ENGINEERING CHANGE NOTICE

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1. ECN No 624023

Proj.
ECN

2. ECN Category (mark one) Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Standby ☐ Supersedeure ☐ Cancel/Void ☐	3. Originator's Name, Organization, MSIN, and Telephone No. T.M. Brown, R2-12, 373-4437	3a. USQ Required? ☐ Yes ☒ No	4. Date 06/24/96
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11a. Modification Work ☐ Yes (fill out Blk. 11b) ☒ No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. N/A	11c. Modification Work Complete N/A Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A Cog. Engineer Signature & Date

12. Description of Change

1. Complete rewrite and update of the introduction section.
2. Added HTCE and Supporting Document flow diagram.
3. Added NE quadrant tank farms timeline diagram.
4. Updated and restructured waste and level history plots.
5. Removed temperature data tables since they are available on PC-SACS.
6. Removed drywell data, plots, and well layout diagram.
7. Removed chemical and radionuclide sample data and laboratory reports.
8. Removed unknown tank transfer plots from LANL.
9. Added the Hanford Tank Chemical and Radionuclide Inventories: HWD Model, Rev. 3, containing the Tank Layer Model, Supernatant Mixing Model, and inventory estimate tables.

13a. Justification (mark one)

Criteria Change ☐	Design Improvement ☒	Environmental ☐	Facility Deactivation ☐
As-Found ☐	Facilitate Const ☐	Const. Error/Omission ☐	Design Error/Omission ☐

13b. Justification Details

To update the supporting document with more complete historical and tank inventory information.

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

See attached distribution sheet.

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

624023

15. Design Verification Required		16. Cost Impact				17. Schedule Impact (days)	
		ENGINEERING		CONSTRUCTION			
☐ Yes		Additional ☐ \$		Additional ☐ \$		Improvement ☐	
☒ No		Savings ☐ \$		Savings ☐ \$		Delay ☐	

18. 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 12. Enter the affected document number in Block 19.

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 ☒

19. 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		

20. Approvals

Signature	Date	Signature	Date
<u>OPERATIONS AND ENGINEERING</u>		<u>ARCHITECT-ENGINEER</u>	
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	_____	Signature or a Control Number that tracks the Approval Signature	_____
	_____		_____
	_____	<u>ADDITIONAL</u>	_____
	_____		_____
	_____		_____

Supporting Document for the Historical Tank Content Estimate for BY-Tank Farm

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U.S. Department of Energy Contract DE-AC06-87RL10930

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

Abstract: This Supporting Document provides historical in-depth characterization information on BY-Tank Farm, such as historical waste transfer and level data, tank physical information, temperature plots, liquid observation well plots, chemical analyte and radionuclide inventories for the Historical Tank Content Estimate Report for the northeast quadrant of the Hanford 200 East Area.

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Date

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Approved for Public Release

**SUPPORTING DOCUMENT FOR THE
HISTORICAL TANK CONTENT
ESTIMATE FOR
BY TANK FARM**

WORK ORDER E44205

Prepared for

Westinghouse Hanford Company

May 1996

Prepared by

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BY TANK FARM

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APPENDICES

Appendix A	Glossary
Appendix B	References
Appendix C	Waste and Level History Sketches and Data
Appendix D	Temperature Graphs
Appendix E	Surface Level Graphs
Appendix F	Riser Configurations and Tank Cross Sections
Appendix G	Tank Farm Photograph and Tank Montages
Appendix H	Tank Layer Model, Supernatant Mixing Model, and Inventory Estimates

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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, 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 Department of Energy 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 report 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) 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 covers available information about the wastes contained in the single-shell tanks in the BY Tank Farm. Waste transfer and level data, tank physical information, and surveillance data of tanks and wastes have been compiled for this report. The inventory estimates of waste types and volumes generated by the computer modeling programs developed by LANL are included also. A summary of this information is contained in the *Historical Tank Content Estimate (HTCE) for the Northeast Quadrant of the Hanford 200-East Area* (Brevick et al., 1994). The northeast quadrant document covers six single-shell tank farms. These six tank farms, A, AX, B, BX, BY, and C, are located in the 200-East Area and are shown on the map in Figure 1. A flow diagram showing the relationships between the sources of data, the HTCE, and the supporting documents is in Figure 2.

This 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.

1.0.3 Approach

This report was compiled from work performed by ICF Kaiser Hanford Company (ICF KH), LANL, and Westinghouse Hanford Company (WHC). ICF KH reviewed the historical records of the

FIGURE 1: 200 EAST AREA

Figure 2 HTCE and Supporting Document Flow Diagram

tanks and incorporated the inventory estimates and models of waste layers in the tanks being developed by LANL into the report.

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 a listing of all tanks that are believed to pose potential safety hazards to workers, the environment, and the public. Non-watch list issues are of concern because of the possible impact 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 most 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 November 1995, 48 single-shell tanks and 6 double-shell tanks are on watch lists. 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 the potential to release chemicals and radioactive liquids to 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 producing a reduction in 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 take the form of one or more of the 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 cause a release of contamination to the environment.

