.99 (kW)	(6.80E+03 BTU/hr)	---	1.88	1.93	2.05	2.11
Bulk Density*	1.28 (g/cc)	---	---	1.26	1.27	1.29	1.30
Water wt%	61.4	---	---	59.5	60.4	62.5	63.7
TOC wt% C (wet	0.413	---	---	0.274	0.342	0.484	0.553
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	6.50	1.17E+05	3.08E+05	5.95	6.22	6.73	6.95
Al3+	0.779	1.64E+04	4.33E+04	0.719	0.747	0.813	0.830
Fe3+ (total Fe)	4.88E-03	213	562	3.98E-03	4.42E-03	5.34E-03	5.78E-03
Cr3+	7.01E-02	2.85E+03	7.52E+03	5.79E-02	6.45E-02	7.23E-02	7.44E-02
Bi3+	5.71E-04	93.3	246	5.19E-04	5.44E-04	5.97E-04	6.23E-04
La3+	1.54E-05	1.67	4.41	1.11E-05	1.32E-05	1.76E-05	1.96E-05
Hg2+	3.99E-06	0.626	1.65	3.72E-06	3.87E-06	4.05E-06	4.10E-06
Zr (as ZrO(OH)2)	1.07E-04	7.66	20.2	9.79E-05	1.01E-04	1.11E-04	1.17E-04
Pb2+	4.43E-04	71.8	189	3.61E-04	4.01E-04	4.84E-04	5.24E-04
Ni2+	2.91E-03	133	352	2.78E-03	2.84E-03	2.94E-03	2.97E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	1.75E-03	75.2	198	1.32E-03	1.53E-03	1.97E-03	2.18E-03
Ca2+	1.52E-02	477	1.26E+03	1.39E-02	1.45E-02	1.59E-02	1.65E-02
K+	2.97E-02	908	2.39E+03	2.70E-02	2.83E-02	3.11E-02	3.25E-02
OH-	4.67	6.21E+04	1.64E+05	4.30	4.47	4.88	4.95
NO3-	2.29	1.11E+05	2.93E+05	2.12	2.22	2.33	2.34
NO2-	1.14	4.09E+04	1.08E+05	0.952	1.04	1.23	1.32
CO32-	0.191	8.95E+03	2.36E+04	0.173	0.180	0.204	0.206
PO43-	3.91E-02	2.91E+03	7.66E+03	3.37E-02	3.56E-02	4.01E-02	4.10E-02
SO42-	0.108	8.13E+03	2.14E+04	8.44E-02	9.57E-02	0.121	0.132
Si (as SiO32-)	3.52E-02	774	2.04E+03	2.90E-02	3.20E-02	3.84E-02	4.14E-02
F-	2.80E-02	416	1.10E+03	2.34E-02	2.53E-02	3.02E-02	3.19E-02
Cl-	0.112	3.10E+03	8.16E+03	0.101	0.106	0.117	0.121
C6H5O73-	1.25E-02	1.85E+03	4.89E+03	1.15E-02	1.20E-02	1.30E-02	1.35E-02
EDTA4-	6.31E-03	1.42E+03	3.75E+03	1.95E-03	4.08E-03	8.56E-03	1.08E-02
HEDTA3-	1.18E-02	2.53E+03	6.67E+03	3.06E-03	7.32E-03	1.63E-02	2.07E-02
glycolate-	3.83E-02	2.25E+03	5.93E+03	2.49E-02	3.15E-02	4.51E-02	5.17E-02
acetate-	2.67E-03	123	325	2.19E-03	2.43E-03	2.92E-03	3.16E-03
oxalate2-	2.01E-05	1.39	3.66	1.78E-05	1.90E-05	2.13E-05	2.24E-05
DBP	8.44E-03	1.39E+03	3.66E+03	6.92E-03	7.67E-03	9.20E-03	9.93E-03
butanol	8.44E-03	490	1.29E+03	6.92E-03	7.67E-03	9.20E-03	9.93E-03
NH3	3.84E-02	511	1.35E+03	3.14E-02	3.42E-02	4.38E-02	5.01E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-102							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.66E+06 (kg)	(549 kgal)	---	---	---	---	---
Heat Load	2.09 (kW)	(7.13E+03 BTU/hr)	---	1.97	2.03	2.15	2.20
Bulk Density†	1.28 (g/cc)	---	---	1.26	1.27	1.29	1.30
Water wt%†	61.1	---	---	59.2	60.0	62.1	63.4
TOC wt% C (wet	0.409	---	---	0.271	0.338	0.479	0.547
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	6.51	1.17E+05	3.11E+05	5.96	6.24	6.74	6.95
Al3+	0.824	1.73E+04	4.62E+04	0.764	0.793	0.856	0.874
Fe3+ (total Fe)	1.22E-02	533	1.42E+03	1.13E-02	1.18E-02	1.27E-02	1.31E-02
Cr3+	7.01E-02	2.84E+03	7.57E+03	6.21E-02	6.59E-02	7.28E-02	7.43E-02
Bi3+	5.67E-04	92.4	246	5.15E-04	5.40E-04	5.93E-04	6.18E-04
La3+	1.53E-05	1.65	4.41	1.11E-05	1.31E-05	1.74E-05	1.95E-05
Hg2+	3.96E-06	0.620	1.65	3.69E-06	3.84E-06	4.02E-06	4.07E-06
Zr (as ZrO(OH)2)	1.07E-04	7.59	20.2	9.71E-05	1.01E-04	1.10E-04	1.16E-04
Pb2+	4.39E-04	71.0	189	3.58E-04	3.98E-04	4.81E-04	5.21E-04
Ni2+	3.25E-03	149	397	3.13E-03	3.19E-03	3.29E-03	3.32E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	1.74E-03	74.5	198	1.31E-03	1.52E-03	1.96E-03	2.17E-03
Ca2+	1.67E-02	522	1.39E+03	1.54E-02	1.60E-02	1.74E-02	1.80E-02
K+	2.95E-02	901	2.40E+03	2.69E-02	2.82E-02	3.10E-02	3.23E-02
OH-	4.82	6.40E+04	1.70E+05	4.45	4.63	5.02	5.10
NO3-	2.31	1.12E+05	2.97E+05	2.14	2.24	2.35	2.36
NO2-	1.14	4.09E+04	1.09E+05	0.956	1.04	1.23	1.33
CO32-	0.191	8.94E+03	2.38E+04	0.173	0.181	0.204	0.206
PO43-	3.88E-02	2.88E+03	7.66E+03	3.35E-02	3.53E-02	3.98E-02	4.07E-02
SO42-	0.107	8.06E+03	2.15E+04	8.38E-02	9.51E-02	0.120	0.131
Si (as SiO32-)	3.50E-02	767	2.04E+03	2.89E-02	3.19E-02	3.81E-02	4.11E-02
F-	2.78E-02	412	1.10E+03	2.33E-02	2.52E-02	3.00E-02	3.17E-02
Cl-	0.111	3.08E+03	8.19E+03	0.101	0.105	0.116	0.120
C6H5O73-	1.24E-02	1.84E+03	4.89E+03	1.14E-02	1.19E-02	1.30E-02	1.34E-02
EDTA4-	6.27E-03	1.41E+03	3.75E+03	1.93E-03	4.05E-03	8.50E-03	1.07E-02
HEDTA3-	1.17E-02	2.50E+03	6.67E+03	3.03E-03	7.27E-03	1.62E-02	2.05E-02
glycolate-	3.80E-02	2.23E+03	5.93E+03	2.48E-02	3.12E-02	4.48E-02	5.13E-02
acetate-	2.65E-03	122	325	2.17E-03	2.41E-03	2.90E-03	3.14E-03
oxalate2-	2.00E-05	1.37	3.66	1.77E-05	1.88E-05	2.12E-05	2.23E-05
DBP	8.38E-03	1.37E+03	3.66E+03	6.87E-03	7.61E-03	9.14E-03	9.86E-03
butanol	8.38E-03	485	1.29E+03	6.87E-03	7.61E-03	9.14E-03	9.86E-03
NH3	4.00E-02	530	1.41E+03	3.31E-02	3.58E-02	4.53E-02	5.15E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-102

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	2.66E+04 (kg)	(4.00 kgal)	---	---	---	---	---
Heat Load	9.86E-02 (kW)	(337 BTU/hr)	---	7.15E-02	8.74E-02	0.106	0.109
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	---	---	0	0	0	0

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.92E-05	1.67E-02	0.443	3.05E-06	1.47E-05	4.10E-05	4.10E-05
C-14	2.26E-06	1.29E-03	3.43E-02	2.59E-07	1.06E-06	3.07E-06	3.07E-06
Ni-59	1.49E-05	8.46E-03	0.225	1.07E-05	1.31E-05	1.62E-05	1.60E-05
Ni-63	1.39E-03	0.790	21.0	1.00E-03	1.22E-03	1.52E-03	1.49E-03
Co-60	8.94E-07	5.09E-04	1.35E-02	1.02E-07	4.18E-07	1.21E-06	1.21E-06
Se-79	4.81E-07	2.74E-04	7.27E-03	5.50E-08	2.25E-07	6.51E-07	7.15E-06
Sr-90	0.928	529	1.40E+04	0.662	0.812	1.02	1.03
Y-90	0.929	529	1.41E+04	0.662	0.812	1.02	1.03
Zr-93	2.27E-06	1.29E-03	3.43E-02	2.59E-07	1.06E-06	3.08E-06	3.03E-05
Nb-93m	1.85E-06	1.06E-03	2.81E-02	2.12E-07	8.68E-07	2.51E-06	3.21E-05
Tc-99	1.58E-05	9.02E-03	0.240	1.81E-06	7.42E-06	2.15E-05	2.15E-05
Ru-106	2.50E-12	1.42E-09	3.78E-08	2.86E-13	1.17E-12	3.38E-12	3.38E-12
Cd-113m	6.99E-06	3.98E-03	0.106	8.00E-07	3.27E-06	9.48E-06	9.48E-06
Sb-125	1.31E-06	7.47E-04	1.99E-02	1.50E-07	6.14E-07	1.78E-06	1.78E-06
Sn-126	7.39E-07	4.21E-04	1.12E-02	8.45E-08	3.46E-07	1.00E-06	1.14E-05
I-129	3.04E-08	1.73E-05	4.61E-04	3.48E-09	1.42E-08	4.13E-08	4.13E-08
Cs-134	2.72E-08	1.55E-05	4.11E-04	7.19E-09	1.52E-08	3.52E-08	3.52E-08
Cs-137	5.60E-02	31.9	848	1.48E-02	3.13E-02	7.26E-02	7.26E-02
Ba-137m	5.30E-02	30.2	802	1.40E-02	2.96E-02	6.87E-02	6.87E-02
Sm-151	1.71E-03	0.976	26.0	1.96E-04	8.03E-04	2.33E-03	2.64E-02
Eu-152	7.00E-06	3.98E-03	0.106	6.85E-06	6.91E-06	7.06E-06	7.06E-06
Eu-154	2.16E-05	1.23E-02	0.327	2.47E-06	1.01E-05	2.93E-05	2.93E-05
Eu-155	3.30E-04	0.188	5.00	3.23E-04	3.26E-04	3.33E-04	3.33E-04
Ra-226	1.08E-09	6.15E-07	1.63E-05	1.48E-10	6.04E-10	1.56E-09	2.01E-09
Ra-228	9.26E-15	5.28E-12	1.40E-10	9.07E-15	9.15E-15	9.34E-15	9.34E-15
Ac-227	4.76E-09	2.71E-06	7.20E-05	3.06E-10	2.00E-09	7.52E-09	1.02E-08
Pa-231	7.18E-10	4.09E-07	1.09E-05	8.21E-11	3.36E-10	2.04E-09	1.68E-08
Th-229	1.77E-12	1.01E-09	2.67E-08	1.73E-12	1.75E-12	1.78E-12	1.78E-12
Th-232	5.91E-16	3.36E-13	8.94E-12	6.76E-17	2.77E-16	8.01E-16	8.01E-16
U-232	5.24E-12	2.98E-09	7.92E-08	5.99E-13	2.45E-12	7.10E-12	7.10E-12
U-233	2.00E-13	1.14E-10	3.02E-09	2.28E-14	9.34E-14	2.71E-13	2.71E-13
U-234	1.19E-07	6.78E-05	1.80E-03	1.36E-08	5.58E-08	1.62E-07	1.62E-07
U-235	5.13E-09	2.92E-06	7.76E-05	5.86E-10	2.40E-09	6.95E-09	6.95E-09
U-236	1.88E-09	1.07E-06	2.85E-05	2.16E-10	8.82E-10	2.56E-09	2.56E-09
U-238	1.22E-07	6.92E-05	1.84E-03	1.39E-08	5.69E-08	1.65E-07	1.65E-07
Np-237	1.03E-07	5.86E-05	1.56E-03	1.18E-08	4.81E-08	1.39E-07	1.39E-07
Pu-238	6.61E-06	3.77E-03	0.100	4.75E-06	5.66E-06	7.57E-06	8.48E-06
Pu-239	4.72E-04	0.269	7.14	3.39E-04	4.04E-04	5.40E-04	6.05E-04
Pu-240	6.76E-05	3.85E-02	1.02	4.85E-05	5.78E-05	7.73E-05	8.66E-05
Pu-241	3.97E-04	0.226	6.01	2.85E-04	3.40E-04	4.55E-04	5.09E-04
Pu-242	1.82E-09	1.04E-06	2.76E-05	1.31E-09	1.56E-09	2.08E-09	2.34E-09
Am-241	8.09E-06	4.61E-03	0.122	9.26E-07	3.79E-06	1.10E-05	1.43E-04
Am-243	7.57E-11	4.31E-08	1.15E-06	8.66E-12	3.54E-11	1.03E-10	1.34E-09
Cm-242	1.61E-07	9.16E-05	2.44E-03	1.58E-07	1.59E-07	1.62E-07	1.62E-07
Cm-243	3.69E-09	2.10E-06	5.58E-05	3.61E-09	3.64E-09	3.72E-09	3.72E-09
Cm-244	2.70E-09	1.54E-06	4.09E-05	3.09E-10	1.27E-09	3.67E-09	3.67E-09

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	7.89E-03 (g/L)	---	0.119	5.67E-03	6.76E-03	9.03E-03	1.01E-02
U	1.53E-03	207	5.51	1.75E-04	7.16E-04	2.07E-03	2.07E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-102							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	2.64E+06 (kg)	(545 kgal)	—	—	—	—	—
Heat Load	1.99 (kW)	(6.80E+03 BTU/hr)	—	1.88	1.93	2.05	2.11
Bulk Density*	1.28 (g/cc)	—	—	1.26	1.27	1.29	1.30
Water wt%†	61.4	---	---	59.5	60.4	62.5	63.7
TOC wt% C (wet	0.413	—	—	0.274	0.342	0.484	0.553
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	1.17E-04	9.14E-02	241	6.17E-05	6.17E-05	1.20E-04	1.24E-04
C-14	1.66E-05	1.30E-02	34.2	5.05E-06	5.05E-06	1.68E-05	1.70E-05
Ni-59	1.07E-06	8.36E-04	2.20	5.26E-07	5.26E-07	1.10E-06	1.12E-06
Ni-63	1.05E-04	8.18E-02	216	5.09E-05	5.09E-05	1.07E-04	1.10E-04
Co-60	1.82E-05	1.43E-02	37.6	5.04E-06	5.04E-06	1.86E-05	1.89E-05
Se-79	1.65E-06	1.29E-03	3.40	9.12E-07	9.12E-07	1.91E-06	2.17E-06
Sr-90	5.46E-02	42.7	1.13E+05	5.09E-02	5.27E-02	5.64E-02	5.82E-02
Y-90	5.46E-02	42.7	1.13E+05	2.91E-02	2.91E-02	5.64E-02	5.82E-02
Zr-93	8.08E-06	6.33E-03	16.7	4.41E-06	4.41E-06	9.41E-06	1.07E-05
Nb-93m	5.87E-06	4.60E-03	12.1	3.30E-06	3.30E-06	6.81E-06	7.70E-06
Tc-99	1.18E-04	9.24E-02	244	7.51E-05	9.61E-05	1.40E-04	1.62E-04
Ru-106	3.22E-09	2.52E-06	6.64E-03	1.51E-09	1.51E-09	3.60E-09	3.95E-09
Cd-113m	4.23E-05	3.31E-02	87.3	2.03E-05	2.03E-05	5.03E-05	5.80E-05
Sb-125	7.81E-05	6.11E-02	161	2.10E-05	2.10E-05	7.96E-05	8.09E-05
Sn-126	2.49E-06	1.95E-03	5.14	1.39E-06	1.39E-06	2.89E-06	3.27E-06
I-129	2.28E-07	1.78E-04	0.470	1.44E-07	1.85E-07	2.70E-07	3.12E-07
Cs-134	1.20E-06	9.41E-04	2.48	8.72E-07	9.86E-07	1.37E-06	1.54E-06
Cs-137	0.128	99.8	2.63E+05	0.116	0.121	0.134	0.139
Ba-137m	0.121	94.4	2.49E+05	9.19E-02	9.19E-02	0.126	0.132
Sm-151	5.80E-03	4.54	1.20E+04	3.22E-03	3.22E-03	6.73E-03	7.63E-03
Eu-152	1.86E-06	1.46E-03	3.84	9.51E-07	9.51E-07	1.98E-06	2.10E-06
Eu-154	2.96E-04	0.232	611	1.12E-04	1.12E-04	3.63E-04	3.89E-04
Eu-155	1.10E-04	8.60E-02	227	5.56E-05	5.56E-05	1.17E-04	1.25E-04
Ra-226	7.03E-11	5.50E-08	1.45E-04	4.75E-11	4.75E-11	7.85E-11	8.65E-11
Ra-228	6.33E-08	4.95E-05	0.131	2.63E-08	4.44E-08	8.52E-08	1.09E-07
Ac-227	4.42E-10	3.46E-07	9.13E-04	3.10E-10	3.10E-10	4.90E-10	5.36E-10
Pa-231	2.03E-09	1.59E-06	4.19E-03	1.30E-09	1.30E-09	2.30E-09	2.55E-09
Th-229	1.49E-09	1.16E-06	3.07E-03	6.74E-10	1.07E-09	1.97E-09	2.48E-09
Th-232	4.21E-09	3.30E-06	8.69E-03	2.16E-09	3.17E-09	5.26E-09	6.26E-09
U-232	3.30E-07	2.58E-04	0.680	1.81E-07	2.54E-07	4.17E-07	5.11E-07
U-233	1.26E-06	9.89E-04	2.61	6.96E-07	9.73E-07	1.60E-06	1.96E-06
U-234	3.91E-07	3.06E-04	0.807	3.76E-07	3.83E-07	4.00E-07	4.04E-07
U-235	1.59E-08	1.24E-05	3.28E-02	1.52E-08	1.55E-08	1.63E-08	1.64E-08
U-236	1.22E-08	9.53E-06	2.51E-02	1.18E-08	1.20E-08	1.24E-08	1.26E-08
U-238	4.48E-07	3.50E-04	0.924	4.32E-07	4.39E-07	4.57E-07	4.60E-07
Np-237	4.34E-07	3.40E-04	0.895	2.94E-07	3.62E-07	5.06E-07	5.76E-07
Pu-238	6.63E-07	5.19E-04	1.37	4.98E-07	5.79E-07	7.47E-07	8.28E-07
Pu-239	2.28E-05	1.78E-02	47.0	1.86E-05	2.06E-05	2.49E-05	2.70E-05
Pu-240	3.86E-06	3.02E-03	7.96	3.07E-06	3.46E-06	4.26E-06	4.64E-06
Pu-241	4.48E-05	3.50E-02	92.3	3.35E-05	3.90E-05	5.05E-05	5.60E-05
Pu-242	2.46E-10	1.92E-07	5.07E-04	1.79E-10	2.11E-10	2.80E-10	3.13E-10
Am-241	2.78E-05	2.17E-02	57.3	2.00E-05	2.38E-05	3.18E-05	3.56E-05
Am-243	9.55E-10	7.48E-07	1.97E-03	7.10E-10	8.27E-10	1.09E-09	1.21E-09
Cm-242	7.01E-08	5.49E-05	0.145	3.27E-08	3.27E-08	7.47E-08	7.92E-08
Cm-243	6.49E-09	5.08E-06	1.34E-02	2.92E-09	2.92E-09	6.90E-09	7.30E-09
Cm-244	6.46E-08	5.06E-05	0.133	2.78E-08	2.78E-08	7.71E-08	8.50E-08
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	2.85E-04 (g/L)	—	0.587	2.05E-04	2.44E-04	3.25E-04	3.64E-04
U	4.49E-03	836	2.20E+03	4.29E-03	4.38E-03	4.61E-03	4.64E-03

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-102							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.66E+06 (kg)	(549 kgal)	---	---	---	---	---
Heat Load	2.09 (kW)	(7.13E+03 BTU/hr)	---	1.97	2.03	2.15	2.20
Bulk Density†	1.28 (g/cc)	---	---	1.26	1.27	1.29	1.30
Water wt%†	61.1	---	---	59.2	60.0	62.1	63.4
TOC wt% C (wet	0.409	---	---	0.271	0.338	0.479	0.547
Radiological Constituents	**CI/L**	**μCi/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	1.16E-04	9.07E-02	241	6.15E-05	6.15E-05	1.20E-04	1.24E-04
C-14	1.65E-05	1.29E-02	34.2	5.03E-06	5.03E-06	1.67E-05	1.69E-05
Ni-59	1.17E-06	9.12E-04	2.43	6.30E-07	6.30E-07	1.20E-06	1.22E-06
Ni-63	1.14E-04	8.89E-02	237	6.07E-05	6.07E-05	1.17E-04	1.19E-04
Co-60	1.81E-05	1.41E-02	37.6	5.01E-06	5.01E-06	1.84E-05	1.87E-05
Se-79	1.64E-06	1.28E-03	3.41	9.08E-07	9.08E-07	1.90E-06	2.16E-06
Sr-90	6.09E-02	47.5	1.27E+05	5.73E-02	5.91E-02	6.27E-02	6.45E-02
Y-90	6.09E-02	47.5	1.27E+05	3.57E-02	3.57E-02	6.28E-02	6.45E-02
Zr-93	8.04E-06	6.28E-03	16.7	4.39E-06	4.39E-06	9.36E-06	1.06E-05
Nb-93m	5.85E-06	4.56E-03	12.1	3.29E-06	3.29E-06	6.77E-06	7.66E-06
Tc-99	1.17E-04	9.16E-02	244	7.47E-05	9.55E-05	1.39E-04	1.61E-04
Ru-106	3.20E-09	2.49E-06	6.64E-03	1.50E-09	1.50E-09	3.57E-09	3.92E-09
Cd-113m	4.21E-05	3.28E-02	87.4	2.02E-05	2.02E-05	5.00E-05	5.76E-05
Sb-125	7.76E-05	6.05E-02	161	2.09E-05	2.09E-05	7.90E-05	8.04E-05
Sn-126	2.48E-06	1.93E-03	5.15	1.38E-06	1.38E-06	2.87E-06	3.25E-06
I-129	2.26E-07	1.77E-04	0.470	1.44E-07	1.84E-07	2.69E-07	3.10E-07
Cs-134	1.19E-06	9.32E-04	2.48	8.66E-07	9.79E-07	1.36E-06	1.53E-06
Cs-137	0.127	99.1	2.64E+05	0.115	0.121	0.133	0.139
Ba-137m	0.120	93.8	2.50E+05	9.16E-02	9.16E-02	0.126	0.131
Sm-151	5.77E-03	4.50	1.20E+04	3.21E-03	3.21E-03	6.70E-03	7.58E-03
Eu-152	1.90E-06	1.48E-03	3.95	9.95E-07	9.95E-07	2.02E-06	2.14E-06
Eu-154	2.94E-04	0.229	611	1.11E-04	1.11E-04	3.60E-04	3.86E-04
Eu-155	1.11E-04	8.70E-02	232	5.76E-05	5.76E-05	1.19E-04	1.26E-04
Ra-226	7.76E-11	6.06E-08	1.61E-04	5.50E-11	5.50E-11	8.58E-11	9.37E-11
Ra-228	6.28E-08	4.90E-05	0.131	2.61E-08	4.41E-08	8.46E-08	1.08E-07
Ac-227	4.74E-10	3.70E-07	9.85E-04	3.42E-10	3.42E-10	5.21E-10	5.67E-10
Pa-231	2.02E-09	1.58E-06	4.20E-03	1.29E-09	1.29E-09	2.29E-09	2.54E-09
Th-229	1.48E-09	1.15E-06	3.07E-03	6.69E-10	1.06E-09	1.95E-09	2.46E-09
Th-232	4.18E-09	3.26E-06	8.69E-03	2.15E-09	3.14E-09	5.22E-09	6.21E-09
U-232	3.27E-07	2.55E-04	0.680	1.80E-07	2.52E-07	4.14E-07	5.07E-07
U-233	1.25E-06	9.79E-04	2.61	6.91E-07	9.66E-07	1.59E-06	1.94E-06
U-234	3.89E-07	3.04E-04	0.809	3.74E-07	3.81E-07	3.98E-07	4.01E-07
U-235	1.58E-08	1.23E-05	3.29E-02	1.52E-08	1.55E-08	1.62E-08	1.63E-08
U-236	1.21E-08	9.45E-06	2.52E-02	1.17E-08	1.19E-08	1.23E-08	1.25E-08
U-238	4.45E-07	3.48E-04	0.925	4.30E-07	4.37E-07	4.54E-07	4.57E-07
Np-237	4.31E-07	3.37E-04	0.897	2.92E-07	3.60E-07	5.03E-07	5.73E-07
Pu-238	7.06E-07	5.51E-04	1.47	5.42E-07	6.23E-07	7.90E-07	8.70E-07
Pu-239	2.61E-05	2.03E-02	54.2	2.19E-05	2.39E-05	2.82E-05	3.02E-05
Pu-240	4.32E-06	3.37E-03	8.98	3.54E-06	3.93E-06	4.72E-06	5.10E-06
Pu-241	4.73E-05	3.69E-02	98.4	3.62E-05	4.16E-05	5.30E-05	5.85E-05
Pu-242	2.57E-10	2.01E-07	5.34E-04	1.91E-10	2.23E-10	2.91E-10	3.24E-10
Am-241	2.76E-05	2.16E-02	57.4	1.99E-05	2.37E-05	3.16E-05	3.54E-05
Am-243	9.49E-10	7.41E-07	1.97E-03	7.05E-10	8.22E-10	1.08E-09	1.20E-09
Cm-242	7.08E-08	5.52E-05	0.147	3.37E-08	3.37E-08	7.54E-08	7.98E-08
Cm-243	6.47E-09	5.05E-06	1.34E-02	2.92E-09	2.92E-09	6.88E-09	7.28E-09
Cm-244	6.42E-08	5.01E-05	0.133	2.76E-08	2.76E-08	7.65E-08	8.44E-08
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	3.40E-04 (g/L)	---	0.707	2.61E-04	3.00E-04	3.80E-04	4.19E-04
U	4.47E-03	830	2.21E+03	4.27E-03	4.37E-03	4.58E-03	4.61E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.

241-S-102

TANK 241-S-103 SUMMARY

TANK HISTORY	
Entered Service	4th qtr 1953
Removed from Service	-
Inactive	1980
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
11, 14, 16	4 in
8, 8	12 in

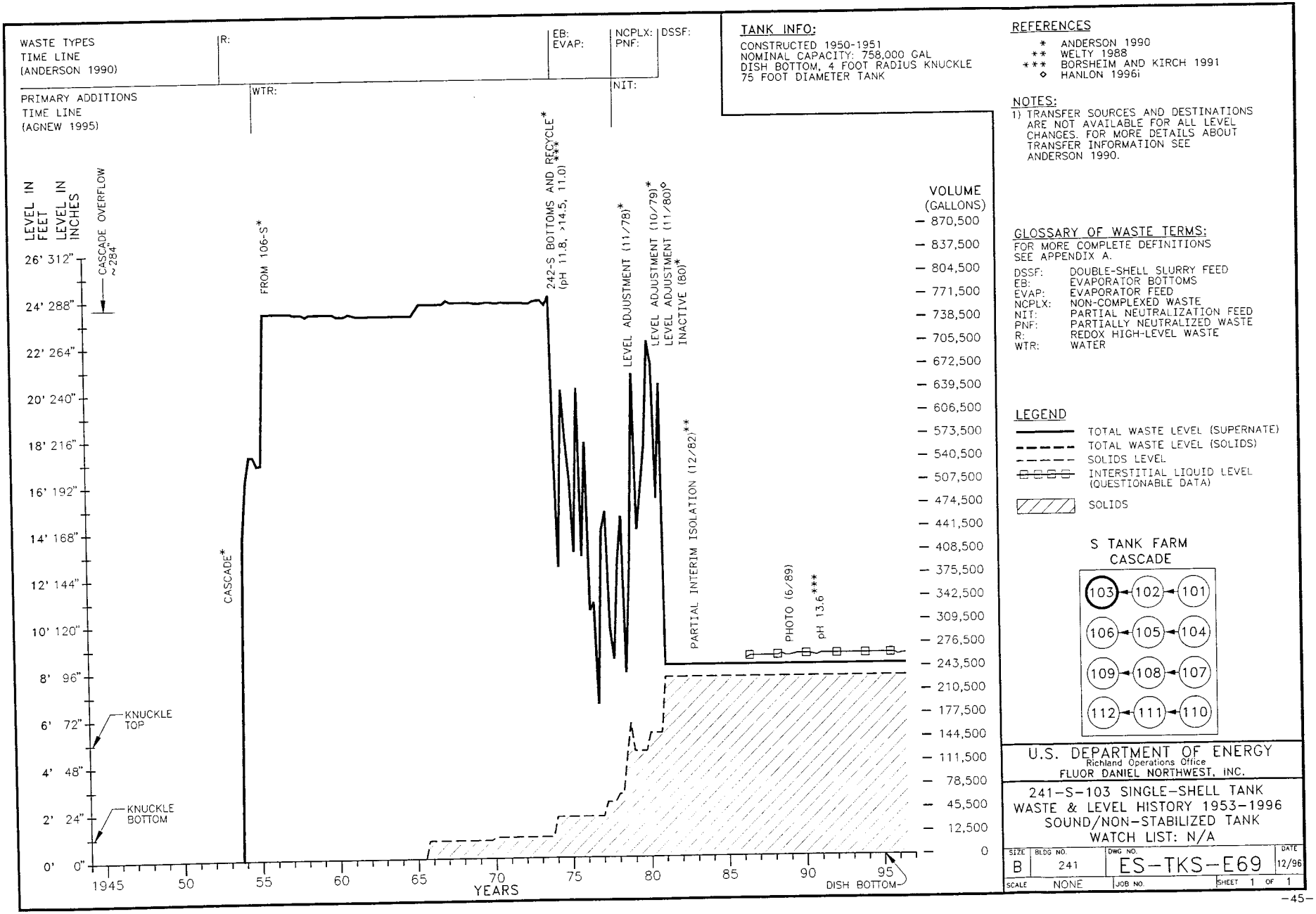
TANK TEMPERATURE	
Average Tank Temperature	82°F
Maximum Temperature	95°F
Date	Nov 7, 1988
Elevation from tank bottom	0.43 ft
Riser Number	4
Minimum Temperature	63.7°F
Date	July 2, 1994
Elevation from tank bottom	8.39 ft
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	none
Total Risers	12

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	248,000 gal
Waste Type	DSSF
Drainable Interstitial Liquids	85,000 gal
Pumpable Liquids	97,000 gal
Saltcake	221,000 gal
Sludge	10,000 gal
Supernatant	17,000 gal

INTERIOR PHOTOGRAPHS	
Date	June 1, 1989
Montage Number	94041033-26CN
Photo Set Number	89060148

WASTE SURFACE LEVEL	
Devices	Auto and Manual ENRAF
Max Level	106 in
Date	May 13, 1996
Min Level	102.5 in
Date	March 7 and 8, 1991



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

DSSF:	DOUBLE-SHELL SLURRY FEED
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
NCPLX:	NON-COMPLEXED WASTE
NIT:	PARTIAL NEUTRALIZATION FEED
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL (QUESTIONABLE DATA)
- SOLIDS

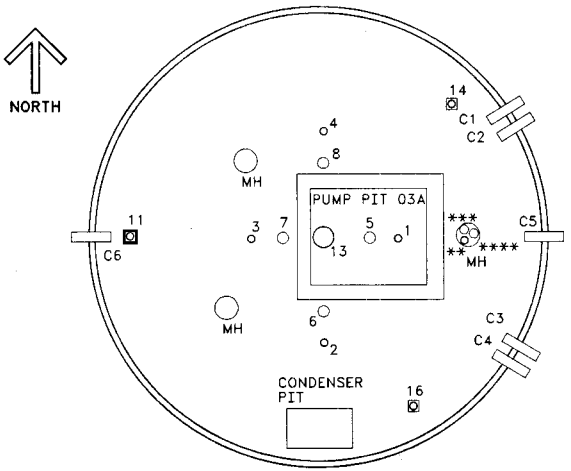
S TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-103 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1953-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: N/A

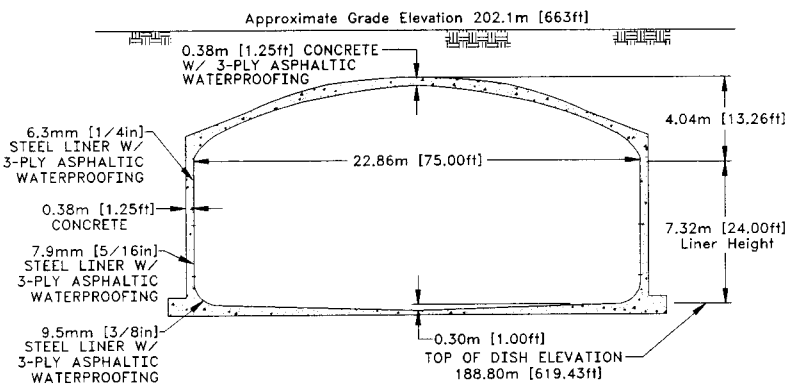
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E69	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-103



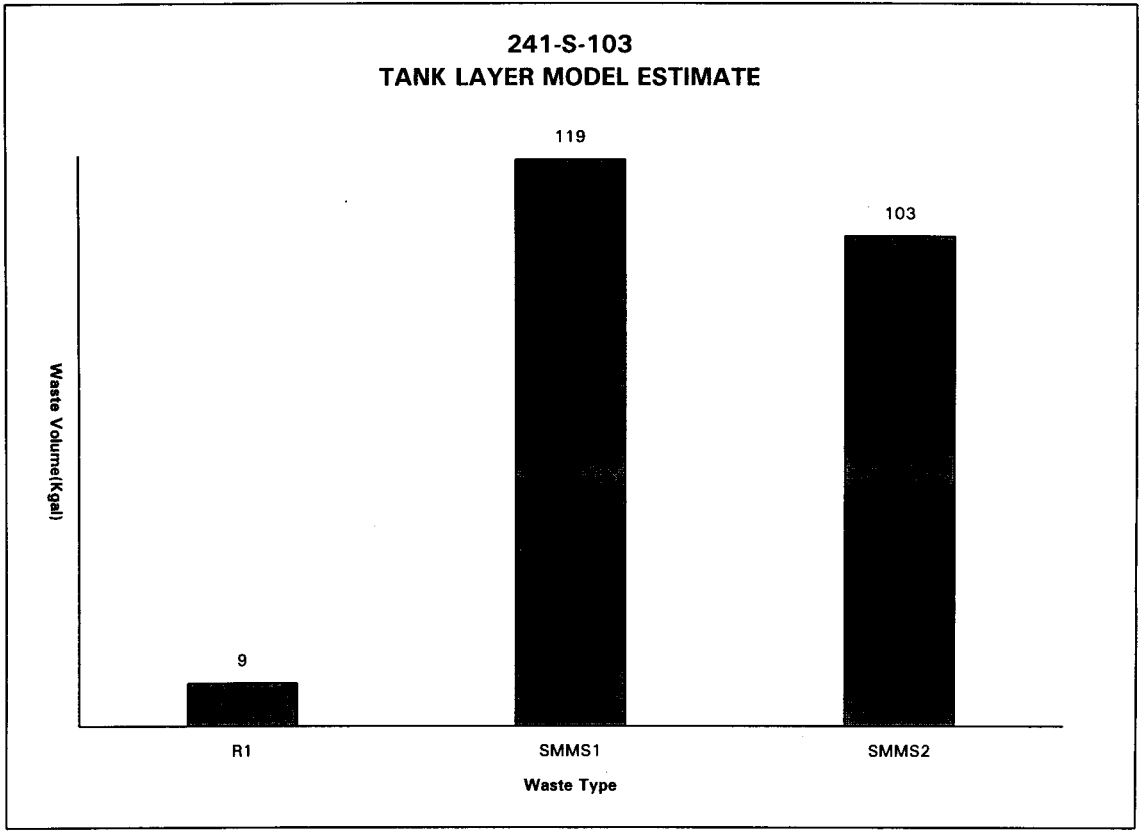
Ref: Alstad 1993
H-2-73183, Rev. 4
H-2-37526, Rev. 1

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-103							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Waste	5.98E+04 (kg)	(9.00 kgal)	—	---	---	---	---
Heat Load	*0.222 (kW)*	*(758 BTU/hr)*	---	*0.161*	*0.197*	*0.238*	*0.246*
Bulk Density	1.76 (g/cc)	—	—	1.51	1.53	2.11	2.24
Void Fraction	0.536	—	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	—	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	---	—	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	8.13	1.06E+05	6.36E+03	3.05	3.56	14.7	18.2
Al3+	6.99	1.07E+05	6.42E+03	6.58	6.74	7.15	7.15
Fe3+ (total Fe)	1.01	3.22E+04	1.93E+03	0.994	1.00	1.02	1.03
Cr3+	6.19E-02	1.83E+03	110	7.08E-03	3.39E-02	0.522	1.06
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	5.07E-02	1.69E+03	101	3.66E-02	4.45E-02	5.54E-02	5.45E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.220	5.02E+03	300	0.146	0.182	0.258	0.294
K+	1.12E-02	250	14.9	1.28E-03	5.25E-03	1.52E-02	1.52E-02
OH-	25.6	2.48E+05	1.48E+04	23.1	24.3	26.9	28.4
NO3-	5.29	1.87E+05	1.12E+04	*6.03E-02*	*6.03E-02*	*13.5*	*17.9*
NO2-	1.46	3.82E+04	2.28E+03	0.132	0.595	2.15	2.15
CO32-	0.220	7.51E+03	449	0.146	0.182	0.258	0.294
PO43-	0	0	0	0	0	0	0
SO42-	1.04E-02	569	34.0	1.19E-03	4.87E-03	1.41E-02	1.41E-02
Si (as SiO32-)	8.06E-03	129	7.71	9.21E-04	3.77E-03	1.09E-02	1.09E-02
F-	0	0	0	0	0	0	0
Cl-	5.16E-02	1.04E+03	62.3	5.91E-03	2.42E-02	7.00E-02	0.157
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.256	2.47E+03	148	6.55E-02	9.25E-02	0.270	0.284
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-103							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	1.52E+06 (kg)	(239 kgal)	—	—	—	—	—
Heat Load	2.12 (kW)	(7.25E+03 BTU/hr)	—	1.99	2.06	2.19	2.26
Bulk Density*	1.67 (g/cc)	----	—	1.62	1.65	1.70	1.72
Water wt%	28.3	----	—	25.7	26.8	29.8	31.7
TOC wt% C (wet	0.798	----	—	0.523	0.658	0.938	1.07
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.8	2.17E+05	3.28E+05	14.5	15.1	16.4	16.9
Al3+	1.86	2.99E+04	4.53E+04	1.72	1.79	1.93	1.99
Fe3+ (total Fe)	1.21E-02	403	611	9.90E-03	1.10E-02	1.32E-02	1.43E-02
Cr3+	0.165	5.12E+03	7.75E+03	0.137	0.152	0.170	0.174
Bi3+	1.52E-03	190	288	1.38E-03	1.45E-03	1.59E-03	1.66E-03
La3+	4.56E-05	3.78	5.72	3.30E-05	3.91E-05	5.20E-05	5.82E-05
Hg2+	1.03E-05	1.23	1.86	9.52E-06	9.94E-06	1.04E-05	1.05E-05
Zr (as ZrO(OH)2)	2.87E-04	15.6	23.7	2.61E-04	2.70E-04	2.97E-04	3.12E-04
Pb2+	1.12E-03	138	209	9.06E-04	1.01E-03	1.22E-03	1.33E-03
Ni2+	7.21E-03	253	383	6.89E-03	7.05E-03	7.29E-03	7.37E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	4.31E-03	141	214	3.26E-03	3.78E-03	4.85E-03	5.36E-03
Ca2+	3.78E-02	905	1.37E+03	3.47E-02	3.62E-02	3.94E-02	4.09E-02
K+	7.32E-02	1.71E+03	2.59E+03	6.68E-02	6.98E-02	7.67E-02	8.00E-02
OH-	11.1	1.13E+05	1.71E+05	10.2	10.6	11.6	11.8
NO3-	5.64	2.09E+05	3.16E+05	5.19	5.45	5.73	5.78
NO2-	2.72	7.47E+04	1.13E+05	2.27	2.48	2.95	3.17
CO32-	0.482	1.73E+04	2.62E+04	0.437	0.454	0.516	0.522
PO43-	0.101	5.74E+03	8.70E+03	8.67E-02	9.18E-02	0.104	0.106
SO42-	0.272	1.56E+04	2.36E+04	0.214	0.241	0.303	0.330
Si (as SiO32-)	8.66E-02	1.45E+03	2.20E+03	7.15E-02	7.89E-02	9.42E-02	0.102
F-	7.47E-02	847	1.28E+03	6.26E-02	6.77E-02	8.07E-02	8.54E-02
Cl-	0.273	5.77E+03	8.75E+03	0.247	0.257	0.285	0.295
C6H5O73-	3.07E-02	3.46E+03	5.24E+03	2.81E-02	2.94E-02	3.19E-02	3.32E-02
EDTA4-	1.64E-02	2.83E+03	4.28E+03	5.03E-03	1.06E-02	2.23E-02	2.80E-02
HEDTA3-	3.07E-02	5.03E+03	7.62E+03	7.92E-03	1.91E-02	4.25E-02	5.39E-02
glycolate-	9.70E-02	4.34E+03	6.58E+03	6.35E-02	7.99E-02	0.114	0.131
acetate-	6.90E-03	243	368	5.66E-03	6.27E-03	7.53E-03	8.14E-03
oxalate2-	5.97E-05	3.14	4.75	5.29E-05	5.62E-05	6.31E-05	6.65E-05
DBP	2.09E-02	2.62E+03	3.97E+03	1.72E-02	1.90E-02	2.27E-02	2.45E-02
butanol	2.09E-02	923	1.40E+03	1.72E-02	1.90E-02	2.27E-02	2.45E-02
NH3	9.63E-02	977	1.48E+03	7.94E-02	8.60E-02	0.109	0.125
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-103							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	1.58E+06 (kg)	(248 kgal)	----	----	----	----	----
Heat Load	2.35 (kW)	(8.01E+03 BTU/hr)	----	2.21	2.28	2.41	2.48
Bulk Density†	1.68 (g/cc)	----	----	1.63	1.65	1.70	1.72
Water wt%†	28.3	----	----	25.7	26.8	29.7	31.5
TOC wt% C (wet	0.768	----	----	0.503	0.633	0.903	1.03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.5	2.12E+05	3.35E+05	14.2	14.9	16.1	16.6
Al3+	2.04	3.29E+04	5.17E+04	1.91	1.98	2.11	2.17
Fe3+ (total Fe)	4.84E-02	1.61E+03	2.54E+03	4.63E-02	4.73E-02	4.95E-02	5.05E-02
Cr3+	0.161	4.99E+03	7.86E+03	0.143	0.152	0.172	0.171
Bi3+	1.47E-03	183	288	1.33E-03	1.40E-03	1.54E-03	1.60E-03
La3+	4.39E-05	3.63	5.72	3.18E-05	3.77E-05	5.01E-05	5.61E-05
Hg2+	9.88E-06	1.18	1.86	9.17E-06	9.57E-06	1.00E-05	1.02E-05
Zr (as ZrO(OH)2)	2.76E-04	15.0	23.7	2.52E-04	2.60E-04	2.86E-04	3.00E-04
Pb2+	1.08E-03	133	209	8.73E-04	9.73E-04	1.18E-03	1.28E-03
Ni2+	8.79E-03	307	484	8.28E-03	8.56E-03	8.96E-03	8.94E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	4.15E-03	136	214	3.14E-03	3.64E-03	4.67E-03	5.17E-03
Ca2+	4.44E-02	1.06E+03	1.67E+03	4.14E-02	4.29E-02	4.60E-02	4.74E-02
K+	7.09E-02	1.65E+03	2.60E+03	6.48E-02	6.77E-02	7.43E-02	7.75E-02
OH-	11.6	1.18E+05	1.85E+05	10.8	11.2	12.0	12.3
NO3-	5.62	2.08E+05	3.27E+05	5.19	5.40	5.88	5.87
NO2-	2.67	7.33E+04	1.15E+05	2.24	2.44	2.90	3.11
CO32-	0.472	1.69E+04	2.66E+04	0.429	0.446	0.506	0.511
PO43-	9.76E-02	5.53E+03	8.70E+03	8.36E-02	8.85E-02	0.100	0.103
SO42-	0.262	1.50E+04	2.36E+04	0.207	0.233	0.292	0.319
Si (as SiO32-)	8.37E-02	1.40E+03	2.21E+03	6.92E-02	7.63E-02	9.11E-02	9.82E-02
F-	7.20E-02	815	1.28E+03	6.03E-02	6.52E-02	7.77E-02	8.23E-02
Cl-	0.265	5.59E+03	8.81E+03	0.240	0.249	0.276	0.286
C6H5O73-	2.95E-02	3.33E+03	5.24E+03	2.71E-02	2.83E-02	3.08E-02	3.20E-02
EDTA4-	1.58E-02	2.72E+03	4.28E+03	4.85E-03	1.02E-02	2.15E-02	2.70E-02
HEDTA3-	2.96E-02	4.84E+03	7.62E+03	7.63E-03	1.84E-02	4.09E-02	5.20E-02
glycolate-	9.35E-02	4.18E+03	6.58E+03	6.12E-02	7.70E-02	0.110	0.126
acetate-	6.65E-03	234	368	5.46E-03	6.04E-03	7.26E-03	7.85E-03
oxalate2-	5.75E-05	3.02	4.75	5.09E-05	5.42E-05	6.09E-05	6.41E-05
DBP	2.01E-02	2.52E+03	3.97E+03	1.65E-02	1.83E-02	2.19E-02	2.36E-02
butanol	2.01E-02	888	1.40E+03	1.65E-02	1.83E-02	2.19E-02	2.36E-02
NH3	0.102	1.03E+03	1.63E+03	8.58E-02	9.22E-02	0.115	0.129
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-103							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	5.98E+04 (kg)	(9.00 kgal)	---	---	---	---	---
Heat Load	0.222 (kW)	(758 BTU/hr)	---	0.161	0.197	0.238	0.246
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	---	---	0	0	0	0
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.92E-05	1.67E-02	0.996	3.05E-06	1.47E-05	4.10E-05	4.10E-05
C-14	2.26E-06	1.29E-03	7.71E-02	2.59E-07	1.06E-06	3.07E-06	3.07E-06
Ni-59	1.49E-05	8.46E-03	0.506	1.07E-05	1.31E-05	1.62E-05	1.60E-05
Ni-63	1.39E-03	0.790	47.2	1.00E-03	1.22E-03	1.52E-03	1.49E-03
Co-60	8.94E-07	5.09E-04	3.04E-02	1.02E-07	4.18E-07	1.21E-06	1.21E-06
Se-79	4.81E-07	2.74E-04	1.64E-02	5.50E-08	2.25E-07	6.51E-07	7.15E-06
Sr-90	0.928	529	3.16E+04	0.662	0.812	1.02	1.03
Y-90	0.929	529	3.16E+04	0.662	0.812	1.02	1.03
Zr-93	2.27E-06	1.29E-03	7.73E-02	2.59E-07	1.06E-06	3.08E-06	3.03E-05
Nb-93m	1.85E-06	1.06E-03	6.32E-02	2.12E-07	8.68E-07	2.51E-06	3.21E-05
Tc-99	1.58E-05	9.02E-03	0.540	1.81E-06	7.42E-06	2.15E-05	2.15E-05
Ru-106	2.50E-12	1.42E-09	8.50E-08	2.86E-13	1.17E-12	3.38E-12	3.38E-12
Cd-113m	6.99E-06	3.98E-03	0.238	8.00E-07	3.27E-06	9.48E-06	9.48E-06
Sb-125	1.31E-06	7.47E-04	4.47E-02	1.50E-07	6.14E-07	1.78E-06	1.78E-06
Sn-126	7.39E-07	4.21E-04	2.52E-02	8.45E-08	3.46E-07	1.00E-06	1.14E-05
I-129	3.04E-08	1.73E-05	1.04E-03	3.48E-09	1.42E-08	4.13E-08	4.13E-08
Cs-134	2.72E-08	1.55E-05	9.26E-04	7.19E-09	1.52E-08	3.52E-08	3.52E-08
Cs-137	5.60E-02	31.9	1.91E+03	1.48E-02	3.13E-02	7.26E-02	7.26E-02
Ba-137m	5.30E-02	30.2	1.80E+03	1.40E-02	2.96E-02	6.87E-02	6.87E-02
Sm-151	1.71E-03	0.976	58.4	1.96E-04	8.03E-04	2.33E-03	2.64E-02
Eu-152	7.00E-06	3.98E-03	0.238	6.85E-06	6.91E-06	7.06E-06	7.06E-06
Eu-154	2.16E-05	1.23E-02	0.735	2.47E-06	1.01E-05	2.93E-05	2.93E-05
Eu-155	3.30E-04	0.188	11.3	3.23E-04	3.26E-04	3.33E-04	3.33E-04
Ra-226	1.08E-09	6.15E-07	3.68E-05	1.48E-10	6.04E-10	1.56E-09	2.01E-09
Ra-228	9.26E-15	5.28E-12	3.16E-10	9.07E-15	9.15E-15	9.34E-15	9.34E-15
Ac-227	4.76E-09	2.71E-06	1.62E-04	3.06E-10	2.00E-09	7.52E-09	1.02E-08
Pa-231	7.18E-10	4.09E-07	2.44E-05	8.21E-11	3.36E-10	2.04E-09	1.68E-08
Th-229	1.77E-12	1.01E-09	6.02E-08	1.73E-12	1.75E-12	1.78E-12	1.78E-12
Th-232	5.91E-16	3.36E-13	2.01E-11	6.76E-17	2.77E-16	8.01E-16	8.01E-16
U-232	5.24E-12	2.98E-09	1.78E-07	5.99E-13	2.45E-12	7.10E-12	7.10E-12
U-233	2.00E-13	1.14E-10	6.80E-09	2.28E-14	9.34E-14	2.71E-13	2.71E-13
U-234	1.19E-07	6.78E-05	4.06E-03	1.36E-08	5.58E-08	1.62E-07	1.62E-07
U-235	5.13E-09	2.92E-06	1.75E-04	5.86E-10	2.40E-09	6.95E-09	6.95E-09
U-236	1.88E-09	1.07E-06	6.42E-05	2.16E-10	8.82E-10	2.56E-09	2.56E-09
U-238	1.22E-07	6.92E-05	4.14E-03	1.39E-08	5.69E-08	1.65E-07	1.65E-07
Np-237	1.03E-07	5.86E-05	3.50E-03	1.18E-08	4.81E-08	1.39E-07	1.39E-07
Pu-238	6.61E-06	3.77E-03	0.225	4.75E-06	5.66E-06	7.57E-06	8.48E-06
Pu-239	4.72E-04	0.269	16.1	3.39E-04	4.04E-04	5.40E-04	6.05E-04
Pu-240	6.76E-05	3.85E-02	2.30	4.85E-05	5.78E-05	7.73E-05	8.66E-05
Pu-241	3.97E-04	0.226	13.5	2.85E-04	3.40E-04	4.55E-04	5.09E-04
Pu-242	1.82E-09	1.04E-06	6.21E-05	1.31E-09	1.56E-09	2.08E-09	2.34E-09
Am-241	8.09E-06	4.61E-03	0.276	9.26E-07	3.79E-06	1.10E-05	1.43E-04
Am-243	7.57E-11	4.31E-08	2.58E-06	8.66E-12	3.54E-11	1.03E-10	1.34E-09
Cm-242	1.61E-07	9.16E-05	5.48E-03	1.58E-07	1.59E-07	1.62E-07	1.62E-07
Cm-243	3.69E-09	2.10E-06	1.26E-04	3.61E-09	3.64E-09	3.72E-09	3.72E-09
Cm-244	2.70E-09	1.54E-06	9.21E-05	3.09E-10	1.27E-09	3.67E-09	3.67E-09
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.89E-03 (g/L)	---	0.269	5.67E-03	6.76E-03	9.03E-03	1.01E-02
U	1.53E-03	207	12.4	1.75E-04	7.16E-04	2.07E-03	2.07E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-103

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	1.52E+06 (kg)	(239 kgal)	---	---	---	---	---
Heat Load	2.12 (kW)	(7.25E+03 BTU/hr)	---	1.99	2.06	2.19	2.26
Bulk Density*	1.67 (g/cc)	---	---	1.62	1.65	1.70	1.72
Water wt%†	28.3	---	---	25.7	26.8	29.8	31.7
TOC wt% C (wet	0.798	---	---	0.523	0.658	0.938	1.07

Radiological Constituents	Ci/L	µCi/g	CI	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.80E-04	0.167	253	1.46E-04	1.46E-04	2.89E-04	3.00E-04
C-14	4.03E-05	2.41E-02	36.4	1.23E-05	1.23E-05	4.09E-05	4.15E-05
Ni-59	2.61E-06	1.56E-03	2.36	1.29E-06	1.29E-06	2.67E-06	2.74E-06
Ni-63	2.55E-04	0.153	231	1.25E-04	1.25E-04	2.62E-04	2.68E-04
Co-60	4.46E-05	2.66E-02	40.3	1.26E-05	1.26E-05	4.54E-05	4.62E-05
Se-79	4.00E-06	2.39E-03	3.62	2.21E-06	2.21E-06	4.65E-06	5.27E-06
Sr-90	0.133	79.6	1.21E+05	0.124	0.129	0.138	0.142
Y-90	0.133	79.6	1.21E+05	7.16E-02	7.16E-02	0.138	0.142
Zr-93	1.96E-05	1.17E-02	17.8	1.07E-05	1.07E-05	2.29E-05	2.60E-05
Nb-93m	1.43E-05	8.51E-03	12.9	8.01E-06	8.01E-06	1.65E-05	1.87E-05
Tc-99	2.87E-04	0.171	260	1.83E-04	2.34E-04	3.41E-04	3.92E-04
Ru-106	7.93E-09	4.73E-06	7.17E-03	3.79E-09	3.79E-09	8.85E-09	9.69E-09
Cd-113m	1.03E-04	6.15E-02	93.2	4.94E-05	4.94E-05	1.22E-04	1.41E-04
Sb-125	1.92E-04	0.114	173	5.30E-05	5.30E-05	1.95E-04	1.99E-04
Sn-126	6.05E-06	3.61E-03	5.47	3.37E-06	3.37E-06	7.02E-06	7.94E-06
I-129	5.53E-07	3.30E-04	0.500	3.51E-07	4.50E-07	6.57E-07	7.57E-07
Cs-134	3.03E-06	1.81E-03	2.74	2.16E-06	2.55E-06	3.47E-06	3.90E-06
Cs-137	0.310	185	2.80E+05	0.279	0.294	0.325	0.341
Ba-137m	0.293	175	2.65E+05	0.230	0.230	0.308	0.322
Sm-151	1.41E-02	8.41	1.27E+04	7.84E-03	7.84E-03	1.63E-02	1.85E-02
Eu-152	4.61E-06	2.75E-03	4.17	2.40E-06	2.40E-06	4.93E-06	5.24E-06
Eu-154	7.23E-04	0.432	654	2.77E-04	2.77E-04	8.85E-04	9.49E-04
Eu-155	2.73E-04	0.163	247	1.41E-04	1.41E-04	2.92E-04	3.11E-04
Ra-226	1.71E-10	1.02E-07	1.55E-04	1.16E-10	1.16E-10	1.91E-10	2.10E-10
Ra-228	1.67E-07	9.95E-05	0.151	6.98E-08	1.17E-07	2.24E-07	2.85E-07
Ac-227	1.08E-09	6.46E-07	9.79E-04	7.61E-10	7.61E-10	1.20E-09	1.31E-09
Pa-231	4.96E-09	2.96E-06	4.49E-03	3.18E-09	3.18E-09	5.61E-09	6.23E-09
Th-229	3.91E-09	2.33E-06	3.54E-03	1.78E-09	2.82E-09	5.17E-09	6.52E-09
Th-232	1.11E-08	6.63E-06	1.00E-02	5.74E-09	8.37E-09	1.38E-08	1.65E-08
U-232	8.58E-07	5.12E-04	0.776	4.69E-07	6.59E-07	1.09E-06	1.33E-06
U-233	3.29E-06	1.96E-03	2.97	1.80E-06	2.53E-06	4.17E-06	5.11E-06
U-234	9.64E-07	5.76E-04	0.872	9.28E-07	9.46E-07	9.84E-07	9.94E-07
U-235	3.91E-08	2.34E-05	3.54E-02	3.76E-08	3.83E-08	4.00E-08	4.04E-08
U-236	3.02E-08	1.80E-05	2.73E-02	2.91E-08	2.97E-08	3.06E-08	3.11E-08
U-238	1.12E-06	6.67E-04	1.01	1.08E-06	1.10E-06	1.14E-06	1.15E-06
Np-237	1.05E-06	6.26E-04	0.948	7.07E-07	8.74E-07	1.22E-06	1.39E-06
Pu-238	1.63E-06	9.75E-04	1.48	1.23E-06	1.43E-06	1.84E-06	2.03E-06
Pu-239	5.61E-05	3.35E-02	50.8	4.58E-05	5.09E-05	6.13E-05	6.63E-05
Pu-240	9.51E-06	5.68E-03	8.60	7.60E-06	8.54E-06	1.05E-05	1.14E-05
Pu-241	1.10E-04	6.59E-02	99.8	8.31E-05	9.64E-05	1.24E-04	1.38E-04
Pu-242	6.06E-10	3.62E-07	5.48E-04	4.43E-10	5.23E-10	6.89E-10	7.69E-10
Am-241	6.81E-05	4.06E-02	61.6	4.91E-05	5.84E-05	7.78E-05	8.71E-05
Am-243	2.36E-09	1.41E-06	2.13E-03	1.76E-09	2.05E-09	2.68E-09	2.98E-09
Cm-242	1.75E-07	1.04E-04	0.158	8.40E-08	8.40E-08	1.87E-07	1.99E-07
Cm-243	1.62E-08	9.66E-06	1.46E-02	7.52E-09	7.52E-09	1.73E-08	1.83E-08
Cm-244	1.60E-07	9.55E-05	0.145	7.07E-08	7.07E-08	1.90E-07	2.10E-07

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	7.03E-04 (g/L)	---	0.636	5.09E-04	6.04E-04	8.02E-04	8.96E-04
U	1.10E-02	1.57E+03	2.38E+03	1.06E-02	1.08E-02	1.13E-02	1.14E-02

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

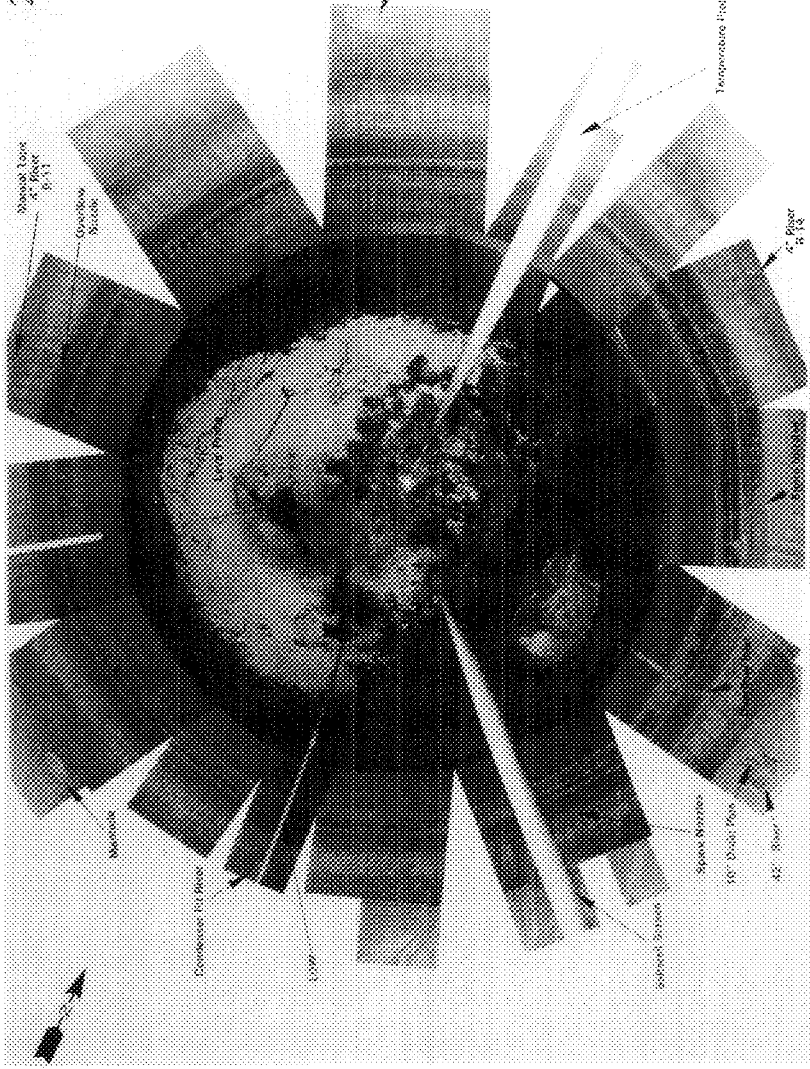
HDW Model Rev. 4

Single-Shell Tank 241-S-103							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	1.58E+06 (kg)	(248 kgal)	---	---	---	---	---
Heat Load	2.35 (kW)	(8.01E+03 BTU/hr)	---	2.21	2.28	2.41	2.48
Bulk Density†	1.68 (g/cc)	---	---	1.63	1.65	1.70	1.72
Water wt%†	28.3	---	---	25.7	26.8	29.7	31.5
TOC wt% C (wet	0.768	---	---	0.503	0.633	0.903	1.03
Radiological Constituents	**CI/L**	**µCI/g**	**Ci**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.71E-04	0.161	254	1.42E-04	1.42E-04	2.79E-04	2.90E-04
C-14	3.89E-05	2.32E-02	36.5	1.19E-05	1.19E-05	3.95E-05	4.01E-05
Ni-59	3.05E-06	1.82E-03	2.86	1.78E-06	1.78E-06	3.12E-06	3.18E-06
Ni-63	2.97E-04	0.177	278	1.71E-04	1.71E-04	3.03E-04	3.09E-04
Co-60	4.30E-05	2.56E-02	40.4	1.21E-05	1.21E-05	4.38E-05	4.46E-05
Se-79	3.87E-06	2.31E-03	3.64	2.15E-06	2.15E-06	4.50E-06	5.09E-06
Sr-90	0.162	96.6	1.52E+05	0.152	0.158	0.166	0.171
Y-90	0.162	96.6	1.52E+05	0.103	0.103	0.166	0.171
Zr-93	1.90E-05	1.13E-02	17.8	1.04E-05	1.04E-05	2.21E-05	2.51E-05
Nb-93m	1.38E-05	8.23E-03	13.0	7.78E-06	7.78E-06	1.60E-05	1.81E-05
Tc-99	2.77E-04	0.165	260	1.77E-04	2.26E-04	3.29E-04	3.79E-04
Ru-106	7.64E-09	4.55E-06	7.17E-03	3.65E-09	3.65E-09	8.53E-09	9.34E-09
Cd-113m	9.95E-05	5.93E-02	93.4	4.79E-05	4.79E-05	1.18E-04	1.36E-04
Sb-125	1.85E-04	0.110	173	5.11E-05	5.11E-05	1.88E-04	1.92E-04
Sn-126	5.85E-06	3.49E-03	5.49	3.27E-06	3.27E-06	6.79E-06	7.68E-06
I-129	5.34E-07	3.18E-04	0.501	3.40E-07	4.35E-07	6.34E-07	7.31E-07
Cs-134	2.92E-06	1.74E-03	2.74	2.09E-06	2.46E-06	3.35E-06	3.76E-06
Cs-137	0.300	179	2.82E+05	0.271	0.285	0.316	0.331
Ba-137m	0.284	169	2.67E+05	0.223	0.223	0.299	0.313
Sm-151	1.36E-02	8.13	1.28E+04	7.61E-03	7.61E-03	1.58E-02	1.79E-02
Eu-152	4.70E-06	2.80E-03	4.41	2.57E-06	2.57E-06	5.00E-06	5.30E-06
Eu-154	6.98E-04	0.416	655	2.68E-04	2.68E-04	8.53E-04	9.16E-04
Eu-155	2.75E-04	0.164	258	1.48E-04	1.48E-04	2.93E-04	3.12E-04
Ra-226	2.04E-10	1.22E-07	1.92E-04	1.51E-10	1.51E-10	2.23E-10	2.42E-10
Ra-228	1.61E-07	9.58E-05	0.151	6.72E-08	1.13E-07	2.16E-07	2.75E-07
Ac-227	1.22E-09	7.25E-07	1.14E-03	9.06E-10	9.06E-10	1.33E-09	1.44E-09
Pa-231	4.81E-09	2.87E-06	4.52E-03	3.09E-09	3.09E-09	5.43E-09	6.03E-09
Th-229	3.77E-09	2.25E-06	3.54E-03	1.72E-09	2.72E-09	4.98E-09	6.28E-09
Th-232	1.07E-08	6.38E-06	1.00E-02	5.53E-09	8.07E-09	1.33E-08	1.59E-08
U-232	8.27E-07	4.93E-04	0.776	4.52E-07	6.35E-07	1.05E-06	1.29E-06
U-233	3.17E-06	1.89E-03	2.97	1.74E-06	2.44E-06	4.02E-06	4.92E-06
U-234	9.34E-07	5.56E-04	0.876	8.99E-07	9.16E-07	9.51E-07	9.62E-07
U-235	3.79E-08	2.26E-05	3.56E-02	3.64E-08	3.71E-08	3.86E-08	3.91E-08
U-236	2.91E-08	1.74E-05	2.74E-02	2.81E-08	2.87E-08	2.96E-08	3.00E-08
U-238	1.08E-06	6.44E-04	1.01	1.05E-06	1.06E-06	1.10E-06	1.11E-06
Np-237	1.01E-06	6.04E-04	0.952	6.86E-07	8.46E-07	1.18E-06	1.35E-06
Pu-238	1.81E-06	1.08E-03	1.70	1.43E-06	1.62E-06	2.01E-06	2.20E-06
Pu-239	7.12E-05	4.24E-02	66.8	6.13E-05	6.62E-05	7.62E-05	8.10E-05
Pu-240	1.16E-05	6.92E-03	10.9	9.78E-06	1.07E-05	1.26E-05	1.35E-05
Pu-241	1.21E-04	7.20E-02	113	9.45E-05	1.07E-04	1.34E-04	1.47E-04
Pu-242	6.50E-10	3.88E-07	6.10E-04	4.93E-10	5.70E-10	7.30E-10	8.08E-10
Am-241	6.59E-05	3.93E-02	61.8	4.76E-05	5.66E-05	7.52E-05	8.42E-05
Am-243	2.28E-09	1.36E-06	2.14E-03	1.70E-09	1.98E-09	2.58E-09	2.88E-09
Cm-242	1.74E-07	1.04E-04	0.164	8.68E-08	8.68E-08	1.86E-07	1.97E-07
Cm-243	1.57E-08	9.37E-06	1.48E-02	7.38E-09	7.38E-09	1.68E-08	1.78E-08
Cm-244	1.54E-07	9.20E-05	0.145	6.83E-08	6.83E-08	1.83E-07	2.02E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	9.64E-04 (g/L)	---	0.905	7.77E-04	8.69E-04	1.06E-03	1.15E-03
U	1.07E-02	1.52E+03	2.39E+03	1.03E-02	1.05E-02	1.09E-02	1.10E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.

241-S-103

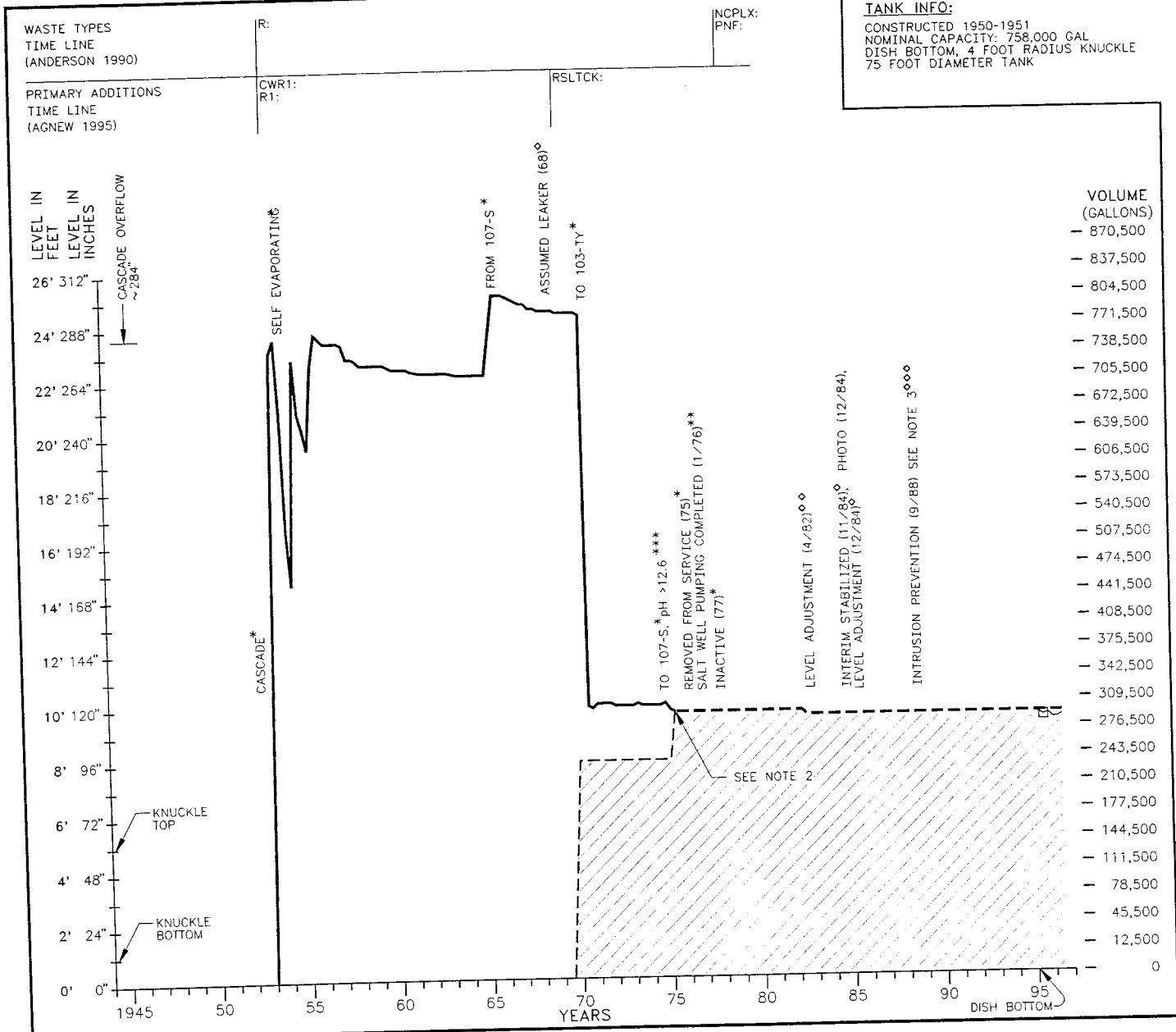


TANK 241-S-104 SUMMARY

TANK HISTORY	
Entered Service	1st qtr 1953
Removed from Service	1975
Inactive	1977
Watch Lists	none
Integrity	Assumed Leaker
Assumed Leaker	Dec 1968
Interim Stabilization (IS)	Dec 1984
Partial Interim Isolation (PI)	-
Intrusion Prevention (IP)	Sept 1988
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
1, 3	4 in
7, 8	12 in
TANK TEMPERATURE	
Average Tank Temperature	98°F
Maximum Temperature	114°F
Date	Jan 4, 1995
Elevation from tank bottom	unknown
Riser Number	4
Minimum Temperature	83.1°F
Date	July 2, 1993
Elevation from tank bottom	unknown
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-105
Total Risers	9
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	294,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	28,000 gal
Pumpable Liquids	23,000 gal
Saltcake	0 gal
Sludge	293,000 gal
Supernatant	1,000 gal
INTERIOR PHOTOGRAPHS	
Date	Dec 12, 1984
Montage Number	94041033-25CN
Photo Set Number	8408365
WASTE SURFACE LEVEL	
Devices	Manual Tape
Max Level	114 in
Date	Jan 3, 1991 - Feb 11, 1991*
Min Level	111.25 in
Date	April 3, 1995 - Jan 2, 1996*

• Numerous dates in this time span.



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i
◇◇ McCANN 1982b
◇◇◇ THURMAN 1988j

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.
3) IN JUNE 1993, INTERIM ISOLATION WAS REPLACED BY INTRUSION PREVENTION.

GLOSSARY OF WASTE TERMS:

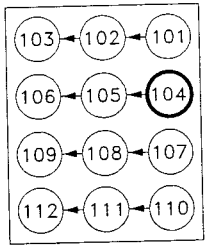
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

CWR1:	COATING (CLADDING) WASTE 1952-60
NCPLX:	NON-COMPLEXED WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R1:	REDOX WASTE 1952-57
R:	REDOX HIGH-LEVEL WASTE
RSLTCK:	SALTCAKE

LEGEND

TOTAL WASTE LEVEL (SUPERNATE)
TOTAL WASTE LEVEL (SOLIDS)
SOLIDS LEVEL
INTERSTITIAL LIQUID LEVEL
SOLIDS

S TANK FARM CASCADE

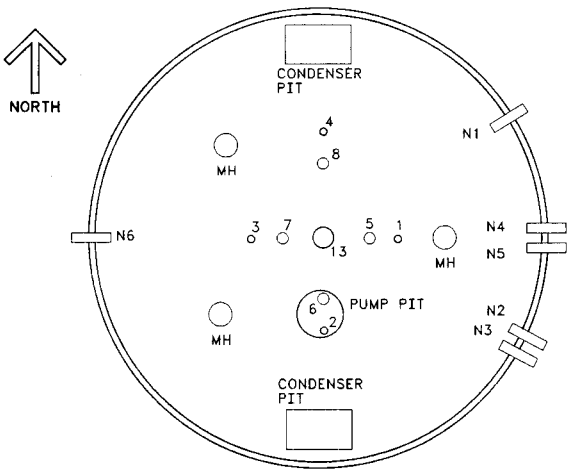


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-104 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1953-1996
ASSUMED LEAKER/STABILIZED TANK
WATCH LIST: N/A

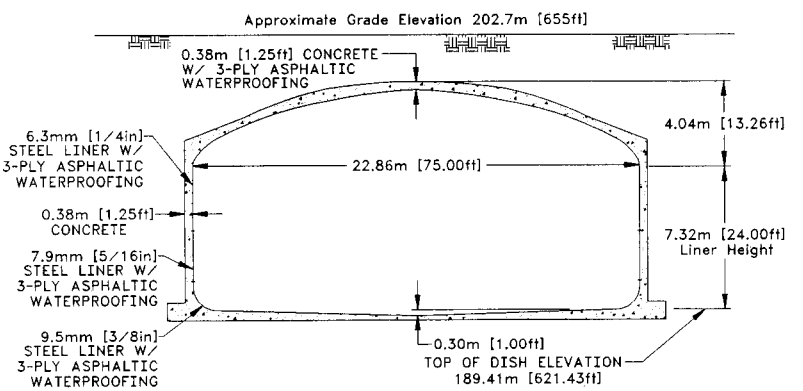
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E70	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-104



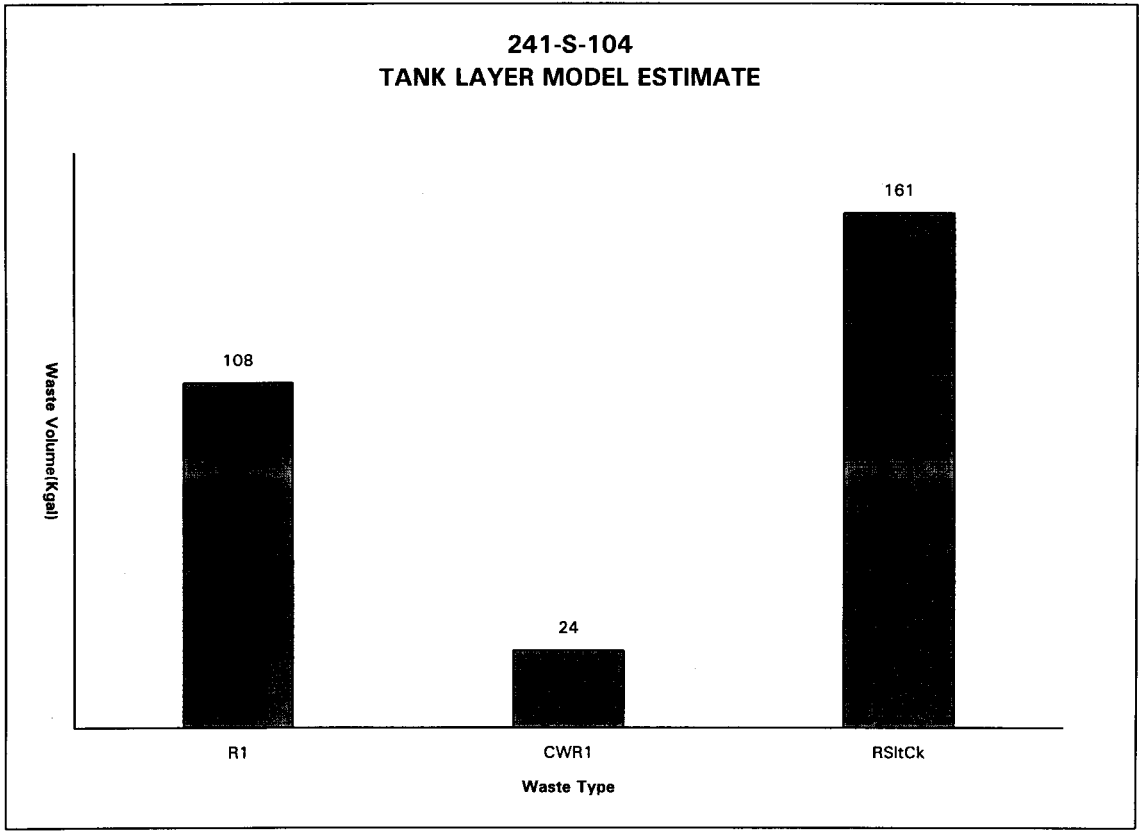
Ref: Alstad 1993
H-2-73180, Rev. 4
H-2-37527, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-104							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	1.92E+06 (kg)	(293 kgal)	---	---	---	---	---
Heat Load	4.67 (kW)	(1.59E+04 BTU/hr)	---	3.94	4.37	4.87	4.96
Bulk Density	1.73 (g/cc)	---	---	1.58	1.65	1.86	1.91
Void Fraction	0.682	---	---	0.507	0.565	0.756	0.788
Water wt%	31.0	---	---	20.1	23.6	36.5	42.0
TOC wt% C (wet	2.85E-03	---	---	2.58E-03	2.65E-03	3.06E-03	3.33E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	11.0	1.46E+05	2.81E+05	8.34	9.35	13.5	14.7
Al3+	5.36	8.34E+04	1.60E+05	4.28	4.60	6.18	7.01
Fe3+ (total Fe)	0.397	1.28E+04	2.46E+04	0.390	0.393	0.400	0.404
Cr3+	0.475	1.42E+04	2.74E+04	0.287	0.376	0.644	0.842
Bi3+	3.78E-06	0.455	0.875	3.19E-06	3.48E-06	4.16E-06	4.57E-06
La3+	9.30E-12	7.45E-07	1.43E-06	8.15E-12	8.80E-12	1.03E-11	1.13E-11
Hg2+	3.35E-04	38.7	74.5	3.30E-04	3.33E-04	3.36E-04	3.37E-04
Zr (as ZrO(OH)2)	3.77E-07	1.98E-02	3.81E-02	3.46E-07	3.61E-07	3.95E-07	4.26E-07
Pb2+	9.73E-03	1.16E+03	2.24E+03	8.95E-03	9.38E-03	1.01E-02	1.04E-02
Ni2+	2.71E-02	917	1.76E+03	2.19E-02	2.48E-02	2.88E-02	2.85E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.75E-05	0.871	1.67	1.96E-05	2.35E-05	3.15E-05	3.55E-05
Ca2+	0.133	3.08E+03	5.92E+03	0.106	0.119	0.147	0.161
K+	2.18E-02	493	947	1.82E-02	1.96E-02	2.34E-02	2.51E-02
OH-	23.1	2.27E+05	4.36E+05	18.2	19.8	26.7	30.2
NO3-	4.88	1.75E+05	3.36E+05	2.96	2.96	7.89	9.53
NO2-	1.64	4.36E+04	8.39E+04	1.15	1.33	1.90	1.90
CO32-	0.136	4.70E+03	9.04E+03	0.108	0.122	0.150	0.163
PO43-	2.44E-04	13.4	25.7	2.27E-04	2.37E-04	2.54E-04	2.77E-04
SO42-	2.67E-02	1.48E+03	2.85E+03	2.33E-02	2.47E-02	2.87E-02	3.08E-02
Si (as SiO32-)	7.61E-02	1.23E+03	2.37E+03	4.98E-02	6.61E-02	8.60E-02	9.57E-02
F-	1.95E-04	2.13	4.10	1.66E-04	1.83E-04	2.14E-04	2.31E-04
Cl-	9.29E-02	1.90E+03	3.65E+03	5.90E-02	7.56E-02	0.100	0.132
C6H5O73-	2.01E-04	21.9	42.2	1.95E-04	1.98E-04	2.10E-04	2.28E-04
EDTA4-	7.84E-06	1.30	2.50	5.51E-06	6.78E-06	9.23E-06	1.06E-05
HEDTA3-	6.51E-06	1.03	1.98	2.09E-06	4.47E-06	8.69E-06	1.08E-05
glycolate-	2.84E-04	12.3	23.6	1.54E-04	2.25E-04	3.53E-04	4.19E-04
acetate-	2.95E-05	1.00	1.93	2.85E-05	2.90E-05	3.13E-05	3.35E-05
oxalate2-	1.22E-11	6.19E-07	1.19E-06	1.08E-11	1.15E-11	1.34E-11	1.47E-11
DBP	1.78E-04	21.6	41.6	1.67E-04	1.74E-04	1.93E-04	2.08E-04
butanol	1.78E-04	7.63	14.7	1.67E-04	1.74E-04	1.93E-04	2.08E-04
NH3	0.114	1.12E+03	2.15E+03	4.40E-02	5.39E-02	0.119	0.125
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-104							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM Wast	4.89E+03 (kg)	(1.01 kgal)	—	—	—	—	—
Heat Load	*4.58E-03 (kW)*	*(15.6 BTU/hr)*	—	*3.75E-03*	*4.15E-03*	*5.01E-03*	*5.45E-03*
Bulk Density*	1.28 (g/cc)	—	—	1.24	1.26	1.29	1.30
Water wt%	63.4	—	—	61.0	62.1	64.9	67.2
TOC wt% C (wet	5.57E-03	—	—	4.15E-03	4.83E-03	6.27E-03	6.92E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	6.39	1.15E+05	561	5.36	5.92	6.79	7.14
Al3+	0.994	2.10E+04	102	0.915	0.957	1.03	1.07
Fe3+ (total Fe)	1.24E-03	54.3	0.265	6.87E-04	9.59E-04	1.53E-03	1.80E-03
Cr3+	7.46E-02	3.03E+03	14.8	4.25E-02	5.82E-02	9.09E-02	0.107
Bi3+	5.44E-06	0.889	4.34E-03	4.59E-06	5.01E-06	5.87E-06	6.28E-06
La3+	1.34E-11	1.46E-06	7.11E-09	9.43E-12	1.14E-11	1.54E-11	1.72E-11
Hg2+	8.54E-07	0.134	6.55E-04	7.70E-07	8.12E-07	8.97E-07	9.38E-07
Zr (as ZrO(OH)2)	5.43E-07	3.87E-02	1.89E-04	4.29E-07	4.74E-07	5.90E-07	6.50E-07
Pb2+	1.35E-04	21.9	0.107	7.39E-05	1.04E-04	1.67E-04	1.97E-04
Ni2+	1.12E-03	51.4	0.251	1.01E-03	1.06E-03	1.18E-03	1.23E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.96E-05	1.70	8.31E-03	2.88E-05	3.41E-05	4.51E-05	5.03E-05
Ca2+	5.59E-03	175	0.856	3.41E-03	4.48E-03	6.71E-03	7.78E-03
K+	2.53E-02	775	3.78	1.92E-02	2.21E-02	2.86E-02	3.19E-02
OH-	6.20	8.24E+04	402	5.42	5.96	6.44	6.69
NO3-	1.74	8.44E+04	412	*1.41*	*1.57*	*1.91*	2.07
NO2-	1.48	5.33E+04	260	1.03	1.26	1.63	1.73
CO32-	9.52E-03	447	2.18	7.33E-03	8.40E-03	1.06E-02	1.17E-02
PO43-	3.52E-04	26.1	0.128	2.73E-04	3.20E-04	3.75E-04	3.92E-04
SO42-	3.20E-02	2.40E+03	11.7	2.43E-02	2.80E-02	3.61E-02	4.01E-02
Si (as SiO32-)	2.11E-02	464	2.27	1.07E-02	1.58E-02	2.65E-02	3.16E-02
F-	2.81E-04	4.17	2.04E-02	2.01E-04	2.37E-04	3.20E-04	3.52E-04
Cl-	0.106	2.93E+03	14.3	5.68E-02	8.07E-02	0.116	0.116
C6H5O73-	2.90E-04	42.9	0.209	2.45E-04	2.67E-04	3.11E-04	3.30E-04
EDTA4-	1.13E-05	2.54	1.24E-02	6.38E-06	8.76E-06	1.38E-05	1.62E-05
HEDTA3-	9.38E-06	2.01	9.82E-03	2.42E-06	5.77E-06	1.30E-05	1.65E-05
glycolate-	4.09E-04	24.0	0.117	1.78E-04	2.90E-04	5.27E-04	6.40E-04
acetate-	4.25E-05	1.96	9.57E-03	3.35E-05	3.79E-05	4.68E-05	5.09E-05
oxalate2-	1.76E-11	1.21E-06	5.90E-09	1.55E-11	1.65E-11	1.86E-11	1.96E-11
DBP	2.57E-04	42.3	0.206	1.93E-04	2.24E-04	2.88E-04	3.18E-04
butanol	2.57E-04	14.9	7.28E-02	1.93E-04	2.24E-04	2.88E-04	3.18E-04
NH3	2.85E-02	379	1.85	1.77E-02	2.28E-02	3.37E-02	3.84E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-104							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	1.93E+06 (kg)	(294 kgal)	---	---	---	---	---
Heat Load	4.67 (kW)	(1.60E+04 BTU/hr)	---	3.94	4.37	4.87	4.96
Bulk Density†	1.73 (g/cc)	---	---	1.58	1.65	1.86	1.91
Water wt%†	31.1	---	---	20.2	23.7	36.6	42.1
TOC wt% C (wet	2.86E-03	---	---	2.59E-03	2.66E-03	3.07E-03	3.33E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	11.0	1.46E+05	2.82E+05	8.33	9.34	13.4	14.7
Al3+	5.34	8.32E+04	1.60E+05	4.27	4.59	6.16	6.99
Fe3+ (total Fe)	0.395	1.27E+04	2.46E+04	0.388	0.392	0.399	0.402
Cr3+	0.473	1.42E+04	2.74E+04	0.286	0.375	0.642	0.840
Bi3+	3.78E-06	0.456	0.879	3.19E-06	3.48E-06	4.16E-06	4.58E-06
La3+	9.31E-12	7.47E-07	1.44E-06	8.16E-12	8.81E-12	1.03E-11	1.13E-11
Hg2+	3.34E-04	38.6	74.5	3.29E-04	3.32E-04	3.35E-04	3.36E-04
Zr (as ZrO(OH)2)	3.77E-07	1.99E-02	3.83E-02	3.47E-07	3.62E-07	3.96E-07	4.27E-07
Pb2+	9.70E-03	1.16E+03	2.24E+03	8.92E-03	9.35E-03	1.00E-02	1.04E-02
Ni2+	2.70E-02	914	1.76E+03	2.18E-02	2.47E-02	2.87E-02	2.84E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.75E-05	0.873	1.68	1.97E-05	2.35E-05	3.16E-05	3.56E-05
Ca2+	0.133	3.07E+03	5.92E+03	0.105	0.119	0.147	0.160
K+	2.19E-02	494	951	1.82E-02	1.97E-02	2.34E-02	2.52E-02
OH-	23.1	2.26E+05	4.36E+05	18.1	19.7	26.6	30.1
NO3-	4.87	1.74E+05	3.36E+05	2.95	2.95	7.87	9.50
NO2-	1.64	4.36E+04	8.41E+04	1.16	1.33	1.90	1.90
CO32-	0.135	4.69E+03	9.04E+03	0.108	0.121	0.149	0.163
PO43-	2.45E-04	13.4	25.9	2.27E-04	2.37E-04	2.55E-04	2.77E-04
SO42-	2.68E-02	1.48E+03	2.86E+03	2.34E-02	2.47E-02	2.87E-02	3.08E-02
Si (as SiO32-)	7.59E-02	1.23E+03	2.37E+03	4.97E-02	6.59E-02	8.58E-02	9.54E-02
F-	1.95E-04	2.14	4.12	1.66E-04	1.84E-04	2.14E-04	2.31E-04
Cl-	9.30E-02	1.90E+03	3.67E+03	5.90E-02	7.56E-02	0.100	0.132
C6H5O73-	2.02E-04	22.0	42.4	1.95E-04	1.98E-04	2.10E-04	2.29E-04
EDTA4-	7.85E-06	1.31	2.52	5.52E-06	6.79E-06	9.24E-06	1.06E-05
HEDTA3-	6.52E-06	1.03	1.99	2.09E-06	4.48E-06	8.70E-06	1.08E-05
glycolate-	2.84E-04	12.3	23.7	1.54E-04	2.25E-04	3.54E-04	4.20E-04
acetate-	2.95E-05	1.01	1.94	2.86E-05	2.90E-05	3.14E-05	3.35E-05
oxalate2-	1.22E-11	6.20E-07	1.19E-06	1.08E-11	1.15E-11	1.34E-11	1.47E-11
DBP	1.79E-04	21.7	41.8	1.67E-04	1.74E-04	1.93E-04	2.09E-04
butanol	1.79E-04	7.65	14.7	1.67E-04	1.74E-04	1.93E-04	2.09E-04
NH3	0.114	1.12E+03	2.15E+03	4.39E-02	5.38E-02	0.119	0.124
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-104							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	1.92E+06 (kg)	(293 kgal)	—	—	—	—	—
Heat Load	4.67 (kW)	(1.59E+04 BTU/hr)	—	3.94	4.37	4.87	4.96
Bulk Density	1.73 (g/cc)	—	—	1.58	1.65	1.86	1.91
Void Fraction	0.682	—	—	0.507	0.565	0.756	0.788
Water wt%	31.0	—	—	20.1	23.6	36.5	42.0
TOC wt% C (wet	2.85E-03	—	—	2.58E-03	2.65E-03	3.06E-03	3.33E-03
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	1.33E-04	7.69E-02	148	1.09E-05	1.09E-05	1.39E-04	1.51E-04
C-14	7.13E-06	4.11E-03	7.90	8.43E-07	8.43E-07	7.42E-06	7.96E-06
Ni-59	9.22E-06	5.32E-03	10.2	5.48E-06	5.48E-06	9.73E-06	9.64E-06
Ni-63	8.75E-04	0.505	971	5.12E-04	5.12E-04	9.23E-04	9.14E-04
Co-60	5.99E-06	3.46E-03	6.64	3.33E-07	3.33E-07	6.23E-06	6.75E-06
Se-79	4.00E-06	2.31E-03	4.43	1.79E-07	1.79E-07	4.06E-06	6.46E-06
Sr-90	0.487	281	5.40E+05	0.389	0.444	0.520	0.525
Y-90	0.487	281	5.40E+05	0.342	0.342	0.520	0.525
Zr-93	1.89E-05	1.09E-02	21.0	8.45E-07	8.45E-07	1.92E-05	2.93E-05
Nb-93m	1.54E-05	8.86E-03	17.0	6.91E-07	6.91E-07	1.56E-05	2.65E-05
Tc-99	5.48E-05	3.16E-02	60.7	4.96E-05	5.16E-05	5.84E-05	6.26E-05
Ru-106	1.31E-09	7.55E-07	1.45E-03	9.43E-13	9.43E-13	1.37E-09	1.49E-09
Cd-113m	2.81E-05	1.62E-02	31.1	2.61E-06	2.61E-06	5.91E-05	5.72E-05
Sb-125	2.07E-05	1.19E-02	23.0	4.90E-07	4.90E-07	2.16E-05	2.34E-05
Sn-126	6.14E-06	3.54E-03	6.80	2.75E-07	2.75E-07	6.23E-06	1.01E-05
I-129	1.04E-07	6.00E-05	0.115	9.41E-08	9.81E-08	1.11E-07	1.19E-07
Cs-134	1.27E-06	7.35E-04	1.41	1.02E-08	1.02E-08	1.32E-06	1.42E-06
Cs-137	0.199	115	2.20E+05	0.184	0.190	0.212	0.226
Ba-137m	0.188	108	2.09E+05	1.97E-02	1.97E-02	0.194	0.208
Sm-151	1.43E-02	8.22	1.58E+04	6.39E-04	6.39E-04	1.45E-02	2.33E-02
Eu-152	7.47E-06	4.31E-03	8.28	2.59E-06	2.59E-06	7.50E-06	7.56E-06
Eu-154	1.43E-04	8.27E-02	159	8.05E-06	8.05E-06	1.49E-04	1.86E-04
Eu-155	3.70E-04	0.213	410	1.22E-04	1.22E-04	3.71E-04	3.74E-04
Ra-226	6.56E-10	3.79E-07	7.28E-04	3.13E-10	3.98E-10	8.32E-10	1.00E-09
Ra-228	8.66E-09	4.99E-06	9.60E-03	3.44E-15	3.44E-15	8.74E-09	8.84E-09
Ac-227	3.27E-09	1.88E-06	3.62E-03	1.62E-09	1.76E-09	4.28E-09	5.26E-09
Pa-231	5.95E-09	3.43E-06	6.60E-03	2.67E-10	2.67E-10	6.44E-09	1.19E-08
Th-229	2.08E-10	1.20E-07	2.31E-04	6.55E-13	6.55E-13	2.10E-10	2.12E-10
Th-232	1.16E-10	6.69E-08	1.29E-04	2.21E-16	2.21E-16	1.46E-10	1.76E-10
U-232	3.87E-08	2.23E-05	4.29E-02	1.37E-08	2.53E-08	5.52E-08	7.34E-08
U-233	1.48E-07	8.54E-05	0.164	5.23E-08	9.66E-08	2.11E-07	2.81E-07
U-234	1.96E-06	1.13E-03	2.17	1.56E-06	1.75E-06	2.17E-06	2.39E-06
U-235	8.16E-08	4.71E-05	9.05E-02	6.57E-08	7.34E-08	9.05E-08	9.94E-08
U-236	5.63E-08	3.25E-05	6.25E-02	4.06E-08	4.84E-08	6.46E-08	7.28E-08
U-238	1.84E-06	1.06E-03	2.04	1.49E-06	1.66E-06	2.03E-06	2.23E-06
Np-237	2.51E-07	1.45E-04	0.279	2.18E-07	2.31E-07	2.69E-07	2.89E-07
Pu-238	5.79E-06	3.34E-03	6.42	4.88E-06	5.32E-06	6.25E-06	6.70E-06
Pu-239	3.48E-04	0.200	385	2.98E-04	3.23E-04	3.73E-04	3.97E-04
Pu-240	5.04E-05	2.91E-02	55.9	4.34E-05	4.68E-05	5.40E-05	5.74E-05
Pu-241	3.26E-04	0.188	362	2.80E-04	3.03E-04	3.50E-04	3.73E-04
Pu-242	1.51E-09	8.69E-07	1.67E-03	1.26E-09	1.38E-09	1.63E-09	1.75E-09
Am-241	6.71E-05	3.87E-02	74.5	3.94E-05	5.85E-05	7.65E-05	1.17E-04
Am-243	2.07E-09	1.20E-06	2.30E-03	9.69E-10	1.80E-09	2.28E-09	2.54E-09
Cm-242	6.05E-08	3.49E-05	6.71E-02	5.92E-08	5.96E-08	6.10E-08	6.10E-08
Cm-243	1.38E-09	7.99E-07	1.54E-03	1.36E-09	1.37E-09	1.40E-09	1.40E-09
Cm-244	1.11E-09	6.41E-07	1.23E-03	2.29E-10	5.81E-10	1.47E-09	1.47E-09
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.81E-03 (g/L)	—	6.44	4.99E-03	5.39E-03	6.23E-03	6.63E-03
U	2.30E-02	3.16E+03	6.07E+03	1.87E-02	2.08E-02	2.54E-02	2.78E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-104

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	4.89E+03 (kg)	(1.01 kgal)	---	---	---	---	---
Heat Load	4.58E-03 (kW)	(15.6 BTU/hr)	---	3.75E-03	4.15E-03	5.01E-03	5.45E-03
Bulk Density*	1.28 (g/cc)	---	---	1.24	1.26	1.29	1.30
Water wt%†	63.4	---	---	61.0	62.1	64.9	67.2
TOC wt% C (wet	5.57E-03	---	---	4.15E-03	4.83E-03	6.27E-03	6.92E-03

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	1.76E-04	0.138	0.674	9.18E-10	9.18E-10	1.77E-04	1.77E-04
C-14	9.06E-06	7.08E-03	3.46E-02	7.13E-11	7.13E-11	9.14E-06	9.22E-06
Ni-59	5.05E-07	3.95E-04	1.93E-03	9.02E-12	9.02E-12	5.32E-07	5.58E-07
Ni-63	4.90E-05	3.83E-02	0.187	8.43E-10	8.43E-10	5.17E-05	5.42E-05
Co-60	8.15E-06	6.37E-03	3.11E-02	2.84E-11	2.84E-11	8.22E-06	8.29E-06
Se-79	1.24E-06	9.72E-04	4.75E-03	1.51E-11	1.51E-11	1.69E-06	2.09E-06
Sr-90	2.11E-02	16.5	80.7	1.81E-02	1.96E-02	2.27E-02	2.42E-02
Y-90	2.11E-02	16.5	80.7	5.85E-07	5.85E-07	2.27E-02	2.42E-02
Zr-93	6.22E-06	4.86E-03	2.37E-02	7.15E-11	7.15E-11	8.46E-06	9.97E-06
Nb-93m	4.35E-06	3.40E-03	1.66E-02	5.84E-11	5.84E-11	5.92E-06	7.43E-06
Tc-99	7.04E-05	5.50E-02	0.269	5.49E-05	6.24E-05	7.84E-05	8.65E-05
Ru-106	1.88E-09	1.47E-06	7.19E-06	1.78E-16	1.78E-16	1.90E-09	1.92E-09
Cd-113m	3.67E-05	2.87E-02	0.140	2.21E-10	2.21E-10	3.70E-05	3.73E-05
Sb-125	2.91E-05	2.28E-02	0.111	4.27E-11	4.27E-11	2.93E-05	2.96E-05
Sn-126	1.86E-06	1.46E-03	7.12E-03	2.33E-11	2.33E-11	2.54E-06	3.06E-06
I-129	1.34E-07	1.04E-04	5.10E-04	1.04E-07	1.18E-07	1.49E-07	1.64E-07
Cs-134	1.60E-06	1.25E-03	6.12E-03	7.87E-13	7.87E-13	1.62E-06	1.63E-06
Cs-137	0.226	176	862	0.179	0.201	0.250	0.274
Ba-137m	0.213	167	815	1.39E-06	1.39E-06	0.215	0.217
Sm-151	4.35E-03	3.40	16.6	5.41E-08	5.41E-08	5.92E-03	7.38E-03
Eu-152	7.06E-07	5.52E-04	2.70E-03	5.34E-12	5.34E-12	7.12E-07	7.19E-07
Eu-154	1.95E-04	0.152	0.744	6.85E-10	6.85E-10	1.96E-04	1.98E-04
Eu-155	3.50E-05	2.80E-02	0.137	2.53E-10	2.53E-10	3.61E-05	3.65E-05
Ra-226	3.85E-11	3.01E-08	1.47E-07	1.05E-15	1.05E-15	5.25E-11	6.58E-11
Ra-228	1.25E-09	9.80E-07	4.79E-06	7.12E-21	7.12E-21	1.27E-09	1.28E-09
Ac-227	2.24E-10	1.75E-07	8.55E-07	6.10E-15	6.10E-15	3.05E-10	3.82E-10
Pa-231	1.24E-09	9.72E-07	4.75E-06	2.26E-14	2.26E-14	1.69E-09	2.12E-09
Th-229	3.01E-11	2.35E-08	1.15E-07	1.34E-18	1.34E-18	3.04E-11	3.06E-11
Th-232	1.67E-10	1.31E-07	6.38E-07	1.89E-20	1.89E-20	2.09E-10	2.49E-10
U-232	1.27E-08	9.94E-06	4.85E-05	1.04E-08	1.17E-08	1.37E-08	1.47E-08
U-233	4.86E-08	3.80E-05	1.86E-04	3.97E-08	4.49E-08	5.25E-08	5.61E-08
U-234	2.30E-07	1.80E-04	8.77E-04	2.07E-07	2.18E-07	2.41E-07	2.52E-07
U-235	9.28E-09	7.25E-06	3.54E-05	8.35E-09	8.80E-09	9.74E-09	1.02E-08
U-236	9.51E-09	7.44E-06	3.63E-05	8.54E-09	9.01E-09	1.00E-08	1.05E-08
U-238	2.01E-07	1.57E-04	7.69E-04	1.81E-07	1.91E-07	2.11E-07	2.21E-07
Np-237	3.07E-07	2.40E-04	1.17E-03	2.36E-07	2.70E-07	3.45E-07	3.82E-07
Pu-238	1.71E-07	1.34E-04	6.53E-04	5.09E-08	1.10E-07	2.32E-07	2.91E-07
Pu-239	5.52E-06	4.32E-03	2.11E-02	1.66E-06	3.55E-06	7.50E-06	9.39E-06
Pu-240	9.16E-07	7.16E-04	3.50E-03	2.74E-07	5.89E-07	1.24E-06	1.56E-06
Pu-241	8.77E-06	6.86E-03	3.35E-02	2.63E-06	5.64E-06	1.19E-05	1.49E-05
Pu-242	4.65E-11	3.64E-08	1.78E-07	1.39E-11	2.99E-11	6.32E-11	7.91E-11
Am-241	1.86E-05	1.46E-02	7.12E-02	5.42E-06	1.19E-05	2.54E-05	3.19E-05
Am-243	5.95E-10	4.65E-07	2.27E-06	1.40E-10	3.33E-10	8.72E-10	1.15E-09
Cm-242	1.26E-10	9.86E-08	4.81E-07	1.22E-13	1.22E-13	1.28E-10	1.29E-10
Cm-243	2.58E-12	2.01E-09	9.84E-09	2.80E-15	2.80E-15	2.61E-12	2.63E-12
Cm-244	1.50E-10	1.17E-07	5.73E-07	8.52E-14	8.52E-14	1.52E-10	1.53E-10

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	9.20E-05 (g/L)	---	3.51E-04	2.68E-05	5.87E-05	1.25E-04	1.57E-04
U	2.49E-03	463	2.26	2.24E-03	2.36E-03	2.61E-03	2.73E-03

*Density is calculated based on Na, OH-, and AlO2-.

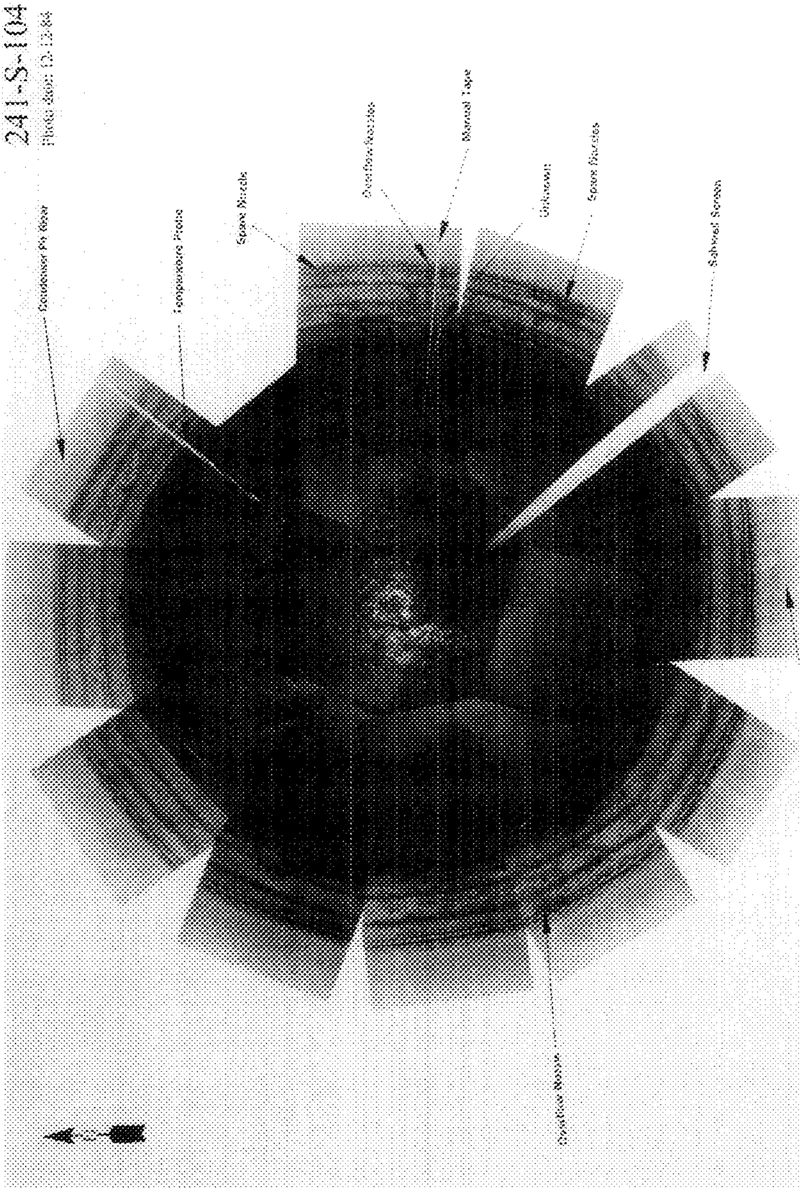
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-104							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	1.93E+06 (kg)	(294 kgal)	---	---	---	---	---
Heat Load	4.67 (kW)	(1.60E+04 BTU/hr)	---	3.94	4.37	4.87	4.96
Bulk Density†	1.73 (g/cc)	---	---	1.58	1.65	1.86	1.91
Water wt%†	31.1	---	---	20.2	23.7	36.6	42.1
TOC wt% C (wet	2.86E-03	---	---	2.59E-03	2.66E-03	3.07E-03	3.33E-03
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	1.33E-04	7.71E-02	149	1.08E-05	1.08E-05	1.40E-04	1.51E-04
C-14	7.13E-06	4.12E-03	7.94	8.40E-07	8.40E-07	7.43E-06	7.96E-06
Ni-59	9.19E-06	5.31E-03	10.2	5.46E-06	5.46E-06	9.70E-06	9.61E-06
Ni-63	8.72E-04	0.504	971	5.10E-04	5.10E-04	9.20E-04	9.11E-04
Co-60	6.00E-06	3.46E-03	6.67	3.32E-07	3.32E-07	6.24E-06	6.75E-06
Se-79	3.99E-06	2.30E-03	4.44	1.78E-07	1.78E-07	4.05E-06	6.44E-06
Sr-90	0.485	280	5.40E+05	0.387	0.443	0.518	0.523
Y-90	0.485	280	5.40E+05	0.341	0.341	0.518	0.524
Zr-93	1.89E-05	1.09E-02	21.0	8.43E-07	8.43E-07	1.92E-05	2.92E-05
Nb-93m	1.53E-05	8.85E-03	17.0	6.89E-07	6.89E-07	1.56E-05	2.64E-05
Tc-99	5.48E-05	3.16E-02	61.0	4.97E-05	5.17E-05	5.85E-05	6.27E-05
Ru-106	1.31E-09	7.57E-07	1.46E-03	9.39E-13	9.39E-13	1.37E-09	1.49E-09
Cd-113m	2.81E-05	1.62E-02	31.3	2.60E-06	2.60E-06	5.90E-05	5.70E-05
Sb-125	2.07E-05	1.20E-02	23.1	4.88E-07	4.88E-07	2.16E-05	2.34E-05
Sn-126	6.12E-06	3.53E-03	6.81	2.74E-07	2.74E-07	6.22E-06	1.01E-05
I-129	1.04E-07	6.01E-05	0.116	9.42E-08	9.82E-08	1.11E-07	1.19E-07
Cs-134	1.28E-06	7.36E-04	1.42	1.01E-08	1.01E-08	1.32E-06	1.43E-06
Cs-137	0.199	115	2.21E+05	0.184	0.190	0.212	0.227
Ba-137m	0.188	109	2.09E+05	1.96E-02	1.96E-02	0.194	0.208
Sm-151	1.42E-02	8.21	1.58E+04	6.37E-04	6.37E-04	1.44E-02	2.33E-02
Eu-152	7.45E-06	4.30E-03	8.29	2.58E-06	2.58E-06	7.48E-06	7.54E-06
Eu-154	1.43E-04	8.28E-02	160	8.02E-06	8.02E-06	1.49E-04	1.86E-04
Eu-155	3.69E-04	0.213	410	1.22E-04	1.22E-04	3.70E-04	3.73E-04
Ra-226	6.54E-10	3.78E-07	7.28E-04	3.12E-10	3.97E-10	8.29E-10	9.97E-10
Ra-228	8.63E-09	4.98E-06	9.60E-03	3.43E-15	3.43E-15	8.71E-09	8.81E-09
Ac-227	3.26E-09	1.88E-06	3.62E-03	1.62E-09	1.75E-09	4.27E-09	5.25E-09
Pa-231	5.93E-09	3.43E-06	6.60E-03	2.66E-10	2.66E-10	6.42E-09	1.18E-08
Th-229	2.08E-10	1.20E-07	2.31E-04	6.53E-13	6.53E-13	2.09E-10	2.12E-10
Th-232	1.16E-10	6.71E-08	1.29E-04	2.20E-16	2.20E-16	1.46E-10	1.76E-10
U-232	3.86E-08	2.23E-05	4.30E-02	1.37E-08	2.52E-08	5.50E-08	7.32E-08
U-233	1.48E-07	8.53E-05	0.164	5.23E-08	9.64E-08	2.10E-07	2.80E-07
U-234	1.95E-06	1.13E-03	2.17	1.56E-06	1.75E-06	2.17E-06	2.39E-06
U-235	8.14E-08	4.70E-05	9.06E-02	6.55E-08	7.32E-08	9.02E-08	9.91E-08
U-236	5.62E-08	3.24E-05	6.25E-02	4.05E-08	4.83E-08	6.44E-08	7.26E-08
U-238	1.83E-06	1.06E-03	2.04	1.49E-06	1.65E-06	2.03E-06	2.22E-06
Np-237	2.52E-07	1.45E-04	0.280	2.18E-07	2.32E-07	2.69E-07	2.89E-07
Pu-238	5.77E-06	3.33E-03	6.42	4.86E-06	5.31E-06	6.23E-06	6.68E-06
Pu-239	3.46E-04	0.200	385	2.97E-04	3.21E-04	3.71E-04	3.95E-04
Pu-240	5.02E-05	2.90E-02	55.9	4.32E-05	4.67E-05	5.38E-05	5.73E-05
Pu-241	3.25E-04	0.188	362	2.79E-04	3.02E-04	3.49E-04	3.72E-04
Pu-242	1.50E-09	8.67E-07	1.67E-03	1.25E-09	1.38E-09	1.63E-09	1.75E-09
Am-241	6.70E-05	3.87E-02	74.5	3.93E-05	5.83E-05	7.63E-05	1.17E-04
Am-243	2.07E-09	1.20E-06	2.30E-03	9.67E-10	1.79E-09	2.28E-09	2.53E-09
Cm-242	6.03E-08	3.48E-05	6.71E-02	5.90E-08	5.94E-08	6.08E-08	6.08E-08
Cm-243	1.36E-09	7.97E-07	1.54E-03	1.35E-09	1.36E-09	1.39E-09	1.39E-09
Cm-244	1.11E-09	6.40E-07	1.23E-03	2.28E-10	5.80E-10	1.46E-09	1.46E-09
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.79E-03 (g/L)	---	6.44	4.97E-03	5.37E-03	6.21E-03	6.61E-03
U	2.29E-02	3.15E+03	6.07E+03	1.86E-02	2.07E-02	2.53E-02	2.78E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-S-104
Temperature Probe
Spare Nozzle
Overflow Nozzles
Manual Tape
Unknown
Spare Nozzles

TANK 241-S-105 SUMMARY

TANK HISTORY	
Entered Service	2nd qtr 1953
Removed from Service	1975
Inactive	1978
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	Sept 1988
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	Sept 1990
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
2, 11, 16	4 in
6, 8	12 in
TANK TEMPERATURE	
Average Tank Temperature	73°F
Maximum Temperature	82.58°F
Date	Jan 30, 1996
Elevation from tank bottom	0.56 ft
Riser Number	4
Minimum Temperature	58.64°F
Date	May 20 - 22, 1996
Elevation from tank bottom	10.56 ft
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-106
Total Risers	12
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	456,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	35,000 gal
Pumpable Liquids	13,000 gal
Saltcake	454,000 gal
Sludge	2,000 gal
Supernatant	0 gal
INTERIOR PHOTOGRAPHS	
Date	April 12, 1989
Montage Number	94041033-22CN
Photo Set Number	89041307
WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	158 in
Date	April 11, 1995
Min Level	155.1 in
Date	July 8 and 29, 1991

WASTE TYPES
TIME LINE
(ANDERSON 1990)

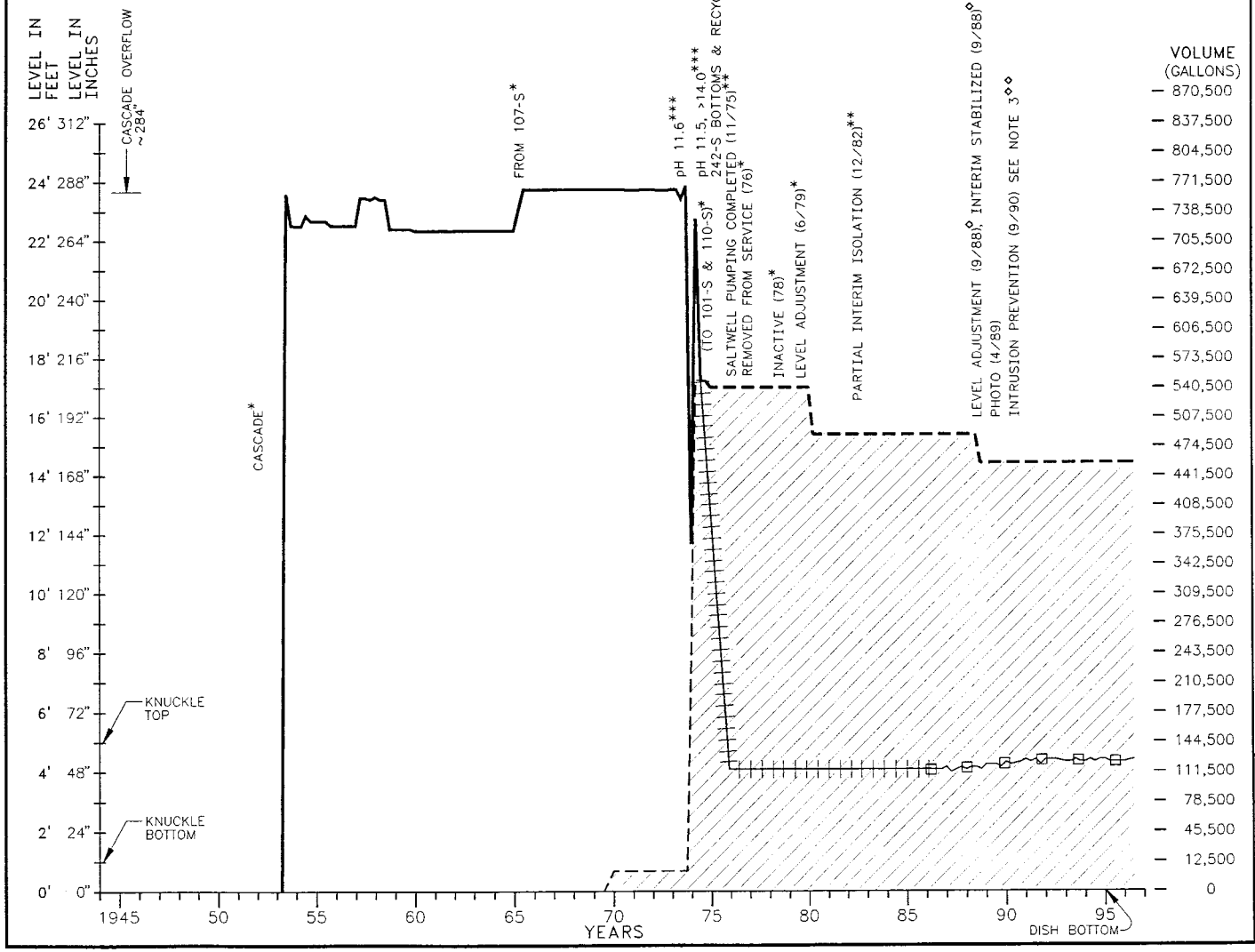
R:

EB:

NCPLX:
PNF:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995)

NONE:



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i
◇◇ HANLON 1991c

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.
3) IN JUNE 1993, INTERIM ISOLATION WAS REPLACED BY INTRUSION PREVENTION.

GLOSSARY OF WASTE TERMS:

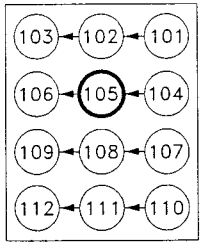
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

EB: EVAPORATOR BOTTOMS
NCPLX: NON-COMPLEXED WASTE
PNF: PARTIALLY NEUTRALIZED WASTE
R: REDOX HIGH-LEVEL WASTE

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- ASSUMED INTERSTITIAL LIQUID LEVEL
- SOLIDS

S TANK FARM
CASCADE

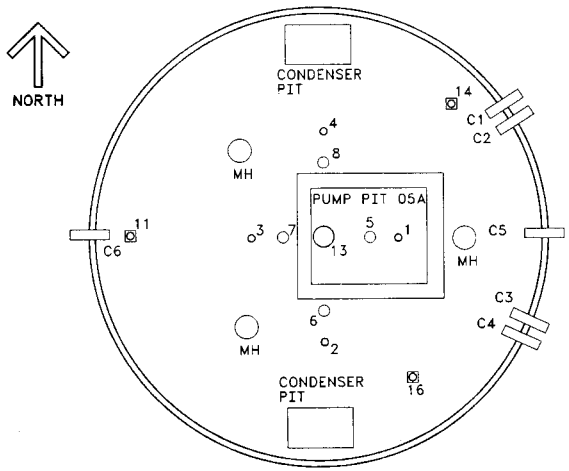


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-105 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1953-1996
SOUND/STABILIZED TANK
WATCH LIST: N/A

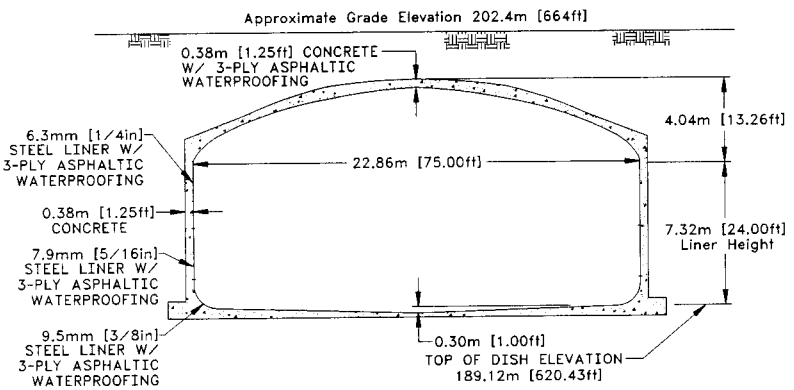
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E71	12/96
SCALE NONE	JOB NO.	SHEET 1 OF 1	

241-S-105



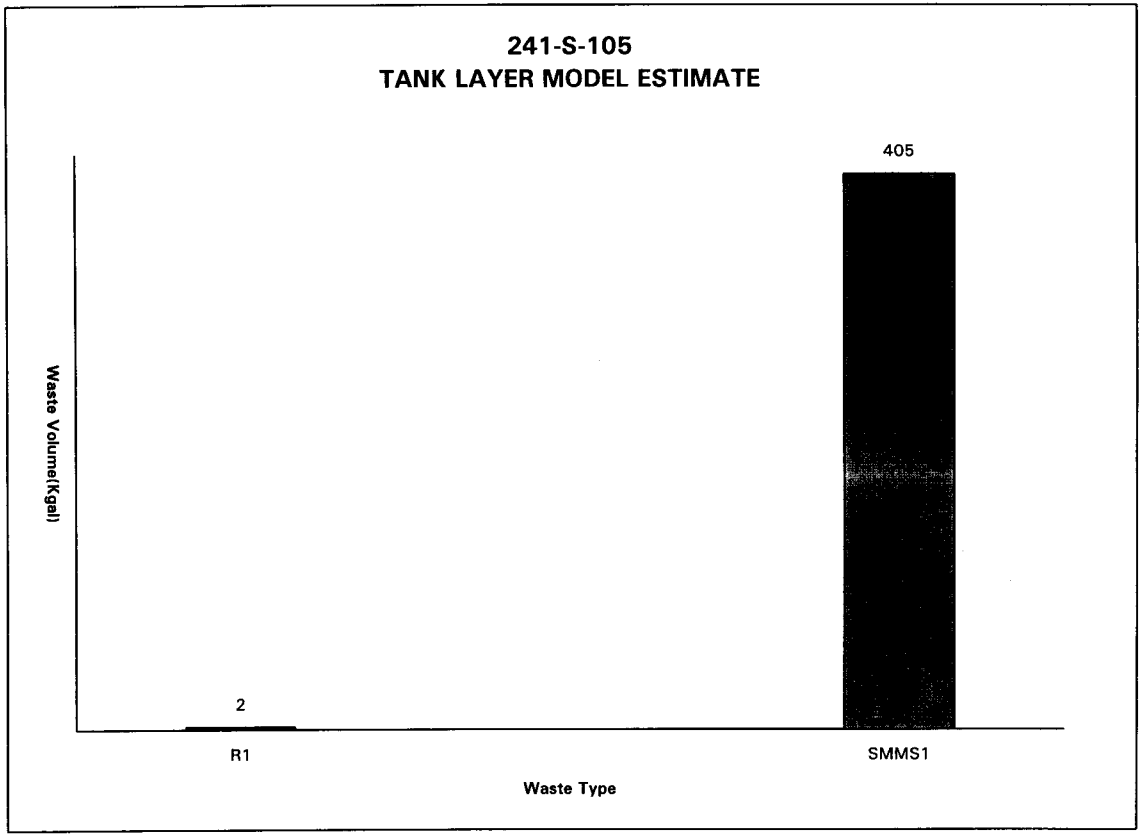
Ref: Alstad 1993
H-2-73184, Rev. 4
H-2-37528, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-105							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Waste	1.33E+04 (kg)	(2.00 kgal)	---	---	---	---	---
Heat Load	4.93E-02 (kW)	(168 BTU/hr)	---	3.57E-02	4.37E-02	5.29E-02	5.46E-02
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	---	---	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	8.13	1.06E+05	1.41E+03	3.05	3.56	14.7	18.2
Al3+	6.99	1.07E+05	1.43E+03	6.58	6.74	7.15	7.15
Fe3+ (total Fe)	1.01	3.22E+04	428	0.994	1.00	1.02	1.03
Cr3+	6.19E-02	1.83E+03	24.3	7.08E-03	3.39E-02	0.522	1.06
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	5.07E-02	1.69E+03	22.5	3.66E-02	4.45E-02	5.54E-02	5.45E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.220	5.02E+03	66.6	0.146	0.182	0.258	0.294
K+	1.12E-02	230	3.32	1.28E-03	5.25E-03	1.52E-02	1.52E-02
OH-	25.6	2.48E+05	3.29E+03	23.1	24.3	26.9	28.4
NO3-	5.29	1.87E+05	2.48E+03	6.03E-02	6.03E-02	13.5	17.9
NO2-	1.46	3.82E+04	507	0.132	0.595	2.15	2.15
CO32-	0.220	7.51E+03	99.8	0.146	0.182	0.258	0.294
PO43-	0	0	0	0	0	0	0
SO42-	1.04E-02	569	7.56	1.19E-03	4.87E-03	1.41E-02	1.41E-02
Si (as SiO32-)	8.06E-03	129	1.71	9.21E-04	3.77E-03	1.09E-02	1.09E-02
F-	0	0	0	0	0	0	0
Cl-	5.16E-02	1.04E+03	13.8	5.91E-03	2.42E-02	7.00E-02	0.157
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.256	2.47E+03	32.9	6.55E-02	9.25E-02	0.270	0.284
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-105							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	2.46E+06 (kg)	(405 kgal)	—	—	—	—	—
Heat Load	2.89 (kW)	(9.88E+03 BTU/hr)	----	2.69	2.79	3.01	3.01
Bulk Density*	1.61 (g/cc)	----	----	1.54	1.58	1.63	1.63
Water wt%	34.2	—	—	32.4	33.1	35.9	38.5
TOC wt% C (wet	0.264	—	—	0.235	0.249	0.278	0.292
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	13.9	1.99E+05	4.90E+05	12.4	13.2	14.4	14.6
Al3+	1.97	3.32E+04	8.17E+04	1.70	1.83	2.13	2.03
Fe3+ (total Fe)	8.26E-03	287	707	6.92E-03	7.58E-03	8.93E-03	9.59E-03
Cr3+	0.204	6.59E+03	1.62E+04	0.147	0.178	0.209	0.213
Bi3+	7.36E-04	95.7	236	6.61E-04	6.97E-04	7.74E-04	8.11E-04
La3+	9.36E-10	8.09E-05	1.99E-04	7.17E-10	8.25E-10	1.05E-09	1.16E-09
Hg2+	6.14E-06	0.767	1.89	5.75E-06	5.97E-06	6.23E-06	6.31E-06
Zr (as ZrO(OH)2)	1.54E-04	8.72	21.5	1.40E-04	1.45E-04	1.59E-04	1.67E-04
Pb2+	7.23E-04	93.2	230	5.99E-04	6.60E-04	7.86E-04	8.47E-04
Ni2+	5.57E-03	203	501	5.35E-03	5.45E-03	5.68E-03	5.78E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	2.39E-03	81.6	201	1.75E-03	2.06E-03	2.71E-03	3.03E-03
Ca2+	2.84E-02	709	1.75E+03	2.42E-02	2.63E-02	3.06E-02	3.26E-02
K+	5.80E-02	1.41E+03	3.48E+03	5.13E-02	5.45E-02	6.20E-02	6.22E-02
OH-	11.9	1.26E+05	3.10E+05	10.2	11.0	12.9	12.3
NO3-	4.70	1.81E+05	4.47E+05	4.26	4.48	4.88	4.88
NO2-	2.62	7.50E+04	1.85E+05	2.25	2.46	2.76	2.90
CO32-	0.234	8.74E+03	2.15E+04	0.212	0.219	0.253	0.255
PO43-	5.27E-02	3.11E+03	7.67E+03	4.62E-02	4.85E-02	5.41E-02	5.54E-02
SO42-	0.161	9.60E+03	2.36E+04	0.125	0.142	0.180	0.196
Si (as SiO32-)	6.27E-02	1.10E+03	2.70E+03	5.36E-02	5.80E-02	6.74E-02	7.19E-02
F-	3.52E-02	417	1.03E+03	2.87E-02	3.14E-02	3.85E-02	4.10E-02
Cl-	0.236	5.19E+03	1.28E+04	0.204	0.219	0.253	0.249
C6H5O73-	1.71E-02	2.01E+03	4.96E+03	1.58E-02	1.64E-02	1.78E-02	1.84E-02
EDTA4-	1.92E-03	344	846	9.55E-04	1.42E-03	2.41E-03	2.89E-03
HEDTA3-	3.07E-03	523	1.29E+03	1.15E-03	2.08E-03	4.06E-03	5.02E-03
glycolate-	2.65E-02	1.24E+03	3.04E+03	1.53E-02	2.08E-02	3.22E-02	3.76E-02
acetate-	2.46E-03	90.4	223	1.99E-03	2.22E-03	2.70E-03	2.93E-03
oxalate2-	1.23E-09	6.72E-05	1.65E-04	1.11E-09	1.17E-09	1.29E-09	1.34E-09
DBP	1.19E-02	1.55E+03	3.83E+03	9.63E-03	1.07E-02	1.30E-02	1.41E-02
butanol	1.19E-02	548	1.35E+03	9.63E-03	1.07E-02	1.30E-02	1.41E-02
NH3	6.88E-02	728	1.79E+03	5.85E-02	6.26E-02	7.68E-02	8.61E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-105							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.48E+06 (kg)	(407 kgal)	----	—	—	—	—
Heat Load	*2.94 (kW)*	*(1.00E+04 BTU/hr)*	—	2.73	2.83	3.06	3.06
Bulk Density†	1.61 (g/cc)	—	—	1.54	1.58	1.63	1.63
Water wt%†	34.2	----	----	32.3	33.0	35.9	38.6
TOC wt% C (wet	0.262	—	—	0.233	0.247	0.277	0.290
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	13.9	1.99E+05	4.92E+05	12.3	13.2	14.4	14.5
Al3+	2.00	3.36E+04	8.31E+04	1.72	1.85	2.16	2.05
Fe3+ (total Fe)	1.32E-02	458	1.13E+03	1.19E-02	1.25E-02	1.39E-02	1.45E-02
Cr3+	0.203	6.56E+03	1.63E+04	0.152	0.179	0.209	0.212
Bi3+	7.32E-04	95.2	236	6.57E-04	6.94E-04	7.70E-04	8.07E-04
La3+	9.32E-10	8.05E-05	1.99E-04	7.14E-10	8.20E-10	1.04E-09	1.15E-09
Hg2+	6.11E-06	0.763	1.89	5.72E-06	5.95E-06	6.20E-06	6.28E-06
Zr (as ZrO(OH)2)	1.53E-04	8.67	21.5	1.39E-04	1.44E-04	1.58E-04	1.66E-04
Pb2+	7.19E-04	92.7	230	5.96E-04	6.56E-04	7.82E-04	8.43E-04
Ni2+	5.79E-03	211	523	5.59E-03	5.69E-03	5.89E-03	5.98E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	2.37E-03	81.2	201	1.74E-03	2.05E-03	2.70E-03	3.01E-03
Ca2+	2.94E-02	733	1.81E+03	2.55E-02	2.74E-02	3.13E-02	3.32E-02
K+	5.78E-02	1.41E+03	3.48E+03	5.11E-02	5.43E-02	6.17E-02	6.19E-02
OH-	12.0	1.27E+05	3.13E+05	10.2	11.1	12.9	12.4
NO3-	4.71	1.82E+05	4.49E+05	*4.33*	*4.51*	*4.86*	*4.86*
NO2-	2.61	7.48E+04	1.85E+05	2.25	2.46	2.75	2.89
CO32-	0.234	8.73E+03	2.16E+04	0.212	0.219	0.252	0.255
PO43-	5.24E-02	3.10E+03	7.67E+03	4.60E-02	4.82E-02	5.38E-02	5.52E-02
SO42-	0.160	9.55E+03	2.36E+04	0.125	0.141	0.179	0.195
Si (as SiO32-)	6.24E-02	1.09E+03	2.70E+03	5.33E-02	5.78E-02	6.71E-02	7.16E-02
F-	3.51E-02	415	1.03E+03	2.86E-02	3.13E-02	3.83E-02	4.08E-02
Cl-	0.235	5.17E+03	1.28E+04	0.204	0.218	0.252	0.248
C6H5O73-	1.70E-02	2.00E+03	4.96E+03	1.57E-02	1.64E-02	1.77E-02	1.83E-02
EDTA4-	1.91E-03	342	846	9.51E-04	1.42E-03	2.40E-03	2.88E-03
HEDTA3-	3.05E-03	520	1.29E+03	1.14E-03	2.07E-03	4.04E-03	5.00E-03
glycolate-	2.63E-02	1.23E+03	3.04E+03	1.53E-02	2.07E-02	3.20E-02	3.74E-02
acetate-	2.45E-03	89.9	223	1.98E-03	2.21E-03	2.69E-03	2.91E-03
oxalate2-	1.22E-09	6.68E-05	1.65E-04	1.10E-09	1.16E-09	1.28E-09	1.34E-09
DBP	1.18E-02	1.55E+03	3.83E+03	9.58E-03	1.07E-02	1.29E-02	1.40E-02
butanol	1.18E-02	545	1.35E+03	9.58E-03	1.07E-02	1.29E-02	1.40E-02
NH3	6.97E-02	737	1.83E+03	5.95E-02	6.35E-02	7.76E-02	8.69E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-105

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	1.33E+04 (kg)	(2.00 kgal)	---	---	---	---	---
Heat Load	4.93E-02 (kW)	(168 BTU/hr)	---	3.57E-02	4.37E-02	5.29E-02	5.46E-02
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	---	---	0	0	0	0

Radiological Constituents	CI/L	µCI/g	CI	-95 CI (CI/L)	-67 CI (CI/L)	+67 CI (CI/L)	+95 CI (CI/L)
H-3	2.92E-05	1.67E-02	0.221	3.05E-06	1.47E-05	4.10E-05	4.10E-05
C-14	2.26E-06	1.29E-03	1.71E-02	2.59E-07	1.06E-06	3.07E-06	3.07E-06
Ni-59	1.49E-05	8.46E-03	0.112	1.07E-05	1.31E-05	1.62E-05	1.60E-05
Ni-63	1.39E-03	0.790	10.5	1.00E-03	1.22E-03	1.52E-03	1.49E-03
Co-60	8.94E-07	5.09E-04	6.76E-03	1.02E-07	4.18E-07	1.21E-06	1.21E-06
Se-79	4.81E-07	2.74E-04	3.63E-03	5.50E-08	2.25E-07	6.51E-07	7.15E-06
Sr-90	0.928	529	7.02E+03	0.662	0.812	1.02	1.03
Y-90	0.929	529	7.02E+03	0.662	0.812	1.02	1.03
Zr-93	2.27E-06	1.29E-03	1.72E-02	2.59E-07	1.06E-06	3.08E-06	3.03E-05
Nb-93m	1.85E-06	1.06E-03	1.40E-02	2.12E-07	8.68E-07	2.51E-06	3.21E-05
Tc-99	1.58E-05	9.02E-03	0.120	1.81E-06	7.42E-06	2.15E-05	2.15E-05
Ru-106	2.50E-12	1.42E-09	1.89E-08	2.86E-13	1.17E-12	3.38E-12	3.38E-12
Cd-113m	6.99E-06	3.98E-03	5.29E-02	8.00E-07	3.27E-06	9.48E-06	9.48E-06
Sb-125	1.31E-06	7.47E-04	9.92E-03	1.50E-07	6.14E-07	1.78E-06	1.78E-06
Sn-126	7.39E-07	4.21E-04	5.59E-03	8.45E-08	3.46E-07	1.00E-06	1.14E-05
I-129	3.04E-08	1.73E-05	2.30E-04	3.48E-09	1.42E-08	4.13E-08	4.13E-08
Cs-134	2.72E-08	1.55E-05	2.06E-04	7.19E-09	1.52E-08	3.52E-08	3.52E-08
Cs-137	5.60E-02	31.9	424	1.48E-02	3.13E-02	7.26E-02	7.26E-02
Ba-137m	5.30E-02	30.2	401	1.40E-02	2.96E-02	6.87E-02	6.87E-02
Sm-151	1.71E-03	0.976	13.0	1.96E-04	8.03E-04	2.33E-03	2.64E-02
Eu-152	7.00E-06	3.98E-03	5.29E-02	6.85E-06	6.91E-06	7.06E-06	7.06E-06
Eu-154	2.16E-05	1.23E-02	0.163	2.47E-06	1.01E-05	2.93E-05	2.93E-05
Eu-155	3.30E-04	0.188	2.50	3.23E-04	3.26E-04	3.33E-04	3.33E-04
Ra-226	1.08E-09	6.15E-07	8.17E-06	1.48E-10	6.04E-10	1.56E-09	2.01E-09
Ra-228	9.26E-15	5.28E-12	7.01E-11	9.07E-15	9.15E-15	9.34E-15	9.34E-15
Ac-227	4.76E-09	2.71E-06	3.60E-05	3.06E-10	2.00E-09	7.52E-09	1.02E-08
Pa-231	7.18E-10	4.09E-07	5.43E-06	8.21E-11	3.36E-10	2.04E-09	1.68E-08
Th-229	1.77E-12	1.01E-09	1.34E-08	1.73E-12	1.75E-12	1.78E-12	1.78E-12
Th-232	5.91E-16	3.36E-13	4.47E-12	6.76E-17	2.77E-16	8.01E-16	8.01E-16
U-232	5.24E-12	2.98E-09	3.96E-08	5.99E-13	2.45E-12	7.10E-12	7.10E-12
U-233	2.00E-13	1.14E-10	1.51E-09	2.28E-14	9.34E-14	2.71E-13	2.71E-13
U-234	1.19E-07	6.78E-05	9.01E-04	1.36E-08	5.58E-08	1.62E-07	1.62E-07
U-235	5.13E-09	2.92E-06	3.88E-05	5.86E-10	2.40E-09	6.95E-09	6.95E-09
U-236	1.88E-09	1.07E-06	1.43E-05	2.16E-10	8.82E-10	2.56E-09	2.56E-09
U-238	1.22E-07	6.92E-05	9.20E-04	1.39E-08	5.69E-08	1.65E-07	1.65E-07
Np-237	1.03E-07	5.86E-05	7.78E-04	1.18E-08	4.81E-08	1.39E-07	1.39E-07
Pu-238	6.61E-06	3.77E-03	5.00E-02	4.75E-06	5.66E-06	7.57E-06	8.48E-06
Pu-239	4.72E-04	0.269	3.57	3.39E-04	4.04E-04	5.40E-04	6.05E-04
Pu-240	6.76E-05	3.85E-02	0.511	4.85E-05	5.78E-05	7.73E-05	8.66E-05
Pu-241	3.97E-04	0.226	3.01	2.85E-04	3.40E-04	4.55E-04	5.09E-04
Pu-242	1.82E-09	1.04E-06	1.38E-05	1.31E-09	1.56E-09	2.08E-09	2.34E-09
Am-241	8.09E-06	4.61E-03	6.12E-02	9.26E-07	3.79E-06	1.10E-05	1.43E-04
Am-243	7.57E-11	4.31E-08	5.72E-07	8.66E-12	3.54E-11	1.03E-10	1.34E-09
Cm-242	1.61E-07	9.16E-05	1.22E-03	1.58E-07	1.59E-07	1.62E-07	1.62E-07
Cm-243	3.69E-09	2.10E-06	2.79E-05	3.61E-09	3.64E-09	3.72E-09	3.72E-09
Cm-244	2.70E-09	1.54E-06	2.05E-05	3.09E-10	1.27E-09	3.67E-09	3.67E-09

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	7.89E-03 (g/L)	---	5.97E-02	5.67E-03	6.76E-03	9.03E-03	1.01E-02
U	1.53E-03	207	2.75	1.75E-04	7.16E-04	2.07E-03	2.07E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-105							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	2.46E+06 (kg)	(405 kgal)	---	---	---	---	---
Heat Load	2.89 (kW)	(9.88E+03 BTU/hr)	---	2.69	2.79	3.01	3.01
Bulk Density*	1.61 (g/cc)	---	---	1.54	1.58	1.63	1.63
Water wt%†	34.2	---	---	32.4	33.1	35.9	38.5
TOC wt% C (wet	0.264	---	---	0.235	0.249	0.278	0.292

Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.25E-04	0.140	345	1.43E-04	1.43E-04	2.41E-04	2.34E-04
C-14	2.77E-05	1.72E-02	42.4	1.06E-05	1.06E-05	2.85E-05	2.83E-05
Ni-59	1.97E-06	1.23E-03	3.02	1.17E-06	1.17E-06	2.01E-06	2.05E-06
Ni-63	1.91E-04	0.119	293	1.11E-04	1.11E-04	1.95E-04	1.99E-04
Co-60	2.72E-05	1.70E-02	41.8	7.72E-06	7.72E-06	2.77E-05	2.81E-05
Se-79	3.02E-06	1.88E-03	4.63	1.93E-06	1.93E-06	3.41E-06	3.79E-06
Sr-90	9.96E-02	62.0	1.53E+05	9.37E-02	9.66E-02	0.103	0.105
Y-90	9.96E-02	62.0	1.53E+05	6.20E-02	6.20E-02	0.103	0.105
Zr-93	1.47E-05	9.16E-03	22.6	9.28E-06	9.28E-06	1.67E-05	1.86E-05
Nb-93m	1.10E-05	6.84E-03	16.8	7.17E-06	7.17E-06	1.24E-05	1.37E-05
Tc-99	1.97E-04	0.123	302	1.34E-04	1.65E-04	2.30E-04	2.62E-04
Ru-106	4.14E-09	2.58E-06	6.35E-03	1.62E-09	1.62E-09	4.71E-09	5.22E-09
Cd-113m	7.02E-05	4.37E-02	108	3.75E-05	3.75E-05	8.20E-05	9.34E-05
Sb-125	1.10E-04	6.87E-02	169	2.58E-05	2.58E-05	1.12E-04	1.14E-04
Sn-126	4.58E-06	2.85E-03	7.02	2.95E-06	2.95E-06	5.17E-06	5.74E-06
I-129	3.80E-07	2.36E-04	0.582	2.57E-07	3.17E-07	4.43E-07	5.04E-07
Cs-134	1.33E-06	8.28E-04	2.04	8.79E-07	8.79E-07	1.44E-06	1.54E-06
Cs-137	0.260	162	3.98E+05	0.232	0.245	0.276	0.276
Ba-137m	0.246	153	3.77E+05	0.185	0.185	0.261	0.261
Sm-151	1.07E-02	6.64	1.63E+04	6.85E-03	6.85E-03	1.20E-02	1.34E-02
Eu-152	2.52E-06	1.57E-03	3.86	1.17E-06	1.17E-06	2.58E-06	2.62E-06
Eu-154	4.43E-04	0.276	680	1.71E-04	1.71E-04	5.42E-04	5.81E-04
Eu-155	1.44E-04	8.96E-02	221	6.36E-05	6.36E-05	1.48E-04	1.52E-04
Ra-226	1.47E-10	9.12E-08	2.25E-04	9.37E-11	1.13E-10	1.73E-10	1.99E-10
Ra-228	5.48E-08	3.41E-05	8.40E-02	2.13E-08	3.77E-08	7.47E-08	9.58E-08
Ac-227	8.85E-10	5.50E-07	1.36E-03	5.78E-10	6.89E-10	1.04E-09	1.14E-09
Pa-231	3.84E-09	2.39E-06	5.89E-03	2.76E-09	2.76E-09	4.24E-09	4.62E-09
Th-229	1.30E-09	8.09E-07	1.99E-03	5.65E-10	9.24E-10	1.74E-09	2.20E-09
Th-232	3.63E-09	2.26E-06	5.57E-03	1.78E-09	2.69E-09	4.58E-09	5.49E-09
U-232	3.20E-07	1.99E-04	0.491	1.86E-07	2.52E-07	4.00E-07	4.85E-07
U-233	1.23E-06	7.65E-04	1.88	7.15E-07	9.66E-07	1.53E-06	1.86E-06
U-234	7.68E-07	4.78E-04	1.18	6.96E-07	7.30E-07	8.09E-07	7.86E-07
U-235	3.18E-08	1.98E-05	4.88E-02	2.87E-08	3.02E-08	3.36E-08	3.26E-08
U-236	2.12E-08	1.32E-05	3.26E-02	2.01E-08	2.06E-08	2.19E-08	2.18E-08
U-238	8.01E-07	4.98E-04	1.23	7.27E-07	7.62E-07	8.43E-07	8.18E-07
Np-237	8.00E-07	4.98E-04	1.23	5.93E-07	6.94E-07	9.08E-07	1.01E-06
Pu-238	9.60E-07	5.97E-04	1.47	7.16E-07	8.35E-07	1.08E-06	1.20E-06
Pu-239	3.73E-05	2.32E-02	57.2	2.98E-05	3.35E-05	4.12E-05	4.49E-05
Pu-240	6.04E-06	3.76E-03	9.26	4.88E-06	5.45E-06	6.63E-06	7.20E-06
Pu-241	6.30E-05	3.92E-02	96.5	4.63E-05	5.45E-05	7.15E-05	7.96E-05
Pu-242	3.37E-10	2.10E-07	5.17E-04	2.38E-10	2.87E-10	3.88E-10	4.37E-10
Am-241	4.89E-05	3.04E-02	74.9	3.73E-05	4.30E-05	5.48E-05	6.04E-05
Am-243	1.29E-09	8.06E-07	1.98E-03	9.31E-10	1.10E-09	1.49E-09	1.67E-09
Cm-242	8.75E-08	5.44E-05	0.134	3.21E-08	3.21E-08	8.90E-08	9.05E-08
Cm-243	7.64E-09	4.76E-06	1.17E-02	2.36E-09	2.36E-09	7.81E-09	7.97E-09
Cm-244	8.49E-08	5.28E-05	0.130	3.05E-08	3.05E-08	1.03E-07	1.15E-07

Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.01E-04 (g/L)	---	0.768	3.75E-04	4.37E-04	5.66E-04	6.27E-04
U	9.09E-03	1.35E+03	3.32E+03	8.17E-03	8.61E-03	9.63E-03	9.31E-03

*Density is calculated based on Na, OH-, and AlO2-.

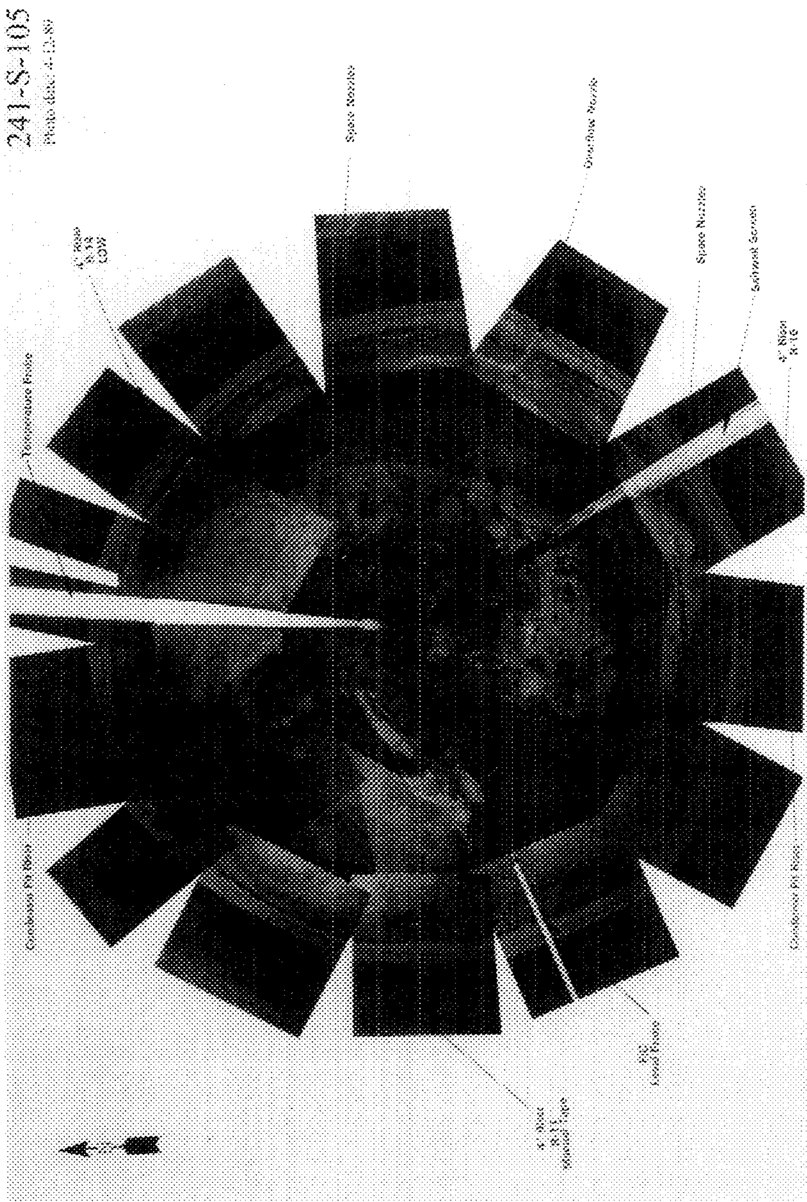
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-105							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.48E+06 (kg)	(407 kgal)	—	—	—	—	—
Heat Load	2.94 (kW)	(1.00E+04 BTU/hr)	—	2.73	2.83	3.06	3.06
Bulk Density†	1.61 (g/cc)	—	—	1.54	1.58	1.63	1.63
Water wt%†	34.2	—	—	32.3	33.0	35.9	38.6
TOC wt% C (wet	0.262	—	—	0.233	0.247	0.277	0.290
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.24E-04	0.139	345	1.43E-04	1.43E-04	2.40E-04	2.33E-04
C-14	2.75E-05	1.71E-02	42.4	1.06E-05	1.06E-05	2.83E-05	2.82E-05
Ni-59	2.03E-06	1.27E-03	3.13	1.24E-06	1.24E-06	2.07E-06	2.11E-06
Ni-63	1.97E-04	0.122	303	1.18E-04	1.18E-04	2.01E-04	2.05E-04
Co-60	2.71E-05	1.69E-02	41.8	7.69E-06	7.69E-06	2.76E-05	2.80E-05
Se-79	3.01E-06	1.87E-03	4.63	1.92E-06	1.92E-06	3.40E-06	3.78E-06
Sr-90	0.104	64.5	1.60E+05	9.83E-02	0.101	0.106	0.109
Y-90	0.104	64.5	1.60E+05	6.62E-02	6.62E-02	0.106	0.109
Zr-93	1.47E-05	9.12E-03	22.6	9.24E-06	9.24E-06	1.66E-05	1.85E-05
Nb-93m	1.09E-05	6.81E-03	16.9	7.15E-06	7.15E-06	1.23E-05	1.36E-05
Tc-99	1.96E-04	0.122	303	1.33E-04	1.64E-04	2.29E-04	2.60E-04
Ru-106	4.12E-09	2.56E-06	6.35E-03	1.61E-09	1.61E-09	4.68E-09	5.19E-09
Cd-113m	6.99E-05	4.35E-02	108	3.74E-05	3.74E-05	8.17E-03	9.29E-05
Sb-125	1.10E-04	6.83E-02	169	2.57E-05	2.57E-05	1.12E-04	1.14E-04
Sn-126	4.56E-06	2.84E-03	7.02	2.93E-06	2.93E-06	5.15E-06	5.71E-06
I-129	3.78E-07	2.35E-04	0.582	2.56E-07	3.15E-07	4.41E-07	5.02E-07
Cs-134	1.32E-06	8.24E-04	2.04	8.75E-07	8.75E-07	1.43E-06	1.53E-06
Cs-137	0.259	161	3.98E+05	0.231	0.244	0.275	0.275
Ba-137m	0.245	152	3.77E+05	0.185	0.185	0.260	0.260
Sm-151	1.06E-02	6.60	1.64E+04	6.83E-03	6.83E-03	1.20E-02	1.33E-02
Eu-152	2.54E-06	1.58E-03	3.91	1.20E-06	1.20E-06	2.60E-06	2.64E-06
Eu-154	4.41E-04	0.275	680	1.70E-04	1.70E-04	5.39E-04	5.78E-04
Eu-155	1.45E-04	9.01E-02	223	6.49E-05	6.49E-05	1.49E-04	1.52E-04
Ra-226	1.51E-10	9.40E-08	2.33E-04	1.03E-10	1.18E-10	1.76E-10	1.99E-10
Ra-228	5.45E-08	3.39E-05	8.40E-02	2.12E-08	3.75E-08	7.43E-08	9.54E-08
Ac-227	9.04E-10	5.62E-07	1.39E-03	6.25E-10	7.09E-10	1.05E-09	1.13E-09
Pa-231	3.83E-09	2.38E-06	5.90E-03	2.75E-09	2.75E-09	4.22E-09	4.60E-09
Th-229	1.29E-09	8.05E-07	1.99E-03	5.62E-10	9.20E-10	1.73E-09	2.19E-09
Th-232	3.61E-09	2.25E-06	5.57E-03	1.77E-09	2.67E-09	4.56E-09	5.46E-09
U-232	3.19E-07	1.98E-04	0.491	1.85E-07	2.51E-07	3.98E-07	4.83E-07
U-233	1.22E-06	7.61E-04	1.88	7.11E-07	9.61E-07	1.53E-06	1.85E-06
U-234	7.64E-07	4.76E-04	1.18	6.93E-07	7.27E-07	8.05E-07	7.83E-07
U-235	3.17E-08	1.97E-05	4.88E-02	2.86E-08	3.01E-08	3.34E-08	3.24E-08
U-236	2.11E-08	1.32E-05	3.26E-02	2.00E-08	2.06E-08	2.18E-08	2.17E-08
U-238	7.97E-07	4.96E-04	1.23	7.24E-07	7.59E-07	8.39E-07	8.15E-07
Np-237	7.97E-07	4.96E-04	1.23	5.90E-07	6.91E-07	9.04E-07	1.01E-06
Pu-238	9.88E-07	6.14E-04	1.52	7.45E-07	8.64E-07	1.11E-06	1.23E-06
Pu-239	3.95E-05	2.46E-02	60.8	3.26E-05	3.60E-05	4.30E-05	4.63E-05
Pu-240	6.34E-06	3.94E-03	9.77	5.18E-06	5.75E-06	6.93E-06	7.50E-06
Pu-241	6.46E-05	4.02E-02	99.5	4.80E-05	5.61E-05	7.31E-05	8.12E-05
Pu-242	3.45E-10	2.14E-07	5.31E-04	2.46E-10	2.94E-10	3.95E-10	4.44E-10
Am-241	4.87E-05	3.03E-02	75.0	3.71E-05	4.28E-05	5.46E-05	6.02E-05
Am-243	1.29E-09	8.02E-07	1.99E-03	9.27E-10	1.10E-09	1.48E-09	1.67E-09
Cm-242	8.78E-08	5.46E-05	0.135	3.27E-08	3.27E-08	8.94E-08	9.08E-08
Cm-243	7.63E-09	4.74E-06	1.17E-02	2.37E-09	2.37E-09	7.79E-09	7.95E-09
Cm-244	8.45E-08	5.26E-05	0.130	3.03E-08	3.03E-08	1.03E-07	1.15E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.38E-04 (g/L)	—	0.828	4.20E-04	4.78E-04	5.97E-04	6.55E-04
U	9.06E-03	1.34E+03	3.32E+03	8.14E-03	8.57E-03	9.58E-03	9.27E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-S-105
Spare Nozzle
Overflow Nozzle
Spare Nozzle
Saltwell Screen
Temperature Probe
Condenser Pit Riser
Condenser Pit Riser

TANK 241-S-106 SUMMARY

TANK HISTORY	
Entered Service	2nd qtr 1953
Removed from Service	1976
Inactive	-
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
11, 14, 16	4 in
6, 8	12 in

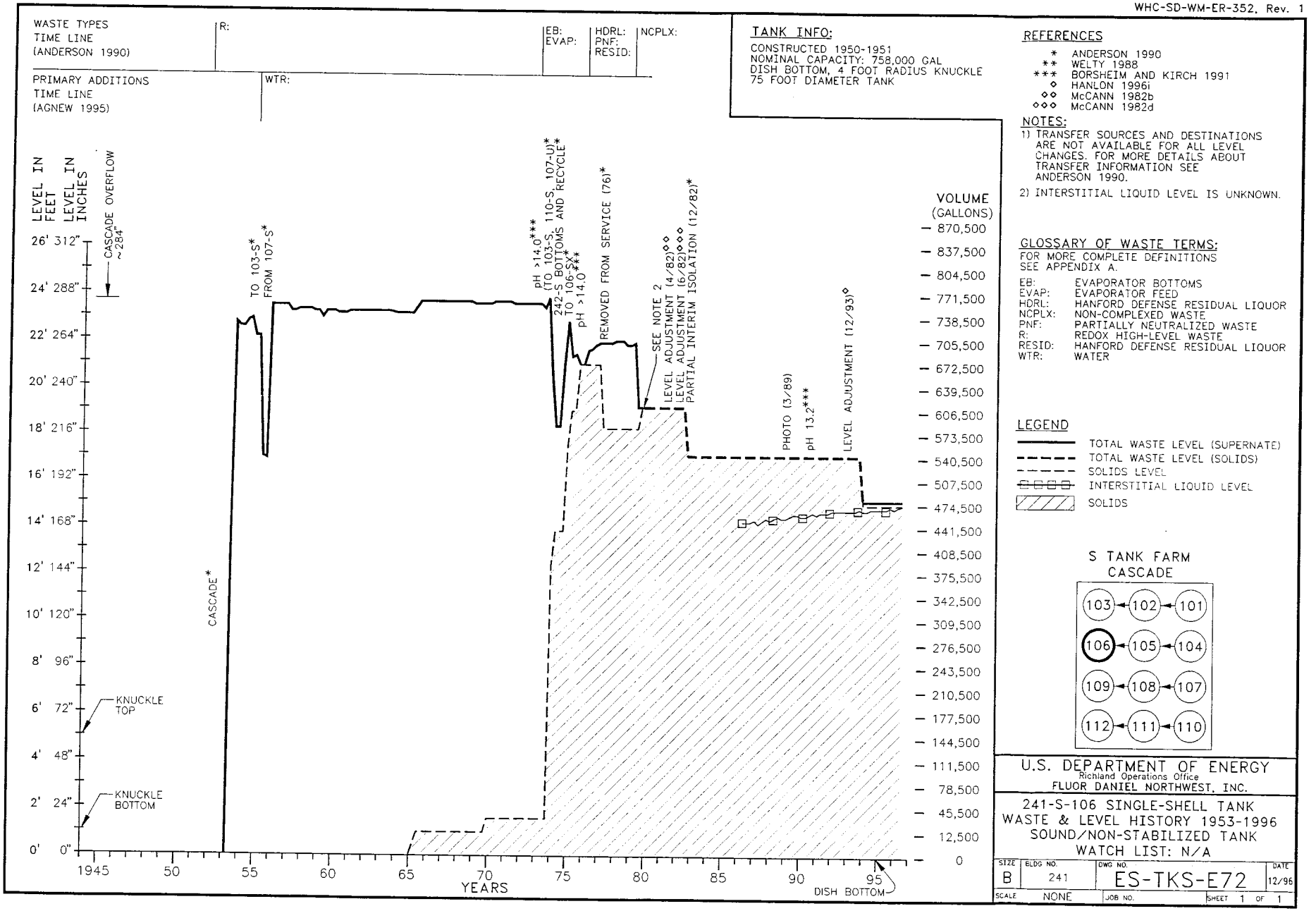
TANK TEMPERATURE	
Average Tank Temperature	76°F
Maximum Temperature	87°F
Date	Jan 1, 1992
Elevation from tank bottom	4.46 ft
Riser Number	4
Minimum Temperature	62.06°F
Date	March 19, 21 & 24, 1996
Elevation from tank bottom	16.46 ft, 18.46 ft
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	none
Total Risers	12

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	479,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	186,000 gal
Pumpable Liquids	168,000 gal
Saltcake	447,000 gal
Sludge	28,000 gal
Supernatant	4,000 gal

INTERIOR PHOTOGRAPHS	
Date	March 17, 1989
Montage Number	94041033-23CN
Photo Set Number	89032049

WASTE SURFACE LEVEL	
Devices	Auto and Manual ENRAF
Max Level	181.06 in
Date	Dec 13, 1995
Min Level	174.5 in
Date	April 8 and 22, 1991



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i
◇◇ McCANN 1982b
◇◇◇ McCANN 1982d

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HDRL:	HANFORD DEFENSE RESIDUAL LIQUOR
NCPLX:	NON-COMPLEXED WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

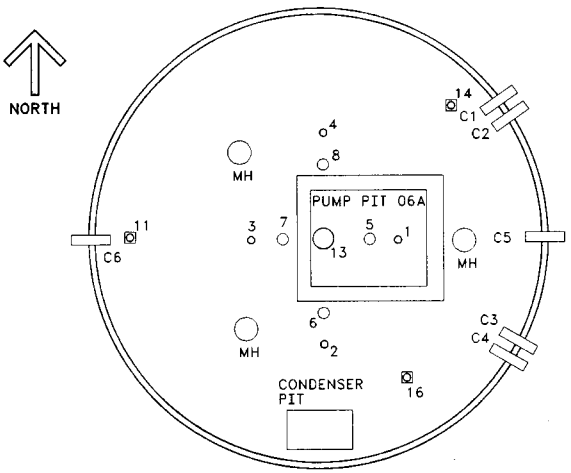
S TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-106 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1953-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: N/A

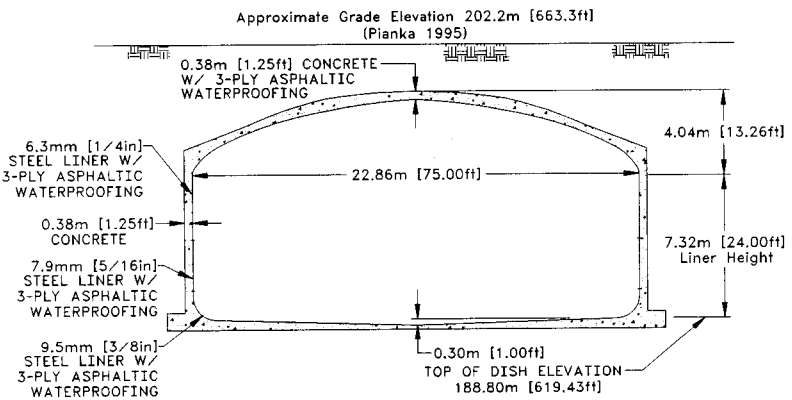
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E72	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-106



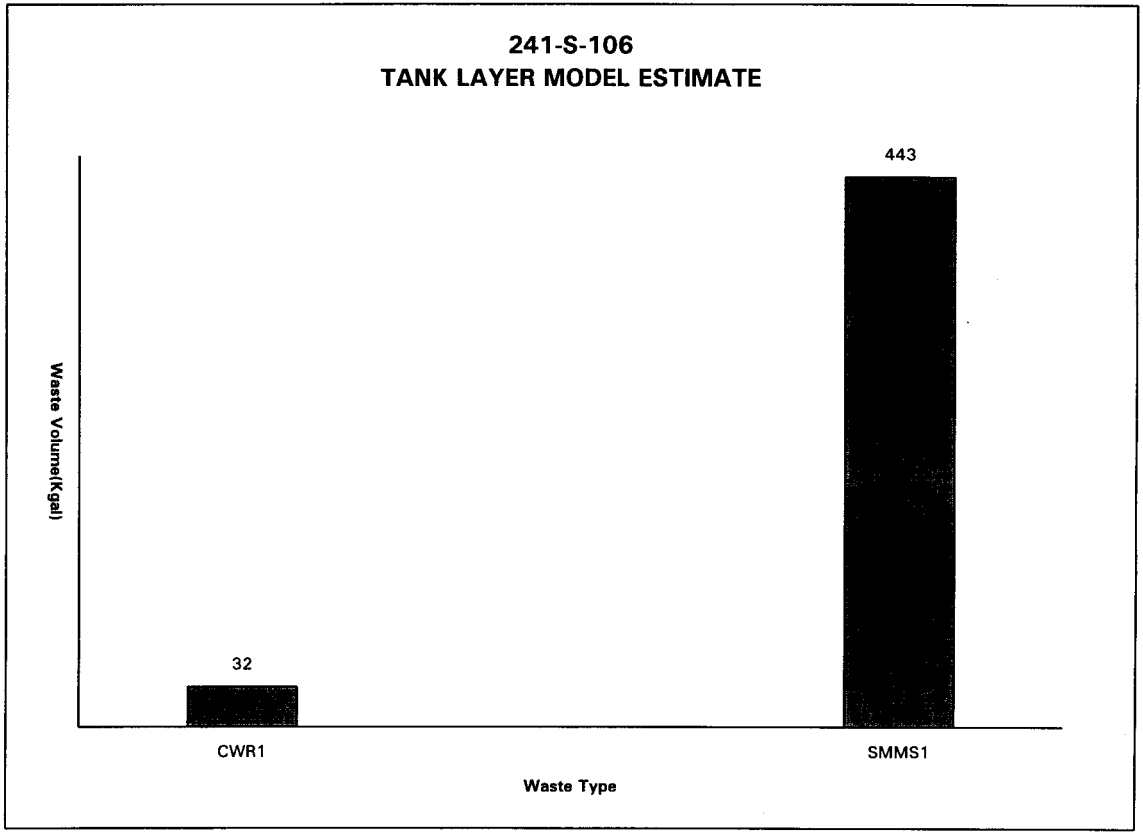
Ref: Alstad 1993
H-2-73185, Rev. 4
H-2-37829, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-106							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	2.15E+05 (kg)	(32.0 kgal)	---	---	---	---	---
Heat Load	*3.00E-03 (kW)*	*(10.3 BTU/hr)*	---	*2.52E-03*	*2.90E-03*	*3.11E-03*	*3.20E-03*
Bulk Density	1.77 (g/cc)	---	---	1.47	1.57	1.92	2.02
Void Fraction	0.651	---	---	0.488	0.557	0.780	0.825
Water wt%	24.5	---	---	4.37	12.2	45.5	55.1
TOC wt% C (wet	0	---	---	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	7.86	1.02E+05	2.19E+04	2.23	3.91	10.7	12.9
Al3+	11.2	1.71E+05	3.66E+04	5.84	7.28	14.0	16.1
Fe3+ (total Fe)	0.165	5.20E+03	1.12E+03	0.153	0.160	0.170	0.175
Cr3+	2.04E-03	59.8	12.8	1.71E-03	1.97E-03	2.10E-03	2.17E-03
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	4.08E-03	462	99.1	4.02E-03	4.06E-03	4.10E-03	4.11E-03
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	0.118	1.38E+04	2.95E+03	0.108	0.113	0.122	0.126
Ni2+	1.02E-03	33.7	7.24	8.54E-04	9.84E-04	1.51E-03	3.79E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.121	2.73E+03	586	6.72E-02	9.87E-02	0.141	0.161
K+	1.54E-03	33.9	7.27	1.29E-03	1.48E-03	1.59E-03	1.64E-03
OH-	41.7	4.00E+05	8.59E+04	20.0	25.9	53.0	61.2
NO3-	0.572	2.00E+04	4.30E+03	*0.485*	*0.554*	*0.591*	*0.610*
NO2-	0.958	2.49E+04	5.34E+03	0.799	0.925	0.990	1.02
CO32-	0.121	4.09E+03	878	6.72E-02	9.87E-02	0.141	0.161
PO43-	0	0	0	0	0	0	0
SO42-	8.39E-03	455	97.6	7.04E-03	8.10E-03	8.67E-03	8.94E-03
Si (as SiO32-)	2.01E-02	319	68.4	1.69E-02	1.94E-02	8.18E-02	0.175
F-	0	0	0	0	0	0	0
Cl-	7.07E-03	141	30.3	5.93E-03	6.83E-03	7.30E-03	7.53E-03
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	2.05E-04	1.97	0.422	1.61E-04	1.80E-04	2.38E-04	2.49E-04
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-106							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM Wast	2.80E+06 (kg)	(447 kgal)	---	---	---	---	---
Heat Load	3.65 (kW)	(1.25E+04 BTU/hr)	---	3.47	3.56	3.76	3.85
Bulk Density*	1.66 (g/cc)	---	---	1.60	1.63	1.68	1.69
Water wt%	31.0	---	---	28.8	29.8	32.3	34.4
TOC wt% C (wet	0.342	---	---	0.306	0.324	0.360	0.377
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.2	2.11E+05	5.90E+05	13.9	14.6	15.6	16.1
Al3+	2.08	3.38E+04	9.47E+04	1.85	1.95	2.21	2.15
Fe3+ (total Fe)	9.22E-03	311	871	7.46E-03	8.32E-03	1.01E-02	1.10E-02
Cr3+	0.207	6.50E+03	1.82E+04	0.160	0.185	0.215	0.223
Bi3+	6.55E-04	82.7	232	5.92E-04	6.23E-04	6.87E-04	7.18E-04
La3+	3.27E-08	2.75E-03	7.69E-03	2.40E-08	2.83E-08	3.72E-08	4.15E-08
Hg2+	5.82E-06	0.705	1.97	5.49E-06	5.68E-06	5.89E-06	5.95E-06
Zr (as ZrO(OH)2)	1.32E-04	7.30	20.4	1.21E-04	1.25E-04	1.37E-04	1.44E-04
Pb2+	7.06E-04	88.3	247	6.08E-04	6.56E-04	7.55E-04	8.03E-04
Ni2+	5.89E-03	209	586	5.72E-03	5.80E-03	5.99E-03	6.07E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.04E-03	101	283	2.20E-03	2.61E-03	3.48E-03	3.89E-03
Ca2+	3.00E-02	727	2.04E+03	2.65E-02	2.82E-02	3.18E-02	3.35E-02
K+	6.36E-02	1.50E+03	4.21E+03	5.80E-02	6.07E-02	6.68E-02	6.91E-02
OH-	12.7	1.31E+05	3.66E+05	11.3	12.0	13.5	13.3
NO3-	4.93	1.85E+05	5.17E+05	4.56	4.74	5.08	5.10
NO2-	2.90	8.06E+04	2.26E+05	2.54	2.71	3.09	3.27
CO32-	0.291	1.05E+04	2.95E+04	0.261	0.275	0.306	0.314
PO43-	5.70E-02	3.27E+03	9.15E+03	5.16E-02	5.34E-02	5.83E-02	5.96E-02
SO42-	0.185	1.07E+04	3.00E+04	0.138	0.160	0.210	0.232
Si (as SiO32-)	7.16E-02	1.21E+03	3.40E+03	5.94E-02	6.54E-02	7.77E-02	8.37E-02
F-	3.13E-02	359	1.00E+03	2.58E-02	2.81E-02	3.39E-02	3.61E-02
Cl-	0.256	5.49E+03	1.54E+04	0.230	0.243	0.271	0.274
C6H5O73-	2.34E-02	2.67E+03	7.48E+03	2.17E-02	2.25E-02	2.43E-02	2.51E-02
EDTA4-	2.10E-03	366	1.02E+03	1.06E-03	1.57E-03	2.64E-03	3.16E-03
HEDTA3-	3.45E-03	571	1.60E+03	1.37E-03	2.39E-03	4.52E-03	5.56E-03
glycolate-	4.48E-02	2.03E+03	5.69E+03	2.44E-02	3.44E-02	5.53E-02	6.53E-02
acetate-	2.43E-03	86.6	243	1.97E-03	2.20E-03	2.66E-03	2.89E-03
oxalate2-	4.29E-08	2.28E-03	6.38E-03	3.81E-08	4.04E-08	4.53E-08	4.76E-08
DBP	1.51E-02	1.92E+03	5.37E+03	1.21E-02	1.36E-02	1.66E-02	1.80E-02
butanol	1.51E-02	676	1.89E+03	1.21E-02	1.36E-02	1.66E-02	1.80E-02
NH3	7.44E-02	764	2.14E+03	6.07E-02	6.61E-02	8.49E-02	9.72E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-106							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.02E+06 (kg)	(479 kgal)	----	---	---	---	---
Heat Load	3.66 (kW)	(1.25E+04 BTU/hr)	----	3.47	3.56	3.76	3.85
Bulk Density†	1.66 (g/cc)	----	----	1.61	1.64	1.68	1.70
Water wt%†	30.6	---	---	28.5	29.3	32.0	33.6
TOC wt% C (wet	0.317	---	----	0.284	0.300	0.334	0.350
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	14.7	2.03E+05	6.12E+05	13.5	14.2	15.1	15.5
Al3+	2.69	4.36E+04	1.31E+05	2.31	2.43	2.86	2.99
Fe3+ (total Fe)	1.96E-02	659	1.99E+03	1.80E-02	1.88E-02	2.05E-02	2.13E-02
Cr3+	0.193	6.04E+03	1.82E+04	0.150	0.173	0.201	0.208
Bi3+	6.11E-04	76.8	232	5.52E-04	5.81E-04	6.41E-04	6.70E-04
La3+	3.05E-08	2.55E-03	7.69E-03	2.24E-08	2.64E-08	3.47E-08	3.87E-08
Hg2+	2.78E-04	33.5	101	2.74E-04	2.76E-04	2.79E-04	2.80E-04
Zr (as ZrO(OH)2)	1.24E-04	6.78	20.4	1.13E-04	1.17E-04	1.28E-04	1.34E-04
Pb2+	8.52E-03	1.06E+03	3.20E+03	7.88E-03	8.26E-03	8.75E-03	8.98E-03
Ni2+	5.57E-03	197	593	5.40E-03	5.48E-03	5.65E-03	5.78E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	2.84E-03	93.8	283	2.05E-03	2.44E-03	3.24E-03	3.63E-03
Ca2+	3.61E-02	869	2.62E+03	3.25E-02	3.44E-02	3.77E-02	3.93E-02
K+	5.95E-02	1.40E+03	4.22E+03	5.42E-02	5.67E-02	6.25E-02	6.46E-02
OH-	14.7	1.50E+05	4.52E+05	13.2	13.7	15.4	15.9
NO3-	4.64	1.73E+05	5.22E+05	4.30	4.46	4.78	4.80
NO2-	2.77	7.67E+04	2.31E+05	2.43	2.59	2.95	3.11
CO32-	0.279	1.01E+04	3.04E+04	0.252	0.265	0.294	0.301
PO43-	5.32E-02	3.04E+03	9.15E+03	4.81E-02	4.99E-02	5.44E-02	5.56E-02
SO42-	0.173	9.98E+03	3.01E+04	0.129	0.150	0.196	0.217
Si (as SiO32-)	6.81E-02	1.15E+03	3.47E+03	5.68E-02	6.24E-02	7.39E-02	7.94E-02
F-	2.92E-02	333	1.00E+03	2.40E-02	2.62E-02	3.17E-02	3.37E-02
Cl-	0.240	5.11E+03	1.54E+04	0.216	0.227	0.254	0.256
C6H5O73-	2.18E-02	2.48E+03	7.48E+03	2.02E-02	2.10E-02	2.26E-02	2.34E-02
EDTA4-	1.96E-03	340	1.02E+03	9.93E-04	1.47E-03	2.46E-03	2.95E-03
HEDTA3-	3.22E-03	531	1.60E+03	1.28E-03	2.23E-03	4.22E-03	5.19E-03
glycolate-	4.18E-02	1.89E+03	5.69E+03	2.28E-02	3.21E-02	5.16E-02	6.09E-02
acetate-	2.27E-03	80.5	243	1.84E-03	2.05E-03	2.49E-03	2.70E-03
oxalate2-	4.00E-08	2.12E-03	6.38E-03	3.56E-08	3.77E-08	4.23E-08	4.44E-08
DBP	1.41E-02	1.78E+03	5.37E+03	1.13E-02	1.27E-02	1.55E-02	1.68E-02
butanol	1.41E-02	628	1.89E+03	1.13E-02	1.27E-02	1.55E-02	1.68E-02
NH3	6.94E-02	710	2.14E+03	5.67E-02	6.17E-02	7.92E-02	9.07E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-106							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	2.15E+05 (kg)	(32.0 kgal)	---	---	---	---	---
Heat Load	3.00E-03 (kW)	(10.3 BTU/hr)	---	2.52E-03	2.90E-03	3.11E-03	3.20E-03
Bulk Density	1.77 (g/cc)	---	---	1.47	1.57	1.92	2.02
Void Fraction	0.651	---	---	0.488	0.557	0.780	0.825
Water wt%	24.5	---	---	4.37	12.2	45.5	55.1
TOC wt% C (wet	0	---	---	0	0	0	0

Radiological Constituents	**Ci/L**	**μCi/g**	**CI**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	1.01E-06	5.71E-04	0.123	6.33E-07	8.98E-07	1.13E-06	1.24E-06
C-14	1.09E-07	6.16E-05	1.32E-02	9.15E-08	1.05E-07	1.13E-07	1.16E-07
Ni-59	3.09E-08	1.75E-05	3.75E-03	2.59E-08	2.99E-08	4.60E-08	1.15E-07
Ni-63	2.90E-06	1.64E-03	0.351	2.43E-06	2.80E-06	4.31E-06	1.08E-05
Co-60	4.71E-08	2.66E-05	5.71E-03	3.96E-08	4.56E-08	4.87E-08	5.02E-08
Se-79	2.37E-08	1.34E-05	2.87E-03	1.99E-08	2.29E-08	2.45E-08	2.53E-08
Sr-90	2.05E-03	1.16	248	1.72E-03	1.98E-03	2.12E-03	2.18E-03
Y-90	2.05E-03	1.16	248	1.72E-03	1.98E-03	2.12E-03	2.18E-03
Zr-93	1.12E-07	6.34E-05	1.36E-02	9.42E-08	1.09E-07	1.16E-07	1.20E-07
Nb-93m	9.13E-08	5.15E-05	1.11E-02	7.66E-08	8.82E-08	9.43E-08	9.73E-08
Tc-99	7.84E-07	4.42E-04	9.49E-02	6.57E-07	7.57E-07	8.10E-07	8.35E-07
Ru-106	2.76E-13	1.56E-10	3.34E-08	2.31E-13	2.66E-13	2.85E-13	2.94E-13
Cd-113m	3.51E-07	1.98E-04	4.25E-02	2.94E-07	3.39E-07	3.62E-07	3.74E-07
Sb-125	7.89E-08	4.46E-05	9.56E-03	6.62E-08	7.63E-08	8.16E-08	8.41E-08
Sn-126	3.61E-08	2.04E-05	4.38E-03	3.03E-08	3.49E-08	3.73E-08	3.85E-08
I-129	1.50E-09	8.47E-07	1.82E-04	1.26E-09	1.45E-09	1.55E-09	1.60E-09
Cs-134	1.65E-09	9.34E-07	2.00E-04	1.39E-09	1.60E-09	1.71E-09	1.76E-09
Cs-137	2.35E-03	1.33	285	1.97E-03	2.27E-03	2.43E-03	2.50E-03
Ba-137m	2.22E-03	1.26	269	1.87E-03	2.15E-03	2.30E-03	2.37E-03
Sm-151	8.47E-05	4.78E-02	10.3	7.10E-05	8.18E-05	8.75E-05	9.02E-05
Eu-152	1.75E-07	9.89E-05	2.12E-02	1.74E-07	1.75E-07	1.76E-07	1.76E-07
Eu-154	1.15E-06	6.48E-04	0.139	9.63E-07	1.11E-06	1.19E-06	1.22E-06
Eu-155	8.33E-06	4.71E-03	1.01	8.27E-06	8.32E-06	8.35E-06	8.36E-06
Ra-226	2.83E-12	1.60E-09	3.42E-07	2.37E-12	2.73E-12	2.92E-12	3.01E-12
Ra-228	2.92E-16	1.65E-13	3.54E-11	2.90E-16	2.91E-16	2.92E-16	2.93E-16
Ac-227	1.45E-11	8.19E-09	1.76E-06	1.22E-11	1.40E-11	1.50E-11	1.55E-11
Pa-231	3.44E-11	1.94E-08	4.17E-06	2.89E-11	3.32E-11	3.55E-11	3.67E-11
Th-229	4.13E-14	2.33E-11	5.00E-09	4.09E-14	4.12E-14	4.13E-14	4.14E-14
Th-232	4.04E-17	2.28E-14	4.89E-12	3.39E-17	3.90E-17	4.17E-17	4.30E-17
U-232	6.47E-10	3.65E-07	7.83E-05	5.62E-10	6.12E-10	6.72E-10	6.90E-10
U-233	2.39E-11	1.35E-08	2.90E-06	2.08E-11	2.26E-11	2.49E-11	2.55E-11
U-234	1.48E-05	8.36E-03	1.79	1.29E-05	1.40E-05	1.54E-05	1.58E-05
U-235	6.29E-07	3.55E-04	7.62E-02	5.46E-07	5.95E-07	6.53E-07	6.71E-07
U-236	3.26E-07	1.84E-04	3.95E-02	2.83E-07	3.08E-07	3.39E-07	3.48E-07
U-238	1.44E-05	8.14E-03	1.75	1.25E-05	1.36E-05	1.50E-05	1.54E-05
Np-237	5.48E-09	3.09E-06	6.64E-04	4.60E-09	5.30E-09	5.67E-09	5.84E-09
Pu-238	2.51E-05	1.42E-02	3.04	2.40E-05	2.45E-05	2.57E-05	2.62E-05
Pu-239	1.61E-03	0.908	195	1.54E-03	1.57E-03	1.64E-03	1.68E-03
Pu-240	2.27E-04	0.128	27.5	2.17E-04	2.22E-04	2.32E-04	2.37E-04
Pu-241	1.39E-03	0.782	168	1.32E-03	1.35E-03	1.42E-03	1.45E-03
Pu-242	5.88E-09	3.32E-06	7.12E-04	5.62E-09	5.75E-09	6.01E-09	6.14E-09
Am-241	4.09E-07	2.31E-04	4.95E-02	3.43E-07	3.95E-07	4.22E-07	4.36E-07
Am-243	3.73E-12	2.10E-09	4.51E-07	3.13E-12	3.60E-12	3.85E-12	3.97E-12
Cm-242	3.65E-09	2.06E-06	4.42E-04	3.62E-09	3.65E-09	3.66E-09	3.67E-09
Cm-243	8.34E-11	4.71E-08	1.01E-05	8.27E-11	8.32E-11	8.35E-11	8.36E-11
Cm-244	1.30E-10	7.33E-08	1.57E-05	1.09E-10	1.25E-10	1.34E-10	1.38E-10

Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	2.69E-02 (g/L)	---	3.26	2.57E-02	2.63E-02	2.75E-02	2.81E-02
U	0.181	2.44E+04	5.23E+03	0.158	0.172	0.188	0.194

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-106							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	2.80E+06 (kg)	(447 kgal)	---	---	---	---	---
Heat Load	3.65 (kW)	(1.25E+04 BTU/hr)	---	3.47	3.56	3.76	3.85
Bulk Density*	1.66 (g/cc)	---	---	1.60	1.63	1.68	1.69
Water wt%†	31.0	---	---	28.8	29.8	32.3	34.4
TOC wt% C (wet	0.342	---	---	0.306	0.324	0.360	0.377
Radiological Constituents	**CI/L**	**µCi/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.82E-04	0.171	478	1.74E-04	1.74E-04	2.95E-04	2.90E-04
C-14	3.45E-05	2.09E-02	58.4	1.19E-05	1.19E-05	3.52E-05	3.51E-05
Ni-59	2.26E-06	1.36E-03	3.82	1.20E-06	1.20E-06	2.31E-06	2.36E-06
Ni-63	2.20E-04	0.133	372	1.15E-04	1.15E-04	2.25E-04	2.30E-04
Co-60	3.54E-05	2.14E-02	59.9	9.52E-06	9.52E-06	3.58E-05	3.61E-05
Se-79	3.57E-06	2.16E-03	6.04	2.13E-06	2.13E-06	4.09E-06	4.59E-06
Sr-90	0.112	67.6	1.89E+05	0.105	0.108	0.116	0.119
Y-90	0.112	67.6	1.89E+05	6.21E-02	6.21E-02	0.116	0.119
Zr-93	1.75E-05	1.06E-02	29.6	1.03E-05	1.03E-05	2.01E-05	2.26E-05
Nb-93m	1.29E-05	7.77E-03	21.8	7.81E-06	7.81E-06	1.47E-05	1.64E-05
Tc-99	2.47E-04	0.149	418	1.63E-04	2.04E-04	2.90E-04	3.32E-04
Ru-106	5.80E-09	3.50E-06	9.81E-03	2.46E-09	2.46E-09	6.55E-09	7.23E-09
Cd-113m	8.82E-05	5.33E-02	149	4.49E-05	4.49E-05	1.04E-04	1.19E-04
Sb-125	1.46E-04	8.80E-02	246	3.37E-05	3.37E-05	1.47E-04	1.49E-04
Sn-126	5.41E-06	3.27E-03	9.15	3.25E-06	3.25E-06	6.19E-06	6.94E-06
I-129	4.76E-07	2.87E-04	0.805	3.13E-07	3.92E-07	5.60E-07	6.41E-07
Cs-134	1.72E-06	1.04E-03	2.92	9.10E-07	9.10E-07	1.82E-06	1.91E-06
Cs-137	0.300	181	5.07E+05	0.276	0.288	0.313	0.325
Ba-137m	0.284	171	4.80E+05	0.175	0.175	0.296	0.298
Sm-151	1.26E-02	7.61	2.13E+04	7.55E-03	7.55E-03	1.44E-02	1.62E-02
Eu-152	3.14E-06	1.90E-03	5.32	1.36E-06	1.36E-06	3.20E-06	3.25E-06
Eu-154	5.78E-04	0.349	978	2.18E-04	2.18E-04	7.08E-04	7.60E-04
Eu-155	1.80E-04	0.109	305	7.38E-05	7.38E-05	1.84E-04	1.87E-04
Ra-226	1.57E-10	9.51E-08	2.66E-04	1.13E-10	1.13E-10	1.80E-10	2.01E-10
Ra-228	5.17E-08	3.12E-05	8.74E-02	2.06E-08	3.58E-08	7.01E-08	8.97E-08
Ac-227	9.48E-10	5.73E-07	1.60E-03	6.89E-10	6.89E-10	1.08E-09	1.16E-09
Pa-231	4.28E-09	2.58E-06	7.24E-03	2.84E-09	2.84E-09	4.80E-09	5.30E-09
Th-229	1.24E-09	7.47E-07	2.09E-03	5.55E-10	8.88E-10	1.64E-09	2.07E-09
Th-232	3.56E-09	2.15E-06	6.03E-03	1.85E-09	2.69E-09	4.44E-09	5.28E-09
U-232	3.23E-07	1.95E-04	0.547	1.99E-07	2.59E-07	3.97E-07	4.75E-07
U-233	1.24E-06	7.49E-04	2.10	7.63E-07	9.96E-07	1.52E-06	1.82E-06
U-234	8.07E-07	4.88E-04	1.37	7.47E-07	7.76E-07	8.41E-07	8.31E-07
U-235	3.33E-08	2.01E-05	5.63E-02	3.07E-08	3.19E-08	3.48E-08	3.43E-08
U-236	2.39E-08	1.44E-05	4.04E-02	2.29E-08	2.34E-08	2.44E-08	2.46E-08
U-238	8.30E-07	5.01E-04	1.40	7.69E-07	7.98E-07	8.65E-07	8.53E-07
Np-237	9.66E-07	5.84E-04	1.64	6.91E-07	8.26E-07	1.11E-06	1.25E-06
Pu-238	1.18E-06	7.13E-04	2.00	8.58E-07	1.02E-06	1.35E-06	1.50E-06
Pu-239	4.26E-05	2.57E-02	72.0	3.43E-05	3.84E-05	4.68E-05	5.08E-05
Pu-240	7.06E-06	4.27E-03	12.0	5.52E-06	6.28E-06	7.85E-06	8.60E-06
Pu-241	7.81E-05	4.72E-02	132	5.61E-05	6.69E-05	8.94E-05	1.00E-04
Pu-242	4.26E-10	2.57E-07	7.20E-04	2.94E-10	3.59E-10	4.93E-10	5.57E-10
Am-241	5.79E-05	3.50E-02	97.9	4.25E-05	5.01E-05	6.57E-05	7.32E-05
Am-243	1.75E-09	1.06E-06	2.96E-03	1.27E-09	1.50E-09	2.01E-09	2.25E-09
Cm-242	1.09E-07	6.57E-05	0.184	3.55E-08	3.55E-08	1.12E-07	1.14E-07
Cm-243	9.83E-09	5.94E-06	1.66E-02	2.84E-09	2.84E-09	1.01E-08	1.04E-08
Cm-244	1.10E-07	6.65E-05	0.186	3.80E-08	3.80E-08	1.35E-07	1.50E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.47E-04 (g/L)	---	0.926	3.91E-04	4.68E-04	6.27E-04	7.03E-04
U	9.47E-03	1.36E+03	3.81E+03	8.70E-03	9.06E-03	9.91E-03	9.75E-03

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-106							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.02E+06 (kg)	(479 kgal)	—	—	—	—	—
Heat Load	3.66 (kW)	(1.25E+04 BTU/hr)	----	3.47	3.56	3.76	3.85
Bulk Density†	1.66 (g/cc)	—	—	1.61	1.64	1.68	1.70
Water wt%†	30.6	----	----	28.5	29.3	32.0	33.6
TOC wt% C (wet	0.317	----	----	0.284	0.300	0.334	0.350
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.63E-04	0.158	478	1.63E-04	1.63E-04	2.76E-04	2.71E-04
C-14	3.22E-05	1.94E-02	58.4	1.11E-05	1.11E-05	3.28E-05	3.27E-05
Ni-59	2.11E-06	1.27E-03	3.82	1.12E-06	1.12E-06	2.16E-06	2.21E-06
Ni-63	2.05E-04	0.123	372	1.07E-04	1.07E-04	2.10E-04	2.15E-04
Co-60	3.30E-05	1.99E-02	59.9	8.89E-06	8.89E-06	3.34E-05	3.37E-05
Se-79	3.34E-06	2.01E-03	6.05	1.99E-06	1.99E-06	3.82E-06	4.29E-06
Sr-90	0.105	62.9	1.90E+05	9.80E-02	0.101	0.108	0.111
Y-90	0.105	62.9	1.90E+05	5.81E-02	5.81E-02	0.108	0.111
Zr-93	1.63E-05	9.82E-03	29.6	9.60E-06	9.60E-06	1.88E-05	2.11E-05
Nb-93m	1.20E-05	7.22E-03	21.8	7.30E-06	7.30E-06	1.37E-05	1.53E-05
Tc-99	2.31E-04	0.139	418	1.52E-04	1.90E-04	2.71E-04	3.10E-04
Ru-106	5.41E-09	3.25E-06	9.81E-03	2.29E-09	2.29E-09	6.11E-09	6.74E-09
Cd-113m	8.23E-05	4.95E-02	149	4.19E-05	4.19E-05	9.69E-05	1.11E-04
Sb-125	1.36E-04	8.17E-02	246	3.14E-05	3.14E-05	1.38E-04	1.39E-04
Sn-126	5.05E-06	3.04E-03	9.15	3.03E-06	3.03E-06	5.78E-06	6.48E-06
I-129	4.44E-07	2.67E-04	0.805	2.92E-07	3.66E-07	5.22E-07	5.98E-07
Cs-134	1.61E-06	9.67E-04	2.92	8.49E-07	8.49E-07	1.70E-06	1.78E-06
Cs-137	0.280	168	5.08E+05	0.258	0.269	0.293	0.303
Ba-137m	0.265	159	4.80E+05	0.164	0.164	0.277	0.278
Sm-151	1.18E-02	7.07	2.13E+04	7.05E-03	7.05E-03	1.35E-02	1.51E-02
Eu-152	2.95E-06	1.77E-03	5.34	1.28E-06	1.28E-06	3.00E-06	3.04E-06
Eu-154	5.39E-04	0.324	978	2.03E-04	2.03E-04	6.61E-04	7.10E-04
Eu-155	1.69E-04	0.101	306	6.94E-05	6.94E-05	1.72E-04	1.75E-04
Ra-226	1.47E-10	8.85E-08	2.67E-04	1.05E-10	1.05E-10	1.68E-10	1.88E-10
Ra-228	4.82E-08	2.90E-05	8.74E-02	1.93E-08	3.34E-08	6.54E-08	8.37E-08
Ac-227	8.86E-10	5.33E-07	1.61E-03	6.44E-10	6.44E-10	1.01E-09	1.08E-09
Pa-231	4.00E-09	2.40E-06	7.24E-03	2.65E-09	2.65E-09	4.48E-09	4.95E-09
Th-229	1.15E-09	6.93E-07	2.09E-03	5.18E-10	8.28E-10	1.53E-09	1.93E-09
Th-232	3.33E-09	2.00E-06	6.03E-03	1.72E-09	2.51E-09	4.14E-09	4.93E-09
U-232	3.02E-07	1.81E-04	0.547	1.85E-07	2.42E-07	3.70E-07	4.44E-07
U-233	1.16E-06	6.96E-04	2.10	7.12E-07	9.30E-07	1.42E-06	1.70E-06
U-234	1.74E-06	1.05E-03	3.16	1.61E-06	1.69E-06	1.78E-06	1.81E-06
U-235	7.31E-08	4.39E-05	0.132	6.76E-08	7.08E-08	7.47E-08	7.59E-08
U-236	4.41E-08	2.65E-05	7.99E-02	4.12E-08	4.29E-08	4.49E-08	4.55E-08
U-238	1.74E-06	1.04E-03	3.15	1.61E-06	1.68E-06	1.77E-06	1.80E-06
Np-237	9.02E-07	5.42E-04	1.64	6.46E-07	7.71E-07	1.03E-06	1.16E-06
Pu-238	2.78E-06	1.67E-03	5.04	2.48E-06	2.63E-06	2.93E-06	3.08E-06
Pu-239	1.47E-04	8.85E-02	267	1.39E-04	1.43E-04	1.51E-04	1.55E-04
Pu-240	2.17E-05	1.31E-02	39.4	2.03E-05	2.10E-05	2.25E-05	2.32E-05
Pu-241	1.65E-04	9.95E-02	300	1.45E-04	1.55E-04	1.76E-04	1.86E-04
Pu-242	7.90E-10	4.75E-07	1.43E-03	6.67E-10	7.27E-10	8.53E-10	9.13E-10
Am-241	5.40E-05	3.25E-02	98.0	3.97E-05	4.67E-05	6.13E-05	6.83E-05
Am-243	1.63E-09	9.82E-07	2.96E-03	1.18E-09	1.40E-09	1.87E-09	2.10E-09
Cm-242	1.02E-07	6.12E-05	0.185	3.34E-08	3.34E-08	1.04E-07	1.07E-07
Cm-243	9.18E-09	5.52E-06	1.66E-02	2.66E-09	2.66E-09	9.46E-09	9.73E-09
Cm-244	1.03E-07	6.18E-05	0.186	3.55E-08	3.55E-08	1.26E-07	1.40E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	2.31E-03 (g/L)	—	4.18	2.16E-03	2.23E-03	2.38E-03	2.45E-03
U	2.10E-02	3.00E+03	9.04E+03	1.94E-02	2.03E-02	2.14E-02	2.18E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.

TANK 241-S-107 SUMMARY

TANK HISTORY	
Entered Service	4th qtr 1952
Removed from Service	-
Inactive	1980
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
2, 11, 14, 16	4 in
6	12 in

TANK TEMPERATURE	
Average Tank Temperature	101°F
Maximum Temperature	123°F
Date	May 2, 1988
Elevation from tank bottom	0.48 ft
Riser Number	4
Minimum Temperature	78.3°F
Date	Feb 13, 1993
Elevation from tank bottom	24.44 ft
Riser Number	4

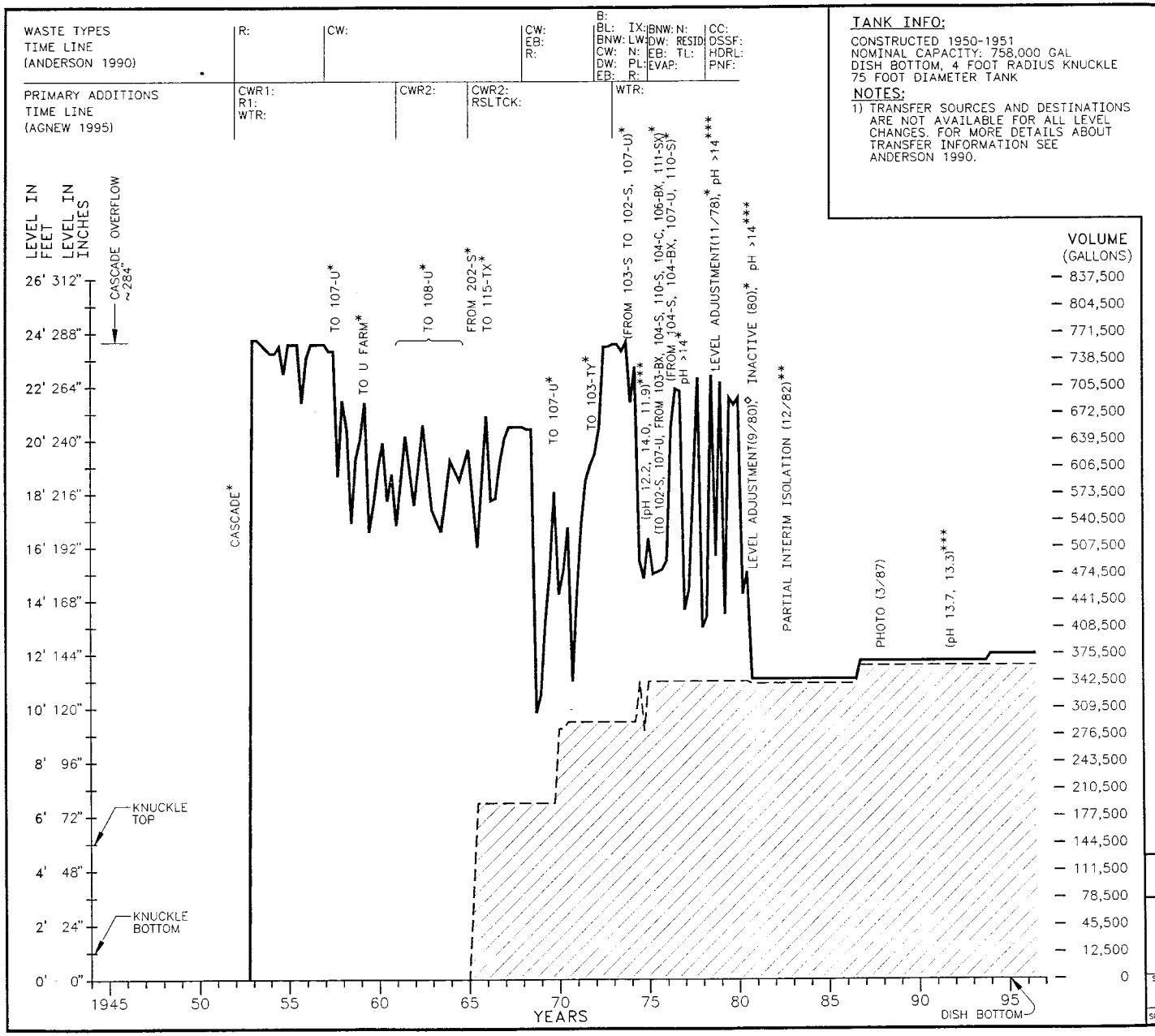
TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-108
Total Risers	12

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	376,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	45,000 gal
Pumpable Liquids	88,000 gal
Saltcake	69,000 gal
Sludge	293,000 gal
Supernatant	14,000 gal

INTERIOR PHOTOGRAPHS	
Date	March 12, 1987
Montage Number	94041033-24CN
Photo Set Number	8701464

WASTE SURFACE LEVEL	
Devices	Auto and Manual ENRAF
Max Level	146.49 in
Date	Sept 15, 1996
Min Level	142.1 in
Date	Jan 1, 1991 - May 16, 1991*

* Numerous dates in this time span.