■ Tank Bumps

A tank bump is the sudden pressurization of the tank. This 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. Also, uncontrolled mixing can occur when a natural "rollover" of waste occurs in the tank. Tank bumps are a safety issue because of the potential to cause a release of 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 the BY Tank Farm. An occurrence is an event that falls outside of 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. The occurrence documentation in each report that could be located was evaluated for its significance in determining the waste content of the tanks before being included in this document. The types of significant occurrences included are occurrences written about surface level changes, temperature changes, and radioactivity changes (activity in the drywells). This document does not contain complete information from the reports, only summaries of the events. For more information on occurrences, refer to the Occurrences section for the specific tank.

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 northeast quadrant, the waste they generated could have been transferred indirectly tank-to-tank.

■ A Plant (PUREX)

The Plutonium Uranium Extraction (PUREX) plant (i.e., A Plant) began operating in January 1956 (Gerber, 1993b). "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, 1993b).

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, 1993c).

■ 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, 1993c) (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 Site processing plants (B, T, REDOX, and PUREX)" (Gerber, 1993c, p. 12); however, the large production and economic efficiency of the PUREX plant caused the 4X Program to be abandoned (Gerber, 1993c). 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 strontium 90, promethium 147, and cesium 144 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 waste stream 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, 1994a) (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, 1994a, 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, 1994a, 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).

■ Uranium Trioxide Plant

The 224-U Building was converted to a uranium trioxide (UO_3) plant which 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, 1993c, 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 eight days each. Final deactivation was ordered for the plant 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, 1993c).

■ Z Plant (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 et al., 1993, pp. 2-1-2-2).

In July 1949, PFP began operations with a glove box line (see Figure 4). The remote mechanical A line replaced the glove box 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 was installed with an incinerator and leaching equipment. 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 Plutonium Finishing Plant is from D.R. 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, concentrating, and scavenging are all methods used to reduce liquid volumes or precipitate solids from 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 4 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 of the tanks to form radionuclide-bearing salt cakes (Sheftik, 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). "...one 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).

In-tank solidification 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, 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 accidentally 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 is located north and west of the A Tank Farm and 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 was constructed in 1952 and 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 was built in 1981 (Leach and Stahl, 1993) and 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 are presented on the following pages that 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 were the main sources of the wastes currently stored in the tanks. Abbreviations are defined in the preceding text and the glossary in Appendix A.

One time line represents the history of each of the tank farms in the northeast quadrant of the 200-East Area (Figure 6). The events represented include the dates of construction, 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

NE QUADRANT TANK FARMS - TIMELINE

FIGURE 6

1.3 Waste and Level History

The Waste and Level History section of this document is presented by a combination of two methods and is represented by sketches shown in Appendix C. The first method presents a graph of waste levels versus time for each tank. The waste levels graphed include the total waste level, solid waste level, and when available the interstitial liquid level. The waste level graphs also include information on transfers, stabilization, intrusion prevention (isolation), salt-well and jet pumping activities, level adjustments, pH, photographs, and a few other miscellaneous items. The second method presents a time line showing the periods of time that different waste types were added to each tank. The time line and the waste level graphs for a given tank have been arranged so that the time axis for each method correlates with one another.

1.3.1 Source of Data

The references used to create the total waste level graph and the solid waste level graph for each level history graph are listed below in chronological order beginning with the oldest documents. Anderson (1990) was the source used for level information from when the tanks entered service until the end of 1980. Level information from 1981 to the present was taken from a series of documents that basically contain the same type of information. These documents have been given various titles over the years but they all reflect the monthly waste status (i.e., waste volumes) for all the tanks. Beginning in 1981, these "monthly waste status reports" have been authored by the following people: O.C. Mudd, O.C. Mudd & D.C. McCann, D.C. McCann, D.C. McCann & T.S. Vail, T.S. Vail, T.S. Vail & G.D. Murry, T.S. Vail & G.J. Carter, G.J. Carter, G.A. Escobar, J.M. Thurman, and B.M. Hanlon. The last "monthly waste status report" reviewed was for October 31, 1995 (Hanlon, 1996a). See Appendix B for more complete reference information.

The reference for the interstitial liquid level (ILL) graph for the applicable level history graphs is from the Westinghouse Hanford Company's Surveillance Analysis Computer System (SACS). SACS is a database that stores ILL data along with other types of surveillance data. PCSACS software on a personal computer is the user interface to the SACS database via the Hanford Local Area Network (HLAN). The SACS database was queried back to 1950 for ILL data.

The reference for the transfer information is only Anderson (1990). Anderson has information for all the tanks through 1980. Transfers that may have occurred after 1980 have not been identified on the sketches of the Waste and Level History. For more transfer information not included in this document see *Waste Status and Transaction Record Summary for the Northeast Quadrant* (Agnew et al., 1995).

The reference for stabilization information is Hanlon (1996a).

For tanks that were intrusion prevented before June 1988, the reference is Welty (1988). For tanks that were intrusion prevented after June 1988, the references are various "monthly waste status reports". For more complete reference information on intrusion prevention after June 1988, refer to the Waste and Level History sketches in Appendix C where the references for intrusion prevention have been identified.