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

GLOSSARY OF WASTE TERMS:

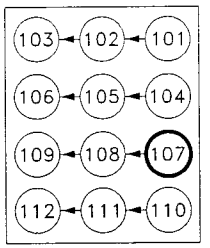
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

B:	B-PLANT HIGH-LEVEL WASTE
BL:	B-PLANT LOW-LEVEL WASTE
BNW:	BATTELLE NW LABORATORY WASTE
CC:	COMPLEXANT CONCENTRATE
CW:	COATING (CLADDING) WASTE
CWR1:	COATING (CLADDING) WASTE 1952-60
CWR2:	COATING (CLADDING) WASTE 1961-67
DSSF:	DOUBLE-SHELL SLURRY FEED
DW:	DECONTAMINATION WASTE
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HDRL:	HANFORD DEFENSE RESIDUAL LIQUOR
IX:	ION EXCHANGE
LW:	LABORATORY WASTE
N:	N-REACTOR WASTE
PL:	PUREX LOW-LEVEL WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
R1:	REDOX WASTE 1952-57
RSLTCK:	SALTCAKE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
TL:	TERMINAL LIQUOR
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- SOLIDS

S TANK FARM
CASCADE

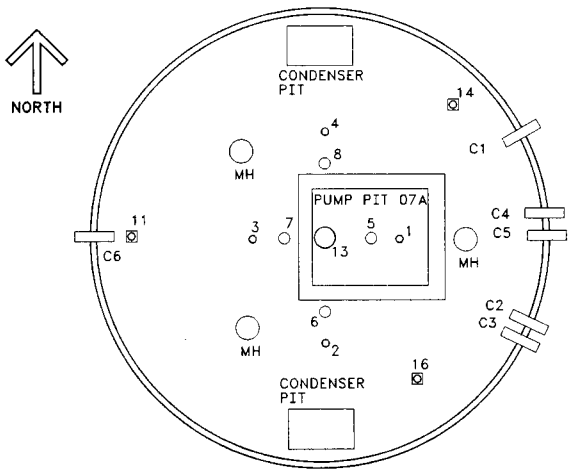


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-107 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: N/A

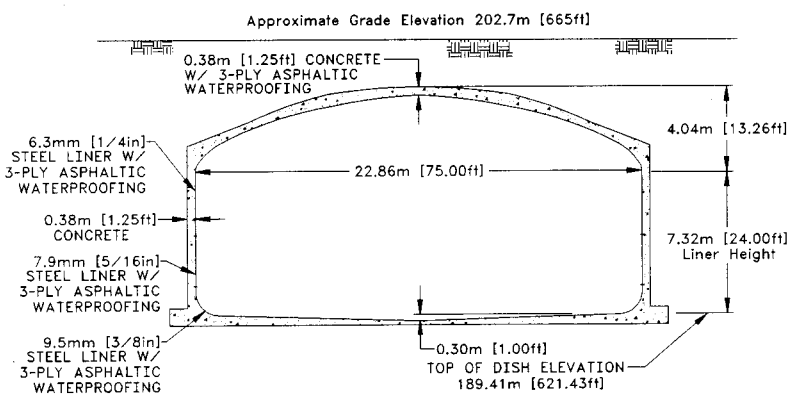
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E73	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-107



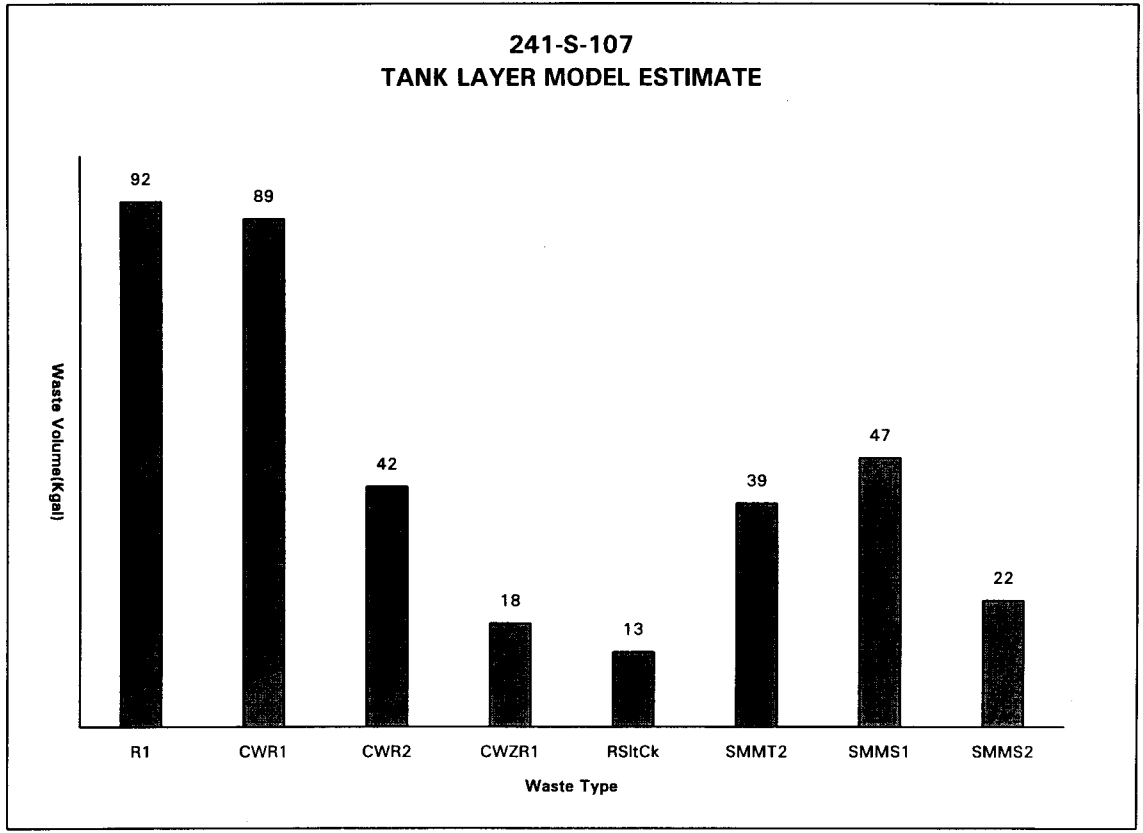
Ref: Alstad 1993
H-2-73186, Rev. 4
H-2-37530, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-107							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Waste	1.64E+06 (kg)	(254 kgal)	---	---	---	---	---
Heat Load	2.45 (kW)	(8.38E+03 BTU/hr)	---	1.83	2.19	2.62	2.70
Bulk Density	1.71 (g/cc)	---	---	1.61	1.63	1.84	1.89
Void Fraction	0.649	---	---	0.477	0.534	0.722	0.724
Water wt%	31.8	---	---	20.9	24.5	39.2	42.1
TOC wt% C (wet	2.69E-04	---	---	2.44E-04	2.51E-04	2.94E-04	3.21E-04
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	7.01	9.42E+04	1.55E+05	5.04	5.35	9.39	10.7
Al3+	7.60	1.20E+05	1.97E+05	5.72	6.22	8.58	9.30
Fe3+ (total Fe)	0.510	1.67E+04	2.74E+04	0.503	0.507	0.514	0.517
Cr3+	6.58E-02	2.00E+03	3.29E+03	4.59E-02	5.56E-02	0.232	0.427
Bi3+	3.52E-07	4.30E-02	7.06E-02	2.97E-07	3.24E-07	3.87E-07	4.26E-07
La3+	8.66E-13	7.04E-08	1.16E-07	7.59E-13	8.20E-13	9.58E-13	1.05E-12
Hg2+	3.39E-03	398	654	3.37E-03	3.38E-03	3.40E-03	3.40E-03
Zr (as ZrO(OH)2)	6.57E-02	3.50E+03	5.76E+03	6.06E-02	6.45E-02	6.62E-02	6.65E-02
Pb2+	9.51E-02	1.15E+04	1.89E+04	9.10E-02	9.30E-02	9.71E-02	9.91E-02
Ni2+	1.98E-02	679	1.12E+03	1.47E-02	1.76E-02	2.15E-02	2.12E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.56E-06	8.23E-02	0.135	1.83E-06	2.19E-06	2.94E-06	3.31E-06
Ca2+	0.186	4.36E+03	7.16E+03	0.159	0.172	0.200	0.213
K+	2.03E-02	465	764	1.10E-02	1.56E-02	2.52E-02	2.99E-02
OH-	29.0	2.88E+05	4.74E+05	21.4	23.5	33.0	35.8
NO3-	2.51	9.10E+04	1.50E+05	0.617	0.617	5.47	7.08
NO2-	1.00	2.69E+04	4.43E+04	0.521	0.689	1.25	1.25
CO32-	0.186	6.53E+03	1.07E+04	0.159	0.172	0.200	0.213
PO43-	2.28E-05	1.26	2.08	2.11E-05	2.21E-05	2.37E-05	2.58E-05
SO42-	1.05E-02	588	966	7.12E-03	8.46E-03	1.18E-02	1.18E-02
Si (as SiO32-)	1.66E-02	273	449	1.40E-02	1.51E-02	3.82E-02	7.10E-02
F-	0.375	*4.16E+03*	*6.84E+03*	*1.49E-02*	*0.282*	*0.418*	*0.442*
Cl-	3.04E-02	630	1.04E+03	1.38E-02	2.05E-02	3.71E-02	6.85E-02
C6H5O73-	1.87E-05	2.07	3.41	1.82E-05	1.84E-05	1.96E-05	2.13E-05
EDTA4-	7.30E-07	0.123	0.202	5.14E-07	6.32E-07	8.60E-07	9.89E-07
HEDTA3-	6.06E-07	9.72E-02	0.160	1.95E-07	4.17E-07	8.09E-07	1.01E-06
glycolate-	2.65E-05	1.16	1.91	1.44E-05	2.09E-05	3.29E-05	3.91E-05
acetate-	2.75E-06	9.48E-02	0.156	2.66E-06	2.70E-06	2.92E-06	3.12E-06
oxalate2-	1.13E-12	5.84E-08	9.60E-08	1.01E-12	1.07E-12	1.25E-12	1.37E-12
DBP	1.66E-05	2.04	3.36	1.55E-05	1.62E-05	1.80E-05	1.94E-05
butanol	*1.66E-05*	*0.721*	*1.18*	*1.55E-05*	*1.62E-05*	*1.80E-05*	*1.94E-05*
NH3	0.141	1.40E+03	2.31E+03	7.24E-02	8.22E-02	0.157	0.173
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-107							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM Wast	6.46E+05 (kg)	(122 kgal)	----	----	----	----	----
Heat Load	0.732 (kW)	(2.50E+03 BTU/hr)	—	0.670	0.710	0.755	0.777
Bulk Density*	1.40 (g/cc)	----	----	1.37	1.38	1.41	1.42
Water wt%	49.0	—	—	46.8	47.8	50.4	51.9
TOC wt% C (wet	0.898	---	—	0.468	0.679	1.12	1.33
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	9.39	1.54E+05	9.97E+04	8.60	9.00	9.73	10.0
Al3+	1.05	2.03E+04	1.31E+04	0.975	1.01	1.09	1.13
Fe3+ (total Fe)	7.79E-03	311	201	6.49E-03	7.13E-03	8.46E-03	9.09E-03
Cr3+	9.29E-02	3.45E+03	2.23E+03	7.83E-02	8.61E-02	9.55E-02	9.81E-02
Bi3+	8.42E-04	126	81.2	7.67E-04	8.04E-04	8.79E-04	9.16E-04
La3+	2.73E-05	2.72	1.75	1.98E-05	2.35E-05	3.12E-05	3.49E-05
Hg2+	5.80E-06	0.832	0.537	5.41E-06	5.63E-06	5.89E-06	5.97E-06
Zr (as ZrO(OH)2)	1.55E-04	10.1	6.52	1.41E-04	1.46E-04	1.60E-04	1.68E-04
Pb2+	6.44E-04	95.4	61.6	5.20E-04	5.81E-04	7.07E-04	7.68E-04
Ni2+	4.33E-03	182	117	4.14E-03	4.24E-03	4.38E-03	4.43E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	2.64E-03	104	67.0	2.02E-03	2.32E-03	2.96E-03	3.27E-03
Ca2+	2.33E-02	668	431	2.14E-02	2.23E-02	2.43E-02	2.52E-02
K+	4.35E-02	1.22E+03	786	3.97E-02	4.15E-02	4.56E-02	4.76E-02
OH-	6.38	7.76E+04	5.01E+04	5.93	6.14	6.63	6.78
NO3-	3.21	1.42E+05	9.19E+04	2.97	3.11	3.26	3.31
NO2-	1.58	5.21E+04	3.37E+04	1.32	1.44	1.72	1.86
CO32-	0.319	1.37E+04	8.86E+03	0.286	0.303	0.338	0.348
PO43-	6.02E-02	4.09E+03	2.64E+03	5.23E-02	5.51E-02	6.16E-02	6.30E-02
SO42-	0.171	1.17E+04	7.59E+03	0.137	0.153	0.190	0.206
Si (as SiO32-)	5.57E-02	1.12E+03	723	4.68E-02	5.12E-02	6.03E-02	6.47E-02
F-	4.13E-02	562	363	3.49E-02	3.76E-02	4.45E-02	4.70E-02
Cl-	0.162	4.12E+03	2.66E+03	0.147	0.154	0.170	0.175
C6H5O73-	1.90E-02	2.57E+03	1.66E+03	1.72E-02	1.81E-02	2.00E-02	2.09E-02
EDTA4-	2.04E-02	4.20E+03	2.71E+03	5.54E-03	1.28E-02	2.80E-02	3.55E-02
HEDTA3-	3.94E-02	7.72E+03	4.99E+03	9.66E-03	2.42E-02	5.47E-02	6.96E-02
glycolate-	8.79E-02	4.72E+03	3.05E+03	5.82E-02	7.27E-02	0.103	0.118
acetate-	4.52E-03	191	123	3.71E-03	4.10E-03	4.93E-03	5.33E-03
oxalate2-	3.58E-05	2.25	1.46	3.17E-05	3.37E-05	3.79E-05	3.99E-05
DBP	1.24E-02	1.87E+03	1.21E+03	1.02E-02	1.13E-02	1.35E-02	1.46E-02
butanol	1.24E-02	660	426	1.02E-02	1.13E-02	1.35E-02	1.46E-02
NH3	5.52E-02	671	433	4.51E-02	4.91E-02	6.30E-02	7.20E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-107							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.29E+06 (kg)	(376 kgal)	---	---	---	---	---
Heat Load	3.19 (kW)	(1.09E+04 BTU/hr)	---	2.55	2.92	3.36	3.43
Bulk Density†	1.61 (g/cc)	---	---	1.54	1.55	1.70	1.73
Water wt%†	36.7	---	---	28.4	30.9	42.0	44.2
TOC wt% C (wet	0.253	---	---	0.131	0.191	0.316	0.377
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	7.78	1.11E+05	2.55E+05	6.41	6.61	9.43	10.2
Al3+	5.47	9.18E+04	2.10E+05	4.20	4.55	6.14	6.62
Fe3+ (total Fe)	0.347	1.21E+04	2.76E+04	0.343	0.345	0.350	0.352
Cr3+	7.46E-02	2.41E+03	5.52E+03	6.14E-02	6.79E-02	0.185	0.314
Bi3+	2.73E-04	35.5	81.3	2.49E-04	2.61E-04	2.86E-04	2.97E-04
La3+	8.87E-06	0.766	1.75	6.43E-06	7.62E-06	1.01E-05	1.13E-05
Hg2+	2.29E-03	286	655	2.28E-03	2.29E-03	2.30E-03	2.30E-03
Zr (as ZrO(OH)2)	4.44E-02	2.52E+03	5.77E+03	4.10E-02	4.36E-02	4.48E-02	4.50E-02
Pb2+	6.44E-02	8.30E+03	1.90E+04	6.17E-02	6.30E-02	6.58E-02	6.71E-02
Ni2+	1.48E-02	539	1.23E+03	1.13E-02	1.33E-02	1.59E-02	1.57E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	8.59E-04	29.3	67.2	6.56E-04	7.55E-04	9.63E-04	1.06E-03
Ca2+	0.133	3.32E+03	7.59E+03	0.115	0.124	0.142	0.151
K+	2.79E-02	677	1.55E+03	2.08E-02	2.43E-02	3.15E-02	3.50E-02
OH-	21.7	2.29E+05	5.24E+05	16.5	17.9	24.3	26.3
NO3-	2.74	1.05E+05	2.41E+05	1.44	1.46	4.73	5.79
NO2-	1.19	3.40E+04	7.80E+04	0.850	0.988	1.37	1.37
CO32-	0.229	8.56E+03	1.96E+04	0.212	0.220	0.239	0.247
PO43-	1.96E-02	1.16E+03	2.64E+03	1.70E-02	1.79E-02	2.00E-02	2.05E-02
SO42-	6.26E-02	3.74E+03	8.55E+03	5.14E-02	5.67E-02	6.86E-02	7.39E-02
Si (as SiO32-)	2.93E-02	512	1.17E+03	2.64E-02	2.78E-02	4.38E-02	6.57E-02
F-	0.266	3.15E+03	7.21E+03	2.34E-02	0.204	0.296	0.312
Cl-	7.33E-02	1.61E+03	3.69E+03	6.23E-02	6.77E-02	7.77E-02	9.85E-02
C6H5O73-	6.19E-03	728	1.67E+03	5.59E-03	5.88E-03	6.50E-03	6.80E-03
EDTA4-	6.62E-03	1.19E+03	2.71E+03	1.80E-03	4.15E-03	9.10E-03	1.15E-02
HEDTA3-	1.28E-02	2.18E+03	4.99E+03	3.14E-03	7.85E-03	1.77E-02	2.26E-02
glycolate-	2.85E-02	1.33E+03	3.05E+03	1.89E-02	2.36E-02	3.35E-02	3.83E-02
acetate-	1.47E-03	53.9	123	1.21E-03	1.33E-03	1.60E-03	1.73E-03
oxalate2-	1.16E-05	0.636	1.46	1.03E-05	1.09E-05	1.23E-05	1.29E-05
DBP	4.05E-03	529	1.21E+03	3.34E-03	3.69E-03	4.41E-03	4.75E-03
butanol	4.05E-03	187	427	3.34E-03	3.69E-03	4.41E-03	4.75E-03
NH3	0.113	1.20E+03	2.74E+03	6.62E-02	7.31E-02	0.125	0.137
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-107							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	1.64E+06 (kg)	(254 kgal)	—	—	—	—	—
Heat Load	2.45 (kW)	(8.38E+03 BTU/hr)	—	1.83	2.19	2.62	2.70
Bulk Density	1.71 (g/cc)	—	—	1.61	1.63	1.84	1.89
Void Fraction	0.649	—	—	0.477	0.534	0.722	0.724
Water wt%	31.8	—	—	20.9	24.5	39.2	42.1
TOC wt% C (wet	2.69E-04	—	—	2.44E-04	2.51E-04	2.94E-04	3.21E-04
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.26E-05	1.32E-02	21.8	1.12E-05	1.12E-05	2.69E-05	2.69E-05
C-14	1.51E-06	8.81E-04	1.45	7.81E-07	9.22E-07	1.80E-06	1.80E-06
Ni-59	5.75E-06	3.36E-03	5.53	4.25E-06	5.10E-06	6.25E-06	6.16E-06
Ni-63	5.38E-04	0.315	517	3.99E-04	4.77E-04	5.85E-04	5.76E-04
Co-60	9.91E-07	5.79E-04	0.952	4.64E-07	4.64E-07	1.11E-06	1.11E-06
Se-79	5.49E-07	3.21E-04	0.528	1.94E-07	1.94E-07	6.11E-07	2.97E-06
Sr-90	0.352	206	3.38E+05	0.255	0.310	0.384	0.389
Y-90	0.352	206	3.38E+05	0.255	0.310	0.384	0.389
Zr-93	2.60E-06	1.52E-03	2.50	9.16E-07	9.16E-07	2.89E-06	1.28E-05
Nb-93m	2.11E-06	1.23E-03	2.03	7.43E-07	7.43E-07	2.35E-06	1.30E-05
Tc-99	1.09E-05	6.40E-03	10.5	5.86E-06	7.89E-06	1.30E-05	1.30E-05
Ru-106	1.08E-09	6.31E-07	1.04E-03	2.44E-10	3.67E-10	2.17E-09	3.22E-09
Cd-113m	5.29E-06	3.09E-03	5.08	2.92E-06	2.92E-06	8.18E-06	8.00E-06
Sb-125	2.91E-06	1.70E-03	2.79	1.02E-06	1.02E-06	3.08E-06	3.19E-06
Sn-126	8.43E-07	4.93E-04	0.811	2.97E-07	2.97E-07	9.39E-07	4.72E-06
I-129	2.09E-08	1.22E-05	2.01E-02	1.12E-08	1.51E-08	2.49E-08	2.49E-08
Cs-134	2.25E-07	1.32E-04	0.216	1.07E-07	1.07E-07	2.57E-07	2.89E-07
Cs-137	3.91E-02	22.9	3.76E+04	2.42E-02	3.02E-02	4.51E-02	4.51E-02
Ba-137m	3.70E-02	21.6	3.56E+04	2.13E-02	2.13E-02	4.27E-02	4.27E-02
Sm-151	1.95E-03	1.14	1.88E+03	6.86E-04	6.86E-04	2.18E-03	1.09E-02
Eu-152	3.44E-06	2.01E-03	3.30	2.98E-06	2.98E-06	3.46E-06	3.46E-06
Eu-154	2.40E-05	1.40E-02	23.1	1.14E-05	1.14E-05	2.68E-05	2.80E-05
Eu-155	1.62E-04	9.49E-02	156	1.39E-04	1.39E-04	1.63E-04	1.63E-04
Ra-226	4.17E-10	2.44E-07	4.01E-04	7.91E-11	2.45E-10	5.89E-10	7.55E-10
Ra-228	8.06E-10	4.72E-07	7.75E-04	3.92E-15	3.92E-15	8.14E-10	8.23E-10
Ac-227	1.87E-09	1.10E-06	1.80E-03	2.59E-10	8.72E-10	2.87E-09	3.84E-09
Pa-231	8.10E-10	4.74E-07	7.78E-04	2.80E-10	2.80E-10	1.29E-09	6.63E-09
Th-229	2.00E-11	1.17E-08	1.92E-05	6.84E-13	6.84E-13	2.02E-11	2.04E-11
Th-232	1.08E-11	6.32E-09	1.04E-05	2.65E-16	2.65E-16	1.36E-11	1.64E-11
U-232	4.75E-09	2.78E-06	4.57E-03	2.42E-09	3.50E-09	6.28E-09	7.99E-09
U-233	1.38E-08	8.08E-06	1.33E-02	4.90E-09	9.02E-09	1.97E-08	2.62E-08
U-234	1.52E-05	8.88E-03	14.6	1.45E-05	1.49E-05	1.54E-05	1.55E-05
U-235	5.99E-07	3.51E-04	0.576	5.70E-07	5.87E-07	6.08E-07	6.14E-07
U-236	7.89E-07	4.61E-04	0.758	7.27E-07	7.71E-07	7.98E-07	8.06E-07
U-238	1.20E-05	7.03E-03	11.6	1.14E-05	1.17E-05	1.22E-05	1.24E-05
Np-237	6.38E-08	3.73E-05	6.14E-02	3.08E-08	4.40E-08	7.71E-08	7.71E-08
Pu-238	7.39E-05	4.32E-02	71.0	7.12E-05	7.33E-05	7.45E-05	7.52E-05
Pu-239	1.76E-03	1.03	1.69E+03	1.71E-03	1.74E-03	1.79E-03	1.81E-03
Pu-240	3.16E-04	0.185	303	3.09E-04	3.12E-04	3.19E-04	3.23E-04
Pu-241	4.03E-03	2.35	3.87E+03	3.84E-03	3.98E-03	4.05E-03	4.08E-03
Pu-242	2.30E-08	1.34E-05	2.21E-02	2.15E-08	2.26E-08	2.32E-08	2.33E-08
Am-241	1.07E-05	6.27E-03	10.3	8.13E-06	9.16E-06	1.45E-05	5.96E-05
Am-243	4.51E-10	2.64E-07	4.34E-04	2.93E-10	3.71E-10	1.02E-09	1.96E-09
Cm-242	9.40E-08	5.50E-05	9.03E-02	9.21E-08	9.30E-08	9.49E-08	9.59E-08
Cm-243	5.56E-09	3.25E-06	5.34E-03	5.32E-09	5.44E-09	5.68E-09	5.80E-09
Cm-244	1.04E-07	6.10E-05	0.100	5.75E-09	6.55E-08	1.26E-07	1.47E-07
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	2.98E-02 (g/L)	—	28.6	2.90E-02	2.94E-02	3.02E-02	3.06E-02
U	0.151	2.11E+04	3.46E+04	0.143	0.148	0.154	0.156

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-107

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	6.46E+05 (kg)	(122 kgal)	---	---	---	---	---
Heat Load	0.732 (kW)	(2.50E+03 BTU/hr)	---	0.670	0.710	0.755	0.777
Bulk Density*	1.40 (g/cc)	---	---	1.37	1.38	1.41	1.42
Water wt%†	49.0	---	---	46.8	47.8	50.4	51.9
TOC wt% C (wet	0.898	---	---	0.468	0.679	1.12	1.33

Radiological Constituents	Ci/L	µCi/g	CI	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	1.69E-04	0.121	78.2	8.95E-05	8.95E-05	1.81E-04	1.95E-04
C-14	2.51E-05	1.80E-02	11.6	8.45E-06	8.45E-06	2.55E-05	2.58E-05
Ni-59	1.62E-06	1.16E-03	0.751	8.41E-07	8.41E-07	1.66E-06	1.70E-06
Ni-63	1.59E-04	0.114	73.6	8.19E-05	8.19E-05	1.63E-04	1.67E-04
Co-60	2.86E-05	2.04E-02	13.2	9.49E-06	9.49E-06	2.94E-05	3.03E-05
Se-79	2.63E-06	1.88E-03	1.22	1.57E-06	1.57E-06	3.02E-06	3.39E-06
Sr-90	9.03E-02	64.6	4.17E+04	8.44E-02	8.76E-02	9.30E-02	9.55E-02
Y-90	9.03E-02	64.6	4.17E+04	5.36E-02	5.36E-02	9.30E-02	9.56E-02
Zr-93	1.29E-05	9.25E-03	5.97	7.61E-06	7.61E-06	1.49E-05	1.67E-05
Nb-93m	9.36E-06	6.70E-03	4.32	5.64E-06	5.64E-06	1.07E-05	1.20E-05
Tc-99	1.79E-04	0.128	82.5	1.16E-04	1.47E-04	2.11E-04	2.41E-04
Ru-106	5.56E-09	3.97E-06	2.57E-03	3.09E-09	3.09E-09	6.11E-09	6.61E-09
Cd-113m	6.88E-05	4.92E-02	31.8	3.69E-05	3.69E-05	8.03E-05	9.14E-05
Sb-125	1.25E-04	8.95E-02	57.8	4.25E-05	4.25E-05	1.30E-04	1.35E-04
Sn-126	3.98E-06	2.85E-03	1.84	2.38E-06	2.38E-06	4.56E-06	5.11E-06
I-129	3.44E-07	2.46E-04	0.159	2.24E-07	2.83E-07	4.06E-07	4.66E-07
Cs-134	2.70E-06	1.93E-03	1.25	1.58E-06	2.12E-06	3.28E-06	3.84E-06
Cs-137	0.209	149	9.63E+04	0.188	0.198	0.219	0.229
Ba-137m	0.197	141	9.11E+04	0.163	0.163	0.207	0.217
Sm-151	9.27E-03	6.63	4.28E+03	5.55E-03	5.55E-03	1.06E-02	1.19E-02
Eu-152	3.48E-06	2.49E-03	1.61	2.16E-06	2.16E-06	3.89E-06	4.29E-06
Eu-154	4.84E-04	0.346	224	2.18E-04	2.18E-04	5.80E-04	6.19E-04
Eu-155	2.08E-04	0.149	96.0	1.29E-04	1.29E-04	2.33E-04	2.58E-04
Ra-226	1.09E-10	7.78E-08	5.02E-05	7.58E-11	7.58E-11	1.21E-10	1.32E-10
Ra-228	9.63E-08	6.89E-05	4.45E-02	4.09E-08	6.80E-08	1.29E-07	1.64E-07
Ac-227	6.84E-10	4.89E-07	3.16E-04	4.92E-10	4.92E-10	7.53E-10	8.20E-10
Pa-231	3.17E-09	2.27E-06	1.47E-03	2.11E-09	2.11E-09	3.56E-09	3.93E-09
Th-229	2.26E-09	1.62E-06	1.05E-03	1.05E-09	1.64E-09	2.98E-09	3.75E-09
Th-232	6.50E-09	4.65E-06	3.00E-03	3.43E-09	4.93E-09	8.06E-09	9.57E-09
U-232	4.98E-07	3.56E-04	0.230	2.76E-07	3.84E-07	6.30E-07	7.70E-07
U-233	1.91E-06	1.37E-03	0.882	1.06E-06	1.47E-06	2.41E-06	2.95E-06
U-234	5.63E-07	4.03E-04	0.260	5.42E-07	5.53E-07	5.74E-07	5.81E-07
U-235	2.28E-08	1.63E-05	1.05E-02	2.20E-08	2.24E-08	2.33E-08	2.36E-08
U-236	1.77E-08	1.27E-05	8.19E-03	1.71E-08	1.75E-08	1.80E-08	1.83E-08
U-238	6.53E-07	4.67E-04	0.302	6.33E-07	6.43E-07	6.64E-07	6.70E-07
Np-237	6.43E-07	4.60E-04	0.297	4.40E-07	5.39E-07	7.47E-07	8.48E-07
Pu-238	1.18E-06	8.46E-04	0.546	9.44E-07	1.06E-06	1.30E-06	1.42E-06
Pu-239	4.00E-05	2.86E-02	18.5	3.39E-05	3.69E-05	4.31E-05	4.61E-05
Pu-240	6.85E-06	4.90E-03	3.16	5.71E-06	6.27E-06	7.42E-06	7.98E-06
Pu-241	8.10E-05	5.80E-02	37.4	6.48E-05	7.27E-05	8.93E-05	9.73E-05
Pu-242	4.45E-10	3.19E-07	2.06E-04	3.48E-10	3.96E-10	4.95E-10	5.43E-10
Am-241	4.46E-05	3.19E-02	20.6	3.33E-05	3.89E-05	5.04E-05	5.60E-05
Am-243	1.64E-09	1.18E-06	7.59E-04	1.26E-09	1.44E-09	1.88E-09	2.09E-09
Cm-242	1.32E-07	9.46E-05	6.11E-02	7.81E-08	7.81E-08	1.48E-07	1.63E-07
Cm-243	1.22E-08	8.71E-06	5.62E-03	7.01E-09	7.01E-09	1.36E-08	1.50E-08
Cm-244	1.12E-07	8.02E-05	5.18E-02	5.89E-08	5.89E-08	1.30E-07	1.42E-07

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	4.60E-04 (g/L)	---	0.212	3.44E-04	4.01E-04	5.18E-04	5.75E-04
U	6.45E-03	1.10E+03	709	6.20E-03	6.32E-03	6.59E-03	6.66E-03

*Density is calculated based on Na, OH-, and AlO2-.

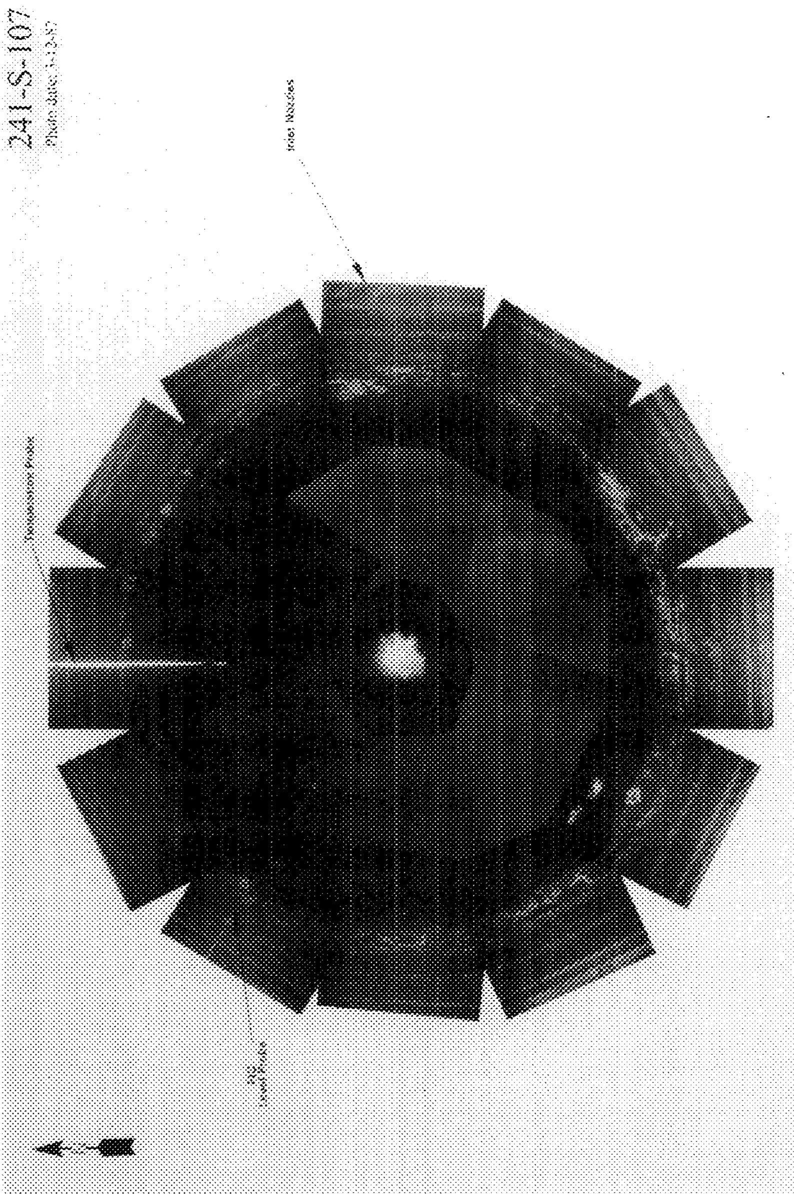
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-107							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.29E+06 (kg)	(376 kgal)	---	---	---	---	---
Heat Load	3.19 (kW)	(1.09E+04 BTU/hr)	---	2.55	2.92	3.36	3.43
Bulk Density†	1.61 (g/cc)	---	---	1.54	1.55	1.70	1.73
Water wt%†	36.7	---	---	28.4	30.9	42.0	44.2
TOC wt% C (wet	0.253	---	---	0.131	0.191	0.316	0.377
Radiological Constituents	**CI/L**	**µCi/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	7.02E-05	4.36E-02	99.9	4.43E-05	4.43E-05	7.40E-05	7.87E-05
C-14	9.17E-06	5.70E-03	13.1	3.76E-06	3.76E-06	9.37E-06	9.40E-06
Ni-59	4.41E-06	2.74E-03	6.28	3.40E-06	3.97E-06	4.75E-06	4.68E-06
Ni-63	4.15E-04	0.258	591	3.21E-04	3.74E-04	4.47E-04	4.40E-04
Co-60	9.94E-06	6.18E-03	14.2	3.75E-06	3.75E-06	1.02E-05	1.05E-05
Se-79	1.23E-06	7.62E-04	1.74	8.80E-07	8.80E-07	1.35E-06	2.83E-06
Sr-90	0.267	166	3.80E+05	0.202	0.238	0.289	0.292
Y-90	0.267	166	3.80E+05	0.202	0.239	0.289	0.292
Zr-93	5.95E-06	3.70E-03	8.47	4.23E-06	4.23E-06	6.58E-06	1.27E-05
Nb-93m	4.46E-06	2.77E-03	6.35	3.25E-06	3.25E-06	4.90E-06	1.17E-05
Tc-99	6.53E-05	4.06E-02	93.0	4.52E-05	5.50E-05	7.57E-05	8.58E-05
Ru-106	2.53E-09	1.57E-06	3.60E-03	1.73E-09	1.73E-09	3.26E-09	3.96E-09
Cd-113m	2.59E-05	1.61E-02	36.9	1.55E-05	1.55E-05	2.96E-05	3.32E-05
Sb-125	4.26E-05	2.65E-02	60.6	1.57E-05	1.57E-05	4.41E-05	4.56E-05
Sn-126	1.86E-06	1.16E-03	2.65	1.34E-06	1.34E-06	2.05E-06	4.43E-06
I-129	1.26E-07	7.83E-05	0.179	8.69E-08	1.06E-07	1.46E-07	1.65E-07
Cs-134	1.03E-06	6.39E-04	1.46	6.63E-07	8.42E-07	1.22E-06	1.40E-06
Cs-137	9.41E-02	58.5	1.34E+05	8.42E-02	8.91E-02	9.81E-02	0.101
Ba-137m	8.90E-02	55.3	1.27E+05	6.72E-02	6.72E-02	9.28E-02	9.54E-02
Sm-151	4.33E-03	2.69	6.16E+03	3.12E-03	3.12E-03	4.77E-03	1.02E-02
Eu-152	3.45E-06	2.15E-03	4.91	3.02E-06	3.02E-06	3.58E-06	3.71E-06
Eu-154	1.73E-04	0.108	247	8.70E-05	8.70E-05	2.05E-04	2.17E-04
Eu-155	1.77E-04	0.110	252	1.52E-04	1.52E-04	1.85E-04	1.93E-04
Ra-226	3.17E-10	1.97E-07	4.51E-04	9.31E-11	2.03E-10	4.31E-10	5.41E-10
Ra-228	3.18E-08	1.98E-05	4.53E-02	1.38E-08	2.26E-08	4.25E-08	5.38E-08
Ac-227	1.49E-09	9.25E-07	2.12E-03	4.18E-10	8.24E-10	2.15E-09	2.79E-09
Pa-231	1.58E-09	9.80E-07	2.24E-03	1.15E-09	1.15E-09	1.89E-09	5.43E-09
Th-229	7.48E-10	4.65E-07	1.06E-03	3.53E-10	5.46E-10	9.82E-10	1.23E-09
Th-232	2.12E-09	1.32E-06	3.01E-03	1.12E-09	1.61E-09	2.62E-09	3.11E-09
U-232	1.65E-07	1.02E-04	0.235	9.27E-08	1.28E-07	2.08E-07	2.53E-07
U-233	6.29E-07	3.91E-04	0.895	3.53E-07	4.88E-07	7.93E-07	9.67E-07
U-234	1.04E-05	6.49E-03	14.9	9.98E-06	1.02E-05	1.06E-05	1.07E-05
U-235	4.12E-07	2.56E-04	0.587	3.93E-07	4.04E-07	4.18E-07	4.22E-07
U-236	5.39E-07	3.35E-04	0.767	4.97E-07	5.27E-07	5.44E-07	5.50E-07
U-238	8.33E-06	5.18E-03	11.9	7.88E-06	8.14E-06	8.46E-06	8.56E-06
Np-237	2.52E-07	1.56E-04	0.358	1.86E-07	2.18E-07	2.86E-07	3.19E-07
Pu-238	5.03E-05	3.13E-02	71.6	4.85E-05	4.99E-05	5.07E-05	5.11E-05
Pu-239	1.20E-03	0.748	1.71E+03	1.17E-03	1.19E-03	1.22E-03	1.24E-03
Pu-240	2.15E-04	0.134	307	2.11E-04	2.13E-04	2.18E-04	2.20E-04
Pu-241	2.75E-03	1.71	3.91E+03	2.62E-03	2.72E-03	2.76E-03	2.78E-03
Pu-242	1.57E-08	9.73E-06	2.23E-02	1.47E-08	1.54E-08	1.58E-08	1.59E-08
Am-241	2.17E-05	1.35E-02	30.9	1.81E-05	1.99E-05	2.43E-05	5.41E-05
Am-243	8.38E-10	5.21E-07	1.19E-03	7.14E-10	7.71E-10	1.22E-09	1.84E-09
Cm-242	1.06E-07	6.61E-05	0.151	8.88E-08	8.88E-08	1.11E-07	1.16E-07
Cm-243	7.70E-09	4.79E-06	1.10E-02	6.03E-09	6.03E-09	8.16E-09	8.61E-09
Cm-244	1.07E-07	6.64E-05	0.152	4.01E-08	8.06E-08	1.21E-07	1.35E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	2.03E-02 (g/L)	---	28.8	1.97E-02	2.00E-02	2.05E-02	2.08E-02
U	0.104	1.54E+04	3.54E+04	9.87E-02	0.102	0.106	0.107

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-S-107

TANK 241-S-108 SUMMARY

TANK HISTORY	
Entered Service	4th qtr 1952
Removed from Service	-
Inactive	1979
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
11, 14	4 in
7, 8	12 in

TANK TEMPERATURE	
Average Tank Temperature	81°F
Maximum Temperature	94.64°F
Date	Dec 15, 1995
Elevation from tank bottom	10.45 ft
Riser Number	4
Minimum Temperature	57°F
Date	July 2, 1994
Elevation from tank bottom	30.45 ft
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-109
Total Risers	12

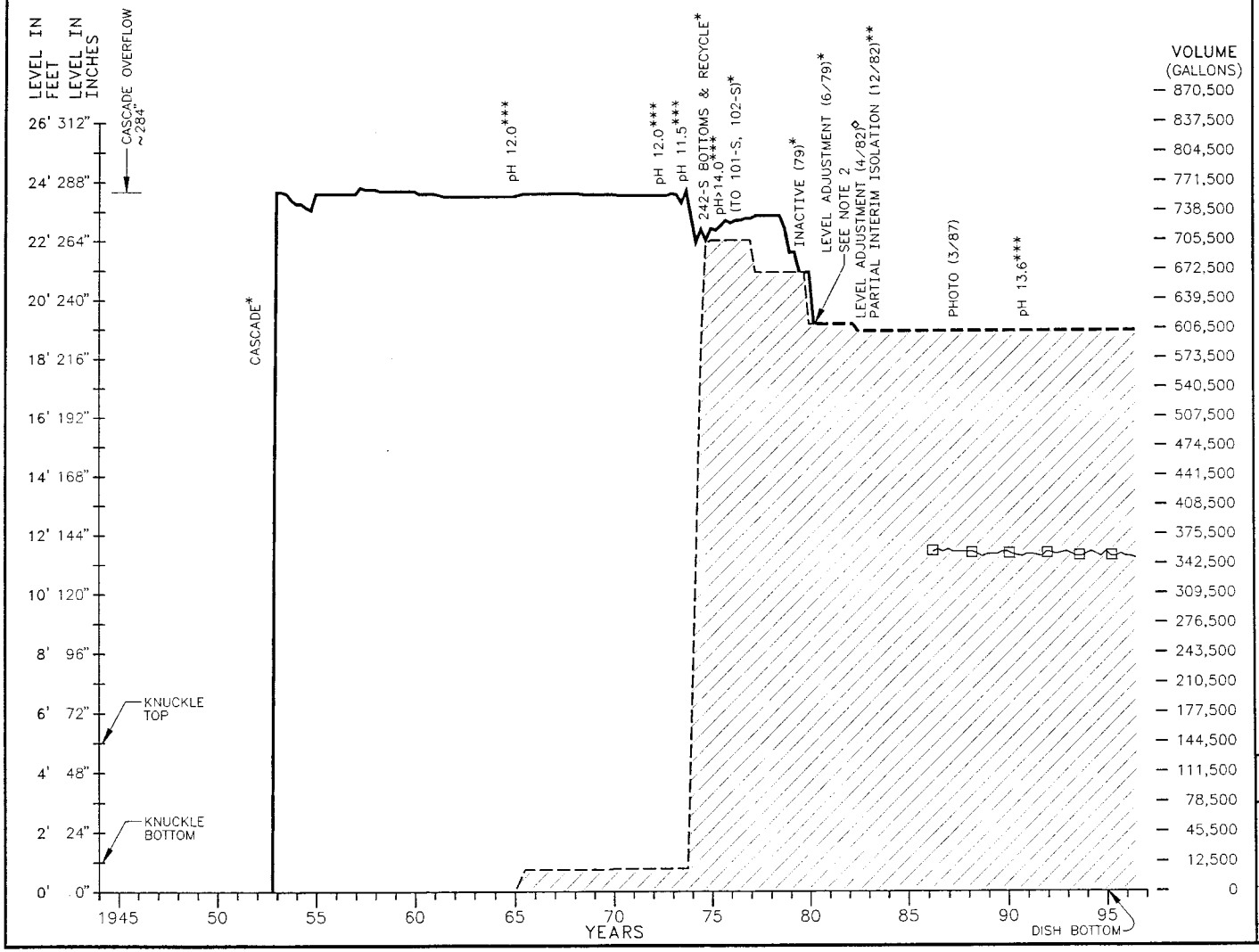
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	604,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	92,000 gal
Pumpable Liquids	105,000 gal
Saltcake	600,000 gal
Sludge	4,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	March 12, 1987
Montage Number	94041033-32CN
Photo Set Number	8701462

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	191 in
Date	Feb 4, 1991
Min Level	158.8 in
Date	April 3, 1995

WASTE TYPES TIME LINE (ANDERSON 1990)	R:	EB: EVAP: TL:	HDRL: PNF: RESID:	NCPLX: PNF:
	NONE:			

PRIMARY ADDITIONS TIME LINE (AGNEW 1995)



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

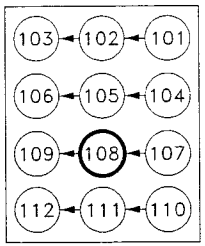
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HDRL:	HANFORD DEFENSE RESIDUAL LIQUOR
NCPLX:	NON-COMPLEXED WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
TL:	TERMINAL LIQUOR

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

S TANK FARM
CASCADE

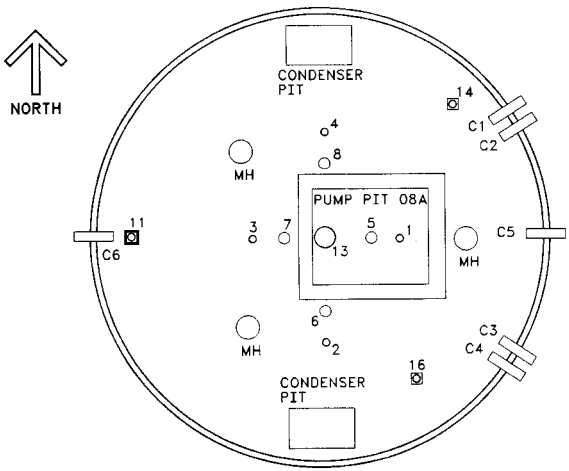


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-108 SINGLE-SHELL TANK WASTE & LEVEL HISTORY 1952-1996 SOUND/NON-STABILIZED TANK WATCH LIST: N/A

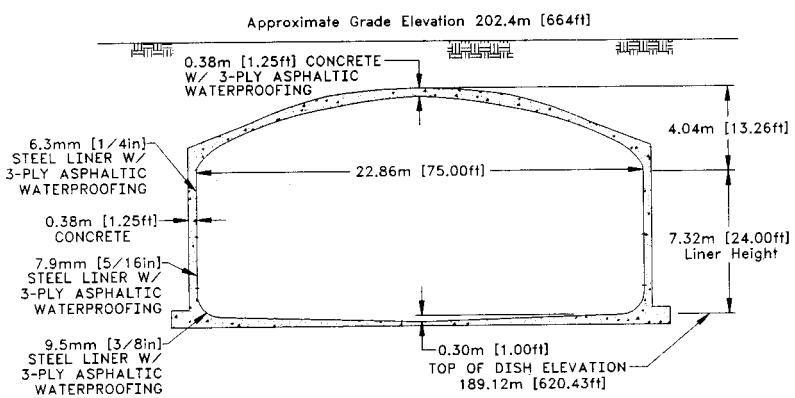
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E74	12/96
SCALE NONE	JOB NO.	SHEET 1 OF 1	

241-S-108



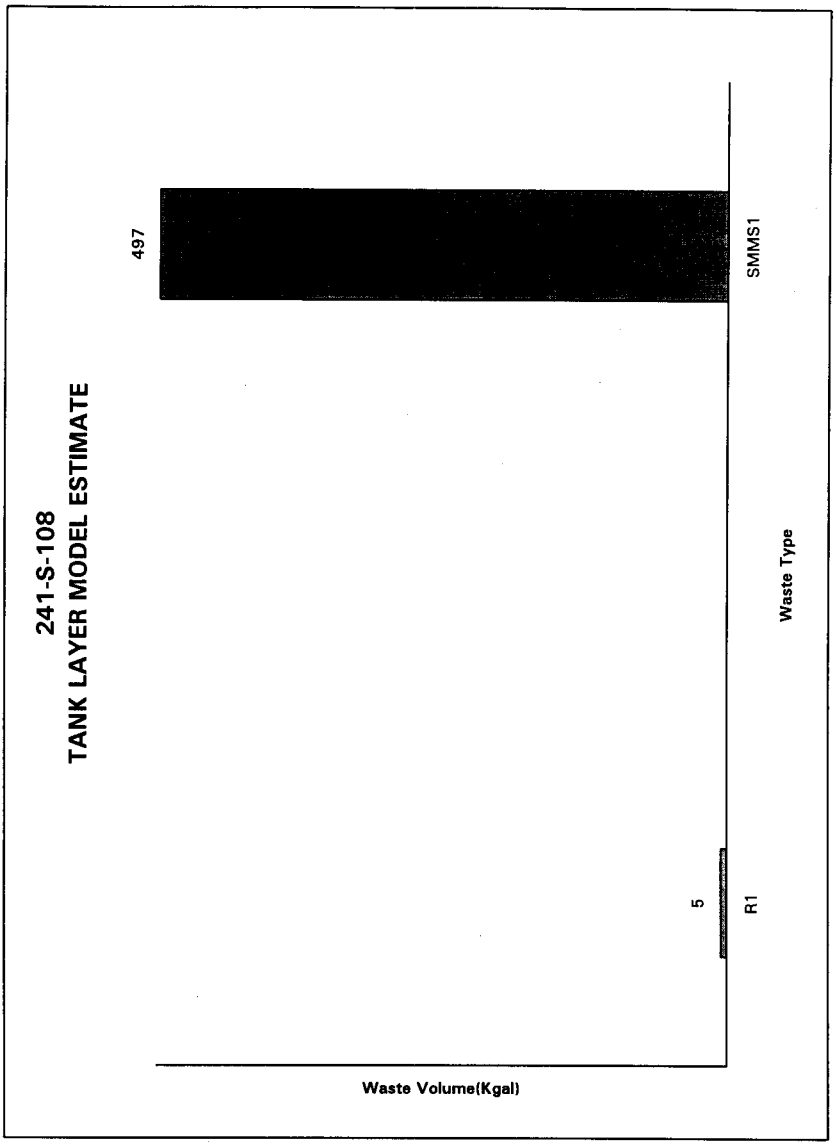
Ref: Alstad 1993
H-2-73187, Rev. 4
H-2-37531, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-108							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	3.32E+04 (kg)	(5.00 kgal)	---	---	---	---	---
Heat Load	0.123 (kW)	(421 BTU/hr)	---	8.94E-02	0.109	0.132	0.136
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	---	---	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	8.13	1.06E+05	3.53E+03	3.05	3.56	14.7	18.2
Al3+	6.99	1.07E+05	3.56E+03	6.58	6.74	7.15	7.15
Fe3+ (total Fe)	1.01	3.22E+04	1.07E+03	0.994	1.00	1.02	1.03
Cr3+	6.19E-02	1.83E+03	60.8	7.08E-03	3.39E-02	0.522	1.06
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	5.07E-02	1.69E+03	56.3	3.66E-02	4.45E-02	5.54E-02	5.45E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.220	5.02E+03	167	0.146	0.182	0.258	0.294
K+	1.12E-02	250	8.30	1.28E-03	5.25E-03	1.52E-02	1.52E-02
OH-	25.6	2.48E+05	8.23E+03	23.1	24.3	26.9	28.4
NO3-	5.29	1.87E+05	6.20E+03	6.03E-02	6.03E-02	13.5	17.9
NO2-	1.46	3.82E+04	1.27E+03	0.132	0.595	2.15	2.15
CO32-	0.220	7.51E+03	249	0.146	0.182	0.258	0.294
PO43-	0	0	0	0	0	0	0
SO42-	1.04E-02	569	18.9	1.19E-03	4.87E-03	1.41E-02	1.41E-02
Si (as SiO32-)	8.06E-03	129	4.28	9.21E-04	3.77E-03	1.09E-02	1.09E-02
F-	0	0	0	0	0	0	0
Cl-	5.16E-02	1.04E+03	34.6	5.91E-03	2.42E-02	7.00E-02	0.157
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.256	2.47E+03	82.1	6.55E-02	9.25E-02	0.270	0.284
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-108							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	3.14E+06 (kg)	(497 kgal)	---	---	---	---	---
Heat Load	3.98 (kW)	(1.36E+04 BTU/hr)	---	3.73	3.85	4.12	4.14
Bulk Density*	1.67 (g/cc)	---	---	1.60	1.64	1.70	1.70
Water wt%	30.0	---	---	27.8	28.7	31.5	34.0
TOC wt% C (wet	0.321	---	---	0.286	0.303	0.338	0.355
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.4	2.13E+05	6.68E+05	13.9	14.8	15.9	16.3
Al3+	2.15	3.47E+04	1.09E+05	1.86	2.00	2.31	2.22
Fe3+ (total Fe)	9.59E-03	320	1.01E+03	7.88E-03	8.72E-03	1.05E-02	1.13E-02
Cr3+	0.221	6.87E+03	2.16E+04	0.163	0.194	0.226	0.231
Bi3+	8.02E-04	100	315	7.21E-04	7.61E-04	8.43E-04	8.82E-04
La3+	1.17E-09	9.74E-05	3.06E-04	8.91E-10	1.03E-09	1.32E-09	1.45E-09
Hg2+	6.71E-06	0.806	2.53	6.29E-06	6.53E-06	6.80E-06	6.89E-06
Zr (as ZrO(OH)2)	1.66E-04	9.06	28.5	1.51E-04	1.56E-04	1.72E-04	1.80E-04
Pb2+	7.92E-04	98.3	309	6.64E-04	7.27E-04	8.58E-04	9.21E-04
Ni2+	6.26E-03	220	691	6.04E-03	6.15E-03	6.37E-03	6.48E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.01E-03	98.8	311	2.18E-03	2.59E-03	3.42E-03	3.83E-03
Ca2+	3.20E-02	767	2.41E+03	2.77E-02	2.98E-02	3.41E-02	3.62E-02
K+	6.48E-02	1.52E+03	4.77E+03	5.79E-02	6.11E-02	6.88E-02	7.01E-02
OH-	13.0	1.32E+05	4.16E+05	11.2	12.1	14.0	13.5
NO3-	5.17	1.92E+05	6.03E+05	4.72	4.94	5.35	5.35
NO2-	2.92	8.03E+04	2.53E+05	2.55	2.73	3.10	3.27
CO32-	0.284	1.02E+04	3.21E+04	0.256	0.268	0.304	0.307
PO43-	6.33E-02	3.60E+03	1.13E+04	5.64E-02	5.88E-02	6.48E-02	6.62E-02
SO42-	0.188	1.08E+04	3.40E+04	0.143	0.165	0.213	0.234
Si (as SiO32-)	7.18E-02	1.21E+03	3.79E+03	6.00E-02	6.58E-02	7.78E-02	8.35E-02
F-	3.83E-02	436	1.37E+03	3.13E-02	3.43E-02	4.18E-02	4.45E-02
Cl-	0.261	5.54E+03	1.74E+04	0.229	0.244	0.279	0.278
C6H5O73-	2.20E-02	2.48E+03	7.81E+03	2.03E-02	2.11E-02	2.28E-02	2.36E-02
EDTA4-	2.37E-03	409	1.29E+03	1.15E-03	1.75E-03	3.00E-03	3.61E-03
HEDTA3-	3.90E-03	640	2.01E+03	1.46E-03	2.65E-03	5.15E-03	6.38E-03
glycolate-	3.44E-02	1.55E+03	4.86E+03	1.99E-02	2.70E-02	4.19E-02	4.90E-02
acetate-	2.73E-03	96.3	303	2.21E-03	2.46E-03	2.99E-03	3.24E-03
oxalate2-	1.54E-09	8.09E-05	2.54E-04	1.38E-09	1.46E-09	1.61E-09	1.69E-09
DBP	1.48E-02	1.87E+03	5.87E+03	1.19E-02	1.34E-02	1.63E-02	1.77E-02
butanol	1.48E-02	658	2.07E+03	1.19E-02	1.34E-02	1.63E-02	1.77E-02
NH3	7.75E-02	789	2.48E+03	6.43E-02	6.95E-02	8.78E-02	9.97E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-108							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.18E+06 (kg)	(502 kgal)	—	—	—	—	—
Heat Load	4.10 (kW)	(1.40E+04 BTU/hr)	—	3.82	3.95	4.26	4.26
Bulk Density†	1.67 (g/cc)	—	—	1.60	1.64	1.70	1.71
Water wt%†	29.9	---	---	27.8	28.7	31.6	34.1
TOC wt% C (wet	0.318	---	---	0.283	0.300	0.335	0.351
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.4	2.11E+05	6.72E+05	13.8	14.7	15.9	16.2
Al3+	2.19	3.54E+04	1.13E+05	1.92	2.05	2.35	2.26
Fe3+ (total Fe)	1.96E-02	654	2.08E+03	1.79E-02	1.87E-02	2.04E-02	2.13E-02
Cr3+	0.219	6.81E+03	2.16E+04	0.172	0.197	0.227	0.229
Bi3+	7.94E-04	99.2	315	7.14E-04	7.53E-04	8.34E-04	8.73E-04
La3+	1.16E-09	9.64E-05	3.06E-04	8.82E-10	1.02E-09	1.30E-09	1.44E-09
Hg2+	6.64E-06	0.797	2.53	6.23E-06	6.46E-06	6.73E-06	6.82E-06
Zr (as ZrO(OH)2)	1.64E-04	8.96	28.5	1.50E-04	1.55E-04	1.70E-04	1.79E-04
Pb2+	7.85E-04	97.2	309	6.57E-04	7.19E-04	8.50E-04	9.12E-04
Ni2+	6.70E-03	235	748	6.52E-03	6.61E-03	6.79E-03	6.88E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	2.98E-03	97.8	311	2.16E-03	2.56E-03	3.39E-03	3.79E-03
Ca2+	3.38E-02	811	2.58E+03	3.03E-02	3.20E-02	3.56E-02	3.73E-02
K+	6.43E-02	1.50E+03	4.77E+03	5.74E-02	6.07E-02	6.81E-02	6.95E-02
OH-	13.1	1.34E+05	4.24E+05	11.4	12.2	14.1	13.6
NO3-	5.17	1.92E+05	6.09E+05	4.78	5.00	5.30	5.30
NO2-	2.90	7.99E+04	2.54E+05	2.54	2.72	3.08	3.26
CO32-	0.284	1.02E+04	3.23E+04	0.256	0.268	0.303	0.306
PO43-	6.27E-02	3.56E+03	1.13E+04	5.58E-02	5.82E-02	6.41E-02	6.56E-02
SO42-	0.187	1.07E+04	3.41E+04	0.142	0.163	0.211	0.232
Si (as SiO32-)	7.11E-02	1.20E+03	3.80E+03	5.95E-02	6.52E-02	7.71E-02	8.28E-02
F-	3.79E-02	431	1.37E+03	3.10E-02	3.39E-02	4.13E-02	4.40E-02
Cl-	0.259	5.49E+03	1.74E+04	0.228	0.243	0.277	0.276
C6H5O73-	2.17E-02	2.46E+03	7.81E+03	2.01E-02	2.09E-02	2.26E-02	2.34E-02
EDTA4-	2.35E-03	405	1.29E+03	1.14E-03	1.73E-03	2.97E-03	3.58E-03
HEDTA3-	3.86E-03	633	2.01E+03	1.45E-03	2.63E-03	5.10E-03	6.31E-03
glycolate-	3.41E-02	1.53E+03	4.86E+03	1.97E-02	2.67E-02	4.15E-02	4.86E-02
acetate-	2.70E-03	95.3	303	2.19E-03	2.44E-03	2.96E-03	3.21E-03
oxalate2-	1.52E-09	8.00E-05	2.54E-04	1.37E-09	1.44E-09	1.60E-09	1.67E-09
DBP	1.47E-02	1.85E+03	5.87E+03	1.18E-02	1.32E-02	1.61E-02	1.75E-02
butanol	1.47E-02	651	2.07E+03	1.18E-02	1.32E-02	1.61E-02	1.75E-02
NH3	7.93E-02	807	2.56E+03	6.62E-02	7.14E-02	8.94E-02	0.101
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-108							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	3.32E+04 (kg)	(5.00 kgal)	---	---	---	---	---
Heat Load	0.123 (kW)	(421 BTU/hr)	---	8.94E-02	0.109	0.132	0.136
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (wet	0	---	---	0	0	0	0
Radiological Constituents	**CI/L**	**μCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.92E-05	1.67E-02	0.553	3.05E-06	1.47E-05	4.10E-05	4.10E-05
C-14	2.26E-06	1.29E-03	4.28E-02	2.59E-07	1.06E-06	3.07E-06	3.07E-06
Ni-59	1.49E-05	8.46E-03	0.281	1.07E-05	1.31E-05	1.62E-05	1.60E-05
Ni-63	1.39E-03	0.790	26.2	1.00E-03	1.22E-03	1.52E-03	1.49E-03
Co-60	8.94E-07	5.09E-04	1.69E-02	1.02E-07	4.18E-07	1.21E-06	1.21E-06
Se-79	4.81E-07	2.74E-04	9.09E-03	5.50E-08	2.25E-07	6.51E-07	7.15E-06
Sr-90	0.928	529	1.76E+04	0.662	0.812	1.02	1.03
Y-90	0.929	529	1.76E+04	0.662	0.812	1.02	1.03
Zr-93	2.27E-06	1.29E-03	4.29E-02	2.59E-07	1.06E-06	3.08E-06	3.03E-05
Nb-93m	1.85E-06	1.06E-03	3.51E-02	2.12E-07	8.68E-07	2.51E-06	3.21E-05
Tc-99	1.58E-05	9.02E-03	0.300	1.81E-06	7.42E-06	2.15E-05	2.15E-05
Ru-106	2.50E-12	1.42E-09	4.72E-08	2.86E-13	1.17E-12	3.38E-12	3.38E-12
Cd-113m	6.99E-06	3.98E-03	0.132	8.00E-07	3.27E-06	9.48E-06	9.48E-06
Sb-125	1.31E-06	7.47E-04	2.48E-02	1.50E-07	6.14E-07	1.78E-06	1.78E-06
Sn-126	7.39E-07	4.21E-04	1.40E-02	8.45E-08	3.46E-07	1.00E-06	1.14E-05
I-129	3.04E-08	1.73E-05	5.76E-04	3.48E-09	1.42E-08	4.13E-08	4.13E-08
Cs-134	2.72E-08	1.55E-05	5.14E-04	7.19E-09	1.52E-08	3.52E-08	3.52E-08
Cs-137	5.60E-02	31.9	1.06E+03	1.48E-02	3.13E-02	7.26E-02	7.26E-02
Ba-137m	5.30E-02	30.2	1.00E+03	1.40E-02	2.96E-02	6.87E-02	6.87E-02
Sm-151	1.71E-03	0.976	32.4	1.96E-04	8.03E-04	2.33E-03	2.64E-02
Eu-152	7.00E-06	3.98E-03	0.132	6.85E-06	6.91E-06	7.06E-06	7.06E-06
Eu-154	2.16E-05	1.23E-02	0.408	2.47E-06	1.01E-05	2.93E-05	2.93E-05
Eu-155	3.30E-04	0.188	6.25	3.23E-04	3.26E-04	3.33E-04	3.33E-04
Ra-226	1.08E-09	6.15E-07	2.04E-05	1.48E-10	6.04E-10	1.56E-09	2.01E-09
Ra-228	9.26E-15	5.28E-12	1.75E-10	9.07E-15	9.15E-15	9.34E-15	9.34E-15
Ac-227	4.76E-09	2.71E-06	9.00E-05	3.06E-10	2.00E-09	7.52E-09	1.02E-08
Pa-231	7.18E-10	4.09E-07	1.36E-05	8.21E-11	3.36E-10	2.04E-09	1.68E-08
Th-229	1.77E-12	1.01E-09	3.34E-08	1.73E-12	1.75E-12	1.78E-12	1.78E-12
Th-232	5.91E-16	3.36E-13	1.12E-11	6.76E-17	2.77E-16	8.01E-16	8.01E-16
U-232	5.24E-12	2.98E-09	9.90E-08	5.99E-13	2.45E-12	7.10E-12	7.10E-12
U-233	2.00E-13	1.14E-10	3.77E-09	2.28E-14	9.34E-14	2.71E-13	2.71E-13
U-234	1.19E-07	6.78E-05	2.25E-03	1.36E-08	5.58E-08	1.62E-07	1.62E-07
U-235	5.13E-09	2.92E-06	9.69E-05	5.86E-10	2.40E-09	6.95E-09	6.95E-09
U-236	1.88E-09	1.07E-06	3.56E-05	2.16E-10	8.82E-10	2.56E-09	2.56E-09
U-238	1.22E-07	6.92E-05	2.30E-03	1.39E-08	5.69E-08	1.65E-07	1.65E-07
Np-237	1.03E-07	5.86E-05	1.94E-03	1.18E-08	4.81E-08	1.39E-07	1.39E-07
Pu-238	6.61E-06	3.77E-03	0.125	4.75E-06	5.66E-06	7.57E-06	8.48E-06
Pu-239	4.72E-04	0.269	8.92	3.39E-04	4.04E-04	5.40E-04	6.05E-04
Pu-240	6.76E-05	3.85E-02	1.28	4.85E-05	5.78E-05	7.73E-05	8.66E-05
Pu-241	3.97E-04	0.226	7.51	2.85E-04	3.40E-04	4.55E-04	5.09E-04
Pu-242	1.82E-09	1.04E-06	3.45E-05	1.31E-09	1.56E-09	2.08E-09	2.34E-09
Am-241	8.09E-06	4.61E-03	0.153	9.26E-07	3.79E-06	1.10E-05	1.43E-04
Am-243	7.57E-11	4.31E-08	1.43E-06	8.66E-12	3.54E-11	1.03E-10	1.34E-09
Cm-242	1.61E-07	9.16E-05	3.04E-03	1.58E-07	1.59E-07	1.62E-07	1.62E-07
Cm-243	3.69E-09	2.10E-06	6.98E-05	3.61E-09	3.64E-09	3.72E-09	3.72E-09
Cm-244	2.70E-09	1.54E-06	5.11E-05	3.09E-10	1.27E-09	3.67E-09	3.67E-09
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.89E-03 (g/L)	---	0.149	5.67E-03	6.76E-03	9.03E-03	1.01E-02
U	1.53E-03	207	6.89	1.75E-04	7.16E-04	2.07E-03	2.07E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-108							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	3.14E+06 (kg)	(497 kgal)	---	---	---	---	---
Heat Load	3.98 (kW)	(1.36E+04 BTU/hr)	---	3.73	3.85	4.12	4.14
Bulk Density*	1.67 (g/cc)	---	---	1.60	1.64	1.70	1.70
Water wt%†	30.0	---	---	27.8	28.7	31.5	34.0
TOC wt% C (wet	0.321	---	---	0.286	0.303	0.338	0.355
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.62E-04	0.157	494	1.58E-04	1.58E-04	2.78E-04	2.72E-04
C-14	3.34E-05	2.00E-02	62.9	1.15E-05	1.15E-05	3.42E-05	3.41E-05
Ni-59	2.29E-06	1.37E-03	4.30	1.26E-06	1.26E-06	2.34E-06	2.39E-06
Ni-63	2.22E-04	0.133	418	1.20E-04	1.20E-04	2.27E-04	2.32E-04
Co-60	3.37E-05	2.02E-02	63.5	8.66E-06	8.66E-06	3.42E-05	3.47E-05
Se-79	3.49E-06	2.09E-03	6.57	2.09E-06	2.09E-06	4.00E-06	4.48E-06
Sr-90	0.114	68.5	2.15E+05	0.108	0.111	0.118	0.121
Y-90	0.114	68.5	2.15E+05	6.62E-02	6.62E-02	0.118	0.121
Zr-93	1.71E-05	1.02E-02	32.1	1.01E-05	1.01E-05	1.96E-05	2.20E-05
Nb-93m	1.27E-05	7.57E-03	23.8	7.76E-06	7.76E-06	1.44E-05	1.61E-05
Tc-99	2.38E-04	0.143	448	1.57E-04	1.96E-04	2.80E-04	3.21E-04
Ru-106	5.19E-09	3.11E-06	9.76E-03	1.95E-09	1.95E-09	5.91E-09	6.57E-09
Cd-113m	8.33E-05	4.98E-02	157	4.13E-05	4.13E-05	9.85E-05	1.13E-04
Sb-125	1.38E-04	8.28E-02	260	2.97E-05	2.97E-05	1.40E-04	1.43E-04
Sn-126	5.29E-06	3.17E-03	9.96	3.19E-06	3.19E-06	6.05E-06	6.78E-06
I-129	4.59E-07	2.75E-04	0.863	3.01E-07	3.78E-07	5.40E-07	6.19E-07
Cs-134	1.56E-06	9.31E-04	2.93	1.04E-06	1.04E-06	1.67E-06	1.79E-06
Cs-137	0.287	172	5.40E+05	0.258	0.272	0.303	0.305
Ba-137m	0.271	162	5.10E+05	0.203	0.203	0.287	0.289
Sm-151	1.23E-02	7.38	2.32E+04	7.43E-03	7.43E-03	1.41E-02	1.58E-02
Eu-152	3.05E-06	1.83E-03	5.74	1.32E-06	1.32E-06	3.11E-06	3.17E-06
Eu-154	5.42E-04	0.325	1.02E+03	1.93E-04	1.93E-04	6.69E-04	7.19E-04
Eu-155	1.75E-04	0.105	330	7.20E-05	7.20E-05	1.80E-04	1.84E-04
Ra-226	1.63E-10	9.78E-08	3.07E-04	1.10E-10	1.20E-10	1.91E-10	2.17E-10
Ra-228	5.84E-08	3.50E-05	0.110	2.28E-08	4.02E-08	7.96E-08	1.02E-07
Ac-227	9.86E-10	5.90E-07	1.85E-03	6.74E-10	7.34E-10	1.15E-09	1.24E-09
Pa-231	4.35E-09	2.60E-06	8.18E-03	2.95E-09	2.95E-09	4.86E-09	5.34E-09
Th-229	1.39E-09	8.33E-07	2.62E-03	6.10E-10	9.92E-10	1.86E-09	2.35E-09
Th-232	3.93E-09	2.35E-06	7.40E-03	1.96E-09	2.93E-09	4.94E-09	5.91E-09
U-232	3.53E-07	2.11E-04	0.664	2.10E-07	2.80E-07	4.38E-07	5.28E-07
U-233	1.35E-06	8.10E-04	2.55	8.07E-07	1.07E-06	1.68E-06	2.02E-06
U-234	8.55E-07	5.12E-04	1.61	7.82E-07	8.17E-07	8.98E-07	8.79E-07
U-235	3.54E-08	2.12E-05	6.66E-02	3.22E-08	3.37E-08	3.72E-08	3.64E-08
U-236	2.42E-08	1.45E-05	4.56E-02	2.31E-08	2.36E-08	2.49E-08	2.49E-08
U-238	8.89E-07	5.32E-04	1.67	8.14E-07	8.50E-07	9.33E-07	9.12E-07
Np-237	9.44E-07	5.65E-04	1.78	6.77E-07	8.08E-07	1.08E-06	1.21E-06
Pu-238	1.16E-06	6.94E-04	2.18	8.47E-07	1.00E-06	1.32E-06	1.47E-06
Pu-239	4.36E-05	2.61E-02	82.1	3.56E-05	3.95E-05	4.77E-05	5.16E-05
Pu-240	7.14E-06	4.27E-03	13.4	5.64E-06	6.37E-06	7.90E-06	8.63E-06
Pu-241	7.65E-05	4.58E-02	144	5.52E-05	6.56E-05	8.75E-05	9.80E-05
Pu-242	4.13E-10	2.47E-07	7.77E-04	2.86E-10	3.48E-10	4.79E-10	5.41E-10
Am-241	5.64E-05	3.38E-02	106	4.16E-05	4.88E-05	6.40E-05	7.13E-05
Am-243	1.57E-09	9.41E-07	2.96E-03	1.11E-09	1.33E-09	1.82E-09	2.06E-09
Cm-242	1.08E-07	6.49E-05	0.204	3.73E-08	3.73E-08	1.10E-07	1.12E-07
Cm-243	9.64E-09	5.77E-06	1.81E-02	2.86E-09	2.86E-09	9.86E-09	1.01E-08
Cm-244	1.06E-07	6.35E-05	0.200	3.63E-08	3.63E-08	1.30E-07	1.45E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.71E-04 (g/L)	---	1.07	4.19E-04	4.94E-04	6.48E-04	7.22E-04
U	1.01E-02	1.44E+03	4.52E+03	9.16E-03	9.60E-03	1.06E-02	1.04E-02

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-108

Total Inventory Estimate*

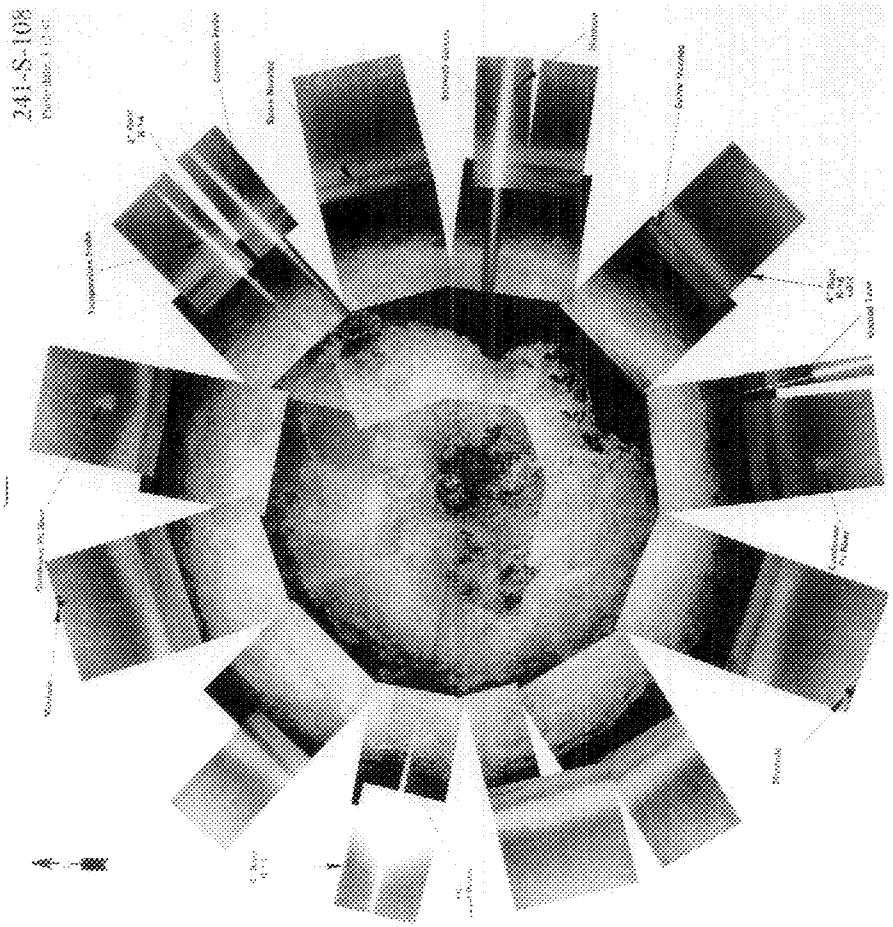
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.18E+06 (kg)	(502 kgal)	---	---	---	---	---
Heat Load	4.10 (kW)	(1.40E+04 BTU/hr)	---	3.82	3.95	4.26	4.26
Bulk Density†	1.67 (g/cc)	---	---	1.60	1.64	1.70	1.71
Water wt%†	29.9	---	---	27.8	28.7	31.6	34.1
TOC wt% C (wet	0.318	---	---	0.283	0.300	0.335	0.351

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.60E-04	0.156	494	1.56E-04	1.56E-04	2.76E-04	2.70E-04
C-14	3.31E-05	1.98E-02	62.9	1.14E-05	1.14E-05	3.39E-05	3.38E-05
Ni-59	2.41E-06	1.44E-03	4.58	1.39E-06	1.39E-06	2.46E-06	2.51E-06
Ni-63	2.34E-04	0.140	444	1.33E-04	1.33E-04	2.39E-04	2.44E-04
Co-60	3.34E-05	2.00E-02	63.5	8.58E-06	8.58E-06	3.39E-05	3.44E-05
Se-79	3.46E-06	2.07E-03	6.58	2.08E-06	2.08E-06	3.96E-06	4.44E-06
Sr-90	0.123	73.3	2.33E+05	0.116	0.119	0.126	0.129
Y-90	0.123	73.3	2.33E+05	7.47E-02	7.47E-02	0.126	0.129
Zr-93	1.69E-05	1.01E-02	32.1	9.99E-06	9.99E-06	1.94E-05	2.18E-05
Nb-93m	1.25E-05	7.51E-03	23.8	7.70E-06	7.70E-06	1.43E-05	1.60E-05
Tc-99	2.36E-04	0.141	448	1.55E-04	1.95E-04	2.78E-04	3.18E-04
Ru-106	5.14E-09	3.07E-06	9.76E-03	1.93E-09	1.93E-09	5.86E-09	6.51E-09
Cd-113m	8.25E-05	4.94E-02	157	4.10E-05	4.10E-05	9.76E-05	1.12E-04
Sb-125	1.37E-04	8.19E-02	260	2.94E-05	2.94E-05	1.39E-04	1.41E-04
Sn-126	5.25E-06	3.14E-03	9.97	3.17E-06	3.17E-06	6.00E-06	6.72E-06
I-129	4.55E-07	2.72E-04	0.864	2.98E-07	3.74E-07	5.35E-07	6.13E-07
Cs-134	1.54E-06	9.21E-04	2.93	1.03E-06	1.03E-06	1.66E-06	1.77E-06
Cs-137	0.285	170	5.41E+05	0.256	0.270	0.301	0.303
Ba-137m	0.269	161	5.11E+05	0.201	0.201	0.284	0.286
Sm-151	1.22E-02	7.31	2.32E+04	7.37E-03	7.37E-03	1.40E-02	1.57E-02
Eu-152	3.09E-06	1.85E-03	5.87	1.37E-06	1.37E-06	3.15E-06	3.20E-06
Eu-154	5.37E-04	0.321	1.02E+03	1.91E-04	1.91E-04	6.62E-04	7.12E-04
Eu-155	1.77E-04	0.106	336	7.46E-05	7.46E-05	1.81E-04	1.85E-04
Ra-226	1.73E-10	1.03E-07	3.28E-04	1.29E-10	1.30E-10	1.95E-10	2.17E-10
Ra-228	5.79E-08	3.46E-05	0.110	2.26E-08	3.98E-08	7.88E-08	1.01E-07
Ac-227	1.02E-09	6.12E-07	1.94E-03	7.68E-10	7.74E-10	1.15E-09	1.23E-09
Pa-231	4.31E-09	2.58E-06	8.19E-03	2.93E-09	2.93E-09	4.81E-09	5.30E-09
Th-229	1.38E-09	8.24E-07	2.62E-03	6.04E-10	9.83E-10	1.84E-09	2.33E-09
Th-232	3.90E-09	2.33E-06	7.40E-03	1.94E-09	2.90E-09	4.89E-09	5.85E-09
U-232	3.49E-07	2.09E-04	0.664	2.08E-07	2.77E-07	4.33E-07	5.22E-07
U-233	1.34E-06	8.02E-04	2.55	7.99E-07	1.06E-06	1.66E-06	2.00E-06
U-234	8.48E-07	5.07E-04	1.61	7.75E-07	8.10E-07	8.89E-07	8.71E-07
U-235	3.51E-08	2.10E-05	6.67E-02	3.20E-08	3.34E-08	3.69E-08	3.60E-08
U-236	2.40E-08	1.44E-05	4.56E-02	2.29E-08	2.34E-08	2.47E-08	2.47E-08
U-238	8.82E-07	5.27E-04	1.68	8.08E-07	8.43E-07	9.24E-07	9.04E-07
Np-237	9.36E-07	5.60E-04	1.78	6.72E-07	8.01E-07	1.07E-06	1.20E-06
Pu-238	1.21E-06	7.26E-04	2.31	9.04E-07	1.06E-06	1.37E-06	1.53E-06
Pu-239	4.79E-05	2.86E-02	91.0	3.99E-05	4.38E-05	5.19E-05	5.58E-05
Pu-240	7.74E-06	4.63E-03	14.7	6.26E-06	6.98E-06	8.49E-06	9.21E-06
Pu-241	7.97E-05	4.77E-02	151	5.86E-05	6.89E-05	9.05E-05	1.01E-04
Pu-242	4.27E-10	2.56E-07	8.12E-04	3.01E-10	3.63E-10	4.92E-10	5.54E-10
Am-241	5.60E-05	3.35E-02	106	4.12E-05	4.84E-05	6.35E-05	7.07E-05
Am-243	1.56E-09	9.32E-07	2.96E-03	1.10E-09	1.32E-09	1.80E-09	2.04E-09
Cm-242	1.09E-07	6.51E-05	0.207	3.85E-08	3.85E-08	1.11E-07	1.13E-07
Cm-243	9.58E-09	5.73E-06	1.82E-02	2.87E-09	2.87E-09	9.80E-09	1.00E-08
Cm-244	1.05E-07	6.29E-05	0.200	3.59E-08	3.59E-08	1.29E-07	1.44E-07

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	6.44E-04 (g/L)	---	1.22	4.94E-04	5.68E-04	7.21E-04	7.94E-04
U	1.00E-02	1.43E+03	4.53E+03	9.08E-03	9.53E-03	1.05E-02	1.03E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-S-108

TANK 241-S-109 SUMMARY

TANK HISTORY	
Entered Service	4th qtr 1952
Removed from Service	-
Inactive	-
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
2, 11, 14, 16	4 in
6	12 in

TANK TEMPERATURE	
Average Tank Temperature	79°F
Maximum Temperature	89.42°F
Date	Jan 30, 1996, Feb 1 & 2, 1996
Elevation from tank bottom	4.49 ft
Riser Number	4
Minimum Temperature	55.3°F
Date	Feb 13, 1993
Elevation from tank bottom	unknown
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	none
Total Risers	12

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	568,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	141,000 gal
Pumpable Liquids	119,000 gal
Saltcake	555,000 gal
Sludge	13,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	Aug 24, 1984
Montage Number	94041033-18CN
Photo Set Number	8905333

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	172.8 in
Date	Sept 6, 1993
Min Level	171.1 in
Date	July 1, 1995

WASTE TYPES TIME LINE (ANDERSON 1990)	R:	EB: EVAP: TL:	HDRL: PNF: RESID:	NCPLX:
PRIMARY ADDITIONS TIME LINE (AGNEW 1995)	NONE:			

TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

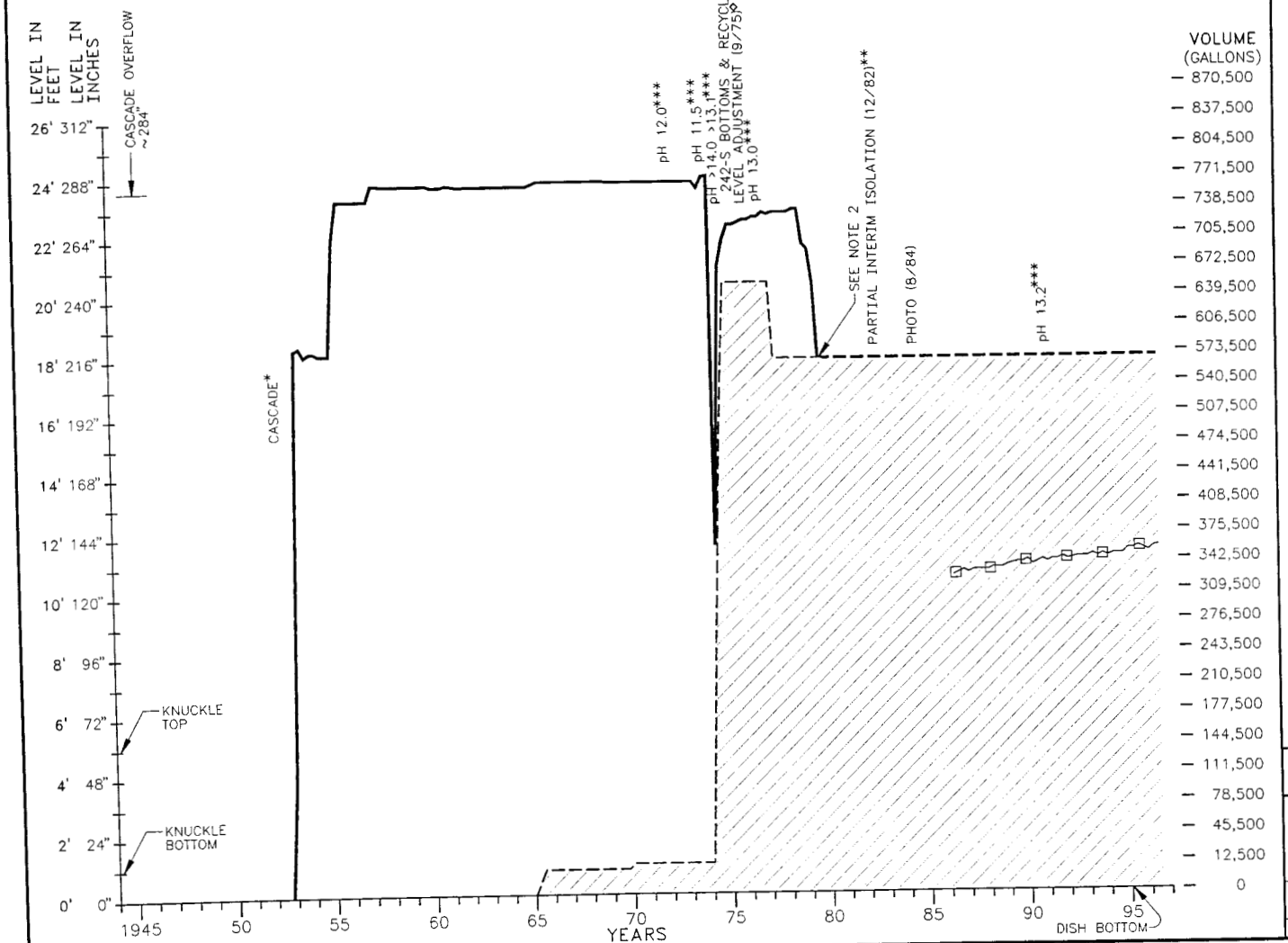
1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

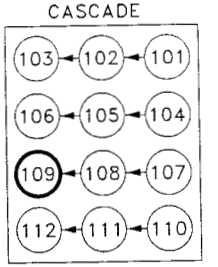
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HDRL:	HANFORD DEFENSE RESIDUAL LIQUOR
NCPLX:	NON-COMPLEXED WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
TL:	TERMINAL LIQUOR



LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

S TANK FARM CASCADE

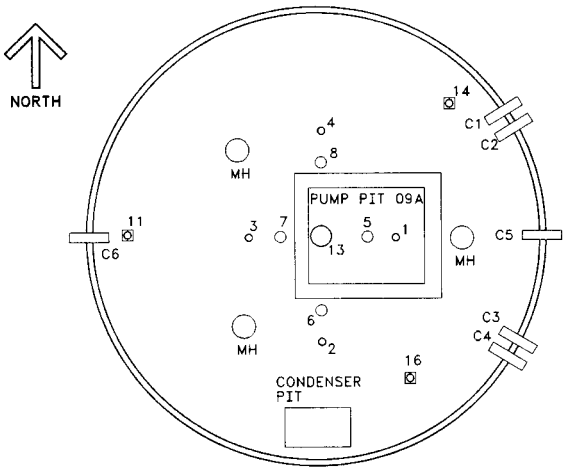


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-109 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: N/A

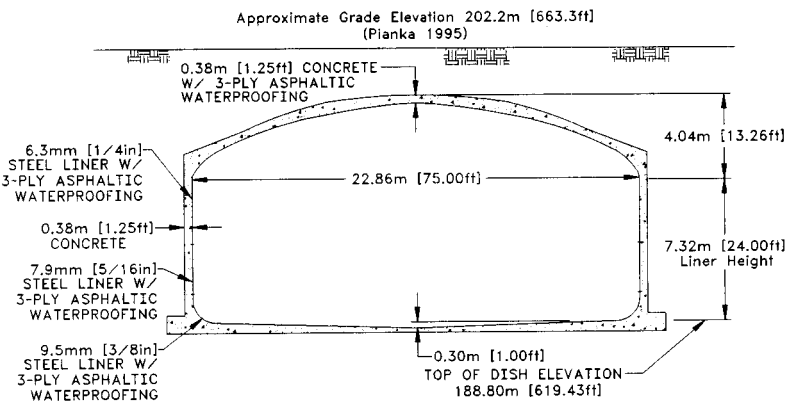
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E75	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-109



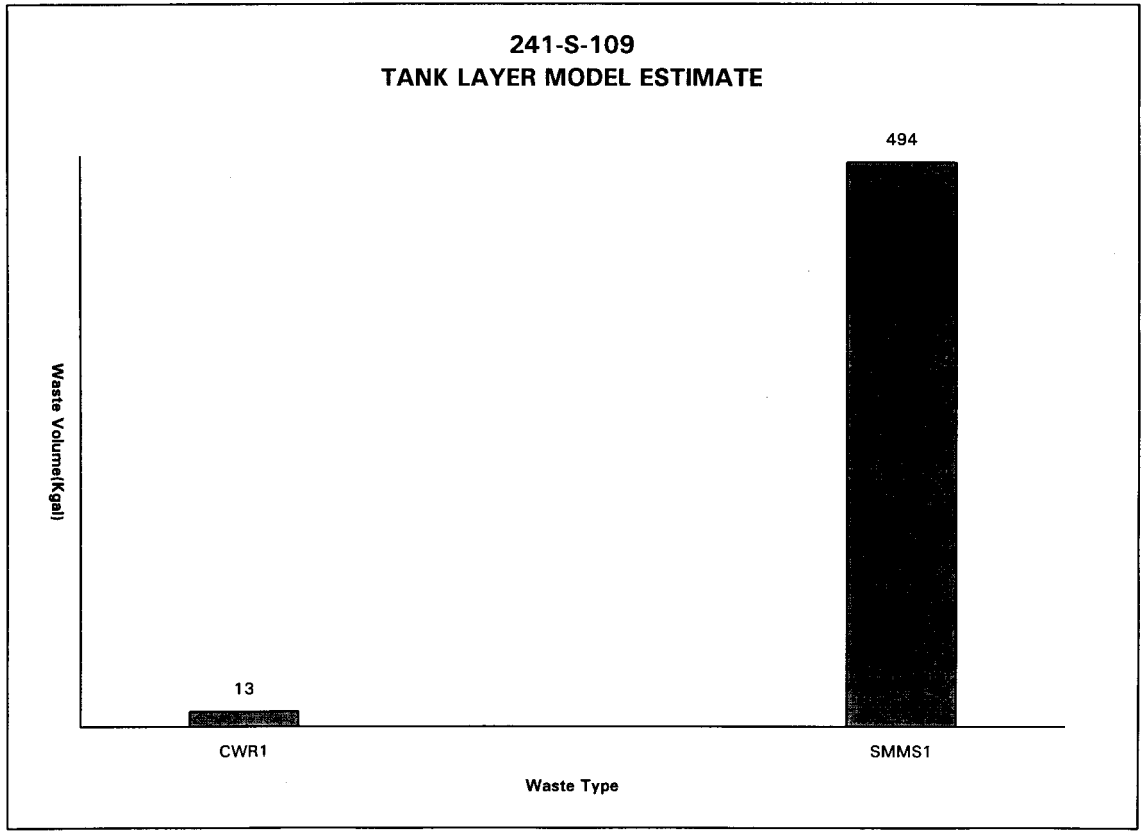
Ref: Alstad 1993
H-2-73188, Rev. 4
H-2-37532, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-109							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	8.71E+04 (kg)	(13.0 kgal)	----	----	----	----	----
Heat Load	1.22E-03 (kW)	(4.17 BTU/hr)	----	1.02E-03	1.18E-03	1.26E-03	1.30E-03
Bulk Density	1.77 (g/cc)	----	----	1.47	1.57	1.92	2.02
Void Fraction	0.651	----	----	0.488	0.557	0.780	0.825
Water wt%	24.5	----	----	4.37	12.2	45.5	55.1
TOC wt% C (wet	0	----	----	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	7.86	1.02E+05	8.89E+03	2.23	3.91	10.7	12.9
Al3+	11.2	1.71E+05	1.49E+04	5.84	7.28	14.0	16.1
Fe3+ (total Fe)	0.165	5.20E+03	453	0.153	0.160	0.170	0.175
Cr3+	2.04E-03	59.8	5.21	1.71E-03	1.97E-03	2.10E-03	2.17E-03
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	4.08E-03	462	40.3	4.02E-03	4.06E-03	4.10E-03	4.11E-03
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	0.118	1.38E+04	1.20E+03	0.108	0.113	0.122	0.126
Ni2+	1.02E-03	33.7	2.94	8.54E-04	9.84E-04	1.51E-03	3.79E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.121	2.73E+03	238	6.72E-02	9.87E-02	0.141	0.161
K+	1.54E-03	33.9	2.95	1.29E-03	1.48E-03	1.59E-03	1.64E-03
OH-	41.7	4.00E+05	3.49E+04	20.0	25.9	53.0	61.2
NO3-	0.572	2.00E+04	1.75E+03	0.485	0.554	0.591	0.610
NO2-	0.958	2.49E+04	2.17E+03	0.799	0.925	0.990	1.02
CO32-	0.121	4.09E+03	356	6.72E-02	9.87E-02	0.141	0.161
PO43-	0	0	0	0	0	0	0
SO42-	8.39E-03	455	39.6	7.04E-03	8.10E-03	8.67E-03	8.94E-03
Si (as SiO32-)	2.01E-02	319	27.8	1.69E-02	1.94E-02	8.18E-02	0.175
F-	0	0	0	0	0	0	0
Cl-	7.07E-03	141	12.3	5.93E-03	6.83E-03	7.30E-03	7.53E-03
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	2.05E-04	1.97	0.171	1.61E-04	1.80E-04	2.38E-04	2.49E-04
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-109							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM Wast	3.10E+06 (kg)	(494 kgal)	---	---	---	---	---
Heat Load	3.87 (kW)	(1.32E+04 BTU/hr)	---	3.64	3.75	4.00	4.02
Bulk Density*	1.66 (g/cc)	---	---	1.59	1.63	1.68	1.69
Water wt%	30.9	---	---	28.6	29.6	32.3	34.7
TOC wt% C (wet	0.340	---	---	0.304	0.321	0.358	0.375
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.1	2.10E+05	6.51E+05	13.7	14.5	15.6	16.0
Al3+	2.08	3.38E+04	1.05E+05	1.81	1.94	2.23	2.15
Fe3+ (total Fe)	9.65E-03	325	1.01E+03	7.85E-03	8.73E-03	1.06E-02	1.14E-02
Cr3+	0.213	6.68E+03	2.07E+04	0.159	0.188	0.218	0.223
Bi3+	7.78E-04	98.2	304	7.01E-04	7.39E-04	8.17E-04	8.55E-04
La3+	1.75E-08	1.47E-03	4.54E-03	1.29E-08	1.52E-08	1.98E-08	2.20E-08
Hg2+	6.58E-06	0.797	2.47	6.17E-06	6.40E-06	6.66E-06	6.74E-06
Zr (as ZrO(OH)2)	1.60E-04	8.82	27.3	1.46E-04	1.51E-04	1.66E-04	1.74E-04
Pb2+	7.81E-04	97.7	303	6.60E-04	7.19E-04	8.43E-04	9.02E-04
Ni2+	6.20E-03	220	681	6.00E-03	6.10E-03	6.31E-03	6.41E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.14E-03	104	322	2.27E-03	2.70E-03	3.58E-03	4.00E-03
Ca2+	3.17E-02	767	2.37E+03	2.77E-02	2.96E-02	3.37E-02	3.57E-02
K+	6.37E-02	1.50E+03	4.65E+03	5.72E-02	6.03E-02	6.74E-02	6.93E-02
OH-	12.6	1.30E+05	4.01E+05	11.0	11.7	13.5	13.2
NO3-	5.04	1.89E+05	5.85E+05	4.62	4.83	5.21	5.21
NO2-	2.85	7.93E+04	2.45E+05	2.48	2.65	3.05	3.23
CO32-	0.295	1.07E+04	3.32E+04	0.266	0.280	0.315	0.317
PO43-	6.49E-02	3.72E+03	1.15E+04	5.83E-02	6.06E-02	6.64E-02	6.79E-02
SO42-	0.190	1.10E+04	3.42E+04	0.143	0.165	0.216	0.239
Si (as SiO32-)	7.16E-02	1.21E+03	3.76E+03	5.92E-02	6.53E-02	7.79E-02	8.40E-02
F-	3.72E-02	427	1.32E+03	3.05E-02	3.33E-02	4.05E-02	4.31E-02
Cl-	0.256	5.47E+03	1.69E+04	0.226	0.240	0.273	0.274
C6H5O73-	2.33E-02	2.66E+03	8.23E+03	2.15E-02	2.24E-02	2.42E-02	2.50E-02
EDTA4-	2.32E-03	403	1.25E+03	1.15E-03	1.72E-03	2.92E-03	3.50E-03
HEDTA3-	3.80E-03	629	1.95E+03	1.47E-03	2.60E-03	5.00E-03	6.17E-03
glycolate-	3.85E-02	1.74E+03	5.40E+03	2.17E-02	2.99E-02	4.71E-02	5.52E-02
acetate-	2.70E-03	96.3	298	2.19E-03	2.44E-03	2.96E-03	3.21E-03
oxalate2-	2.29E-08	1.22E-03	3.77E-03	2.04E-08	2.16E-08	2.41E-08	2.53E-08
DBP	1.55E-02	1.97E+03	6.08E+03	1.24E-02	1.39E-02	1.70E-02	1.85E-02
butanol	1.55E-02	693	2.15E+03	1.24E-02	1.39E-02	1.70E-02	1.85E-02
NH3	7.63E-02	783	2.42E+03	6.23E-02	6.78E-02	8.70E-02	9.96E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-109							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.18E+06 (kg)	(507 kgal)	—	—	----	—	—
Heat Load	3.87 (kW)	(1.32E+04 BTU/hr)	----	3.64	3.75	4.01	4.03
Bulk Density†	1.66 (g/cc)	—	----	1.60	1.63	1.68	1.69
Water wt%†	30.7	----	—	28.4	29.4	32.1	34.4
TOC wt% C (wet	0.331	—	----	0.295	0.313	0.348	0.365
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	14.9	2.07E+05	6.60E+05	13.5	14.3	15.4	15.8
Al3+	2.31	3.76E+04	1.20E+05	2.05	2.18	2.46	2.41
Fe3+ (total Fe)	1.36E-02	459	1.46E+03	1.19E-02	1.27E-02	1.45E-02	1.54E-02
Cr3+	0.207	6.49E+03	2.07E+04	0.155	0.183	0.212	0.217
Bi3+	7.58E-04	95.5	304	6.83E-04	7.20E-04	7.96E-04	8.33E-04
La3+	1.70E-08	1.43E-03	4.54E-03	1.26E-08	1.48E-08	1.93E-08	2.15E-08
Hg2+	1.11E-04	13.4	42.7	1.09E-04	1.10E-04	1.11E-04	1.12E-04
Zr (as ZrO(OH)2)	1.56E-04	8.57	27.3	1.42E-04	1.47E-04	1.62E-04	1.69E-04
Pb2+	3.78E-03	472	1.50E+03	3.53E-03	3.68E-03	3.85E-03	3.90E-03
Ni2+	6.07E-03	215	684	5.87E-03	5.97E-03	6.17E-03	6.27E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.06E-03	101	322	2.21E-03	2.63E-03	3.49E-03	3.90E-03
Ca2+	3.40E-02	820	2.61E+03	3.00E-02	3.20E-02	3.59E-02	3.78E-02
K+	6.21E-02	1.46E+03	4.66E+03	5.58E-02	5.88E-02	6.57E-02	6.75E-02
OH-	13.4	1.37E+05	4.36E+05	11.8	12.5	14.2	13.9
NO3-	4.93	1.84E+05	5.86E+05	4.52	4.72	5.10	5.10
NO2-	2.80	7.78E+04	2.48E+05	2.44	2.61	2.99	3.17
CO32-	0.291	1.05E+04	3.35E+04	0.262	0.276	0.310	0.312
PO43-	6.32E-02	3.62E+03	1.15E+04	5.68E-02	5.90E-02	6.47E-02	6.61E-02
SO42-	0.186	1.08E+04	3.42E+04	0.139	0.161	0.211	0.233
Si (as SiO32-)	7.03E-02	1.19E+03	3.79E+03	5.82E-02	6.41E-02	7.64E-02	8.24E-02
F-	3.63E-02	415	1.32E+03	2.97E-02	3.25E-02	3.95E-02	4.20E-02
Cl-	0.249	5.32E+03	1.69E+04	0.220	0.234	0.266	0.267
C6H5O73-	2.27E-02	2.59E+03	8.23E+03	2.10E-02	2.18E-02	2.36E-02	2.44E-02
EDTA4-	2.26E-03	392	1.25E+03	1.12E-03	1.68E-03	2.84E-03	3.41E-03
HEDTA3-	3.70E-03	611	1.95E+03	1.43E-03	2.54E-03	4.87E-03	6.01E-03
glycolate-	3.75E-02	1.70E+03	5.40E+03	2.12E-02	2.92E-02	4.58E-02	5.38E-02
acetate-	2.63E-03	93.6	298	2.13E-03	2.38E-03	2.89E-03	3.13E-03
oxalate2-	2.23E-08	1.18E-03	3.77E-03	1.99E-08	2.11E-08	2.35E-08	2.47E-08
DBP	1.51E-02	1.91E+03	6.08E+03	1.21E-02	1.36E-02	1.66E-02	1.80E-02
butanol	1.51E-02	674	2.15E+03	1.21E-02	1.36E-02	1.66E-02	1.80E-02
NH3	7.43E-02	762	2.42E+03	6.07E-02	6.61E-02	8.48E-02	9.70E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-109

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	8.71E+04 (kg)	(13.0 kgal)	---	---	---	---	---
Heat Load	1.22E-03 (kW)	(4.17 BTU/hr)	---	1.02E-03	1.18E-03	1.26E-03	1.30E-03
Bulk Density	1.77 (g/cc)	---	---	1.47	1.57	1.92	2.02
Void Fraction	0.651	---	---	0.488	0.557	0.780	0.825
Water wt%	24.5	---	---	4.37	12.2	45.5	55.1
TOC wt% C (wet	0	---	---	0	0	0	0

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	1.01E-06	5.71E-04	4.98E-02	6.33E-07	8.98E-07	1.13E-06	1.24E-06
C-14	1.09E-07	6.16E-05	5.37E-03	9.15E-08	1.05E-07	1.13E-07	1.16E-07
Ni-59	3.09E-08	1.75E-05	1.52E-03	2.59E-08	2.99E-08	4.60E-08	1.15E-07
Ni-63	2.90E-06	1.64E-03	0.143	2.43E-06	2.80E-06	4.31E-06	1.08E-05
Co-60	4.71E-08	2.66E-05	2.32E-03	3.96E-08	4.56E-08	4.87E-08	5.02E-08
Se-79	2.37E-08	1.34E-05	1.17E-03	1.99E-08	2.29E-08	2.45E-08	2.53E-08
Sr-90	2.05E-03	1.16	101	1.72E-03	1.98E-03	2.12E-03	2.18E-03
Y-90	2.05E-03	1.16	101	1.72E-03	1.98E-03	2.12E-03	2.18E-03
Zr-93	1.12E-07	6.34E-05	5.52E-03	9.42E-08	1.09E-07	1.16E-07	1.20E-07
Nb-93m	9.13E-08	5.15E-05	4.49E-03	7.66E-08	8.82E-08	9.43E-08	9.73E-08
Tc-99	7.84E-07	4.42E-04	3.85E-02	6.57E-07	7.57E-07	8.10E-07	8.35E-07
Ru-106	2.76E-13	1.56E-10	1.36E-08	2.31E-13	2.66E-13	2.85E-13	2.94E-13
Cd-113m	3.51E-07	1.98E-04	1.73E-02	2.94E-07	3.39E-07	3.62E-07	3.74E-07
Sb-125	7.89E-08	4.46E-05	3.88E-03	6.62E-08	7.63E-08	8.16E-08	8.41E-08
Sn-126	3.61E-08	2.04E-05	1.78E-03	3.03E-08	3.49E-08	3.73E-08	3.85E-08
I-129	1.50E-09	8.47E-07	7.38E-05	1.26E-09	1.45E-09	1.55E-09	1.60E-09
Cs-134	1.65E-09	9.34E-07	8.14E-05	1.39E-09	1.60E-09	1.71E-09	1.76E-09
Cs-137	2.35E-03	1.33	116	1.97E-03	2.27E-03	2.43E-03	2.50E-03
Ba-137m	2.22E-03	1.26	109	1.87E-03	2.15E-03	2.30E-03	2.37E-03
Sm-151	8.47E-05	4.78E-02	4.17	7.10E-05	8.18E-05	8.75E-05	9.02E-05
Eu-152	1.75E-07	9.89E-05	8.62E-03	1.74E-07	1.75E-07	1.76E-07	1.76E-07
Eu-154	1.15E-06	6.48E-04	5.65E-02	9.63E-07	1.11E-06	1.19E-06	1.22E-06
Eu-155	8.33E-06	4.71E-03	0.410	8.27E-06	8.32E-06	8.35E-06	8.36E-06
Ra-226	2.83E-12	1.60E-09	1.39E-07	2.37E-12	2.73E-12	2.92E-12	3.01E-12
Ra-228	2.92E-16	1.65E-13	1.44E-11	2.90E-16	2.91E-16	2.92E-16	2.93E-16
Ac-227	1.45E-11	8.19E-09	7.13E-07	1.22E-11	1.40E-11	1.50E-11	1.55E-11
Pa-231	3.44E-11	1.94E-08	1.69E-06	2.89E-11	3.32E-11	3.55E-11	3.67E-11
Th-229	4.13E-14	2.33E-11	2.03E-09	4.09E-14	4.12E-14	4.13E-14	4.14E-14
Th-232	4.04E-17	2.28E-14	1.99E-12	3.39E-17	3.90E-17	4.17E-17	4.30E-17
U-232	6.47E-10	3.65E-07	3.18E-05	5.62E-10	6.12E-10	6.72E-10	6.90E-10
U-233	2.39E-11	1.35E-08	1.18E-06	2.08E-11	2.26E-11	2.49E-11	2.55E-11
U-234	1.48E-05	8.36E-03	0.728	1.29E-05	1.40E-05	1.54E-05	1.58E-05
U-235	6.29E-07	3.55E-04	3.09E-02	5.46E-07	5.95E-07	6.53E-07	6.71E-07
U-236	3.26E-07	1.84E-04	1.60E-02	2.83E-07	3.08E-07	3.39E-07	3.48E-07
U-238	1.44E-05	8.14E-03	0.709	1.25E-05	1.36E-05	1.50E-05	1.54E-05
Np-237	5.48E-09	3.09E-06	2.70E-04	4.60E-09	5.30E-09	5.67E-09	5.84E-09
Pu-238	2.51E-05	1.42E-02	1.23	2.40E-05	2.45E-05	2.57E-05	2.62E-05
Pu-239	1.61E-03	0.908	79.1	1.54E-03	1.57E-03	1.64E-03	1.68E-03
Pu-240	2.27E-04	0.128	11.2	2.17E-04	2.22E-04	2.32E-04	2.37E-04
Pu-241	1.39E-03	0.782	68.2	1.32E-03	1.35E-03	1.42E-03	1.45E-03
Pu-242	5.88E-09	3.32E-06	2.89E-04	5.62E-09	5.75E-09	6.01E-09	6.14E-09
Am-241	4.09E-07	2.31E-04	2.01E-02	3.43E-07	3.95E-07	4.22E-07	4.36E-07
Am-243	3.73E-12	2.10E-09	1.83E-07	3.13E-12	3.60E-12	3.85E-12	3.97E-12
Cm-242	3.65E-09	2.06E-06	1.80E-04	3.62E-09	3.65E-09	3.66E-09	3.67E-09
Cm-243	8.34E-11	4.71E-08	4.10E-06	8.27E-11	8.32E-11	8.35E-11	8.36E-11
Cm-244	1.30E-10	7.33E-08	6.39E-06	1.09E-10	1.25E-10	1.34E-10	1.38E-10

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	2.69E-02 (g/L)	---	1.32	2.57E-02	2.63E-02	2.75E-02	2.81E-02
U	0.181	2.44E+04	2.12E+03	0.158	0.172	0.188	0.194

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-109							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	3.10E+06 (kg)	(494 kgal)	---	---	---	---	---
Heat Load	3.87 (kW)	(1.32E+04 BTU/hr)	---	3.64	3.75	4.00	4.02
Bulk Density*	1.66 (g/cc)	---	---	1.59	1.63	1.68	1.69
Water wt%†	30.9	---	---	28.6	29.6	32.3	34.7
TOC wt% C (wet	0.340	---	---	0.304	0.321	0.358	0.375
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.62E-04	0.158	490	1.52E-04	1.52E-04	2.77E-04	2.71E-04
C-14	3.41E-05	2.06E-02	63.8	1.10E-05	1.10E-05	3.48E-05	3.48E-05
Ni-59	2.29E-06	1.38E-03	4.28	1.20E-06	1.20E-06	2.34E-06	2.40E-06
Ni-63	2.23E-04	0.134	416	1.15E-04	1.15E-04	2.28E-04	2.33E-04
Co-60	3.49E-05	2.10E-02	65.2	8.45E-06	8.45E-06	3.53E-05	3.58E-05
Se-79	3.50E-06	2.11E-03	6.54	2.02E-06	2.02E-06	4.03E-06	4.54E-06
Sr-90	0.114	69.0	2.14E+05	0.107	0.111	0.118	0.122
Y-90	0.114	69.0	2.14E+05	6.35E-02	6.35E-02	0.118	0.122
Zr-93	1.71E-05	1.03E-02	31.9	9.72E-06	9.72E-06	1.97E-05	2.23E-05
Nb-93m	1.26E-05	7.63E-03	23.6	7.48E-06	7.48E-06	1.45E-05	1.63E-05
Tc-99	2.43E-04	0.147	454	1.57E-04	1.99E-04	2.87E-04	3.30E-04
Ru-106	5.43E-09	3.28E-06	1.02E-02	2.02E-09	2.02E-09	6.19E-09	6.89E-09
Cd-113m	8.42E-05	5.08E-02	157	4.00E-05	4.00E-05	1.00E-04	1.16E-04
Sb-125	1.44E-04	8.68E-02	269	2.95E-05	2.95E-05	1.46E-04	1.48E-04
Sn-126	5.29E-06	3.20E-03	9.90	3.09E-06	3.09E-06	6.09E-06	6.86E-06
I-129	4.68E-07	2.83E-04	0.875	3.02E-07	3.83E-07	5.54E-07	6.36E-07
Cs-134	1.53E-06	9.25E-04	2.86	1.03E-06	1.03E-06	1.64E-06	1.75E-06
Cs-137	0.277	167	5.19E+05	0.251	0.263	0.293	0.295
Ba-137m	0.262	158	4.91E+05	0.196	0.196	0.277	0.279
Sm-151	1.23E-02	7.45	2.31E+04	7.18E-03	7.18E-03	1.42E-02	1.60E-02
Eu-152	3.12E-06	1.88E-03	5.83	1.29E-06	1.29E-06	3.18E-06	3.23E-06
Eu-154	5.57E-04	0.336	1.04E+03	1.89E-04	1.89E-04	6.90E-04	7.43E-04
Eu-155	1.79E-04	0.108	336	7.09E-05	7.09E-05	1.84E-04	1.88E-04
Ra-226	1.61E-10	9.72E-08	3.01E-04	1.11E-10	1.15E-10	1.86E-10	2.11E-10
Ra-228	5.94E-08	3.59E-05	0.111	2.33E-08	4.09E-08	8.08E-08	1.04E-07
Ac-227	9.72E-10	5.87E-07	1.82E-03	6.81E-10	7.07E-10	1.12E-09	1.21E-09
Pa-231	4.31E-09	2.61E-06	8.07E-03	2.84E-09	2.84E-09	4.85E-09	5.36E-09
Th-229	1.42E-09	8.55E-07	2.65E-03	6.24E-10	1.01E-09	1.88E-09	2.38E-09
Th-232	4.02E-09	2.43E-06	7.51E-03	2.02E-09	3.00E-09	5.03E-09	6.01E-09
U-232	3.61E-07	2.18E-04	0.676	2.17E-07	2.87E-07	4.47E-07	5.38E-07
U-233	1.39E-06	8.37E-04	2.59	8.33E-07	1.10E-06	1.71E-06	2.06E-06
U-234	8.42E-07	5.08E-04	1.57	7.73E-07	8.05E-07	8.81E-07	8.66E-07
U-235	3.48E-08	2.10E-05	6.50E-02	3.18E-08	3.32E-08	3.65E-08	3.58E-08
U-236	2.41E-08	1.46E-05	4.51E-02	2.30E-08	2.35E-08	2.47E-08	2.49E-08
U-238	8.77E-07	5.30E-04	1.64	8.07E-07	8.40E-07	9.17E-07	9.01E-07
Np-237	9.52E-07	5.75E-04	1.78	6.71E-07	8.08E-07	1.10E-06	1.24E-06
Pu-238	1.19E-06	7.19E-04	2.23	8.61E-07	1.02E-06	1.36E-06	1.52E-06
Pu-239	4.40E-05	2.66E-02	82.3	3.55E-05	3.97E-05	4.83E-05	5.24E-05
Pu-240	7.24E-06	4.37E-03	13.5	5.66E-06	6.44E-06	8.04E-06	8.81E-06
Pu-241	7.89E-05	4.76E-02	147	5.64E-05	6.74E-05	9.04E-05	1.01E-04
Pu-242	4.28E-10	2.58E-07	7.99E-04	2.93E-10	3.59E-10	4.96E-10	5.62E-10
Am-241	5.66E-05	3.42E-02	106	4.09E-05	4.86E-05	6.46E-05	7.22E-05
Am-243	1.63E-09	9.85E-07	3.05E-03	1.14E-09	1.37E-09	1.89E-09	2.14E-09
Cm-242	1.12E-07	6.78E-05	0.210	3.74E-08	3.74E-08	1.15E-07	1.17E-07
Cm-243	1.01E-08	6.09E-06	1.89E-02	2.94E-09	2.94E-09	1.03E-08	1.06E-08
Cm-244	1.11E-07	6.71E-05	0.208	3.76E-08	3.76E-08	1.36E-07	1.52E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.69E-04 (g/L)	---	1.06	4.09E-04	4.88E-04	6.50E-04	7.28E-04
U	9.92E-03	1.43E+03	4.41E+03	9.04E-03	9.45E-03	1.04E-02	1.02E-02

*Density is calculated based on Na, OH-, and AlO2-.

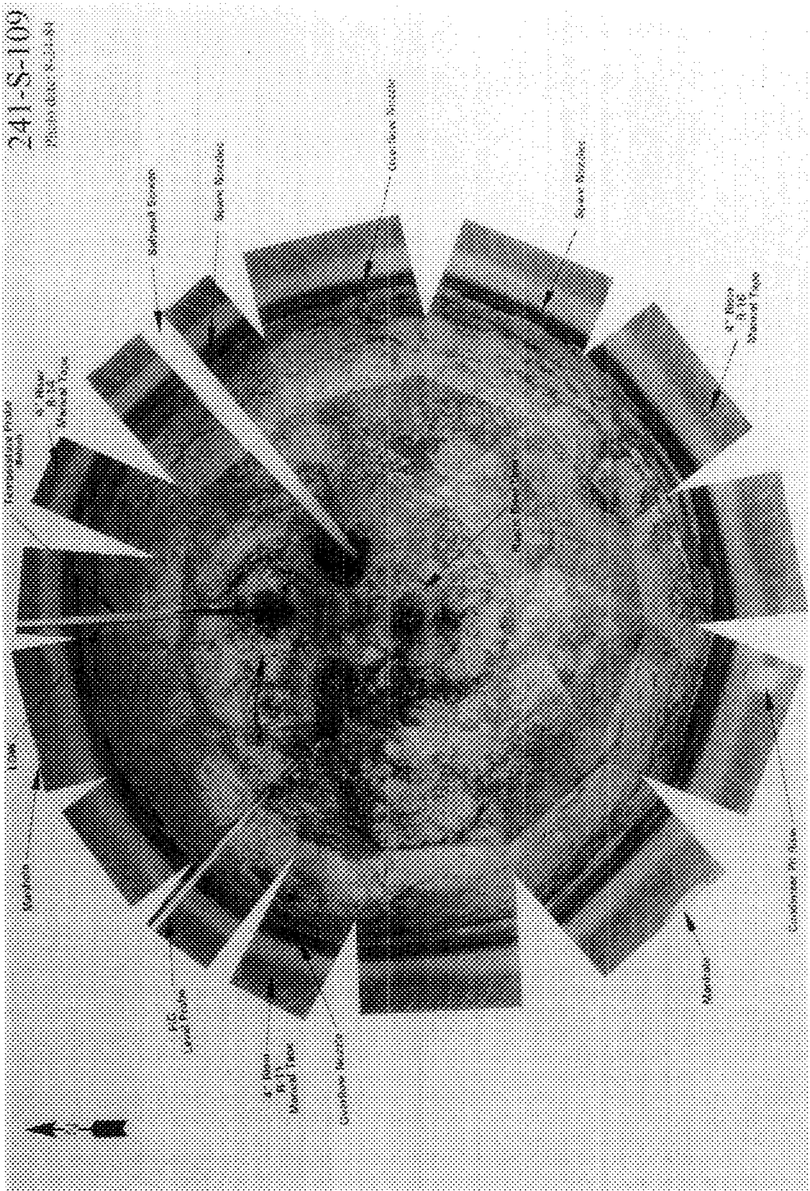
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-109							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.18E+06 (kg)	(507 kgal)	---	---	---	---	---
Heat Load	3.87 (kW)	(1.32E+04 BTU/hr)	---	3.64	3.75	4.01	4.03
Bulk Density†	1.66 (g/cc)	---	---	1.60	1.63	1.68	1.69
Water wt%†	30.7	---	---	28.4	29.4	32.1	34.4
TOC wt% C (wet	0.331	---	---	0.295	0.313	0.348	0.365
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.55E-04	0.154	490	1.48E-04	1.48E-04	2.70E-04	2.64E-04
C-14	3.32E-05	2.00E-02	63.8	1.08E-05	1.08E-05	3.40E-05	3.39E-05
Ni-59	2.23E-06	1.34E-03	4.28	1.17E-06	1.17E-06	2.28E-06	2.34E-06
Ni-63	2.17E-04	0.131	416	1.12E-04	1.12E-04	2.22E-04	2.27E-04
Co-60	3.40E-05	2.05E-02	65.2	8.24E-06	8.24E-06	3.44E-05	3.49E-05
Se-79	3.41E-06	2.05E-03	6.54	1.97E-06	1.97E-06	3.93E-06	4.42E-06
Sr-90	0.111	67.2	2.14E+05	0.104	0.108	0.115	0.118
Y-90	0.111	67.2	2.14E+05	6.19E-02	6.19E-02	0.115	0.119
Zr-93	1.66E-05	1.00E-02	31.9	9.48E-06	9.48E-06	1.92E-05	2.17E-05
Nb-93m	1.23E-05	7.42E-03	23.6	7.29E-06	7.29E-06	1.41E-05	1.59E-05
Tc-99	2.37E-04	0.143	454	1.53E-04	1.94E-04	2.80E-04	3.22E-04
Ru-106	5.29E-09	3.19E-06	1.02E-02	1.97E-09	1.97E-09	6.04E-09	6.71E-09
Cd-113m	8.21E-05	4.95E-02	157	3.90E-05	3.90E-05	9.76E-05	1.13E-04
Sb-125	1.40E-04	8.44E-02	269	2.87E-05	2.87E-05	1.42E-04	1.44E-04
Sn-126	5.16E-06	3.11E-03	9.90	3.01E-06	3.01E-06	5.94E-06	6.68E-06
I-129	4.56E-07	2.75E-04	0.875	2.94E-07	3.73E-07	5.40E-07	6.20E-07
Cs-134	1.49E-06	8.99E-04	2.86	1.00E-06	1.00E-06	1.60E-06	1.71E-06
Cs-137	0.270	163	5.19E+05	0.244	0.257	0.285	0.288
Ba-137m	0.256	154	4.91E+05	0.191	0.191	0.270	0.272
Sm-151	1.20E-02	7.24	2.31E+04	6.99E-03	6.99E-03	1.38E-02	1.56E-02
Eu-152	3.04E-06	1.83E-03	5.84	1.27E-06	1.27E-06	3.10E-06	3.15E-06
Eu-154	5.42E-04	0.327	1.04E+03	1.84E-04	1.84E-04	6.72E-04	7.24E-04
Eu-155	1.75E-04	0.106	336	6.93E-05	6.93E-05	1.79E-04	1.83E-04
Ra-226	1.57E-10	9.45E-08	3.01E-04	1.08E-10	1.12E-10	1.82E-10	2.06E-10
Ra-228	5.79E-08	3.49E-05	0.111	2.27E-08	3.99E-08	7.87E-08	1.01E-07
Ac-227	9.48E-10	5.71E-07	1.82E-03	6.64E-10	6.89E-10	1.09E-09	1.18E-09
Pa-231	4.20E-09	2.53E-06	8.07E-03	2.77E-09	2.77E-09	4.72E-09	5.22E-09
Th-229	1.38E-09	8.31E-07	2.65E-03	6.08E-10	9.85E-10	1.84E-09	2.32E-09
Th-232	3.91E-09	2.36E-06	7.51E-03	1.97E-09	2.92E-09	4.91E-09	5.86E-09
U-232	3.52E-07	2.12E-04	0.676	2.11E-07	2.80E-07	4.36E-07	5.24E-07
U-233	1.35E-06	8.14E-04	2.59	8.12E-07	1.08E-06	1.67E-06	2.01E-06
U-234	1.20E-06	7.23E-04	2.30	1.13E-06	1.16E-06	1.24E-06	1.22E-06
U-235	5.00E-08	3.01E-05	9.60E-02	4.71E-08	4.85E-08	5.17E-08	5.11E-08
U-236	3.19E-08	1.92E-05	6.11E-02	3.08E-08	3.13E-08	3.25E-08	3.26E-08
U-238	1.22E-06	7.38E-04	2.35	1.16E-06	1.19E-06	1.26E-06	1.25E-06
Np-237	9.28E-07	5.59E-04	1.78	6.54E-07	7.88E-07	1.07E-06	1.21E-06
Pu-238	1.80E-06	1.09E-03	3.46	1.48E-06	1.64E-06	1.97E-06	2.13E-06
Pu-239	8.41E-05	5.07E-02	161	7.58E-05	7.99E-05	8.83E-05	9.23E-05
Pu-240	1.29E-05	7.76E-03	24.7	1.13E-05	1.21E-05	1.37E-05	1.44E-05
Pu-241	1.12E-04	6.77E-02	216	9.05E-05	1.01E-04	1.24E-04	1.34E-04
Pu-242	5.67E-10	3.42E-07	1.09E-03	4.36E-10	5.00E-10	6.34E-10	6.98E-10
Am-241	5.51E-05	3.32E-02	106	3.99E-05	4.74E-05	6.29E-05	7.04E-05
Am-243	1.59E-09	9.58E-07	3.05E-03	1.11E-09	1.34E-09	1.84E-09	2.09E-09
Cm-242	1.10E-07	6.60E-05	0.210	3.66E-08	3.66E-08	1.12E-07	1.14E-07
Cm-243	9.83E-09	5.92E-06	1.89E-02	2.87E-09	2.87E-09	1.01E-08	1.03E-08
Cm-244	1.08E-07	6.53E-05	0.208	3.66E-08	3.66E-08	1.33E-07	1.48E-07
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	1.24E-03 (g/L)	---	2.39	1.09E-03	1.16E-03	1.32E-03	1.40E-03
U	1.43E-02	2.05E+03	6.54E+03	1.35E-02	1.39E-02	1.48E-02	1.46E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-S-109

TANK 241-S-110 SUMMARY

TANK HISTORY	
Entered Service	2nd qtr 1952
Removed from Service	1976
Inactive	1976
Watch Lists	none
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
11, 14, 15	4 in
7, 8	12 in

TANK TEMPERATURE	
Average Tank Temperature	106°F
Maximum Temperature	136°F
Date	May 2, 1988
Elevation from tank bottom	0.47 ft
Riser Number	4
Minimum Temperature	72.6°F
Date	Feb 13, 1993
Elevation from tank bottom	24.43 ft
Riser Number	4

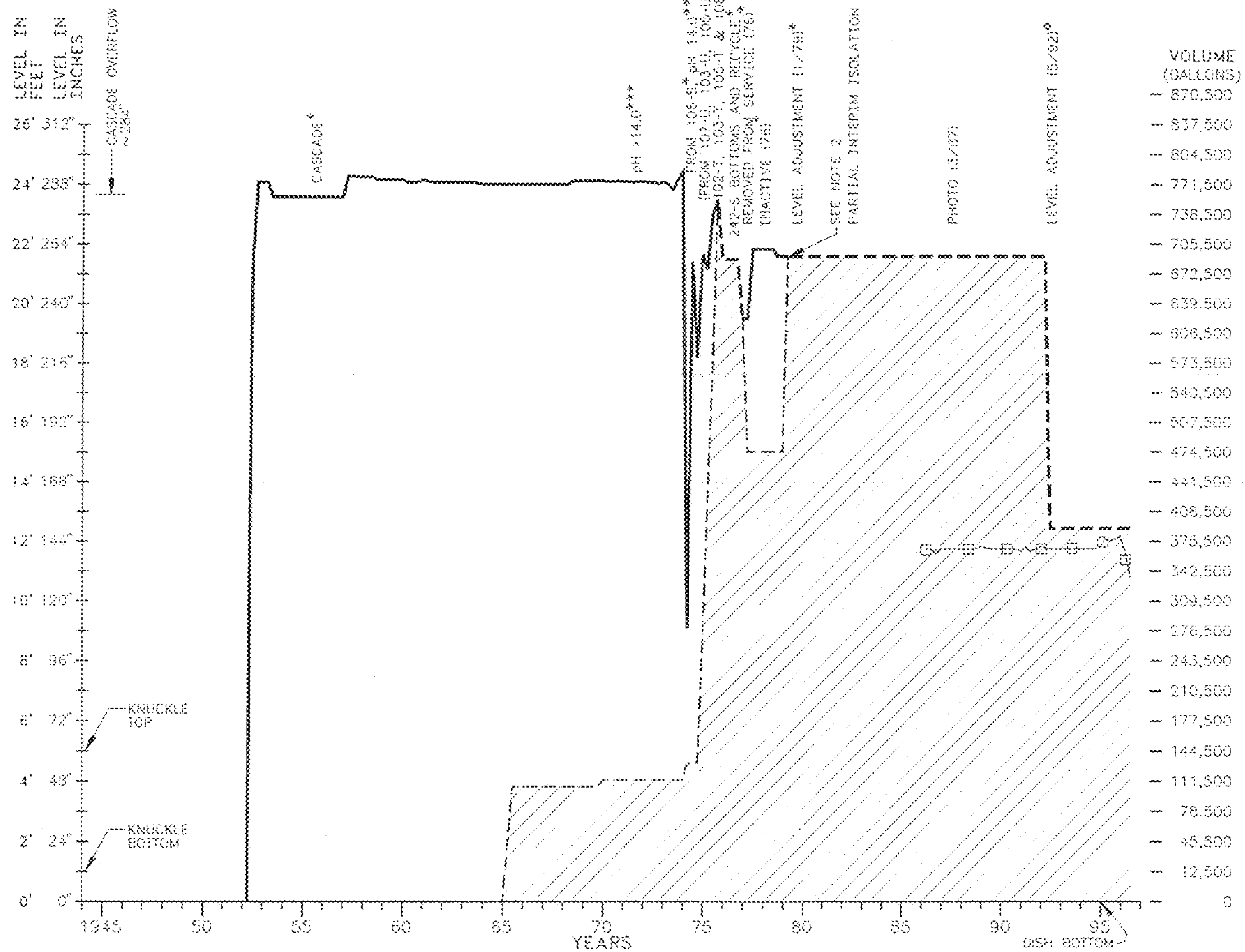
TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-111
Total Risers	12

WASTE VOLUME (HANLON 1996)	
Total Waste Volume	390,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	96,000 gal
Pumpable Liquids	103,000 gal
Saltcake	259,000 gal
Sludge	131,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	March 12, 1967
Montage Number	94041033-19CN
Photo Set Number	8701463

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	149.52 in
Date	Aug 26, 1995 - Aug 30, 1996*
Min Level	148.2 in
Date	Oct 19, 1992

* Numerous dates in this time span.



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

- * ANDERSON 1990
- ** WELTY 1988
- *** BORSHEIM AND KIRCH 1991
- ◇ HANLON 1996

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN

GLOSSARY OF WASTE TERMS:

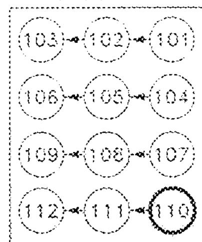
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

224:	224-U WASTE
BL:	B-PLANT LOW-LEVEL WASTE
CW:	COATING (CLADDING) WASTE
CWR1:	COATING (CLADDING) WASTE 1952-60
DW:	DECONTAMINATION WASTE
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HDRL:	HANFORD DEFENSE RESIDUAL LIQUOR
IX:	ION EXCHANGE
NCPLX:	NON-COMPLEXED WASTE
OWW:	PUREX ORGANIC WASH WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RIX:	REDOX ION EXCHANGE WASTE
R1:	REDOX WASTE 1952-57
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

S TANK FARM CASCADE

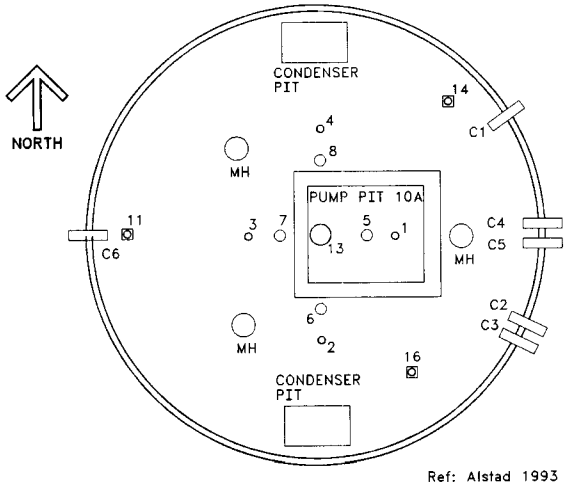


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-110 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: N/A

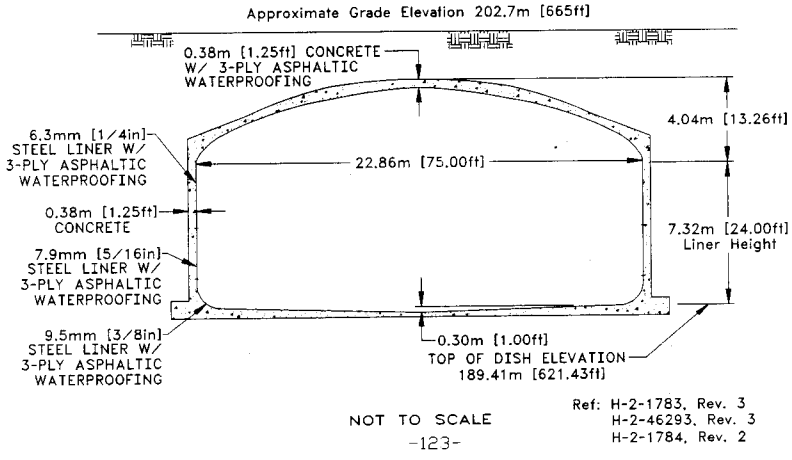
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E76	12/96
SCALE NONE	JOB NO.	SHEET 1 OF 1	

241-S-110



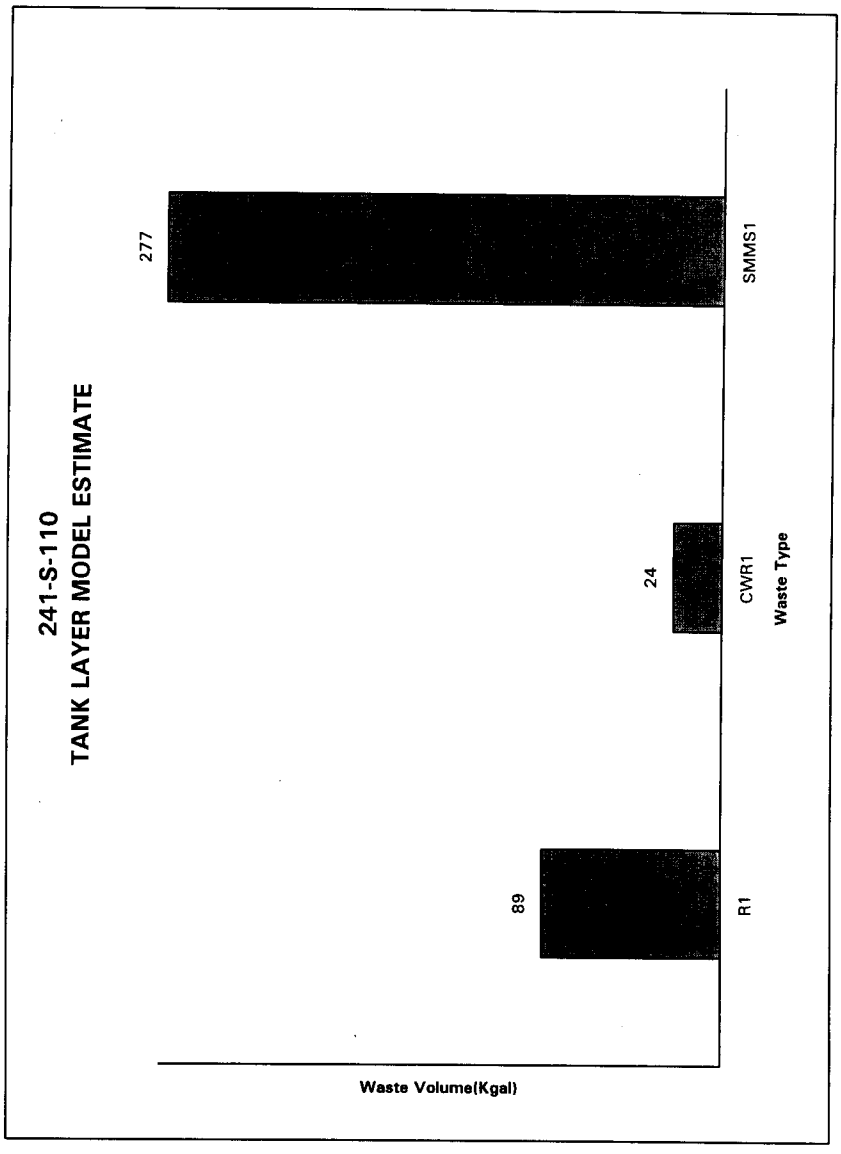
Ref: Alstad 1993
H-2-73189, Rev. 4
H-2-37533, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-110							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	7.53E+05 (kg)	(113 kgal)	---	---	---	---	---
Heat Load	2.20 (kW)	(7.50E+03 BTU/hr)	---	1.59	1.95	2.36	2.43
Bulk Density	1.76 (g/cc)	---	---	1.56	1.58	2.04	2.14
Void Fraction	0.560	---	---	0.185	0.309	0.719	0.723
Water wt%	26.5	---	---	6.48	12.7	38.3	39.4
TOC wt% C (wet	0	---	---	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	8.07	1.05E+05	7.93E+04	4.07	4.47	13.2	16.0
Al3+	7.88	1.21E+05	9.10E+04	6.74	7.05	8.48	8.91
Fe3+ (total Fe)	0.833	2.64E+04	1.99E+04	0.818	0.825	0.841	0.848
Cr3+	4.92E-02	1.45E+03	1.09E+03	6.01E-03	2.71E-02	0.411	0.835
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	8.66E-04	98.8	74.3	8.54E-04	8.61E-04	8.70E-04	8.73E-04
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	2.50E-02	2.94E+03	2.21E+03	2.30E-02	2.41E-02	2.59E-02	2.67E-02
Ni2+	4.01E-02	1.34E+03	1.01E+03	2.90E-02	3.53E-02	4.38E-02	4.32E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.199	4.53E+03	3.41E+03	0.140	0.169	0.229	0.258
K+	9.17E-03	204	153	1.34E-03	4.47E-03	1.23E-02	1.23E-02
OH-	29.0	2.80E+05	2.11E+05	24.4	25.7	31.4	33.2
NO3-	4.29	1.51E+05	1.14E+05	0.169	0.169	10.7	14.2
NO2-	1.35	3.53E+04	2.66E+04	0.307	0.672	1.90	1.90
CO32-	0.199	6.78E+03	5.10E+03	0.140	0.169	0.229	0.258
PO43-	0	0	0	0	0	0	0
SO42-	9.98E-03	545	410	2.72E-03	5.62E-03	1.29E-02	1.29E-02
Si (as SiO32-)	1.06E-02	169	127	4.99E-03	7.24E-03	2.37E-02	4.35E-02
F-	0	0	0	0	0	0	0
Cl-	4.22E-02	849	639	6.15E-03	2.05E-02	5.66E-02	0.125
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.201	1.95E+03	1.46E+03	5.17E-02	7.29E-02	0.213	0.224
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HOW Model Rev. 4

Single-Shell Tank 241-S-110							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	1.67E+06 (kg)	(277 kgal)	---	---	---	---	---
Heat Load	2.09 (kW)	(7.14E+03 BTU/hr)	---	1.96	2.03	2.14	2.18
Bulk Density*	1.59 (g/cc)	---	---	1.54	1.57	1.62	1.63
Water wt%	34.6	---	---	31.8	33.0	36.2	38.1
TOC wt% C (wet	0.569	---	---	0.441	0.503	0.634	0.698
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	13.9	2.00E+05	3.34E+05	12.6	13.2	14.4	14.9
Al3+	1.76	2.98E+04	4.98E+04	1.61	1.68	1.85	1.86
Fe3+ (total Fe)	9.82E-03	344	575	7.75E-03	8.77E-03	1.09E-02	1.19E-02
Cr3+	0.163	5.33E+03	8.91E+03	0.134	0.150	0.170	0.176
Bi3+	8.12E-04	107	178	7.49E-04	7.80E-04	8.45E-04	8.76E-04
La3+	7.38E-06	0.643	1.08	5.35E-06	6.34E-06	8.43E-06	9.44E-06
Hg2+	7.06E-06	0.889	1.49	6.73E-06	6.92E-06	7.17E-06	7.28E-06
Zr (as ZrO(OH)2)	1.42E-04	8.13	13.6	1.30E-04	1.35E-04	1.47E-04	1.54E-04
Pb2+	8.62E-04	112	187	7.03E-04	7.81E-04	9.44E-04	1.02E-03
Ni2+	5.77E-03	212	355	5.53E-03	5.65E-03	5.85E-03	5.92E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.58E-03	123	206	2.59E-03	3.07E-03	4.09E-03	4.58E-03
Ca2+	2.98E-02	750	1.25E+03	2.68E-02	2.83E-02	3.13E-02	3.28E-02
K+	6.00E-02	1.47E+03	2.46E+03	5.39E-02	5.68E-02	6.33E-02	6.64E-02
OH-	10.8	1.15E+05	1.92E+05	9.84	10.3	11.3	11.4
NO3-	4.56	1.77E+05	2.97E+05	4.30	4.44	4.66	4.69
NO2-	2.55	7.36E+04	1.23E+05	2.13	2.32	2.77	2.98
CO32-	0.365	1.38E+04	2.30E+04	0.328	0.347	0.384	0.397
PO43-	6.36E-02	3.79E+03	6.33E+03	5.69E-02	5.93E-02	6.48E-02	6.59E-02
SO42-	0.209	1.26E+04	2.10E+04	0.154	0.180	0.239	0.265
Si (as SiO32-)	7.24E-02	1.28E+03	2.13E+03	5.82E-02	6.52E-02	7.97E-02	8.67E-02
F-	3.95E-02	471	786	3.39E-02	3.63E-02	4.22E-02	4.43E-02
Cl-	0.235	5.22E+03	8.72E+03	0.210	0.223	0.246	0.255
C6H5O73-	2.82E-02	3.34E+03	5.59E+03	2.61E-02	2.71E-02	2.93E-02	3.03E-02
EDTA4-	7.79E-03	1.41E+03	2.35E+03	2.75E-03	5.21E-03	1.04E-02	1.29E-02
HEDTA3-	1.40E-02	2.41E+03	4.03E+03	3.96E-03	8.88E-03	1.92E-02	2.43E-02
glycolate-	6.95E-02	3.27E+03	5.47E+03	4.18E-02	5.53E-02	8.38E-02	9.73E-02
acetate-	4.96E-03	184	307	4.03E-03	4.48E-03	5.43E-03	5.89E-03
oxalate2-	9.67E-06	0.534	0.893	8.57E-06	9.11E-06	1.02E-05	1.08E-05
DBP	1.83E-02	2.41E+03	4.02E+03	1.48E-02	1.65E-02	2.00E-02	2.17E-02
butanol	1.83E-02	849	1.42E+03	1.48E-02	1.65E-02	2.00E-02	2.17E-02
NH3	7.24E-02	772	1.29E+03	5.63E-02	6.27E-02	8.48E-02	9.92E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-110							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	2.42E+06 (kg)	(390 kgal)	—	—	—	—	—
Heat Load	4.29 (kW)	(1.46E+04 BTU/hr)	----	3.61	4.00	4.49	4.50
Bulk Density†	1.64 (g/cc)	—	----	1.56	1.58	1.73	1.75
Water wt%†	32.1	—	----	25.2	26.7	36.3	37.6
TOC wt% C (wet	0.392	—	----	0.304	0.347	0.438	0.482
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	12.2	1.71E+05	4.13E+05	10.4	10.9	13.9	14.3
Al3+	3.53	5.81E+04	1.41E+05	3.20	3.30	3.70	3.82
Fe3+ (total Fe)	0.248	8.45E+03	2.05E+04	0.244	0.246	0.250	0.252
Cr3+	0.130	4.13E+03	1.00E+04	0.116	0.125	0.225	0.337
Bi3+	5.77E-04	73.4	178	5.32E-04	5.54E-04	6.00E-04	6.22E-04
La3+	5.25E-06	0.444	1.08	3.80E-06	4.51E-06	5.99E-06	6.70E-06
Hg2+	2.56E-04	31.3	75.8	2.52E-04	2.55E-04	2.57E-04	2.58E-04
Zr (as ZrO(OH)2)	1.01E-04	5.61	13.6	9.26E-05	9.56E-05	1.04E-04	1.09E-04
Pb2+	7.85E-03	991	2.40E+03	7.26E-03	7.61E-03	8.09E-03	8.31E-03
Ni2+	1.57E-02	562	1.36E+03	1.25E-02	1.43E-02	1.68E-02	1.65E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.54E-03	85.1	206	1.84E-03	2.18E-03	2.91E-03	3.25E-03
Ca2+	7.88E-02	1.92E+03	4.66E+03	6.27E-02	7.09E-02	8.66E-02	9.42E-02
K+	4.53E-02	1.08E+03	2.61E+03	4.09E-02	4.30E-02	4.76E-02	4.99E-02
OH-	16.1	1.66E+05	4.03E+05	14.7	15.1	16.7	17.2
NO3-	4.48	1.69E+05	4.10E+05	3.18	3.27	6.31	7.19
NO2-	2.20	6.17E+04	1.50E+05	1.83	2.00	2.39	2.51
CO32-	0.317	1.16E+04	2.81E+04	0.291	0.304	0.330	0.339
PO43-	4.52E-02	2.61E+03	6.33E+03	4.04E-02	4.21E-02	4.60E-02	4.68E-02
SO42-	0.151	8.85E+03	2.15E+04	0.112	0.131	0.172	0.191
Si (as SiO32-)	5.45E-02	932	2.26E+03	4.44E-02	4.94E-02	5.97E-02	6.46E-02
F-	2.80E-02	324	786	2.41E-02	2.58E-02	3.00E-02	3.15E-02
Cl-	0.179	3.86E+03	9.36E+03	0.162	0.170	0.187	0.201
C6H5O73-	2.00E-02	2.31E+03	5.59E+03	1.86E-02	1.93E-02	2.08E-02	2.15E-02
EDTA4-	5.53E-03	971	2.35E+03	1.95E-03	3.70E-03	7.37E-03	9.17E-03
HEDTA3-	9.97E-03	1.66E+03	4.03E+03	2.81E-03	6.31E-03	1.37E-02	1.72E-02
glycolate-	4.94E-02	2.26E+03	5.47E+03	2.97E-02	3.93E-02	5.95E-02	6.91E-02
acetate-	3.52E-03	127	307	2.86E-03	3.18E-03	3.86E-03	4.18E-03
oxalate2-	6.87E-06	0.368	0.893	6.09E-06	6.47E-06	7.27E-06	7.65E-06
DBP	1.30E-02	1.66E+03	4.02E+03	1.05E-02	1.17E-02	1.42E-02	1.54E-02
butanol	1.30E-02	585	1.42E+03	1.05E-02	1.17E-02	1.42E-02	1.54E-02
NH3	0.110	1.14E+03	2.75E+03	6.34E-02	7.10E-02	0.119	0.129
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-110

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	7.53E+05 (kg)	(113 kgal)	---	---	---	---	---
Heat Load	2.20 (kW)	(7.50E+03 BTU/hr)	---	1.59	1.95	2.36	2.43
Bulk Density	*1.76 (g/cc)*	---	---	1.56	1.58	2.04	2.14
Void Fraction	0.560	---	---	0.185	0.309	0.719	0.723
Water wt%	26.5	---	---	6.48	12.7	38.3	39.4
TOC wt% C (wet	0	---	---	0	0	0	0

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.32E-05	1.32E-02	9.94	2.62E-06	1.18E-05	3.25E-05	3.25E-05
C-14	1.81E-06	1.03E-03	0.772	2.27E-07	8.58E-07	2.44E-06	2.44E-06
Ni-59	1.17E-05	6.65E-03	5.01	8.45E-06	1.03E-05	1.28E-05	1.26E-05
Ni-63	1.09E-03	0.621	468	7.89E-04	9.61E-04	1.19E-03	1.18E-03
Co-60	7.14E-07	4.06E-04	0.305	9.05E-08	3.39E-07	9.64E-07	9.64E-07
Se-79	3.84E-07	2.18E-04	0.164	4.83E-08	1.82E-07	5.18E-07	5.64E-06
Sr-90	0.732	416	3.13E+05	0.522	0.640	0.802	0.814
Y-90	0.732	416	3.13E+05	0.522	0.640	0.802	0.814
Zr-93	1.81E-06	1.03E-03	0.774	2.28E-07	8.60E-07	2.45E-06	2.39E-05
Nb-93m	1.48E-06	8.41E-04	0.633	1.86E-07	7.03E-07	2.00E-06	2.53E-05
Tc-99	1.26E-05	7.19E-03	5.41	1.59E-06	6.01E-06	1.71E-05	1.71E-05
Ru-106	2.02E-12	1.15E-09	8.66E-07	2.83E-13	9.79E-13	2.72E-12	2.72E-12
Cd-113m	5.58E-06	3.17E-03	2.39	7.04E-07	2.65E-06	7.54E-06	7.54E-06
Sb-125	1.05E-06	5.97E-04	0.449	1.35E-07	5.01E-07	1.42E-06	1.42E-06
Sn-126	5.89E-07	3.35E-04	0.252	7.42E-08	2.80E-07	7.96E-07	9.03E-06
I-129	2.43E-08	1.38E-05	1.04E-02	3.06E-09	1.15E-08	3.28E-08	3.28E-08
Cs-134	2.18E-08	1.24E-05	9.31E-03	6.01E-09	1.23E-08	2.81E-08	2.81E-08
Cs-137	4.46E-02	25.4	1.91E+04	1.22E-02	2.51E-02	5.77E-02	5.77E-02
Ba-137m	*4.22E-02*	*24.0*	*1.81E+04*	1.15E-02	2.38E-02	5.45E-02	5.45E-02
Sm-151	1.37E-03	0.778	585	1.72E-04	6.50E-04	1.85E-03	2.08E-02
Eu-152	5.55E-06	3.15E-03	2.37	5.43E-06	5.48E-06	5.60E-06	5.60E-06
Eu-154	1.72E-05	9.80E-03	7.38	2.19E-06	8.20E-06	2.33E-05	2.33E-05
Eu-155	2.62E-04	0.149	112	2.56E-04	2.59E-04	2.64E-04	2.64E-04
Ra-226	8.52E-10	4.84E-07	3.64E-04	1.17E-10	4.77E-10	1.23E-09	1.59E-09
Ra-228	7.36E-15	4.18E-12	3.15E-09	7.20E-15	7.27E-15	7.42E-15	7.42E-15
Ac-227	3.75E-09	2.13E-06	1.61E-03	2.44E-10	1.58E-09	5.93E-09	8.02E-09
Pa-231	5.73E-10	3.25E-07	2.45E-04	7.20E-11	2.72E-10	1.62E-09	1.32E-08
Th-229	1.40E-12	7.96E-10	5.99E-07	1.37E-12	1.38E-12	1.41E-12	1.41E-12
Th-232	4.74E-16	2.69E-13	2.03E-10	6.18E-17	2.26E-16	6.39E-16	6.39E-16
U-232	1.41E-10	8.04E-08	6.05E-05	1.23E-10	1.34E-10	1.47E-10	1.51E-10
U-233	5.24E-12	2.98E-09	2.24E-06	4.57E-12	4.96E-12	5.44E-12	5.58E-12
U-234	3.24E-06	1.84E-03	1.38	2.83E-06	3.07E-06	3.36E-06	3.45E-06
U-235	1.38E-07	7.82E-05	5.88E-02	1.20E-07	1.30E-07	1.43E-07	1.46E-07
U-236	7.07E-08	4.02E-05	3.02E-02	6.16E-08	6.69E-08	7.34E-08	7.53E-08
U-238	3.16E-06	1.79E-03	1.35	2.75E-06	2.99E-06	3.28E-06	3.36E-06
Np-237	8.22E-08	4.67E-05	3.51E-02	1.04E-08	3.91E-08	1.11E-07	1.11E-07
Pu-238	1.05E-05	5.99E-03	4.51	9.07E-06	9.79E-06	1.13E-05	1.20E-05
Pu-239	7.13E-04	0.405	305	6.08E-04	6.60E-04	7.67E-04	8.18E-04
Pu-240	1.01E-04	5.76E-02	43.4	8.64E-05	9.37E-05	1.09E-04	1.16E-04
Pu-241	6.07E-04	0.345	260	5.19E-04	5.62E-04	6.52E-04	6.96E-04
Pu-242	2.68E-09	1.53E-06	1.15E-03	2.28E-09	2.48E-09	2.89E-09	3.09E-09
Am-241	6.46E-06	3.67E-03	2.76	8.16E-07	3.07E-06	8.73E-06	1.13E-04
Am-243	6.04E-11	3.43E-08	2.58E-05	7.61E-12	2.87E-11	8.16E-11	1.06E-09
Cm-242	*1.28E-07*	7.25E-05	5.45E-02	*1.25E-07*	*1.26E-07*	*1.29E-07*	*1.29E-07*
Cm-243	2.92E-09	1.66E-06	1.25E-03	2.86E-09	2.89E-09	2.95E-09	2.95E-09
Cm-244	2.16E-09	1.23E-06	9.23E-04	2.71E-10	1.02E-09	2.92E-09	2.92E-09

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	1.19E-02 (g/L)	---	5.10	1.02E-02	1.10E-02	1.28E-02	1.37E-02
U	3.97E-02	5.37E+03	4.04E+03	3.47E-02	3.76E-02	4.12E-02	4.23E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-110							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM Wast	1.67E+06 (kg)	(277 kgal)	----	---	---	----	----
Heat Load	2.09 (kW)	(7.14E+03 BTU/hr)	----	1.96	2.03	2.14	2.18
Bulk Density*	1.59 (g/cc)	---	---	1.54	1.57	1.62	1.63
Water wt%†	34.6	----	---	31.8	33.0	36.2	38.1
TOC wt% C (wet	0.569	----	----	0.441	0.503	0.634	0.698
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.65E-04	0.166	278	1.38E-04	1.38E-04	2.73E-04	2.75E-04
C-14	3.67E-05	2.30E-02	38.5	1.02E-05	1.02E-05	3.71E-05	3.74E-05
Ni-59	2.28E-06	1.43E-03	2.39	1.03E-06	1.03E-06	2.34E-06	2.40E-06
Ni-63	2.23E-04	0.140	234	9.95E-05	9.95E-05	2.29E-04	2.35E-04
Co-60	3.98E-05	2.49E-02	41.7	9.37E-06	9.37E-06	4.03E-05	4.07E-05
Se-79	3.55E-06	2.23E-03	3.72	1.86E-06	1.86E-06	4.16E-06	4.75E-06
Sr-90	0.115	71.9	1.20E+05	0.106	0.110	0.119	0.123
Y-90	0.115	72.0	1.20E+05	5.62E-02	5.62E-02	0.119	0.123
Zr-93	1.74E-05	1.09E-02	18.3	8.94E-06	8.94E-06	2.05E-05	2.34E-05
Nb-93m	1.27E-05	7.95E-03	13.3	6.74E-06	6.74E-06	1.48E-05	1.69E-05
Tc-99	2.62E-04	0.164	274	1.63E-04	2.11E-04	3.12E-04	3.62E-04
Ru-106	6.78E-09	4.25E-06	7.10E-03	2.85E-09	2.85E-09	7.65E-09	8.45E-09
Cd-113m	9.11E-05	5.71E-02	95.5	4.03E-05	4.03E-05	1.09E-04	1.27E-04
Sb-125	1.69E-04	0.106	177	3.73E-05	3.73E-05	1.71E-04	1.73E-04
Sn-126	5.37E-06	3.37E-03	5.63	2.83E-06	2.83E-06	6.29E-06	7.17E-06
I-129	5.04E-07	3.16E-04	0.528	3.13E-07	4.06E-07	6.03E-07	6.98E-07
Cs-134	2.03E-06	1.27E-03	2.12	1.42E-06	1.42E-06	2.22E-06	2.41E-06
Cs-137	0.261	164	2.73E+05	0.241	0.248	0.270	0.279
Ba-137m	0.247	155	2.59E+05	0.166	0.166	0.256	0.264
Sm-151	1.25E-02	7.84	1.31E+04	6.57E-03	6.57E-03	1.46E-02	1.67E-02
Eu-152	3.69E-06	2.31E-03	3.87	1.59E-06	1.59E-06	3.83E-06	3.97E-06
Eu-154	6.36E-04	0.399	667	2.12E-04	2.12E-04	7.89E-04	8.50E-04
Eu-155	2.16E-04	0.135	226	9.05E-05	9.05E-05	2.24E-04	2.32E-04
Ra-226	1.49E-10	9.33E-08	1.56E-04	9.62E-11	9.62E-11	1.68E-10	1.86E-10
Ra-228	1.18E-07	7.38E-05	0.123	4.88E-08	8.25E-08	1.59E-07	2.02E-07
Ac-227	9.33E-10	5.85E-07	9.78E-04	6.28E-10	6.28E-10	1.04E-09	1.15E-09
Pa-231	4.32E-09	2.71E-06	4.53E-03	2.63E-09	2.63E-09	4.94E-09	5.53E-09
Th-229	2.78E-09	1.74E-06	2.91E-03	1.26E-09	2.00E-09	3.67E-09	4.63E-09
Th-232	7.86E-09	4.93E-06	8.25E-03	4.05E-09	5.92E-09	9.81E-09	1.17E-08
U-232	6.26E-07	3.92E-04	0.656	3.49E-07	4.84E-07	7.89E-07	9.64E-07
U-233	2.40E-06	1.51E-03	2.52	1.34E-06	1.86E-06	3.03E-06	3.69E-06
U-234	8.08E-07	5.07E-04	0.847	7.70E-07	7.88E-07	8.30E-07	8.36E-07
U-235	3.29E-08	2.06E-05	3.45E-02	3.12E-08	3.20E-08	3.38E-08	3.41E-08
U-236	2.49E-08	1.56E-05	2.61E-02	2.40E-08	2.44E-08	2.53E-08	2.57E-08
U-238	8.99E-07	5.64E-04	0.943	8.60E-07	8.79E-07	9.22E-07	9.26E-07
Np-237	9.73E-07	6.10E-04	1.02	6.49E-07	8.07E-07	1.14E-06	1.30E-06
Pu-238	1.36E-06	8.52E-04	1.42	9.78E-07	1.16E-06	1.55E-06	1.74E-06
Pu-239	4.64E-05	2.91E-02	48.6	3.66E-05	4.14E-05	5.13E-05	5.61E-05
Pu-240	7.86E-06	4.93E-03	8.24	6.05E-06	6.94E-06	8.79E-06	9.67E-06
Pu-241	9.18E-05	5.76E-02	96.2	6.59E-05	7.85E-05	1.05E-04	1.18E-04
Pu-242	5.03E-10	3.15E-07	5.27E-04	3.48E-10	4.24E-10	5.82E-10	6.58E-10
Am-241	5.83E-05	3.66E-02	61.2	4.03E-05	4.92E-05	6.76E-05	7.64E-05
Am-243	1.98E-09	1.24E-06	2.07E-03	1.41E-09	1.68E-09	2.28E-09	2.57E-09
Cm-242	1.37E-07	8.60E-05	0.144	5.09E-08	5.09E-08	1.42E-07	1.48E-07
Cm-243	1.27E-08	7.98E-06	1.33E-02	4.50E-09	4.50E-09	1.32E-08	1.37E-08
Cm-244	1.33E-07	8.32E-05	0.139	4.79E-08	4.79E-08	1.61E-07	1.80E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.77E-04 (g/L)	---	0.605	3.93E-04	4.84E-04	6.71E-04	7.60E-04
U	9.33E-03	1.39E+03	2.33E+03	8.83E-03	9.07E-03	9.61E-03	9.66E-03

*Density is calculated based on Na, OH-, and AlO2-.

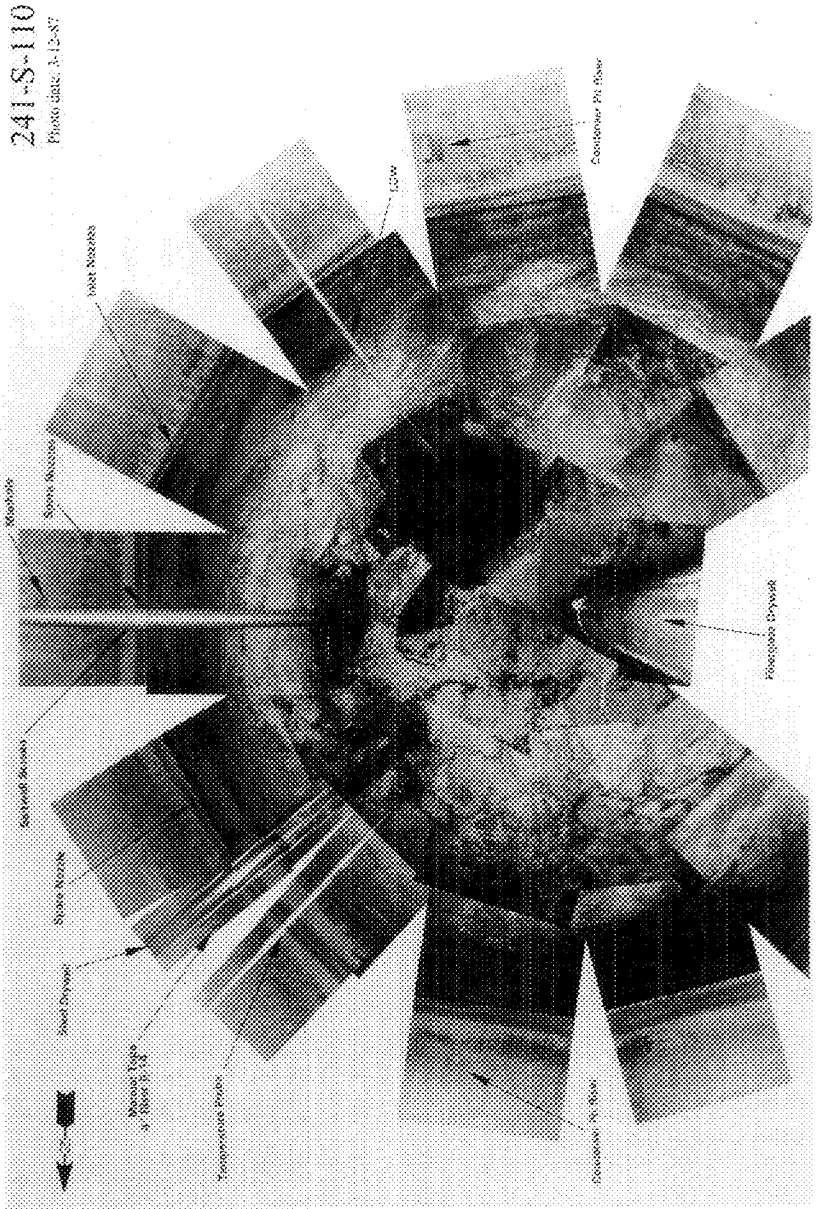
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-110							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.42E+06 (kg)	(390 kgal)	---	---	---	---	---
Heat Load	4.29 (kW)	(1.46E+04 BTU/hr)	---	3.61	4.00	4.49	4.50
Bulk Density†	1.64 (g/cc)	---	---	1.56	1.58	1.73	1.75
Water wt%†	32.1	---	---	25.2	26.7	36.3	37.6
TOC wt% C (wet	0.392	---	---	0.304	0.347	0.438	0.482
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	1.95E-04	0.119	288	1.05E-04	1.05E-04	1.98E-04	2.02E-04
C-14	2.66E-05	1.62E-02	39.3	7.73E-06	7.73E-06	2.68E-05	2.71E-05
Ni-59	5.01E-06	3.05E-03	7.40	4.07E-06	4.12E-06	5.33E-06	5.24E-06
Ni-63	4.75E-04	0.289	701	3.87E-04	3.87E-04	5.05E-04	4.97E-04
Co-60	2.84E-05	1.73E-02	42.0	6.86E-06	6.86E-06	2.88E-05	2.91E-05
Se-79	2.63E-06	1.60E-03	3.89	1.43E-06	1.43E-06	3.07E-06	4.01E-06
Sr-90	0.293	179	4.33E+05	0.233	0.267	0.314	0.315
Y-90	0.293	179	4.33E+05	0.233	0.252	0.314	0.315
Zr-93	1.29E-05	7.85E-03	19.0	6.88E-06	6.88E-06	1.51E-05	1.87E-05
Nb-93m	9.43E-06	5.74E-03	13.9	5.22E-06	5.22E-06	1.10E-05	1.57E-05
Tc-99	1.89E-04	0.115	280	1.19E-04	1.53E-04	2.26E-04	2.61E-04
Ru-106	4.81E-09	2.93E-06	7.10E-03	2.02E-09	2.02E-09	5.44E-09	6.00E-09
Cd-113m	6.63E-05	4.04E-02	97.9	3.02E-05	3.02E-05	7.94E-05	9.19E-05
Sb-125	1.20E-04	7.32E-02	177	2.68E-05	2.68E-05	1.22E-04	1.23E-04
Sn-126	3.98E-06	2.43E-03	5.88	2.18E-06	2.18E-06	4.64E-06	6.20E-06
I-129	3.65E-07	2.22E-04	0.539	2.29E-07	2.95E-07	4.35E-07	5.03E-07
Cs-134	1.44E-06	8.80E-04	2.13	1.01E-06	1.01E-06	1.58E-06	1.72E-06
Cs-137	0.198	121	2.93E+05	0.184	0.189	0.205	0.211
Ba-137m	0.188	114	2.77E+05	0.130	0.130	0.194	0.200
Sm-151	9.27E-03	5.65	1.37E+04	5.06E-03	5.06E-03	1.08E-02	1.44E-02
Eu-152	4.23E-06	2.58E-03	6.24	2.74E-06	2.74E-06	4.33E-06	4.42E-06
Eu-154	4.57E-04	0.278	674	1.56E-04	1.56E-04	5.65E-04	6.09E-04
Eu-155	2.29E-04	0.139	338	1.40E-04	1.40E-04	2.35E-04	2.41E-04
Ra-226	3.52E-10	2.15E-07	5.20E-04	1.59E-10	2.54E-10	4.51E-10	5.45E-10
Ra-228	8.36E-08	5.09E-05	0.123	3.46E-08	5.86E-08	1.13E-07	1.44E-07
Ac-227	1.75E-09	1.07E-06	2.58E-03	8.28E-10	1.18E-09	2.32E-09	2.87E-09
Pa-231	3.24E-09	1.97E-06	4.78E-03	2.03E-09	2.03E-09	3.67E-09	6.56E-09
Th-229	1.97E-09	1.20E-06	2.91E-03	8.97E-10	1.42E-09	2.61E-09	3.29E-09
Th-232	5.59E-09	3.40E-06	8.25E-03	2.88E-09	4.20E-09	6.97E-09	8.30E-09
U-232	4.44E-07	2.71E-04	0.656	2.48E-07	3.44E-07	5.61E-07	6.85E-07
U-233	1.70E-06	1.04E-03	2.52	9.53E-07	1.32E-06	2.15E-06	2.62E-06
U-234	1.51E-06	9.21E-04	2.23	1.39E-06	1.46E-06	1.55E-06	1.57E-06
U-235	6.32E-08	3.85E-05	9.33E-02	5.81E-08	6.11E-08	6.47E-08	6.58E-08
U-236	3.82E-08	2.32E-05	5.63E-02	3.55E-08	3.71E-08	3.89E-08	3.95E-08
U-238	1.55E-06	9.46E-04	2.29	1.44E-06	1.51E-06	1.59E-06	1.61E-06
Np-237	7.15E-07	4.35E-04	1.05	4.85E-07	5.97E-07	8.33E-07	9.47E-07
Pu-238	4.02E-06	2.45E-03	5.93	3.63E-06	3.82E-06	4.22E-06	4.40E-06
Pu-239	2.40E-04	0.146	354	2.12E-04	2.26E-04	2.54E-04	2.67E-04
Pu-240	3.50E-05	2.13E-02	51.6	3.10E-05	3.29E-05	3.70E-05	3.89E-05
Pu-241	2.41E-04	0.147	356	2.18E-04	2.29E-04	2.53E-04	2.64E-04
Pu-242	1.13E-09	6.91E-07	1.67E-03	1.02E-09	1.08E-09	1.19E-09	1.24E-09
Am-241	4.33E-05	2.64E-02	63.9	3.05E-05	3.68E-05	4.99E-05	7.12E-05
Am-243	1.42E-09	8.65E-07	2.10E-03	1.02E-09	1.21E-09	1.63E-09	1.84E-09
Cm-242	1.34E-07	8.18E-05	0.198	7.31E-08	7.31E-08	1.38E-07	1.42E-07
Cm-243	9.88E-09	6.02E-06	1.46E-02	4.04E-09	4.04E-09	1.02E-08	1.05E-08
Cm-244	9.48E-08	5.78E-05	0.140	3.47E-08	3.47E-08	1.15E-07	1.28E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	3.87E-03 (g/L)	---	5.71	3.40E-03	3.63E-03	4.10E-03	4.33E-03
U	1.81E-02	2.63E+03	6.37E+03	1.67E-02	1.75E-02	1.86E-02	1.89E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.

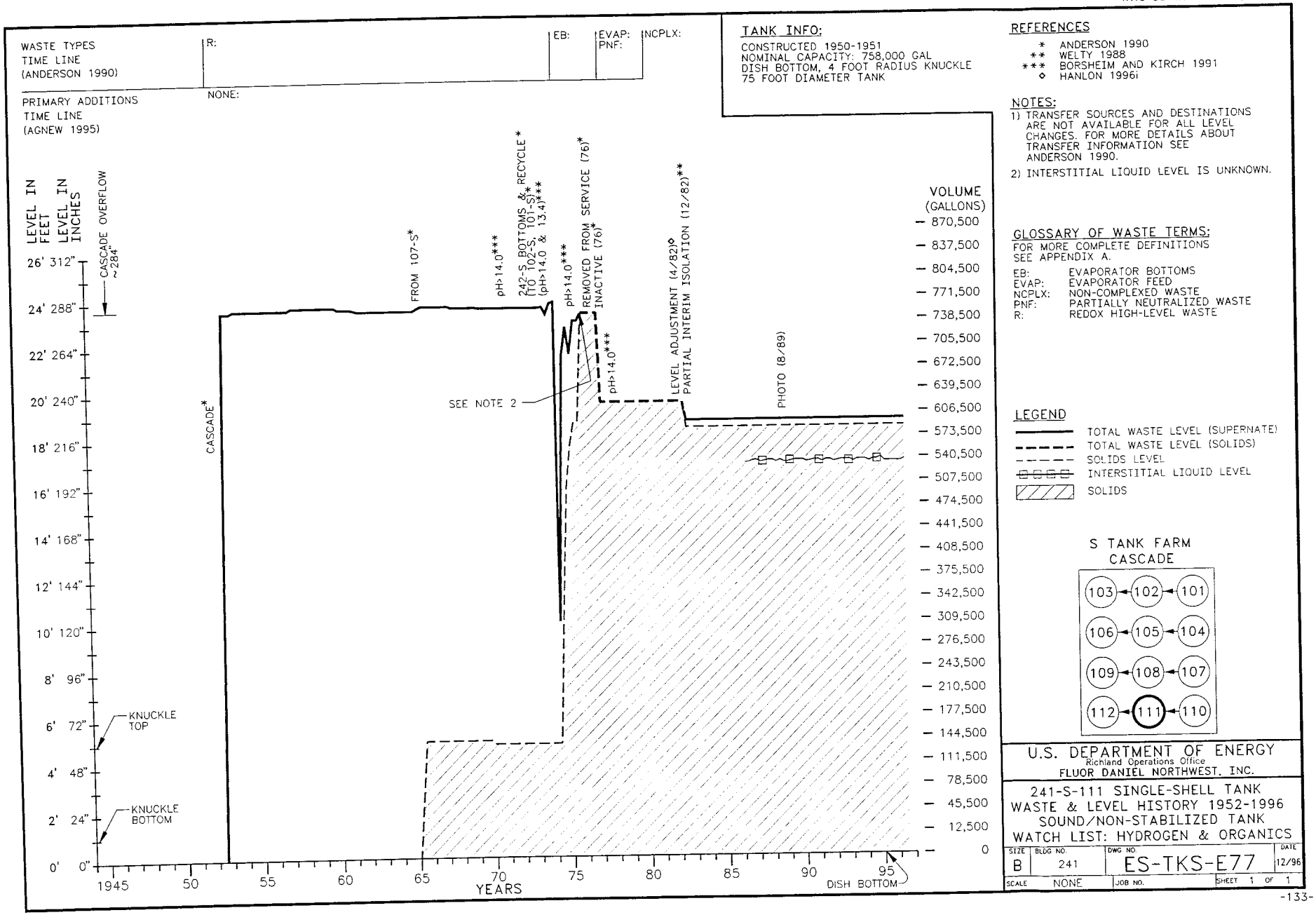

241-S-110
Photo date: 3-12-87

TANK 241-S-111 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1952
Removed from Service	1976
Inactive	1976
Watch Lists	Hydrogen & Organics
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
11, 14	4 in
6, 7, 8	12 in
TANK TEMPERATURE	
Average Tank Temperature	83°F
Maximum Temperature	97°F
Date	arch 9, 1991 - March 1, 1992
Elevation from tank bottom	0.5 ft, 2.5 ft, 4.5 ft
Riser Number	4
Minimum Temperature	65.2° F
Date	April 18, 1992
Elevation from tank bottom	30.50 ft
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	to 241-S-112
Total Risers	12
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	596,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	195,000 gal
Pumpable Liquids	134,000 gal
Saltcake	447,000 gal
Sludge	139,000 gal
Supernatant	10,000 gal
INTERIOR PHOTOGRAPHS	
Date	Aug 10, 1989
Montage Number	94041033-17CN
Photo Set Number	89081043
WASTE SURFACE LEVEL	
Devices	Auto and Manual ENRAF
Max Level	204.255 in
Date	Dec. 12, 1995
Min Level	202.5 in
Date	Feb 11, 1991 - March 13, 1994*

* Numerous dates in this time span.



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
NCPLX:	NON-COMPLEXED WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

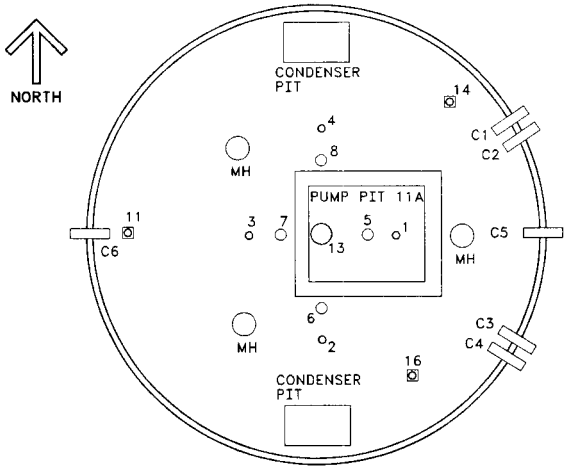
S TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-111 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: HYDROGEN & ORGANICS

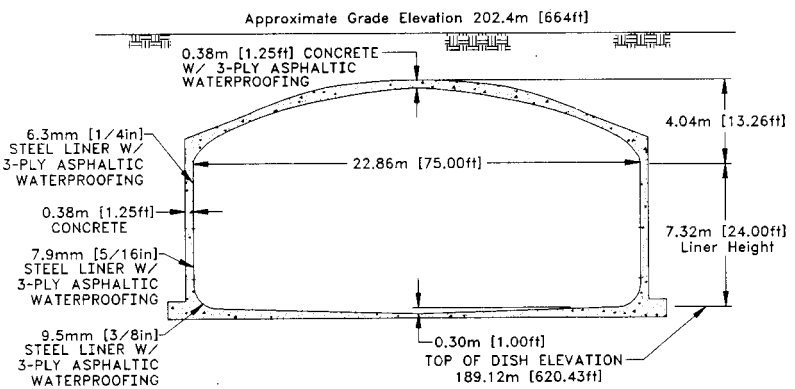
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E77	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-111



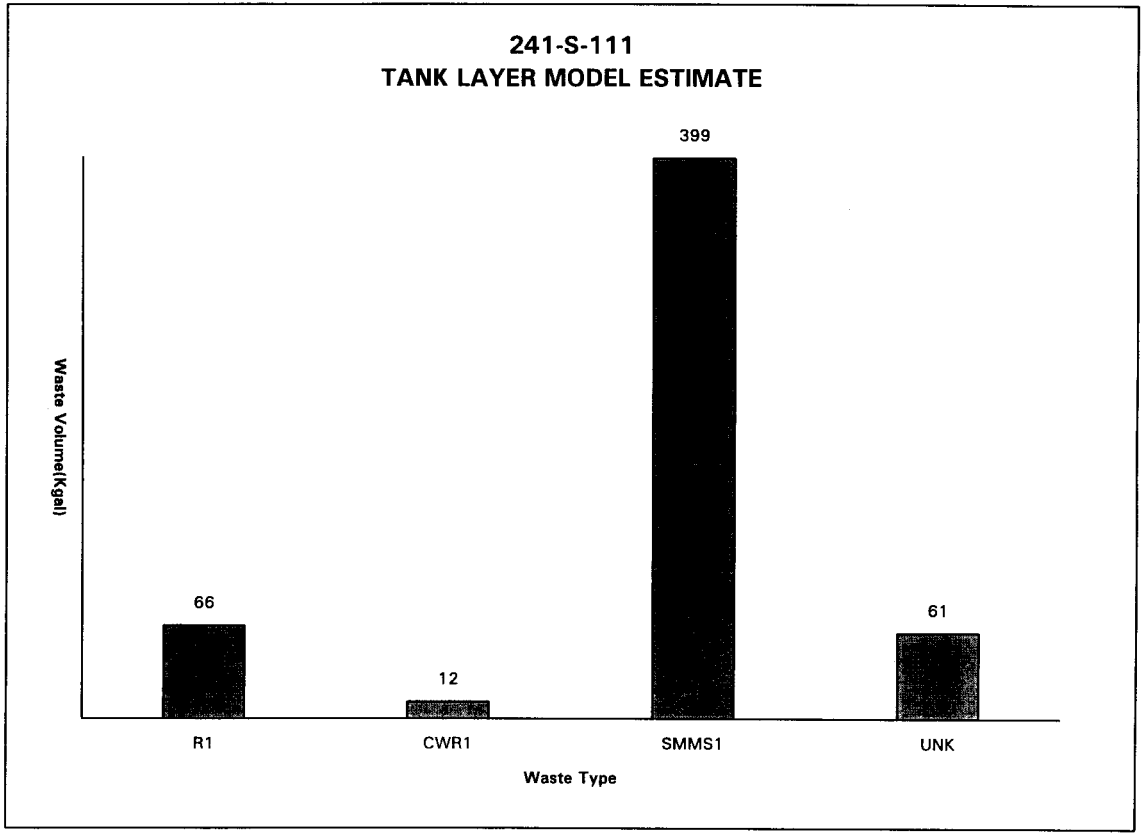
Ref: Alstad 1993
H-2-73190, Rev. 4
H-2-37534, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-111							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	5.19E+05 (kg)	(78.0 kgal)	----	----	----	----	----
Heat Load	1.63 (kW)	(5.56E+03 BTU/hr)	----	1.18	1.44	1.75	1.80
Bulk Density	1.76 (g/cc)	----	----	1.55	1.57	2.06	2.17
Void Fraction	0.554	----	----	0.151	0.284	0.724	0.728
Water wt%	26.6	----	----	5.39	12.0	39.4	40.7
TOC wt% C (wet	0	----	----	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	8.09	1.06E+05	5.49E+04	3.79	4.22	13.6	16.6
Al3+	7.64	1.17E+05	6.08E+04	6.81	7.03	8.07	8.38
Fe3+ (total Fe)	0.883	2.80E+04	1.46E+04	0.867	0.874	0.891	0.899
Cr3+	5.27E-02	1.56E+03	809	6.30E-03	2.90E-02	0.442	0.896
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	6.28E-04	71.6	37.2	6.18E-04	6.24E-04	6.30E-04	6.32E-04
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	1.81E-02	2.13E+03	1.11E+03	1.66E-02	1.74E-02	1.87E-02	1.94E-02
Ni2+	4.30E-02	1.44E+03	746	3.11E-02	3.78E-02	4.70E-02	4.63E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.205	4.66E+03	2.42E+03	0.142	0.173	0.237	0.268
K+	9.73E-03	216	112	1.32E-03	4.68E-03	1.31E-02	1.31E-02
OH-	28.1	2.71E+05	1.41E+05	24.7	25.7	29.8	31.1
NO3-	4.56	1.61E+05	8.35E+04	0.139	0.139	11.5	15.2
NO2-	1.38	3.61E+04	1.88E+04	0.259	0.650	1.97	1.97
CO32-	0.205	6.98E+03	3.62E+03	0.142	0.173	0.237	0.268
PO43-	0	0	0	0	0	0	0
SO42-	1.01E-02	551	286	2.30E-03	5.41E-03	1.32E-02	1.32E-02
Si (as SiO32-)	9.91E-03	158	82.2	3.87E-03	6.28E-03	1.94E-02	3.38E-02
F-	0	0	0	0	0	0	0
Cl-	4.48E-02	902	468	6.08E-03	2.15E-02	6.03E-02	0.134
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.216	2.09E+03	1.09E+03	5.55E-02	7.83E-02	0.229	0.240
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-111							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	3.01E+06 (kg)	(460 kgal)	----	----	----	----	----
Heat Load	4.23 (kW)	(1.44E+04 BTU/hr)	----	3.99	4.12	4.33	4.43
Bulk Density*	1.73 (g/cc)	----	----	1.67	1.70	1.75	1.77
Water wt%	26.4	----	----	23.9	25.0	27.8	29.5
TOC wt% C (wet	0.503	----	----	0.407	0.454	0.551	0.599
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	16.9	2.25E+05	6.76E+05	15.6	16.2	17.5	18.0
Al3+	2.23	3.48E+04	1.05E+05	2.00	2.11	2.36	2.31
Fe3+ (total Fe)	1.11E-02	357	1.07E+03	8.90E-03	9.95E-03	1.22E-02	1.32E-02
Cr3+	0.217	6.52E+03	1.96E+04	0.171	0.196	0.225	0.233
Bi3+	9.01E-04	109	328	8.21E-04	8.60E-04	9.42E-04	9.81E-04
La3+	1.61E-05	1.29	3.88	1.16E-05	1.38E-05	1.83E-05	2.05E-05
Hg2+	7.45E-06	0.865	2.60	7.03E-06	7.27E-06	7.54E-06	7.62E-06
Zr (as ZrO(OH)2)	1.71E-04	9.02	27.1	1.56E-04	1.61E-04	1.77E-04	1.85E-04
Pb2+	8.91E-04	107	321	7.64E-04	8.26E-04	9.56E-04	1.02E-03
Ni2+	6.83E-03	232	698	6.64E-03	6.73E-03	6.92E-03	7.00E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.80E-03	121	363	2.76E-03	3.27E-03	4.32E-03	4.83E-03
Ca2+	3.50E-02	813	2.45E+03	3.16E-02	3.33E-02	3.68E-02	3.84E-02
K+	7.28E-02	1.65E+03	4.96E+03	6.65E-02	6.95E-02	7.63E-02	7.96E-02
OH-	13.6	1.34E+05	4.04E+05	12.2	12.9	14.4	14.3
NO3-	5.54	1.99E+05	5.98E+05	5.18	5.36	5.69	5.71
NO2-	3.16	8.43E+04	2.53E+05	2.72	2.93	3.39	3.61
CO32-	0.378	1.31E+04	3.95E+04	0.341	0.359	0.397	0.408
PO43-	7.39E-02	4.07E+03	1.22E+04	6.64E-02	6.91E-02	7.55E-02	7.70E-02
SO42-	0.229	1.27E+04	3.82E+04	0.172	0.199	0.259	0.286
Si (as SiO32-)	8.35E-02	1.36E+03	4.08E+03	6.87E-02	7.59E-02	9.10E-02	9.83E-02
F-	4.35E-02	479	1.44E+03	3.66E-02	3.95E-02	4.70E-02	4.97E-02
Cl-	0.286	5.87E+03	1.77E+04	0.261	0.273	0.301	0.308
C6H5O73-	2.91E-02	3.19E+03	9.59E+03	2.70E-02	2.81E-02	3.02E-02	3.12E-02
EDTA4-	6.48E-03	1.08E+03	3.25E+03	2.42E-03	4.41E-03	8.57E-03	1.06E-02
HEDTA3-	1.15E-02	1.83E+03	5.50E+03	3.40E-03	7.36E-03	1.57E-02	1.98E-02
glycolate-	6.60E-02	2.87E+03	8.62E+03	3.90E-02	5.22E-02	7.99E-02	9.31E-02
acetate-	4.65E-03	159	477	3.81E-03	4.22E-03	5.07E-03	5.48E-03
oxalate2-	2.10E-05	1.07	3.22	1.86E-05	1.98E-05	2.23E-05	2.34E-05
DBP	1.89E-02	2.30E+03	6.92E+03	1.53E-02	1.71E-02	2.07E-02	2.25E-02
butanol	1.89E-02	812	2.44E+03	1.53E-02	1.71E-02	2.07E-02	2.25E-02
NH3	8.63E-02	850	2.55E+03	6.96E-02	7.62E-02	9.92E-02	0.114
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-111							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.53E+06 (kg)	(538 kgal)	----	----	----	----	----
Heat Load	5.85 (kW)	(2.00E+04 BTU/hr)	----	5.22	5.57	6.08	6.06
Bulk Density†	1.73 (g/cc)	----	----	1.65	1.68	1.79	1.78
Water wt%†	26.4	----	----	23.7	23.3	29.1	30.8
TOC wt% C (wet	0.429	----	----	0.347	0.387	0.470	0.511
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.6	2.07E+05	7.31E+05	13.9	14.6	16.8	16.5
Al3+	3.01	4.69E+04	1.65E+05	2.82	2.92	3.09	3.10
Fe3+ (total Fe)	0.137	4.43E+03	1.56E+04	0.135	0.136	0.138	0.139
Cr3+	0.193	5.79E+03	2.04E+04	0.167	0.181	0.231	0.276
Bi3+	7.70E-04	93.0	328	7.02E-04	7.36E-04	8.05E-04	8.39E-04
La3+	1.37E-05	1.10	3.88	9.95E-06	1.18E-05	1.57E-05	1.75E-05
Hg2+	9.73E-05	11.3	39.8	9.60E-05	9.68E-05	9.77E-05	9.80E-05
Zr (as ZrO(OH)2)	1.46E-04	7.69	27.1	1.33E-04	1.38E-04	1.51E-04	1.58E-04
Pb2+	3.38E-03	405	1.43E+03	3.17E-03	3.30E-03	3.45E-03	3.49E-03
Ni2+	1.21E-02	410	1.44E+03	1.03E-02	1.13E-02	1.27E-02	1.24E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	3.25E-03	103	363	2.36E-03	2.79E-03	3.70E-03	4.13E-03
Ca2+	5.96E-02	1.38E+03	4.87E+03	5.10E-02	5.59E-02	6.28E-02	6.59E-02
K+	6.37E-02	1.44E+03	5.07E+03	5.83E-02	6.08E-02	6.66E-02	6.94E-02
OH-	15.7	1.54E+05	5.45E+05	14.5	15.2	16.3	16.3
NO3-	5.40	1.93E+05	6.82E+05	4.54	4.71	6.34	6.64
NO2-	2.91	7.72E+04	2.72E+05	2.53	2.70	3.10	3.29
CO32-	0.353	1.22E+04	4.31E+04	0.322	0.336	0.369	0.379
PO43-	6.32E-02	3.47E+03	1.22E+04	5.68E-02	5.90E-02	6.45E-02	6.58E-02
SO42-	0.197	1.09E+04	3.85E+04	0.148	0.171	0.223	0.246
Si (as SiO32-)	7.28E-02	1.18E+03	4.16E+03	6.02E-02	6.64E-02	7.93E-02	8.55E-02
F-	3.72E-02	409	1.44E+03	3.13E-02	3.38E-02	4.02E-02	4.25E-02
Cl-	0.251	5.14E+03	1.81E+04	0.230	0.240	0.261	0.270
C6H5O73-	2.49E-02	2.72E+03	9.59E+03	2.31E-02	2.40E-02	2.58E-02	2.67E-02
EDTA4-	5.34E-03	922	3.25E+03	2.07E-03	3.77E-03	7.33E-03	9.07E-03
HEDTA3-	9.85E-03	1.56E+03	5.50E+03	2.90E-03	6.30E-03	1.34E-02	1.69E-02
glycolate-	5.64E-02	2.45E+03	8.62E+03	3.33E-02	4.46E-02	6.83E-02	7.96E-02
acetate-	3.97E-03	135	477	3.26E-03	3.61E-03	4.34E-03	4.69E-03
oxalate2-	1.80E-05	0.914	3.22	1.59E-05	1.69E-05	1.90E-05	2.00E-05
DBP	1.62E-02	1.96E+03	6.92E+03	1.31E-02	1.46E-02	1.77E-02	1.92E-02
butanol	1.62E-02	692	2.44E+03	1.31E-02	1.46E-02	1.77E-02	1.92E-02
NH3	0.105	1.03E+03	3.64E+03	7.64E-02	8.24E-02	0.116	0.129
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-111

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	5.19E+05 (kg)	(78.0 kgal)	—	—	—	—	—
Heat Load	1.63 (kW)	(5.56E+03 BTU/hr)	—	1.18	1.44	1.75	1.80
Bulk Density	1.76 (g/cc)	—	—	1.55	1.57	2.06	2.17
Void Fraction	0.554	—	—	0.151	0.284	0.724	0.728
Water wt%	26.6	—	—	5.39	12.0	39.4	40.7
TOC wt% C (wet	0	—	—	0	0	0	0

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.49E-05	1.42E-02	7.35	2.74E-06	1.26E-05	3.49E-05	3.49E-05
C-14	1.93E-06	1.10E-03	0.570	2.36E-07	9.13E-07	2.61E-06	2.61E-06
Ni-59	1.26E-05	7.15E-03	3.71	9.08E-06	1.11E-05	1.37E-05	1.35E-05
Ni-63	1.17E-03	0.668	347	8.48E-04	1.03E-03	1.28E-03	1.26E-03
Co-60	7.63E-07	4.34E-04	0.225	9.37E-08	3.61E-07	1.03E-06	1.03E-06
Se-79	4.10E-07	2.33E-04	0.121	5.02E-08	1.94E-07	5.55E-07	6.06E-06
Sr-90	0.786	447	2.32E+05	0.561	0.688	0.861	0.874
Y-90	0.786	447	2.32E+05	0.561	0.688	0.861	0.874
Zr-93	1.94E-06	1.10E-03	0.572	2.37E-07	9.16E-07	2.62E-06	2.57E-05
Nb-93m	1.58E-06	9.00E-04	0.467	1.94E-07	7.49E-07	2.14E-06	2.71E-05
Tc-99	1.35E-05	7.69E-03	3.99	1.65E-06	6.40E-06	1.83E-05	1.83E-05
Ru-106	2.15E-12	1.23E-09	6.36E-07	2.84E-13	1.03E-12	2.91E-12	2.91E-12
Cd-113m	5.97E-06	3.40E-03	1.76	7.31E-07	2.82E-06	8.08E-06	8.08E-06
Sb-125	1.12E-06	6.38E-04	0.331	1.39E-07	5.32E-07	1.52E-06	1.52E-06
Sn-126	6.31E-07	3.59E-04	0.186	7.70E-08	2.98E-07	8.53E-07	9.69E-06
I-129	2.60E-08	1.48E-05	7.67E-03	3.18E-09	1.23E-08	3.52E-08	3.52E-08
Cs-134	2.33E-08	1.32E-05	6.87E-03	6.34E-09	1.31E-08	3.01E-08	3.01E-08
Cs-137	4.78E-02	27.2	1.41E+04	1.29E-02	2.68E-02	6.18E-02	6.18E-02
Ba-137m	4.52E-02	25.7	1.33E+04	1.22E-02	2.54E-02	5.84E-02	5.84E-02
Sm-151	1.46E-03	0.833	432	1.79E-04	6.92E-04	1.98E-03	2.23E-02
Eu-152	5.95E-06	3.38E-03	1.76	5.82E-06	5.87E-06	6.00E-06	6.00E-06
Eu-154	1.84E-05	1.05E-02	5.44	2.27E-06	8.73E-06	2.49E-05	2.49E-05
Eu-155	2.81E-04	0.160	82.9	2.75E-04	2.77E-04	2.83E-04	2.83E-04
Ra-226	9.15E-10	5.20E-07	2.70E-04	1.25E-10	5.12E-10	1.32E-09	1.70E-09
Ra-228	7.88E-15	4.48E-12	2.33E-09	7.72E-15	7.78E-15	7.95E-15	7.95E-15
Ac-227	4.03E-09	2.29E-06	1.19E-03	2.61E-10	1.69E-09	6.37E-09	8.61E-09
Pa-231	6.13E-10	3.48E-07	1.81E-04	7.48E-11	2.90E-10	1.73E-09	1.42E-08
Th-229	1.50E-12	8.54E-10	4.43E-07	1.47E-12	1.48E-12	1.51E-12	1.51E-12
Th-232	5.06E-16	2.88E-13	1.49E-10	6.34E-17	2.40E-16	6.84E-16	6.84E-16
U-232	1.04E-10	5.91E-08	3.07E-05	9.08E-11	9.85E-11	1.08E-10	1.11E-10
U-233	3.85E-12	2.19E-09	1.14E-06	3.37E-12	3.65E-12	3.99E-12	4.10E-12
U-234	2.38E-06	1.35E-03	0.702	2.08E-06	2.25E-06	2.47E-06	2.53E-06
U-235	1.01E-07	5.75E-05	2.98E-02	8.84E-08	9.58E-08	1.05E-07	1.08E-07
U-236	5.17E-08	2.94E-05	1.53E-02	4.51E-08	4.90E-08	5.37E-08	5.51E-08
U-238	2.32E-06	1.32E-03	0.685	2.03E-06	2.20E-06	2.41E-06	2.47E-06
Np-237	8.79E-08	5.00E-05	2.59E-02	1.08E-08	4.16E-08	1.19E-07	1.19E-07
Pu-238	9.46E-06	5.38E-03	2.79	7.88E-06	8.65E-06	1.03E-05	1.10E-05
Pu-239	6.47E-04	0.368	191	5.34E-04	5.89E-04	7.04E-04	7.59E-04
Pu-240	9.21E-05	5.23E-02	27.2	7.59E-05	8.38E-05	1.00E-04	1.08E-04
Pu-241	5.49E-04	0.312	162	4.54E-04	5.01E-04	5.98E-04	6.44E-04
Pu-242	2.45E-09	1.39E-06	7.22E-04	2.01E-09	2.22E-09	2.67E-09	2.88E-09
Am-241	6.91E-06	3.93E-03	2.04	8.46E-07	3.27E-06	9.35E-06	1.21E-04
Am-243	6.46E-11	3.67E-08	1.91E-05	7.90E-12	3.06E-11	8.74E-11	1.13E-09
Cm-242	1.37E-07	7.78E-05	4.04E-02	1.34E-07	1.35E-07	1.38E-07	1.38E-07
Cm-243	3.13E-09	1.78E-06	9.25E-04	3.07E-09	3.09E-09	3.16E-09	3.16E-09
Cm-244	2.31E-09	1.31E-06	6.81E-04	2.82E-10	1.09E-09	3.12E-09	3.12E-09

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	1.08E-02 (g/L)	—	3.19	8.93E-03	9.85E-03	1.18E-02	1.27E-02
U	2.92E-02	3.95E+03	2.05E+03	2.55E-02	2.77E-02	3.03E-02	3.11E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-111							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	3.01E+06 (kg)	(460 kgal)	---	---	---	---	---
Heat Load	4.23 (kW)	(1.44E+04 BTU/hr)	---	3.99	4.12	4.33	4.43
Bulk Density*	1.73 (g/cc)	---	---	1.67	1.70	1.75	1.77
Water wt%†	26.4	---	---	23.9	25.0	27.8	29.5
TOC wt% C (wet	0.503	---	---	0.407	0.454	0.551	0.599
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	3.15E-04	0.182	548	1.83E-04	1.83E-04	3.28E-04	3.25E-04
C-14	4.07E-05	2.36E-02	70.9	1.31E-05	1.31E-05	4.14E-05	4.15E-05
Ni-59	2.62E-06	1.51E-03	4.55	1.32E-06	1.32E-06	2.68E-06	2.74E-06
Ni-63	2.55E-04	0.148	444	1.27E-04	1.27E-04	2.62E-04	2.68E-04
Co-60	4.29E-05	2.48E-02	74.7	1.13E-05	1.13E-05	4.34E-05	4.39E-05
Se-79	4.12E-06	2.38E-03	7.17	2.35E-06	2.35E-06	4.75E-06	5.37E-06
Sr-90	0.131	76.0	2.28E+05	0.122	0.127	0.136	0.140
Y-90	0.131	76.0	2.28E+05	7.03E-02	7.03E-02	0.136	0.140
Zr-93	2.02E-05	1.17E-02	35.1	1.14E-05	1.14E-05	2.34E-05	2.64E-05
Nb-93m	1.48E-05	8.55E-03	25.7	8.60E-06	8.60E-06	1.70E-05	1.91E-05
Tc-99	2.91E-04	0.169	507	1.88E-04	2.39E-04	3.44E-04	3.95E-04
Ru-106	7.19E-09	4.17E-06	1.25E-02	3.11E-09	3.11E-09	8.11E-09	8.94E-09
Cd-113m	1.03E-04	5.98E-02	180	5.04E-05	5.04E-05	1.22E-04	1.41E-04
Sb-125	1.79E-04	0.104	312	4.25E-05	4.25E-05	1.82E-04	1.84E-04
Sn-126	6.23E-06	3.61E-03	10.8	3.59E-06	3.59E-06	7.19E-06	8.10E-06
I-129	5.61E-07	3.25E-04	0.976	3.62E-07	4.59E-07	6.63E-07	7.62E-07
Cs-134	2.24E-06	1.30E-03	3.90	1.43E-06	1.43E-06	2.40E-06	2.56E-06
Cs-137	0.330	191	5.74E+05	0.306	0.316	0.343	0.354
Ba-137m	0.312	181	5.43E+05	0.204	0.204	0.324	0.330
Sm-151	1.45E-02	8.40	2.53E+04	8.34E-03	8.34E-03	1.67E-02	1.89E-02
Eu-152	3.96E-06	2.29E-03	6.89	1.77E-06	1.77E-06	4.07E-06	4.18E-06
Eu-154	6.96E-04	0.403	1.21E+03	2.55E-04	2.55E-04	8.55E-04	9.19E-04
Eu-155	2.29E-04	0.133	399	9.91E-05	9.91E-05	2.36E-04	2.43E-04
Ra-226	1.78E-10	1.03E-07	3.10E-04	1.23E-10	1.23E-10	2.00E-10	2.21E-10
Ra-228	8.85E-08	5.12E-05	0.154	3.78E-08	6.26E-08	1.19E-07	1.51E-07
Ac-227	1.09E-09	6.30E-07	1.89E-03	7.71E-10	7.71E-10	1.21E-09	1.31E-09
Pa-231	4.95E-09	2.87E-06	8.62E-03	3.19E-09	3.19E-09	5.59E-09	6.20E-09
Th-229	2.10E-09	1.22E-06	3.66E-03	9.88E-10	1.53E-09	2.76E-09	3.46E-09
Th-232	6.18E-09	3.58E-06	1.08E-02	3.37E-09	4.75E-09	7.61E-09	8.98E-09
U-232	4.99E-07	2.89E-04	0.869	2.96E-07	3.95E-07	6.19E-07	7.48E-07
U-233	1.91E-06	1.11E-03	3.33	1.14E-06	1.52E-06	2.38E-06	2.87E-06
U-234	9.31E-07	5.39E-04	1.62	8.73E-07	9.00E-07	9.65E-07	9.61E-07
U-235	3.82E-08	2.21E-05	6.65E-02	3.57E-08	3.69E-08	3.97E-08	3.94E-08
U-236	2.80E-08	1.62E-05	4.87E-02	2.71E-08	2.75E-08	2.85E-08	2.89E-08
U-238	9.94E-07	5.76E-04	1.73	9.35E-07	9.63E-07	1.03E-06	1.02E-06
Np-237	1.11E-06	6.45E-04	1.94	7.77E-07	9.41E-07	1.29E-06	1.45E-06
Pu-238	1.46E-06	8.46E-04	2.54	1.07E-06	1.26E-06	1.66E-06	1.86E-06
Pu-239	5.15E-05	2.98E-02	89.7	4.14E-05	4.64E-05	5.66E-05	6.16E-05
Pu-240	8.62E-06	4.99E-03	15.0	6.74E-06	7.66E-06	9.58E-06	1.05E-05
Pu-241	9.76E-05	5.65E-02	170	7.07E-05	8.39E-05	1.11E-04	1.25E-04
Pu-242	5.34E-10	3.09E-07	9.29E-04	3.73E-10	4.52E-10	6.16E-10	6.95E-10
Am-241	6.73E-05	3.89E-02	117	4.85E-05	5.77E-05	7.68E-05	8.60E-05
Am-243	2.14E-09	1.24E-06	3.73E-03	1.55E-09	1.83E-09	2.45E-09	2.75E-09
Cm-242	1.42E-07	8.20E-05	0.247	5.20E-08	5.20E-08	1.46E-07	1.50E-07
Cm-243	1.29E-08	7.49E-06	2.25E-02	4.39E-09	4.39E-09	1.33E-08	1.37E-08
Cm-244	1.39E-07	8.05E-05	0.242	5.08E-08	5.08E-08	1.69E-07	1.88E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	6.50E-04 (g/L)	---	1.13	4.59E-04	5.53E-04	7.48E-04	8.41E-04
U	1.09E-02	1.50E+03	4.50E+03	1.01E-02	1.05E-02	1.13E-02	1.12E-02

*Density is calculated based on Na, OH-, and AlO2-.

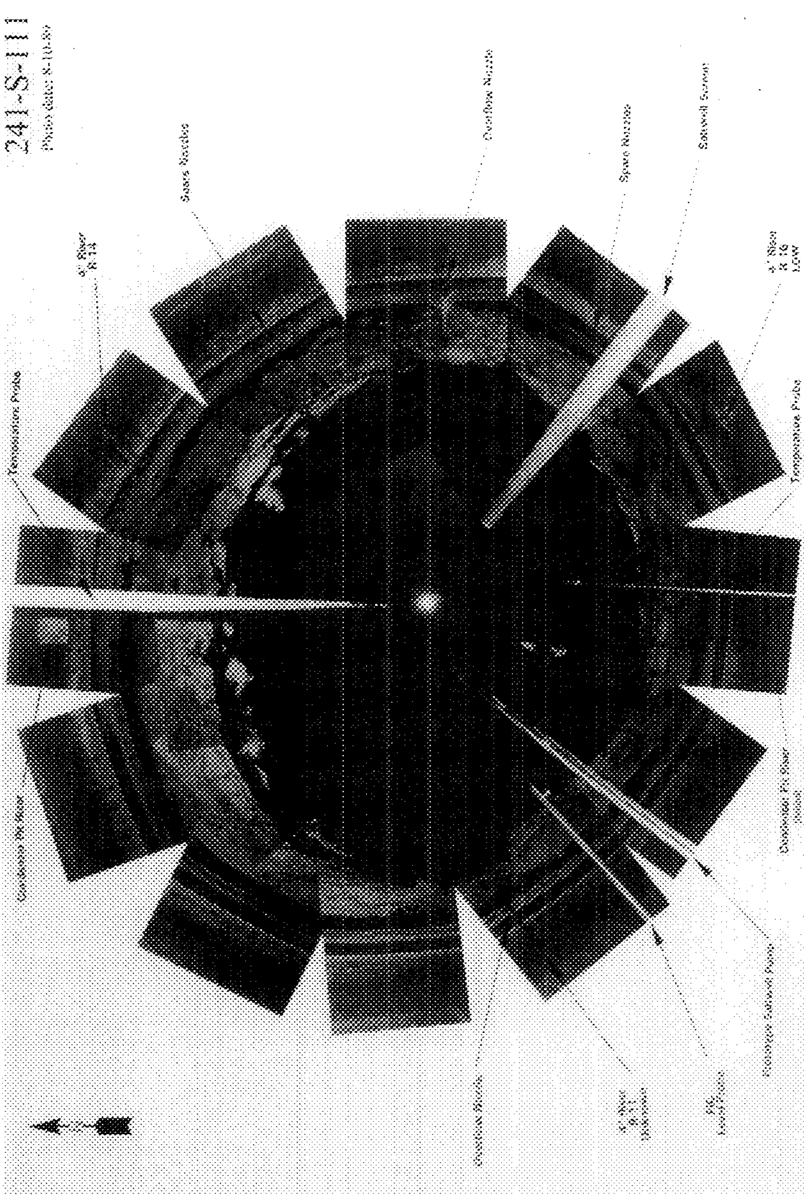
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-111							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.53E+06 (kg)	(538 kgal)	---	---	---	---	---
Heat Load	5.85 (kW)	(2.00E+04 BTU/hr)	---	5.22	5.57	6.08	6.06
Bulk Density†	1.73 (g/cc)	---	---	1.65	1.68	1.79	1.78
Water wt%†	26.4	---	---	23.7	23.3	29.1	30.8
TOC wt% C (wet	0.429	---	---	0.347	0.387	0.470	0.511
Radiological Constituents	**CI/L**	**µCi/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.73E-04	0.158	556	1.60E-04	1.60E-04	2.82E-04	2.82E-04
C-14	3.51E-05	2.03E-02	71.5	1.15E-05	1.15E-05	3.55E-05	3.57E-05
Ni-59	4.06E-06	2.34E-03	8.27	2.95E-06	2.95E-06	4.23E-06	4.17E-06
Ni-63	3.88E-04	0.224	791	2.79E-04	2.79E-04	4.04E-04	3.99E-04
Co-60	3.68E-05	2.12E-02	74.9	9.77E-06	9.77E-06	3.72E-05	3.77E-05
Se-79	3.58E-06	2.07E-03	7.29	2.07E-06	2.07E-06	4.12E-06	4.65E-06
Sr-90	0.226	131	4.60E+05	0.193	0.212	0.237	0.235
Y-90	0.226	131	4.60E+05	0.174	0.174	0.237	0.235
Zr-93	1.75E-05	1.01E-02	35.7	1.00E-05	1.00E-05	2.03E-05	2.29E-05
Nb-93m	1.29E-05	7.43E-03	26.2	7.58E-06	7.58E-06	1.48E-05	1.66E-05
Tc-99	2.51E-04	0.145	511	1.63E-04	2.06E-04	2.96E-04	3.40E-04
Ru-106	6.15E-09	3.55E-06	1.25E-02	2.66E-09	2.66E-09	6.93E-09	7.64E-09
Cd-113m	8.92E-05	5.15E-02	182	4.40E-05	4.40E-05	1.06E-04	1.21E-04
Sb-125	1.53E-04	8.86E-02	313	3.65E-05	3.65E-05	1.55E-04	1.57E-04
Sn-126	5.42E-06	3.13E-03	11.0	3.16E-06	3.16E-06	6.24E-06	7.02E-06
I-129	4.83E-07	2.79E-04	0.984	3.13E-07	3.96E-07	5.71E-07	6.56E-07
Cs-134	1.92E-06	1.11E-03	3.91	1.23E-06	1.23E-06	2.06E-06	2.19E-06
Cs-137	0.289	167	5.88E+05	0.269	0.277	0.299	0.310
Ba-137m	0.273	158	5.56E+05	0.181	0.181	0.281	0.289
Sm-151	1.26E-02	7.29	2.57E+04	7.34E-03	7.34E-03	1.45E-02	1.64E-02
Eu-152	4.24E-06	2.45E-03	8.64	2.38E-06	2.38E-06	4.34E-06	4.43E-06
Eu-154	5.98E-04	0.345	1.22E+03	2.21E-04	2.21E-04	7.34E-04	7.88E-04
Eu-155	2.37E-04	0.137	482	1.25E-04	1.25E-04	2.42E-04	2.48E-04
Ra-226	2.85E-10	1.65E-07	5.80E-04	2.07E-10	2.38E-10	3.25E-10	3.63E-10
Ra-228	7.57E-08	4.37E-05	0.154	3.23E-08	5.35E-08	1.01E-07	1.29E-07
Ac-227	1.51E-09	8.75E-07	3.08E-03	1.14E-09	1.24E-09	1.75E-09	1.97E-09
Pa-231	4.32E-09	2.50E-06	8.81E-03	2.82E-09	2.82E-09	4.87E-09	5.67E-09
Th-229	1.80E-09	1.04E-06	3.66E-03	8.45E-10	1.31E-09	2.36E-09	2.96E-09
Th-232	5.28E-09	3.05E-06	1.08E-02	2.89E-09	4.06E-09	6.51E-09	7.68E-09
U-232	4.27E-07	2.46E-04	0.869	2.53E-07	3.38E-07	5.30E-07	6.39E-07
U-233	1.64E-06	9.45E-04	3.33	9.72E-07	1.30E-06	2.03E-06	2.45E-06
U-234	1.14E-06	6.59E-04	2.32	1.09E-06	1.12E-06	1.16E-06	1.17E-06
U-235	4.73E-08	2.73E-05	9.64E-02	4.52E-08	4.63E-08	4.82E-08	4.84E-08
U-236	3.14E-08	1.82E-05	6.40E-02	3.05E-08	3.10E-08	3.18E-08	3.22E-08
U-238	1.19E-06	6.85E-04	2.42	1.14E-06	1.16E-06	1.21E-06	1.21E-06
Np-237	9.64E-07	5.57E-04	1.96	6.77E-07	8.17E-07	1.11E-06	1.26E-06
Pu-238	2.62E-06	1.51E-03	5.34	2.28E-06	2.45E-06	2.79E-06	2.96E-06
Pu-239	1.38E-04	7.96E-02	281	1.27E-04	1.32E-04	1.43E-04	1.49E-04
Pu-240	2.07E-05	1.20E-02	42.2	1.91E-05	1.99E-05	2.15E-05	2.23E-05
Pu-241	1.63E-04	9.42E-02	332	1.40E-04	1.51E-04	1.75E-04	1.86E-04
Pu-242	8.11E-10	4.68E-07	1.65E-03	6.73E-10	7.41E-10	8.81E-10	9.49E-10
Am-241	5.85E-05	3.38E-02	119	4.25E-05	5.03E-05	6.67E-05	7.45E-05
Am-243	1.84E-09	1.06E-06	3.75E-03	1.34E-09	1.58E-09	2.11E-09	2.36E-09
Cm-242	1.41E-07	8.14E-05	0.287	6.43E-08	6.43E-08	1.45E-07	1.48E-07
Cm-243	1.15E-08	6.65E-06	2.34E-02	4.21E-09	4.21E-09	1.19E-08	1.22E-08
Cm-244	1.19E-07	6.88E-05	0.243	4.38E-08	4.38E-08	1.45E-07	1.61E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	2.12E-03 (g/L)	---	4.33	1.94E-03	2.03E-03	2.22E-03	2.31E-03
U	1.35E-02	1.86E+03	6.55E+03	1.29E-02	1.32E-02	1.38E-02	1.38E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-S-111
Overflow Nozzle
Spare Nozzle
Temperature Probe
Temperature Probe

TANK 241-S-112 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1952
Removed from Service	1976
Inactive	1976
Watch Lists	Hydrogen
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	Dec 1982
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
2, 11, 14, 16	4 in
6	12 in

TANK TEMPERATURE	
Average Tank Temperature	78°F
Maximum Temperature	92°F
Date	April 18, 1991, March 26, 1992
Elevation from tank bottom	6.33 ft, 10.33 ft
Riser Number	4
Minimum Temperature	50°F
Date	March 19, 1992
Elevation from tank bottom	30.33 ft
Riser Number	4

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	758,000 gal
Cascade Tank	none
Total Risers	12

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	523,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	110,000 gal
Pumpable Liquids	107,000 gal
Saltcake	518,000 gal
Sludge	5,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	March 24, 1987
Montage Number	94041033-30CN
Photo Set Number	8701812

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	197.8 in
Date	April 11, 1995
Min Level	194.9 in
Date	July 22, 1991

WASTE TYPES
TIME LINE
(ANDERSON 1990)

R:

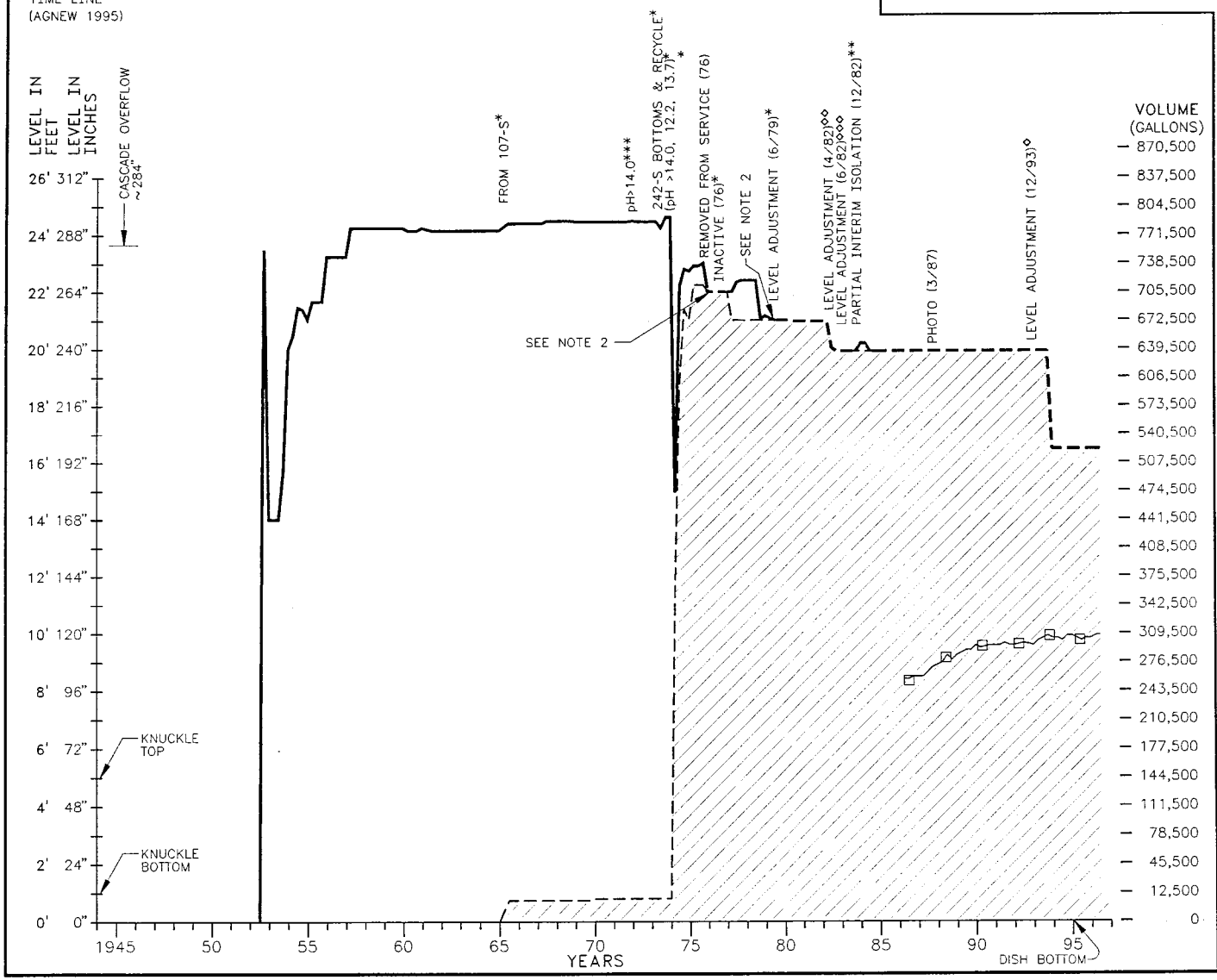
EB:

EVAP:
HDRL:
PNF:
RESID:

NCPLX:

NONE:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995)



TANK INFO:

CONSTRUCTED 1950-1951
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

- ● ANDERSON 1990
- ** WELTY 1988
- *** BORSHEIM AND KIRCH 1991
- ◇ HANLON 1996i
- ◇◇ McCANN 1982b
- ◇◇◇ McCANN 1982d

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

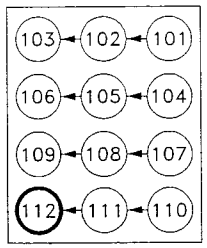
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HDRL:	HANFORD DEFENSE RESIDUAL LIQUOR
NCPLX:	NON-COMPLEXED WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

S TANK FARM
CASCADE

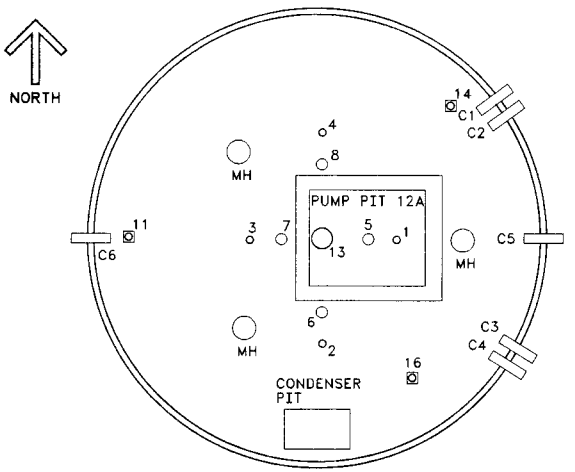


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-S-112 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: HYDROGEN

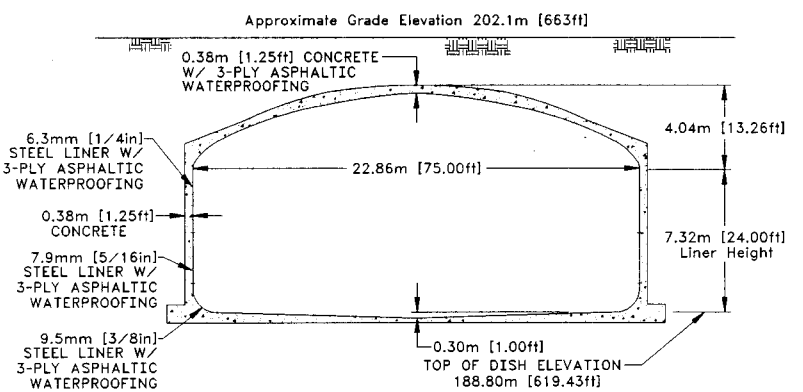
SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E78	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-S-112



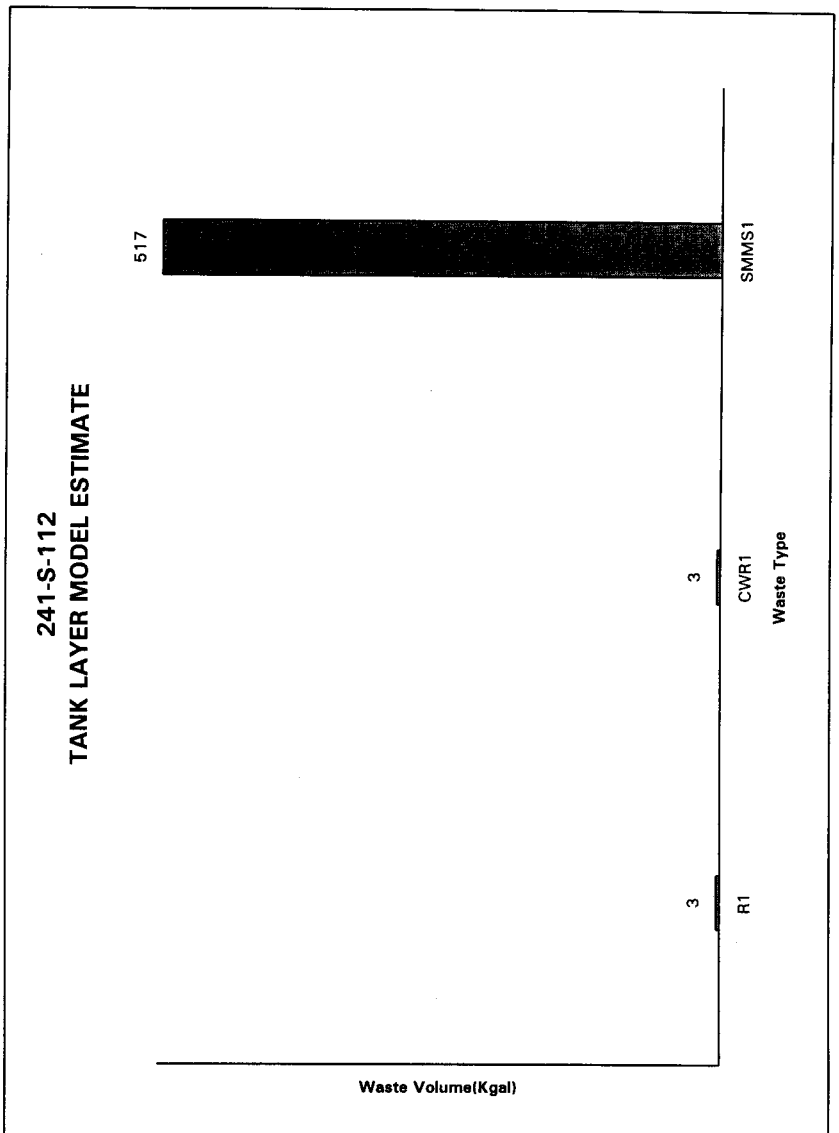
Ref: Alstad 1993
H-2-73191, Rev. 4
H-2-37535, Rev. 2

TANK RISER LOCATION



NOT TO SCALE

Ref: H-2-1783, Rev. 3
H-2-46293, Rev. 3
H-2-1784, Rev. 2



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-S-112

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	4.00E+04 (kg)	(6.00 kgal)	---	---	---	---	---
Heat Load	7.43E-02 (kW)	(254 BTU/hr)	---	5.39E-02	6.58E-02	7.97E-02	8.22E-02
Bulk Density	1.76 (g/cc)	---	---	1.61	1.65	1.94	2.01
Void Fraction	0.593	---	---	0.355	0.434	0.694	0.697
Water wt%	25.8	---	---	12.3	16.7	35.7	39.8
TOC wt% C (wet	0	---	---	0	0	0	0

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	7.99	1.04E+05	4.17E+03	5.18	5.71	11.3	13.0
Al3+	9.10	1.39E+05	5.57E+03	6.41	7.13	10.5	11.5
Fe3+ (total Fe)	0.589	1.87E+04	747	0.580	0.584	0.594	0.599
Cr3+	3.20E-02	942	37.7	4.56E-03	1.80E-02	0.262	0.531
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	2.04E-03	232	9.29	2.01E-03	2.03E-03	2.05E-03	2.05E-03
Zr (as ZrO(OH)2)	0	0	0	0	0	0	0
Pb2+	5.88E-02	6.91E+03	277	5.40E-02	5.67E-02	6.09E-02	6.29E-02
Ni2+	2.59E-02	861	34.5	1.88E-02	2.28E-02	2.82E-02	2.78E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.170	3.87E+03	155	0.133	0.151	0.189	0.208
K+	6.38E-03	141	5.67	1.41E-03	3.40E-03	8.38E-03	8.38E-03
OH-	33.7	3.24E+05	1.30E+04	22.8	25.8	39.3	43.4
NO3-	2.93	1.03E+05	4.12E+03	0.316	0.316	7.02	9.24
NO2-	1.21	3.15E+04	1.26E+03	0.545	0.776	1.55	1.55
CO32-	0.170	5.79E+03	232	0.133	0.151	0.189	0.208
PO43-	0	0	0	0	0	0	0
SO42-	9.40E-03	512	20.5	4.79E-03	6.63E-03	1.12E-02	1.12E-02
Si (as SiO32-)	1.41E-02	224	8.97	1.05E-02	1.19E-02	4.49E-02	9.16E-02
F-	0	0	0	0	0	0	0
Cl-	2.94E-02	590	23.6	6.49E-03	1.56E-02	3.85E-02	8.20E-02
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.128	1.23E+03	49.4	3.29E-02	4.64E-02	0.135	0.142
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-112							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM Wast	3.29E+06 (kg)	(517 kgal)	----	---	---	---	---
Heat Load	4.21 (kW)	(1.44E+04 BTU/hr)	---	3.94	4.07	4.36	4.38
Bulk Density*	1.68 (g/cc)	---	---	1.61	1.65	1.71	1.72
Water wt%	29.3	----	---	27.1	28.0	30.8	33.3
TOC wt% C (wet	0.328	----	---	0.293	0.310	0.346	0.362
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.7	2.15E+05	7.06E+05	14.1	15.0	16.2	16.6
Al3+	2.18	3.50E+04	1.15E+05	1.89	2.03	2.34	2.25
Fe3+ (total Fe)	9.77E-03	325	1.07E+03	8.02E-03	8.88E-03	1.07E-02	1.15E-02
Cr3+	0.224	6.92E+03	2.28E+04	0.166	0.197	0.229	0.234
Bi3+	8.16E-04	101	334	7.35E-04	7.75E-04	8.58E-04	8.98E-04
La3+	5.41E-07	4.47E-02	0.147	3.92E-07	4.65E-07	6.18E-07	6.91E-07
Hg2+	6.84E-06	0.816	2.68	6.41E-06	6.65E-06	6.93E-06	7.02E-06
Zr (as ZrO(OH)2)	1.68E-04	9.14	30.1	1.53E-04	1.59E-04	1.75E-04	1.83E-04
Pb2+	8.08E-04	99.6	328	6.78E-04	7.42E-04	8.75E-04	9.39E-04
Ni2+	6.37E-03	222	731	6.14E-03	6.25E-03	6.48E-03	6.59E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.08E-03	101	331	2.23E-03	2.65E-03	3.51E-03	3.92E-03
Ca2+	3.25E-02	775	2.55E+03	2.82E-02	3.03E-02	3.47E-02	3.68E-02
K+	6.59E-02	1.53E+03	5.04E+03	5.89E-02	6.22E-02	6.99E-02	7.14E-02
OH-	13.2	1.33E+05	4.39E+05	11.4	12.3	14.2	13.7
NO3-	5.25	1.94E+05	6.37E+05	4.79	5.02	5.44	5.44
NO2-	2.97	8.11E+04	2.67E+05	2.59	2.77	3.15	3.33
CO32-	0.291	1.04E+04	3.42E+04	0.262	0.275	0.311	0.314
PO43-	6.46E-02	3.65E+03	1.20E+04	5.76E-02	6.00E-02	6.61E-02	6.76E-02
SO42-	0.192	1.10E+04	3.61E+04	0.146	0.168	0.217	0.239
Si (as SiO32-)	7.31E-02	1.22E+03	4.02E+03	6.10E-02	6.69E-02	7.92E-02	8.51E-02
F-	3.90E-02	441	1.45E+03	3.19E-02	3.49E-02	4.25E-02	4.53E-02
Cl-	0.265	5.59E+03	1.84E+04	0.233	0.248	0.284	0.283
C6H5O73-	2.25E-02	2.53E+03	8.32E+03	2.08E-02	2.16E-02	2.34E-02	2.42E-02
EDTA4-	2.49E-03	427	1.40E+03	1.21E-03	1.83E-03	3.15E-03	3.80E-03
HEDTA3-	4.09E-03	667	2.19E+03	1.52E-03	2.78E-03	5.41E-03	6.70E-03
glycolate-	3.54E-02	1.58E+03	5.20E+03	2.05E-02	2.78E-02	4.31E-02	5.04E-02
acetate-	2.87E-03	101	332	2.33E-03	2.59E-03	3.15E-03	3.42E-03
oxalate2-	7.09E-07	3.71E-02	0.122	6.28E-07	6.68E-07	7.50E-07	7.90E-07
DBP	1.52E-02	1.90E+03	6.25E+03	1.22E-02	1.37E-02	1.67E-02	1.81E-02
butanol	1.52E-02	669	2.20E+03	1.22E-02	1.37E-02	1.67E-02	1.81E-02
NH3	7.89E-02	797	2.62E+03	6.53E-02	7.07E-02	8.93E-02	0.102
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-112							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	3.33E+06 (kg)	(523 kgal)	---	---	---	---	---
Heat Load	4.28 (kW)	(1.46E+04 BTU/hr)	---	4.00	4.13	4.44	4.45
Bulk Density†	1.68 (g/cc)	---	---	1.61	1.65	1.71	1.72
Water wt%†	29.2	---	---	27.1	28.0	30.8	33.3
TOC wt% C (wet	0.324	---	---	0.289	0.306	0.341	0.358
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.6	2.13E+05	7.11E+05	14.0	14.9	16.1	16.5
Al3+	2.26	3.62E+04	1.21E+05	1.98	2.11	2.42	2.33
Fe3+ (total Fe)	1.64E-02	545	1.82E+03	1.47E-02	1.55E-02	1.73E-02	1.82E-02
Cr3+	0.222	6.85E+03	2.28E+04	0.170	0.198	0.228	0.232
Ba3+	8.07E-04	100	334	7.27E-04	7.66E-04	8.48E-04	8.88E-04
La3+	5.35E-07	4.42E-02	0.147	3.88E-07	4.60E-07	6.11E-07	6.83E-07
Hg2+	3.01E-05	3.59	12.0	2.97E-05	3.00E-05	3.02E-05	3.03E-05
Zr (as ZrO(OH)2)	1.66E-04	9.03	30.1	1.52E-04	1.57E-04	1.73E-04	1.81E-04
Pb2+	1.47E-03	181	604	1.38E-03	1.43E-03	1.52E-03	1.57E-03
Ni2+	6.59E-03	230	766	6.39E-03	6.49E-03	6.69E-03	6.79E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.04E-03	99.3	331	2.21E-03	2.62E-03	3.47E-03	3.87E-03
Ca2+	3.41E-02	812	2.71E+03	3.02E-02	3.21E-02	3.61E-02	3.80E-02
K+	6.52E-02	1.52E+03	5.05E+03	5.83E-02	6.16E-02	6.92E-02	7.06E-02
OH-	13.4	1.36E+05	4.52E+05	11.7	12.5	14.4	14.0
NO3-	5.23	1.93E+05	6.41E+05	4.85	5.03	5.38	5.38
NO2-	2.95	8.05E+04	2.68E+05	2.57	2.75	3.13	3.31
CO32-	0.289	1.03E+04	3.44E+04	0.261	0.274	0.309	0.312
PO43-	6.38E-02	3.60E+03	1.20E+04	5.69E-02	5.93E-02	6.54E-02	6.68E-02
SO42-	0.190	1.09E+04	3.62E+04	0.144	0.166	0.215	0.237
Si (as SiO32-)	7.24E-02	1.21E+03	4.03E+03	6.05E-02	6.63E-02	7.85E-02	8.43E-02
F-	3.86E-02	436	1.45E+03	3.16E-02	3.45E-02	4.20E-02	4.48E-02
Cl-	0.263	5.53E+03	1.84E+04	0.231	0.246	0.281	0.280
C6H5O73-	2.22E-02	2.50E+03	8.32E+03	2.05E-02	2.14E-02	2.31E-02	2.39E-02
EDTA4-	2.46E-03	422	1.40E+03	1.19E-03	1.81E-03	3.12E-03	3.75E-03
HEDTA3-	4.04E-03	659	2.19E+03	1.50E-03	2.74E-03	5.35E-03	6.63E-03
glycolate-	3.50E-02	1.56E+03	5.20E+03	2.02E-02	2.75E-02	4.26E-02	4.98E-02
acetate-	2.84E-03	99.5	332	2.30E-03	2.56E-03	3.11E-03	3.38E-03
oxalate2-	7.01E-07	3.67E-02	0.122	6.21E-07	6.60E-07	7.42E-07	7.81E-07
DBP	1.50E-02	1.88E+03	6.25E+03	1.21E-02	1.35E-02	1.65E-02	1.79E-02
butanol	1.50E-02	661	2.20E+03	1.21E-02	1.35E-02	1.65E-02	1.79E-02
NH3	7.94E-02	802	2.67E+03	6.60E-02	7.13E-02	8.98E-02	0.102
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-112							
TLM Solids Composite Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Waste	4.00E+04 (kg)	(6.00 kgal)	---	---	---	---	---
Heat Load	7.43E-02 (kW)	(254 BTU/hr)	---	5.39E-02	6.58E-02	7.97E-02	8.22E-02
Bulk Density	1.76 (g/cc)	---	---	1.61	1.65	1.94	2.01
Void Fraction	0.593	---	---	0.355	0.434	0.694	0.697
Water wt%	25.8	---	---	12.3	16.7	35.7	39.8
TOC wt% C (wet	0	---	---	0	0	0	0
Radiological Constituents	**CI/L**	**µCi/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	1.51E-05	8.58E-03	0.344	2.03E-06	7.86E-06	2.10E-05	2.10E-05
C-14	1.19E-06	6.73E-04	2.69E-02	1.84E-07	5.85E-07	1.59E-06	1.59E-06
Ni-59	7.45E-06	4.22E-03	0.169	5.38E-06	6.55E-06	8.14E-06	8.01E-06
Ni-63	6.95E-04	0.394	15.8	5.02E-04	6.11E-04	7.60E-04	7.48E-04
Co-60	4.71E-07	2.67E-04	1.07E-02	7.47E-08	2.33E-07	6.30E-07	6.30E-07
Se-79	2.52E-07	1.43E-04	5.73E-03	3.94E-08	1.24E-07	3.38E-07	3.59E-06
Sr-90	0.465	264	1.06E+04	0.332	0.407	0.510	0.517
Y-90	0.465	264	1.06E+04	0.332	0.407	0.510	0.518
Zr-93	1.19E-06	6.75E-04	2.70E-02	1.86E-07	5.87E-07	1.59E-06	1.52E-05
Nb-93m	9.73E-07	5.52E-04	2.21E-02	1.52E-07	4.80E-07	1.30E-06	1.61E-05
Tc-99	8.32E-06	4.72E-03	0.189	1.30E-06	4.10E-06	1.11E-05	1.11E-05
Ru-106	1.39E-12	7.86E-10	3.15E-08	2.81E-13	7.22E-13	1.83E-12	1.83E-12
Cd-113m	3.67E-06	2.08E-03	8.34E-02	5.75E-07	1.81E-06	4.92E-06	4.92E-06
Sb-125	6.96E-07	3.94E-04	1.58E-02	1.15E-07	3.47E-07	9.29E-07	9.29E-07
Sn-126	3.87E-07	2.20E-04	8.80E-03	6.03E-08	1.91E-07	5.19E-07	5.74E-06
I-129	1.60E-08	9.06E-06	3.63E-04	2.49E-09	7.88E-09	2.14E-08	2.14E-08
Cs-134	1.44E-08	8.18E-06	3.27E-04	4.42E-09	8.42E-09	1.84E-08	1.84E-08
Cs-137	2.92E-02	16.6	663	8.58E-03	1.68E-02	3.75E-02	3.75E-02
Ba-137m	2.76E-02	15.7	627	8.12E-03	1.59E-02	3.54E-02	3.54E-02
Sm-151	9.00E-04	0.510	20.4	1.40E-04	4.44E-04	1.21E-03	1.32E-02
Eu-152	3.59E-06	2.03E-03	8.14E-02	3.51E-06	3.54E-06	3.62E-06	3.62E-06
Eu-154	1.14E-05	6.45E-03	0.258	1.81E-06	5.63E-06	1.52E-05	1.52E-05
Eu-155	1.69E-04	9.60E-02	3.85	1.66E-04	1.67E-04	1.71E-04	1.71E-04
Ra-226	5.42E-10	3.07E-07	1.23E-05	7.52E-11	3.04E-10	7.80E-10	1.01E-09
Ra-228	4.78E-15	2.71E-12	1.09E-10	4.68E-15	4.72E-15	4.82E-15	4.82E-15
Ac-227	2.39E-09	1.35E-06	5.42E-05	1.60E-10	1.01E-09	3.77E-09	5.10E-09
Pa-231	3.76E-10	2.13E-07	8.54E-06	5.83E-11	1.85E-10	1.04E-09	8.41E-09
Th-229	9.05E-13	5.13E-10	2.05E-08	8.86E-13	8.93E-13	9.12E-13	9.12E-13
Th-232	3.16E-16	1.79E-13	7.17E-12	5.40E-17	1.58E-16	4.21E-16	4.21E-16
U-232	3.26E-10	1.85E-07	7.40E-06	2.83E-10	3.08E-10	3.38E-10	3.47E-10
U-233	1.21E-11	6.84E-09	2.74E-07	1.05E-11	1.14E-11	1.25E-11	1.29E-11
U-234	7.46E-06	4.23E-03	0.169	6.49E-06	7.06E-06	7.75E-06	7.95E-06
U-235	3.17E-07	1.80E-04	7.19E-03	2.76E-07	3.00E-07	3.29E-07	3.38E-07
U-236	1.64E-07	9.29E-05	3.72E-03	1.42E-07	1.55E-07	1.70E-07	1.75E-07
U-238	7.27E-06	4.12E-03	0.165	6.32E-06	6.87E-06	7.54E-06	7.75E-06
Np-237	5.42E-08	3.07E-05	1.23E-03	8.62E-09	2.68E-08	7.25E-08	7.25E-08
Pu-238	1.59E-05	8.99E-03	0.360	1.49E-05	1.54E-05	1.63E-05	1.68E-05
Pu-239	1.04E-03	0.590	23.6	9.73E-04	1.01E-03	1.07E-03	1.11E-03
Pu-240	1.47E-04	8.34E-02	3.34	1.38E-04	1.42E-04	1.52E-04	1.57E-04
Pu-241	8.91E-04	0.505	20.2	8.35E-04	8.63E-04	9.20E-04	9.47E-04
Pu-242	3.85E-09	2.18E-06	8.74E-05	3.59E-09	3.72E-09	3.98E-09	4.11E-09
Am-241	4.25E-06	2.41E-03	9.65E-02	6.67E-07	2.10E-06	5.69E-06	7.18E-05
Am-243	3.97E-11	2.25E-08	9.02E-07	6.19E-12	1.96E-11	5.32E-11	6.71E-10
Cm-242	8.23E-08	4.67E-05	1.87E-03	8.06E-08	8.13E-08	8.30E-08	8.30E-08
Cm-243	1.89E-09	1.07E-06	4.28E-05	1.85E-09	1.86E-09	1.90E-09	1.90E-09
Cm-244	1.42E-09	8.04E-07	3.22E-05	2.20E-10	6.98E-10	1.90E-09	1.90E-09
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	1.74E-02 (g/L)	---	0.395	1.63E-02	1.68E-02	1.80E-02	1.85E-02
U	9.14E-02	1.23E+04	494	7.95E-02	8.65E-02	9.50E-02	9.75E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-S-112							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM Wast	3.29E+06 (kg)	(517 kgal)	---	---	---	---	---
Heat Load	4.21 (kW)	(1.44E+04 BTU/hr)	---	3.94	4.07	4.36	4.38
Bulk Density*	1.68 (g/cc)	---	---	1.61	1.65	1.71	1.72
Water wt%†	29.3	---	---	27.1	28.0	30.8	33.3
TOC wt% C (wet	0.328	---	---	0.293	0.310	0.346	0.362
Radiological Constituents	**Ci/L**	**μCi/g**	**CI**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.67E-04	0.159	523	1.60E-04	1.60E-04	2.84E-04	2.77E-04
C-14	3.41E-05	2.03E-02	66.8	1.17E-05	1.17E-05	3.49E-05	3.48E-05
Ni-59	2.33E-06	1.38E-03	4.56	1.27E-06	1.27E-06	2.38E-06	2.43E-06
Ni-63	2.26E-04	0.134	443	1.22E-04	1.22E-04	2.31E-04	2.37E-04
Co-60	3.45E-05	2.05E-02	67.5	8.81E-06	8.81E-06	3.50E-05	3.55E-05
Se-79	3.56E-06	2.12E-03	6.96	2.13E-06	2.13E-06	4.08E-06	4.57E-06
Sr-90	0.117	69.3	2.28E+05	0.110	0.113	0.120	0.124
Y-90	0.117	69.3	2.28E+05	6.71E-02	6.71E-02	0.120	0.124
Zr-93	1.74E-05	1.03E-02	34.0	1.02E-05	1.02E-05	2.00E-05	2.25E-05
Nb-93m	1.29E-05	7.66E-03	25.2	7.87E-06	7.87E-06	1.47E-05	1.64E-05
Tc-99	2.43E-04	0.145	476	1.60E-04	2.00E-04	2.86E-04	3.28E-04
Ru-106	5.31E-09	3.16E-06	1.04E-02	1.99E-09	1.99E-09	6.05E-09	6.73E-09
Cd-113m	8.50E-05	5.05E-02	166	4.20E-05	4.20E-05	1.01E-04	1.15E-04
Sb-125	1.41E-04	8.41E-02	277	3.03E-05	3.03E-05	1.44E-04	1.46E-04
Sn-126	5.39E-06	3.21E-03	10.5	3.24E-06	3.24E-06	6.17E-06	6.91E-06
I-129	4.68E-07	2.79E-04	0.917	3.06E-07	3.86E-07	5.52E-07	6.32E-07
Cs-134	1.59E-06	9.44E-04	3.11	1.06E-06	1.06E-06	1.71E-06	1.82E-06
Cs-137	0.291	173	5.70E+05	0.262	0.276	0.308	0.310
Ba-137m	0.276	164	5.39E+05	0.206	0.206	0.291	0.293
Sm-151	1.26E-02	7.46	2.46E+04	7.54E-03	7.54E-03	1.44E-02	1.61E-02
Eu-152	3.12E-06	1.85E-03	6.10	1.34E-06	1.34E-06	3.18E-06	3.24E-06
Eu-154	5.54E-04	0.329	1.08E+03	1.96E-04	1.96E-04	6.84E-04	7.35E-04
Eu-155	1.79E-04	0.106	350	7.34E-05	7.34E-05	1.84E-04	1.88E-04
Ra-226	1.66E-10	9.88E-08	3.25E-04	1.12E-10	1.22E-10	1.94E-10	2.21E-10
Ra-228	6.02E-08	3.58E-05	0.118	2.35E-08	4.14E-08	8.19E-08	1.05E-07
Ac-227	1.00E-09	5.96E-07	1.96E-03	6.87E-10	7.45E-10	1.16E-09	1.26E-09
Pa-231	4.43E-09	2.63E-06	8.67E-03	3.00E-09	3.00E-09	4.95E-09	5.45E-09
Th-229	1.43E-09	8.52E-07	2.80E-03	6.29E-10	1.02E-09	1.91E-09	2.42E-09
Th-232	4.05E-09	2.41E-06	7.93E-03	2.03E-09	3.02E-09	5.09E-09	6.08E-09
U-232	3.63E-07	2.16E-04	0.710	2.16E-07	2.88E-07	4.50E-07	5.42E-07
U-233	1.30E-06	8.27E-04	2.72	8.29E-07	1.10E-06	1.72E-06	2.08E-06
U-234	8.70E-07	5.18E-04	1.70	7.96E-07	8.31E-07	9.13E-07	8.95E-07
U-235	3.60E-08	2.14E-05	7.05E-02	3.28E-08	3.43E-08	3.78E-08	3.70E-08
U-236	2.47E-08	1.47E-05	4.83E-02	2.35E-08	2.41E-08	2.54E-08	2.54E-08
U-238	9.06E-07	5.39E-04	1.77	8.31E-07	8.66E-07	9.50E-07	9.29E-07
Np-237	9.63E-07	5.72E-04	1.88	6.89E-07	8.23E-07	1.10E-06	1.24E-06
Pu-238	1.19E-06	7.05E-04	2.32	8.64E-07	1.02E-06	1.35E-06	1.51E-06
Pu-239	4.45E-05	2.65E-02	87.1	3.63E-05	4.03E-05	4.87E-05	5.27E-05
Pu-240	7.28E-06	4.33E-03	14.3	5.75E-06	6.50E-06	8.06E-06	8.81E-06
Pu-241	7.82E-05	4.65E-02	153	5.64E-05	6.71E-05	8.94E-05	1.00E-04
Pu-242	4.23E-10	2.51E-07	8.27E-04	2.92E-10	3.56E-10	4.89E-10	5.54E-10
Am-241	5.75E-05	3.42E-02	112	4.23E-05	4.97E-05	6.53E-05	7.27E-05
Am-243	1.61E-09	9.55E-07	3.14E-03	1.13E-09	1.36E-09	1.86E-09	2.11E-09
Cm-242	1.11E-07	6.59E-05	0.217	3.80E-08	3.80E-08	1.13E-07	1.15E-07
Cm-243	9.88E-09	5.87E-06	1.93E-02	2.93E-09	2.93E-09	1.01E-08	1.03E-08
Cm-244	1.09E-07	6.46E-05	0.213	3.70E-08	3.70E-08	1.33E-07	1.48E-07
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	5.82E-04 (g/L)	---	1.14	4.26E-04	5.03E-04	6.61E-04	7.37E-04
U	1.03E-02	1.45E+03	4.79E+03	9.32E-03	9.77E-03	1.08E-02	1.06E-02

*Density is calculated based on Na, OH-, and AlO2-.

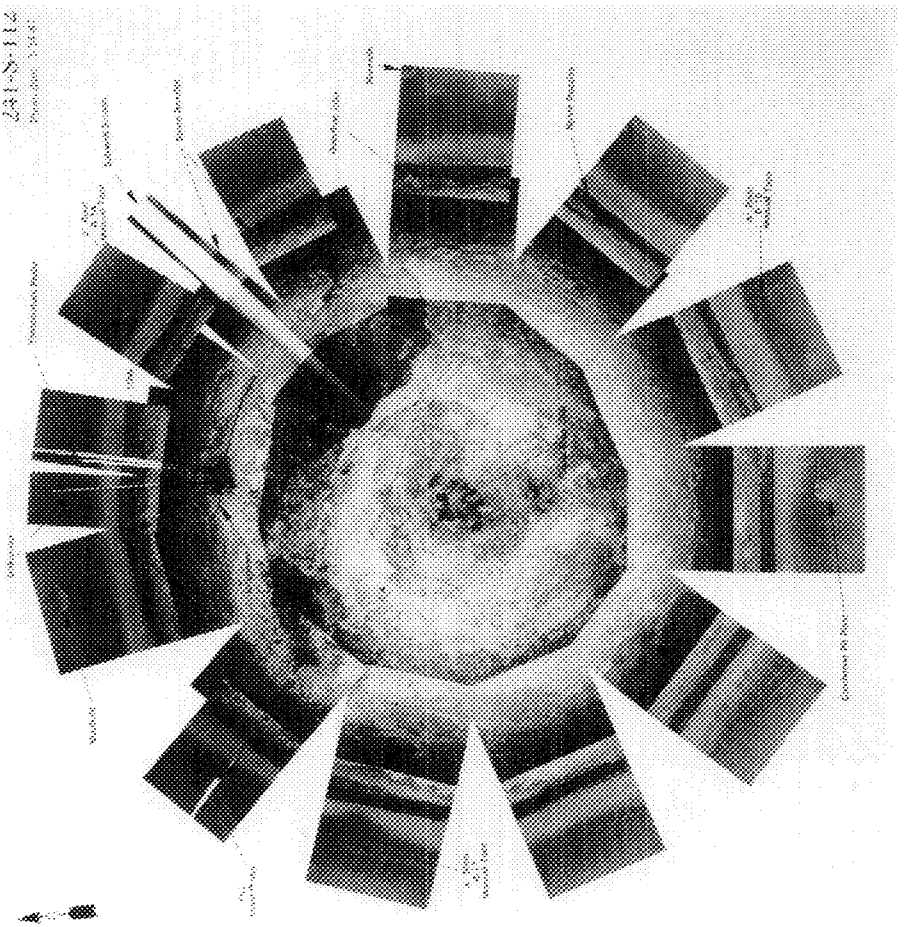
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-S-112							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.33E+06 (kg)	(523 kgal)	----	----	----	----	----
Heat Load	4.28 (kW)	(1.46E+04 BTU/hr)	----	4.00	4.13	4.44	4.45
Bulk Density†	1.68 (g/cc)	----	----	1.61	1.65	1.71	1.72
Water wt%†	29.2	----	----	27.1	28.0	30.8	33.3
TOC wt% C (wet	0.324	----	----	0.289	0.306	0.341	0.358
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.64E-04	0.157	523	1.58E-04	1.58E-04	2.80E-04	2.74E-04
C-14	3.37E-05	2.00E-02	66.8	1.16E-05	1.16E-05	3.45E-05	3.44E-05
Ni-59	2.39E-06	1.42E-03	4.73	1.34E-06	1.34E-06	2.44E-06	2.49E-06
Ni-63	2.32E-04	0.138	458	1.28E-04	1.28E-04	2.37E-04	2.42E-04
Co-60	3.41E-05	2.03E-02	67.5	8.71E-06	8.71E-06	3.46E-05	3.51E-05
Se-79	3.52E-06	2.09E-03	6.97	2.10E-06	2.10E-06	4.03E-06	4.52E-06
Sr-90	0.121	71.7	2.39E+05	0.114	0.117	0.124	0.128
Y-90	0.121	71.7	2.39E+05	7.17E-02	7.17E-02	0.124	0.128
Zr-93	1.72E-05	1.02E-02	34.0	1.01E-05	1.01E-05	1.98E-05	2.22E-05
Nb-93m	1.28E-05	7.58E-03	25.2	7.80E-06	7.80E-06	1.45E-05	1.63E-05
Tc-99	2.41E-04	0.143	476	1.58E-04	1.98E-04	2.83E-04	3.24E-04
Ru-106	5.25E-09	3.12E-06	1.04E-02	1.97E-09	1.97E-09	5.98E-09	6.65E-09
Cd-113m	8.40E-05	4.99E-02	166	4.15E-05	4.15E-05	9.94E-05	1.14E-04
Sb-125	1.40E-04	8.31E-02	277	3.00E-05	3.00E-05	1.42E-04	1.44E-04
Sn-126	5.33E-06	3.17E-03	10.6	3.21E-06	3.21E-06	6.10E-06	6.84E-06
I-129	4.63E-07	2.75E-04	0.917	3.03E-07	3.81E-07	5.46E-07	6.25E-07
Cs-134	1.57E-06	9.33E-04	3.11	1.05E-06	1.05E-06	1.69E-06	1.80E-06
Cs-137	0.288	171	5.71E+05	0.260	0.273	0.305	0.307
Ba-137m	0.273	162	5.40E+05	0.204	0.204	0.288	0.290
Sm-151	1.24E-02	7.38	2.46E+04	7.46E-03	7.46E-03	1.42E-02	1.59E-02
Eu-152	3.12E-06	1.86E-03	6.18	1.37E-06	1.37E-06	3.18E-06	3.24E-06
Eu-154	5.48E-04	0.326	1.08E+03	1.94E-04	1.94E-04	6.76E-04	7.27E-04
Eu-155	1.79E-04	0.106	354	7.45E-05	7.45E-05	1.83E-04	1.88E-04
Ra-226	1.70E-10	1.01E-07	3.38E-04	1.22E-10	1.27E-10	1.95E-10	2.19E-10
Ra-228	5.95E-08	3.53E-05	0.118	2.33E-08	4.10E-08	8.09E-08	1.04E-07
Ac-227	1.02E-09	6.05E-07	2.02E-03	7.38E-10	7.64E-10	1.16E-09	1.25E-09
Pa-231	4.38E-09	2.60E-06	8.67E-03	2.97E-09	2.97E-09	4.89E-09	5.39E-09
Th-229	1.42E-09	8.42E-07	2.80E-03	6.22E-10	1.01E-09	1.89E-09	2.39E-09
Th-232	4.01E-09	2.38E-06	7.93E-03	2.00E-09	2.98E-09	5.03E-09	6.01E-09
U-232	3.58E-07	2.13E-04	0.710	2.13E-07	2.84E-07	4.44E-07	5.36E-07
U-233	1.30E-06	8.17E-04	2.72	8.20E-07	1.09E-06	1.70E-06	2.06E-06
U-234	9.46E-07	5.62E-04	1.87	8.73E-07	9.07E-07	9.88E-07	9.70E-07
U-235	3.92E-08	2.33E-05	7.76E-02	3.61E-08	3.76E-08	4.10E-08	4.02E-08
U-236	2.63E-08	1.56E-05	5.20E-02	2.51E-08	2.57E-08	2.69E-08	2.70E-08
U-238	9.79E-07	5.82E-04	1.94	9.04E-07	9.40E-07	1.02E-06	1.00E-06
Np-237	9.52E-07	5.66E-04	1.89	6.82E-07	8.14E-07	1.09E-06	1.23E-06
Pu-238	1.35E-06	8.04E-04	2.68	1.04E-06	1.19E-06	1.52E-06	1.67E-06
Pu-239	5.59E-05	3.32E-02	111	4.78E-05	5.18E-05	6.00E-05	6.40E-05
Pu-240	8.89E-06	5.28E-03	17.6	7.37E-06	8.12E-06	9.66E-06	1.04E-05
Pu-241	8.76E-05	5.20E-02	173	6.59E-05	7.65E-05	9.86E-05	1.09E-04
Pu-242	4.62E-10	2.74E-07	9.14E-04	3.33E-10	3.96E-10	5.28E-10	5.91E-10
Am-241	5.69E-05	3.38E-02	113	4.18E-05	4.92E-05	6.46E-05	7.19E-05
Am-243	1.59E-09	9.44E-07	3.15E-03	1.12E-09	1.34E-09	1.84E-09	2.08E-09
Cm-242	1.11E-07	6.57E-05	0.219	3.86E-08	3.86E-08	1.13E-07	1.15E-07
Cm-243	9.78E-09	5.81E-06	1.94E-02	2.92E-09	2.92E-09	1.00E-08	1.02E-08
Cm-244	1.07E-07	6.38E-05	0.213	3.66E-08	3.66E-08	1.31E-07	1.47E-07
Totals	**M**	**μg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.75E-04 (g/L)	----	1.53	6.21E-04	6.96E-04	8.53E-04	9.28E-04
U	1.12E-02	1.59E+03	5.28E+03	1.03E-02	1.07E-02	1.17E-02	1.15E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.



SX TANK FARM

3.0 241-SX Tank Farm

The SX Tank Farm is located in the 200 West Area west of Beliot Avenue and south of 13th Street . The farm contains fifteen 100 series, dish bottom design, single-shell tanks built in 1953 and 1954. The 100 series tanks are 75 feet in diameter with an operating capacity of 1,000,000 gallons. The tanks were designed to store boiling waste. The tanks contents were allowed to boil for one to five years at a fluid temperature up to 250°F. The fifteen tanks were constructed at different elevations with connecting overflow lines that allowed waste to cascade from tank to tank. The tank farm has five cascades of three tanks each. For more information on the design, construction, and waste contents of the tanks, refer to the SX Tank Farm Supporting Document, HNF-SD-WM-ER-324, Rev. 1 (Brevick et al., 1997b).

The SX Tank Farm tanks were the first tanks designed to store self-boiling wastes. Tanks 241-SX-101 through -106 started operations in 1954 and began receiving REDOX (S Plant) plant salt waste and first-cycle condensate. The other nine tanks (241-SX-107 through -115) were not released for use until late 1955 when they began receiving REDOX boiling high-level waste and salt waste (Leach and Stahl, 1993). The primary additions to the tanks were REDOX high-level waste (R1 and R2), REDOX cladding waste (CWR1), REDOX saltcake (RsltCk), partial neutralization feed (NIT), diatomaceous earth (DE), and water (WTR) (Agnew et al., 1995).

Concrete or diatomaceous earth has been added to various tanks in the SX farm. Tank 241-SX-107 contains 41 small bottles of neutralized waste from 100 F, each bottle contained less than 1 g (gram) of ^{239}Pu (Plutonium 239). Tank 241-SX-110 contains 16 bottles totaling 204 g ^{239}Pu and 6 g of enriched uranium (Leach and Stahl, 1993).

The following table presents a summary of the 241-SX Tank Farm. Refer to the glossary for waste type terminology.

241-SX TANK FARM SUMMARY

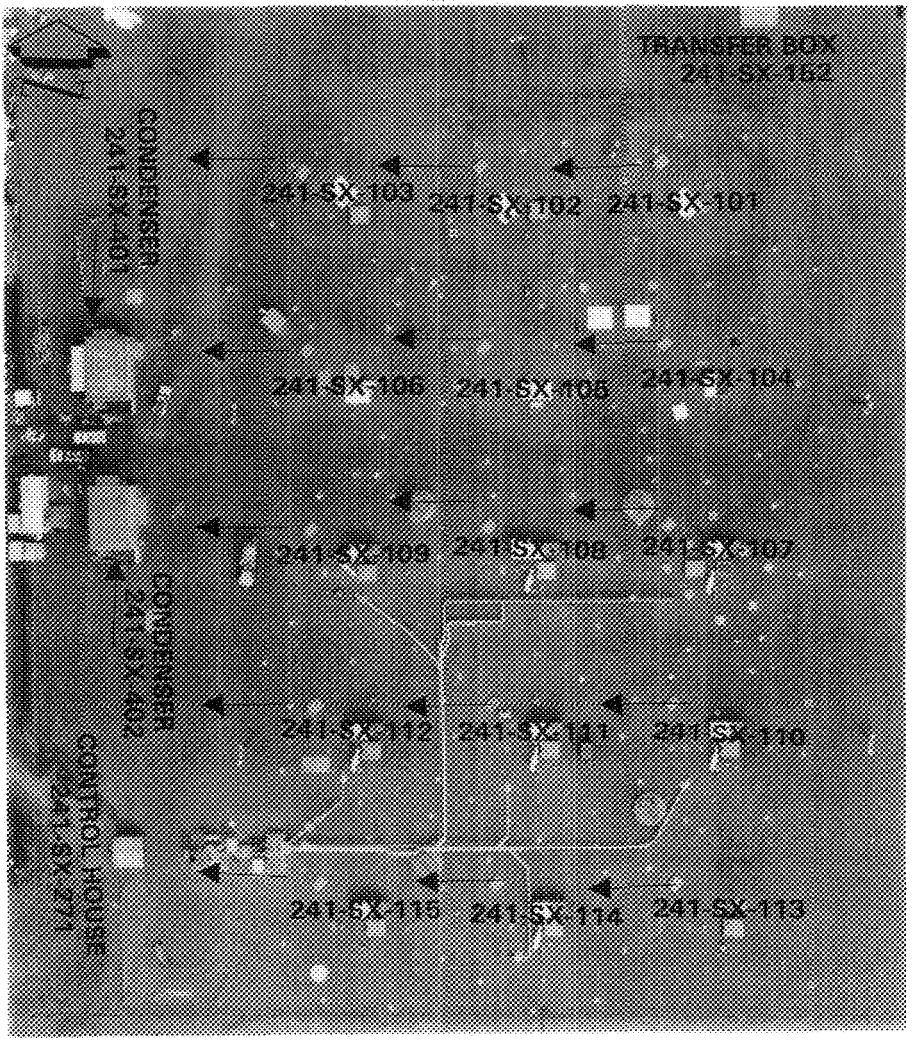
TANK FARM DESCRIPTION		WASTE VOLUME (HANLON 1996i)	
Shell Type	Single	Total Waste Volume	4,419,000 gal
Number of Tanks	15	Waste Type	DSSF, DC, NCPLX
Construction Date	1953-1954	Drainable Interstitial Liquids	1,298,000 gal
INTEGRITY		Pumpable Liquids	1,445,000 gal
Sound	101, 102, 103, 105 106	Saltcake	3,102,000 gal
		Sludge	1,254,000 gal
Assumed Leaker	104, 107, 108, 109 110, 111, 112,113 114, 115	Supernatant	63,000 gal
		WATCH LISTS	
TANK VOLUMES		Hydrogen	101, 102, 103, 104 105, 106, 109
15 @ 1,000,000 gal		Organics	103, 106
		High Heat	none
		Ferrocyanide	none

The historical characterization and waste inventory information for each tank is assembled into a set of tables, sketches, graphs, and interior tank montage. The set consists of the following for each tank in SX Tank Farm:

- Tank Summary table
- Waste and Level History sketch
- Riser Configuration sketch
- Tank Layer Model Estimate graph
- Total Inventory Estimate tables
- TLM Solids Composite Inventory Estimate tables
- SMM Composite Inventory Estimate tables
- Interior tank montage

The supporting document for SX Tank Farm provides backup data and further explanation of the above tables, sketches, and graphs.

SX TANK FARM


TRANSFER BOX
241-SX-152
241-SX-103
241-SX-102
241-SX-101
CONDENSER
241-SX-201
241-SX-106
241-SX-105
241-SX-104
241-SX-109
241-SX-108
241-SX-107
CONDENSER
241-SX-202
241-SX-112
241-SX-111
241-SX-110
CONTROL HOUSE
241-SX-270
241-SX-115
241-SX-114
241-SX-113

TANK 241-SX-101 SUMMARY

TANK HISTORY	
Entered Service	2nd qtr 1954
Removed from Service	-
Inactive	-
Watch Lists	Hydrogen
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	June 1985
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
10	3 in
18	4 in
11	8 in
19	12 in

TANK TEMPERATURE	
Average Tank Temperature	128°F
Maximum Temperature	154.2°F
Date	Jan 4, 1988
Elevation from tank bottom	0.21 ft
Riser Number	15
Minimum Temperature	90°F
Date	April 24, 1995
Elevation from tank bottom	30.25 ft
Riser Number	15

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	to 241-SX-102
Total Risers	22

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	456,000 gal
Waste Type	DC
Drainable Interstitial Liquids	145,000 gal
Pumpable Liquids	174,000 gal
Saltcake	343,000 gal
Sludge	112,000 gal
Supernatant	1,000 gal

INTERIOR PHOTOGRAPHS	
Date	March 10, 1989
Montage Number	94041033-5CN
Photo Set Number	89031034

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	171.8 in
Date	Aug 20 and 24, 1992
Min Level	166.44 in
Date	Oct 2, 1996

WASTE TYPES TIME LINE (ANDERSON 1990)	R:		EB: RIX:	PNF: RESID: TL:	CPLX: NCPLX:
PRIMARY ADDITIONS TIME LINE (AGNEW 1995)	R1: WTR:	RSLTCK:	WTR:		

TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

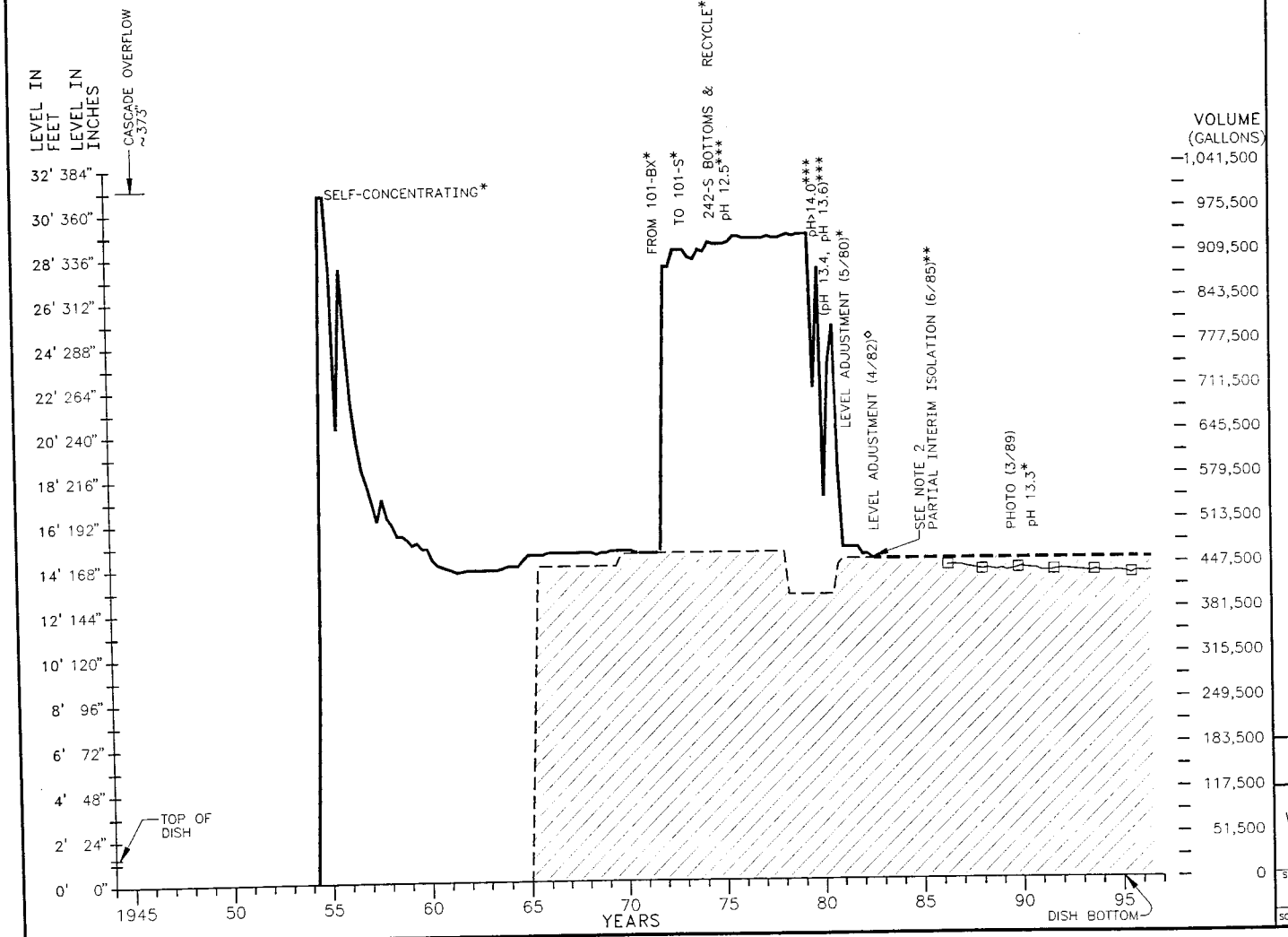
GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

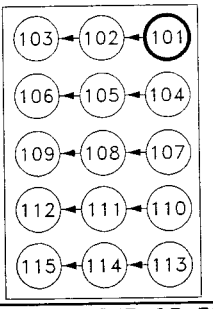
CPLX:	COMPLEXED WASTE
EB:	EVAPORATOR BOTTOMS
NCPLX:	NON-COMPLEXED WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RIX:	REDOX ION EXCHANGE WASTE
RSLTCK:	SALTCAKE
R1:	REDOX WASTE 1952-57
TL:	TERMINAL LIQUOR
WTR:	WATER

LEGEND

TOTAL WASTE LEVEL (SUPERNATE)
TOTAL WASTE LEVEL (SOLIDS)
SOLIDS LEVEL
INTERSTITIAL LIQUID LEVEL
SOLIDS



SX TANK FARM CASCADE

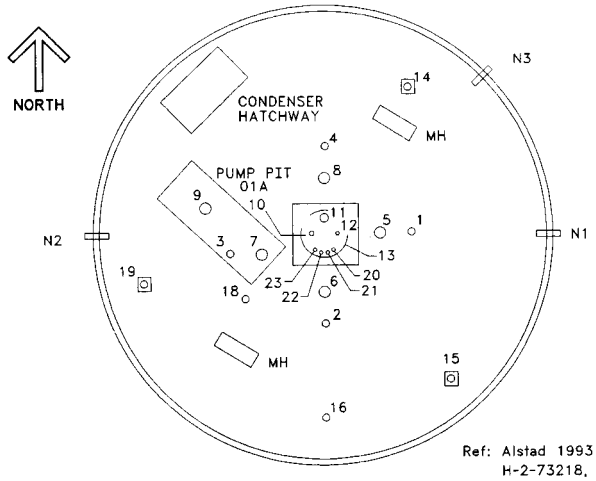


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-101 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1954-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: HYDROGEN

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E79	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

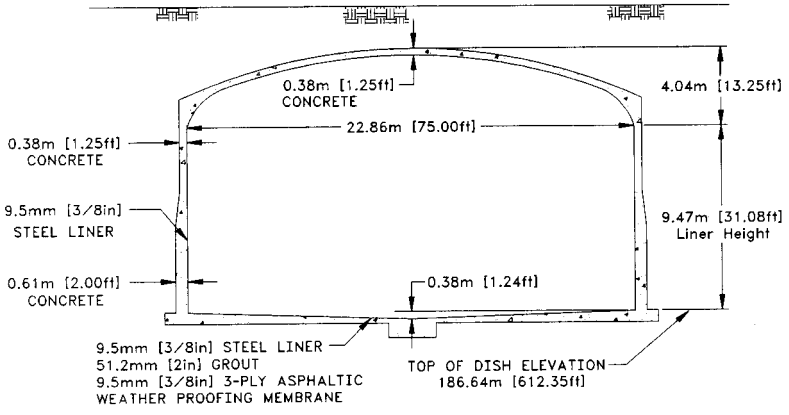
241-SX-101



Ref: Alstad 1993
H-2-73218, Rev. 2

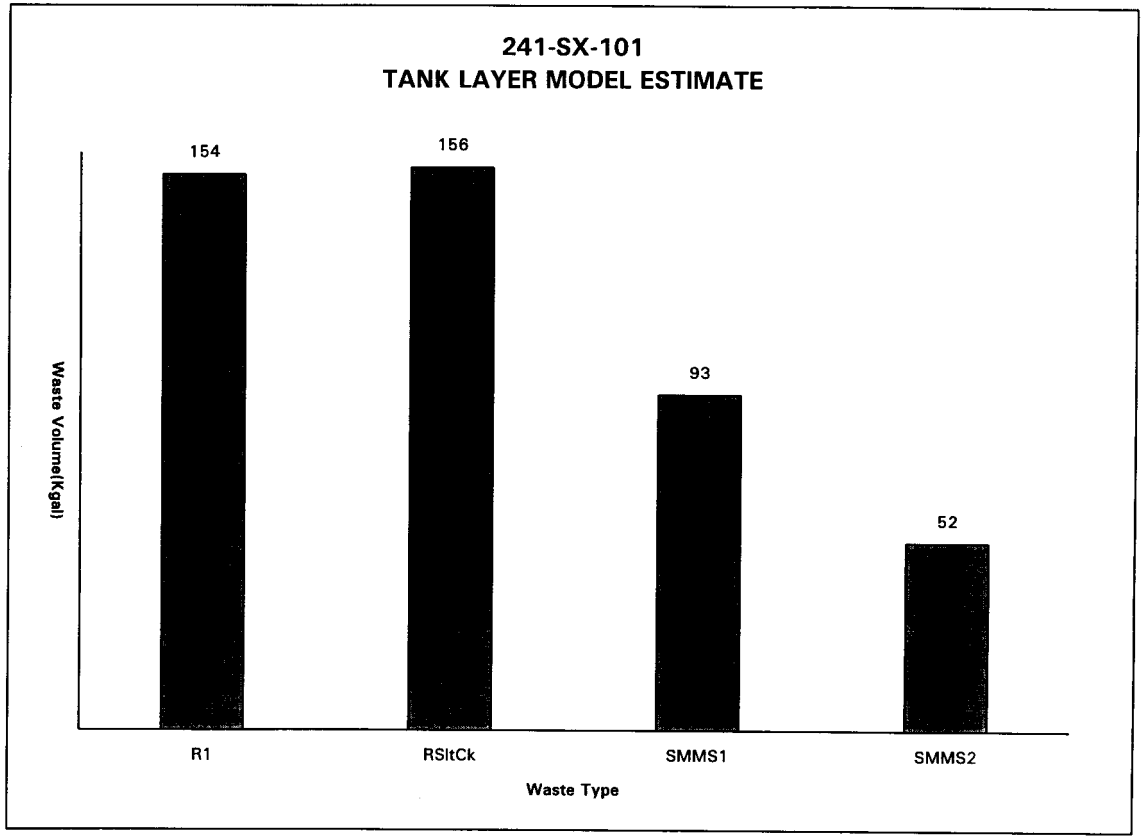
TANK RISER LOCATION

Approximate Grade Elevation 202.08m [663ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-101							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wt	2.04E+06 (kg)	(310 kgal)	---	---	---	---	---
Heat Load	5.74 (kW)	(1.96E+04 BTU/hr)	---	4.70	5.31	6.02	6.15
Bulk Density	1.73 (g/cc)	---	---	1.60	1.62	1.91	1.98
Void Fraction	0.661	---	---	0.425	0.503	0.761	0.764
Water wt%	30.8	---	---	16.6	21.2	38.4	40.9
TOC wt% C (w	2.61E-03	---	---	2.29E-03	2.37E-03	2.81E-03	3.04E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	10.8	1.43E+05	2.92E+05	8.29	8.54	14.1	15.8
Al3+	5.18	8.06E+04	1.64E+05	4.19	4.48	5.93	6.69
Fe3+ (total Fe)	0.512	1.65E+04	3.36E+04	0.503	0.507	0.517	0.521
Cr3+	0.444	1.33E+04	2.71E+04	0.272	0.354	0.673	0.940
Bi3+	3.46E-06	0.417	0.848	2.92E-06	3.18E-06	3.81E-06	4.19E-06
La3+	8.52E-12	6.82E-07	1.39E-06	7.46E-12	8.06E-12	9.42E-12	1.03E-11
Hg2+	5.43E-07	6.28E-02	0.128	4.81E-07	5.11E-07	5.98E-07	6.56E-07
Zr (as ZrO(OH)2	3.45E-07	1.82E-02	3.69E-02	3.17E-07	3.31E-07	3.62E-07	3.90E-07
Pb2+	8.61E-05	10.3	20.9	4.61E-05	6.56E-05	1.07E-04	1.27E-04
Ni2+	3.28E-02	1.11E+03	2.26E+03	2.58E-02	2.97E-02	3.51E-02	3.47E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.52E-05	0.797	1.62	1.80E-05	2.15E-05	2.89E-05	3.25E-05
Ca2+	0.148	3.42E+03	6.95E+03	0.111	0.129	0.167	0.185
K+	2.17E-02	489	995	1.67E-02	1.87E-02	2.37E-02	2.47E-02
OH-	22.1	2.17E+05	4.41E+05	17.6	19.0	25.4	28.6
NO3-	5.27	1.88E+05	3.83E+05	2.67	2.67	9.33	11.5
NO2-	1.67	4.42E+04	8.99E+04	1.01	1.24	2.01	2.01
CO32-	0.150	5.20E+03	1.06E+04	0.113	0.132	0.169	0.187
PO43-	2.24E-04	12.3	24.9	2.08E-04	2.17E-04	2.33E-04	2.53E-04
SO42-	2.55E-02	1.41E+03	2.88E+03	2.09E-02	2.28E-02	2.74E-02	2.92E-02
Si (as SiO32-)	6.94E-02	1.12E+03	2.29E+03	4.54E-02	6.03E-02	7.86E-02	8.74E-02
F-	1.78E-04	1.95	3.98	1.52E-04	1.68E-04	1.96E-04	2.11E-04
Cl-	9.28E-02	1.90E+03	3.86E+03	6.18E-02	7.69E-02	0.102	0.145
C6H5O73-	1.84E-04	20.1	40.9	1.78E-04	1.81E-04	1.92E-04	2.09E-04
EDTA4-	7.18E-06	1.19	2.43	5.05E-06	6.21E-06	8.45E-06	9.72E-06
HEDTA3-	5.96E-06	0.942	1.92	1.91E-06	4.10E-06	7.96E-06	9.90E-06
glycolate-	2.60E-04	11.3	22.9	1.41E-04	2.06E-04	3.23E-04	3.84E-04
acetate-	2.70E-05	0.919	1.87	2.61E-05	2.66E-05	2.87E-05	3.07E-05
oxalate2-	1.12E-11	5.66E-07	1.15E-06	9.89E-12	1.05E-11	1.23E-11	1.35E-11
DBP	1.63E-04	19.8	40.3	1.53E-04	1.59E-04	1.77E-04	1.91E-04
butanol	1.63E-04	6.99	14.2	1.53E-04	1.59E-04	1.77E-04	1.91E-04
NH3	0.145	1.42E+03	2.89E+03	5.07E-02	6.41E-02	0.152	0.159
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-101							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM W	7.16E+05 (kg)	(146 kgal)	---	---	---	---	---
Heat Load	0.567 (kW)	(1.94E+03 BTU/hr)	---	0.534	0.550	0.584	0.600
Bulk Density*	1.29 (g/cc)	---	---	1.27	1.28	1.30	1.31
Water wt%	59.6	---	---	57.7	58.6	60.8	62.0
TOC wt% C (w	0.437	---	---	0.287	0.360	0.513	0.587
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	6.89	1.22E+05	8.76E+04	6.32	6.61	7.14	7.37
Al3+	0.827	1.72E+04	1.23E+04	0.763	0.793	0.864	0.881
Fe3+ (total Fe)	5.19E-03	224	160	4.24E-03	4.71E-03	5.67E-03	6.14E-03
Cr3+	7.46E-02	3.00E+03	2.14E+03	6.15E-02	6.86E-02	7.69E-02	7.91E-02
Bi3+	6.12E-04	98.8	70.7	5.56E-04	5.84E-04	6.41E-04	6.68E-04
La3+	1.66E-05	1.78	1.27	1.20E-05	1.42E-05	1.89E-05	2.12E-05
Hg2+	4.25E-06	0.659	0.471	3.96E-06	4.12E-06	4.31E-06	4.37E-06
Zr (as ZrO(OH)2	1.16E-04	8.16	5.84	1.06E-04	1.09E-04	1.20E-04	1.26E-04
Pb2+	4.70E-04	75.2	53.8	3.84E-04	4.26E-04	5.14E-04	5.56E-04
Ni2+	3.10E-03	140	100	2.97E-03	3.03E-03	3.13E-03	3.17E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	1.79E-03	76.1	54.5	1.34E-03	1.56E-03	2.03E-03	2.25E-03
Ca2+	1.62E-02	502	359	1.49E-02	1.55E-02	1.69E-02	1.76E-02
K+	3.15E-02	952	681	2.87E-02	3.00E-02	3.30E-02	3.45E-02
OH-	4.98	6.54E+04	4.68E+04	4.58	4.77	5.20	5.27
NO3-	2.40	1.15E+05	8.23E+04	2.22	2.33	2.44	2.46
NO2-	1.21	4.29E+04	3.07E+04	1.01	1.10	1.31	1.40
CO32-	0.202	9.39E+03	6.72E+03	0.184	0.191	0.216	0.219
PO43-	4.20E-02	3.08E+03	2.20E+03	3.61E-02	3.82E-02	4.30E-02	4.40E-02
SO42-	0.115	8.53E+03	6.10E+03	8.99E-02	0.102	0.128	0.140
Si (as SiO32-)	3.74E-02	812	581	3.09E-02	3.41E-02	4.07E-02	4.39E-02
F-	3.00E-02	440	315	2.51E-02	2.72E-02	3.24E-02	3.43E-02
Cl-	0.119	3.25E+03	2.33E+03	0.108	0.112	0.124	0.128
C6H5O73-	1.32E-02	1.93E+03	1.38E+03	1.21E-02	1.27E-02	1.37E-02	1.43E-02
EDTA4-	6.87E-03	1.53E+03	1.09E+03	2.11E-03	4.44E-03	9.33E-03	1.17E-02
HEDTA3-	1.29E-02	2.72E+03	1.95E+03	3.32E-03	7.98E-03	1.78E-02	2.25E-02
glycolate-	4.10E-02	2.37E+03	1.70E+03	2.68E-02	3.37E-02	4.82E-02	5.52E-02
acetate-	2.86E-03	131	93.4	2.34E-03	2.60E-03	3.13E-03	3.39E-03
oxalate2-	2.17E-05	1.47	1.05	1.92E-05	2.04E-05	2.29E-05	2.42E-05
DBP	8.90E-03	1.45E+03	1.03E+03	7.30E-03	8.09E-03	9.70E-03	1.05E-02
butanol	8.90E-03	510	365	7.30E-03	8.09E-03	9.70E-03	1.05E-02
NH3	4.09E-02	537	384	3.36E-02	3.65E-02	4.66E-02	5.32E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-101

Total Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	2.75E+06 (kg)	(456 kgal)	---	---	---	---	---
Heat Load	6.30 (kW)	(2.15E+04 BTU/hr)	---	5.25	5.86	6.60	6.71
Bulk Density†	1.59 (g/cc)	---	---	1.50	1.52	1.71	1.76
Water wt%†	38.3	---	---	26.9	30.4	44.3	46.2
TOC wt% C (w	0.115	---	---	7.65E-02	9.55E-02	0.136	0.155

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	9.56	1.38E+05	3.79E+05	7.73	7.96	11.8	12.9
Al3+	3.78	6.41E+04	1.76E+05	3.11	3.31	4.30	4.82
Fe3+ (total Fe)	0.350	1.23E+04	3.37E+04	0.343	0.347	0.353	0.356
Cr3+	0.326	1.06E+04	2.93E+04	0.209	0.265	0.479	0.658
Bi3+	1.98E-04	26.0	71.6	1.80E-04	1.89E-04	2.08E-04	2.16E-04
La3+	5.30E-06	0.462	1.27	3.84E-06	4.55E-06	6.05E-06	6.77E-06
Hg2+	1.73E-06	0.218	0.599	1.64E-06	1.69E-06	1.77E-06	1.81E-06
Zr (as ZrO(OH)2	3.73E-05	2.14	5.87	3.40E-05	3.52E-05	3.87E-05	4.05E-05
Pb2+	2.09E-04	27.2	74.8	1.79E-04	1.94E-04	2.25E-04	2.40E-04
Ni2+	2.33E-02	858	2.36E+03	1.85E-02	2.12E-02	2.49E-02	2.46E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	5.91E-04	20.4	56.1	4.46E-04	5.17E-04	6.66E-04	7.37E-04
Ca2+	0.106	2.66E+03	7.31E+03	8.09E-02	9.31E-02	0.118	0.131
K+	2.48E-02	609	1.68E+03	2.15E-02	2.31E-02	2.62E-02	2.72E-02
OH-	16.6	1.77E+05	4.88E+05	13.5	14.5	18.8	21.0
NO3-	4.35	1.69E+05	4.66E+05	2.58	2.59	7.10	8.58
NO2-	1.52	4.38E+04	1.21E+05	1.06	1.23	1.76	1.76
CO32-	0.167	6.29E+03	1.73E+04	0.142	0.154	0.180	0.192
PO43-	1.36E-02	810	2.23E+03	1.17E-02	1.24E-02	1.39E-02	1.42E-02
SO42-	5.42E-02	3.26E+03	8.98E+03	4.61E-02	5.00E-02	5.85E-02	6.23E-02
Si (as SiO32-)	5.92E-02	1.04E+03	2.87E+03	4.33E-02	5.30E-02	6.54E-02	7.14E-02
F-	9.72E-03	116	319	8.16E-03	8.82E-03	1.05E-02	1.11E-02
Cl-	0.101	2.25E+03	6.18E+03	7.78E-02	8.92E-02	0.107	0.136
C6H5O73-	4.35E-03	516	1.42E+03	4.01E-03	4.18E-03	4.53E-03	4.69E-03
EDTA4-	2.21E-03	399	1.10E+03	6.80E-04	1.42E-03	2.99E-03	3.76E-03
HEDTA3-	4.12E-03	709	1.95E+03	1.07E-03	2.56E-03	5.69E-03	7.22E-03
glycolate-	1.33E-02	626	1.72E+03	8.75E-03	1.10E-02	1.56E-02	1.78E-02
acetate-	9.36E-04	34.7	95.3	7.69E-04	8.51E-04	1.02E-03	1.10E-03
oxalate2-	6.94E-06	0.384	1.05	6.15E-06	6.54E-06	7.35E-06	7.74E-06
DBP	2.96E-03	391	1.07E+03	2.45E-03	2.70E-03	3.22E-03	3.46E-03
butanol	2.96E-03	138	379	2.45E-03	2.70E-03	3.22E-03	3.46E-03
NH3	0.112	1.19E+03	3.28E+03	4.70E-02	5.64E-02	0.117	0.121
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-101							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wa	2.04E+06 (kg)	(310 kgal)	----	----	----	----	----
Heat Load	5.74 (kW)	(1.96E+04 BTU/hr)	----	4.70	5.31	6.02	6.15
Bulk Density	1.73 (g/cc)	----	----	1.60	1.62	1.91	1.98
Void Fraction	0.661	----	----	0.425	0.503	0.761	0.764
Water wt%	30.8	----	----	16.6	21.2	38.4	40.9
TOC wt% C (w	2.61E-03	----	----	2.29E-03	2.37E-03	2.81E-03	3.04E-03
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	1.27E-04	7.31E-02	149	1.45E-05	1.45E-05	1.33E-04	1.43E-04
C-14	6.88E-06	3.97E-03	8.07	1.12E-06	1.12E-06	7.28E-06	7.64E-06
Ni-59	1.08E-05	6.23E-03	12.7	7.38E-06	7.38E-06	1.15E-05	1.14E-05
Ni-63	1.02E-03	0.589	1.20E+03	6.89E-04	6.89E-04	1.09E-03	1.07E-03
Co-60	5.62E-06	3.24E-03	6.60	4.44E-07	4.44E-07	5.85E-06	6.32E-06
Se-79	3.74E-06	2.15E-03	4.38	2.39E-07	2.39E-07	3.82E-06	7.05E-06
Sr-90	0.593	342	6.96E+05	0.461	0.536	0.638	0.645
Y-90	0.594	342	6.96E+05	0.461	0.461	0.638	0.645
Zr-93	1.77E-05	1.02E-02	20.7	1.13E-06	1.13E-06	1.81E-05	3.16E-05
Nb-93m	1.44E-05	8.28E-03	16.8	9.21E-07	9.21E-07	1.47E-05	2.94E-05
Tc-99	5.26E-05	3.03E-02	61.7	4.56E-05	4.84E-05	5.60E-05	5.98E-05
Ru-106	1.20E-09	6.91E-07	1.41E-03	1.24E-12	1.24E-12	1.25E-09	1.36E-09
Cd-113m	2.68E-05	1.54E-02	31.4	3.47E-06	3.47E-06	5.52E-05	5.35E-05
Sb-125	1.92E-05	1.10E-02	22.5	6.52E-07	6.52E-07	2.00E-05	2.17E-05
Sn-126	5.73E-06	3.31E-03	6.73	3.67E-07	3.67E-07	5.86E-06	1.11E-05
I-129	1.00E-07	5.77E-05	0.117	8.66E-08	9.20E-08	1.06E-07	1.14E-07
Cs-134	1.17E-06	6.75E-04	1.37	1.35E-08	1.35E-08	1.22E-06	1.31E-06
Cs-137	0.191	110	2.24E+05	0.170	0.179	0.203	0.216
Ba-137m	0.180	104	2.12E+05	2.63E-02	2.63E-02	0.188	0.198
Sm-151	1.33E-02	7.68	1.56E+04	8.52E-04	8.52E-04	1.36E-02	2.56E-02
Eu-152	7.94E-06	4.58E-03	9.32	3.48E-06	3.48E-06	7.97E-06	8.02E-06
Eu-154	1.35E-04	7.76E-02	158	1.07E-05	1.07E-05	1.40E-04	1.74E-04
Eu-155	3.91E-04	0.225	458	1.64E-04	1.64E-04	3.92E-04	3.95E-04
Ra-226	7.73E-10	4.46E-07	9.07E-04	3.10E-10	5.37E-10	1.01E-09	1.24E-09
Ra-228	7.93E-09	4.57E-06	9.30E-03	4.60E-15	4.60E-15	8.00E-09	8.09E-09
Ac-227	3.75E-09	2.16E-06	4.40E-03	1.53E-09	2.37E-09	5.12E-09	6.44E-09
Pa-231	5.56E-09	3.21E-06	6.52E-03	3.57E-10	3.57E-10	6.22E-09	1.35E-08
Th-229	1.91E-10	1.10E-07	2.24E-04	8.78E-13	8.78E-13	1.93E-10	1.95E-10
Th-232	1.06E-10	6.13E-08	1.25E-04	2.93E-16	2.93E-16	1.34E-10	1.61E-10
U-232	3.54E-08	2.04E-05	4.16E-02	1.25E-08	2.31E-08	5.05E-08	6.72E-08
U-233	1.36E-07	7.82E-05	0.159	4.79E-08	8.84E-08	1.93E-07	2.57E-07
U-234	6.99E-07	4.03E-04	0.821	3.39E-07	5.15E-07	8.99E-07	1.10E-06
U-235	2.84E-08	1.64E-05	3.33E-02	1.38E-08	2.09E-08	3.65E-08	4.47E-08
U-236	2.74E-08	1.58E-05	3.22E-02	1.30E-08	2.02E-08	3.51E-08	4.26E-08
U-238	6.22E-07	3.58E-04	0.729	3.04E-07	4.58E-07	7.99E-07	9.79E-07
Np-237	2.46E-07	1.42E-04	0.289	2.01E-07	2.19E-07	2.64E-07	2.81E-07
Pu-238	4.47E-06	2.58E-03	5.25	3.54E-06	4.00E-06	4.94E-06	5.40E-06
Pu-239	2.73E-04	0.157	320	2.07E-04	2.39E-04	3.07E-04	3.39E-04
Pu-240	3.99E-05	2.30E-02	46.8	3.04E-05	3.51E-05	4.47E-05	4.94E-05
Pu-241	2.58E-04	0.149	303	2.03E-04	2.30E-04	2.87E-04	3.14E-04
Pu-242	1.23E-09	7.08E-07	1.44E-03	9.73E-10	1.10E-09	1.36E-09	1.48E-09
Am-241	6.27E-05	3.62E-02	73.6	3.74E-05	5.48E-05	7.13E-05	1.30E-04
Am-243	1.91E-09	1.10E-06	2.24E-03	9.00E-10	1.66E-09	2.10E-09	2.54E-09
Cm-242	8.07E-08	4.66E-05	9.47E-02	7.90E-08	7.97E-08	8.14E-08	8.14E-08
Cm-243	1.85E-09	1.07E-06	2.17E-03	1.81E-09	1.83E-09	1.86E-09	1.86E-09
Cm-244	1.44E-09	8.30E-07	1.69E-03	2.49E-10	7.24E-10	1.92E-09	1.92E-09
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	4.56E-03 (g/L)	----	5.35	3.45E-03	4.00E-03	5.12E-03	5.67E-03
U	7.69E-03	1.06E+03	2.15E+03	3.76E-03	5.66E-03	9.90E-03	1.21E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-101

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	7.16E+05 (kg)	(146 kgal)	----	----	----	----	----
Heat Load	0.567 (kW)	(1.94E+03 BTU/hr)	----	0.534	0.550	0.584	0.600
Bulk Density*	1.29 (g/cc)	----	----	1.27	1.28	1.30	1.31
Water wt%†	59.6	----	----	57.7	58.6	60.8	62.0
TOC wt% C (w	0.437	----	----	0.287	0.360	0.513	0.587

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	1.23E-04	9.54E-02	68.2	6.55E-05	6.55E-05	1.27E-04	1.32E-04
C-14	1.75E-05	1.35E-02	9.67	5.38E-06	5.38E-06	1.78E-05	1.80E-05
Ni-59	1.13E-06	8.74E-04	0.625	5.61E-07	5.61E-07	1.16E-06	1.19E-06
Ni-63	1.11E-04	8.56E-02	61.2	5.44E-05	5.44E-05	1.14E-04	1.16E-04
Co-60	1.92E-05	1.49E-02	10.6	5.37E-06	5.37E-06	1.96E-05	1.99E-05
Se-79	1.75E-06	1.35E-03	0.965	9.73E-07	9.73E-07	2.03E-06	2.29E-06
Sr-90	5.80E-02	44.8	3.20E+04	5.42E-02	5.60E-02	5.99E-02	6.18E-02
Y-90	5.80E-02	44.8	3.20E+04	3.13E-02	3.13E-02	5.99E-02	6.18E-02
Zr-93	8.57E-06	6.62E-03	4.74	4.70E-06	4.70E-06	9.97E-06	1.13E-05
Nb-93m	6.23E-06	4.81E-03	3.44	3.52E-06	3.52E-06	7.21E-06	8.15E-06
Tc-99	1.25E-04	9.63E-02	68.9	7.95E-05	1.02E-04	1.48E-04	1.70E-04
Ru-106	3.41E-09	2.63E-06	1.88E-03	1.61E-09	1.61E-09	3.81E-09	4.17E-09
Cd-113m	4.48E-05	3.46E-02	24.8	2.16E-05	2.16E-05	5.32E-05	6.13E-05
Sb-125	8.25E-05	6.37E-02	45.6	2.24E-05	2.24E-05	8.40E-05	8.55E-05
Sn-126	2.64E-06	2.04E-03	1.46	1.48E-06	1.48E-06	3.06E-06	3.46E-06
I-129	2.40E-07	1.86E-04	0.133	1.53E-07	1.96E-07	2.85E-07	3.29E-07
Cs-134	1.29E-06	9.95E-04	0.712	9.28E-07	1.06E-06	1.47E-06	1.65E-06
Cs-137	0.136	105	7.50E+04	0.123	0.129	0.142	0.148
Ba-137m	0.128	99.1	7.09E+04	9.84E-02	9.84E-02	0.135	0.140
Sm-151	6.15E-03	4.75	3.40E+03	3.44E-03	3.44E-03	7.13E-03	8.07E-03
Eu-152	1.98E-06	1.53E-03	1.09	1.02E-06	1.02E-06	2.11E-06	2.24E-06
Eu-154	3.13E-04	0.242	173	1.20E-04	1.20E-04	3.83E-04	4.11E-04
Eu-155	1.17E-04	9.02E-02	64.5	5.97E-05	5.97E-05	1.25E-04	1.33E-04
Ra-226	7.48E-11	5.78E-08	4.13E-05	5.08E-11	5.08E-11	8.35E-11	9.18E-11
Ra-228	6.65E-08	5.14E-05	3.68E-02	2.76E-08	4.67E-08	8.96E-08	1.14E-07
Ac-227	4.70E-10	3.63E-07	2.60E-04	3.31E-10	3.31E-10	5.21E-10	5.69E-10
Pa-231	2.16E-09	1.66E-06	1.19E-03	1.38E-09	1.38E-09	2.44E-09	2.70E-09
Th-229	1.56E-09	1.21E-06	8.63E-04	7.09E-10	1.13E-09	2.07E-09	2.61E-09
Th-232	4.43E-09	3.42E-06	2.45E-03	2.28E-09	3.33E-09	5.53E-09	6.58E-09
U-232	3.47E-07	2.68E-04	0.192	1.91E-07	2.67E-07	4.39E-07	5.38E-07
U-233	1.33E-06	1.03E-03	0.735	7.33E-07	1.02E-06	1.68E-06	2.06E-06
U-234	4.15E-07	3.21E-04	0.230	3.99E-07	4.07E-07	4.25E-07	4.28E-07
U-235	1.69E-08	1.30E-05	9.33E-03	1.62E-08	1.65E-08	1.73E-08	1.74E-08
U-236	1.29E-08	9.98E-06	7.14E-03	1.25E-08	1.27E-08	1.31E-08	1.33E-08
U-238	4.76E-07	3.67E-04	0.263	4.58E-07	4.66E-07	4.85E-07	4.88E-07
Np-237	4.58E-07	3.54E-04	0.253	3.11E-07	3.83E-07	5.35E-07	6.08E-07
Pu-238	7.03E-07	5.43E-04	0.388	5.29E-07	6.14E-07	7.91E-07	8.76E-07
Pu-239	2.42E-05	1.87E-02	13.4	1.97E-05	2.19E-05	2.64E-05	2.86E-05
Pu-240	4.09E-06	3.16E-03	2.26	3.27E-06	3.67E-06	4.52E-06	4.92E-06
Pu-241	4.74E-05	3.66E-02	26.2	3.56E-05	4.14E-05	5.35E-05	5.93E-05
Pu-242	2.60E-10	2.01E-07	1.44E-04	1.90E-10	2.24E-10	2.96E-10	3.31E-10
Am-241	2.95E-05	2.28E-02	16.3	2.13E-05	2.53E-05	3.37E-05	3.77E-05
Am-243	1.01E-09	7.83E-07	5.60E-04	7.55E-10	8.78E-10	1.15E-09	1.28E-09
Cm-242	7.46E-08	5.76E-05	4.12E-02	3.52E-08	3.52E-08	7.96E-08	8.45E-08
Cm-243	6.89E-09	5.32E-06	3.81E-03	3.14E-09	3.14E-09	7.34E-09	7.78E-09
Cm-244	6.85E-08	5.29E-05	3.78E-02	2.98E-08	2.98E-08	8.16E-08	8.99E-08

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	3.03E-04 (g/L)	----	0.167	2.19E-04	2.60E-04	3.45E-04	3.86E-04
U	4.77E-03	877	627	4.56E-03	4.66E-03	4.89E-03	4.92E-03

*Density is calculated based on Na, OH-, and AlO2-.

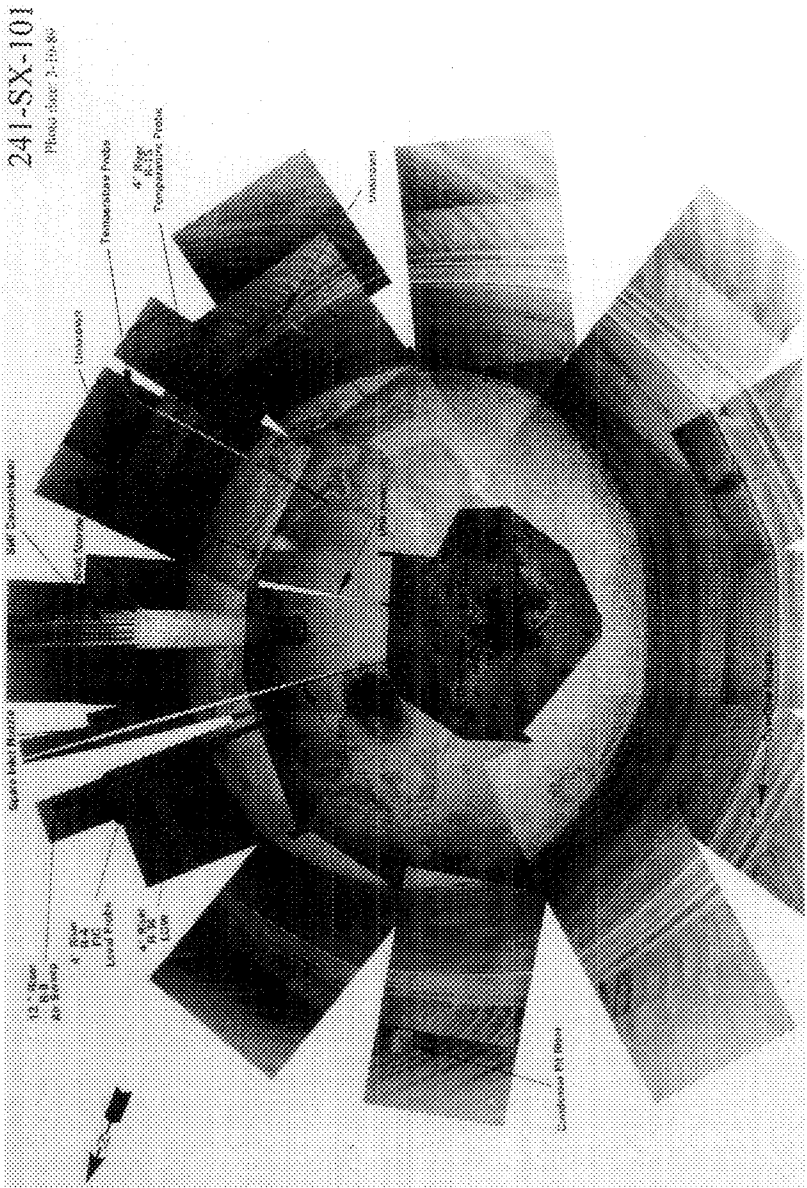
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-101							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	2.75E+06 (kg)	(456 kgal)	---	---	---	---	---
Heat Load	6.30 (kW)	(2.15E+04 BTU/hr)	---	5.25	5.86	6.60	6.71
Bulk Density†	1.59 (g/cc)	---	---	1.50	1.52	1.71	1.76
Water wt%†	38.3	---	---	26.9	30.4	44.3	46.2
TOC wt% C (w	0.115	---	---	7.65E-02	9.55E-02	0.136	0.155
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	1.26E-04	7.89E-02	217	4.15E-05	4.15E-05	1.30E-04	1.36E-04
C-14	1.03E-05	6.45E-03	17.7	5.96E-06	5.96E-06	1.06E-05	1.08E-05
Ni-59	7.71E-06	4.84E-03	13.3	5.36E-06	5.36E-06	8.18E-06	8.09E-06
Ni-63	7.30E-04	0.458	1.26E+03	5.02E-04	5.02E-04	7.74E-04	7.65E-04
Co-60	9.99E-06	6.27E-03	17.2	5.54E-06	5.54E-06	1.01E-05	1.05E-05
Se-79	3.10E-06	1.94E-03	5.35	6.66E-07	6.66E-07	3.19E-06	5.32E-06
Sr-90	0.422	265	7.28E+05	0.332	0.383	0.452	0.457
Y-90	0.422	265	7.28E+05	0.331	0.331	0.452	0.457
Zr-93	1.48E-05	9.26E-03	25.5	3.23E-06	3.23E-06	1.52E-05	2.41E-05
Nb-93m	1.18E-05	7.37E-03	20.3	2.43E-06	2.43E-06	1.21E-05	2.18E-05
Tc-99	7.57E-05	4.75E-02	131	6.12E-05	6.83E-05	8.31E-05	9.03E-05
Ru-106	1.91E-09	1.20E-06	3.29E-03	1.01E-09	1.01E-09	2.03E-09	2.15E-09
Cd-113m	3.26E-05	2.04E-02	56.2	1.51E-05	1.51E-05	5.13E-05	4.95E-05
Sb-125	3.94E-05	2.47E-02	68.1	2.02E-05	2.02E-05	4.00E-05	4.11E-05
Sn-126	4.74E-06	2.98E-03	8.19	1.01E-06	1.01E-06	4.88E-06	8.32E-06
I-129	1.45E-07	9.10E-05	0.250	1.17E-07	1.31E-07	1.59E-07	1.73E-07
Cs-134	1.21E-06	7.58E-04	2.09	3.50E-07	3.50E-07	1.27E-06	1.33E-06
Cs-137	0.173	109	2.99E+05	0.159	0.166	0.182	0.192
Ba-137m	0.164	103	2.83E+05	4.94E-02	4.94E-02	0.169	0.176
Sm-151	1.10E-02	6.92	1.90E+04	2.35E-03	2.35E-03	1.13E-02	1.92E-02
Eu-152	6.03E-06	3.79E-03	10.4	2.97E-06	2.97E-06	6.07E-06	6.12E-06
Eu-154	1.92E-04	0.120	331	9.88E-05	9.88E-05	2.14E-04	2.23E-04
Eu-155	3.03E-04	0.190	523	1.47E-04	1.47E-04	3.05E-04	3.08E-04
Ra-226	5.49E-10	3.45E-07	9.48E-04	2.38E-10	3.87E-10	7.08E-10	8.61E-10
Ra-228	2.67E-08	1.68E-05	4.61E-02	1.42E-08	2.03E-08	3.41E-08	4.19E-08
Ac-227	2.70E-09	1.69E-06	4.66E-03	1.21E-09	1.75E-09	3.62E-09	4.50E-09
Pa-231	4.47E-09	2.81E-06	7.72E-03	8.77E-10	8.77E-10	4.91E-09	9.83E-09
Th-229	6.30E-10	3.95E-07	1.09E-03	3.57E-10	4.90E-10	7.92E-10	9.65E-10
Th-232	1.49E-09	9.35E-07	2.57E-03	8.01E-10	1.14E-09	1.84E-09	2.18E-09
U-232	1.35E-07	8.48E-05	0.233	8.52E-08	1.10E-07	1.65E-07	1.96E-07
U-233	5.18E-07	3.25E-04	0.894	3.27E-07	4.20E-07	6.31E-07	7.52E-07
U-234	6.08E-07	3.82E-04	1.05	3.64E-07	4.83E-07	7.44E-07	8.81E-07
U-235	2.47E-08	1.55E-05	4.27E-02	1.48E-08	1.96E-08	3.02E-08	3.58E-08
U-236	2.28E-08	1.43E-05	3.93E-02	1.30E-08	1.79E-08	2.80E-08	3.31E-08
U-238	5.75E-07	3.61E-04	0.992	3.59E-07	4.64E-07	6.96E-07	8.17E-07
Np-237	3.14E-07	1.97E-04	0.542	2.67E-07	2.90E-07	3.39E-07	3.62E-07
Pu-238	3.26E-06	2.05E-03	5.64	2.64E-06	2.95E-06	3.58E-06	3.89E-06
Pu-239	1.93E-04	0.121	333	1.49E-04	1.71E-04	2.16E-04	2.38E-04
Pu-240	2.84E-05	1.79E-02	49.1	2.21E-05	2.52E-05	3.17E-05	3.48E-05
Pu-241	1.91E-04	0.120	329	1.53E-04	1.72E-04	2.10E-04	2.28E-04
Pu-242	9.18E-10	5.76E-07	1.58E-03	7.47E-10	8.31E-10	1.01E-09	1.09E-09
Am-241	5.21E-05	3.27E-02	89.9	3.43E-05	4.67E-05	5.79E-05	9.71E-05
Am-243	1.62E-09	1.02E-06	2.80E-03	9.16E-10	1.44E-09	1.76E-09	2.05E-09
Cm-242	7.88E-08	4.94E-05	0.136	6.62E-08	6.62E-08	8.04E-08	8.19E-08
Cm-243	3.46E-09	2.17E-06	5.98E-03	2.26E-09	2.26E-09	3.61E-09	3.75E-09
Cm-244	2.29E-08	1.44E-05	3.95E-02	1.05E-08	1.05E-08	2.71E-08	2.98E-08
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	3.20E-03 (g/L)	---	5.52	2.45E-03	2.82E-03	3.58E-03	3.94E-03
U	6.76E-03	1.01E+03	2.78E+03	4.08E-03	5.38E-03	8.26E-03	9.78E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

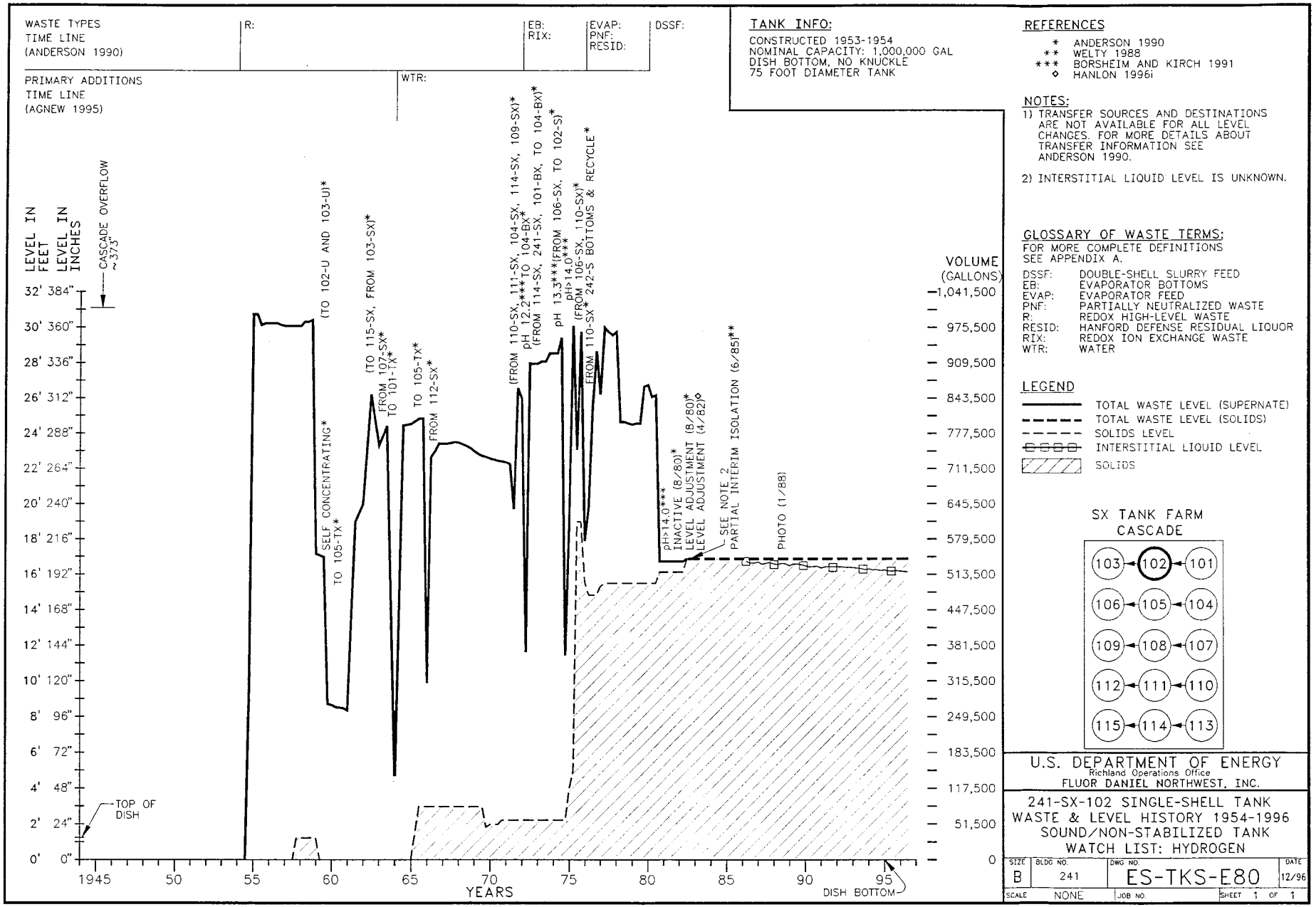
†Volume average for density, mass average Water wt% and TOC wt% C.


241-SX-101

TANK 241-SX-102 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1954
Removed from Service	-
Inactive	Aug 1980
Watch Lists	Hydrogen
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	June 1985
Intrusion Prevention (IP)	-
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
2, 11	4 in
8	12 in
TANK TEMPERATURE	
Average Tank Temperature	131°F
Maximum Temperature	174°F
Date	May 2, 1988
Elevation from tank bottom	0.21 ft
Riser Number	16
Minimum Temperature	80°F
Date	March 28, 1992
Elevation from tank bottom	30.25 ft
Riser Number	16

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	to 241-SX-103
Total Risers	13
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	543,000 gal
Waste Type	DSSF
Drainable Interstitial Liquids	183,000 gal
Pumpable Liquids	216,000 gal
Saltcake	426,000 gal
Sludge	117,000 gal
Supernatant	0 gal
INTERIOR PHOTOGRAPHS	
Date	Jan 7, 1988
Montage Number	94041033-28CN
Photo Set Number	8800247
WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	197.8 in
Date	Aug 24, 1992
Min Level	189 in
Date	April 3, 1995



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

DSSF:	DOUBLE-SHELL SLURRY FEED
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
PNF:	PARTIALLY NEUTRALIZED WASTE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RIX:	REDOX ION EXCHANGE WASTE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

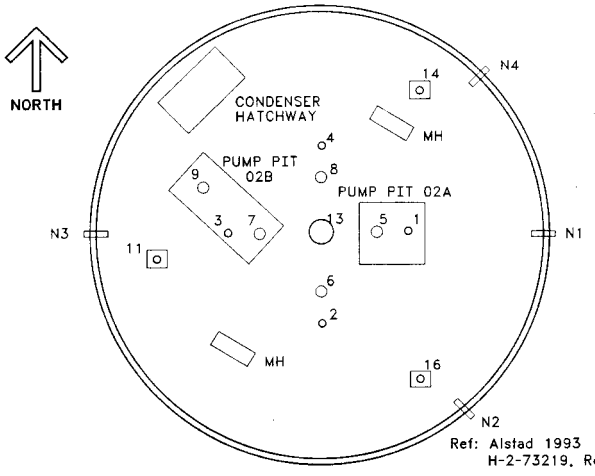
SX TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-102 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1954-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: HYDROGEN

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E80	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

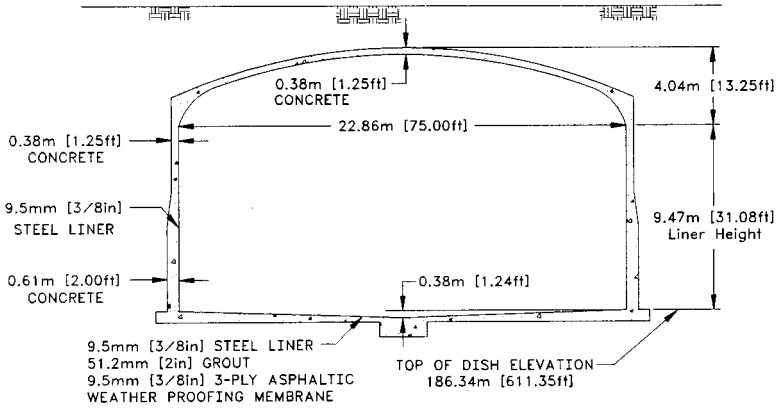
241-SX-102



Ref: Alstad 1993
H-2-73219, Rev. 2

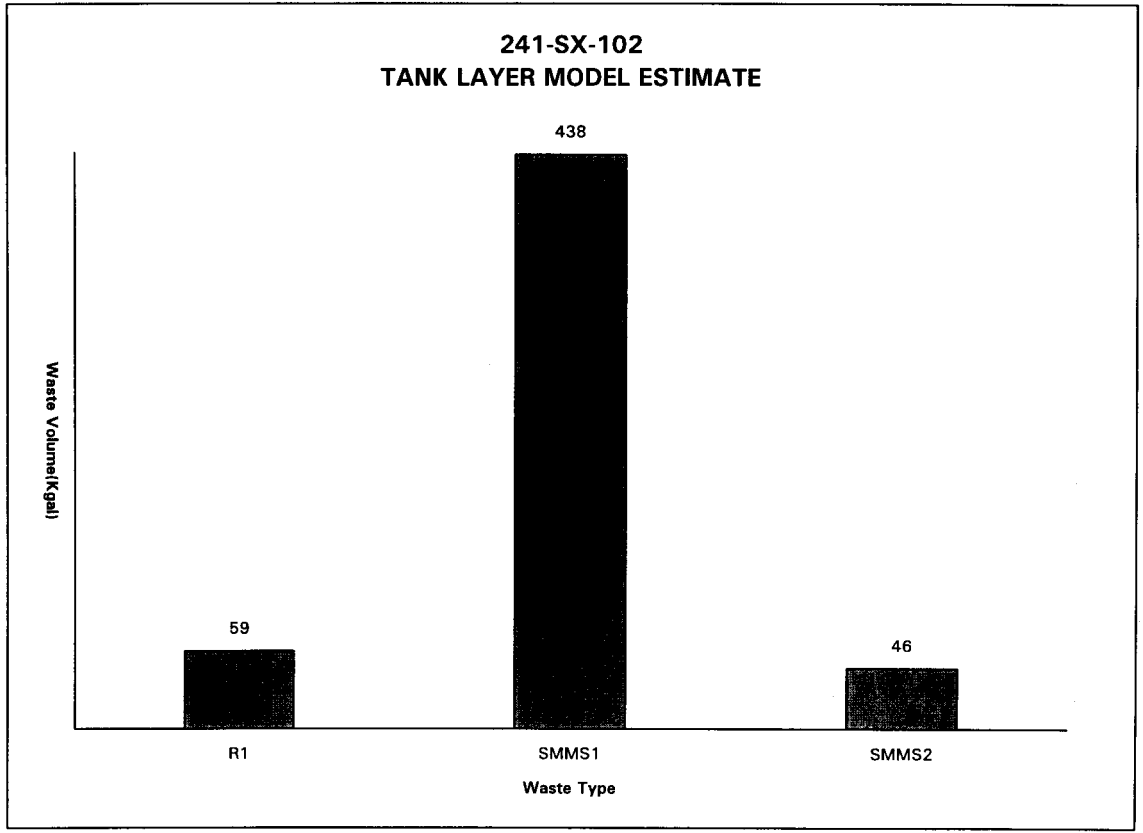
TANK RISER LOCATION

Approximate Grade Elevation 201.87m [662.3ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-102							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wa	3.92E+05 (kg)	(59.0 kgal)	---	---	---	---	---
Heat Load	1.45 (kW)	(4.97E+03 BTU/hr)	---	1.06	1.29	1.56	1.61
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (w	0	---	---	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	8.13	1.06E+05	4.17E+04	3.05	3.56	14.7	18.2
Al3+	6.99	1.07E+05	4.21E+04	6.58	6.74	7.15	7.15
Fe3+ (total Fe)	1.01	3.22E+04	1.26E+04	0.994	1.00	1.02	1.03
Cr3+	6.19E-02	1.83E+03	718	7.08E-03	3.39E-02	0.522	1.06
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	5.07E-02	1.69E+03	665	3.66E-02	4.45E-02	5.54E-02	5.45E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.220	5.02E+03	1.97E+03	0.146	0.182	0.258	0.294
K+	1.12E-02	250	98.0	1.28E-03	5.25E-03	1.52E-02	1.52E-02
OH-	25.6	2.48E+05	9.72E+04	23.1	24.3	26.9	28.4
NO3-	5.29	1.87E+05	7.32E+04	6.03E-02	6.03E-02	13.5	17.9
NO2-	1.46	3.82E+04	1.50E+04	0.132	0.595	2.15	2.15
CO32-	0.220	7.51E+03	2.95E+03	0.146	0.182	0.258	0.294
PO43-	0	0	0	0	0	0	0
SO42-	1.04E-02	569	223	1.19E-03	4.87E-03	1.41E-02	1.41E-02
Si (as SiO32-)	8.06E-03	129	50.5	9.21E-04	3.77E-03	1.09E-02	1.09E-02
F-	0	0	0	0	0	0	0
Cl-	5.16E-02	1.04E+03	409	5.91E-03	2.42E-02	7.00E-02	0.157
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.256	2.47E+03	970	6.55E-02	9.25E-02	0.270	0.284
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-102							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM W	3.20E+06 (kg)	(484 kgal)	---	---	---	---	---
Heat Load	4.77 (kW)	(1.63E+04 BTU/hr)	---	4.46	4.62	4.92	5.07
Bulk Density*	1.75 (g/cc)	---	---	1.68	1.72	1.77	1.80
Water wt%	24.0	---	---	21.0	22.3	25.7	27.7
TOC wt% C (w	0.932	---	---	0.618	0.772	1.09	1.25
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	17.6	2.31E+05	7.39E+05	15.9	16.7	18.2	18.9
Al3+	2.03	3.14E+04	1.00E+05	1.87	1.95	2.11	2.19
Fe3+ (total Fe)	1.39E-02	445	1.42E+03	1.12E-02	1.26E-02	1.53E-02	1.66E-02
Cr3+	0.177	5.26E+03	1.68E+04	0.151	0.165	0.182	0.187
Bi3+	1.72E-03	205	657	1.57E-03	1.64E-03	1.79E-03	1.86E-03
La3+	6.94E-05	5.51	17.7	5.03E-05	5.96E-05	7.92E-05	8.86E-05
Hg2+	1.17E-05	1.34	4.30	1.10E-05	1.14E-05	1.19E-05	1.21E-05
Zr (as ZrO(OH)2	3.04E-04	15.9	50.8	2.77E-04	2.87E-04	3.15E-04	3.30E-04
Pb2+	1.31E-03	155	496	1.05E-03	1.18E-03	1.44E-03	1.56E-03
Ni2+	8.08E-03	271	869	7.69E-03	7.88E-03	8.18E-03	8.27E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	5.05E-03	159	508	3.76E-03	4.39E-03	5.70E-03	6.33E-03
Ca2+	4.24E-02	973	3.11E+03	3.86E-02	4.04E-02	4.44E-02	4.63E-02
K+	8.30E-02	1.86E+03	5.95E+03	7.52E-02	7.89E-02	8.73E-02	9.14E-02
OH-	12.2	1.19E+05	3.81E+05	11.4	11.8	12.7	13.0
NO3-	6.10	2.16E+05	6.93E+05	5.64	5.91	6.19	6.27
NO2-	3.03	7.97E+04	2.55E+05	2.48	2.73	3.32	3.59
CO32-	0.571	1.96E+04	6.28E+04	0.517	0.543	0.607	0.617
PO43-	0.117	6.35E+03	2.03E+04	0.101	0.107	0.119	0.122
SO42-	0.318	1.75E+04	5.60E+04	0.247	0.281	0.356	0.390
Si (as SiO32-)	9.87E-02	1.59E+03	5.08E+03	8.03E-02	8.93E-02	0.108	0.117
F-	8.46E-02	920	2.94E+03	7.21E-02	7.73E-02	9.07E-02	9.56E-02
Cl-	0.304	6.16E+03	1.97E+04	0.272	0.287	0.318	0.331
C6H5O73-	3.81E-02	4.12E+03	1.32E+04	3.50E-02	3.65E-02	3.96E-02	4.11E-02
EDTA4-	1.99E-02	3.28E+03	1.05E+04	6.30E-03	1.30E-02	2.69E-02	3.38E-02
HEDTA3-	3.67E-02	5.76E+03	1.84E+04	9.50E-03	2.28E-02	5.07E-02	6.44E-02
glycolate-	0.117	5.03E+03	1.61E+04	7.67E-02	9.65E-02	0.138	0.158
acetate-	9.96E-03	336	1.08E+03	8.29E-03	9.11E-03	1.08E-02	1.16E-02
oxalate2-	9.09E-05	4.58	14.7	8.05E-05	8.56E-05	9.62E-05	1.01E-04
DBP	2.57E-02	3.09E+03	9.89E+03	2.12E-02	2.34E-02	2.79E-02	3.01E-02
butanol	2.57E-02	1.09E+03	3.49E+03	2.12E-02	2.34E-02	2.79E-02	3.01E-02
NH3	0.106	1.04E+03	3.31E+03	8.57E-02	9.39E-02	0.122	0.141
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-102							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	3.59E+06 (kg)	(543 kgal)	---	---	---	---	---
Heat Load	6.22 (kW)	(2.12E+04 BTU/hr)	---	5.71	6.00	6.40	6.52
Bulk Density†	1.75 (g/cc)	---	---	1.69	1.71	1.80	1.80
Water wt%†	24.3	---	---	21.6	21.7	26.2	27.6
TOC wt% C (w	0.830	---	---	0.550	0.687	0.973	1.11
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	16.5	2.17E+05	7.81E+05	15.1	15.8	17.4	17.7
Al3+	2.57	3.97E+04	1.43E+05	2.43	2.50	2.64	2.71
Fe3+ (total Fe)	0.122	3.91E+03	1.41E+04	0.120	0.121	0.124	0.125
Cr3+	0.164	4.89E+03	1.76E+04	0.149	0.157	0.203	0.249
Bi3+	1.53E-03	183	657	1.40E-03	1.46E-03	1.59E-03	1.66E-03
La3+	6.18E-05	4.91	17.7	4.48E-05	5.31E-05	7.06E-05	7.90E-05
Hg2+	1.04E-05	1.20	4.30	9.76E-06	1.01E-05	1.06E-05	1.07E-05
Zr (as ZrO(OH)2	2.71E-04	14.1	50.8	2.47E-04	2.56E-04	2.80E-04	2.94E-04
Pb2+	1.16E-03	138	496	9.37E-04	1.05E-03	1.28E-03	1.39E-03
Ni2+	1.27E-02	427	1.53E+03	1.12E-02	1.20E-02	1.32E-02	1.30E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	4.50E-03	141	508	3.35E-03	3.91E-03	5.08E-03	5.65E-03
Ca2+	6.17E-02	1.41E+03	5.08E+03	5.40E-02	5.84E-02	6.49E-02	6.80E-02
K+	7.52E-02	1.68E+03	6.05E+03	6.82E-02	7.15E-02	7.91E-02	8.27E-02
OH-	13.7	1.33E+05	4.78E+05	12.9	13.3	14.1	14.4
NO3-	6.01	2.13E+05	7.66E+05	5.31	5.42	6.86	7.20
NO2-	2.86	7.52E+04	2.70E+05	2.37	2.60	3.11	3.36
CO32-	0.533	1.83E+04	6.58E+04	0.485	0.508	0.565	0.574
PO43-	0.104	5.65E+03	2.03E+04	9.04E-02	9.52E-02	0.107	0.109
SO42-	0.285	1.56E+04	5.62E+04	0.221	0.252	0.319	0.349
Si (as SiO32-)	8.88E-02	1.43E+03	5.13E+03	7.24E-02	8.05E-02	9.72E-02	0.105
F-	7.54E-02	819	2.94E+03	6.42E-02	6.89E-02	8.09E-02	8.52E-02
Cl-	0.276	5.60E+03	2.01E+04	0.248	0.262	0.289	0.300
C6H5O73-	3.39E-02	3.67E+03	1.32E+04	3.12E-02	3.25E-02	3.53E-02	3.66E-02
EDTA4-	1.78E-02	2.93E+03	1.05E+04	5.62E-03	1.15E-02	2.40E-02	3.01E-02
HEDTA3-	3.27E-02	5.13E+03	1.84E+04	8.46E-03	2.03E-02	4.52E-02	5.74E-02
glycolate-	0.104	4.48E+03	1.61E+04	6.84E-02	8.60E-02	0.123	0.140
acetate-	8.88E-03	300	1.08E+03	7.39E-03	8.12E-03	9.64E-03	1.04E-02
oxalate2-	8.10E-05	4.08	14.7	7.18E-05	7.63E-05	8.57E-05	9.02E-05
DBP	2.29E-02	2.75E+03	9.89E+03	1.89E-02	2.08E-02	2.49E-02	2.68E-02
butanol	2.29E-02	970	3.49E+03	1.89E-02	2.08E-02	2.49E-02	2.68E-02
NH3	0.123	1.19E+03	4.28E+03	9.87E-02	0.103	0.137	0.154
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-102							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wa	3.92E+05 (kg)	(59.0 kgal)	---	---	---	---	---
Heat Load	1.45 (kW)	(4.97E+03 BTU/hr)	---	1.06	1.29	1.56	1.61
Bulk Density	1.76 (g/cc)	---	---	1.51	1.53	2.11	2.24
Void Fraction	0.536	---	---	6.00E-02	0.217	0.737	0.743
Water wt%	27.0	---	---	2.64	10.0	42.6	44.2
TOC wt% C (w	0	---	---	0	0	0	0
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.92E-05	1.67E-02	6.53	3.05E-06	1.47E-05	4.10E-05	4.10E-05
C-14	2.26E-06	1.29E-03	0.505	2.59E-07	1.06E-06	3.07E-06	3.07E-06
Ni-59	1.49E-05	8.46E-03	3.32	1.07E-05	1.31E-05	1.62E-05	1.60E-05
Ni-63	1.39E-03	0.790	310	1.00E-03	1.22E-03	1.52E-03	1.49E-03
Co-60	8.94E-07	5.09E-04	0.200	1.02E-07	4.18E-07	1.21E-06	1.21E-06
Se-79	4.81E-07	2.74E-04	0.107	5.50E-08	2.25E-07	6.51E-07	7.15E-06
Sr-90	0.928	529	2.07E+05	0.662	0.812	1.02	1.03
Y-90	0.929	529	2.07E+05	0.662	0.812	1.02	1.03
Zr-93	2.27E-06	1.29E-03	0.507	2.59E-07	1.06E-06	3.08E-06	3.03E-05
Nb-93m	1.85E-06	1.06E-03	0.414	2.12E-07	8.68E-07	2.51E-06	3.21E-05
Tc-99	1.58E-05	9.02E-03	3.54	1.81E-06	7.42E-06	2.15E-05	2.15E-05
Ru-106	2.50E-12	1.42E-09	5.57E-07	2.86E-13	1.17E-12	3.38E-12	3.38E-12
Cd-113m	6.99E-06	3.98E-03	1.56	8.00E-07	3.27E-06	9.48E-06	9.48E-06
Sb-125	1.31E-06	7.47E-04	0.293	1.50E-07	6.14E-07	1.78E-06	1.78E-06
Sn-126	7.39E-07	4.21E-04	0.165	8.45E-08	3.46E-07	1.00E-06	1.14E-05
I-129	3.04E-08	1.73E-05	6.80E-03	3.48E-09	1.42E-08	4.13E-08	4.13E-08
Cs-134	2.72E-08	1.55E-05	6.07E-03	7.19E-09	1.52E-08	3.52E-08	3.52E-08
Cs-137	5.60E-02	31.9	1.25E+04	1.48E-02	3.13E-02	7.26E-02	7.26E-02
Ba-137m	5.30E-02	30.2	1.18E+04	1.40E-02	2.96E-02	6.87E-02	6.87E-02
Sm-151	1.71E-03	0.976	383	1.96E-04	8.03E-04	2.33E-03	2.64E-02
Eu-152	7.00E-06	3.98E-03	1.56	6.85E-06	6.91E-06	7.06E-06	7.06E-06
Eu-154	2.16E-05	1.23E-02	4.82	2.47E-06	1.01E-05	2.93E-05	2.93E-05
Eu-155	3.30E-04	0.188	73.8	3.23E-04	3.26E-04	3.33E-04	3.33E-04
Ra-226	1.08E-09	6.15E-07	2.41E-04	1.48E-10	6.04E-10	1.56E-09	2.01E-09
Ra-228	9.26E-15	5.28E-12	2.07E-09	9.07E-15	9.15E-15	9.34E-15	9.34E-15
Ac-227	4.76E-09	2.71E-06	1.06E-03	3.06E-10	2.00E-09	7.52E-09	1.02E-08
Pa-231	7.18E-10	4.09E-07	1.60E-04	8.21E-11	3.36E-10	2.04E-09	1.68E-08
Th-229	1.77E-12	1.01E-09	3.95E-07	1.73E-12	1.75E-12	1.78E-12	1.78E-12
Th-232	5.91E-16	3.36E-13	1.32E-10	6.76E-17	2.77E-16	8.01E-16	8.01E-16
U-232	5.24E-12	2.98E-09	1.17E-06	5.99E-13	2.45E-12	7.10E-12	7.10E-12
U-233	2.00E-13	1.14E-10	4.46E-08	2.28E-14	9.34E-14	2.71E-13	2.71E-13
U-234	1.19E-07	6.78E-05	2.66E-02	1.36E-08	5.58E-08	1.62E-07	1.62E-07
U-235	5.13E-09	2.92E-06	1.14E-03	5.86E-10	2.40E-09	6.95E-09	6.95E-09
U-236	1.88E-09	1.07E-06	4.21E-04	2.16E-10	8.82E-10	2.56E-09	2.56E-09
U-238	1.22E-07	6.92E-05	2.72E-02	1.39E-08	5.69E-08	1.65E-07	1.65E-07
Np-237	1.03E-07	5.86E-05	2.30E-02	1.18E-08	4.81E-08	1.39E-07	1.39E-07
Pu-238	6.61E-06	3.77E-03	1.48	4.75E-06	5.66E-06	7.57E-06	8.48E-06
Pu-239	4.72E-04	0.269	105	3.39E-04	4.04E-04	5.40E-04	6.05E-04
Pu-240	6.76E-05	3.85E-02	15.1	4.85E-05	5.78E-05	7.73E-05	8.66E-05
Pu-241	3.97E-04	0.226	88.7	2.85E-04	3.40E-04	4.55E-04	5.09E-04
Pu-242	1.82E-09	1.04E-06	4.07E-04	1.31E-09	1.56E-09	2.08E-09	2.34E-09
Am-241	8.09E-06	4.61E-03	1.81	9.26E-07	3.79E-06	1.10E-05	1.43E-04
Am-243	7.57E-11	4.31E-08	1.69E-05	8.66E-12	3.54E-11	1.03E-10	1.34E-09
Cm-242	1.61E-07	9.16E-05	3.59E-02	1.58E-07	1.59E-07	1.62E-07	1.62E-07
Cm-243	3.69E-09	2.10E-06	8.24E-04	3.61E-09	3.64E-09	3.72E-09	3.72E-09
Cm-244	2.70E-09	1.54E-06	6.04E-04	3.09E-10	1.27E-09	3.67E-09	3.67E-09
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.89E-03 (g/L)	---	1.76	5.67E-03	6.76E-03	9.03E-03	1.01E-02
U	1.53E-03	207	81.3	1.75E-04	7.16E-04	2.07E-03	2.07E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-102							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	3.20E+06 (kg)	(484 kgal)	---	---	---	---	---
Heat Load	4.77 (kW)	(1.63E+04 BTU/hr)	---	4.46	4.62	4.92	5.07
Bulk Density*	1.75 (g/cc)	---	---	1.68	1.72	1.77	1.80
Water wt%†	24.0	---	---	21.0	22.3	25.7	27.7
TOC wt% C (w	0.932	---	---	0.618	0.772	1.09	1.25

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	3.20E-04	0.183	586	1.56E-04	1.56E-04	3.30E-04	3.44E-04
C-14	4.78E-05	2.74E-02	87.6	1.35E-05	1.35E-05	4.85E-05	4.92E-05
Ni-59	2.99E-06	1.71E-03	5.48	1.38E-06	1.38E-06	3.07E-06	3.15E-06
Ni-63	2.94E-04	0.168	538	1.34E-04	1.34E-04	3.02E-04	3.09E-04
Co-60	5.38E-05	3.08E-02	98.5	1.45E-05	1.45E-05	5.47E-05	5.56E-05
Se-79	4.60E-06	2.63E-03	8.44	2.42E-06	2.42E-06	5.40E-06	6.16E-06
Sr-90	0.154	88.0	2.82E+05	0.143	0.148	0.159	0.164
Y-90	0.154	88.0	2.82E+05	7.81E-02	7.81E-02	0.159	0.165
Zr-93	2.26E-05	1.29E-02	41.4	1.17E-05	1.17E-05	2.66E-05	3.04E-05
Nb-93m	1.64E-05	9.37E-03	30.0	8.71E-06	8.71E-06	1.91E-05	2.18E-05
Tc-99	3.41E-04	0.195	625	2.13E-04	2.76E-04	4.07E-04	4.71E-04
Ru-106	9.50E-09	5.44E-06	1.74E-02	4.43E-09	4.43E-09	1.06E-08	1.17E-08
Cd-113m	1.20E-04	6.87E-02	220	5.44E-05	5.44E-05	1.44E-04	1.67E-04
Sb-125	2.33E-04	0.133	426	6.26E-05	6.26E-05	2.37E-04	2.41E-04
Sn-126	6.96E-06	3.98E-03	12.7	3.67E-06	3.67E-06	8.15E-06	9.28E-06
I-129	6.58E-07	3.77E-04	1.21	4.11E-07	5.31E-07	7.85E-07	9.08E-07
Cs-134	3.44E-06	1.97E-03	6.31	2.41E-06	2.92E-06	3.97E-06	4.49E-06
Cs-137	0.334	191	6.13E+05	0.300	0.317	0.352	0.369
Ba-137m	0.316	181	5.80E+05	0.251	0.251	0.333	0.349
Sm-151	1.62E-02	9.27	2.97E+04	8.55E-03	8.55E-03	1.90E-02	2.16E-02
Eu-152	5.45E-06	3.12E-03	9.98	2.74E-06	2.74E-06	5.83E-06	6.19E-06
Eu-154	8.61E-04	0.492	1.58E+03	3.13E-04	3.13E-04	1.06E-03	1.14E-03
Eu-155	3.23E-04	0.185	591	1.61E-04	1.61E-04	3.46E-04	3.69E-04
Ra-226	1.93E-10	1.10E-07	3.53E-04	1.25E-10	1.25E-10	2.17E-10	2.41E-10
Ra-228	2.09E-07	1.20E-04	0.383	9.49E-08	1.51E-07	2.77E-07	3.49E-07
Ac-227	1.23E-09	7.02E-07	2.25E-03	8.32E-10	8.32E-10	1.37E-09	1.51E-09
Pa-231	5.69E-09	3.25E-06	1.04E-02	3.50E-09	3.50E-09	6.48E-09	7.24E-09
Th-229	4.91E-09	2.81E-06	8.99E-03	2.40E-09	3.63E-09	6.40E-09	7.98E-09
Th-232	1.47E-08	8.40E-06	2.69E-02	8.35E-09	1.14E-08	1.79E-08	2.10E-08
U-232	1.04E-06	5.95E-04	1.90	5.81E-07	8.05E-07	1.31E-06	1.60E-06
U-233	3.98E-06	2.28E-03	7.30	2.23E-06	3.09E-06	5.02E-06	6.13E-06
U-234	1.09E-06	6.23E-04	1.99	1.04E-06	1.07E-06	1.11E-06	1.13E-06
U-235	4.40E-08	2.52E-05	8.07E-02	4.23E-08	4.33E-08	4.49E-08	4.56E-08
U-236	3.43E-08	1.96E-05	6.28E-02	3.30E-08	3.37E-08	3.48E-08	3.54E-08
U-238	1.29E-06	7.36E-04	2.36	1.24E-06	1.27E-06	1.31E-06	1.32E-06
Np-237	1.23E-06	7.04E-04	2.25	8.12E-07	1.02E-06	1.44E-06	1.65E-06
Pu-238	1.93E-06	1.10E-03	3.53	1.44E-06	1.68E-06	2.18E-06	2.42E-06
Pu-239	6.52E-05	3.73E-02	119	5.26E-05	5.88E-05	7.16E-05	7.77E-05
Pu-240	1.11E-05	6.36E-03	20.4	8.77E-06	9.92E-06	1.23E-05	1.34E-05
Pu-241	1.31E-04	7.50E-02	240	9.76E-05	1.14E-04	1.48E-04	1.65E-04
Pu-242	7.21E-10	4.12E-07	1.32E-03	5.21E-10	6.19E-10	8.23E-10	9.21E-10
Am-241	7.79E-05	4.46E-02	143	5.46E-05	6.60E-05	8.98E-05	1.01E-04
Am-243	2.77E-09	1.59E-06	5.08E-03	2.04E-09	2.39E-09	3.16E-09	3.54E-09
Cm-242	2.08E-07	1.19E-04	0.381	9.65E-08	9.65E-08	2.22E-07	2.36E-07
Cm-243	1.93E-08	1.11E-05	3.54E-02	8.73E-09	8.73E-09	2.06E-08	2.19E-08
Cm-244	1.91E-07	1.09E-04	0.349	8.12E-08	8.12E-08	2.28E-07	2.51E-07

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	8.05E-04 (g/L)	---	1.48	5.67E-04	6.85E-04	9.26E-04	1.04E-03
U	1.24E-02	1.69E+03	5.42E+03	1.19E-02	1.22E-02	1.27E-02	1.29E-02

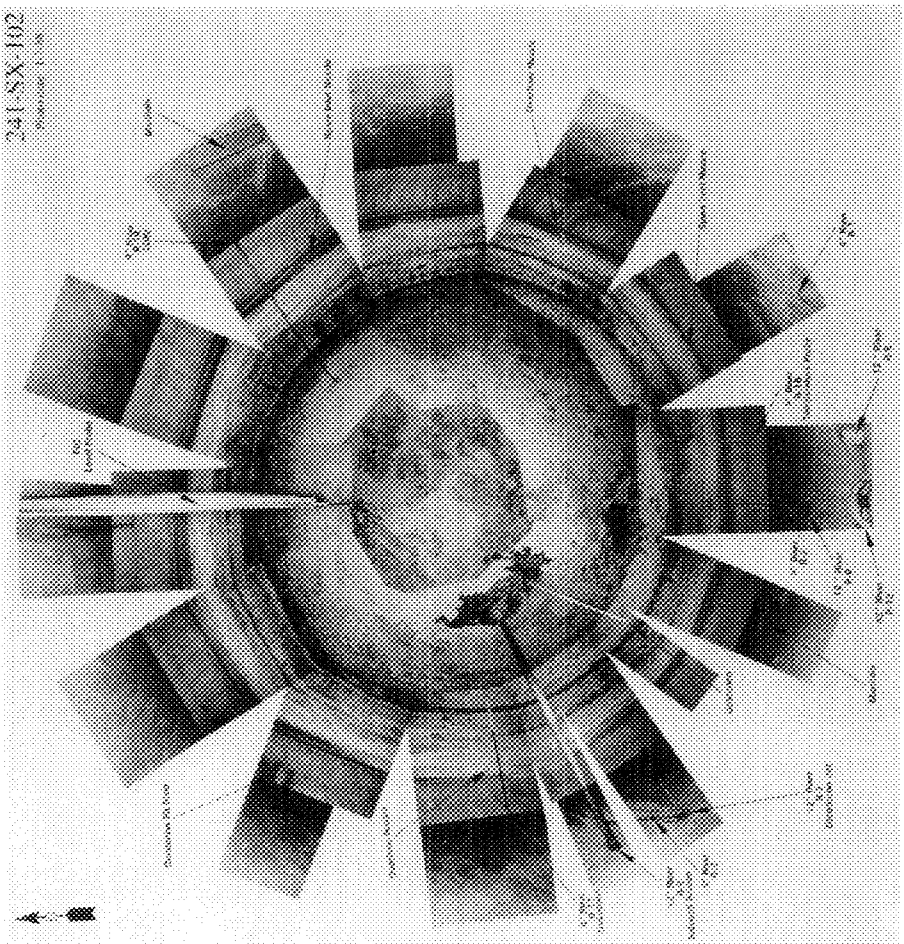
*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-102							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	3.59E+06 (kg)	(543 kgal)	----	----	----	----	----
Heat Load	6.22 (kW)	(2.12E+04 BTU/hr)	----	5.71	6.00	6.40	6.52
Bulk Density†	1.75 (g/cc)	----	----	1.69	1.71	1.80	1.80
Water wt%†	24.3	----	----	21.6	21.7	26.2	27.6
TOC wt% C (w	0.830	----	----	0.550	0.687	0.973	1.11
Radiological Constituents	**CI/L**	**µCi/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.88E-04	0.165	592	1.42E-04	1.42E-04	2.98E-04	3.10E-04
C-14	4.29E-05	2.45E-02	88.1	1.23E-05	1.23E-05	4.35E-05	4.41E-05
Ni-59	4.28E-06	2.45E-03	8.80	2.84E-06	2.84E-06	4.43E-06	4.42E-06
Ni-63	4.12E-04	0.236	848	2.70E-04	2.70E-04	4.26E-04	4.27E-04
Co-60	4.80E-05	2.75E-02	98.7	1.30E-05	1.30E-05	4.88E-05	4.97E-05
Se-79	4.16E-06	2.38E-03	8.54	2.21E-06	2.21E-06	4.86E-06	5.54E-06
Sr-90	0.238	136	4.89E+05	0.209	0.225	0.248	0.247
Y-90	0.238	136	4.89E+05	0.171	0.171	0.248	0.248
Zr-93	2.04E-05	1.17E-02	41.9	1.07E-05	1.07E-05	2.39E-05	2.73E-05
Nb-93m	1.48E-05	8.46E-03	30.4	7.97E-06	7.97E-06	1.73E-05	1.96E-05
Tc-99	3.06E-04	0.175	629	1.92E-04	2.48E-04	3.65E-04	4.21E-04
Ru-106	8.47E-09	4.84E-06	1.74E-02	3.95E-09	3.95E-09	9.48E-09	1.04E-08
Cd-113m	1.08E-04	6.17E-02	222	4.93E-05	4.93E-05	1.29E-04	1.49E-04
Sb-125	2.07E-04	0.119	426	5.59E-05	5.59E-05	2.11E-04	2.15E-04
Sn-126	6.28E-06	3.59E-03	12.9	3.36E-06	3.36E-06	7.34E-06	8.36E-06
I-129	5.90E-07	3.37E-04	1.21	3.69E-07	4.77E-07	7.03E-07	8.13E-07
Cs-134	3.07E-06	1.76E-03	6.31	2.15E-06	2.60E-06	3.54E-06	4.01E-06
Cs-137	0.304	174	6.25E+05	0.274	0.289	0.320	0.335
Ba-137m	0.288	165	5.91E+05	0.230	0.230	0.303	0.317
Sm-151	1.46E-02	8.37	3.01E+04	7.80E-03	7.80E-03	1.71E-02	1.95E-02
Eu-152	5.62E-06	3.21E-03	11.5	3.20E-06	3.20E-06	5.95E-06	6.28E-06
Eu-154	7.69E-04	0.440	1.58E+03	2.82E-04	2.82E-04	9.46E-04	1.02E-03
Eu-155	3.24E-04	0.185	665	1.80E-04	1.80E-04	3.44E-04	3.64E-04
Ra-226	2.89E-10	1.65E-07	5.94E-04	2.10E-10	2.29E-10	3.30E-10	3.69E-10
Ra-228	1.86E-07	1.07E-04	0.383	8.46E-08	1.34E-07	2.47E-07	3.11E-07
Ac-227	1.61E-09	9.21E-07	3.31E-03	1.23E-09	1.26E-09	1.85E-09	2.07E-09
Pa-231	5.15E-09	2.94E-06	1.06E-02	3.20E-09	3.20E-09	5.85E-09	6.53E-09
Th-229	4.38E-09	2.50E-06	8.99E-03	2.14E-09	3.23E-09	5.70E-09	7.12E-09
Th-232	1.31E-08	7.48E-06	2.69E-02	7.44E-09	1.02E-08	1.60E-08	1.87E-08
U-232	9.26E-07	5.30E-04	1.90	5.18E-07	7.17E-07	1.17E-06	1.43E-06
U-233	3.55E-06	2.03E-03	7.30	1.99E-06	2.75E-06	4.48E-06	5.47E-06
U-234	9.83E-07	5.62E-04	2.02	9.44E-07	9.66E-07	9.99E-07	1.02E-06
U-235	3.98E-08	2.28E-05	8.18E-02	3.82E-08	3.91E-08	4.05E-08	4.12E-08
U-236	3.08E-08	1.76E-05	6.32E-02	2.96E-08	3.03E-08	3.12E-08	3.17E-08
U-238	1.16E-06	6.63E-04	2.38	1.12E-06	1.14E-06	1.17E-06	1.19E-06
Np-237	1.11E-06	6.33E-04	2.28	7.35E-07	9.17E-07	1.30E-06	1.48E-06
Pu-238	2.44E-06	1.39E-03	5.01	2.00E-06	2.21E-06	2.66E-06	2.88E-06
Pu-239	1.09E-04	6.26E-02	225	9.81E-05	1.04E-04	1.15E-04	1.21E-04
Pu-240	1.72E-05	9.86E-03	35.4	1.52E-05	1.62E-05	1.83E-05	1.93E-05
Pu-241	1.60E-04	9.15E-02	329	1.30E-04	1.45E-04	1.75E-04	1.90E-04
Pu-242	8.40E-10	4.81E-07	1.73E-03	6.62E-10	7.50E-10	9.31E-10	1.02E-09
Am-241	7.03E-05	4.02E-02	144	4.95E-05	5.97E-05	8.09E-05	9.10E-05
Am-243	2.48E-09	1.42E-06	5.10E-03	1.83E-09	2.14E-09	2.83E-09	3.16E-09
Cm-242	2.03E-07	1.16E-04	0.417	1.03E-07	1.03E-07	2.15E-07	2.28E-07
Cm-243	1.76E-08	1.01E-05	3.63E-02	8.18E-09	8.18E-09	1.88E-08	1.99E-08
Cm-244	1.70E-07	9.73E-05	0.350	7.26E-08	7.26E-08	2.03E-07	2.24E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	1.58E-03 (g/L)	----	3.24	1.36E-03	1.47E-03	1.68E-03	1.79E-03
U	1.13E-02	1.53E+03	5.50E+03	1.08E-02	1.11E-02	1.14E-02	1.16E-02

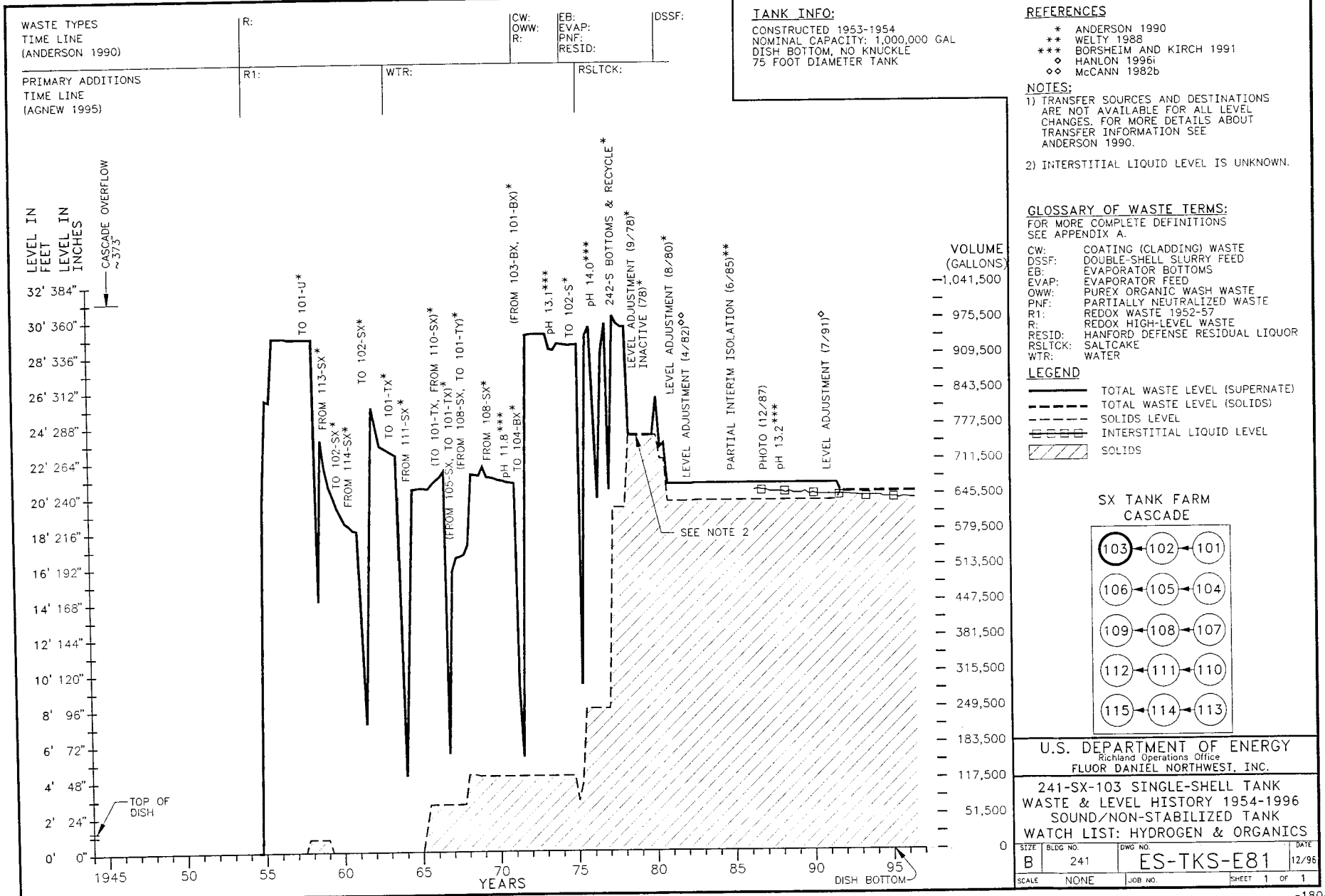
*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).
†Volume average for density, mass average Water wt% and TOC wt% C.


241-SX-102

TANK 241-SX-103 SUMMARY

TANK HISTORY	
Entered Service	4th qtr 1954
Removed from Service	-
Inactive	1978
Watch Lists	Hydrogen & Organics
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	June 1985
Intrusion Prevention (IP)	-
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
11, 16	4 in
7	12 in
TANK TEMPERATURE	
Average Tank Temperature	159°F
Maximum Temperature	196°F
Date	May 2, 1988
Elevation from tank bottom	2.3 ft
Riser Number	2
Minimum Temperature	87.1°F
Date	Feb 5, 1996
Elevation from tank bottom	30.55 ft
Riser Number	2

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	none
Total Risers	13
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	652,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	232,000 gal
Pumpable Liquids	272,000 gal
Saltcake	536,000 gal
Sludge	115,000 gal
Supernatant	1,000 gal
INTERIOR PHOTOGRAPHS	
Date	Dec 17, 1987
Montage Number	94041033-29CN
Photo Set Number	8707708
WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	243.5 in
Date	Jan 12, 1991
Min Level	236.41 in
Date	Jan 4 and April 16, 1996



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i
◇◇ McCANN 1982b

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

CW:	COATING (CLADDING) WASTE
DSSF:	DOUBLE-SHELL SLURRY FEED
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
OWW:	PUREX ORGANIC WASH WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R1:	REDOX WASTE 1952-57
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RSLTCK:	SALTCAKE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

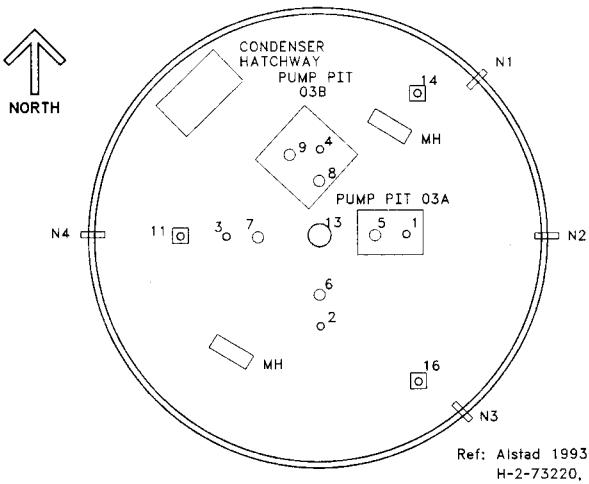
SX TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-103 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1954-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: HYDROGEN & ORGANICS

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E81	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

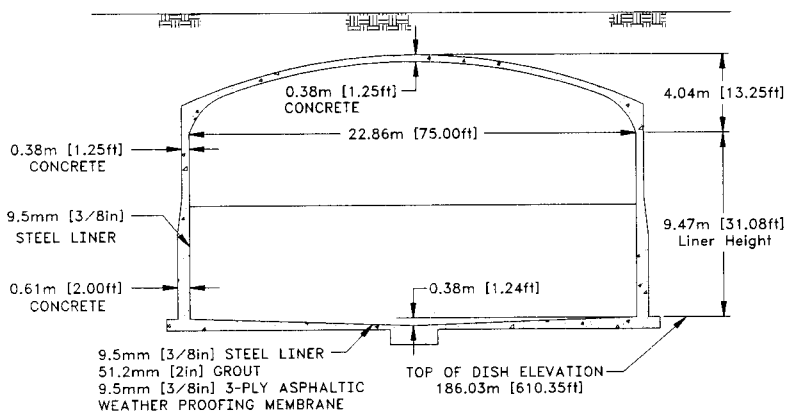
241-SX-103



Ref: Alstad 1993
H-2-73220, Rev. 3

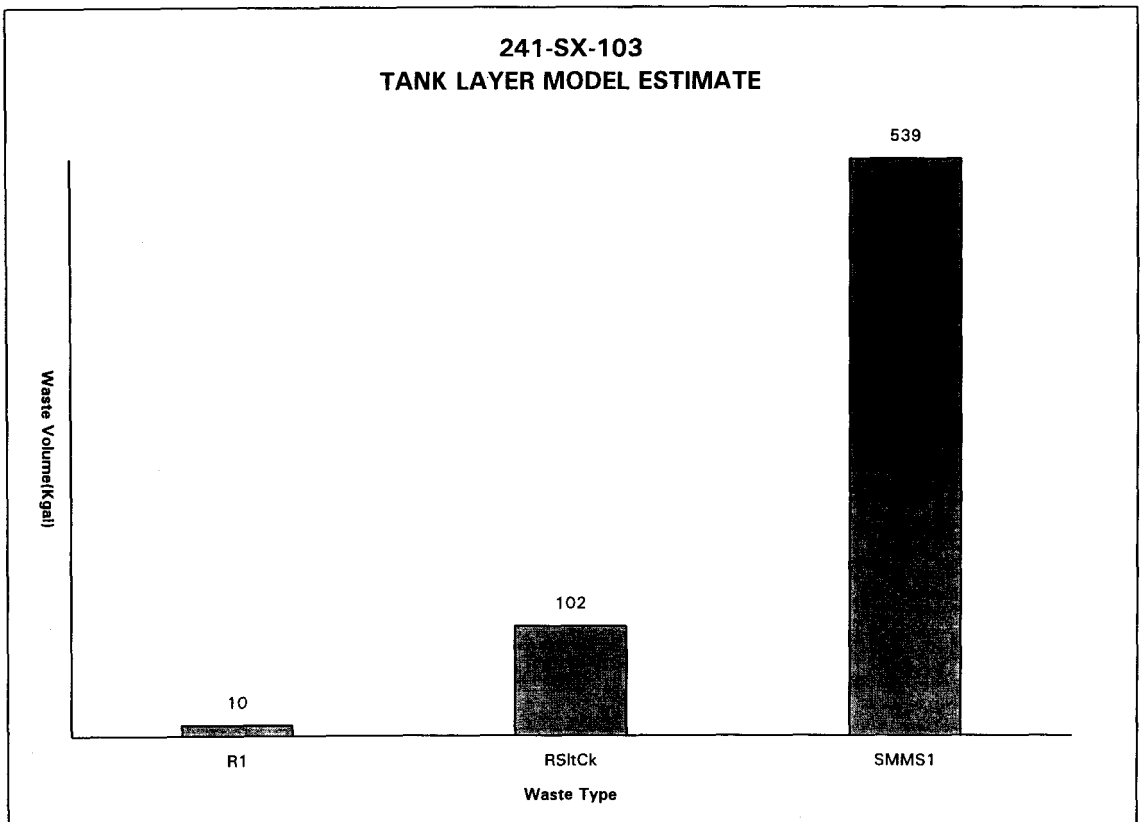
TANK RISER LOCATION

Approximate Grade Elevation 201.59m [661.4ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-103							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wa	7.28E+05 (kg)	(112 kgal)	—	—	—	—	—
Heat Load	1.52 (kW)	(5.18E+03 BTU/hr)	—	1.41	1.46	1.57	1.62
Bulk Density	1.72 (g/cc)	—	—	1.46	1.60	1.77	1.82
Void Fraction	0.763	---	---	0.720	0.734	0.846	0.938
Water wt%	34.0	---	---	24.5	28.8	43.8	54.3
TOC wt% C (w	4.77E-03	—	---	4.56E-03	4.66E-03	5.06E-03	5.68E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	13.0	1.74E+05	1.27E+05	8.51	10.9	14.1	15.0
Al3+	3.71	5.84E+04	4.25E+04	1.93	2.45	5.07	6.46
Fe3+ (total Fe)	0.106	3.46E+03	2.52E+03	9.92E-02	0.103	0.110	0.113
Cr3+	0.754	2.28E+04	1.66E+04	0.443	0.591	0.820	0.843
Bi3+	6.26E-06	0.762	0.554	5.29E-06	5.76E-06	6.89E-06	7.58E-06
La3+	1.54E-11	1.25E-06	9.08E-07	1.35E-11	1.46E-11	1.70E-11	1.87E-11
Hg2+	9.83E-07	0.115	8.36E-02	8.71E-07	9.26E-07	1.08E-06	1.19E-06
Zr (as ZrO(OH)2	6.25E-07	3.32E-02	2.42E-02	5.74E-07	5.98E-07	6.55E-07	7.06E-07
Pb2+	1.56E-04	18.8	13.7	8.35E-05	1.19E-04	1.93E-04	2.30E-04
Ni2+	1.83E-02	625	455	1.70E-02	1.76E-02	1.89E-02	1.95E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	4.55E-05	1.46	1.06	3.26E-05	3.89E-05	5.22E-05	5.89E-05
Ca2+	8.96E-02	2.09E+03	1.52E+03	6.23E-02	7.56E-02	0.103	0.117
K+	3.01E-02	687	500	2.86E-02	2.94E-02	3.27E-02	3.56E-02
OH-	19.3	1.91E+05	1.39E+05	11.1	13.7	25.2	31.0
NO3-	5.26	1.90E+05	1.38E+05	2.94	4.57	5.98	6.38
NO2-	1.83	4.92E+04	3.58E+04	1.58	1.71	1.96	2.12
CO32-	9.41E-02	3.29E+03	2.39E+03	6.68E-02	8.01E-02	0.108	0.121
PO43-	4.05E-04	22.4	16.3	3.76E-04	3.93E-04	4.22E-04	4.58E-04
SO42-	3.77E-02	2.11E+03	1.54E+03	3.58E-02	3.68E-02	4.10E-02	4.45E-02
Si (as SiO32-)	0.119	1.95E+03	1.42E+03	7.56E-02	0.103	0.136	0.152
F-	3.23E-04	3.57	2.60	2.75E-04	3.04E-04	3.55E-04	3.82E-04
Cl-	0.126	2.60E+03	1.89E+03	6.99E-02	9.74E-02	0.138	0.145
C6H5O73-	3.33E-04	36.7	26.7	3.23E-04	3.28E-04	3.48E-04	3.79E-04
EDTA4-	1.30E-05	2.18	1.59	9.14E-06	1.12E-05	1.53E-05	1.76E-05
HEDTA3-	1.08E-05	1.72	1.25	3.46E-06	7.41E-06	1.44E-05	1.79E-05
glycolate-	4.71E-04	20.6	15.0	2.55E-04	3.72E-04	5.85E-04	6.95E-04
acetate-	4.89E-05	1.68	1.22	4.73E-05	4.81E-05	5.19E-05	5.55E-05
oxalate2-	2.02E-11	1.04E-06	7.53E-07	1.79E-11	1.90E-11	2.22E-11	2.44E-11
DBP	2.96E-04	36.2	26.4	2.76E-04	2.88E-04	3.20E-04	3.45E-04
butanol	2.96E-04	12.8	9.29	2.76E-04	2.88E-04	3.20E-04	3.45E-04
NH3	5.56E-02	551	401	3.87E-02	4.11E-02	6.02E-02	6.46E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-103							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	3.45E+06 (kg)	(540 kgal)	----	----	----	----	----
Heat Load	5.00 (kW)	(1.71E+04 BTU/hr)	----	4.67	4.83	5.17	5.34
Bulk Density*	1.69 (g/cc)	----	----	1.63	1.66	1.71	1.73
Water wt%	27.3	----	----	24.6	25.8	28.9	30.8
TOC wt% C (w	0.917	----	----	0.578	0.744	1.09	1.26
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	16.2	2.20E+05	7.59E+05	14.8	15.5	16.8	17.3
Al3+	1.84	2.94E+04	1.01E+05	1.69	1.77	1.92	1.99
Fe3+ (total Fe)	1.29E-02	427	1.47E+03	1.06E-02	1.17E-02	1.41E-02	1.52E-02
Cr3+	0.159	4.91E+03	1.69E+04	0.135	0.148	0.164	0.168
Bi3+	1.73E-03	214	739	1.57E-03	1.65E-03	1.81E-03	1.89E-03
La3+	6.48E-05	5.34	18.4	4.70E-05	5.57E-05	7.40E-05	8.28E-05
Hg2+	1.12E-05	1.33	4.58	1.03E-05	1.08E-05	1.13E-05	1.15E-05
Zr (as ZrO(OH)2	3.23E-04	17.5	60.3	2.94E-04	3.05E-04	3.35E-04	3.52E-04
Pb2+	1.20E-03	147	507	9.61E-04	1.08E-03	1.32E-03	1.44E-03
Ni2+	7.62E-03	265	914	7.26E-03	7.43E-03	7.70E-03	7.79E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	4.40E-03	143	494	3.30E-03	3.84E-03	4.96E-03	5.50E-03
Ca2+	4.01E-02	953	3.29E+03	3.68E-02	3.85E-02	4.18E-02	4.34E-02
K+	7.69E-02	1.78E+03	6.15E+03	7.02E-02	7.34E-02	8.07E-02	8.41E-02
OH-	11.1	1.11E+05	3.84E+05	10.3	10.7	11.5	11.8
NO3-	5.73	2.11E+05	7.26E+05	5.22	5.52	5.81	5.89
NO2-	2.73	7.43E+04	2.56E+05	2.26	2.47	2.97	3.21
CO32-	0.531	1.89E+04	6.52E+04	0.480	0.500	0.570	0.576
PO43-	0.112	6.33E+03	2.18E+04	9.57E-02	0.102	0.115	0.118
SO42-	0.295	1.68E+04	5.78E+04	0.234	0.263	0.328	0.356
Si (as SiO32-)	9.15E-02	1.52E+03	5.25E+03	7.57E-02	8.35E-02	9.95E-02	0.107
F-	8.51E-02	958	3.30E+03	7.13E-02	7.71E-02	9.19E-02	9.72E-02
Cl-	0.282	5.92E+03	2.04E+04	0.254	0.264	0.294	0.305
C6H5O73-	3.27E-02	3.67E+03	1.26E+04	2.98E-02	3.13E-02	3.42E-02	3.56E-02
EDTA4-	2.02E-02	3.45E+03	1.19E+04	6.04E-03	1.30E-02	2.75E-02	3.47E-02
HEDTA3-	3.80E-02	6.18E+03	2.13E+04	9.67E-03	2.35E-02	5.26E-02	6.69E-02
glycolate-	0.114	5.05E+03	1.74E+04	7.52E-02	9.39E-02	0.133	0.152
acetate-	7.72E-03	270	932	6.34E-03	7.02E-03	8.43E-03	9.11E-03
oxalate2-	8.49E-05	4.43	15.3	7.52E-05	8.00E-05	8.99E-05	9.46E-05
DBP	2.23E-02	2.77E+03	9.56E+03	1.84E-02	2.03E-02	2.42E-02	2.61E-02
butanol	2.23E-02	978	3.37E+03	1.84E-02	2.03E-02	2.42E-02	2.61E-02
NH3	0.102	1.03E+03	3.56E+03	8.47E-02	9.17E-02	0.116	0.132
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-103							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	4.18E+06 (kg)	(652 kgal)	—	—	—	—	—
Heat Load	6.52 (kW)	(2.23E+04 BTU/hr)	----	6.18	6.35	6.69	6.85
Bulk Density†	1.69 (g/cc)	----	—	1.64	1.67	1.71	1.73
Water wt%†	28.5	----	—	26.2	27.2	30.1	31.8
TOC wt% C (w	0.758	----	—	0.477	0.615	0.901	1.04
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	15.6	2.12E+05	8.86E+05	14.5	15.0	16.1	16.6
Al3+	2.16	3.45E+04	1.44E+05	1.84	1.95	2.40	2.63
Fe3+ (total Fe)	2.89E-02	955	3.99E+03	2.70E-02	2.80E-02	2.99E-02	3.08E-02
Cr3+	0.261	8.03E+03	3.35E+04	0.206	0.233	0.273	0.273
Bi3+	1.43E-03	177	739	1.30E-03	1.37E-03	1.50E-03	1.56E-03
La3+	5.37E-05	4.41	18.4	3.89E-05	4.61E-05	6.13E-05	6.86E-05
Hg2+	9.43E-06	1.12	4.67	8.74E-06	9.13E-06	9.57E-06	9.70E-06
Zr (as ZrO(OH)2	2.68E-04	14.4	60.3	2.44E-04	2.52E-04	2.78E-04	2.92E-04
Pb2+	1.02E-03	125	521	8.23E-04	9.19E-04	1.12E-03	1.22E-03
Ni2+	9.45E-03	328	1.37E+03	9.15E-03	9.30E-03	9.57E-03	9.69E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.65E-03	119	495	2.74E-03	3.19E-03	4.12E-03	4.57E-03
Ca2+	4.86E-02	1.15E+03	4.81E+03	4.35E-02	4.60E-02	5.12E-02	5.38E-02
K+	6.89E-02	1.59E+03	6.65E+03	6.33E-02	6.60E-02	7.20E-02	7.48E-02
OH-	12.5	1.25E+05	5.23E+05	10.9	11.5	13.5	14.6
NO3-	5.65	2.07E+05	8.65E+05	5.23	5.48	5.74	5.78
NO2-	2.57	7.00E+04	2.92E+05	2.18	2.36	2.78	2.97
CO32-	0.456	1.62E+04	6.76E+04	0.414	0.430	0.489	0.493
PO43-	9.32E-02	5.23E+03	2.18E+04	7.94E-02	8.42E-02	9.57E-02	9.80E-02
SO42-	0.250	1.42E+04	5.94E+04	0.200	0.224	0.278	0.301
Si (as SiO32-)	9.62E-02	1.60E+03	6.67E+03	8.32E-02	8.96E-02	0.103	0.109
F-	7.05E-02	792	3.31E+03	5.91E-02	6.39E-02	7.61E-02	8.06E-02
Cl-	0.255	5.34E+03	2.23E+04	0.232	0.240	0.265	0.274
C6H5O73-	2.72E-02	3.03E+03	1.27E+04	2.48E-02	2.59E-02	2.84E-02	2.95E-02
EDTA4-	1.68E-02	2.85E+03	1.19E+04	5.01E-03	1.07E-02	2.28E-02	2.87E-02
HEDTA3-	3.15E-02	5.10E+03	2.13E+04	8.01E-03	1.95E-02	4.36E-02	5.54E-02
glycolate-	9.41E-02	4.17E+03	1.74E+04	6.23E-02	7.79E-02	0.110	0.126
acetate-	6.41E-03	223	933	5.26E-03	5.82E-03	6.99E-03	7.55E-03
oxalate2-	7.03E-05	3.66	15.3	6.23E-05	6.62E-05	7.44E-05	7.84E-05
DBP	1.85E-02	2.30E+03	9.59E+03	1.53E-02	1.69E-02	2.01E-02	2.16E-02
butanol	1.85E-02	810	3.38E+03	1.53E-02	1.69E-02	2.01E-02	2.16E-02
NH3	9.44E-02	948	3.96E+03	7.97E-02	8.55E-02	0.106	0.119
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-103

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	7.28E+05 (kg)	(112 kgal)	----	----	----	----	----
Heat Load	1.52 (kW)	(5.18E+03 BTU/hr)	----	1.41	1.46	1.57	1.62
Bulk Density	1.72 (g/cc)	----	----	1.46	1.60	1.77	1.82
Void Fraction	0.763	----	----	0.720	0.734	0.846	0.938
Water wt%	34.0	----	----	24.5	28.8	43.8	54.3
TOC wt% C (w	4.77E-03	----	----	4.56E-03	4.66E-03	5.06E-03	5.68E-03

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.06E-04	0.120	87.2	2.61E-06	2.61E-06	2.16E-04	2.34E-04
C-14	1.06E-05	6.19E-03	4.50	2.02E-07	2.02E-07	1.10E-05	1.20E-05
Ni-59	7.53E-06	4.39E-03	3.19	1.33E-06	1.33E-06	7.84E-06	8.13E-06
Ni-63	7.27E-04	0.423	308	1.24E-04	1.24E-04	7.56E-04	7.84E-04
Co-60	9.46E-06	5.51E-03	4.01	7.98E-08	7.98E-08	9.86E-06	1.07E-05
Se-79	6.37E-06	3.71E-03	2.70	4.29E-08	4.29E-08	6.45E-06	6.97E-06
Sr-90	0.322	188	1.37E+05	0.288	0.305	0.340	0.356
Y-90	0.322	188	1.37E+05	8.29E-02	8.29E-02	0.340	0.356
Zr-93	3.02E-05	1.76E-02	12.8	2.03E-07	2.03E-07	3.05E-05	3.27E-05
Nb-93m	2.45E-05	1.43E-02	10.4	1.66E-07	1.66E-07	2.48E-05	2.72E-05
Tc-99	8.24E-05	4.80E-02	34.9	7.98E-05	8.10E-05	8.85E-05	9.54E-05
Ru-106	2.17E-09	1.26E-06	9.19E-04	2.23E-13	2.23E-13	2.26E-09	2.46E-09
Cd-113m	4.28E-05	2.49E-02	18.2	6.24E-07	6.24E-07	9.43E-05	9.11E-05
Sb-125	3.36E-05	1.96E-02	14.3	1.17E-07	1.17E-07	3.51E-05	3.81E-05
Sn-126	9.78E-06	5.70E-03	4.15	6.59E-08	6.59E-08	9.90E-06	1.07E-05
I-129	1.56E-07	9.11E-05	6.63E-02	1.51E-07	1.54E-07	1.68E-07	1.81E-07
Cs-134	2.10E-06	1.22E-03	0.889	2.43E-09	2.43E-09	2.18E-06	2.35E-06
Cs-137	0.300	175	1.27E+05	0.290	0.296	0.321	0.346
Ba-137m	0.284	165	1.20E+05	4.73E-03	4.73E-03	0.294	0.316
Sm-151	2.27E-02	13.2	9.63E+03	1.53E-04	1.53E-04	2.30E-02	2.49E-02
Eu-152	8.70E-06	5.07E-03	3.69	6.25E-07	6.25E-07	8.76E-06	8.86E-06
Eu-154	2.26E-04	0.132	95.8	1.93E-06	1.93E-06	2.36E-04	2.97E-04
Eu-155	4.39E-04	0.256	186	2.95E-05	2.95E-05	4.42E-04	4.47E-04
Ra-226	5.24E-10	3.05E-07	2.22E-04	9.65E-11	9.65E-11	6.77E-10	8.24E-10
Ra-228	1.43E-08	8.36E-06	6.08E-03	8.27E-16	8.27E-16	1.45E-08	1.46E-08
Ac-227	2.93E-09	1.71E-06	1.24E-03	4.25E-10	4.25E-10	3.83E-09	4.38E-09
Pa-231	9.48E-09	5.52E-06	4.02E-03	6.41E-11	6.41E-11	9.60E-09	1.09E-08
Th-229	3.44E-10	2.00E-07	1.46E-04	1.58E-13	1.58E-13	3.47E-10	3.51E-10
Th-232	1.92E-10	1.12E-07	8.15E-05	5.27E-17	5.27E-17	2.42E-10	2.92E-10
U-232	6.41E-08	3.73E-05	2.72E-02	2.27E-08	4.18E-08	9.13E-08	1.22E-07
U-233	2.45E-07	1.43E-04	0.104	8.67E-08	1.60E-07	3.49E-07	4.65E-07
U-234	1.17E-06	6.81E-04	0.496	5.18E-07	8.35E-07	1.53E-06	1.89E-06
U-235	4.72E-08	2.75E-05	2.00E-02	2.09E-08	3.37E-08	6.20E-08	7.68E-08
U-236	4.81E-08	2.80E-05	2.04E-02	2.21E-08	3.50E-08	6.19E-08	7.55E-08
U-238	1.03E-06	5.98E-04	0.435	4.52E-07	7.30E-07	1.35E-06	1.67E-06
Np-237	3.62E-07	2.11E-04	0.154	3.47E-07	3.56E-07	3.92E-07	4.24E-07
Pu-238	2.74E-06	1.59E-03	1.16	1.23E-06	1.97E-06	3.51E-06	4.25E-06
Pu-239	1.12E-04	6.50E-02	47.3	6.29E-05	8.67E-05	1.36E-04	1.60E-04
Pu-240	1.75E-05	1.02E-02	7.43	9.48E-06	1.34E-05	2.16E-05	2.56E-05
Pu-241	1.46E-04	8.48E-02	61.7	6.85E-05	1.06E-04	1.85E-04	2.23E-04
Pu-242	7.47E-10	4.35E-07	3.17E-04	3.38E-10	5.38E-10	9.56E-10	1.16E-09
Am-241	1.07E-04	6.23E-02	45.4	6.11E-05	9.26E-05	1.23E-04	1.39E-04
Am-243	3.40E-09	1.98E-06	1.44E-03	1.57E-09	2.94E-09	3.74E-09	4.09E-09
Cm-242	1.58E-08	9.21E-06	6.70E-03	1.44E-08	1.44E-08	1.59E-08	1.59E-08
Cm-243	3.59E-10	2.09E-07	1.52E-04	3.29E-10	3.29E-10	3.62E-10	3.62E-10
Cm-244	4.14E-10	2.41E-07	1.75E-04	2.00E-10	2.41E-10	5.00E-10	5.00E-10

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	1.86E-03 (g/L)	----	0.788	1.04E-03	1.44E-03	2.28E-03	2.68E-03
U	1.27E-02	1.76E+03	1.28E+03	5.56E-03	9.00E-03	1.67E-02	2.07E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-103							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM W	3.45E+06 (kg)	(540 kgal)	—	—	----	----	—
Heat Load	5.00 (kW)	(1.71E+04 BTU/hr)	----	4.67	4.83	5.17	5.34
Bulk Density*	1.69 (g/cc)	----	—	1.63	1.66	1.71	1.73
Water wt%†	27.3	—	—	24.6	25.8	28.9	30.8
TOC wt% C (w	0.917	—	—	0.578	0.744	1.09	1.26
Radiological Constituents	**CI/L**	**µCi/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.86E-04	0.170	585	1.46E-04	1.46E-04	2.97E-04	3.11E-04
C-14	4.21E-05	2.50E-02	86.1	1.27E-05	1.27E-05	4.28E-05	4.35E-05
Ni-59	2.72E-06	1.61E-03	5.57	1.34E-06	1.34E-06	2.79E-06	2.86E-06
Ni-63	2.67E-04	0.158	546	1.30E-04	1.30E-04	2.74E-04	2.81E-04
Co-60	4.72E-05	2.80E-02	96.5	1.36E-05	1.36E-05	4.82E-05	4.91E-05
Se-79	4.18E-06	2.48E-03	8.55	2.31E-06	2.31E-06	4.86E-06	5.51E-06
Sr-90	0.141	83.3	2.87E+05	0.131	0.136	0.145	0.150
Y-90	0.141	83.4	2.88E+05	7.59E-02	7.59E-02	0.145	0.150
Zr-93	2.05E-05	1.22E-02	42.0	1.12E-05	1.12E-05	2.39E-05	2.72E-05
Nb-93m	1.49E-05	8.82E-03	30.4	8.31E-06	8.31E-06	1.73E-05	1.95E-05
Tc-99	3.00E-04	0.178	613	1.90E-04	2.44E-04	3.56E-04	4.11E-04
Ru-106	8.59E-09	5.09E-06	1.75E-02	4.24E-09	4.24E-09	9.56E-09	1.04E-08
Cd-113m	1.08E-04	6.42E-02	222	5.21E-05	5.21E-05	1.29E-04	1.48E-04
Sb-125	2.04E-04	0.121	418	5.88E-05	5.88E-05	2.09E-04	2.13E-04
Sn-126	6.32E-06	3.75E-03	12.9	3.51E-06	3.51E-06	7.34E-06	8.31E-06
I-129	5.78E-07	3.43E-04	1.18	3.66E-07	4.70E-07	6.87E-07	7.93E-07
Cs-134	3.41E-06	2.02E-03	6.97	2.33E-06	2.86E-06	3.96E-06	4.50E-06
Cs-137	0.320	190	6.54E+05	0.285	0.302	0.338	0.355
Ba-137m	0.303	179	6.19E+05	0.245	0.245	0.320	0.336
Sm-151	1.47E-02	8.72	3.01E+04	8.16E-03	8.16E-03	1.71E-02	1.94E-02
Eu-152	5.03E-06	2.98E-03	10.3	2.71E-06	2.71E-06	5.43E-06	5.81E-06
Eu-154	7.69E-04	0.456	1.57E+03	3.00E-04	3.00E-04	9.38E-04	1.01E-03
Eu-155	2.99E-04	0.177	610	1.60E-04	1.60E-04	3.23E-04	3.46E-04
Ra-226	1.78E-10	1.05E-07	3.64E-04	1.20E-10	1.20E-10	1.99E-10	2.19E-10
Ra-228	1.90E-07	1.13E-04	0.389	7.97E-08	1.34E-07	2.56E-07	3.26E-07
Ac-227	1.13E-09	6.71E-07	2.31E-03	7.94E-10	7.94E-10	1.25E-09	1.37E-09
Pa-231	5.20E-09	3.08E-06	1.06E-02	3.32E-09	3.32E-09	5.88E-09	6.53E-09
Th-229	4.46E-09	2.64E-06	9.11E-03	2.03E-09	3.22E-09	5.90E-09	7.43E-09
Th-232	1.26E-08	7.49E-06	2.59E-02	6.53E-09	9.52E-09	1.58E-08	1.88E-08
U-232	9.69E-07	5.74E-04	1.98	5.26E-07	7.42E-07	1.23E-06	1.51E-06
U-233	3.71E-06	2.20E-03	7.59	2.02E-06	2.85E-06	4.72E-06	5.79E-06
U-234	1.01E-06	5.97E-04	2.06	9.67E-07	9.91E-07	1.02E-06	1.04E-06
U-235	4.08E-08	2.42E-05	8.33E-02	3.91E-08	4.01E-08	4.15E-08	4.21E-08
U-236	3.19E-08	1.89E-05	6.51E-02	3.07E-08	3.14E-08	3.24E-08	3.28E-08
U-238	1.19E-06	7.03E-04	2.42	1.15E-06	1.17E-06	1.20E-06	1.22E-06
Np-237	1.08E-06	6.42E-04	2.21	7.25E-07	9.00E-07	1.27E-06	1.45E-06
Pu-238	1.76E-06	1.04E-03	3.60	1.34E-06	1.55E-06	1.97E-06	2.18E-06
Pu-239	5.98E-05	3.54E-02	122	4.90E-05	5.43E-05	6.53E-05	7.05E-05
Pu-240	1.02E-05	6.03E-03	20.8	8.17E-06	9.15E-06	1.12E-05	1.22E-05
Pu-241	1.19E-04	7.07E-02	244	9.06E-05	1.05E-04	1.34E-04	1.48E-04
Pu-242	6.57E-10	3.89E-07	1.34E-03	4.86E-10	5.70E-10	7.44E-10	8.28E-10
Am-241	7.17E-05	4.25E-02	147	5.18E-05	6.15E-05	8.19E-05	9.17E-05
Am-243	2.57E-09	1.52E-06	5.24E-03	1.94E-09	2.24E-09	2.93E-09	3.25E-09
Cm-242	1.93E-07	1.14E-04	0.394	9.73E-08	9.73E-08	2.08E-07	2.22E-07
Cm-243	1.79E-08	1.06E-05	3.66E-02	8.80E-09	8.80E-09	1.92E-08	2.05E-08
Cm-244	1.74E-07	1.03E-04	0.356	8.05E-08	8.05E-08	2.06E-07	2.26E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.47E-04 (g/L)	—	1.53	5.44E-04	6.44E-04	8.51E-04	9.50E-04
U	1.15E-02	1.62E+03	5.59E+03	1.10E-02	1.13E-02	1.17E-02	1.19E-02

*Density is calculated based on Na, OH-, and AlO2-.

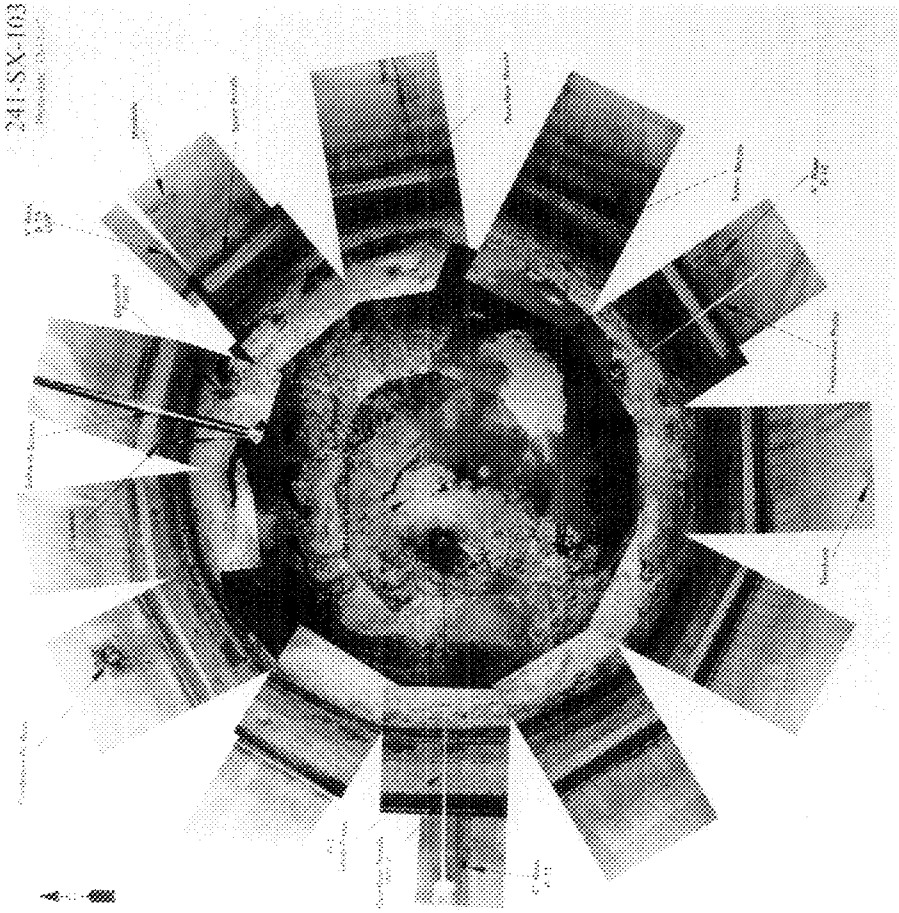
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-103 Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	4.18E+06 (kg)	(652 kgal)	----	----	----	----	----
Heat Load	6.52 (kW)	(2.23E+04 BTU/hr)	----	6.18	6.35	6.69	6.85
Bulk Density†	1.69 (g/cc)	----	----	1.64	1.67	1.71	1.73
Water wt%†	28.5	----	----	26.2	27.2	30.1	31.8
TOC wt% C (w	0.758	----	----	0.477	0.615	0.901	1.04
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.72E-04	0.161	672	1.56E-04	1.56E-04	2.82E-04	2.93E-04
C-14	3.67E-05	2.17E-02	90.6	1.24E-05	1.24E-05	3.73E-05	3.78E-05
Ni-59	3.55E-06	2.10E-03	8.76	2.37E-06	2.37E-06	3.61E-06	3.66E-06
Ni-63	3.46E-04	0.204	854	2.31E-04	2.31E-04	3.52E-04	3.57E-04
Co-60	4.07E-05	2.41E-02	101	1.29E-05	1.29E-05	4.15E-05	4.23E-05
Se-79	4.56E-06	2.69E-03	11.2	3.00E-06	3.00E-06	5.12E-06	5.66E-06
Sr-90	0.172	102	4.24E+05	0.164	0.168	0.176	0.179
Y-90	0.172	102	4.24E+05	0.118	0.118	0.176	0.180
Zr-93	2.22E-05	1.31E-02	54.7	1.44E-05	1.44E-05	2.50E-05	2.77E-05
Nb-93m	1.65E-05	9.76E-03	40.8	1.11E-05	1.11E-05	1.85E-05	2.04E-05
Tc-99	2.63E-04	0.155	648	1.72E-04	2.16E-04	3.09E-04	3.54E-04
Ru-106	7.48E-09	4.42E-06	1.85E-02	3.88E-09	3.88E-09	8.29E-09	9.02E-09
Cd-113m	9.71E-05	5.74E-02	240	5.05E-05	5.05E-05	1.14E-04	1.30E-04
Sb-125	1.75E-04	0.103	432	5.45E-05	5.45E-05	1.79E-04	1.83E-04
Sn-126	6.91E-06	4.09E-03	17.1	4.58E-06	4.58E-06	7.76E-06	8.57E-06
I-129	5.06E-07	2.99E-04	1.25	3.30E-07	4.16E-07	5.96E-07	6.84E-07
Cs-134	3.18E-06	1.88E-03	7.85	2.29E-06	2.46E-06	3.64E-06	4.09E-06
Cs-137	0.317	187	7.81E+05	0.288	0.302	0.331	0.346
Ba-137m	0.299	177	7.39E+05	0.204	0.204	0.313	0.327
Sm-151	1.61E-02	9.51	3.97E+04	1.07E-02	1.07E-02	1.81E-02	2.00E-02
Eu-152	5.66E-06	3.35E-03	14.0	3.74E-06	3.74E-06	5.99E-06	6.31E-06
Eu-154	6.76E-04	0.399	1.67E+03	2.87E-04	2.87E-04	8.16E-04	8.72E-04
Eu-155	3.23E-04	0.191	797	2.08E-04	2.08E-04	3.43E-04	3.62E-04
Ra-226	2.37E-10	1.40E-07	5.86E-04	1.55E-10	1.55E-10	2.67E-10	2.95E-10
Ra-228	1.60E-07	9.46E-05	0.395	6.85E-08	1.13E-07	2.14E-07	2.72E-07
Ac-227	1.44E-09	8.51E-07	3.55E-03	9.60E-10	9.60E-10	1.61E-09	1.73E-09
Pa-231	5.94E-09	3.51E-06	1.46E-02	4.04E-09	4.04E-09	6.50E-09	7.04E-09
Th-229	3.75E-09	2.22E-06	9.26E-03	1.74E-09	2.72E-09	4.94E-09	6.21E-09
Th-232	1.05E-08	6.21E-06	2.59E-02	5.44E-09	7.92E-09	1.31E-08	1.56E-08
U-232	8.14E-07	4.81E-04	2.01	4.46E-07	6.26E-07	1.03E-06	1.26E-06
U-233	3.12E-06	1.84E-03	7.70	1.71E-06	2.40E-06	3.95E-06	4.84E-06
U-234	1.04E-06	6.12E-04	2.55	9.24E-07	9.78E-07	1.10E-06	1.16E-06
U-235	4.19E-08	2.47E-05	0.103	3.74E-08	3.95E-08	4.44E-08	4.69E-08
U-236	3.47E-08	2.05E-05	8.56E-02	3.03E-08	3.25E-08	3.70E-08	3.93E-08
U-238	1.16E-06	6.84E-04	2.86	1.06E-06	1.11E-06	1.21E-06	1.27E-06
Np-237	9.59E-07	5.67E-04	2.37	6.63E-07	8.07E-07	1.11E-06	1.26E-06
Pu-238	1.93E-06	1.14E-03	4.76	1.58E-06	1.75E-06	2.11E-06	2.28E-06
Pu-239	6.87E-05	4.06E-02	169	5.95E-05	6.40E-05	7.34E-05	7.79E-05
Pu-240	1.14E-05	6.76E-03	28.2	9.78E-06	1.06E-05	1.23E-05	1.31E-05
Pu-241	1.24E-04	7.32E-02	306	1.00E-04	1.12E-04	1.36E-04	1.48E-04
Pu-242	6.72E-10	3.97E-07	1.66E-03	5.31E-10	6.00E-10	7.45E-10	8.14E-10
Am-241	7.78E-05	4.59E-02	192	6.13E-05	6.93E-05	8.62E-05	9.43E-05
Am-243	2.71E-09	1.60E-06	6.69E-03	2.19E-09	2.44E-09	3.01E-09	3.28E-09
Cm-242	1.62E-07	9.59E-05	0.400	8.33E-08	8.33E-08	1.75E-07	1.87E-07
Cm-243	1.49E-08	8.79E-06	3.67E-02	7.35E-09	7.35E-09	1.60E-08	1.71E-08
Cm-244	1.44E-07	8.53E-05	0.356	6.68E-08	6.68E-08	1.71E-07	1.88E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	9.39E-04 (g/L)	----	2.32	7.70E-04	8.53E-04	1.02E-03	1.11E-03
U	1.17E-02	1.64E+03	6.87E+03	1.05E-02	1.11E-02	1.24E-02	1.31E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-SX-103

TANK 241-SX-104 SUMMARY

TANK HISTORY	
Entered Service	1st qtr 1955
Removed from Service	-
Inactive	1980
Watch Lists	Hyrdogen
Integrity	Assumed Leaker
Assumed Leaker	1988
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	June 1985
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
3, 11	4 in
7	12 in

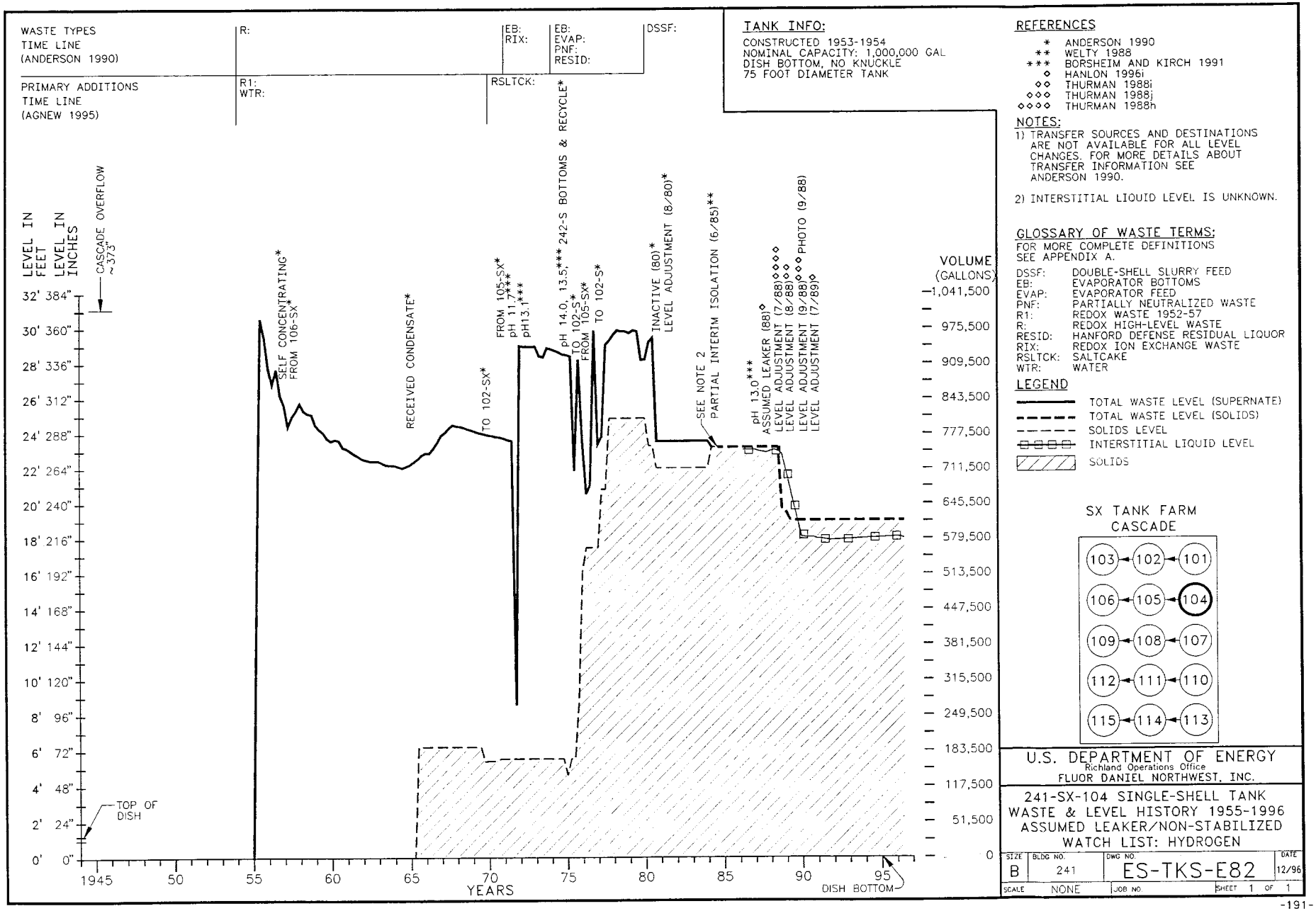
TANK TEMPERATURE	
Average Tank Temperature	145°F
Maximum Temperature	200°F
Date	Aug 1, 1988
Elevation from tank bottom	0.34 ft
Riser Number	2
Minimum Temperature	72.3°F
Date	April 1, 1993
Elevation from tank bottom	30.55 ft
Riser Number	2

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	to 241-SX-105
Total Risers	12

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	614,000 gal
Waste Type	DSSF
Drainable Interstitial Liquids	201,000 gal
Pumpable Liquids	195,000 gal
Saltcake	478,000 gal
Sludge	136,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	Sept 9, 1988
Montage Number	94030320-2CN
Photo Set Number	88090675

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	235.2 in
Date	July 29, 1991
Min Level	219.52 in
Date	Sept 17, 1996



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i
◇◇ THURMAN 1988i
◇◇◇ THURMAN 1988j
◇◇◇◇ THURMAN 1988h

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.

2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

DSSF:	DOUBLE-SHELL SLURRY FEED
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
PNF:	PARTIALLY NEUTRALIZED WASTE
R1:	REDOX WASTE 1952-57
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RIX:	REDOX ION EXCHANGE WASTE
RSLTCK:	SALTCAKE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

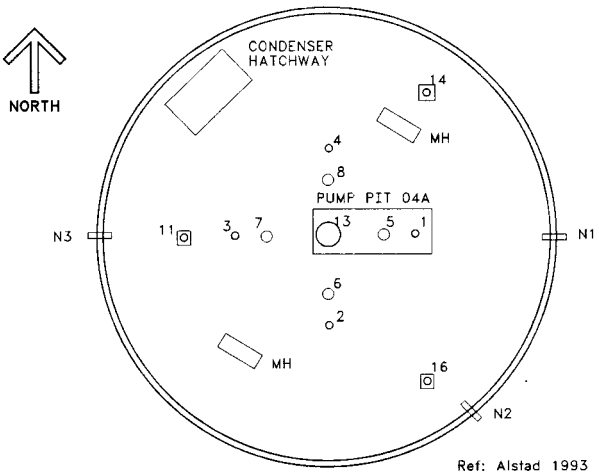
SX TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-104 SINGLE-SHELL TANK WASTE & LEVEL HISTORY 1955-1996 ASSUMED LEAKER/NON-STABILIZED WATCH LIST: HYDROGEN

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E82	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

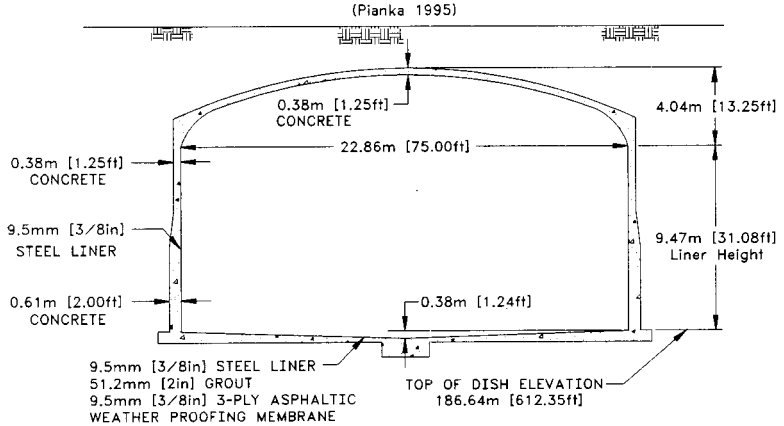
241-SX-104



Ref: Alstad 1993
H-2-73221, Rev. 2

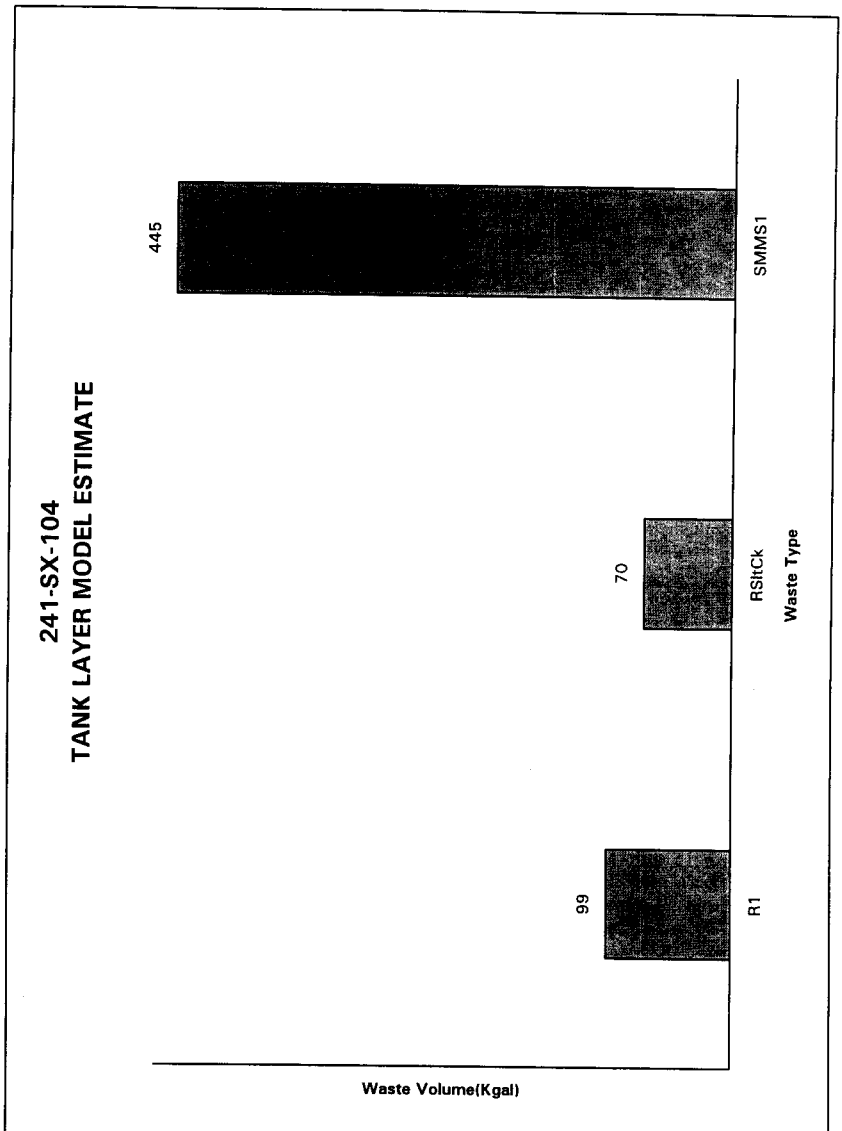
TANK RISER LOCATION

Approximate Grade Elevation 202.05m [662.9ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-104

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	1.11E+06 (kg)	(169 kgal)	---	---	---	---	---
Heat Load	3.31 (kW)	(1.13E+04 BTU/hr)	----	2.64	3.03	3.49	3.58
Bulk Density	1.74 (g/cc)	----	---	1.59	1.61	1.94	2.02
Void Fraction	0.639	---	---	0.360	0.452	0.757	0.760
Water wt%	30.1	---	----	13.9	19.1	39.1	40.0
TOC wt% C (w	2.14E-03	---	----	1.84E-03	1.92E-03	2.32E-03	2.50E-03

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	10.3	1.37E+05	1.52E+05	7.36	7.66	14.2	16.2
Al3+	5.50	8.53E+04	9.49E+04	4.69	4.93	6.12	6.75
Fe3+ (total Fe)	0.601	1.93E+04	2.15E+04	0.590	0.595	0.606	0.612
Cr3+	0.377	1.13E+04	1.25E+04	0.235	0.303	0.646	0.961
Bi3+	2.85E-06	0.342	0.380	2.40E-06	2.62E-06	3.14E-06	3.45E-06
La3+	7.01E-12	5.60E-07	6.23E-07	6.14E-12	6.63E-12	7.75E-12	8.52E-12
Hg2+	4.47E-07	5.16E-02	5.74E-02	3.96E-07	4.21E-07	4.92E-07	5.40E-07
Zr (as ZrO(OH)2	2.84E-07	1.49E-02	1.66E-02	2.61E-07	2.72E-07	2.98E-07	3.21E-07
Pb2+	7.09E-05	8.45	9.39	3.80E-05	5.40E-05	8.79E-05	1.05E-04
Ni2+	3.59E-02	1.21E+03	1.35E+03	2.77E-02	3.23E-02	3.87E-02	3.82E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.07E-05	0.655	0.728	1.48E-05	1.77E-05	2.38E-05	2.68E-05
Ca2+	0.161	3.70E+03	4.12E+03	0.117	0.138	0.183	0.204
K+	1.98E-02	446	496	1.40E-02	1.63E-02	2.22E-02	2.23E-02
OH-	22.7	2.22E+05	2.47E+05	19.0	20.2	25.4	28.0
NO3-	5.27	1.88E+05	2.09E+05	2.21	2.21	10.1	12.7
NO2-	1.63	4.31E+04	4.79E+04	0.852	1.12	2.03	2.03
CO32-	0.163	5.62E+03	6.24E+03	0.119	0.140	0.185	0.206
PO43-	1.84E-04	10.1	11.2	1.71E-04	1.79E-04	1.92E-04	2.08E-04
SO42-	2.28E-02	1.26E+03	1.40E+03	1.74E-02	1.96E-02	2.50E-02	2.59E-02
Si (as SiO32-)	5.86E-02	947	1.05E+03	3.88E-02	5.11E-02	6.61E-02	7.34E-02
F-	1.47E-04	1.60	1.78	1.25E-04	1.38E-04	1.61E-04	1.74E-04
Cl-	8.55E-02	1.74E+03	1.94E+03	5.87E-02	6.94E-02	9.63E-02	0.147
C6H5O73-	1.52E-04	16.5	18.3	1.47E-04	1.49E-04	1.58E-04	1.72E-04
EDTA4-	5.91E-06	0.979	1.09	4.16E-06	5.11E-06	6.96E-06	8.00E-06
HEDTA3-	4.91E-06	0.774	0.860	1.57E-06	3.37E-06	6.55E-06	8.15E-06
glycolate-	2.14E-04	9.24	10.3	1.16E-04	1.69E-04	2.66E-04	3.16E-04
acetate-	2.22E-05	0.755	0.839	2.15E-05	2.19E-05	2.36E-05	2.52E-05
oxalate2-	9.18E-12	4.65E-07	5.17E-07	8.14E-12	8.65E-12	1.01E-11	1.11E-11
DBP	1.35E-04	16.3	18.1	1.26E-04	1.31E-04	1.45E-04	1.57E-04
butanol	1.35E-04	5.74	6.38	1.26E-04	1.31E-04	1.45E-04	1.57E-04
NH3	0.165	1.61E+03	1.79E+03	5.33E-02	6.91E-02	0.173	0.181
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-104

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	2.85E+06 (kg)	(445 kgal)	---	---	---	---	---
Heat Load	4.05 (kW)	(1.38E+04 BTU/hr)	----	3.80	3.93	4.17	4.29
Bulk Density*	1.69 (g/cc)	---	---	1.64	1.67	1.72	1.74
Water wt%	27.3	----	----	24.5	25.7	29.0	31.0
TOC wt% C (w	0.859	---	---	0.568	0.711	1.01	1.15

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	16.3	2.21E+05	6.30E+05	14.8	15.5	16.9	17.5
Al3+	1.92	3.06E+04	8.71E+04	1.78	1.85	2.00	2.06
Fe3+ (total Fe)	1.27E-02	418	1.19E+03	1.03E-02	1.14E-02	1.39E-02	1.51E-02
Cr3+	0.170	5.22E+03	1.49E+04	0.143	0.157	0.175	0.180
Bi3+	1.45E-03	178	509	1.32E-03	1.38E-03	1.51E-03	1.57E-03
La3+	4.57E-05	3.75	10.7	3.31E-05	3.92E-05	5.21E-05	5.83E-05
Hg2+	1.02E-05	1.21	3.46	9.58E-06	9.95E-06	1.04E-05	1.05E-05
Zr (as ZrO(OH)2	2.64E-04	14.2	40.6	2.41E-04	2.49E-04	2.74E-04	2.87E-04
Pb2+	1.15E-03	141	403	9.34E-04	1.04E-03	1.27E-03	1.37E-03
Ni2+	7.39E-03	256	731	7.06E-03	7.22E-03	7.48E-03	7.57E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	4.47E-03	145	413	3.31E-03	3.88E-03	5.06E-03	5.63E-03
Ca2+	3.88E-02	917	2.62E+03	3.53E-02	3.70E-02	4.05E-02	4.22E-02
K+	7.51E-02	1.73E+03	4.94E+03	6.80E-02	7.13E-02	7.89E-02	8.26E-02
OH-	11.6	1.16E+05	3.32E+05	10.7	11.1	12.0	12.3
NO3-	5.61	2.06E+05	5.86E+05	5.21	5.45	5.70	5.77
NO2-	2.83	7.68E+04	2.19E+05	2.33	2.56	3.09	3.33
CO32-	0.506	1.79E+04	5.11E+04	0.456	0.480	0.537	0.548
PO43-	0.103	5.76E+03	1.64E+04	8.94E-02	9.41E-02	0.105	0.107
SO42-	0.281	1.60E+04	4.55E+04	0.217	0.248	0.316	0.346
Si (as SiO32-)	9.02E-02	1.50E+03	4.27E+03	7.36E-02	8.18E-02	9.87E-02	0.107
F-	7.09E-02	796	2.27E+03	6.00E-02	6.46E-02	7.63E-02	8.06E-02
Cl-	0.280	5.86E+03	1.67E+04	0.252	0.266	0.293	0.304
C6H5O73-	3.40E-02	3.80E+03	1.08E+04	3.12E-02	3.26E-02	3.54E-02	3.68E-02
EDTA4-	1.78E-02	3.03E+03	8.63E+03	5.58E-03	1.15E-02	2.41E-02	3.02E-02
HEDTA3-	3.29E-02	5.33E+03	1.52E+04	8.51E-03	2.04E-02	4.55E-02	5.77E-02
glycolate-	0.107	4.74E+03	1.35E+04	6.95E-02	8.78E-02	0.126	0.144
acetate-	8.51E-03	296	846	6.97E-03	7.72E-03	9.29E-03	1.00E-02
oxalate2-	5.98E-05	3.11	8.87	5.30E-05	5.63E-05	6.33E-05	6.66E-05
DBP	2.25E-02	2.80E+03	7.98E+03	1.85E-02	2.05E-02	2.46E-02	2.65E-02
butanol	2.25E-02	986	2.81E+03	1.85E-02	2.05E-02	2.46E-02	2.65E-02
NH3	9.60E-02	963	2.75E+03	7.73E-02	8.46E-02	0.110	0.127
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-104							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	*3.96E+06 (kg)*	*(614 kgal)*	---	---	---	---	---
Heat Load	7.36 (kW)	(2.52E+04 BTU/hr)	---	6.59	7.03	7.61	7.60
Bulk Density†	1.71 (g/cc)	---	---	1.64	1.66	1.77	1.78
Water wt%†	28.1	---	---	23.6	24.4	30.9	32.0
TOC wt% C (w	0.619	---	---	0.409	0.512	0.726	0.831
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	14.6	1.97E+05	7.82E+05	13.3	13.7	15.9	16.1
Al3+	2.90	4.59E+04	1.82E+05	2.66	2.75	3.07	3.25
Fe3+ (total Fe)	*0.175*	*5.71E+03*	*2.26E+04*	0.172	0.173	0.176	0.177
Cr3+	0.227	6.92E+03	2.74E+04	0.184	0.207	0.292	0.368
Bi3+	1.05E-03	128	509	9.57E-04	1.00E-03	1.09E-03	1.14E-03
La3+	3.31E-05	2.69	10.7	2.40E-05	2.84E-05	3.78E-05	4.23E-05
Hg2+	7.54E-06	0.887	3.52	7.06E-06	7.34E-06	7.65E-06	7.76E-06
Zr (as ZrO(OH)2	1.91E-04	10.2	40.6	1.75E-04	1.81E-04	1.98E-04	2.08E-04
Pb2+	8.56E-04	104	412	6.96E-04	7.74E-04	9.37E-04	1.01E-03
Ni2+	1.53E-02	525	2.08E+03	1.30E-02	1.43E-02	1.60E-02	1.58E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	3.24E-03	104	414	2.40E-03	2.81E-03	3.67E-03	4.08E-03
Ca2+	7.23E-02	1.70E+03	6.73E+03	6.09E-02	6.69E-02	7.77E-02	8.28E-02
K+	5.99E-02	1.37E+03	5.44E+03	5.47E-02	5.71E-02	6.27E-02	6.53E-02
OH-	14.7	1.46E+05	5.79E+05	13.5	13.9	15.4	16.2
NO3-	5.52	2.01E+05	7.95E+05	4.57	4.66	6.80	7.40
NO2-	2.50	6.73E+04	2.67E+05	2.14	2.30	2.68	2.86
CO32-	0.411	1.45E+04	5.74E+04	0.375	0.393	0.434	0.442
PO43-	*7.46E-02*	*4.15E+03*	*1.65E+04*	*6.48E-02*	*6.82E-02*	*7.63E-02*	*7.79E-02*
SO42-	0.210	1.18E+04	4.69E+04	0.164	0.186	0.235	0.257
Si (as SiO32-)	8.15E-02	1.34E+03	5.32E+03	6.95E-02	7.54E-02	8.77E-02	9.36E-02
F-	5.15E-02	573	2.27E+03	4.35E-02	4.69E-02	5.53E-02	5.84E-02
Cl-	0.227	4.70E+03	1.87E+04	0.206	0.216	0.236	0.244
C6H5O73-	2.47E-02	2.74E+03	1.08E+04	2.27E-02	2.36E-02	2.57E-02	2.67E-02
EDTA4-	1.29E-02	2.18E+03	8.63E+03	4.05E-03	8.37E-03	1.74E-02	2.19E-02
HEDTA3-	2.39E-02	3.83E+03	1.52E+04	6.17E-03	1.48E-02	3.30E-02	4.19E-02
glycolate-	7.76E-02	3.41E+03	1.35E+04	5.04E-02	6.37E-02	9.15E-02	0.105
acetate-	6.17E-03	214	847	5.06E-03	5.60E-03	6.74E-03	7.29E-03
oxalate2-	*4.34E-05*	*2.24*	*8.87*	3.84E-05	4.08E-05	4.59E-05	4.83E-05
DBP	1.64E-02	2.02E+03	8.00E+03	1.34E-02	1.49E-02	1.78E-02	1.93E-02
butanol	1.64E-02	711	2.82E+03	1.34E-02	1.49E-02	1.78E-02	1.93E-02
NH3	0.115	1.14E+03	4.54E+03	8.14E-02	8.72E-02	0.125	0.138
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-104

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	1.11E+06 (kg)	(169 kgal)	---	---	---	---	---
Heat Load	3.31 (kW)	(1.13E+04 BTU/hr)	---	2.64	3.03	3.49	3.58
Bulk Density	1.74 (g/cc)	---	---	1.59	1.61	1.94	2.02
Void Fraction	0.639	---	---	0.360	0.452	0.757	0.760
Water wt%	30.1	---	---	13.9	19.1	39.1	40.0
TOC wt% C (w	2.14E-03	---	---	1.84E-03	1.92E-03	2.32E-03	2.50E-03

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	1.09E-04	6.30E-02	70.0	1.71E-05	1.71E-05	1.16E-04	1.23E-04
C-14	6.06E-06	3.49E-03	3.88	1.33E-06	1.33E-06	6.54E-06	6.69E-06
Ni-59	1.15E-05	6.63E-03	7.37	8.70E-06	8.70E-06	1.23E-05	1.22E-05
Ni-63	1.09E-03	0.625	695	8.13E-04	8.13E-04	1.16E-03	1.15E-03
Co-60	4.79E-06	2.75E-03	3.06	5.23E-07	5.23E-07	4.97E-06	5.36E-06
Se-79	3.16E-06	1.82E-03	2.02	2.81E-07	2.81E-07	3.26E-06	7.07E-06
Sr-90	0.653	376	4.17E+05	0.497	0.585	0.705	0.714
Y-90	0.653	376	4.18E+05	0.497	0.544	0.705	0.714
Zr-93	1.50E-05	8.60E-03	9.56	1.33E-06	1.33E-06	1.54E-05	3.14E-05
Nb-93m	1.21E-05	6.99E-03	7.77	1.09E-06	1.09E-06	1.25E-05	2.98E-05
Tc-99	4.61E-05	2.65E-02	29.5	3.79E-05	4.12E-05	4.94E-05	5.20E-05
Ru-106	9.87E-10	5.68E-07	6.31E-04	1.46E-12	1.46E-12	1.03E-09	1.12E-09
Cd-113m	2.33E-05	1.34E-02	14.9	4.10E-06	4.10E-06	4.67E-05	4.52E-05
Sb-125	1.60E-05	9.21E-03	10.2	7.69E-07	7.69E-07	1.67E-05	1.81E-05
Sn-126	4.85E-06	2.79E-03	3.10	4.33E-07	4.33E-07	5.00E-06	1.11E-05
I-129	8.77E-08	5.05E-05	5.61E-02	7.19E-08	7.82E-08	9.40E-08	9.90E-08
Cs-134	9.69E-07	5.57E-04	0.620	1.59E-08	1.59E-08	1.01E-06	1.08E-06
Cs-137	0.167	96.1	1.07E+05	0.143	0.152	0.177	0.188
Ba-137m	0.158	90.9	1.01E+05	3.10E-02	3.10E-02	0.167	0.173
Sm-151	1.13E-02	6.48	7.21E+03	1.00E-03	1.00E-03	1.16E-02	2.57E-02
Eu-152	7.77E-06	4.47E-03	4.97	4.10E-06	4.10E-06	7.81E-06	7.84E-06
Eu-154	1.15E-04	6.59E-02	73.3	1.26E-05	1.26E-05	1.19E-04	1.47E-04
Eu-155	3.80E-04	0.219	243	1.94E-04	1.94E-04	3.82E-04	3.83E-04
Ra-226	8.27E-10	4.76E-07	5.29E-04	2.81E-10	5.49E-10	1.11E-09	1.37E-09
Ra-228	6.53E-09	3.75E-06	4.17E-03	5.43E-15	5.43E-15	6.59E-09	6.66E-09
Ac-227	3.93E-09	2.26E-06	2.51E-03	1.32E-09	2.31E-09	5.55E-09	7.10E-09
Pa-231	4.70E-09	2.71E-06	3.01E-03	4.20E-10	4.20E-10	5.48E-09	1.41E-08
Th-229	1.57E-10	9.06E-08	1.01E-04	1.04E-12	1.04E-12	1.59E-10	1.61E-10
Th-232	8.74E-11	5.03E-08	5.59E-05	3.46E-16	3.46E-16	1.10E-10	1.33E-10
U-232	2.92E-08	1.68E-05	1.86E-02	1.03E-08	1.90E-08	4.15E-08	5.53E-08
U-233	1.12E-07	6.42E-05	7.14E-02	3.94E-08	7.28E-08	1.59E-07	2.12E-07
U-234	5.97E-07	3.43E-04	0.382	3.01E-07	4.45E-07	7.61E-07	9.27E-07
U-235	2.43E-08	1.40E-05	1.55E-02	1.23E-08	1.81E-08	3.10E-08	3.77E-08
U-236	2.29E-08	1.32E-05	1.47E-02	1.11E-08	1.69E-08	2.92E-08	3.54E-08
U-238	5.33E-07	3.07E-04	0.341	2.72E-07	3.98E-07	6.79E-07	8.27E-07
Np-237	2.21E-07	1.27E-04	0.141	1.68E-07	1.89E-07	2.42E-07	2.49E-07
Pu-238	4.85E-06	2.79E-03	3.10	3.76E-06	4.29E-06	5.41E-06	5.94E-06
Pu-239	3.08E-04	0.177	197	2.30E-04	2.68E-04	3.48E-04	3.86E-04
Pu-240	4.48E-05	2.58E-02	28.7	3.36E-05	3.91E-05	5.05E-05	5.60E-05
Pu-241	2.83E-04	0.163	181	2.17E-04	2.49E-04	3.16E-04	3.49E-04
Pu-242	1.33E-09	7.67E-07	8.53E-04	1.03E-09	1.18E-09	1.49E-09	1.63E-09
Am-241	5.31E-05	3.05E-02	34.0	3.22E-05	4.65E-05	6.01E-05	1.32E-04
Am-243	1.59E-09	9.13E-07	1.02E-03	7.54E-10	1.38E-09	1.74E-09	2.33E-09
Cm-242	9.49E-08	5.46E-05	6.07E-02	9.29E-08	9.37E-08	9.57E-08	9.57E-08
Cm-243	2.17E-09	1.25E-06	1.39E-03	2.13E-09	2.15E-09	2.19E-09	2.19E-09
Cm-244	1.66E-09	9.57E-07	1.06E-03	2.60E-10	8.20E-10	2.23E-09	2.23E-09

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	5.15E-03 (g/L)	---	3.29	3.84E-03	4.48E-03	5.82E-03	6.45E-03
U	6.60E-03	904	1.01E+03	3.36E-03	4.93E-03	8.42E-03	1.03E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-104							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM W	2.85E+06 (kg)	(445 kgal)	---	---	---	---	---
Heat Load	4.05 (kW)	(1.38E+04 BTU/hr)	---	3.80	3.93	4.17	4.29
Bulk Density*	1.69 (g/cc)	---	---	1.64	1.67	1.72	1.74
Water wt%†	27.3	---	---	24.5	25.7	29.0	31.0
TOC wt% C (w	0.859	---	---	0.568	0.711	1.01	1.15
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.96E-04	0.175	498	1.48E-04	1.48E-04	3.05E-04	3.17E-04
C-14	4.32E-05	2.55E-02	72.8	1.23E-05	1.23E-05	4.38E-05	4.44E-05
Ni-59	2.73E-06	1.61E-03	4.60	1.28E-06	1.28E-06	2.80E-06	2.88E-06
Ni-63	2.68E-04	0.158	451	1.24E-04	1.24E-04	2.75E-04	2.82E-04
Co-60	4.81E-05	2.84E-02	81.0	1.27E-05	1.27E-05	4.89E-05	4.97E-05
Se-79	4.23E-06	2.50E-03	7.12	2.25E-06	2.25E-06	4.94E-06	5.63E-06
Sr-90	0.141	83.4	2.38E+05	0.131	0.136	0.146	0.151
Y-90	0.141	83.4	2.38E+05	7.30E-02	7.30E-02	0.146	0.151
Zr-93	2.07E-05	1.22E-02	34.9	1.09E-05	1.09E-05	2.43E-05	2.77E-05
Nb-93m	1.50E-05	8.89E-03	25.3	8.14E-06	8.14E-06	1.76E-05	2.00E-05
Tc-99	3.08E-04	0.182	518	1.92E-04	2.49E-04	3.67E-04	4.24E-04
Ru-106	8.55E-09	5.05E-06	1.44E-02	3.98E-09	3.98E-09	9.58E-09	1.05E-08
Cd-113m	1.09E-04	6.45E-02	184	5.00E-05	5.00E-05	1.31E-04	1.51E-04
Sb-125	2.07E-04	0.122	349	5.40E-05	5.40E-05	2.11E-04	2.15E-04
Sn-126	6.39E-06	3.77E-03	10.8	3.43E-06	3.43E-06	7.46E-06	8.49E-06
I-129	5.93E-07	3.50E-04	0.999	3.70E-07	4.79E-07	7.08E-07	8.19E-07
Cs-134	3.10E-06	1.83E-03	5.22	2.18E-06	2.60E-06	3.57E-06	4.04E-06
Cs-137	0.311	183	5.23E+05	0.281	0.295	0.326	0.341
Ba-137m	0.294	174	4.95E+05	0.228	0.228	0.308	0.322
Sm-151	1.49E-02	8.79	2.51E+04	7.97E-03	7.97E-03	1.74E-02	1.98E-02
Eu-152	4.91E-06	2.90E-03	8.27	2.46E-06	2.46E-06	5.25E-06	5.58E-06
Eu-154	7.76E-04	0.458	1.31E+03	2.82E-04	2.82E-04	9.54E-04	1.03E-03
Eu-155	2.90E-04	0.171	489	1.45E-04	1.45E-04	3.11E-04	3.31E-04
Ra-226	1.78E-10	1.05E-07	3.00E-04	1.17E-10	1.17E-10	2.00E-10	2.22E-10
Ra-228	1.69E-07	9.98E-05	0.285	7.18E-08	1.19E-07	2.27E-07	2.88E-07
Ac-227	1.13E-09	6.66E-07	1.90E-03	7.72E-10	7.72E-10	1.26E-09	1.38E-09
Pa-231	5.20E-09	3.07E-06	8.76E-03	3.23E-09	3.23E-09	5.91E-09	6.60E-09
Th-229	3.97E-09	2.35E-06	6.69E-03	1.84E-09	2.88E-09	5.24E-09	6.59E-09
Th-232	1.14E-08	6.74E-06	1.92E-02	6.04E-09	8.67E-09	1.42E-08	1.68E-08
U-232	8.71E-07	5.14E-04	1.47	4.81E-07	6.72E-07	1.10E-06	1.35E-06
U-233	3.34E-06	1.97E-03	5.63	1.85E-06	2.58E-06	4.22E-06	5.17E-06
U-234	9.90E-07	5.84E-04	1.67	9.52E-07	9.71E-07	1.01E-06	1.02E-06
U-235	4.01E-08	2.37E-05	6.76E-02	3.86E-08	3.93E-08	4.10E-08	4.15E-08
U-236	3.09E-08	1.83E-05	5.21E-02	2.98E-08	3.04E-08	3.14E-08	3.19E-08
U-238	1.15E-06	6.80E-04	1.94	1.12E-06	1.13E-06	1.17E-06	1.18E-06
Np-237	1.12E-06	6.61E-04	1.88	7.42E-07	9.26E-07	1.31E-06	1.50E-06
Pu-238	1.74E-06	1.03E-03	2.93	1.30E-06	1.51E-06	1.97E-06	2.18E-06
Pu-239	5.90E-05	3.49E-02	99.4	4.77E-05	5.33E-05	6.48E-05	7.03E-05
Pu-240	1.00E-05	5.93E-03	16.9	7.94E-06	8.97E-06	1.11E-05	1.22E-05
Pu-241	1.18E-04	6.97E-02	199	8.79E-05	1.03E-04	1.33E-04	1.48E-04
Pu-242	6.50E-10	3.84E-07	1.09E-03	4.70E-10	5.58E-10	7.42E-10	8.30E-10
Am-241	7.14E-05	4.22E-02	120	5.04E-05	6.07E-05	8.22E-05	9.24E-05
Am-243	2.53E-09	1.49E-06	4.25E-03	1.87E-09	2.18E-09	2.88E-09	3.21E-09
Cm-242	1.87E-07	1.10E-04	0.315	8.66E-08	8.66E-08	2.00E-07	2.12E-07
Cm-243	1.74E-08	1.03E-05	2.93E-02	7.80E-09	7.80E-09	1.85E-08	1.97E-08
Cm-244	1.72E-07	1.02E-04	0.290	7.36E-08	7.36E-08	2.06E-07	2.27E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.35E-04 (g/L)	---	1.24	5.20E-04	6.26E-04	8.44E-04	9.48E-04
U	1.13E-02	1.59E+03	4.55E+03	1.09E-02	1.11E-02	1.16E-02	1.17E-02

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

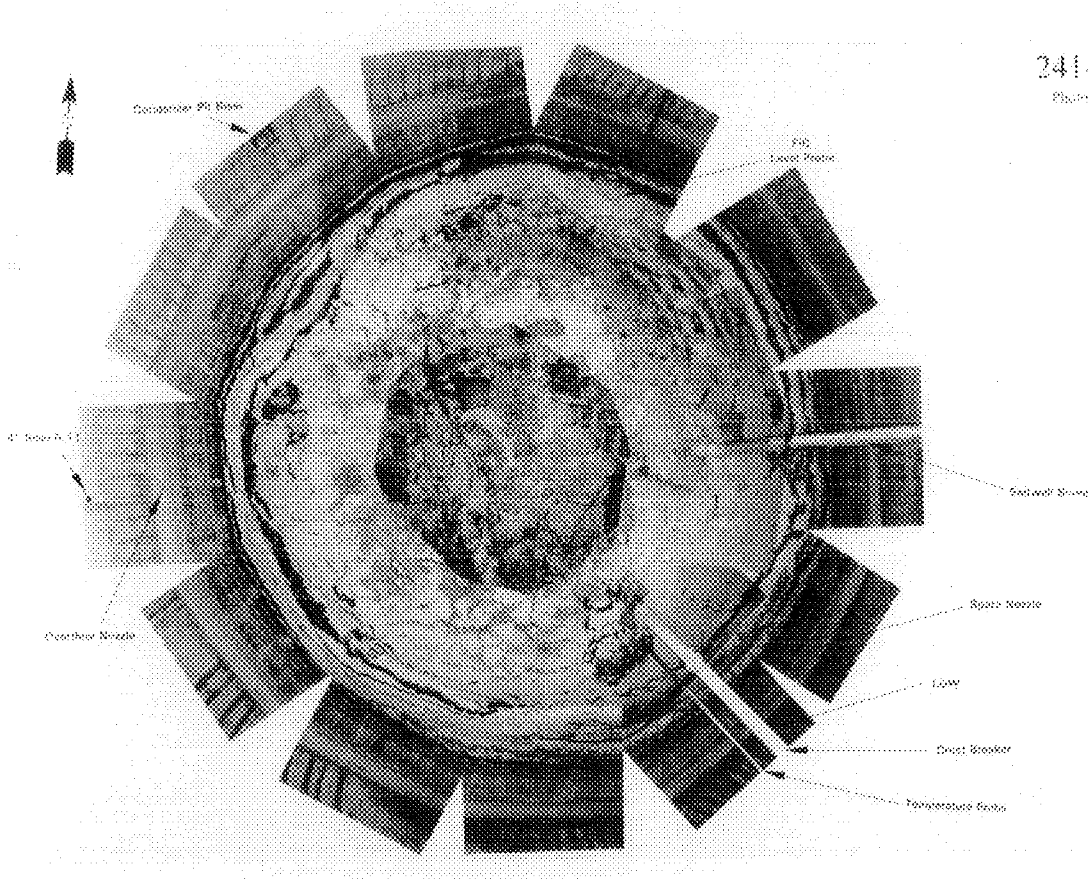
HDW Model Rev. 4

Single-Shell Tank 241-SX-104							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	3.96E+06 (kg)	(614 kgal)	----	---	---	---	---
Heat Load	7.36 (kW)	(2.52E+04 BTU/hr)	----	6.59	7.03	7.61	7.60
Bulk Density†	1.71 (g/cc)	----	----	1.64	1.66	1.77	1.78
Water wt%†	28.1	----	----	23.6	24.4	30.9	32.0
TOC wt% C (w	0.619	----	----	0.409	0.512	0.726	0.831
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.44E-04	0.143	568	1.37E-04	1.37E-04	2.51E-04	2.60E-04
C-14	3.30E-05	1.93E-02	76.7	1.06E-05	1.06E-05	3.34E-05	3.38E-05
Ni-59	5.15E-06	3.02E-03	12.0	4.10E-06	4.10E-06	5.37E-06	5.31E-06
Ni-63	4.93E-04	0.289	1.15E+03	3.89E-04	3.89E-04	5.14E-04	5.08E-04
Co-60	3.62E-05	2.12E-02	84.0	1.05E-05	1.05E-05	3.68E-05	3.73E-05
Se-79	3.93E-06	2.31E-03	9.14	2.50E-06	2.50E-06	4.45E-06	4.95E-06
Sr-90	0.282	165	6.55E+05	0.239	0.263	0.296	0.297
Y-90	0.282	165	6.55E+05	0.233	0.233	0.296	0.297
Zr-93	1.91E-05	1.12E-02	44.5	1.20E-05	1.20E-05	2.17E-05	2.42E-05
Nb-93m	1.42E-05	8.35E-03	33.1	9.24E-06	9.24E-06	1.61E-05	1.85E-05
Tc-99	2.36E-04	0.138	548	1.52E-04	1.93E-04	2.79E-04	3.20E-04
Ru-106	6.47E-09	3.79E-06	1.50E-02	3.15E-09	3.15E-09	7.21E-09	7.89E-09
Cd-113m	8.56E-05	5.02E-02	199	4.27E-05	4.27E-05	1.01E-04	1.16E-04
Sb-125	1.55E-04	9.06E-02	359	4.35E-05	4.35E-05	1.57E-04	1.60E-04
Sn-126	5.97E-06	3.50E-03	13.9	3.82E-06	3.82E-06	6.74E-06	7.49E-06
I-129	4.54E-07	2.66E-04	1.06	2.92E-07	3.71E-07	5.37E-07	6.18E-07
Cs-134	2.51E-06	1.47E-03	5.84	1.84E-06	1.89E-06	2.86E-06	3.19E-06
Cs-137	0.271	159	6.30E+05	0.249	0.260	0.282	0.293
Ba-137m	0.256	150	5.96E+05	0.174	0.174	0.267	0.277
Sm-151	1.39E-02	8.14	3.23E+04	8.88E-03	8.88E-03	1.57E-02	1.74E-02
Eu-152	5.70E-06	3.34E-03	13.2	3.93E-06	3.93E-06	5.94E-06	6.18E-06
Eu-154	5.94E-04	0.348	1.38E+03	2.36E-04	2.36E-04	7.23E-04	7.75E-04
Eu-155	3.15E-04	0.185	732	2.09E-04	2.09E-04	3.30E-04	3.45E-04
Ra-226	3.57E-10	2.09E-07	8.29E-04	2.25E-10	2.90E-10	4.24E-10	4.89E-10
Ra-228	1.24E-07	7.29E-05	0.289	5.39E-08	8.83E-08	1.66E-07	2.11E-07
Ac-227	1.90E-09	1.11E-06	4.41E-03	1.27E-09	1.51E-09	2.29E-09	2.66E-09
Pa-231	5.06E-09	2.97E-06	1.18E-02	3.61E-09	3.61E-09	5.58E-09	7.33E-09
Th-229	2.92E-09	1.71E-06	6.79E-03	1.38E-09	2.13E-09	3.84E-09	4.82E-09
Th-232	8.30E-09	4.87E-06	1.93E-02	4.40E-09	6.31E-09	1.03E-08	1.22E-08
U-232	6.39E-07	3.75E-04	1.49	3.57E-07	4.95E-07	8.07E-07	9.85E-07
U-233	2.45E-06	1.44E-03	5.70	1.37E-06	1.90E-06	3.09E-06	3.78E-06
U-234	8.81E-07	5.17E-04	2.05	8.01E-07	8.40E-07	9.26E-07	9.72E-07
U-235	3.58E-08	2.10E-05	8.32E-02	3.25E-08	3.41E-08	3.76E-08	3.95E-08
U-236	2.87E-08	1.68E-05	6.68E-02	2.56E-08	2.71E-08	3.04E-08	3.21E-08
U-238	9.81E-07	5.75E-04	2.28	9.10E-07	9.44E-07	1.02E-06	1.06E-06
Np-237	8.72E-07	5.11E-04	2.03	5.99E-07	7.32E-07	1.01E-06	1.15E-06
Pu-238	2.60E-06	1.52E-03	6.03	2.28E-06	2.43E-06	2.76E-06	2.92E-06
Pu-239	1.28E-04	7.48E-02	296	1.09E-04	1.18E-04	1.37E-04	1.46E-04
Pu-240	1.96E-05	1.15E-02	45.6	1.69E-05	1.82E-05	2.10E-05	2.23E-05
Pu-241	1.63E-04	9.58E-02	380	1.42E-04	1.52E-04	1.75E-04	1.85E-04
Pu-242	8.38E-10	4.91E-07	1.95E-03	7.07E-10	7.71E-10	9.04E-10	9.69E-10
Am-241	6.64E-05	3.89E-02	154	5.12E-05	5.86E-05	7.42E-05	8.54E-05
Am-243	2.27E-09	1.33E-06	5.27E-03	1.79E-09	2.02E-09	2.53E-09	2.77E-09
Cm-242	1.62E-07	9.48E-05	0.376	8.89E-08	8.89E-08	1.71E-07	1.80E-07
Cm-243	1.32E-08	7.73E-06	3.07E-02	6.25E-09	6.25E-09	1.40E-08	1.48E-08
Cm-244	1.25E-07	7.35E-05	0.291	5.38E-08	5.38E-08	1.50E-07	1.65E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	1.95E-03 (g/L)	---	4.53	1.64E-03	1.79E-03	2.11E-03	2.26E-03
U	1.00E-02	1.40E+03	5.55E+03	9.15E-03	9.58E-03	1.05E-02	1.10E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.

241-SX-104


Sidewall Screen
Spare Nozzle
Low
Temperature Probe
Overflow Nozzle

TANK 241-SX-105 SUMMARY

TANK HISTORY	
Entered Service	2nd qtr 1955
Removed from Service	-
Inactive	July 1978
Watch Lists	Hyrdogen
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	June 1985
Intrusion Prevention (IP)	-

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
3, 11, 14	4 in
6, 7	12 in

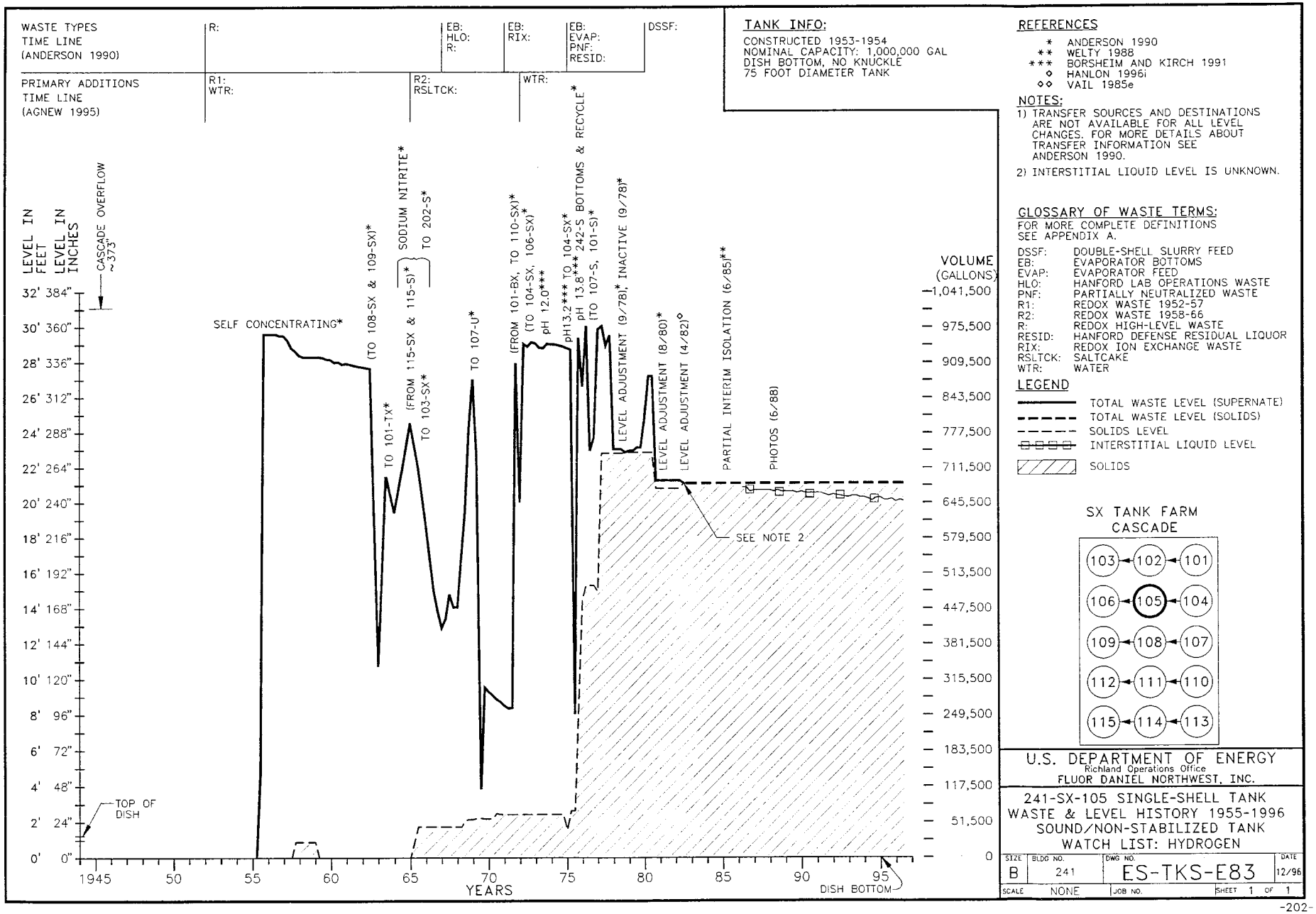
TANK TEMPERATURE	
Average Tank Temperature	156°F
Maximum Temperature	209°F
Date	May 2, 1988
Elevation from tank bottom	0.31 ft
Riser Number	2
Minimum Temperature	77°F
Date	July 8, 1993
Elevation from tank bottom	30.25 ft
Riser Number	2

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	to 241-SX-106
Total Risers	20

WASTE VOLUME (HANLON 1996I)	
Total Waste Volume	883,000 gal
Waste Type	DSSF
Drainable Interstitial Liquids	261,000 gal
Pumpable Liquids	299,000 gal
Saltcake	510,000 gal
Sludge	73,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	June 15, 1988
Montage Number	94041033-6CN
Photo Set Number	8803377

WASTE SURFACE LEVEL	
Devices	Manual ENRAF
Max Level	247.3 in
Date	July 15, 1991
Min Level	241.67 in
Date	Jan 2, 1996



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i
◇◇ VAIL 1985e

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

DSSF:	DOUBLE-SHELL SLURRY FEED
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HLO:	HANFORD LAB OPERATIONS WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
R1:	REDOX WASTE 1952-57
R2:	REDOX WASTE 1958-66
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RIX:	REDOX ION EXCHANGE WASTE
RSLTCK:	SALTCAKE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

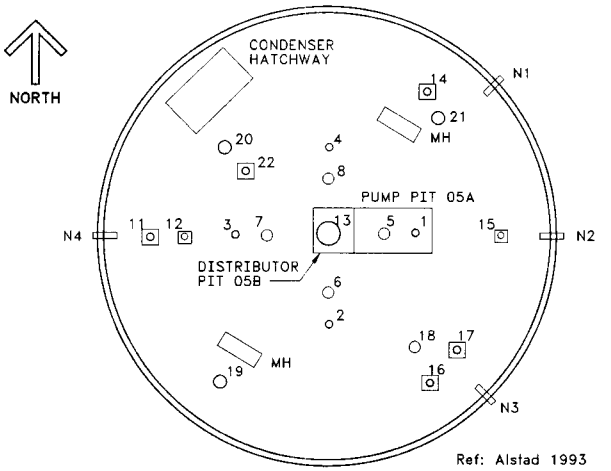
SX TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-105 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1955-1996
SOUND/NON-STABILIZED TANK
WATCH LIST: HYDROGEN

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E83	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

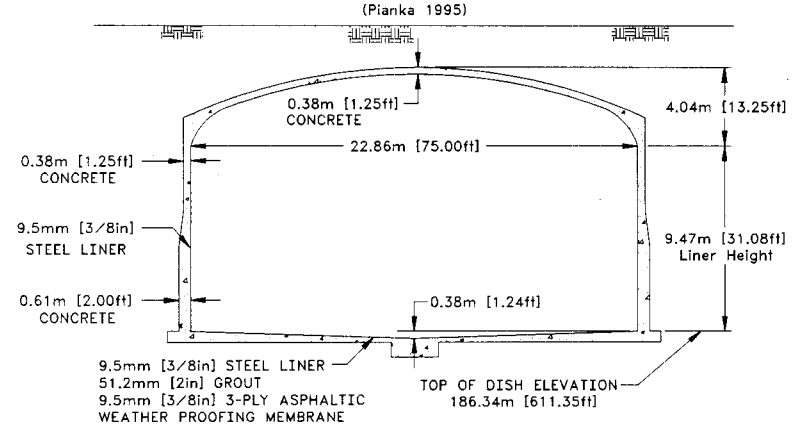
241-SX-105



Ref: Alstad 1993
H-2-73222, Rev. 3

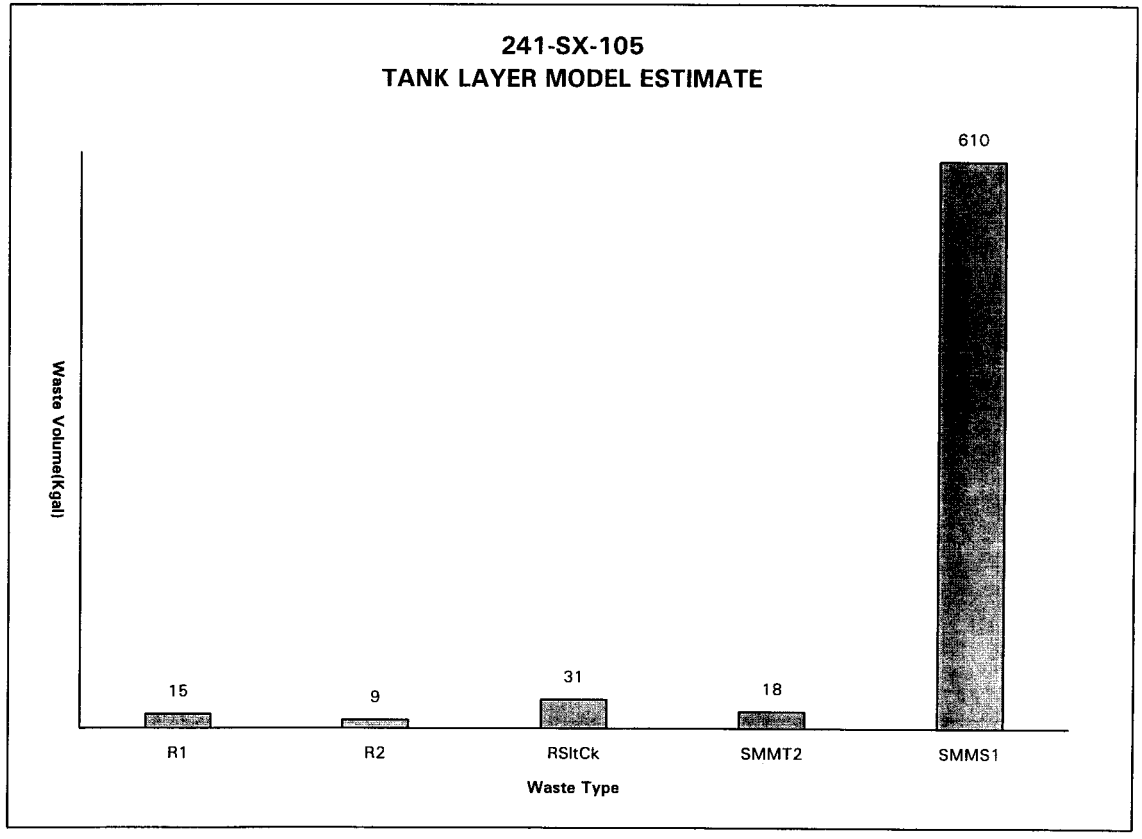
TANK RISER LOCATION

Approximate Grade Elevation 201.84m [662.2ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-105							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wa	3.60E+05 (kg)	(55.0 kgal)	----	---	---	---	---
Heat Load	3.66 (kW)	(1.25E+04 BTU/hr)	----	3.56	3.62	3.69	3.72
Bulk Density	1.73 (g/cc)	---	----	1.57	1.66	1.83	1.86
Void Fraction	0.685	---	----	0.555	0.598	0.739	0.793
Water wt%	32.1	---	----	23.7	26.5	37.9	43.6
TOC wt% C (w	2.93E-03	---	----	2.72E-03	2.78E-03	3.15E-03	3.42E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	10.5	1.39E+05	5.02E+04	7.71	9.18	12.3	13.2
Al3+	5.18	8.08E+04	2.91E+04	4.08	4.40	6.02	6.88
Fe3+ (total Fe)	0.725	2.34E+04	8.43E+03	0.718	0.722	0.729	0.733
Cr3+	0.491	1.48E+04	5.32E+03	0.298	0.390	0.661	0.875
Bi3+	3.87E-06	0.468	0.168	3.27E-06	3.57E-06	4.27E-06	4.69E-06
La3+	9.54E-12	7.66E-07	2.76E-07	8.36E-12	9.02E-12	1.05E-11	1.16E-11
Hg2+	6.08E-07	7.05E-02	2.54E-02	5.39E-07	5.73E-07	6.70E-07	7.35E-07
Zr (as ZrO(OH)2	3.87E-07	2.04E-02	7.34E-03	3.55E-07	3.70E-07	4.05E-07	4.37E-07
Pb2+	9.65E-05	11.6	4.16	5.17E-05	7.35E-05	1.20E-04	1.42E-04
Ni2+	4.16E-02	1.41E+03	508	3.77E-02	3.99E-02	4.29E-02	4.31E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	2.82E-05	0.895	0.322	2.01E-05	2.41E-05	3.23E-05	3.64E-05
Ca2+	0.186	4.32E+03	1.55E+03	0.157	0.171	0.201	0.216
K+	2.30E-02	521	187	2.03E-02	2.14E-02	2.46E-02	2.64E-02
OH-	23.2	2.28E+05	8.22E+04	18.2	19.8	26.9	30.4
NO3-	4.40	1.58E+05	5.68E+04	2.97	2.98	6.63	7.84
NO2-	1.71	4.55E+04	1.64E+04	1.35	1.48	1.90	1.90
CO32-	0.189	6.56E+03	2.36E+03	0.160	0.174	0.204	0.219
PO43-	2.51E-04	13.8	4.95	2.33E-04	2.43E-04	2.61E-04	2.84E-04
SO42-	2.85E-02	1.58E+03	570	2.60E-02	2.67E-02	3.05E-02	3.27E-02
Si (as SiO32-)	0.153	2.49E+03	897	7.98E-02	8.13E-02	0.226	0.295
F-	2.00E-04	2.19	0.790	1.70E-04	1.88E-04	2.20E-04	2.37E-04
Cl-	9.82E-02	2.01E+03	724	6.34E-02	8.04E-02	0.106	0.127
C6H5O73-	2.06E-04	22.6	8.12	2.00E-04	2.03E-04	2.15E-04	2.34E-04
EDTA4-	8.04E-06	1.34	0.482	5.65E-06	6.96E-06	9.47E-06	1.09E-05
HEDTA3-	6.68E-06	1.06	0.381	2.14E-06	4.59E-06	8.91E-06	1.11E-05
glycolate-	2.91E-04	12.6	4.55	1.58E-04	2.30E-04	3.62E-04	4.30E-04
acetate-	3.02E-05	1.03	0.372	2.93E-05	2.97E-05	3.21E-05	3.43E-05
oxalate2-	1.25E-11	6.36E-07	2.29E-07	1.11E-11	1.18E-11	1.38E-11	1.51E-11
DBP	1.83E-04	22.2	8.01	1.71E-04	1.78E-04	1.98E-04	2.14E-04
butanol	1.83E-04	7.84	2.82	1.71E-04	1.78E-04	1.98E-04	2.14E-04
NH3	*0.166*	*1.64E+03*	*589*	*0.115*	*0.122*	*0.288*	*0.174*
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-105							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM W	4.06E+06 (kg)	(628 kgal)	----	----	----	----	----
Heat Load	5.83 (kW)	(1.99E+04 BTU/hr)	----	5.45	5.65	6.00	6.16
Bulk Density*	1.71 (g/cc)	----	----	1.65	1.68	1.73	1.76
Water wt%	26.5	----	----	23.5	24.9	28.3	30.3
TOC wt% C (w	0.887	----	----	0.590	0.736	1.04	1.19
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	16.6	2.23E+05	9.07E+05	15.0	15.8	17.3	17.9
Al3+	1.95	3.08E+04	1.25E+05	1.81	1.88	2.03	2.09
Fe3+ (total Fe)	1.31E-02	427	1.73E+03	1.05E-02	1.18E-02	1.44E-02	1.56E-02
Cr3+	0.173	5.28E+03	2.14E+04	0.146	0.161	0.179	0.184
Bi3+	1.43E-03	176	712	1.31E-03	1.37E-03	1.50E-03	1.55E-03
La3+	5.31E-05	4.32	17.5	3.85E-05	4.56E-05	6.06E-05	6.78E-05
Hg2+	1.03E-05	1.21	4.90	9.63E-06	1.00E-05	1.04E-05	1.06E-05
Zr (as ZrO(OH)2	2.57E-04	13.8	55.8	2.35E-04	2.43E-04	2.66E-04	2.79E-04
Pb2+	1.17E-03	142	576	9.46E-04	1.06E-03	1.28E-03	1.39E-03
Ni2+	7.54E-03	259	1.05E+03	7.20E-03	7.36E-03	7.63E-03	7.72E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	4.68E-03	151	611	3.45E-03	4.05E-03	5.30E-03	5.91E-03
Ca2+	3.95E-02	928	3.76E+03	3.58E-02	3.76E-02	4.14E-02	4.32E-02
K+	7.69E-02	1.76E+03	7.15E+03	6.94E-02	7.29E-02	8.10E-02	8.49E-02
OH-	11.8	1.18E+05	4.77E+05	11.0	11.4	12.3	12.6
NO3-	5.68	2.07E+05	8.38E+05	5.29	5.52	5.77	5.85
NO2-	2.89	7.79E+04	3.16E+05	2.37	2.61	3.16	3.42
CO32-	0.520	1.83E+04	7.42E+04	0.468	0.494	0.550	0.565
PO43-	0.104	5.81E+03	2.36E+04	9.13E-02	9.59E-02	0.107	0.109
SO42-	0.288	1.62E+04	6.58E+04	0.220	0.253	0.325	0.357
Si (as SiO32-)	9.25E-02	1.52E+03	6.18E+03	7.49E-02	8.35E-02	0.101	0.110
F-	7.04E-02	784	3.18E+03	5.99E-02	6.43E-02	7.56E-02	7.97E-02
Cl-	0.285	5.92E+03	2.40E+04	0.255	0.270	0.299	0.311
C6H5O73-	3.59E-02	3.97E+03	1.61E+04	3.29E-02	3.44E-02	3.74E-02	3.88E-02
EDTA4-	1.84E-02	3.11E+03	1.26E+04	5.83E-03	1.20E-02	2.49E-02	3.12E-02
HEDTA3-	3.40E-02	5.46E+03	2.21E+04	8.80E-03	2.11E-02	4.69E-02	5.96E-02
glycolate-	0.111	4.89E+03	1.98E+04	7.22E-02	9.12E-02	0.131	0.150
acetate-	9.18E-03	317	1.29E+03	7.50E-03	8.32E-03	1.00E-02	1.09E-02
oxalate2-	6.96E-05	3.59	14.6	6.16E-05	6.55E-05	7.36E-05	7.75E-05
DBP	2.35E-02	2.90E+03	1.18E+04	1.92E-02	2.13E-02	2.57E-02	2.77E-02
butanol	2.35E-02	1.02E+03	4.14E+03	1.92E-02	2.13E-02	2.57E-02	2.77E-02
NH3	9.69E-02	965	3.91E+03	7.71E-02	8.49E-02	0.112	0.130
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-105							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	4.42E+06 (kg)	(683 kgal)	---	---	---	---	---
Heat Load	9.48 (kW)	(3.24E+04 BTU/hr)	---	9.11	9.31	9.66	9.82
Bulk Density†	1.71 (g/cc)	---	---	1.65	1.68	1.73	1.75
Water wt%†	27.0	---	---	24.2	25.5	28.6	30.5
TOC wt% C (w	0.815	---	---	0.542	0.676	0.955	1.09
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	16.1	2.17E+05	9.57E+05	14.7	15.4	16.7	17.3
Al3+	2.21	3.49E+04	1.54E+05	2.08	2.14	2.28	2.35
Fe3+ (total Fe)	7.04E-02	2.30E+03	1.02E+04	6.81E-02	6.92E-02	7.16E-02	7.28E-02
Cr3+	0.199	6.06E+03	2.67E+04	0.176	0.189	0.211	0.226
Bi3+	1.32E-03	161	712	1.21E-03	1.26E-03	1.38E-03	1.43E-03
La3+	4.88E-05	3.97	17.5	3.54E-05	4.19E-05	5.57E-05	6.24E-05
Hg2+	9.49E-06	1.11	4.92	8.91E-06	9.24E-06	9.64E-06	9.78E-06
Zr (as ZrO(OH)2	2.37E-04	12.6	55.8	2.16E-04	2.23E-04	2.45E-04	2.57E-04
Pb2+	1.08E-03	131	580	8.77E-04	9.78E-04	1.19E-03	1.29E-03
Ni2+	1.03E-02	353	1.56E+03	9.97E-03	1.01E-02	1.04E-02	1.04E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	4.30E-03	138	611	3.17E-03	3.73E-03	4.88E-03	5.43E-03
Ca2+	5.13E-02	1.20E+03	5.32E+03	4.80E-02	4.96E-02	5.31E-02	5.47E-02
K+	7.26E-02	1.66E+03	7.33E+03	6.56E-02	6.89E-02	7.63E-02	7.99E-02
OH-	12.7	1.27E+05	5.60E+05	12.0	12.3	13.1	13.5
NO3-	5.58	2.03E+05	8.95E+05	5.22	5.43	5.72	5.73
NO2-	2.80	7.53E+04	3.33E+05	2.31	2.54	3.05	3.29
CO32-	0.494	1.73E+04	7.66E+04	0.446	0.469	0.521	0.534
PO43-	9.60E-02	5.34E+03	2.36E+04	8.40E-02	8.82E-02	9.81E-02	0.100
SO42-	0.267	1.50E+04	6.64E+04	0.205	0.235	0.301	0.330
Si (as SiO32-)	9.74E-02	1.60E+03	7.07E+03	8.13E-02	8.92E-02	0.106	0.114
F-	6.47E-02	720	3.18E+03	5.50E-02	5.91E-02	6.95E-02	7.33E-02
Cl-	0.270	5.60E+03	2.47E+04	0.242	0.256	0.283	0.294
C6H5O73-	3.30E-02	3.65E+03	1.61E+04	3.03E-02	3.16E-02	3.44E-02	3.57E-02
EDTA4-	1.69E-02	2.86E+03	1.26E+04	5.36E-03	1.10E-02	2.29E-02	2.87E-02
HEDTA3-	3.12E-02	5.01E+03	2.21E+04	8.09E-03	1.94E-02	4.31E-02	5.48E-02
glycolate-	0.102	4.49E+03	1.98E+04	6.64E-02	8.39E-02	0.121	0.138
acetate-	8.44E-03	292	1.29E+03	6.90E-03	7.66E-03	9.23E-03	9.98E-03
oxalate2-	6.40E-05	3.29	14.6	5.67E-05	6.02E-05	6.77E-05	7.12E-05
DBP	2.16E-02	2.66E+03	1.18E+04	1.77E-02	1.96E-02	2.36E-02	2.55E-02
butanol	2.16E-02	939	4.15E+03	1.77E-02	1.96E-02	2.36E-02	2.55E-02
NH3	0.102	1.02E+03	4.50E+03	8.43E-02	9.15E-02	0.117	0.133
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-105

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	3.60E+05 (kg)	(55.0 kgal)	---	---	---	---	---
Heat Load	3.66 (kW)	(1.25E+04 BTU/hr)	---	3.56	3.62	3.69	3.72
Bulk Density	1.73 (g/cc)	---	---	1.57	1.66	1.83	1.86
Void Fraction	0.685	---	---	0.555	0.598	0.739	0.793
Water wt%	32.1	---	---	23.7	26.5	37.9	43.6
TOC wt% C (w	2.93E-03	---	---	2.72E-03	2.78E-03	3.15E-03	3.42E-03

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	1.58E-04	9.12E-02	32.8	3.20E-05	3.20E-05	1.64E-04	1.75E-04
C-14	8.10E-06	4.68E-03	1.69	1.65E-06	1.65E-06	8.36E-06	8.95E-06
Ni-59	2.12E-05	1.22E-02	4.40	1.73E-05	1.73E-05	2.19E-05	2.22E-05
Ni-63	2.06E-03	1.19	429	1.69E-03	1.69E-03	2.14E-03	2.17E-03
Co-60	7.20E-06	4.16E-03	1.50	1.40E-06	1.40E-06	7.45E-06	7.98E-06
Se-79	9.75E-06	5.64E-03	2.03	4.30E-06	4.30E-06	1.59E-05	2.17E-05
Sr-90	2.44	1.41E+03	5.08E+05	2.37	2.41	2.47	2.48
Y-90	2.44	1.41E+03	5.08E+05	2.29	2.29	2.47	2.48
Zr-93	4.30E-05	2.49E-02	8.95	2.04E-05	2.04E-05	7.35E-05	1.03E-04
Nb-93m	3.82E-05	2.21E-02	7.94	1.65E-05	1.68E-05	5.96E-05	8.01E-05
Tc-99	6.29E-05	3.64E-02	13.1	5.91E-05	5.76E-05	6.67E-05	7.10E-05
Ru-106	1.66E-09	9.57E-07	3.45E-04	3.15E-10	3.15E-10	2.37E-09	1.70E-08
Cd-113m	3.28E-05	1.89E-02	6.82	6.66E-06	6.66E-06	1.28E-04	3.04E-04
Sb-125	2.56E-05	1.48E-02	5.32	4.83E-06	4.83E-06	2.65E-05	2.84E-05
Sn-126	1.34E-05	7.75E-03	2.79	6.58E-06	6.58E-06	2.26E-05	3.14E-05
I-129	1.19E-07	6.90E-05	2.48E-02	1.12E-07	1.09E-07	1.27E-07	1.35E-07
Cs-134	1.70E-06	9.84E-04	0.354	4.05E-07	4.05E-07	1.75E-06	1.86E-06
Cs-137	0.241	139	5.01E+04	0.229	0.222	0.254	0.269
Ba-137m	0.228	132	4.74E+04	5.50E-02	5.50E-02	0.234	0.248
Sm-151	3.49E-02	20.2	7.26E+03	1.53E-02	1.53E-02	5.63E-02	7.68E-02
Eu-152	2.52E-05	1.46E-02	5.25	2.02E-05	2.02E-05	2.53E-05	2.53E-05
Eu-154	1.73E-04	9.99E-02	36.0	3.41E-05	3.41E-05	1.79E-04	1.42E-03
Eu-155	1.28E-03	0.740	267	1.03E-03	1.03E-03	1.28E-03	1.29E-03
Ra-226	1.77E-09	1.02E-06	3.69E-04	1.40E-09	1.51E-09	1.96E-09	2.14E-09
Ra-228	8.88E-09	5.13E-06	1.85E-03	3.47E-14	3.47E-14	8.96E-09	9.07E-09
Ac-227	8.26E-09	4.77E-06	1.72E-03	6.10E-09	6.71E-09	9.36E-09	1.04E-08
Pa-231	1.20E-08	6.93E-06	2.50E-03	6.16E-09	6.16E-09	1.81E-08	2.40E-08
Th-229	2.15E-10	1.24E-07	4.48E-05	2.46E-12	2.46E-12	2.17E-10	2.19E-10
Th-232	1.19E-10	6.88E-08	2.48E-05	1.18E-15	1.18E-15	1.50E-10	1.81E-10
U-232	3.97E-08	2.29E-05	8.26E-03	1.40E-08	2.59E-08	5.65E-08	7.53E-08
U-233	1.52E-07	8.78E-05	3.16E-02	5.37E-08	9.90E-08	2.16E-07	2.88E-07
U-234	7.73E-07	4.47E-04	0.161	3.70E-07	5.66E-07	9.96E-07	1.22E-06
U-235	3.12E-08	1.81E-05	6.50E-03	1.49E-08	2.28E-08	4.03E-08	4.95E-08
U-236	3.18E-08	1.84E-05	6.61E-03	1.56E-08	2.36E-08	4.03E-08	4.87E-08
U-238	6.78E-07	3.92E-04	0.141	3.22E-07	4.95E-07	8.77E-07	1.08E-06
Np-237	2.77E-07	1.60E-04	5.76E-02	2.52E-07	2.58E-07	2.95E-07	3.15E-07
Pu-238	1.54E-05	8.93E-03	3.21	1.27E-05	1.41E-05	1.68E-05	1.81E-05
Pu-239	4.10E-04	0.237	85.3	3.58E-04	3.83E-04	4.37E-04	4.62E-04
Pu-240	7.17E-05	4.14E-02	14.9	6.16E-05	6.65E-05	7.68E-05	8.18E-05
Pu-241	7.67E-04	0.444	160	6.38E-04	7.01E-04	8.34E-04	8.97E-04
Pu-242	4.25E-09	2.46E-06	8.84E-04	3.50E-09	3.87E-09	4.63E-09	4.99E-09
Am-241	4.28E-04	0.247	89.1	2.48E-04	3.36E-04	5.20E-04	6.07E-04
Am-243	1.83E-08	1.06E-05	3.82E-03	1.02E-08	1.42E-08	2.25E-08	2.64E-08
Cm-242	9.12E-07	5.27E-04	0.190	9.11E-07	9.06E-07	9.13E-07	9.13E-07
Cm-243	8.89E-08	5.14E-05	1.85E-02	8.88E-08	8.83E-08	8.89E-08	8.89E-08
Cm-244	2.66E-06	1.54E-03	0.554	2.06E-06	2.36E-06	2.97E-06	3.26E-06

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	6.91E-03 (g/L)	---	1.44	6.02E-03	6.46E-03	7.36E-03	7.80E-03
U	8.39E-03	1.15E+03	415	3.98E-03	6.11E-03	1.09E-02	1.34E-02

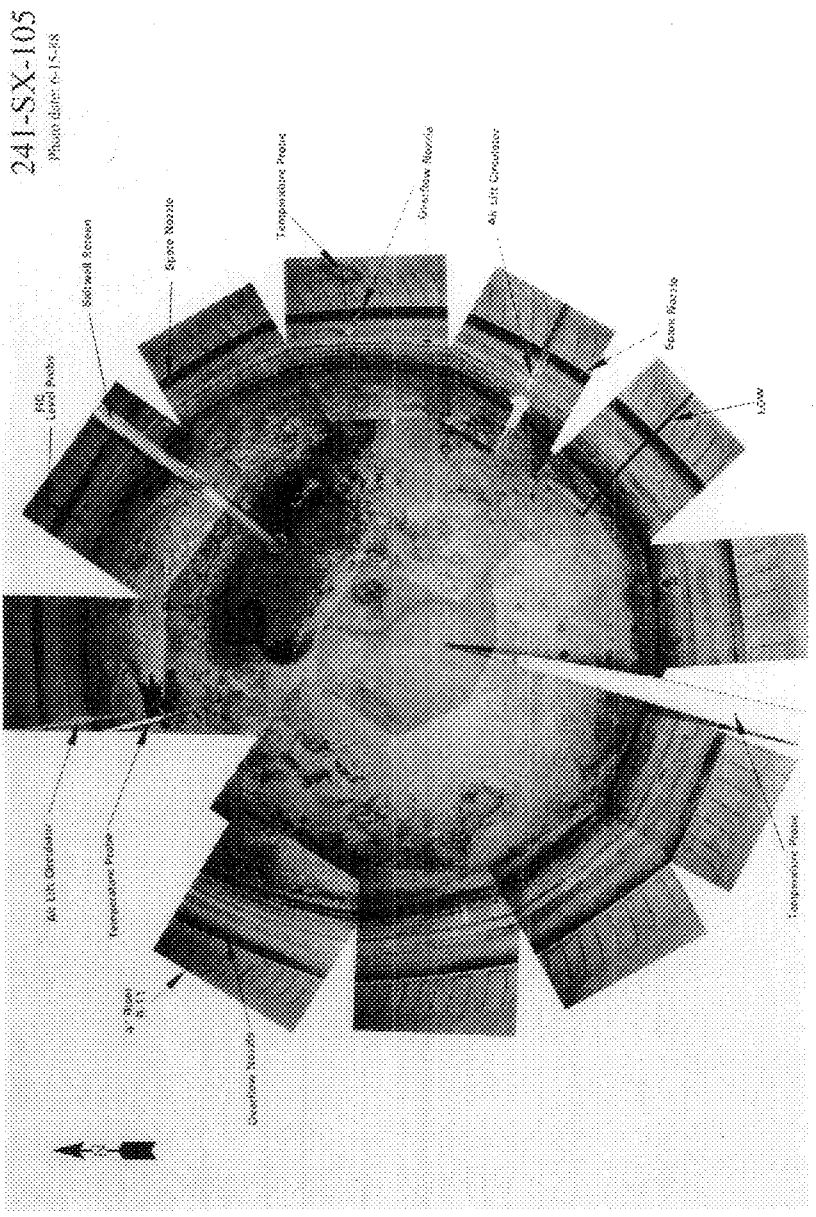
*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-105							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	4.06E+06 (kg)	(628 kgal)	---	---	---	---	---
Heat Load	5.83 (kW)	(1.99E+04 BTU/hr)	---	5.45	5.65	6.00	6.16
Bulk Density*	1.71 (g/cc)	---	---	1.65	1.68	1.73	1.76
Water wt%†	26.5	---	---	23.5	24.9	28.3	30.3
TOC wt% C (w	0.887	---	---	0.590	0.736	1.04	1.19
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	3.06E-04	0.179	726	1.49E-04	1.49E-04	3.15E-04	3.28E-04
C-14	4.50E-05	2.64E-02	107	1.23E-05	1.23E-05	4.56E-05	4.62E-05
Ni-59	2.82E-06	1.65E-03	6.69	1.28E-06	1.28E-06	2.89E-06	2.97E-06
Ni-63	2.76E-04	0.162	656	1.24E-04	1.24E-04	2.84E-04	2.91E-04
Co-60	5.02E-05	2.94E-02	119	1.27E-05	1.27E-05	5.10E-05	5.18E-05
Se-79	4.36E-06	2.56E-03	10.4	2.27E-06	2.27E-06	5.12E-06	5.84E-06
Sr-90	0.146	85.5	3.47E+05	0.136	0.141	0.151	0.156
Y-90	0.146	85.5	3.47E+05	7.37E-02	7.37E-02	0.151	0.156
Zr-93	2.14E-05	1.25E-02	50.9	1.10E-05	1.10E-05	2.52E-05	2.88E-05
Nb-93m	1.55E-05	9.10E-03	36.9	8.21E-06	8.21E-06	1.82E-05	2.07E-05
Tc-99	3.20E-04	0.188	762	1.98E-04	2.58E-04	3.83E-04	4.44E-04
Ru-106	8.91E-09	5.22E-06	2.12E-02	4.07E-09	4.07E-09	9.99E-09	1.10E-08
Cd-113m	1.13E-04	6.63E-02	269	5.05E-05	5.05E-05	1.36E-04	1.58E-04
Sb-125	2.17E-04	0.127	515	5.43E-05	5.43E-05	2.21E-04	2.25E-04
Sn-126	6.60E-06	3.86E-03	15.7	3.46E-06	3.46E-06	7.73E-06	8.82E-06
I-129	6.18E-07	3.62E-04	1.47	3.82E-07	4.97E-07	7.40E-07	8.57E-07
Cs-134	3.15E-06	1.85E-03	7.49	2.20E-06	2.64E-06	3.64E-06	4.12E-06
Cs-137	0.313	184	7.45E+05	0.284	0.298	0.329	0.343
Ba-137m	0.297	174	7.05E+05	0.229	0.229	0.311	0.325
Sm-151	1.54E-02	9.00	3.65E+04	8.05E-03	8.05E-03	1.80E-02	2.05E-02
Eu-152	5.09E-06	2.98E-03	12.1	2.50E-06	2.50E-06	5.44E-06	5.78E-06
Eu-154	8.08E-04	0.473	1.92E+03	2.85E-04	2.85E-04	9.97E-04	1.07E-03
Eu-155	3.01E-04	0.176	716	1.47E-04	1.47E-04	3.22E-04	3.43E-04
Ra-226	1.82E-10	1.07E-07	4.34E-04	1.18E-10	1.18E-10	2.06E-10	2.28E-10
Ra-228	1.69E-07	9.90E-05	0.402	7.14E-08	1.19E-07	2.27E-07	2.88E-07
Ac-227	1.15E-09	6.77E-07	2.74E-03	7.78E-10	7.78E-10	1.29E-09	1.42E-09
Pa-231	5.34E-09	3.13E-06	1.27E-02	3.25E-09	3.25E-09	6.10E-09	6.83E-09
Th-229	3.98E-09	2.33E-06	9.46E-03	1.84E-09	2.88E-09	5.25E-09	6.60E-09
Th-232	1.14E-08	6.68E-06	2.71E-02	6.01E-09	8.65E-09	1.42E-08	1.68E-08
U-232	8.77E-07	5.14E-04	2.09	4.86E-07	6.78E-07	1.11E-06	1.36E-06
U-233	3.36E-06	1.97E-03	8.00	1.87E-06	2.60E-06	4.25E-06	5.20E-06
U-234	1.01E-06	5.91E-04	2.40	9.70E-07	9.90E-07	1.03E-06	1.04E-06
U-235	4.09E-08	2.40E-05	9.72E-02	3.94E-08	4.01E-08	4.18E-08	4.24E-08
U-236	3.15E-08	1.85E-05	7.50E-02	3.04E-08	3.10E-08	3.21E-08	3.26E-08
U-238	1.17E-06	6.88E-04	2.79	1.14E-06	1.16E-06	1.20E-06	1.21E-06
Np-237	1.16E-06	6.81E-04	2.76	7.64E-07	9.59E-07	1.37E-06	1.57E-06
Pu-238	1.81E-06	1.06E-03	4.30	1.34E-06	1.57E-06	2.05E-06	2.28E-06
Pu-239	6.10E-05	3.57E-02	145	4.90E-05	5.49E-05	6.71E-05	7.29E-05
Pu-240	1.04E-05	6.10E-03	24.7	8.17E-06	9.27E-06	1.15E-05	1.26E-05
Pu-241	1.23E-04	7.20E-02	292	9.09E-05	1.07E-04	1.39E-04	1.55E-04
Pu-242	6.76E-10	3.96E-07	1.61E-03	4.86E-10	5.79E-10	7.74E-10	8.68E-10
Am-241	7.35E-05	4.31E-02	175	5.13E-05	6.22E-05	8.49E-05	9.57E-05
Am-243	2.61E-09	1.53E-06	6.21E-03	1.92E-09	2.25E-09	2.99E-09	3.34E-09
Cm-242	1.94E-07	1.14E-04	0.462	8.81E-08	8.81E-08	2.08E-07	2.21E-07
Cm-243	1.81E-08	1.06E-05	4.30E-02	7.95E-09	7.95E-09	1.93E-08	2.04E-08
Cm-244	1.80E-07	1.05E-04	0.427	7.51E-08	7.51E-08	2.15E-07	2.38E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	7.55E-04 (g/L)	---	1.80	5.28E-04	6.40E-04	8.71E-04	9.81E-04
U	1.16E-02	1.61E+03	6.54E+03	1.11E-02	1.13E-02	1.18E-02	1.20E-02

*Density is calculated based on Na, OH-, and AlO2-.

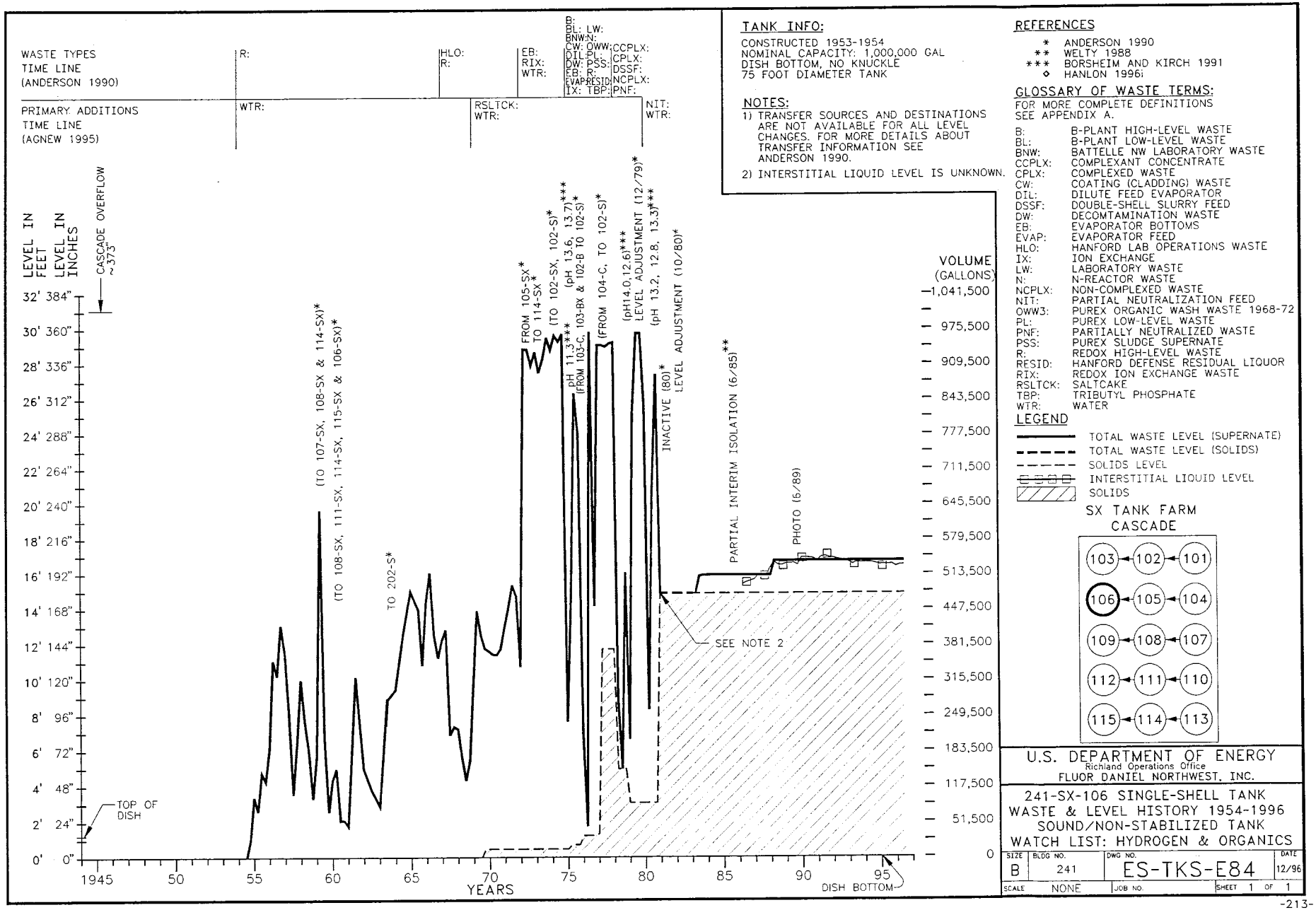
†Water wt% derived from the difference of density and total dissolved species.


241-SX-105
Photo date: 6-15-98
ENE
Level Probe
Slotwell Screen
Spare Nozzle
Temperature Probe
Overflow Nozzle
4th Lift Circulator
Spare Nozzle
Temperature Probe
4th Lift Circulator
Overflow Nozzle
Temperature Probe

TANK 241-SX-106 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1954
Removed from Service	-
Inactive	1980
Watch Lists	Hydrogen and Organics
Integrity	Sound
Assumed Leaker	-
Interim Stabilization (IS)	-
Partial Interim Isolation (PI)	June 1985
Intrusion Prevention (IP)	-
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
11	4 in
6	12 in
TANK TEMPERATURE	
Average Tank Temperature	102°F
Maximum Temperature	124.8°F
Date	Feb 7, 1989
Elevation from tank bottom	0.21 ft
Riser Number	16
Minimum Temperature	63.8°F
Date	Feb 16, 1991
Elevation from tank bottom	14.83 ft
Riser Number	16

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	none
Total Risers	12
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	538,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	194,000 gal
Pumpable Liquids	264,000 gal
Saltcake	465,000 gal
Sludge	12,000 gal
Supernatant	61,000 gal
INTERIOR PHOTOGRAPHS	
Date	June 1, 1989
Montage Number	94041033-20CN
Photo Set Number	89060146
WASTE SURFACE LEVEL	
Devices	Manual and Auto ENRAF
Max Level	209.9 in
Date	May 17, 1991
Min Level	198.06 in
Date	Sept 23, 1996



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

B:	B-PLANT HIGH-LEVEL WASTE
BL:	B-PLANT LOW-LEVEL WASTE
BNW:	BATTELLE NW LABORATORY WASTE
CCPLX:	COMPLEXANT CONCENTRATE
CPLX:	COMPLEXED WASTE
CW:	COATING (CLADDING) WASTE
DIL:	DILUTE FEED EVAPORATOR
DSSF:	DOUBLE-SHELL SLURRY FEED
DW:	DECOMTAMINATION WASTE
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
HLO:	HANFORD LAB OPERATIONS WASTE
IX:	ION EXCHANGE
LW:	LABORATORY WASTE
N:	N-REACTOR WASTE
NCPLX:	NON-COMPLEXED WASTE
NIT:	PARTIAL NEUTRALIZATION FEED
OWW3:	PUREX ORGANIC WASH WASTE 1968-72
PL:	PUREX LOW-LEVEL WASTE
PNF:	PARTIALLY NEUTRALIZED WASTE
PSS:	PUREX SLUDGE SUPERNATE
R:	REDOX HIGH-LEVEL WASTE
RESID:	HANFORD DEFENSE RESIDUAL LIQUOR
RIX:	REDOX ION EXCHANGE WASTE
RSLTCK:	SALTCAKE
TBP:	TRIBUTYL PHOSPHATE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- SOLIDS

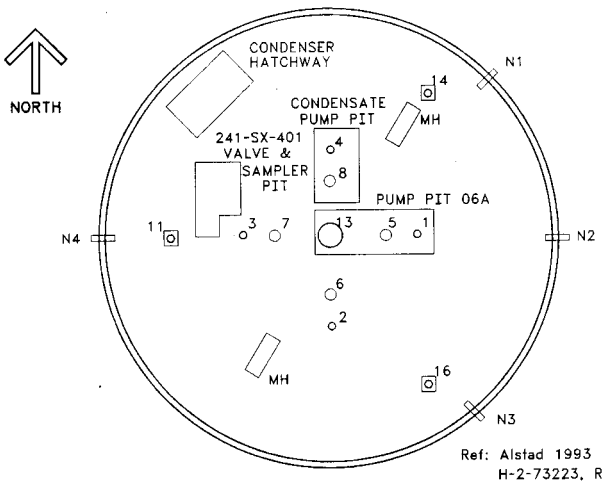
SX TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-106 SINGLE-SHELL TANK WASTE & LEVEL HISTORY 1954-1996 SOUND/NON-STABILIZED TANK WATCH LIST: HYDROGEN & ORGANICS

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E84	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

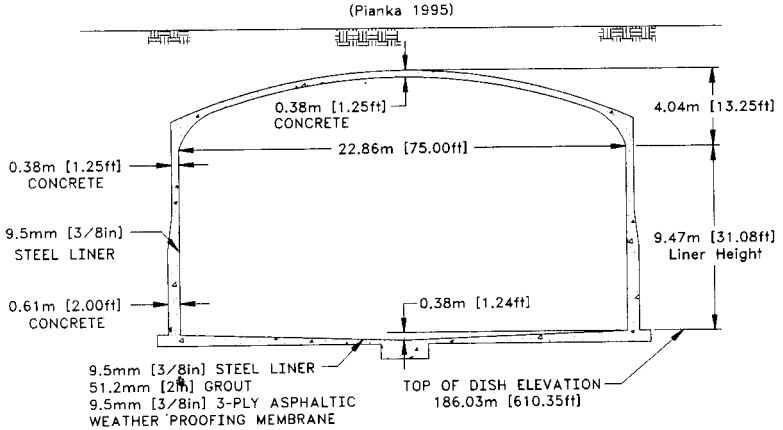
241-SX-106



Ref: Alstad 1993
H-2-73223, Rev. 2

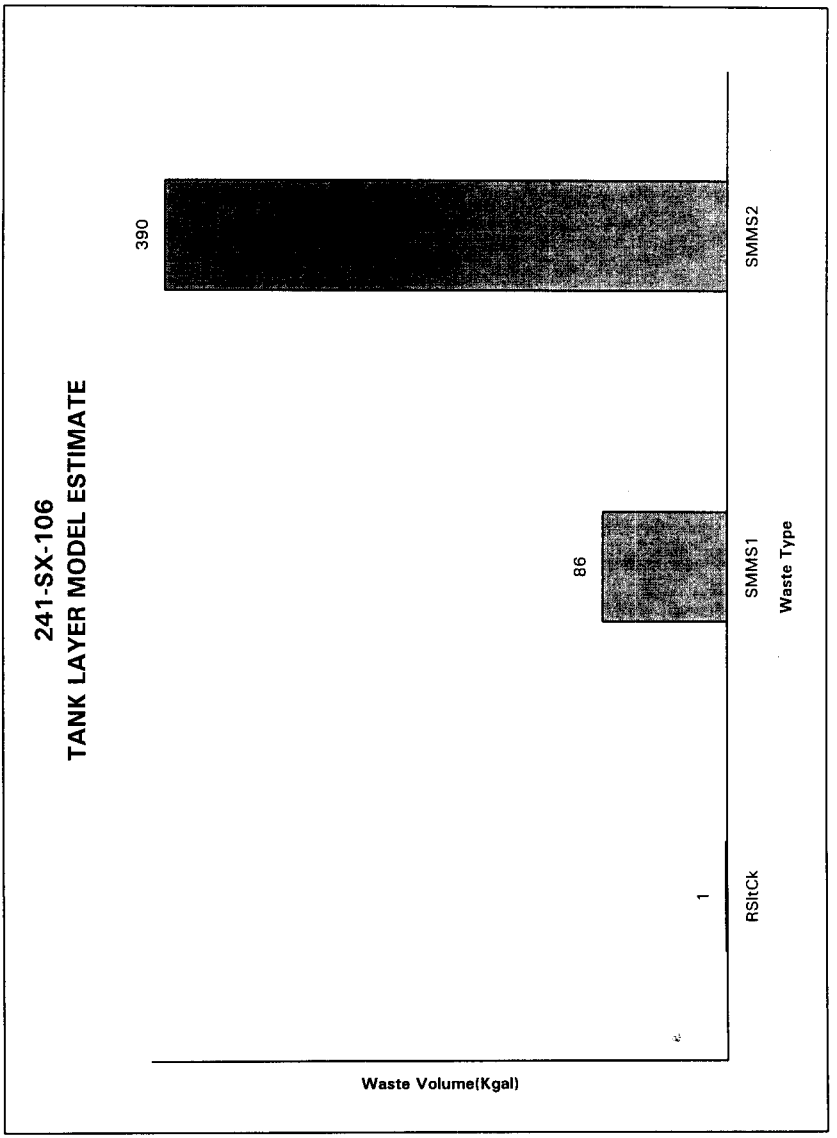
TANK RISER LOCATION

Approximate Grade Elevation 201.63m [661.5ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-106

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	6.48E+03 (kg)	(1.00 kgal)	—	----	—	----	—
Heat Load	1.24E-02 (kW)	(42.5 BTU/hr)	—	1.14E-02	1.19E-02	1.30E-02	1.35E-02
Bulk Density	1.71 (g/cc)	----	—	1.44	1.58	1.78	1.82
Void Fraction	0.785	----	—	0.741	0.757	0.876	0.978
Water wt%	34.7	----	—	24.3	29.0	45.7	57.6
TOC wt% C (w	5.25E-03	----	----	5.01E-03	5.13E-03	5.56E-03	6.28E-03

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	13.5	1.81E+05	1.17E+03	8.55	11.2	14.6	15.6
Al3+	3.39	5.34E+04	346	1.44	2.01	4.89	6.41
Fe3+ (total Fe)	1.74E-02	568	3.68	9.62E-03	1.34E-02	2.14E-02	2.52E-02
Cr3+	0.822	2.50E+04	162	0.480	0.643	0.894	0.897
Bi3+	6.87E-06	0.838	5.43E-03	5.80E-06	6.32E-06	7.57E-06	8.32E-06
La3+	1.69E-11	1.37E-06	8.90E-09	1.48E-11	1.60E-11	1.87E-11	2.06E-11
Hg2+	1.08E-06	0.126	8.19E-04	9.56E-07	1.02E-06	1.19E-06	1.30E-06
Zr (as ZrO(OH)2	6.86E-07	3.65E-02	2.37E-04	6.30E-07	6.57E-07	7.19E-07	7.75E-07
Pb2+	1.71E-04	20.7	0.134	9.17E-05	1.30E-04	2.12E-04	2.53E-04
Ni2+	1.51E-02	518	3.36	1.37E-02	1.44E-02	1.58E-02	1.65E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	5.00E-05	1.60	1.04E-02	3.57E-05	4.27E-05	5.74E-05	6.46E-05
Ca2+	7.68E-02	1.80E+03	11.6	4.68E-02	6.15E-02	9.19E-02	0.106
K+	3.20E-02	731	4.74	3.03E-02	3.12E-02	3.48E-02	3.80E-02
OH-	18.7	1.86E+05	1.20E+03	9.70	12.6	25.1	31.5
NO3-	5.25	1.90E+05	1.23E+03	2.71	4.50	5.40	5.56
NO2-	1.87	5.03E+04	326	1.59	1.73	2.01	2.18
CO32-	8.17E-02	2.86E+03	18.6	5.18E-02	6.64E-02	9.69E-02	0.111
PO43-	4.45E-04	24.7	0.160	4.13E-04	4.31E-04	4.63E-04	5.03E-04
SO42-	4.04E-02	2.27E+03	14.7	3.83E-02	3.94E-02	4.40E-02	4.78E-02
Si (as SiO32-)	0.130	2.13E+03	13.8	8.22E-02	0.112	0.148	0.166
F-	3.54E-04	3.93	2.55E-02	3.02E-04	3.34E-04	3.90E-04	4.20E-04
Cl-	0.133	2.76E+03	17.9	7.17E-02	0.102	0.147	0.154
C6H5O73-	3.66E-04	40.4	0.262	3.55E-04	3.60E-04	3.82E-04	4.16E-04
EDTA4-	1.43E-05	2.40	1.56E-02	1.00E-05	1.23E-05	1.68E-05	1.93E-05
HEDTA3-	1.18E-05	1.90	1.23E-02	3.80E-06	8.14E-06	1.58E-05	1.97E-05
glycolate-	5.17E-04	22.6	0.147	2.80E-04	4.09E-04	6.43E-04	7.63E-04
acetate-	5.36E-05	1.85	1.20E-02	5.19E-05	5.28E-05	5.70E-05	6.09E-05
oxalate2-	2.22E-11	1.14E-06	7.39E-09	1.96E-11	2.09E-11	2.44E-11	2.68E-11
DBP	3.25E-04	39.9	0.258	3.03E-04	3.16E-04	3.51E-04	3.79E-04
butanol	3.25E-04	14.1	9.11E-02	3.03E-04	3.16E-04	3.51E-04	3.79E-04
NH3	3.60E-02	358	2.32	2.78E-02	3.21E-02	4.11E-02	4.59E-02
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-106							
SMM Composite Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total SMM W	3.27E+06 (kg)	(537 kgal)	----	----	----	----	----
Heat Load	4.30 (kW)	(1.47E+04 BTU/hr)	----	4.03	4.16	4.44	4.57
Bulk Density*	1.61 (g/cc)	----	----	1.56	1.58	1.63	1.65
Water wt%	32.7	----	----	30.1	31.3	34.2	36.0
TOC wt% C (w	0.750	----	----	0.491	0.618	0.883	1.01
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	14.2	2.03E+05	6.64E+05	13.0	13.6	14.7	15.2
Al3+	1.67	2.80E+04	9.16E+04	1.55	1.61	1.74	1.79
Fe3+ (total Fe)	1.09E-02	378	1.24E+03	8.93E-03	9.89E-03	1.19E-02	1.29E-02
Cr3+	0.148	4.79E+03	1.56E+04	0.123	0.137	0.152	0.157
Bi3+	1.38E-03	179	586	1.25E-03	1.32E-03	1.45E-03	1.51E-03
La3+	4.14E-05	3.57	11.7	3.00E-05	3.55E-05	4.72E-05	5.29E-05
Hg2+	9.27E-06	1.16	3.78	8.60E-06	8.98E-06	9.40E-06	9.53E-06
Zr (as ZrO(OH)2	2.60E-04	14.8	48.2	2.37E-04	2.45E-04	2.70E-04	2.83E-04
Pb2+	1.01E-03	130	425	8.17E-04	9.11E-04	1.11E-03	1.20E-03
Ni2+	6.50E-03	237	776	6.21E-03	6.35E-03	6.58E-03	6.65E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.89E-03	133	435	2.95E-03	3.41E-03	4.37E-03	4.84E-03
Ca2+	3.41E-02	850	2.78E+03	3.13E-02	3.27E-02	3.55E-02	3.69E-02
K+	6.60E-02	1.60E+03	5.24E+03	6.02E-02	6.29E-02	6.91E-02	7.21E-02
OH-	9.97	1.05E+05	3.45E+05	9.21	9.57	10.4	10.6
NO3-	5.09	1.96E+05	6.41E+05	4.68	4.92	5.17	5.22
NO2-	2.45	7.00E+04	2.29E+05	2.04	2.23	2.66	2.86
CO32-	0.435	1.62E+04	5.31E+04	0.395	0.410	0.466	0.471
PO43-	9.16E-02	5.41E+03	1.77E+04	7.83E-02	8.30E-02	9.40E-02	9.62E-02
SO42-	0.245	1.47E+04	4.79E+04	0.193	0.218	0.273	0.298
Si (as SiO32-)	7.80E-02	1.36E+03	4.45E+03	6.45E-02	7.11E-02	8.49E-02	9.15E-02
F-	6.78E-02	801	2.62E+03	5.67E-02	6.14E-02	7.32E-02	7.74E-02
Cl-	0.246	5.42E+03	1.77E+04	0.223	0.231	0.257	0.265
C6H5O73-	2.76E-02	3.24E+03	1.06E+04	2.53E-02	2.64E-02	2.87E-02	2.99E-02
EDTA4-	1.49E-02	2.66E+03	8.70E+03	4.55E-03	9.59E-03	2.02E-02	2.54E-02
HEDTA3-	2.78E-02	4.74E+03	1.55E+04	7.16E-03	1.72E-02	3.84E-02	4.88E-02
glycolate-	8.75E-02	4.08E+03	1.33E+04	5.74E-02	7.21E-02	0.103	0.118
acetate-	6.21E-03	228	745	5.09E-03	5.64E-03	6.78E-03	7.32E-03
oxalate2-	5.42E-05	2.97	9.70	4.80E-05	5.10E-05	5.73E-05	6.04E-05
DBP	1.88E-02	2.46E+03	8.03E+03	1.55E-02	1.71E-02	2.05E-02	2.20E-02
butanol	1.88E-02	866	2.83E+03	1.55E-02	1.71E-02	2.05E-02	2.20E-02
NH3	8.69E-02	919	3.00E+03	7.17E-02	7.77E-02	9.87E-02	0.112
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-106							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	3.27E+06 (kg)	(538 kgal)	----	----	----	----	----
Heat Load	4.31 (kW)	(1.47E+04 BTU/hr)	----	4.05	4.18	4.45	4.58
Bulk Density†	1.61 (g/cc)	----	----	1.56	1.58	1.63	1.65
Water wt%†	32.7	----	----	30.1	31.3	34.2	36.0
TOC wt% C (w	0.749	----	----	0.490	0.617	0.881	1.01
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	14.2	2.03E+05	6.66E+05	13.0	13.6	14.7	15.2
Al3+	1.67	2.81E+04	9.19E+04	1.55	1.61	1.74	1.79
Fe3+ (total Fe)	1.09E-02	379	1.24E+03	8.95E-03	9.91E-03	1.19E-02	1.29E-02
Cr3+	0.149	4.83E+03	1.58E+04	0.125	0.138	0.153	0.157
Bi3+	1.38E-03	179	586	1.25E-03	1.31E-03	1.44E-03	1.50E-03
La3+	4.13E-05	3.57	11.7	2.99E-05	3.55E-05	4.71E-05	5.28E-05
Hg2+	9.25E-06	1.15	3.78	8.59E-06	8.97E-06	9.39E-06	9.52E-06
Zr (as ZrO(OH)2	2.60E-04	14.7	48.2	2.36E-04	2.45E-04	2.69E-04	2.82E-04
Pb2+	1.01E-03	130	425	8.16E-04	9.10E-04	1.10E-03	1.20E-03
Ni2+	6.52E-03	238	779	6.23E-03	6.37E-03	6.59E-03	6.66E-03
Sr2+	0	0	0	0	0	0	0
Mn4+	3.88E-03	133	435	2.94E-03	3.40E-03	4.36E-03	4.83E-03
Ca2+	3.42E-02	852	2.79E+03	3.14E-02	3.27E-02	3.56E-02	3.70E-02
K+	6.59E-02	1.60E+03	5.25E+03	6.02E-02	6.29E-02	6.91E-02	7.20E-02
OH-	9.99	1.06E+05	3.46E+05	9.23	9.59	10.4	10.6
NO3-	5.09	1.96E+05	6.42E+05	4.68	4.92	5.17	5.22
NO2-	2.45	7.00E+04	2.29E+05	2.04	2.23	2.66	2.85
CO32-	0.434	1.62E+04	5.31E+04	0.394	0.409	0.466	0.470
PO43-	9.14E-02	5.40E+03	1.77E+04	7.82E-02	8.28E-02	9.38E-02	9.61E-02
SO42-	0.245	1.46E+04	4.79E+04	0.193	0.218	0.273	0.297
Si (as SiO32-)	7.81E-02	1.36E+03	4.47E+03	6.46E-02	7.12E-02	8.50E-02	9.16E-02
F-	6.76E-02	799	2.62E+03	5.66E-02	6.12E-02	7.30E-02	7.73E-02
Cl-	0.246	5.41E+03	1.77E+04	0.223	0.231	0.256	0.265
C6H5O73-	2.75E-02	3.24E+03	1.06E+04	2.53E-02	2.64E-02	2.87E-02	2.98E-02
EDTA4-	1.48E-02	2.66E+03	8.70E+03	4.54E-03	9.57E-03	2.01E-02	2.53E-02
HEDTA3-	2.77E-02	4.73E+03	1.55E+04	7.14E-03	1.72E-02	3.83E-02	4.87E-02
glycolate-	8.74E-02	4.08E+03	1.33E+04	5.72E-02	7.20E-02	0.103	0.118
acetate-	6.20E-03	227	745	5.09E-03	5.63E-03	6.76E-03	7.31E-03
oxalate2-	5.41E-05	2.96	9.70	4.79E-05	5.09E-05	5.72E-05	6.03E-05
DBP	1.88E-02	2.45E+03	8.03E+03	1.54E-02	1.71E-02	2.04E-02	2.20E-02
butanol	1.88E-02	865	2.83E+03	1.54E-02	1.71E-02	2.04E-02	2.20E-02
NH3	8.69E-02	918	3.01E+03	7.17E-02	7.77E-02	9.86E-02	0.112
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-106							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wa	6.48E+03 (kg)	(1.00 kgal)	----	----	----	----	----
Heat Load	1.24E-02 (kW)	(42.5 BTU/hr)	----	1.14E-02	1.19E-02	1.30E-02	1.35E-02
Bulk Density	1.71 (g/cc)	----	----	1.44	1.58	1.78	1.82
Void Fraction	0.785	----	----	0.741	0.757	0.876	0.978
Water wt%	34.7	----	----	24.3	29.0	45.7	57.6
TOC wt% C (w	5.25E-03	----	----	5.01E-03	5.13E-03	5.56E-03	6.28E-03
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	2.23E-04	0.130	0.844	0	0	2.34E-04	2.54E-04
C-14	1.14E-05	6.68E-03	4.33E-02	0	0	1.19E-05	1.29E-05
Ni-59	6.82E-06	3.98E-03	2.58E-02	0	0	7.15E-06	7.47E-06
Ni-63	6.62E-04	0.387	2.51	0	0	6.94E-04	7.25E-04
Co-60	1.03E-05	6.01E-03	3.90E-02	0	0	1.07E-05	1.17E-05
Se-79	6.95E-06	4.06E-03	2.63E-02	0	0	7.04E-06	7.11E-06
Sr-90	0.263	153	995	0.225	0.244	0.282	0.300
Y-90	0.263	153	995	0	0	0.282	0.300
Zr-93	3.29E-05	1.92E-02	0.124	0	0	3.33E-05	3.36E-05
Nb-93m	2.67E-05	1.56E-02	0.101	0	0	2.71E-05	2.73E-05
Tc-99	8.89E-05	5.19E-02	0.336	8.61E-05	8.74E-05	9.56E-05	1.03E-04
Ru-106	2.38E-09	1.39E-06	9.00E-06	0	0	2.48E-09	2.70E-09
Cd-113m	4.63E-05	2.71E-02	0.175	0	0	1.03E-04	9.93E-05
Sb-125	3.68E-05	2.15E-02	0.139	0	0	3.84E-05	4.17E-05
Sn-126	1.07E-05	6.23E-03	4.04E-02	0	0	1.08E-05	1.09E-05
I-129	1.69E-07	9.85E-05	6.38E-04	1.63E-07	1.66E-07	1.81E-07	1.96E-07
Cs-134	2.30E-06	1.34E-03	8.71E-03	0	0	2.39E-06	2.57E-06
Cs-137	0.324	189	1.23E+03	0.313	0.319	0.347	0.374
Ba-137m	0.306	179	1.16E+03	0	0	0.318	0.342
Sm-151	2.48E-02	14.5	93.8	0	0	2.51E-02	2.53E-02
Eu-152	8.87E-06	5.18E-03	3.36E-02	0	0	8.93E-06	9.04E-06
Eu-154	2.46E-04	0.144	0.931	0	0	2.57E-04	3.24E-04
Eu-155	4.50E-04	0.263	1.70	0	0	4.53E-04	4.58E-04
Ra-226	4.70E-10	2.74E-07	1.78E-06	0	0	6.38E-10	7.99E-10
Ra-228	1.58E-08	9.20E-06	5.96E-05	0	0	1.59E-08	1.61E-08
Ac-227	2.75E-09	1.60E-06	1.04E-05	0	0	3.73E-09	4.35E-09
Pa-231	1.03E-08	6.04E-06	3.91E-05	0	0	1.05E-08	1.06E-08
Th-229	3.78E-10	2.21E-07	1.43E-06	0	0	3.81E-10	3.85E-10
Th-232	2.11E-10	1.23E-07	7.99E-07	0	0	2.66E-10	3.20E-10
U-232	7.04E-08	4.11E-05	2.66E-04	2.49E-08	4.59E-08	1.00E-07	1.34E-07
U-233	2.69E-07	1.57E-04	1.02E-03	9.52E-08	1.76E-07	3.84E-07	5.11E-07
U-234	1.27E-06	7.43E-04	4.81E-03	5.57E-07	9.05E-07	1.67E-06	2.07E-06
U-235	5.14E-08	3.00E-05	1.94E-04	2.24E-08	3.65E-08	6.75E-08	8.38E-08
U-236	5.27E-08	3.08E-05	1.99E-04	2.41E-08	3.82E-08	6.78E-08	8.27E-08
U-238	1.12E-06	6.51E-04	4.22E-03	4.84E-07	7.90E-07	1.47E-06	1.82E-06
Np-237	3.88E-07	2.26E-04	1.47E-03	3.71E-07	3.81E-07	4.20E-07	4.56E-07
Pu-238	2.36E-06	1.38E-03	8.92E-03	7.01E-07	1.51E-06	3.20E-06	4.01E-06
Pu-239	7.62E-05	4.45E-02	0.288	2.28E-05	4.90E-05	1.03E-04	1.30E-04
Pu-240	1.26E-05	7.38E-03	4.78E-02	3.79E-06	8.12E-06	1.71E-05	2.15E-05
Pu-241	1.21E-04	7.06E-02	0.458	3.63E-05	7.78E-05	1.64E-04	2.06E-04
Pu-242	6.42E-10	3.75E-07	2.43E-06	1.92E-10	4.13E-10	8.71E-10	1.09E-09
Am-241	1.17E-04	6.82E-02	0.442	6.63E-05	1.01E-04	1.34E-04	1.51E-04
Am-243	3.72E-09	2.18E-06	1.41E-05	1.71E-09	3.22E-09	4.10E-09	4.48E-09
Cm-242	1.58E-09	9.24E-07	5.99E-06	0	0	1.60E-09	1.62E-09
Cm-243	3.23E-11	1.89E-08	1.22E-07	0	0	3.27E-11	3.31E-11
Cm-244	1.89E-10	1.11E-07	7.16E-07	0	0	1.95E-10	2.12E-10
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	1.27E-03 (g/L)	----	4.80E-03	3.69E-04	8.10E-04	1.73E-03	2.17E-03
U	1.38E-02	1.91E+03	12.4	5.95E-03	9.74E-03	1.82E-02	2.26E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-106

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	3.27E+06 (kg)	(537 kgal)	---	---	---	---	---
Heat Load	4.30 (kW)	(1.47E+04 BTU/hr)	---	4.03	4.16	4.44	4.57
Bulk Density*	1.61 (g/cc)	---	---	1.56	1.58	1.63	1.65
Water wt%†	32.7	---	---	30.1	31.3	34.2	36.0
TOC wt% C (w	0.750	---	---	0.491	0.618	0.883	1.01

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.52E-04	0.157	512	1.32E-04	1.32E-04	2.60E-04	2.70E-04
C-14	3.63E-05	2.25E-02	73.7	1.11E-05	1.11E-05	3.68E-05	3.73E-05
Ni-59	2.35E-06	1.46E-03	4.77	1.17E-06	1.17E-06	2.41E-06	2.47E-06
Ni-63	2.30E-04	0.143	468	1.13E-04	1.13E-04	2.36E-04	2.42E-04
Co-60	4.01E-05	2.50E-02	81.6	1.13E-05	1.13E-05	4.09E-05	4.16E-05
Se-79	3.60E-06	2.24E-03	7.32	2.00E-06	2.00E-06	4.18E-06	4.74E-06
Sr-90	0.120	74.6	2.44E+05	0.112	0.116	0.124	0.128
Y-90	0.120	74.6	2.44E+05	6.45E-02	6.45E-02	0.124	0.128
Zr-93	1.77E-05	1.10E-02	35.9	9.65E-06	9.65E-06	2.06E-05	2.34E-05
Nb-93m	1.28E-05	7.98E-03	26.1	7.21E-06	7.21E-06	1.49E-05	1.68E-05
Tc-99	2.58E-04	0.161	525	1.64E-04	2.10E-04	3.07E-04	3.53E-04
Ru-106	7.14E-09	4.44E-06	1.45E-02	3.42E-09	3.42E-09	7.97E-09	8.73E-09
Cd-113m	9.28E-05	5.77E-02	189	4.46E-05	4.46E-05	1.10E-04	1.27E-04
Sb-125	1.73E-04	0.107	351	4.78E-05	4.78E-05	1.76E-04	1.79E-04
Sn-126	5.44E-06	3.39E-03	11.1	3.03E-06	3.03E-06	6.32E-06	7.15E-06
I-129	*4.98E-07*	*3.10E-04*	*1.01*	*3.16E-07*	*4.05E-07*	*5.91E-07*	*6.82E-07*
Cs-134	2.73E-06	1.70E-03	5.56	1.95E-06	2.31E-06	3.14E-06	3.53E-06
Cs-137	0.279	174	5.67E+05	0.251	0.265	0.293	0.307
Ba-137m	0.264	164	5.36E+05	0.207	0.207	0.278	0.291
Sm-151	1.27E-02	7.89	2.58E+04	7.06E-03	7.06E-03	1.47E-02	1.67E-02
Eu-152	4.16E-06	2.59E-03	8.45	2.17E-06	2.17E-06	4.44E-06	4.72E-06
Eu-154	6.51E-04	0.405	1.32E+03	2.50E-04	2.50E-04	7.97E-04	8.55E-04
Eu-155	2.46E-04	0.153	500	1.27E-04	1.27E-04	2.63E-04	2.80E-04
Ra-226	1.54E-10	9.59E-08	3.13E-04	1.04E-10	1.04E-10	1.72E-10	1.89E-10
Ra-228	1.51E-07	9.39E-05	0.307	6.32E-08	1.06E-07	2.03E-07	2.59E-07
Ac-227	9.75E-10	6.06E-07	1.98E-03	6.86E-10	6.86E-10	1.08E-09	1.18E-09
Pa-231	4.47E-09	2.78E-06	9.09E-03	2.87E-09	2.87E-09	5.05E-09	5.61E-09
Th-229	3.54E-09	2.20E-06	7.20E-03	1.61E-09	2.55E-09	4.68E-09	5.90E-09
Th-232	1.01E-08	6.25E-06	2.04E-02	5.20E-09	7.58E-09	1.25E-08	1.49E-08
U-232	7.76E-07	4.83E-04	1.58	4.24E-07	5.96E-07	9.85E-07	1.21E-06
U-233	2.98E-06	1.85E-03	6.05	1.63E-06	2.29E-06	3.78E-06	4.63E-06
U-234	8.69E-07	5.41E-04	1.77	8.37E-07	8.53E-07	8.87E-07	8.96E-07
U-235	3.53E-08	2.19E-05	7.17E-02	3.39E-08	3.45E-08	3.60E-08	3.64E-08
U-236	2.72E-08	1.69E-05	5.53E-02	2.62E-08	2.68E-08	2.76E-08	2.80E-08
U-238	1.01E-06	6.27E-04	2.05	9.75E-07	9.90E-07	1.03E-06	1.03E-06
Np-237	9.43E-07	5.87E-04	1.92	6.37E-07	7.86E-07	1.10E-06	1.25E-06
Pu-238	1.47E-06	9.15E-04	2.99	1.11E-06	1.29E-06	1.66E-06	1.83E-06
Pu-239	5.06E-05	3.14E-02	103	4.13E-05	4.59E-05	5.52E-05	5.97E-05
Pu-240	*8.57E-06*	*5.33E-03*	*17.4*	*6.85E-06*	*7.70E-06*	*9.45E-06*	*1.03E-05*
Pu-241	9.95E-05	6.19E-02	202	7.49E-05	8.69E-05	1.12E-04	1.24E-04
Pu-242	5.46E-10	3.40E-07	1.11E-03	4.00E-10	4.71E-10	6.21E-10	6.93E-10
Am-241	6.13E-05	3.81E-02	125	4.43E-05	5.26E-05	7.01E-05	7.84E-05
Am-243	2.13E-09	1.32E-06	4.32E-03	1.59E-09	1.85E-09	2.41E-09	2.69E-09
Cm-242	1.58E-07	9.80E-05	0.320	7.59E-08	7.59E-08	1.68E-07	1.79E-07
Cm-243	1.46E-08	9.08E-06	2.97E-02	6.80E-09	6.80E-09	1.56E-08	1.65E-08
Cm-244	1.44E-07	8.97E-05	0.293	6.39E-08	6.39E-08	1.71E-07	1.89E-07

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	6.34E-04 (g/L)	---	1.29	4.59E-04	5.45E-04	7.22E-04	8.07E-04
U	*9.95E-03*	*1.47E+03*	*4.81E+03*	9.55E-03	9.74E-03	1.02E-02	1.03E-02

*Density is calculated based on Na, OH-, and AlO2-.

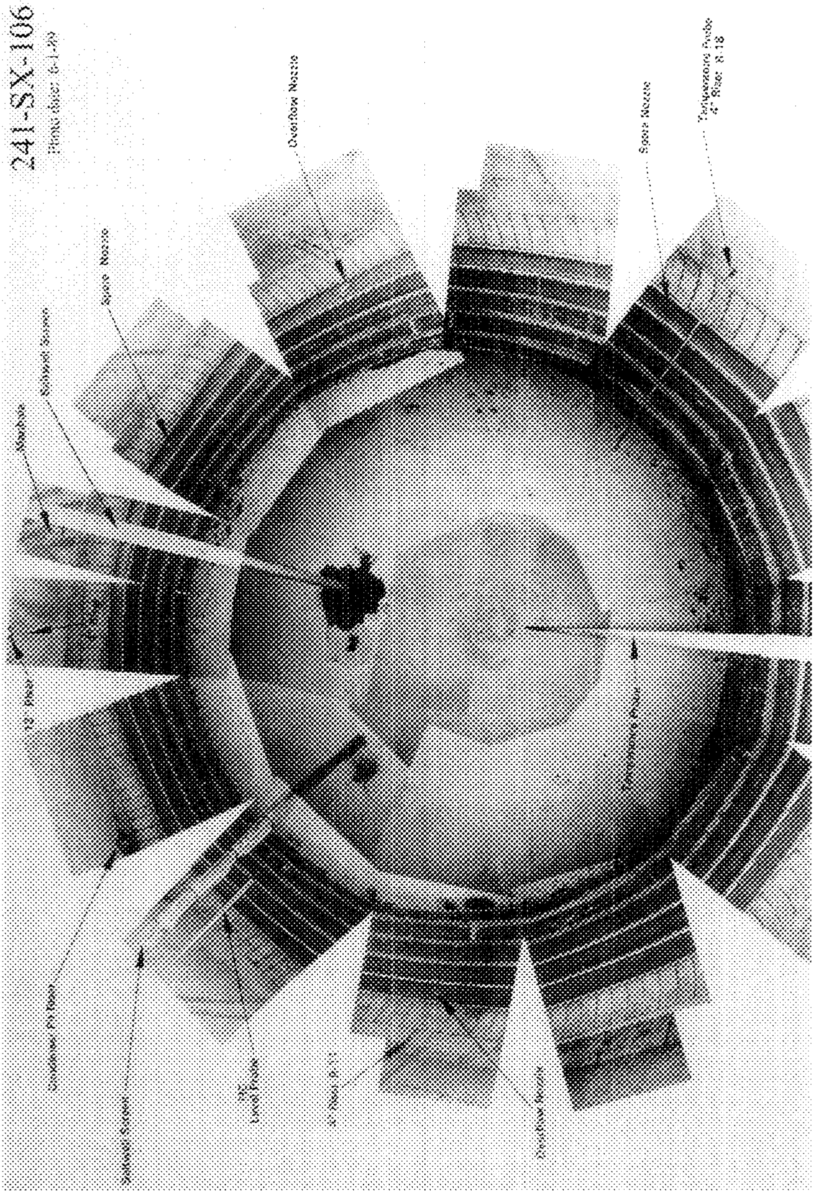
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-106							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	3.27E+06 (kg)	(538 kgal)	----	----	----	----	----
Heat Load	4.31 (kW)	(1.47E+04 BTU/hr)	----	4.05	4.18	4.45	4.58
Bulk Density†	1.61 (g/cc)	----	----	1.56	1.58	1.63	1.65
Water wt%†	32.7	----	----	30.1	31.3	34.2	36.0
TOC wt% C (w	0.749	----	----	0.490	0.617	0.881	1.01
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.52E-04	0.157	513	1.32E-04	1.32E-04	2.60E-04	2.70E-04
C-14	3.62E-05	2.25E-02	73.7	1.11E-05	1.11E-05	3.68E-05	3.73E-05
Ni-59	2.36E-06	1.47E-03	4.80	1.18E-06	1.18E-06	2.42E-06	2.47E-06
Ni-63	2.31E-04	0.144	470	1.14E-04	1.14E-04	2.37E-04	2.43E-04
Co-60	4.01E-05	2.49E-02	81.6	1.13E-05	1.13E-05	4.08E-05	4.16E-05
Se-79	3.61E-06	2.24E-03	7.35	2.00E-06	2.00E-06	4.19E-06	4.74E-06
Sr-90	0.120	74.8	2.45E+05	0.112	0.116	0.124	0.128
Y-90	0.120	74.8	2.45E+05	6.49E-02	6.49E-02	0.124	0.128
Zr-93	1.77E-05	1.10E-02	36.1	9.69E-06	9.69E-06	2.06E-05	2.34E-05
Nb-93m	1.29E-05	8.00E-03	26.2	7.25E-06	7.25E-06	1.49E-05	1.68E-05
Tc-99	2.58E-04	0.160	525	1.64E-04	2.10E-04	3.06E-04	3.53E-04
Ru-106	7.13E-09	4.44E-06	1.45E-02	3.42E-09	3.42E-09	7.96E-09	8.72E-09
Cd-113m	9.27E-05	5.76E-02	189	4.46E-05	4.46E-05	1.10E-04	1.27E-04
Sb-125	1.72E-04	0.107	351	4.78E-05	4.78E-05	1.76E-04	1.79E-04
Sn-126	5.45E-06	3.39E-03	11.1	3.05E-06	3.05E-06	6.32E-06	7.16E-06
I-129	4.97E-07	3.09E-04	1.01	3.16E-07	4.05E-07	5.91E-07	6.81E-07
Cs-134	2.73E-06	1.70E-03	5.57	1.95E-06	2.30E-06	3.13E-06	3.53E-06
Cs-137	0.279	174	5.68E+05	0.251	0.265	0.293	0.307
Ba-137m	0.264	164	5.38E+05	0.207	0.207	0.278	0.291
Sm-151	1.27E-02	7.90	2.59E+04	7.09E-03	7.09E-03	1.47E-02	1.67E-02
Eu-152	4.17E-06	2.59E-03	8.49	2.18E-06	2.18E-06	4.45E-06	4.73E-06
Eu-154	6.51E-04	0.405	1.33E+03	2.50E-04	2.50E-04	7.96E-04	8.53E-04
Eu-155	2.46E-04	0.153	501	1.28E-04	1.28E-04	2.64E-04	2.81E-04
Ra-226	1.55E-10	9.62E-08	3.15E-04	1.05E-10	1.05E-10	1.73E-10	1.90E-10
Ra-228	1.51E-07	9.37E-05	0.307	6.31E-08	1.06E-07	2.03E-07	2.58E-07
Ac-227	9.78E-10	6.08E-07	1.99E-03	6.90E-10	6.90E-10	1.08E-09	1.18E-09
Pa-231	4.48E-09	2.79E-06	9.13E-03	2.88E-09	2.88E-09	5.06E-09	5.62E-09
Th-229	3.53E-09	2.20E-06	7.20E-03	1.61E-09	2.55E-09	4.68E-09	5.89E-09
Th-232	1.00E-08	6.24E-06	2.04E-02	5.19E-09	7.56E-09	1.25E-08	1.49E-08
U-232	7.75E-07	4.82E-04	1.58	4.24E-07	5.95E-07	9.83E-07	1.21E-06
U-233	2.97E-06	1.85E-03	6.05	1.63E-06	2.28E-06	3.77E-06	4.62E-06
U-234	8.70E-07	5.41E-04	1.77	8.38E-07	8.52E-07	8.88E-07	8.97E-07
U-235	3.53E-08	2.19E-05	7.19E-02	3.39E-08	3.46E-08	3.61E-08	3.64E-08
U-236	2.73E-08	1.70E-05	5.55E-02	2.63E-08	2.68E-08	2.77E-08	2.81E-08
U-238	1.01E-06	6.27E-04	2.05	9.75E-07	9.91E-07	1.03E-06	1.03E-06
Np-237	9.42E-07	5.86E-04	1.92	6.36E-07	7.85E-07	1.10E-06	1.25E-06
Pu-238	1.47E-06	9.16E-04	3.00	1.11E-06	1.29E-06	1.66E-06	1.83E-06
Pu-239	5.06E-05	3.15E-02	103	4.14E-05	4.59E-05	5.53E-05	5.98E-05
Pu-240	8.58E-06	5.34E-03	17.5	6.86E-06	7.71E-06	9.45E-06	1.03E-05
Pu-241	9.95E-05	6.19E-02	203	7.50E-05	8.70E-05	1.12E-04	1.24E-04
Pu-242	5.46E-10	3.40E-07	1.11E-03	4.00E-10	4.72E-10	6.21E-10	6.93E-10
Am-241	6.14E-05	3.82E-02	125	4.44E-05	5.27E-05	7.01E-05	7.85E-05
Am-243	2.13E-09	1.32E-06	4.34E-03	1.59E-09	1.85E-09	2.42E-09	2.69E-09
Cm-242	1.57E-07	9.78E-05	0.320	7.58E-08	7.58E-08	1.68E-07	1.79E-07
Cm-243	1.46E-08	9.06E-06	2.97E-02	6.79E-09	6.79E-09	1.55E-08	1.65E-08
Cm-244	1.44E-07	8.95E-05	0.293	6.38E-08	6.38E-08	1.71E-07	1.88E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	6.35E-04 (g/L)	----	1.29	4.61E-04	5.46E-04	7.23E-04	8.08E-04
U	9.96E-03	1.47E+03	4.83E+03	9.55E-03	9.75E-03	1.02E-02	1.03E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-SX-106
Overflow Nozzle
Spare Nozzle

TANK 241-SX-107 SUMMARY

TANK HISTORY	
Entered Service	2nd qtr 1956
Removed from Service	-
Inactive	-
Watch Lists	none
Integrity	Assumed Leaker
Assumed Leaker	1964
Interim Stabilization (IS)	Oct 1979
Partial Interim Isolation (PI)	-
Intrusion Prevention (IP)	Sept 1982
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
6, 16, 17	12 in
13A	18 in
TANK TEMPERATURE	
Average Tank Temperature	145°F
Maximum Temperature	177.4°F
Date	Nov 7, 1994
Elevation from tank bottom	0.5 ft
Riser Number	10
Minimum Temperature	109°F
Date	Dec 4, 1992
Elevation from tank bottom	4.33 ft, 5.0 ft, 5.66 ft
Riser Number	10 and 14

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	to 241-SX-108
Total Risers	29
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	104,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	5,000 gal
Pumpable Liquids	0 gal
Saltcake	0 gal
Sludge	104,000 gal
Supernatant	0 gal
INTERIOR PHOTOGRAPHS	
Date	March 6, 1987
Montage Number	94041033-34CN
Photo Set Number	8701420
WASTE SURFACE LEVEL	
Devices	Manual Tape
Max Level	41.75 in
Date	April 4, 1994
Min Level	35 in
Date	Oct 2, 1996

WASTE TYPES TIME LINE (ANDERSON 1990)	R:		
PRIMARY ADDITIONS TIME LINE (AGNEW 1995)	R1: WTR:	CWR1: R2: WTR:	R2: RSLTCK: WTR:

TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996

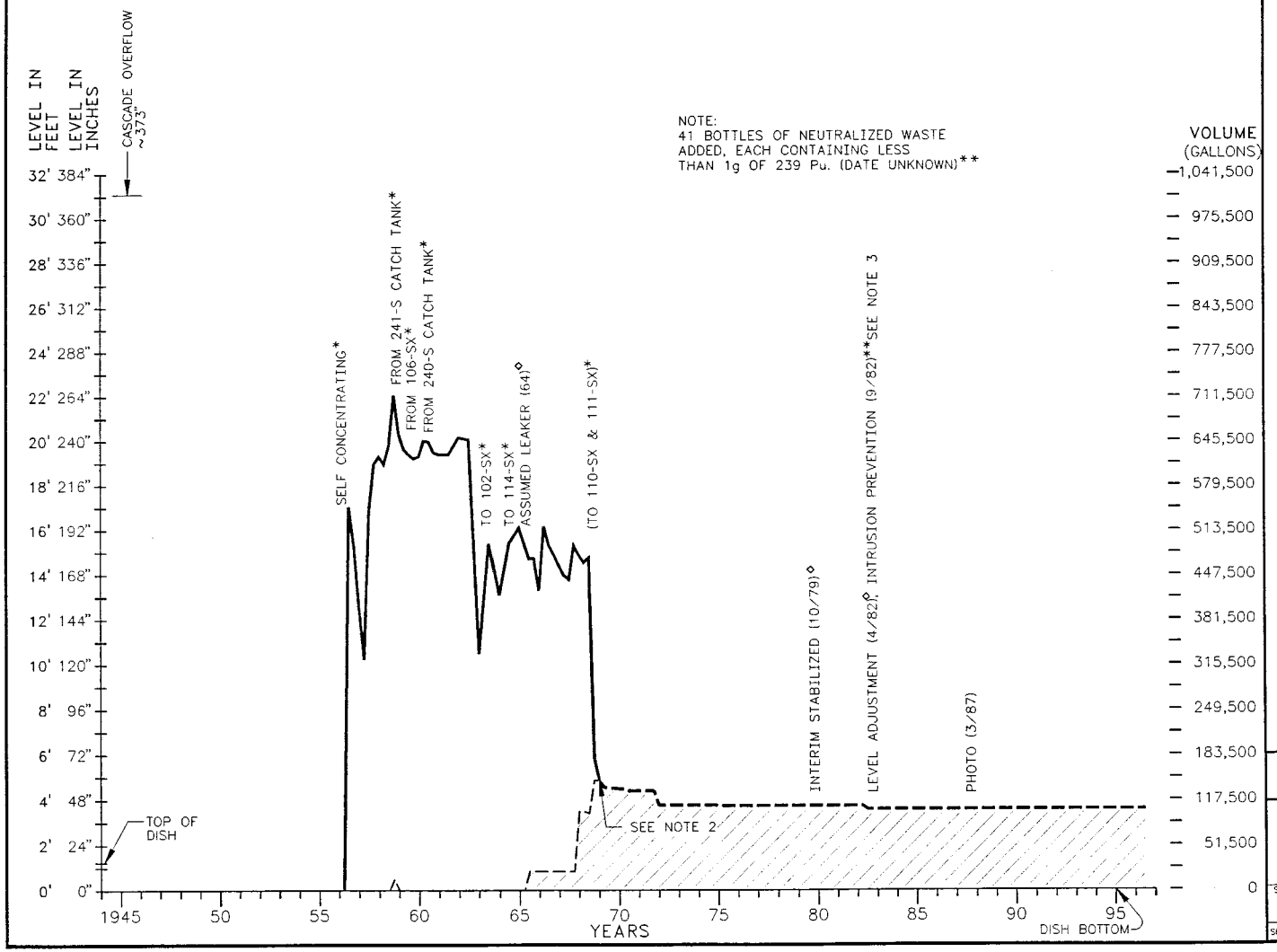
NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.
3) IN JUNE 1993, INTERIM ISOLATION WAS REPLACED BY INTRUSION PREVENTION.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

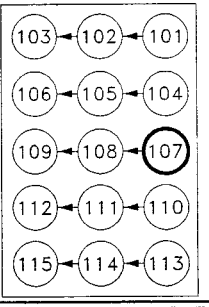
CWR1:	REDOX CLADDING WASTE 1952-60
R:	REDOX HIGH-LEVEL WASTE
R1:	REDOX WASTE 1952-57
R2:	REDOX WASTE 1958-66
RSLTCK:	SALTCAKE
WTR:	WATER



LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- SOLIDS

SX TANK FARM CASCADE

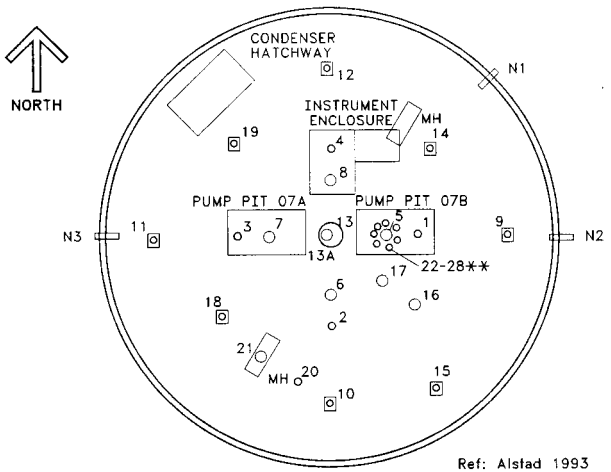


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-107 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1956-1996
ASSUMED LEAKER/STABILIZED TANK
WATCH LIST: N/A

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E85	12/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

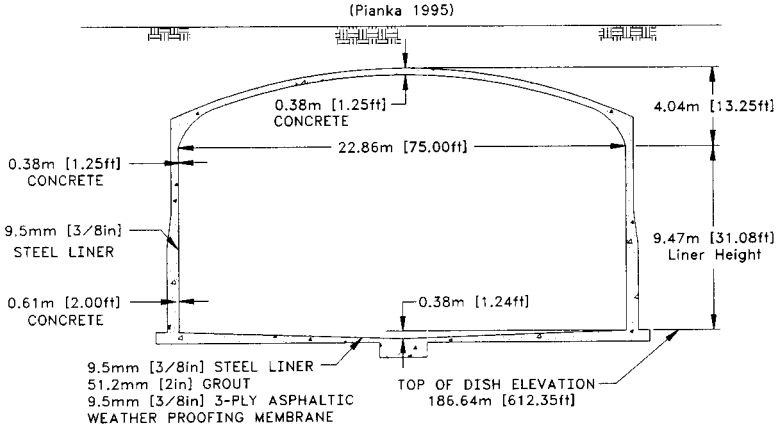
241-SX-107



Ref: Alstad 1993
H-2-73210, Rev. 2

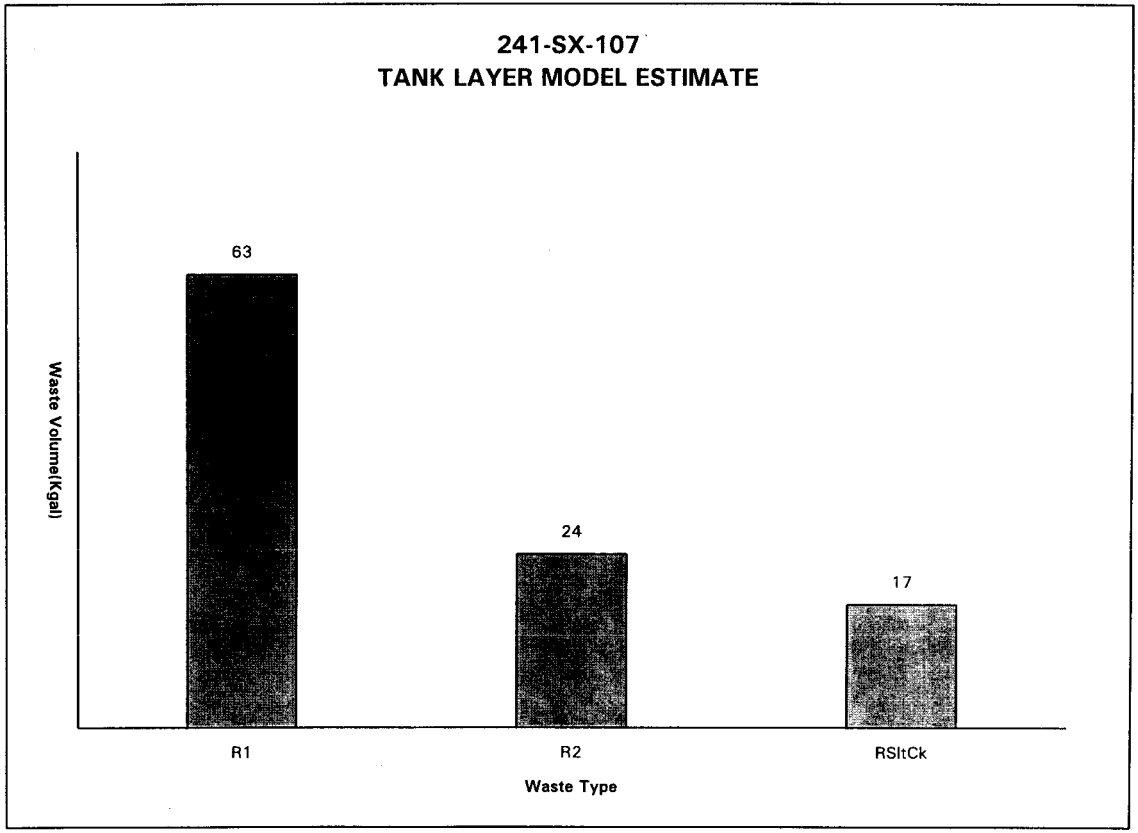
TANK RISER LOCATION

Approximate Grade Elevation 202.08m [663ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-107

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	6.88E+05 (kg)	(104 kgal)	---	---	---	---	---
Heat Load	9.51 (kW)	(3.25E+04 BTU/hr)	---	9.08	9.33	9.63	9.68
Bulk Density	1.75 (g/cc)	---	---	1.59	1.61	1.96	2.04
Void Fraction	0.588	---	---	0.300	0.395	0.710	0.713
Water wt%	29.3	---	---	12.8	18.0	38.5	39.4
TOC wt% C (w	8.42E-04	---	---	7.20E-04	7.50E-04	9.17E-04	9.95E-04

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	8.08	1.06E+05	7.31E+04	5.00	5.31	12.1	14.2
Al3+	6.71	1.04E+05	7.12E+04	6.39	6.48	6.95	7.20
Fe3+ (total Fe)	1.24	3.95E+04	2.72E+04	1.22	1.23	1.24	1.25
Cr3+	0.187	5.58E+03	3.83E+03	0.131	0.158	0.466	0.791
Bi3+	1.12E-06	0.134	9.24E-02	9.49E-07	1.03E-06	1.24E-06	1.36E-06
La3+	2.77E-12	2.20E-07	1.51E-07	2.42E-12	2.62E-12	3.06E-12	3.36E-12
Hg2+	1.76E-07	2.03E-02	1.39E-02	1.56E-07	1.66E-07	1.94E-07	2.13E-07
Zr (as ZrO(OH)2	1.12E-07	5.86E-03	4.03E-03	1.03E-07	1.07E-07	1.18E-07	1.27E-07
Pb2+	2.80E-05	3.32	2.28	1.50E-05	2.13E-05	3.47E-05	4.13E-05
Ni2+	6.03E-02	2.03E+03	1.39E+03	5.18E-02	5.66E-02	6.32E-02	6.26E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	8.18E-06	0.257	0.177	5.84E-06	6.98E-06	9.38E-06	1.06E-05
Ca2+	0.263	6.03E+03	4.15E+03	0.218	0.240	0.286	0.308
K+	1.48E-02	330	227	8.74E-03	1.11E-02	1.72E-02	1.72E-02
OH-	26.6	2.59E+05	1.78E+05	25.1	25.6	27.7	28.7
NO3-	4.06	1.44E+05	9.91E+04	0.895	0.895	9.01	11.7
NO2-	1.55	4.09E+04	2.81E+04	0.751	1.03	1.97	1.97
CO32-	0.264	9.06E+03	6.23E+03	0.219	0.241	0.287	0.309
PO43-	7.27E-05	3.95	2.72	6.75E-05	7.05E-05	7.57E-05	8.23E-05
SO42-	1.70E-02	935	643	1.14E-02	1.37E-02	1.92E-02	1.92E-02
Si (as SiO32-)	0.136	2.19E+03	1.50E+03	3.22E-02	3.43E-02	0.238	0.336
F-	5.79E-05	0.630	0.433	4.93E-05	5.46E-05	6.37E-05	6.86E-05
Cl-	6.56E-02	1.33E+03	915	3.79E-02	4.90E-02	7.68E-02	0.129
C6H5O73-	5.99E-05	6.48	4.45	5.80E-05	5.89E-05	6.25E-05	6.80E-05
EDTA4-	2.33E-06	0.385	0.264	1.64E-06	2.02E-06	2.75E-06	3.16E-06
HEDTA3-	1.94E-06	0.304	0.209	6.21E-07	1.33E-06	2.58E-06	3.22E-06
glycolate-	8.45E-05	3.63	2.49	4.58E-05	6.68E-05	1.05E-04	1.25E-04
acetate-	8.77E-06	0.296	0.204	8.49E-06	8.63E-06	9.32E-06	9.96E-06
oxalate2-	3.62E-12	1.83E-07	1.26E-07	3.21E-12	3.41E-12	3.99E-12	4.39E-12
DBP	5.31E-05	6.39	4.39	4.96E-05	5.16E-05	5.74E-05	6.20E-05
butanol	5.31E-05	2.25	1.55	4.96E-05	5.16E-05	5.74E-05	6.20E-05
NH3	0.269	2.61E+03	1.80E+03	0.153	0.170	0.441	0.286
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-107							
SMM Composite Inventory Estimate							
Physical Properties				-95 Cl	-67 Cl	+67 Cl	+95 Cl
Total SMM W	0 (kg)	(1.10E-02 kgal)	----	----	----	----	----
Heat Load	0 (kW)	(0 BTU/hr)	----	0	0	0	0
Bulk Density*	0 (g/cc)	----	----	0	0	0	0
Water wt%	0	---	----	0	0	0	0
TOC wt% C (w	0	---	----	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 Cl (mole/L)**	**-67 Cl (mole/L)**	**+67 Cl (mole/L)**	**+95 Cl (mole/L)**
Na+	0	0	0	0	0	0	0
Al3+	0	0	0	0	0	0	0
Fe3+ (total Fe)	0	0	0	0	0	0	0
Cr3+	0	0	0	0	0	0	0
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	0	0	0	0	0	0	0
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0	0	0	0	0	0	0
K+	0	0	0	0	0	0	0
OH-	0	0	0	0	0	0	0
NO3-	0	0	0	0	0	0	0
NO2-	0	0	0	0	0	0	0
CO32-	0	0	0	0	0	0	0
PO43-	0	0	0	0	0	0	0
SO42-	0	0	0	0	0	0	0
Si (as SiO32-)	0	0	0	0	0	0	0
F-	0	0	0	0	0	0	0
Cl-	0	0	0	0	0	0	0
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0	0	0	0	0	0	0
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-107							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	6.88E+05 (kg)	(104 kgal)	----	---	---	---	---
Heat Load	9.51 (kW)	(3.25E+04 BTU/hr)	----	9.08	9.33	9.63	9.68
Bulk Density†	1.75 (g/cc)	---	---	1.59	1.61	1.96	2.04
Water wt%†	29.3	---	---	12.8	18.0	38.5	39.4
TOC wt% C (w	8.42E-04	---	----	7.20E-04	7.50E-04	9.17E-04	9.95E-04
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	8.08	1.06E+05	7.31E+04	5.00	5.31	12.1	14.2
Al3+	6.70	1.04E+05	7.12E+04	6.39	6.48	6.95	7.20
Fe3+ (total Fe)	1.24	3.95E+04	2.72E+04	1.22	1.23	1.24	1.25
Cr3+	0.187	5.58E+03	3.83E+03	0.131	0.158	0.466	0.791
Bi3+	1.12E-06	0.134	9.24E-02	9.49E-07	1.03E-06	1.24E-06	1.36E-06
La3+	2.77E-12	2.20E-07	1.51E-07	2.42E-12	2.62E-12	3.06E-12	3.36E-12
Hg2+	1.76E-07	2.03E-02	1.39E-02	1.56E-07	1.66E-07	1.94E-07	2.13E-07
Zr (as ZrO(OH)2	1.12E-07	5.86E-03	4.03E-03	1.03E-07	1.07E-07	1.18E-07	1.27E-07
Pb2+	2.80E-05	3.32	2.28	1.50E-05	2.13E-05	3.47E-05	4.13E-05
Ni2+	6.03E-02	2.03E+03	1.39E+03	5.18E-02	5.66E-02	6.32E-02	6.26E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	8.17E-06	0.257	0.177	5.84E-06	6.98E-06	9.38E-06	1.06E-05
Ca2+	0.263	6.03E+03	4.15E+03	0.218	0.240	0.286	0.308
K+	1.48E-02	330	227	8.74E-03	1.11E-02	1.72E-02	1.72E-02
OH-	26.9	2.59E+05	1.78E+05	25.1	25.6	27.7	28.7
NO3-	4.06	1.44E+05	9.91E+04	0.895	0.895	9.01	11.7
NO2-	1.55	4.09E+04	2.81E+04	0.751	1.03	1.97	1.97
CO32-	0.264	9.06E+03	6.23E+03	0.219	0.241	0.287	0.309
PO43-	7.27E-05	3.95	2.72	6.75E-05	7.05E-05	7.57E-05	8.23E-05
SO42-	1.70E-02	935	643	1.14E-02	1.37E-02	1.92E-02	1.92E-02
Si (as SiO32-)	0.136	2.19E+03	1.50E+03	3.22E-02	3.43E-02	0.238	0.336
F-	5.79E-05	0.630	0.433	4.93E-05	5.46E-05	6.37E-05	6.86E-05
Cl-	6.56E-02	1.33E+03	915	3.79E-02	4.90E-02	7.68E-02	0.129
C6H5O73-	5.99E-05	6.48	4.45	5.80E-05	5.89E-05	6.25E-05	6.80E-05
EDTA4-	2.33E-06	0.385	0.264	1.64E-06	2.02E-06	2.75E-06	3.16E-06
HEDTA3-	1.94E-06	0.304	0.209	6.21E-07	1.33E-06	2.58E-06	3.22E-06
glycolate-	8.45E-05	3.63	2.49	4.58E-05	6.68E-05	1.05E-04	1.25E-04
acetate-	8.77E-06	0.296	0.204	8.49E-06	8.63E-06	9.32E-06	9.96E-06
oxalate2-	3.62E-12	1.83E-07	1.26E-07	3.21E-12	3.41E-12	3.99E-12	4.39E-12
DBP	5.31E-05	6.39	4.39	4.96E-05	5.16E-05	5.74E-05	6.20E-05
butanol	5.31E-05	2.25	1.55	4.96E-05	5.16E-05	5.74E-05	6.20E-05
NH3	0.269	2.61E+03	1.80E+03	0.153	0.170	0.441	0.286
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-107

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	6.88E+05 (kg)	(104 kgal)	---	---	---	---	---
Heat Load	9.51 (kW)	(3.25E+04 BTU/hr)	---	9.08	9.33	9.63	9.68
Bulk Density	1.75 (g/cc)	---	---	1.59	1.61	1.96	2.04
Void Fraction	0.588	---	---	0.300	0.395	0.710	0.713
Water wt%	29.3	---	---	12.8	18.0	38.5	39.4
TOC wt% C (w	8.42E-04	---	---	7.20E-04	7.50E-04	9.17E-04	9.95E-04

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	8.81E-05	5.04E-02	34.7	5.16E-05	5.16E-05	9.52E-05	9.52E-05
C-14	4.70E-06	2.69E-03	1.85	2.83E-06	2.83E-06	5.19E-06	5.19E-06
Ni-59	2.88E-05	1.65E-02	11.3	2.61E-05	2.75E-05	2.99E-05	3.03E-05
Ni-63	2.80E-03	1.60	1.10E+03	2.53E-03	2.67E-03	2.91E-03	2.94E-03
Co-60	3.86E-06	2.21E-03	1.52	2.17E-06	2.17E-06	4.05E-06	4.08E-06
Se-79	9.47E-06	5.42E-03	3.73	1.78E-06	1.78E-06	1.81E-05	2.64E-05
Sr-90	3.48	2.00E+03	1.37E+06	3.32	3.41	3.54	3.55
Y-90	3.49	2.00E+03	1.37E+06	3.32	3.41	3.54	3.55
Zr-93	4.04E-05	2.31E-02	15.9	8.47E-06	8.47E-06	8.35E-05	1.25E-04
Nb-93m	3.74E-05	2.14E-02	14.7	6.78E-06	7.22E-06	6.76E-05	9.65E-05
Tc-99	3.60E-05	2.06E-02	14.2	2.75E-05	2.86E-05	3.95E-05	3.95E-05
Ru-106	8.34E-10	4.77E-07	3.28E-04	4.45E-10	4.45E-10	1.85E-09	2.25E-08
Cd-113m	1.85E-05	1.06E-02	7.29	1.09E-05	1.09E-05	1.52E-04	4.00E-04
Sb-125	1.31E-05	7.51E-03	5.16	7.11E-06	7.11E-06	1.34E-05	1.39E-05
Sn-126	1.23E-05	7.06E-03	4.85	2.71E-06	2.71E-06	2.53E-05	3.77E-05
I-129	6.85E-08	3.92E-05	2.70E-02	5.22E-08	5.44E-08	7.51E-08	7.51E-08
Cs-134	9.53E-07	5.46E-04	0.375	5.77E-07	5.77E-07	9.68E-07	9.98E-07
Cs-137	0.147	84.4	5.80E+04	0.122	0.121	0.157	0.157
Ba-137m	0.139	79.8	5.49E+04	8.94E-02	8.94E-02	0.149	0.149
Sm-151	3.39E-02	19.4	1.34E+04	6.35E-03	6.35E-03	6.41E-02	9.31E-02
Eu-152	3.15E-05	1.81E-02	12.4	3.01E-05	3.01E-05	3.16E-05	3.16E-05
Eu-154	9.31E-05	5.33E-02	36.6	5.28E-05	5.28E-05	9.77E-05	1.86E-03
Eu-155	1.59E-03	0.913	628	1.52E-03	1.52E-03	1.60E-03	1.60E-03
Ra-226	2.44E-09	1.40E-06	9.61E-04	1.88E-09	2.15E-09	2.73E-09	3.01E-09
Ra-228	2.58E-09	1.47E-06	1.01E-03	5.10E-14	5.10E-14	2.60E-09	2.63E-09
Ac-227	1.10E-08	6.28E-06	4.32E-03	7.93E-09	9.29E-09	1.26E-08	1.42E-08
Pa-231	1.05E-08	6.04E-06	4.15E-03	2.49E-09	2.49E-09	1.92E-08	2.74E-08
Th-229	6.56E-11	3.76E-08	2.58E-05	3.87E-12	3.87E-12	6.61E-11	6.68E-11
Th-232	3.45E-11	1.98E-08	1.36E-05	1.79E-15	1.79E-15	4.35E-11	5.24E-11
U-232	1.15E-08	6.59E-06	4.53E-03	4.07E-09	7.51E-09	1.64E-08	2.18E-08
U-233	4.40E-08	2.52E-05	1.73E-02	1.56E-08	2.87E-08	6.27E-08	8.36E-08
U-234	3.13E-07	1.79E-04	0.123	1.96E-07	2.53E-07	3.78E-07	4.43E-07
U-235	1.27E-08	7.29E-06	5.01E-03	8.00E-09	1.03E-08	1.54E-08	1.80E-08
U-236	1.20E-08	6.85E-06	4.71E-03	7.28E-09	9.60E-09	1.44E-08	1.69E-08
U-238	2.79E-07	1.60E-04	0.110	1.76E-07	2.26E-07	3.37E-07	3.95E-07
Np-237	1.68E-07	9.63E-05	6.62E-02	1.13E-07	1.35E-07	1.90E-07	1.90E-07
Pu-238	2.18E-05	1.25E-02	8.56	1.79E-05	1.98E-05	2.37E-05	2.56E-05
Pu-239	6.34E-04	0.363	250	5.54E-04	5.93E-04	6.76E-04	7.15E-04
Pu-240	1.08E-04	6.19E-02	42.5	9.38E-05	1.01E-04	1.15E-04	1.22E-04
Pu-241	1.09E-03	0.626	431	9.11E-04	1.00E-03	1.19E-03	1.28E-03
Pu-242	5.99E-09	3.43E-06	2.36E-03	4.94E-09	5.45E-09	6.52E-09	7.04E-09
Am-241	5.32E-04	0.304	209	2.78E-04	4.02E-04	6.61E-04	7.85E-04
Am-243	2.35E-08	1.35E-05	9.27E-03	1.21E-08	1.77E-08	2.94E-08	3.50E-08
Cm-242	1.32E-06	7.57E-04	0.520	1.32E-06	1.31E-06	1.32E-06	1.32E-06
Cm-243	1.26E-07	7.23E-05	4.97E-02	1.26E-07	1.25E-07	1.26E-07	1.26E-07
Cm-244	3.75E-06	2.15E-03	1.48	2.91E-06	3.32E-06	4.18E-06	4.60E-06

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	1.07E-02 (g/L)	---	4.21	9.34E-03	1.00E-02	1.14E-02	1.20E-02
U	3.47E-03	472	325	2.19E-03	2.81E-03	4.19E-03	4.91E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-107							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	0 (kg)	(1.10E-02 kgal)	----	----	----	----	----
Heat Load	0 (kW)	(0 BTU/hr)	----	0	0	0	0
Bulk Density*	0 (g/cc)	----	----	0	0	0	0
Water wt%†	0	----	----	0	0	0	0
TOC wt% C (w	0	----	----	0	0	0	0
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	0	0	0	0	0	0	0
C-14	0	0	0	0	0	0	0
Ni-59	0	0	0	0	0	0	0
Ni-63	0	0	0	0	0	0	0
Co-60	0	0	0	0	0	0	0
Se-79	0	0	0	0	0	0	0
Sr-90	0	0	0	0	0	0	0
Y-90	0	0	0	0	0	0	0
Zr-93	0	0	0	0	0	0	0
Nb-93m	0	0	0	0	0	0	0
Tc-99	0	0	0	0	0	0	0
Ru-106	0	0	0	0	0	0	0
Cd-113m	0	0	0	0	0	0	0
Sb-125	0	0	0	0	0	0	0
Sn-126	0	0	0	0	0	0	0
I-129	0	0	0	0	0	0	0
Cs-134	0	0	0	0	0	0	0
Cs-137	0	0	0	0	0	0	0
Ba-137m	0	0	0	0	0	0	0
Sm-151	0	0	0	0	0	0	0
Eu-152	0	0	0	0	0	0	0
Eu-154	0	0	0	0	0	0	0
Eu-155	0	0	0	0	0	0	0
Ra-226	0	0	0	0	0	0	0
Ra-228	0	0	0	0	0	0	0
Ac-227	0	0	0	0	0	0	0
Pa-231	0	0	0	0	0	0	0
Th-229	0	0	0	0	0	0	0
Th-232	0	0	0	0	0	0	0
U-232	0	0	0	0	0	0	0
U-233	0	0	0	0	0	0	0
U-234	0	0	0	0	0	0	0
U-235	0	0	0	0	0	0	0
U-236	0	0	0	0	0	0	0
U-238	0	0	0	0	0	0	0
Np-237	0	0	0	0	0	0	0
Pu-238	0	0	0	0	0	0	0
Pu-239	0	0	0	0	0	0	0
Pu-240	0	0	0	0	0	0	0
Pu-241	0	0	0	0	0	0	0
Pu-242	0	0	0	0	0	0	0
Am-241	0	0	0	0	0	0	0
Am-243	0	0	0	0	0	0	0
Cm-242	0	0	0	0	0	0	0
Cm-243	0	0	0	0	0	0	0
Cm-244	0	0	0	0	0	0	0
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	0 (g/L)	----	0	0	0	0	0
U	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

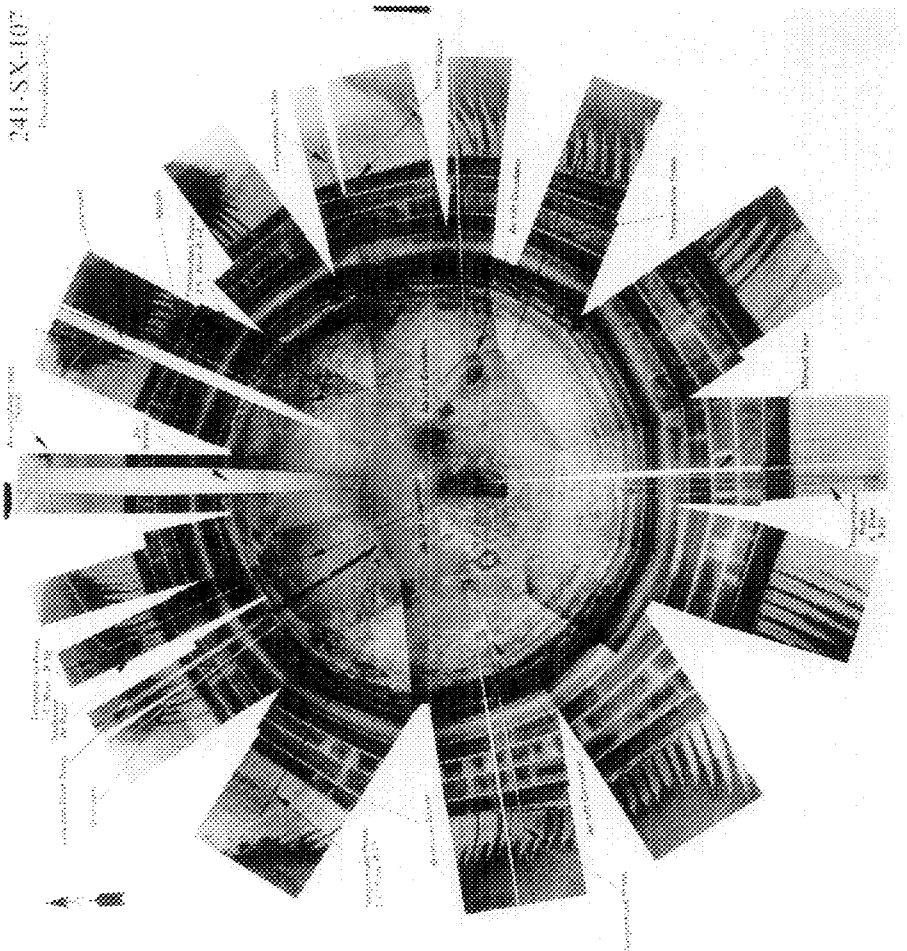
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-107							
Total Inventory Estimate*							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total Waste	6.88E+05 (kg)	(104 kgal)	----	----	----	----	----
Heat Load	9.51 (kW)	(3.25E+04 BTU/hr)	----	9.08	9.33	9.63	9.68
Bulk Density†	1.75 (g/cc)	----	----	1.59	1.61	1.96	2.04
Water wt%†	29.3	----	----	12.8	18.0	38.5	39.4
TOC wt% C (w	8.42E-04	----	----	7.20E-04	7.50E-04	9.17E-04	9.95E-04
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	8.81E-05	5.04E-02	34.7	5.16E-05	5.16E-05	9.52E-05	9.52E-05
C-14	4.70E-06	2.69E-03	1.85	2.83E-06	2.83E-06	5.19E-06	5.19E-06
Ni-59	2.88E-05	1.65E-02	11.3	2.61E-05	2.75E-05	2.99E-05	3.03E-05
Ni-63	2.80E-03	1.60	1.10E+03	2.53E-03	2.67E-03	2.91E-03	2.94E-03
Co-60	3.86E-06	2.21E-03	1.52	2.17E-06	2.17E-06	4.05E-06	4.08E-06
Se-79	9.47E-06	5.42E-03	3.73	1.78E-06	1.78E-06	1.81E-05	2.64E-05
Sr-90	3.48	2.00E+03	1.37E+06	3.32	3.41	3.54	3.55
Y-90	3.48	2.00E+03	1.37E+06	3.32	3.41	3.54	3.55
Zr-93	4.04E-05	2.31E-02	15.9	8.47E-06	8.47E-06	8.35E-05	1.25E-04
Nb-93m	3.74E-05	2.14E-02	14.7	6.78E-06	7.22E-06	6.76E-05	9.65E-05
Tc-99	3.60E-05	2.06E-02	14.2	2.75E-05	2.86E-05	3.95E-05	3.95E-05
Ru-106	8.34E-10	4.77E-07	3.28E-04	4.45E-10	4.45E-10	1.85E-09	2.25E-08
Cd-113m	1.85E-05	1.06E-02	7.29	1.09E-05	1.09E-05	1.52E-04	4.00E-04
Sb-125	1.31E-05	7.51E-03	5.16	7.11E-06	7.11E-06	1.34E-05	1.39E-05
Sn-126	1.23E-05	7.06E-03	4.85	2.71E-06	2.71E-06	2.53E-05	3.77E-05
I-129	6.85E-08	3.92E-05	2.70E-02	5.22E-08	5.44E-08	7.51E-08	7.51E-08
Cs-134	9.53E-07	5.46E-04	0.375	5.77E-07	5.77E-07	9.68E-07	9.98E-07
Cs-137	0.147	84.4	5.80E+04	0.122	0.121	0.157	0.157
Ba-137m	0.139	79.8	5.49E+04	8.94E-02	8.94E-02	0.149	0.149
Sm-151	3.39E-02	19.4	1.34E+04	6.35E-03	6.35E-03	6.41E-02	9.31E-02
Eu-152	3.15E-05	1.81E-02	12.4	3.01E-05	3.01E-05	3.16E-05	3.16E-05
Eu-154	9.30E-05	5.33E-02	36.6	5.28E-05	5.28E-05	9.77E-05	1.86E-03
Eu-155	1.59E-03	0.913	628	1.52E-03	1.52E-03	1.60E-03	1.60E-03
Ra-226	2.44E-09	1.40E-06	9.61E-04	1.88E-09	2.15E-09	2.73E-09	3.01E-09
Ra-228	2.58E-09	1.47E-06	1.01E-03	5.10E-14	5.10E-14	2.60E-09	2.63E-09
Ac-227	1.10E-08	6.28E-06	4.32E-03	7.93E-09	9.29E-09	1.26E-08	1.42E-08
Pa-231	1.05E-08	6.04E-06	4.15E-03	2.49E-09	2.49E-09	1.92E-08	2.74E-08
Th-229	6.56E-11	3.76E-08	2.58E-05	3.87E-12	3.87E-12	6.61E-11	6.68E-11
Th-232	3.45E-11	1.98E-08	1.36E-05	1.79E-15	1.79E-15	4.35E-11	5.24E-11
U-232	1.15E-08	6.59E-06	4.53E-03	4.07E-09	7.51E-09	1.64E-08	2.18E-08
U-233	4.40E-08	2.52E-05	1.73E-02	1.56E-08	2.87E-08	6.27E-08	8.36E-08
U-234	3.13E-07	1.79E-04	0.123	1.96E-07	2.53E-07	3.78E-07	4.43E-07
U-235	1.27E-08	7.29E-06	5.01E-03	8.00E-09	1.03E-08	1.54E-08	1.80E-08
U-236	1.20E-08	6.85E-06	4.71E-03	7.28E-09	9.60E-09	1.44E-08	1.69E-08
U-238	2.79E-07	1.60E-04	0.110	1.76E-07	2.26E-07	3.37E-07	3.95E-07
Np-237	1.68E-07	9.63E-05	6.62E-02	1.13E-07	1.35E-07	1.90E-07	1.90E-07
Pu-238	2.17E-05	1.25E-02	8.56	1.79E-05	1.98E-05	2.37E-05	2.56E-05
Pu-239	6.34E-04	0.363	250	5.54E-04	5.93E-04	6.76E-04	7.15E-04
Pu-240	1.08E-04	6.19E-02	42.5	9.38E-05	1.01E-04	1.15E-04	1.22E-04
Pu-241	1.09E-03	0.626	431	9.11E-04	1.00E-03	1.19E-03	1.28E-03
Pu-242	5.99E-09	3.43E-06	2.36E-03	4.94E-09	5.45E-09	6.52E-09	7.04E-09
Am-241	5.32E-04	0.304	209	2.78E-04	4.02E-04	6.61E-04	7.85E-04
Am-243	2.35E-08	1.35E-05	9.27E-03	1.21E-08	1.77E-08	2.94E-08	3.50E-08
Cm-242	1.32E-06	7.57E-04	0.520	1.32E-06	1.31E-06	1.32E-06	1.32E-06
Cm-243	1.26E-07	7.23E-05	4.97E-02	1.26E-07	1.25E-07	1.26E-07	1.26E-07
Cm-244	3.75E-06	2.15E-03	1.48	2.91E-06	3.32E-06	4.18E-06	4.60E-06
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	1.07E-02 (g/L)	----	4.21	9.34E-03	1.00E-02	1.14E-02	1.20E-02
U	3.47E-03	472	325	2.19E-03	2.81E-03	4.19E-03	4.91E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.


241-SX-107

TANK 241-SX-108 SUMMARY

TANK HISTORY	
Entered Service	4th qtr 1955
Removed from Service	-
Inactive	-
Watch Lists	none
Integrity	Assumed Leaker
Assumed Leaker	1962
Interim Stabilization (IS)	Aug 1979
Partial Interim Isolation (PI)	-
Intrusion Prevention (IP)	Dec 1982

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
7, 16, 17	12 in

TANK TEMPERATURE	
Average Tank Temperature	158°F
Maximum Temperature	204°F
Date	Oct 31, 1994
Elevation from tank bottom	0.5 ft
Riser Number	19
Minimum Temperature	129.74°F
Date	March 25 - April 5, 1996*
Elevation from tank bottom	4.67 ft
Riser Number	10

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	to 241-SX-109
Total Risers	22

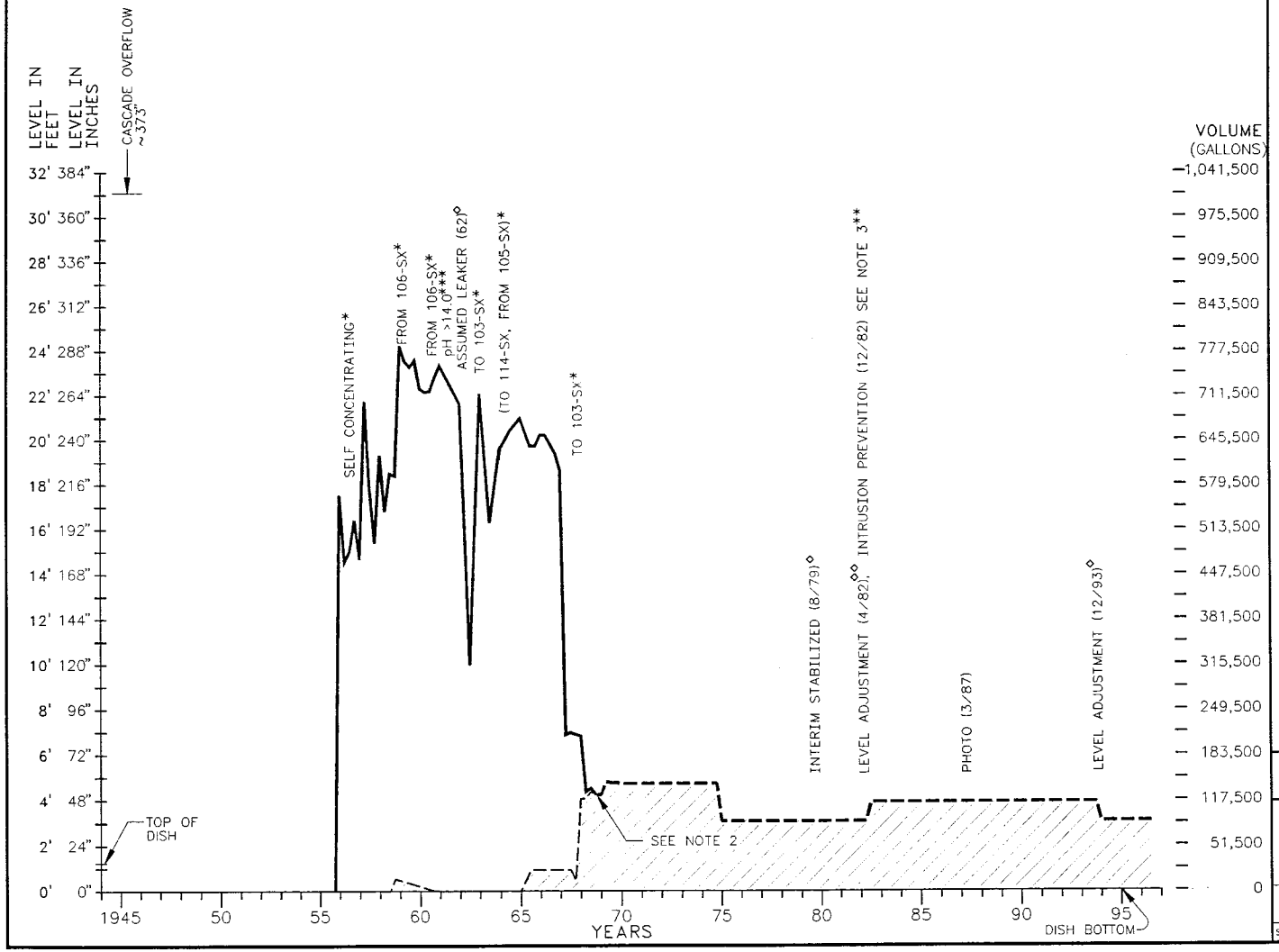
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	87,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	5,000 gal
Pumpable Liquids	0 gal
Saltcake	0 gal
Sludge	87,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	March 6, 1987
Montage Number	94041033-31CN
Photo Set Number	8701429

WASTE SURFACE LEVEL	
Devices	Manual Tape
Max Level	37.75 in
Date	Jan 3, 1994
Min Level	32 in
Date	July 2, 1994

• Numerous dates in this time span

WASTE TYPES TIME LINE (ANDERSON 1990)	R:		
PRIMARY ADDITIONS TIME LINE (AGNEW 1995)	R1: R2: WTR:	R2: WTR:	RSLTCK: WTR:



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i
◇◇ McCANN 1982b

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.
3) IN JUNE 1993, INTERIM ISOLATION WAS REPLACED BY INTRUSION PREVENTION.

GLOSSARY OF WASTE TERMS:

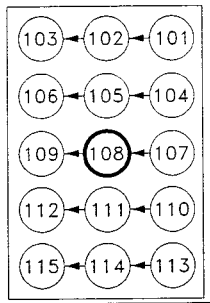
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

R:	REDOX HIGH-LEVEL WASTE
R1:	REDOX WASTE 1952-57
R2:	REDOX WASTE 1958-66
RSLTCK:	SALTCAKE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- SOLIDS

SX TANK FARM CASCADE

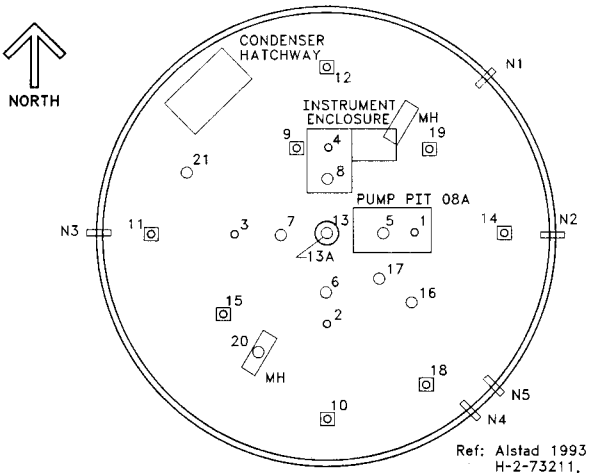


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-108 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1955-1996
ASSUMED LEAKER/STABILIZED TANK
WATCH LIST: N/A

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E86	12/96
SCALE NONE	JOB NO.	SHEET 1 OF 1	

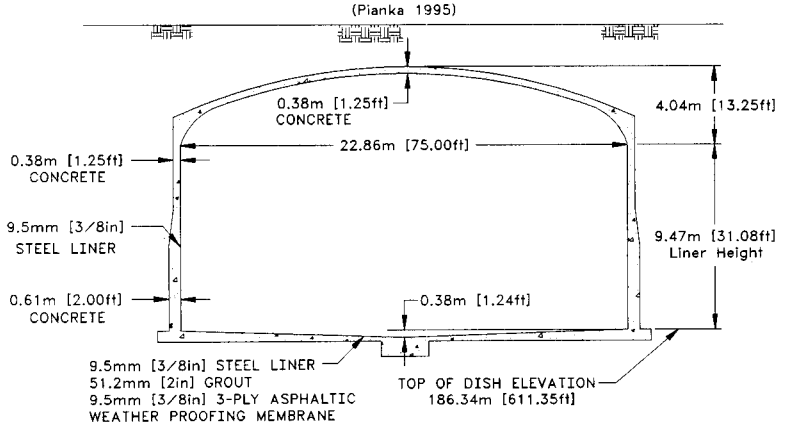
241-SX-108



Ref: Alstad 1993
H-2-73211, Rev. 2

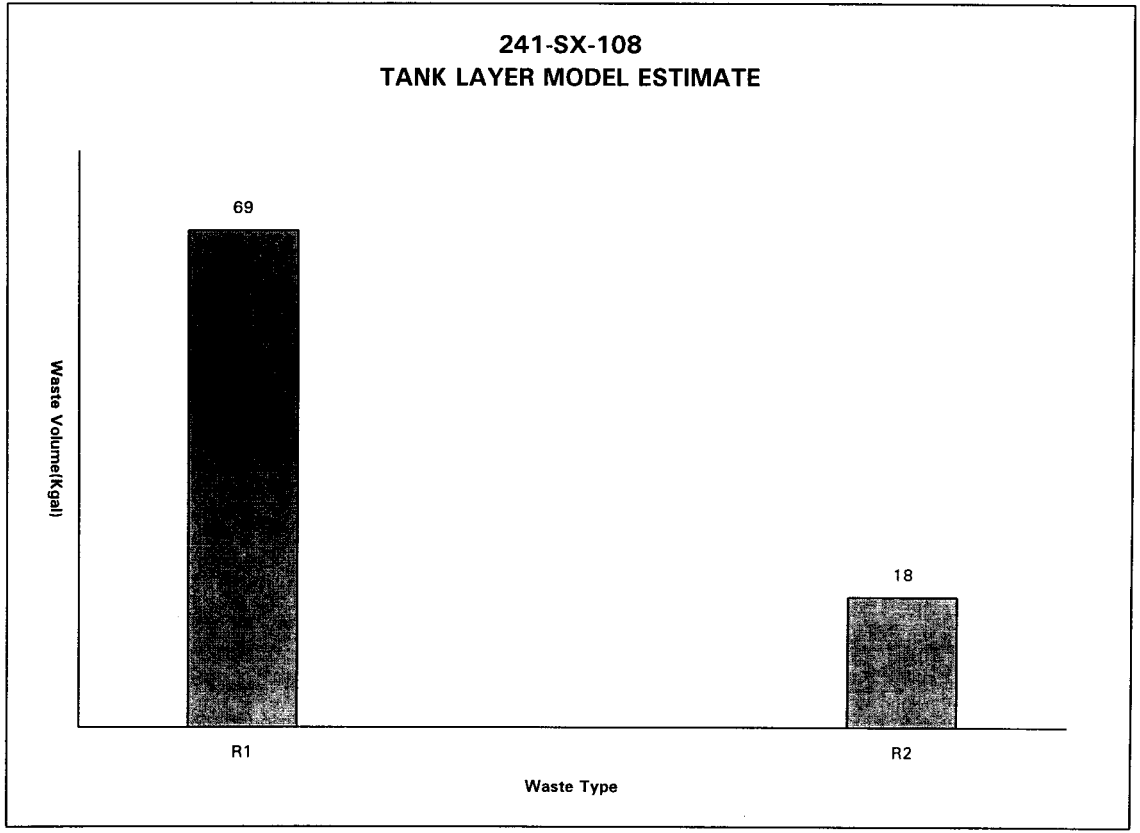
TANK RISER LOCATION

Approximate Grade Elevation 201.84m [662.2ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-108							
TLM Solids Composite Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total TLM Wa	5.78E+05 (kg)	(87.0 kgal)	---	---	---	---	---
Heat Load	7.51 (kW)	(2.56E+04 BTU/hr)	---	7.04	7.32	7.64	7.69
Bulk Density	1.75 (g/cc)	---	---	1.56	1.58	2.03	2.14
Void Fraction	0.547	---	---	0.169	0.294	0.706	0.710
Water wt%	28.0	---	---	7.54	13.9	40.1	41.3
TOC wt% C (w	0	---	---	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	7.30	9.57E+04	5.53E+04	3.27	3.67	12.5	15.3
Al3+	7.26	1.12E+05	6.45E+04	6.94	7.07	7.39	7.39
Fe3+ (total Fe)	1.36	4.33E+04	2.50E+04	1.34	1.35	1.37	1.37
Cr3+	6.29E-02	1.86E+03	1.08E+03	1.94E-02	4.07E-02	0.428	0.854
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	6.45E-02	2.16E+03	1.25E+03	5.33E-02	5.97E-02	6.83E-02	6.76E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.279	6.38E+03	3.69E+03	0.220	0.249	0.310	0.339
K+	1.13E-02	253	146	3.46E-03	6.61E-03	1.45E-02	1.45E-02
OH-	27.5	2.67E+05	1.54E+05	25.5	26.5	28.6	29.8
NO3-	4.19	1.48E+05	8.56E+04	4.78E-02	4.78E-02	10.7	14.2
NO2-	1.48	3.89E+04	2.25E+04	0.432	0.799	2.03	2.03
CO32-	0.279	9.56E+03	5.52E+03	0.220	0.249	0.310	0.339
PO43-	0	0	0	0	0	0	0
SO42-	1.19E-02	653	377	4.61E-03	7.53E-03	1.49E-02	1.49E-02
Si (as SiO32-)	0.105	1.68E+03	971	1.18E-02	1.37E-02	0.197	0.284
F-	0	0	0	0	0	0	0
Cl-	5.22E-02	1.05E+03	609	1.59E-02	3.04E-02	6.68E-02	0.136
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.299	2.90E+03	1.68E+03	0.149	0.170	0.454	0.322
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-108							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	0 (kg)	(1.50E-02 kgal)	----	----	----	----	----
Heat Load	0 (kW)	(0 BTU/hr)	----	0	0	0	0
Bulk Density*	0 (g/cc)	----	----	0	0	0	0
Water wt%	0	----	----	0	0	0	0
TOC wt% C (w	0	----	----	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	0	0	0	0	0	0	0
Al3+	0	0	0	0	0	0	0
Fe3+ (total Fe)	0	0	0	0	0	0	0
Cr3+	0	0	0	0	0	0	0
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	0	0	0	0	0	0	0
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0	0	0	0	0	0	0
K+	0	0	0	0	0	0	0
OH-	0	0	0	0	0	0	0
NO3-	0	0	0	0	0	0	0
NO2-	0	0	0	0	0	0	0
CO32-	0	0	0	0	0	0	0
PO43-	0	0	0	0	0	0	0
SO42-	0	0	0	0	0	0	0
Si (as SiO32-)	0	0	0	0	0	0	0
F-	0	0	0	0	0	0	0
Cl-	0	0	0	0	0	0	0
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0	0	0	0	0	0	0
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-108							
Total Inventory Estimate*							
Physical Properties				**-95 Cl**	**-67 Cl**	**+67 Cl**	**+95 Cl**
Total Waste	5.78E+05 (kg)	(87.0 kgal)	----	----	----	----	----
Heat Load	7.51 (kW)	(2.56E+04 BTU/hr)	----	7.04	7.32	7.64	7.69
Bulk Density†	1.75 (g/cc)	—	—	1.56	1.58	2.03	2.14
Water wt%†	28.0	—	—	7.54	13.9	40.1	41.3
TOC wt% C (w	0	—	—	0	0	0	0
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 Cl (mole/L)**	**-67 Cl (mole/L)**	**+67 Cl (mole/L)**	**+95 Cl (mole/L)**
Na+	7.30	9.57E+04	5.53E+04	3.27	3.67	12.5	15.3
Al3+	7.26	1.12E+05	6.45E+04	6.94	7.07	7.39	7.39
Fe3+ (total Fe)	1.36	4.33E+04	2.50E+04	1.34	1.35	1.37	1.37
Cr3+	6.29E-02	1.86E+03	1.08E+03	1.94E-02	4.07E-02	0.428	0.854
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	6.45E-02	2.16E+03	1.25E+03	5.33E-02	5.97E-02	6.83E-02	6.76E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0.279	6.38E+03	3.69E+03	0.220	0.249	0.310	0.339
K+	1.13E-02	253	146	3.46E-03	6.61E-03	1.45E-02	1.45E-02
OH-	27.5	2.67E+05	1.54E+05	25.5	26.5	28.6	29.8
NO3-	4.19	1.48E+05	8.56E+04	4.78E-02	4.78E-02	10.7	14.2
NO2-	1.48	3.89E+04	2.25E+04	0.432	0.799	2.03	2.03
CO32-	0.279	9.56E+03	5.52E+03	0.220	0.249	0.310	0.339
PO43-	0	0	0	0	0	0	0
SO42-	1.19E-02	653	377	4.61E-03	7.53E-03	1.49E-02	1.49E-02
Si (as SiO32-)	0.105	1.68E+03	971	1.18E-02	1.37E-02	0.197	0.284
F-	0	0	0	0	0	0	0
Cl-	5.22E-02	1.05E+03	609	1.59E-02	3.04E-02	6.68E-02	0.136
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0.299	2.90E+03	1.68E+03	0.149	0.170	0.454	0.322
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-108

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	5.78E+05 (kg)	(87.0 kgal)	---	---	---	---	---
Heat Load	7.51 (kW)	(2.56E+04 BTU/hr)	---	7.04	7.32	7.64	7.69
Bulk Density	1.75 (g/cc)	---	---	1.56	1.58	2.03	2.14
Void Fraction	0.547	---	---	0.169	0.294	0.706	0.710
Water wt%	28.0	---	---	7.54	13.9	40.1	41.3
TOC wt% C (w	0	---	---	0	0	0	0

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	5.36E-05	3.06E-02	17.7	3.28E-05	3.43E-05	6.30E-05	6.30E-05
C-14	3.10E-06	1.77E-03	1.02	1.51E-06	2.15E-06	3.74E-06	3.74E-06
Ni-59	2.86E-05	1.63E-02	9.40	2.53E-05	2.71E-05	2.96E-05	2.99E-05
Ni-63	2.76E-03	1.57	908	2.45E-03	2.63E-03	2.86E-03	2.89E-03
Co-60	2.17E-06	1.24E-03	0.715	1.54E-06	1.26E-06	2.42E-06	2.42E-06
Se-79	7.59E-06	4.33E-03	2.50	7.02E-07	7.02E-07	1.53E-05	2.27E-05
Sr-90	3.32	1.89E+03	1.09E+06	3.11	3.23	3.39	3.40
Y-90	3.32	1.89E+03	1.09E+06	3.11	3.23	3.39	3.40
Zr-93	3.19E-05	1.82E-02	10.5	3.34E-06	3.34E-06	7.06E-05	1.08E-04
Nb-93m	3.01E-05	1.71E-02	9.90	2.63E-06	3.02E-06	5.71E-05	8.31E-05
Tc-99	2.32E-05	1.33E-02	7.65	1.21E-05	1.66E-05	2.77E-05	2.77E-05
Ru-106	3.99E-10	2.28E-07	1.32E-04	3.53E-10	1.51E-10	1.31E-09	1.99E-08
Cd-113m	1.16E-05	6.59E-03	3.80	6.64E-06	7.79E-06	1.31E-04	3.54E-04
Sb-125	6.70E-06	3.82E-03	2.21	5.78E-06	3.16E-06	7.07E-06	7.07E-06
Sn-126	9.67E-06	5.52E-03	3.19	1.05E-06	1.05E-06	2.13E-05	3.24E-05
I-129	4.43E-08	2.53E-05	1.46E-02	2.29E-08	3.15E-08	5.29E-08	5.29E-08
Cs-134	5.24E-07	2.99E-04	0.173	4.84E-07	3.07E-07	5.38E-07	5.38E-07
Cs-137	9.87E-02	56.3	3.25E+04	6.60E-02	7.52E-02	0.112	0.112
Ba-137m	9.34E-02	53.2	3.07E+04	6.24E-02	7.12E-02	0.106	0.106
Sm-151	2.72E-02	15.5	8.96E+03	2.49E-03	2.49E-03	5.43E-02	8.02E-02
Eu-152	2.87E-05	1.64E-02	9.46	2.86E-05	2.86E-05	2.88E-05	2.88E-05
Eu-154	5.28E-05	3.01E-02	17.4	3.76E-05	3.04E-05	5.89E-05	1.64E-03
Eu-155	1.45E-03	0.825	476	1.44E-03	1.44E-03	1.45E-03	1.45E-03
Ra-226	2.39E-09	1.36E-06	7.87E-04	1.65E-09	2.01E-09	2.77E-09	3.13E-09
Ra-228	4.80E-14	2.74E-11	1.58E-08	4.78E-14	4.77E-14	4.81E-14	4.81E-14
Ac-227	1.06E-08	6.05E-06	3.50E-03	7.09E-09	8.43E-09	1.28E-08	1.49E-08
Pa-231	8.12E-09	4.63E-06	2.67E-03	8.94E-10	8.94E-10	1.58E-08	2.33E-08
Th-229	3.91E-12	2.23E-09	1.29E-06	3.88E-12	3.89E-12	3.92E-12	3.92E-12
Th-232	1.75E-15	9.99E-13	5.77E-10	1.34E-15	9.48E-16	1.92E-15	1.92E-15
U-232	7.05E-12	4.02E-09	2.32E-06	3.37E-12	4.84E-12	8.52E-12	8.52E-12
U-233	2.25E-13	1.28E-10	7.42E-08	8.52E-14	1.41E-13	2.82E-13	2.82E-13
U-234	1.24E-07	7.06E-05	4.08E-02	4.01E-08	7.35E-08	1.57E-07	1.57E-07
U-235	5.17E-09	2.95E-06	1.70E-03	1.57E-09	3.01E-09	6.62E-09	6.62E-09
U-236	3.47E-09	1.98E-06	1.14E-03	2.15E-09	2.24E-09	4.01E-09	4.01E-09
U-238	1.17E-07	6.67E-05	3.85E-02	3.15E-08	6.56E-08	1.51E-07	1.51E-07
Np-237	1.20E-07	6.82E-05	3.94E-02	4.74E-08	7.62E-08	1.49E-07	1.49E-07
Pu-238	2.08E-05	1.19E-02	6.85	1.74E-05	1.91E-05	2.25E-05	2.42E-05
Pu-239	6.76E-04	0.385	222	5.70E-04	6.22E-04	7.30E-04	7.81E-04
Pu-240	1.12E-04	6.38E-02	36.8	9.68E-05	1.04E-04	1.20E-04	1.27E-04
Pu-241	1.06E-03	0.606	350	8.99E-04	9.79E-04	1.15E-03	1.23E-03
Pu-242	5.73E-09	3.27E-06	1.89E-03	4.79E-09	5.25E-09	6.21E-09	6.67E-09
Am-241	4.62E-04	0.263	152	2.34E-04	3.46E-04	5.77E-04	6.89E-04
Am-243	2.06E-08	1.17E-05	6.78E-03	1.03E-08	1.54E-08	2.58E-08	3.08E-08
Cm-242	1.22E-06	6.98E-04	0.403	1.22E-06	1.22E-06	1.23E-06	1.23E-06
Cm-243	1.14E-07	6.50E-05	3.76E-02	1.14E-07	1.13E-07	1.14E-07	1.14E-07
Cm-244	3.37E-06	1.92E-03	1.11	2.61E-06	2.98E-06	3.75E-06	4.12E-06

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	1.14E-02 (g/L)	---	3.74	9.61E-03	1.05E-02	1.23E-02	1.31E-02
U	1.47E-03	200	115	3.97E-04	8.26E-04	1.90E-03	1.90E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-108

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	0 (kg)	(1.50E-02 kgal)	---	---	---	---	---
Heat Load	0 (kW)	(0 BTU/hr)	---	0	0	0	0
Bulk Density*	0 (g/cc)	---	---	0	0	0	0
Water wt%†	0	---	---	0	0	0	0
TOC wt% C (w	0	---	---	0	0	0	0

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	0	0	0	0	0	0	0
C-14	0	0	0	0	0	0	0
Ni-59	0	0	0	0	0	0	0
Ni-63	0	0	0	0	0	0	0
Co-60	0	0	0	0	0	0	0
Se-79	0	0	0	0	0	0	0
Sr-90	0	0	0	0	0	0	0
Y-90	0	0	0	0	0	0	0
Zr-93	0	0	0	0	0	0	0
Nb-93m	0	0	0	0	0	0	0
Tc-99	0	0	0	0	0	0	0
Ru-106	0	0	0	0	0	0	0
Cd-113m	0	0	0	0	0	0	0
Sb-125	0	0	0	0	0	0	0
Sn-126	0	0	0	0	0	0	0
I-129	0	0	0	0	0	0	0
Cs-134	0	0	0	0	0	0	0
Cs-137	0	0	0	0	0	0	0
Ba-137m	0	0	0	0	0	0	0
Sm-151	0	0	0	0	0	0	0
Eu-152	0	0	0	0	0	0	0
Eu-154	0	0	0	0	0	0	0
Eu-155	0	0	0	0	0	0	0
Ra-226	0	0	0	0	0	0	0
Ra-228	0	0	0	0	0	0	0
Ac-227	0	0	0	0	0	0	0
Pa-231	0	0	0	0	0	0	0
Th-229	0	0	0	0	0	0	0
Th-232	0	0	0	0	0	0	0
U-232	0	0	0	0	0	0	0
U-233	0	0	0	0	0	0	0
U-234	0	0	0	0	0	0	0
U-235	0	0	0	0	0	0	0
U-236	0	0	0	0	0	0	0
U-238	0	0	0	0	0	0	0
Np-237	0	0	0	0	0	0	0
Pu-238	0	0	0	0	0	0	0
Pu-239	0	0	0	0	0	0	0
Pu-240	0	0	0	0	0	0	0
Pu-241	0	0	0	0	0	0	0
Pu-242	0	0	0	0	0	0	0
Am-241	0	0	0	0	0	0	0
Am-243	0	0	0	0	0	0	0
Cm-242	0	0	0	0	0	0	0
Cm-243	0	0	0	0	0	0	0
Cm-244	0	0	0	0	0	0	0

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	0 (g/L)	---	0	0	0	0	0
U	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-108							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	5.78E+05 (kg)	(87.0 kgal)	----	----	----	----	----
Heat Load	7.51 (kW)	(2.56E+04 BTU/hr)	----	7.04	7.32	7.64	7.69
Bulk Density†	1.75 (g/cc)	----	----	1.56	1.58	2.03	2.14
Water wt%†	28.0	----	----	7.54	13.9	40.1	41.3
TOC wt% C (w	0	----	----	0	0	0	0
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	5.36E-05	3.06E-02	17.7	3.28E-05	3.43E-05	6.30E-05	6.30E-05
C-14	3.10E-06	1.77E-03	1.02	1.51E-06	2.15E-06	3.74E-06	3.74E-06
Ni-59	2.85E-05	1.63E-02	9.40	2.53E-05	2.71E-05	2.96E-05	2.99E-05
Ni-63	2.76E-03	1.57	908	2.45E-03	2.63E-03	2.86E-03	2.89E-03
Co-60	2.17E-06	1.24E-03	0.715	1.54E-06	1.26E-06	2.42E-06	2.42E-06
Se-79	7.59E-06	4.33E-03	2.50	7.02E-07	7.02E-07	1.53E-05	2.27E-05
Sr-90	3.32	1.89E+03	1.09E+06	3.11	3.23	3.39	3.40
Y-90	3.32	1.89E+03	1.09E+06	3.11	3.23	3.39	3.40
Zr-93	3.19E-05	1.82E-02	10.5	3.34E-06	3.34E-06	7.06E-05	1.08E-04
Nb-93m	3.01E-05	1.71E-02	9.90	2.63E-06	3.02E-06	5.71E-05	8.31E-05
Tc-99	2.32E-05	1.33E-02	7.65	1.21E-05	1.66E-05	2.77E-05	2.77E-05
Ru-106	3.99E-10	2.28E-07	1.32E-04	3.53E-10	1.51E-10	1.31E-09	1.99E-08
Cd-113m	1.16E-05	6.59E-03	3.80	6.64E-06	7.79E-06	1.31E-04	3.54E-04
Sb-125	6.70E-06	3.82E-03	2.21	5.78E-06	3.16E-06	7.07E-06	7.07E-06
Sn-126	9.67E-06	5.52E-03	3.19	1.05E-06	1.05E-06	2.13E-05	3.24E-05
I-129	4.43E-08	2.53E-05	1.46E-02	2.29E-08	3.15E-08	5.29E-08	5.29E-08
Cs-134	5.24E-07	2.99E-04	0.173	4.84E-07	3.07E-07	5.38E-07	5.38E-07
Cs-137	9.87E-02	56.3	3.25E+04	6.60E-02	7.52E-02	0.112	0.112
Ba-137m	9.33E-02	53.2	3.07E+04	6.24E-02	7.12E-02	0.106	0.106
Sm-151	2.72E-02	15.5	8.96E+03	2.49E-03	2.49E-03	5.43E-02	8.02E-02
Eu-152	2.87E-05	1.64E-02	9.46	2.86E-05	2.86E-05	2.88E-05	2.88E-05
Eu-154	5.28E-05	3.01E-02	17.4	3.76E-05	3.04E-05	5.89E-05	1.64E-03
Eu-155	1.45E-03	0.825	476	1.44E-03	1.44E-03	1.45E-03	1.45E-03
Ra-226	2.39E-09	1.36E-06	7.87E-04	1.65E-09	2.01E-09	2.77E-09	3.13E-09
Ra-228	4.80E-14	2.74E-11	1.58E-08	4.78E-14	4.77E-14	4.81E-14	4.81E-14
Ac-227	1.06E-08	6.05E-06	3.50E-03	7.09E-09	8.43E-09	1.28E-08	1.49E-08
Pa-231	8.12E-09	4.63E-06	2.67E-03	8.94E-10	8.94E-10	1.58E-08	2.33E-08
Th-229	3.91E-12	2.23E-09	1.29E-06	3.88E-12	3.89E-12	3.92E-12	3.92E-12
Th-232	1.75E-15	9.99E-13	5.77E-10	1.34E-15	9.48E-16	1.92E-15	1.92E-15
U-232	7.05E-12	4.02E-09	2.32E-06	3.37E-12	4.84E-12	8.52E-12	8.52E-12
U-233	2.25E-13	1.28E-10	7.42E-08	8.52E-14	1.41E-13	2.82E-13	2.82E-13
U-234	1.24E-07	7.06E-05	4.08E-02	4.01E-08	7.35E-08	1.57E-07	1.57E-07
U-235	5.17E-09	2.95E-06	1.70E-03	1.57E-09	3.01E-09	6.62E-09	6.62E-09
U-236	3.47E-09	1.98E-06	1.14E-03	2.15E-09	2.24E-09	4.01E-09	4.01E-09
U-238	1.17E-07	6.67E-05	3.85E-02	3.15E-08	6.56E-08	1.51E-07	1.51E-07
Np-237	1.20E-07	6.82E-05	3.94E-02	4.74E-08	7.62E-08	1.49E-07	1.49E-07
Pu-238	2.08E-05	1.19E-02	6.85	1.74E-05	1.91E-05	2.25E-05	2.42E-05
Pu-239	6.76E-04	0.385	222	5.70E-04	6.22E-04	7.30E-04	7.81E-04
Pu-240	1.12E-04	6.38E-02	36.8	9.68E-05	1.04E-04	1.20E-04	1.27E-04
Pu-241	1.06E-03	0.606	350	8.99E-04	9.79E-04	1.15E-03	1.23E-03
Pu-242	5.73E-09	3.27E-06	1.89E-03	4.79E-09	5.25E-09	6.21E-09	6.67E-09
Am-241	4.61E-04	0.263	152	2.34E-04	3.46E-04	5.77E-04	6.89E-04
Am-243	2.06E-08	1.17E-05	6.78E-03	1.03E-08	1.54E-08	2.58E-08	3.08E-08
Cm-242	1.22E-06	6.98E-04	0.403	1.22E-06	1.22E-06	1.23E-06	1.23E-06
Cm-243	1.14E-07	6.50E-05	3.76E-02	1.14E-07	1.13E-07	1.14E-07	1.14E-07
Cm-244	3.37E-06	1.92E-03	1.11	2.61E-06	2.98E-06	3.75E-06	4.12E-06
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	1.14E-02 (g/L)	----	3.74	9.61E-03	1.05E-02	1.23E-02	1.31E-02
U	1.47E-03	200	115	3.97E-04	8.26E-04	1.90E-03	1.90E-03

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

†Volume average for density, mass average Water wt% and TOC wt% C.

241-SX-108

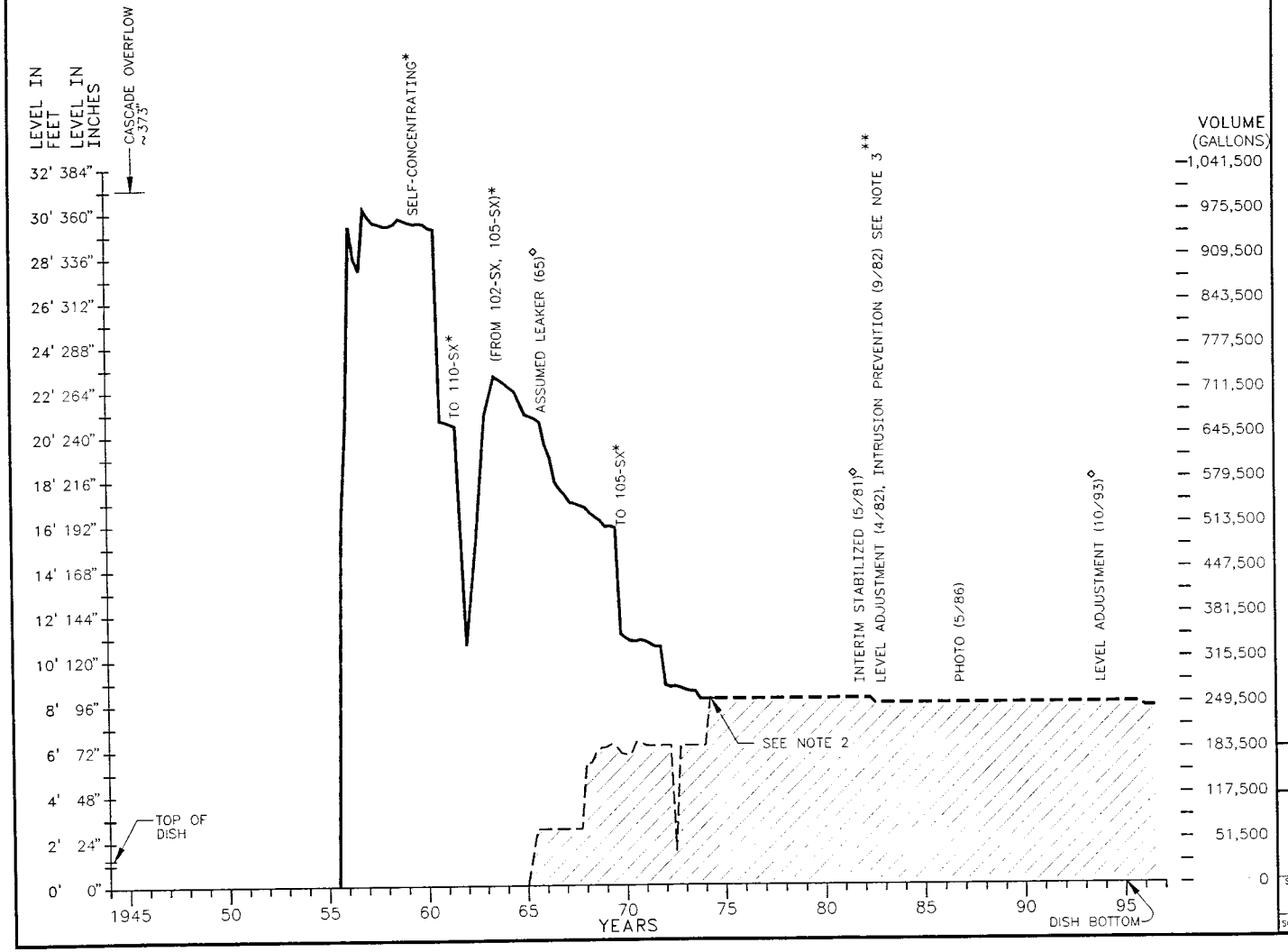
TANK 241-SX-109 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1955
Removed from Service	-
Inactive	-
Watch Lists	Hydrogen
Integrity	Assumed Leaker
Assumed Leaker	1965
Interim Stabilization (IS)	May 1981
Partial Interim Isolation (PI)	-
Intrusion Prevention (IP)	Sept 1982
TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
6	12 in
13A	20 in
TANK TEMPERATURE	
Average Tank Temperature	140°F
Maximum Temperature	153.9°F
Date	Feb 28, 1995
Elevation from tank bottom	unknown
Riser Number	19
Minimum Temperature	115.5°F
Date	Nov 6, 1994
Elevation from tank bottom	unknown
Riser Number	10

TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	none
Total Risers	21
WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	244,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	48,000 gal
Pumpable Liquids	25,000 gal
Saltcake	244,000 gal
Sludge	0 gal
Supernatant	0 gal
INTERIOR PHOTOGRAPHS	
Date	May 21, 1986
Montage Number	94041033-21CN
Photo Set Number	8603308
WASTE SURFACE LEVEL	
Devices	Manual Tape
Max Level	96 in
Date	Oct 2, 1993 - Jan 2, 1994*
Min Level	92 in
Date	Jan 4, 1991 - July 1, 1991*

* Numerous dates in this time span

WASTE TYPES TIME LINE (ANDERSON 1990)	R:			
PRIMARY ADDITIONS TIME LINE (AGNEW 1995)	R1: WTR:	R2: WTR:	RSLTCK:	WTR:



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.
3) IN JUNE 1993, INTERIM ISOLATION WAS REPLACED BY INTRUSION PREVENTION.

GLOSSARY OF WASTE TERMS:

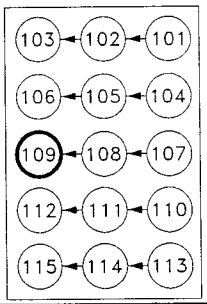
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

R:	REDOX HIGH-LEVEL WASTE
R1:	REDOX WASTE 1952-57
R2:	REDOX WASTE 1958-66
RSLTCK:	SALTCAKE
WTR:	WATER

LEGEND

TOTAL WASTE LEVEL (SUPERNATE)
TOTAL WASTE LEVEL (SOLIDS)
SOLIDS LEVEL
SOLIDS

SX TANK FARM CASCADE

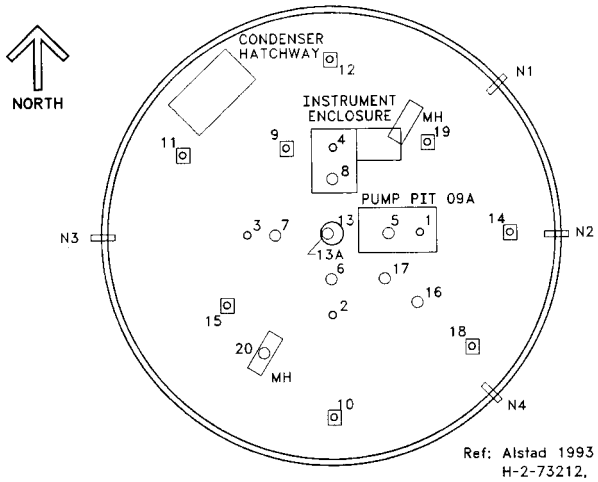


U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-109 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1955-1996
ASSUMED LEAKER/STABILIZED TANK
WATCH LIST: HYDROGEN

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E87	12/96
SCALE NONE	JOB NO.	SHEET 1 OF 1	

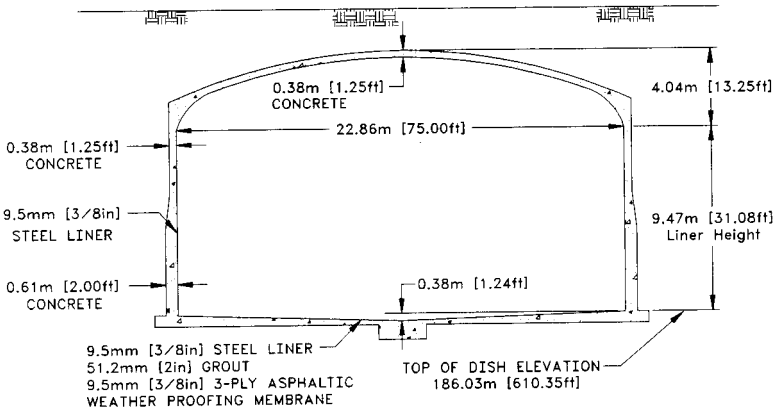
241-SX-109



Ref: Alstad 1993
H-2-73212, Rev. 2

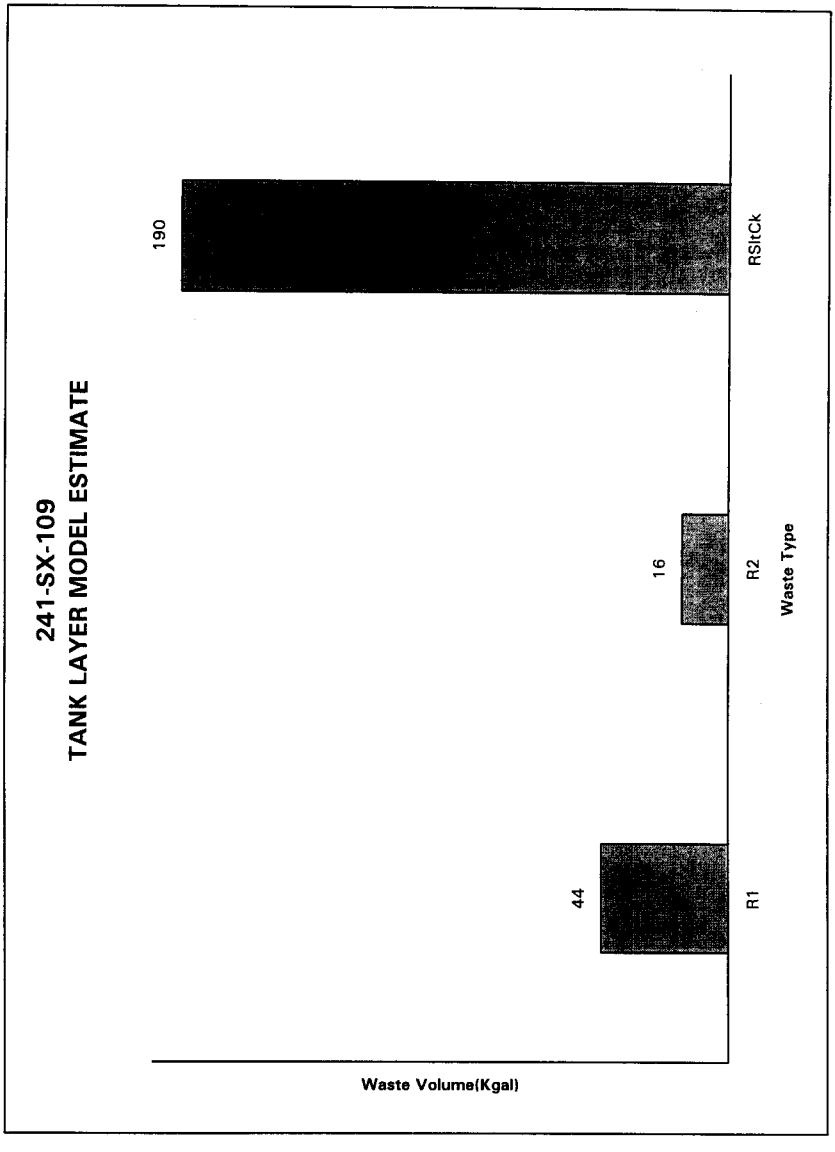
TANK RISER LOCATION

Approximate Grade Elevation 201.53m [661.2ft]
(Pianka 1995)



Ref: H-2-39511, Rev. 3
H-2-46293, Rev. 3
H-2-37855, Rev. 4

NOT TO SCALE



Tank Layer Model(TLM) Estimate from *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4* (Agnew et al., 1997).

HDW Model Rev. 4

Single-Shell Tank 241-SX-109

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	1.63E+06 (kg)	(250 kgal)	—	---	---	---	—
Heat Load	8.61 (kW)	(2.94E+04 BTU/hr)	—	8.32	8.49	8.71	8.81
Bulk Density	1.72 (g/cc)	—	—	1.51	1.62	1.78	1.81
Void Fraction	0.728	—	—	0.645	0.672	0.798	0.875
Water wt%	33.1	—	—	25.2	28.8	41.2	49.4
TOC wt% C (w	3.97E-03	—	—	3.78E-03	3.83E-03	4.23E-03	4.69E-03

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	11.9	1.59E+05	2.59E+05	8.19	10.2	13.1	13.7
Al3+	4.34	6.80E+04	1.11E+05	2.86	3.29	5.48	6.63
Fe3+ (total Fe)	0.363	1.18E+04	1.92E+04	0.358	0.360	0.366	0.369
Cr3+	0.640	1.93E+04	3.15E+04	0.380	0.504	0.721	0.815
Bi3+	5.22E-06	0.634	1.03	4.41E-06	4.81E-06	5.75E-06	6.32E-06
La3+	1.29E-11	1.04E-06	1.69E-06	1.13E-11	1.22E-11	1.42E-11	1.56E-11
Hg2+	8.20E-07	9.55E-02	0.156	7.27E-07	7.72E-07	9.03E-07	9.91E-07
Zr (as ZrO(OH)2	5.21E-07	2.76E-02	4.50E-02	4.79E-07	4.99E-07	5.47E-07	5.89E-07
Pb2+	1.30E-04	15.6	25.5	6.97E-05	9.91E-05	1.61E-04	1.92E-04
Ni2+	2.79E-02	952	1.55E+03	2.54E-02	2.68E-02	2.88E-02	2.90E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	3.80E-05	1.21	1.98	2.72E-05	3.25E-05	4.36E-05	4.91E-05
Ca2+	0.130	3.01E+03	4.91E+03	0.107	0.118	0.141	0.152
K+	2.71E-02	614	1.00E+03	2.53E-02	2.60E-02	2.92E-02	3.16E-02
OH-	21.0	2.07E+05	3.37E+05	14.1	16.3	25.8	30.7
NO3-	4.92	1.77E+05	2.89E+05	2.99	4.00	6.36	7.14
NO2-	1.78	4.75E+04	7.75E+04	1.55	1.63	1.90	2.02
CO32-	0.133	4.65E+03	7.57E+03	0.111	0.122	0.145	0.156
PO43-	3.38E-04	18.6	30.4	3.14E-04	3.28E-04	3.52E-04	3.83E-04
SO42-	3.37E-02	1.88E+03	3.06E+03	3.20E-02	3.27E-02	3.64E-02	3.93E-02
Si (as SiO32-)	0.131	2.13E+03	3.48E+03	9.44E-02	0.103	0.159	0.186
F-	2.69E-04	2.97	4.84	2.29E-04	2.54E-04	2.96E-04	3.19E-04
Cl-	0.114	2.34E+03	3.82E+03	6.71E-02	9.00E-02	0.124	0.133
C6H5O73-	2.78E-04	30.5	49.8	2.69E-04	2.74E-04	2.91E-04	3.16E-04
EDTA4-	1.08E-05	1.81	2.96	7.62E-06	9.38E-06	1.28E-05	1.47E-05
HEDTA3-	9.00E-06	1.43	2.33	2.89E-06	6.19E-06	1.20E-05	1.50E-05
glycolate-	3.93E-04	17.1	27.9	2.13E-04	3.11E-04	4.88E-04	5.80E-04
acetate-	4.08E-05	1.40	2.28	3.95E-05	4.01E-05	4.33E-05	4.63E-05
oxalate2-	1.68E-11	8.61E-07	1.40E-06	1.49E-11	1.59E-11	1.86E-11	2.04E-11
DBP	2.47E-04	30.1	49.1	2.30E-04	2.40E-04	2.67E-04	2.88E-04
butanol	2.47E-04	10.6	17.3	2.30E-04	2.40E-04	2.67E-04	2.88E-04
NH3	0.102	1.01E+03	1.65E+03	6.88E-02	7.36E-02	0.150	0.110
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-109

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	0 (kg)	(2.00E-03 kgal)	----	----	----	----	----
Heat Load	0 (kW)	(0 BTU/hr)	----	0	0	0	0
Bulk Density*	0 (g/cc)	----	----	0	0	0	0
Water wt%	0	----	----	0	0	0	0
TOC wt% C (w	0	----	----	0	0	0	0

Chemical Constituents	mole/L	ppm	kg	-95 CI (mole/L)	-67 CI (mole/L)	+67 CI (mole/L)	+95 CI (mole/L)
Na+	0	0	0	0	0	0	0
Al3+	0	0	0	0	0	0	0
Fe3+ (total Fe)	0	0	0	0	0	0	0
Cr3+	0	0	0	0	0	0	0
Bi3+	0	0	0	0	0	0	0
La3+	0	0	0	0	0	0	0
Hg2+	0	0	0	0	0	0	0
Zr (as ZrO(OH)2	0	0	0	0	0	0	0
Pb2+	0	0	0	0	0	0	0
Ni2+	0	0	0	0	0	0	0
Sr2+	0	0	0	0	0	0	0
Mn4+	0	0	0	0	0	0	0
Ca2+	0	0	0	0	0	0	0
K+	0	0	0	0	0	0	0
OH-	0	0	0	0	0	0	0
NO3-	0	0	0	0	0	0	0
NO2-	0	0	0	0	0	0	0
CO32-	0	0	0	0	0	0	0
PO43-	0	0	0	0	0	0	0
SO42-	0	0	0	0	0	0	0
Si (as SiO32-)	0	0	0	0	0	0	0
F-	0	0	0	0	0	0	0
Cl-	0	0	0	0	0	0	0
C6H5O73-	0	0	0	0	0	0	0
EDTA4-	0	0	0	0	0	0	0
HEDTA3-	0	0	0	0	0	0	0
glycolate-	0	0	0	0	0	0	0
acetate-	0	0	0	0	0	0	0
oxalate2-	0	0	0	0	0	0	0
DBP	0	0	0	0	0	0	0
butanol	0	0	0	0	0	0	0
NH3	0	0	0	0	0	0	0
Fe(CN)64-	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-109							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	1.63E+06 (kg)	(250 kgal)	----	----	----	----	----
Heat Load	8.61 (kW)	(2.94E+04 BTU/hr)	----	8.32	8.49	8.71	8.81
Bulk Density†	1.72 (g/cc)	----	----	1.51	1.62	1.78	1.81
Water wt%†	33.1	----	----	25.2	28.8	41.2	49.4
TOC wt% C (w	3.97E-03	----	----	3.78E-03	3.83E-03	4.23E-03	4.69E-03
Chemical Constituents	**mole/L**	**ppm**	**kg**	**-95 CI (mole/L)**	**-67 CI (mole/L)**	**+67 CI (mole/L)**	**+95 CI (mole/L)**
Na+	11.9	1.59E+05	2.59E+05	8.19	10.2	13.1	13.7
Al3+	4.34	6.80E+04	1.11E+05	2.86	3.29	5.48	6.63
Fe3+ (total Fe)	0.363	1.18E+04	1.92E+04	0.358	0.360	0.366	0.369
Cr3+	0.640	1.93E+04	3.15E+04	0.380	0.504	0.721	0.815
Bi3+	5.22E-06	0.634	1.03	4.41E-06	4.81E-06	5.75E-06	6.32E-06
La3+	1.29E-11	1.04E-06	1.69E-06	1.13E-11	1.22E-11	1.42E-11	1.56E-11
Hg2+	8.20E-07	9.55E-02	0.156	7.27E-07	7.72E-07	9.03E-07	9.91E-07
Zr (as ZrO(OH)2	5.21E-07	2.76E-02	4.50E-02	4.79E-07	4.99E-07	5.47E-07	5.89E-07
Pb2+	1.30E-04	15.6	25.5	6.97E-05	9.91E-05	1.61E-04	1.92E-04
Ni2+	2.79E-02	952	1.55E+03	2.54E-02	2.68E-02	2.88E-02	2.90E-02
Sr2+	0	0	0	0	0	0	0
Mn4+	3.80E-05	1.21	1.98	2.72E-05	3.25E-05	4.36E-05	4.91E-05
Ca2+	0.130	3.01E+03	4.91E+03	0.107	0.118	0.141	0.152
K+	2.71E-02	614	1.00E+03	2.53E-02	2.60E-02	2.92E-02	3.16E-02
OH-	21.0	2.07E+05	3.37E+05	14.1	16.3	25.8	30.7
NO3-	4.92	1.77E+05	2.89E+05	2.99	4.00	6.36	7.14
NO2-	1.78	4.75E+04	7.75E+04	1.55	1.63	1.90	2.02
CO32-	0.133	4.65E+03	7.57E+03	0.111	0.122	0.145	0.156
PO43-	3.38E-04	18.6	30.4	3.14E-04	3.28E-04	3.52E-04	3.83E-04
SO42-	3.37E-02	1.88E+03	3.06E+03	3.20E-02	3.27E-02	3.64E-02	3.93E-02
Si (as SiO32-)	0.131	2.13E+03	3.48E+03	9.44E-02	0.103	0.159	0.186
F-	2.69E-04	2.97	4.84	2.29E-04	2.54E-04	2.96E-04	3.19E-04
Cl-	0.114	2.34E+03	3.82E+03	6.71E-02	9.00E-02	0.124	0.133
C6H5O73-	2.78E-04	30.5	49.8	2.69E-04	2.74E-04	2.91E-04	3.16E-04
EDTA4-	1.08E-05	1.81	2.96	7.62E-06	9.38E-06	1.28E-05	1.47E-05
HEDTA3-	9.00E-06	1.43	2.33	2.89E-06	6.19E-06	1.20E-05	1.50E-05
glycolate-	3.93E-04	17.1	27.9	2.13E-04	3.11E-04	4.88E-04	5.80E-04
acetate-	4.08E-05	1.40	2.28	3.95E-05	4.01E-05	4.33E-05	4.63E-05
oxalate2-	*1.68E-11*	*8.61E-07*	*1.40E-06*	1.49E-11	1.59E-11	1.86E-11	2.04E-11
DBP	2.47E-04	30.1	49.1	2.30E-04	2.40E-04	2.67E-04	2.88E-04
butanol	2.47E-04	10.6	17.3	2.30E-04	2.40E-04	2.67E-04	2.88E-04
NH3	0.102	1.01E+03	1.65E+03	6.88E-02	7.36E-02	0.150	0.110
Fe(CN)64-	0	0	0	0	0	0	0

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).
†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-109

TLM Solids Composite Inventory Estimate*

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total TLM Wa	1.63E+06 (kg)	(250 kgal)	----	----	----	----	----
Heat Load	8.61 (kW)	(2.94E+04 BTU/hr)	----	8.32	8.49	8.71	8.81
Bulk Density	1.72 (g/cc)	----	----	1.51	1.62	1.78	1.81
Void Fraction	0.728	----	----	0.645	0.672	0.798	0.875
Water wt%	33.1	----	----	25.2	28.8	41.2	49.4
TOC wt% C (w	3.97E-03	----	----	3.78E-03	3.83E-03	4.23E-03	4.69E-03

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	1.84E-04	0.107	174	1.46E-05	1.46E-05	1.92E-04	2.08E-04
C-14	9.50E-06	5.51E-03	8.99	8.03E-07	8.03E-07	9.85E-06	1.06E-05
Ni-59	1.30E-05	7.54E-03	12.3	7.80E-06	7.80E-06	1.33E-05	1.35E-05
Ni-63	1.26E-03	0.732	1.19E+03	7.57E-04	7.57E-04	1.29E-03	1.31E-03
Co-60	8.43E-06	4.90E-03	7.98	6.10E-07	6.10E-07	8.77E-06	9.48E-06
Se-79	7.60E-06	4.41E-03	7.19	2.31E-06	2.31E-06	9.99E-06	1.23E-05
Sr-90	1.16	675	1.10E+06	1.11	1.14	1.18	1.19
Y-90	1.16	675	1.10E+06	0.962	0.962	1.18	1.19
Zr-93	3.47E-05	2.02E-02	32.9	9.73E-06	9.73E-06	4.67E-05	5.81E-05
Nb-93m	2.95E-05	1.71E-02	27.9	9.17E-06	9.17E-06	3.78E-05	4.59E-05
Tc-99	7.37E-05	4.28E-02	69.7	7.12E-05	7.16E-05	7.87E-05	8.45E-05
Ru-106	1.93E-09	1.12E-06	1.83E-03	1.23E-10	1.23E-10	2.21E-09	7.95E-09
Cd-113m	3.83E-05	2.22E-02	36.2	3.09E-06	3.09E-06	8.13E-05	1.44E-04
Sb-125	2.99E-05	1.74E-02	28.3	1.98E-06	1.98E-06	3.12E-05	3.37E-05
Sn-126	1.10E-05	6.41E-03	10.5	2.94E-06	2.94E-06	1.46E-05	1.81E-05
I-129	1.40E-07	8.12E-05	0.132	1.35E-07	1.36E-07	1.49E-07	1.61E-07
Cs-134	1.91E-06	1.11E-03	1.81	1.60E-07	1.60E-07	1.98E-06	2.12E-06
Cs-137	0.273	158	2.58E+05	0.265	0.266	0.291	0.311
Ba-137m	0.258	150	2.44E+05	2.52E-02	2.52E-02	0.267	0.285
Sm-151	2.71E-02	15.8	2.57E+04	8.30E-03	8.30E-03	3.55E-02	4.35E-02
Eu-152	1.51E-05	8.79E-03	14.3	8.40E-06	8.40E-06	1.52E-05	1.53E-05
Eu-154	2.02E-04	0.117	191	1.48E-05	1.48E-05	2.10E-04	6.92E-04
Eu-155	7.67E-04	0.445	725	4.25E-04	4.25E-04	7.69E-04	7.73E-04
Ra-226	1.02E-09	5.93E-07	9.67E-04	6.65E-10	6.65E-10	1.15E-09	1.27E-09
Ra-228	1.20E-08	6.95E-06	1.13E-02	1.42E-14	1.42E-14	1.21E-08	1.22E-08
Ac-227	5.04E-09	2.93E-06	4.77E-03	2.96E-09	2.96E-09	5.79E-09	6.26E-09
Pa-231	1.03E-08	5.99E-06	9.77E-03	2.46E-09	2.46E-09	1.27E-08	1.50E-08
Th-229	2.88E-10	1.67E-07	2.73E-04	1.09E-12	1.09E-12	2.91E-10	2.94E-10
Th-232	1.60E-10	9.32E-08	1.52E-04	5.01E-16	5.01E-16	2.02E-10	2.43E-10
U-232	5.35E-08	3.11E-05	5.06E-02	1.89E-08	3.49E-08	7.62E-08	1.01E-07
U-233	2.05E-07	1.19E-04	0.194	7.24E-08	1.34E-07	2.92E-07	3.88E-07
U-234	9.97E-07	5.79E-04	0.943	4.53E-07	7.18E-07	1.30E-06	1.60E-06
U-235	4.03E-08	2.34E-05	3.81E-02	1.83E-08	2.90E-08	5.26E-08	6.49E-08
U-236	4.10E-08	2.38E-05	3.88E-02	1.92E-08	3.00E-08	5.25E-08	6.38E-08
U-238	8.75E-07	5.08E-04	0.828	3.96E-07	6.28E-07	1.14E-06	1.41E-06
Np-237	3.25E-07	1.88E-04	0.307	3.09E-07	3.15E-07	3.49E-07	3.76E-07
Pu-238	7.77E-06	4.51E-03	7.35	6.51E-06	7.13E-06	8.41E-06	9.03E-06
Pu-239	2.34E-04	0.136	222	1.94E-04	2.14E-04	2.55E-04	2.75E-04
Pu-240	3.95E-05	2.30E-02	37.4	3.28E-05	3.61E-05	4.30E-05	4.63E-05
Pu-241	3.93E-04	0.228	372	3.29E-04	3.60E-04	4.26E-04	4.57E-04
Pu-242	2.13E-09	1.24E-06	2.02E-03	1.79E-09	1.96E-09	2.31E-09	2.48E-09
Am-241	2.31E-04	0.134	219	1.61E-04	1.95E-04	2.67E-04	3.01E-04
Am-243	9.19E-09	5.34E-06	8.70E-03	6.02E-09	7.58E-09	1.08E-08	1.24E-08
Cm-242	3.69E-07	2.14E-04	0.349	3.68E-07	3.67E-07	3.69E-07	3.69E-07
Cm-243	3.51E-08	2.04E-05	3.32E-02	3.50E-08	3.48E-08	3.51E-08	3.51E-08
Cm-244	1.04E-06	6.05E-04	0.985	8.07E-07	9.22E-07	1.16E-06	1.28E-06

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	3.93E-03 (g/L)	----	3.72	3.25E-03	3.59E-03	4.28E-03	4.62E-03
U	1.08E-02	1.49E+03	2.44E+03	4.87E-03	7.75E-03	1.42E-02	1.75E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

HDW Model Rev. 4

Single-Shell Tank 241-SX-109

SMM Composite Inventory Estimate

Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	0 (kg)	(2.00E-03 kgal)	—	—	—	—	—
Heat Load	0 (kW)	(0 BTU/hr)	—	0	0	0	0
Bulk Density*	0 (g/cc)	—	—	0	0	0	0
Water wt%†	0	—	—	0	0	0	0
TOC wt% C (w	0	—	—	0	0	0	0

Radiological Constituents	Ci/L	µCi/g	Ci	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	0	0	0	0	0	0	0
C-14	0	0	0	0	0	0	0
Ni-59	0	0	0	0	0	0	0
Ni-63	0	0	0	0	0	0	0
Co-60	0	0	0	0	0	0	0
Se-79	0	0	0	0	0	0	0
Sr-90	0	0	0	0	0	0	0
Y-90	0	0	0	0	0	0	0
Zr-93	0	0	0	0	0	0	0
Nb-93m	0	0	0	0	0	0	0
Tc-99	0	0	0	0	0	0	0
Ru-106	0	0	0	0	0	0	0
Cd-113m	0	0	0	0	0	0	0
Sb-125	0	0	0	0	0	0	0
Sn-126	0	0	0	0	0	0	0
I-129	0	0	0	0	0	0	0
Cs-134	0	0	0	0	0	0	0
Cs-137	0	0	0	0	0	0	0
Ba-137m	0	0	0	0	0	0	0
Sm-151	0	0	0	0	0	0	0
Eu-152	0	0	0	0	0	0	0
Eu-154	0	0	0	0	0	0	0
Eu-155	0	0	0	0	0	0	0
Ra-226	0	0	0	0	0	0	0
Ra-228	0	0	0	0	0	0	0
Ac-227	0	0	0	0	0	0	0
Pa-231	0	0	0	0	0	0	0
Th-229	0	0	0	0	0	0	0
Th-232	0	0	0	0	0	0	0
U-232	0	0	0	0	0	0	0
U-233	0	0	0	0	0	0	0
U-234	0	0	0	0	0	0	0
U-235	0	0	0	0	0	0	0
U-236	0	0	0	0	0	0	0
U-238	0	0	0	0	0	0	0
Np-237	0	0	0	0	0	0	0
Pu-238	0	0	0	0	0	0	0
Pu-239	0	0	0	0	0	0	0
Pu-240	0	0	0	0	0	0	0
Pu-241	0	0	0	0	0	0	0
Pu-242	0	0	0	0	0	0	0
Am-241	0	0	0	0	0	0	0
Am-243	0	0	0	0	0	0	0
Cm-242	0	0	0	0	0	0	0
Cm-243	0	0	0	0	0	0	0
Cm-244	0	0	0	0	0	0	0

Totals	M	µg/g	kg	-95 CI (M or g/L)	-67 CI (M or g/L)	+67 CI (M or g/L)	+95 CI (M or g/L)
Pu	0 (g/L)	—	0	0	0	0	0
U	0	0	0	0	0	0	0

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.

HDW Model Rev. 4

Single-Shell Tank 241-SX-109							
Total Inventory Estimate*							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total Waste	1.63E+06 (kg)	(250 kgal)	---	---	---	---	---
Heat Load	8.61 (kW)	(2.94E+04 BTU/hr)	---	8.32	8.49	8.71	8.81
Bulk Density†	1.72 (g/cc)	---	---	1.51	1.62	1.78	1.81
Water wt%†	33.1	---	---	25.2	28.8	41.2	49.4
TOC wt% C (w	3.97E-03	---	---	3.78E-03	3.83E-03	4.23E-03	4.69E-03
Radiological Constituents	**CI/L**	**µCI/g**	**CI**	**-95 CI (CI/L)**	**-67 CI (CI/L)**	**+67 CI (CI/L)**	**+95 CI (CI/L)**
H-3	1.84E-04	0.107	174	1.46E-05	1.46E-05	1.92E-04	2.08E-04
C-14	9.50E-06	5.51E-03	8.99	8.03E-07	8.03E-07	9.85E-06	1.06E-05
Ni-59	1.30E-05	7.54E-03	12.3	7.80E-06	7.80E-06	1.33E-05	1.35E-05
Ni-63	1.26E-03	0.732	1.19E+03	7.57E-04	7.57E-04	1.29E-03	1.31E-03
Co-60	8.43E-06	4.90E-03	7.98	6.10E-07	6.10E-07	8.77E-06	9.48E-06
Se-79	7.60E-06	4.41E-03	7.19	2.31E-06	2.31E-06	9.99E-06	1.23E-05
Sr-90	1.16	675	1.10E+06	1.11	1.14	1.18	1.19
Y-90	1.16	675	1.10E+06	0.962	0.962	1.18	1.19
Zr-93	3.47E-05	2.02E-02	32.9	9.73E-06	9.73E-06	4.67E-05	5.81E-05
Nb-93m	2.95E-05	1.71E-02	27.9	9.17E-06	9.17E-06	3.78E-05	4.59E-05
Tc-99	7.37E-05	4.28E-02	69.7	7.12E-05	7.16E-05	7.87E-05	8.45E-05
Ru-106	1.93E-09	1.12E-06	1.83E-03	1.23E-10	1.23E-10	2.21E-09	7.95E-09
Cd-113m	3.83E-05	2.22E-02	36.2	3.09E-06	3.09E-06	8.13E-05	1.44E-04
Sb-125	2.99E-05	1.74E-02	28.3	1.98E-06	1.98E-06	3.12E-05	3.37E-05
Sn-126	1.10E-05	6.41E-03	10.5	2.94E-06	2.94E-06	1.46E-05	1.81E-05
I-129	1.40E-07	8.12E-05	0.132	1.35E-07	1.36E-07	1.49E-07	1.61E-07
Cs-134	1.91E-06	1.11E-03	1.81	1.60E-07	1.60E-07	1.98E-06	2.12E-06
Cs-137	0.273	158	2.58E+05	0.265	0.266	0.291	0.311
Ba-137m	0.258	150	2.44E+05	2.52E-02	2.52E-02	0.267	0.285
Sm-151	2.71E-02	15.8	2.57E+04	8.30E-03	8.30E-03	3.55E-02	4.35E-02
Eu-152	1.51E-05	8.79E-03	14.3	8.40E-06	8.40E-06	1.52E-05	1.53E-05
Eu-154	2.02E-04	0.117	191	1.48E-05	1.48E-05	2.10E-04	6.92E-04
Eu-155	7.67E-04	0.445	725	4.25E-04	4.25E-04	7.69E-04	7.73E-04
Ra-226	1.02E-09	5.93E-07	9.67E-04	6.65E-10	6.65E-10	1.15E-09	1.27E-09
Ra-228	1.20E-08	6.95E-06	1.13E-02	1.42E-14	1.42E-14	1.21E-08	1.22E-08
Ac-227	5.04E-09	2.93E-06	4.77E-03	2.96E-09	2.96E-09	5.79E-09	6.26E-09
Pa-231	1.03E-08	5.99E-06	9.77E-03	2.46E-09	2.46E-09	1.27E-08	1.50E-08
Th-229	2.88E-10	1.67E-07	2.73E-04	1.09E-12	1.09E-12	2.91E-10	2.94E-10
Th-232	1.60E-10	9.32E-08	1.52E-04	5.01E-16	5.01E-16	2.02E-10	2.43E-10
U-232	5.35E-08	3.11E-05	5.06E-02	1.89E-08	3.49E-08	7.62E-08	1.01E-07
U-233	2.05E-07	1.19E-04	0.194	7.24E-08	1.34E-07	2.92E-07	3.88E-07
U-234	9.97E-07	5.79E-04	0.943	4.53E-07	7.18E-07	1.30E-06	1.60E-06
U-235	4.03E-08	2.34E-05	3.81E-02	1.83E-08	2.90E-08	5.26E-08	6.49E-08
U-236	4.10E-08	2.38E-05	3.88E-02	1.92E-08	3.00E-08	5.25E-08	6.38E-08
U-238	8.75E-07	5.08E-04	0.828	3.96E-07	6.28E-07	1.14E-06	1.41E-06
Np-237	3.25E-07	1.88E-04	0.307	3.09E-07	3.15E-07	3.49E-07	3.76E-07
Pu-238	7.77E-06	4.51E-03	7.35	6.51E-06	7.13E-06	8.41E-06	9.03E-06
Pu-239	2.34E-04	0.136	222	1.94E-04	2.14E-04	2.55E-04	2.75E-04
Pu-240	3.95E-05	2.30E-02	37.4	3.28E-05	3.61E-05	4.30E-05	4.63E-05
Pu-241	3.93E-04	0.228	372	3.29E-04	3.60E-04	4.26E-04	4.57E-04
Pu-242	2.13E-09	1.24E-06	2.02E-03	1.79E-09	1.96E-09	2.31E-09	2.48E-09
Am-241	2.31E-04	0.134	219	1.61E-04	1.95E-04	2.67E-04	3.01E-04
Am-243	9.19E-09	5.34E-06	8.70E-03	6.02E-09	7.58E-09	1.08E-08	1.24E-08
Cm-242	3.69E-07	2.14E-04	0.349	3.68E-07	3.67E-07	3.69E-07	3.69E-07
Cm-243	3.51E-08	2.04E-05	3.32E-02	3.50E-08	3.48E-08	3.51E-08	3.51E-08
Cm-244	1.04E-06	6.05E-04	0.985	8.07E-07	9.22E-07	1.16E-06	1.28E-06
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	3.93E-03 (g/L)	---	3.72	3.25E-03	3.59E-03	4.28E-03	4.62E-03
U	1.08E-02	1.49E+03	2.44E+03	4.87E-03	7.75E-03	1.42E-02	1.75E-02

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).
†Volume average for density, mass average Water wt% and TOC wt% C.

G. K. Patello	P7-28	X
L. R. Pederson	K2-44	X
K. M. Remund	K5-12	X
P. A. Scott	K9-46	X
G. L. Smith	K7-74	X
J. J. Toth	K7-94	X
T. L. Traub	H2-53	X
J. D. Vienna	P8-37	X
K. D. Wiemers	K6-51	X
P. D. Whitney	K5-12	X
J. Y. Young	K4-16	X
Rust Federal Services Hanford, Inc.		
T. H. Bushaw	T6-30	X
C. T. Narquis	T6-16	X
SGN Eurisys Services Corp.		
D. B. Engelman	B4-51	X
D. B. Hagmann	H6-12	X
D. E. Place	H5-27	X
F. R. Reich	L5-55	X
E. F. Riedel	S3-90	X
K. V. Scott	B4-51	X

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Washington State Department of Ecology

A. B. Stone Washington State Department of Ecology 1315 W. 4th Kennewick, WA 99336	B5-18	X

241-SX-109
Photo: dated 5-21-80
Temperature Probe
Temperature Probe
Air Circulator Line
Air Circulator Line
Air Circulator Line
Temperature Probe
Temperature Probe
Dustfree Nozzle
Pump
Inlet Nozzle
Temperature Probe
Manual Taps
Temperature Probe
Air Circulator Line
Temperature Probe
Condition Nozzle
Condition Nozzle

TANK 241-SX-110 SUMMARY

TANK HISTORY	
Entered Service	3rd qtr 1959
Removed from Service	-
Inactive	1976
Watch Lists	none
Integrity	Assumed Leaker
Assumed Leaker	1976
Interim Stabilization (IS)	Aug 1979
Partial Interim Isolation (PI)	-
Intrusion Prevention (IP)	June 1985

TENTATIVELY AVAILABLE RISERS	
Riser Number(s)	Size
3	4 in
6, 7, 16, 17	12 in
13	42 in

TANK TEMPERATURE	
Average Tank Temperature	145°F
Maximum Temperature	176.2°F
Date	Nov 3, 1994
Elevation from tank bottom	unknown
Riser Number	12
Minimum Temperature	111.02°F
Date	March 24, 1996
Elevation from tank bottom	unknown
Riser Number	20

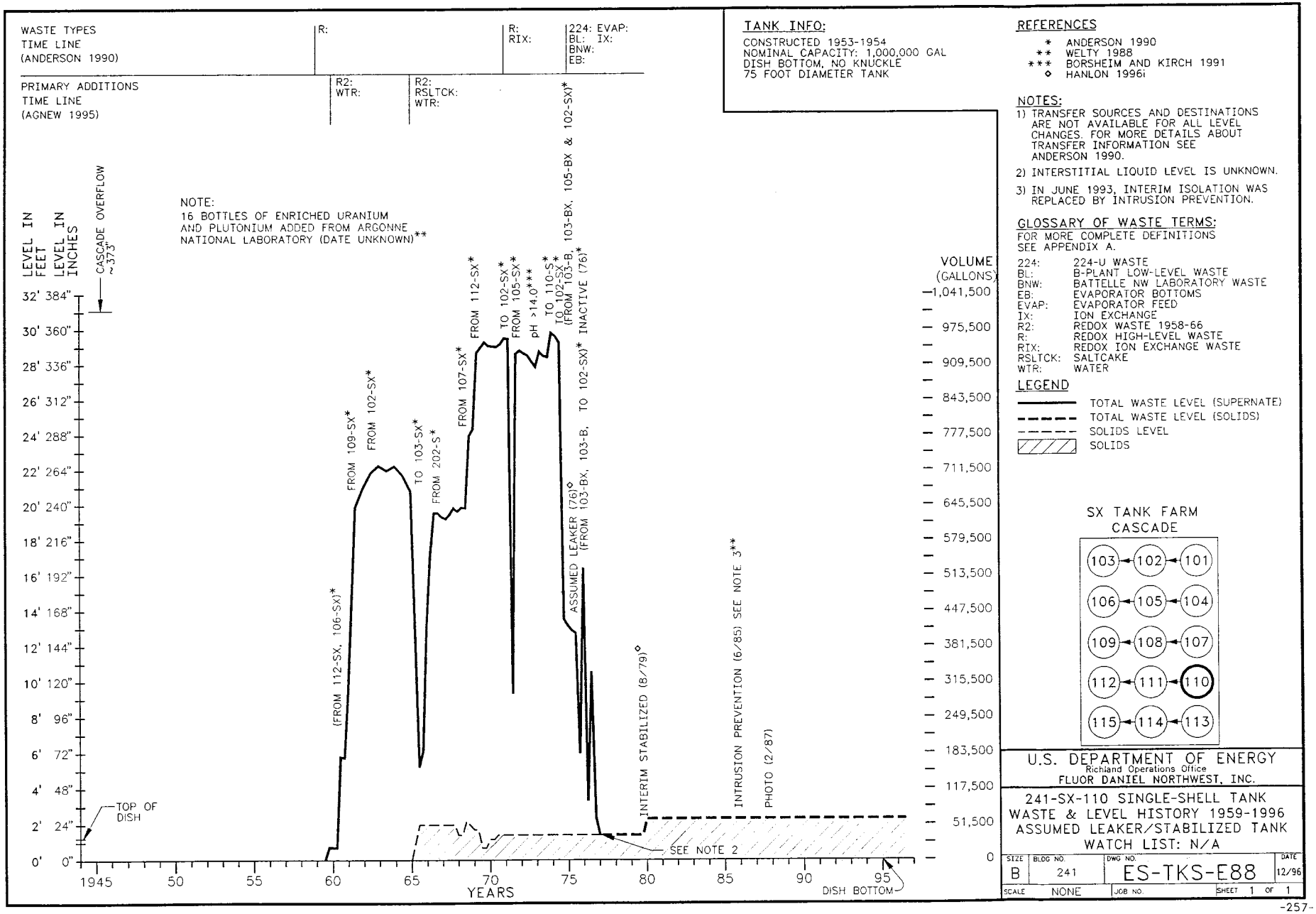
TANK DESCRIPTION	
Diameter	75 ft
Bottom Shape	Dish
Nominal Capacity	1,000,000 gal
Cascade Tank	to 241-SX-111
Total Risers	22

WASTE VOLUME (HANLON 1996i)	
Total Waste Volume	62,000 gal
Waste Type	NCPLX
Drainable Interstitial Liquids	0 gal
Pumpable Liquids	0 gal
Saltcake	0 gal
Sludge	62,000 gal
Supernatant	0 gal

INTERIOR PHOTOGRAPHS	
Date	Feb 20, 1987
Montage Number	94041033-35CN
Photo Set Number	8701204

WASTE SURFACE LEVEL	
Devices	Manual Tape
Max Level	28.5 in
Date	Oct 2, 1994 - April 2, 1996*
Min Level	26.5 in
Date	July 1, 1996 - Oct 2, 1996*

* Numerous dates in this time span



TANK INFO:

CONSTRUCTED 1953-1954
NOMINAL CAPACITY: 1,000,000 GAL
DISH BOTTOM, NO KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

* ANDERSON 1990
** WELTY 1988
*** BORSHEIM AND KIRCH 1991
◇ HANLON 1996i

NOTES:

1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
2) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.
3) IN JUNE 1993, INTERIM ISOLATION WAS REPLACED BY INTRUSION PREVENTION.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A.

224:	224-U WASTE
BL:	B-PLANT LOW-LEVEL WASTE
BNW:	BATTELLE NW LABORATORY WASTE
EB:	EVAPORATOR BOTTOMS
EVAP:	EVAPORATOR FEED
IX:	ION EXCHANGE
R2:	REDOX WASTE 1958-66
R:	REDOX HIGH-LEVEL WASTE
RIX:	REDOX ION EXCHANGE WASTE
RSLTCK:	SALTCAKE
WTR:	WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- SOLIDS

SX TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
FLUOR DANIEL NORTHWEST, INC.

241-SX-110 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1959-1996
ASSUMED LEAKER/STABILIZED TANK
WATCH LIST: N/A

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E88	12/96
SCALE NONE	JOB NO.	SHEET 1 OF 1	

HOW Model Rev. 4

Single-Shell Tank 241-U-103							
SMM Composite Inventory Estimate							
Physical Properties				-95 CI	-67 CI	+67 CI	+95 CI
Total SMM W	2.70E+06 (kg)	(436 kgal)	----	----	----	----	----
Heat Load	3.68 (kW)	(1.26E+04 BTU/hr)	----	3.43	3.55	3.81	3.94
Bulk Density*	1.64 (g/cc)	----	----	1.59	1.61	1.66	1.68
Water wt%†	30.8	----	----	28.2	29.3	32.3	34.0
TOC wt% C (w	0.841	----	----	0.530	0.682	1.000	1.15
Radiological Constituents	**Ci/L**	**µCi/g**	**Ci**	**-95 CI (Ci/L)**	**-67 CI (Ci/L)**	**+67 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.59E-04	0.158	427	1.34E-04	1.34E-04	2.69E-04	2.81E-04
C-14	3.78E-05	2.31E-02	62.3	1.17E-05	1.17E-05	3.84E-05	3.90E-05
Ni-59	2.47E-06	1.51E-03	4.08	1.24E-06	1.24E-06	2.53E-06	2.59E-06
Ni-63	2.42E-04	0.148	400	1.21E-04	1.21E-04	2.48E-04	2.54E-04
Co-60	4.22E-05	2.58E-02	69.6	1.23E-05	1.23E-05	4.31E-05	4.39E-05
Se-79	3.77E-06	2.31E-03	6.22	2.10E-06	2.10E-06	4.37E-06	4.95E-06
Sr-90	0.127	77.7	2.10E+05	0.119	0.123	0.131	0.135
Y-90	0.127	77.7	2.10E+05	6.95E-02	6.95E-02	0.131	0.135
Zr-93	1.85E-05	1.13E-02	30.5	1.02E-05	1.02E-05	2.15E-05	2.44E-05
Nb-93m	1.34E-05	8.21E-03	22.2	7.59E-06	7.59E-06	1.55E-05	1.76E-05
Tc-99	2.69E-04	0.164	444	1.72E-04	2.19E-04	3.19E-04	3.67E-04
Ru-106	7.64E-09	4.67E-06	1.26E-02	3.77E-09	3.77E-09	8.50E-09	9.29E-09
Cd-113m	9.74E-05	5.95E-02	161	4.74E-05	4.74E-05	1.15E-04	1.33E-04
Sb-125	1.82E-04	0.112	301	5.29E-05	5.29E-05	1.86E-04	1.90E-04
Sn-126	5.70E-06	3.49E-03	9.40	3.20E-06	3.20E-06	6.60E-06	7.47E-06
I-129	5.18E-07	3.17E-04	0.856	3.30E-07	4.22E-07	6.15E-07	7.09E-07
Cs-134	3.09E-06	1.89E-03	5.09	2.13E-06	2.60E-06	3.58E-06	4.06E-06
Cs-137	0.294	180	4.84E+05	0.261	0.277	0.310	0.327
Ba-137m	0.278	170	4.58E+05	0.226	0.226	0.294	0.309
Sm-151	1.33E-02	8.12	2.19E+04	7.44E-03	7.44E-03	1.54E-02	1.74E-02
Eu-152	4.51E-06	2.76E-03	7.45	2.45E-06	2.45E-06	4.86E-06	5.20E-06
Eu-154	6.88E-04	0.421	1.13E+03	2.71E-04	2.71E-04	8.38E-04	8.98E-04
Eu-155	2.68E-04	0.164	442	1.45E-04	1.45E-04	2.89E-04	3.10E-04
Ra-226	1.62E-10	9.91E-08	2.67E-04	1.10E-10	1.10E-10	1.81E-10	1.99E-10
Ra-228	1.77E-07	1.08E-04	0.292	7.30E-08	1.24E-07	2.38E-07	3.04E-07
Ac-227	1.03E-09	6.32E-07	1.70E-03	7.33E-10	7.33E-10	1.14E-09	1.25E-09
Pa-231	4.73E-09	2.89E-06	7.80E-03	3.06E-09	3.06E-09	5.33E-09	5.91E-09
Th-229	4.14E-09	2.53E-06	6.83E-03	1.86E-09	2.97E-09	5.49E-09	6.93E-09
Th-232	1.16E-08	7.11E-06	1.92E-02	5.87E-09	8.69E-09	1.46E-08	1.74E-08
U-232	9.02E-07	5.52E-04	1.49	4.85E-07	6.89E-07	1.15E-06	1.41E-06
U-233	3.46E-06	2.11E-03	5.71	1.86E-06	2.64E-06	4.40E-06	5.41E-06
U-234	9.33E-07	5.71E-04	1.54	8.96E-07	9.18E-07	9.50E-07	9.61E-07
U-235	3.78E-08	2.31E-05	6.23E-02	3.62E-08	3.71E-08	3.85E-08	3.89E-08
U-236	2.94E-08	1.80E-05	4.86E-02	2.83E-08	2.90E-08	2.99E-08	3.03E-08
U-238	1.10E-06	6.73E-04	1.82	1.06E-06	1.08E-06	1.12E-06	1.13E-06
Np-237	9.74E-07	5.96E-04	1.61	6.56E-07	8.11E-07	1.14E-06	1.30E-06
Pu-238	1.57E-06	9.63E-04	2.60	1.20E-06	1.38E-06	1.77E-06	1.95E-06
Pu-239	5.39E-05	3.30E-02	88.9	4.43E-05	4.90E-05	5.87E-05	6.34E-05
Pu-240	9.15E-06	5.59E-03	15.1	7.36E-06	8.24E-06	1.01E-05	1.09E-05
Pu-241	1.06E-04	6.51E-02	176	8.10E-05	9.35E-05	1.20E-04	1.32E-04
Pu-242	5.86E-10	3.58E-07	9.67E-04	4.34E-10	5.08E-10	6.63E-10	7.38E-10
Am-241	6.49E-05	3.97E-02	107	4.72E-05	5.58E-05	7.39E-05	8.26E-05
Am-243	2.29E-09	1.40E-06	3.79E-03	1.74E-09	2.00E-09	2.62E-09	2.89E-09
Cm-242	1.73E-07	1.06E-04	0.285	8.78E-08	8.78E-08	1.86E-07	1.99E-07
Cm-243	1.60E-08	9.79E-06	2.64E-02	7.93E-09	7.93E-09	1.72E-08	1.84E-08
Cm-244	1.56E-07	9.52E-05	0.257	7.23E-08	7.23E-08	1.84E-07	2.02E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**-67 CI (M or g/L)**	**+67 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	6.83E-04 (g/L)	----	1.13	5.02E-04	5.91E-04	7.75E-04	8.63E-04
U	1.06E-02	1.55E+03	4.18E+03	1.02E-02	1.04E-02	1.09E-02	1.10E-02

*Density is calculated based on Na, OH-, and AlO2-.

†Water wt% derived from the difference of density and total dissolved species.