The reference for the salt-well pumping completion dates and jet pumping completion dates is Welty (1988). Salt-well and jet pumping activities that may have occurred after the release of Welty's document have not been identified on the Waste and Level History sketches.

Level adjustment dates were taken from various "monthly waste status reports" after and including 1981 and from Anderson (1990) prior to 1981. Anderson's document did not contain a complete listing of the level adjustments prior to 1981. For more complete information on level adjustments, refer to the individual "monthly waste status reports." For more complete reference information on level adjustments after 1980, refer to the Waste and Level History sketches in Appendix C where the references for these level adjustments have been identified.

The reference for the pH information is Borsheim and Kirch (1991). The pH information after the release of Borsheim and Kirch's document has not been identified on the Waste and Level History sketches.

The photographic information was taken from Appendix G of this document.

The information on the time lines came from two sources. The reference for the Waste Types Added Time Line was Anderson (1990). The reference for the Primary Additions Time Line was Agnew et al. (1995b).

1.3.2 Development of Data

The total waste level graphs and the solids waste level graphs were developed from waste volume information from Anderson (1990) and the "monthly waste status reports." Anderson compiled a listing of total waste volumes and solids waste volumes for all the tanks on a quarterly basis prior to January 1981. Since Anderson's document is a compilation of the "monthly waste status reports" prior to January 1981, specific "monthly waste status reports" were reviewed when typographical errors were found. In order to continue on a quarterly basis after January 1981, the total waste volumes and the solids waste volumes were taken from the March, June, September, and December additions of the reports. The waste volumes were converted into equivalent waste levels based upon the following equation:

$$\frac{\text{Total Gallons} - 12,500 \text{ Gallons}}{2750 \frac{\text{Gallons}}{\text{Inch}}} = 12 \text{ Inches} - \text{Total Inches}$$

The "0" reference point for the total waste levels and the solids waste levels are at the bottom inside of the tank. The waste levels have been rounded to the nearest thousand gallons(Kgal). In the event that the total waste level and the solids waste level were the same, the reported volumes were reviewed to determine if the volumes were the same. If the volumes were the same, only the solids level graphed. If the volumes were not the same, then both the total waste level and the solids waste level

were graphed. The quarterly waste volumes and associated waste levels have been arranged in tables and are titled the Level History tables. The Level History tables were developed within Microsoft Excel® and are presented in Appendix C.

The interstitial liquid level (ILL) graphs were developed from ILL data retrieved from SACS. The ILL data from SACS were imported into Microsoft Excel® spreadsheets. The SACS database custodians labeled the ILL data as either good or suspect. Only the data labeled as good were used for the ILL graphs. The SACS data that were labeled as good were reviewed for data on a quarterly basis. The quarters were set to match the quarterly system set up for the "monthly waste status reports" (i.e., the last month for each quarter was March, June, September, and December). The last data reading available from each quarter was the data reading used for the ILL graphs. The data from SACS have been rounded off to the nearest whole number. The "0" reference point for the SACS ILL data is the bottom inside of the tank. The reviewed quarterly ILL data were added to the appropriate quarter in the Level History tables presented in Appendix C.

The total waste level graphs, the solids waste level graphs, and the interstitial liquid level graphs were all created within AutoCAD®. In order to expedite the creation of these graphs, script files were generated from the information contained within the Level History tables. The script files were generated by arranging the waste level information and the corresponding dates from the Level History tables into a Cartesian coordinate system (i.e., x,y coordinates). The script files allowed AutoCAD® to automatically generate the graphs on the Waste and Level History sketches.

Transfer information was taken from the "Remarks" column of the Waste Status Summary tables from Anderson (1990). Transfer information was available on a quarterly basis. However, due to the scale of the time axis on the Waste and Level History sketch, the transfer information was placed near the total waste level graph corresponding to the appropriate year. Because of space limitations on the sketches, not all the transfer information available within Anderson's document could be included. For more details about the transfer information, see Anderson (1990).

Intrusion prevention (isolation) dates were taken from Welty (1988) and various "monthly waste status reports". However, Welty and the various "monthly waste status reports" issued before 1993 use the old terminology of interim isolated. In 1993, the term "interim isolated" was replaced with "intrusion prevention." In order to remain consistent with current terms, the Waste and Level History sketches have used the interim isolation dates given by Welty and changed the terminology to intrusion prevention.

The Waste Types Added Time Line information was taken from the "Type Waste" column of the Waste Status Summary tables from Anderson (1990). Since Anderson's document is a compilation of the "monthly waste status reports" prior to January 1981, specific "monthly waste status reports" were reviewed when typographical errors were found. The vertical lines on the time line are boundaries between which the types of wastes identified have been added to the tanks. The vertical lines are spaced a minimum of three years apart.

The Primary Additions Time Line information was taken from the spreadsheets located in Appendix C of the *Waste Status and Transaction Record Summary for the Northeast Quadrant* (Agnew et al., 1995b). Two columns in the spreadsheet were reviewed to determine the information that would

appear on the time line. The first column reviewed was the "Type" column. The "Type" column describes the type of transaction that occurred in a tank. The type of transactions that were reviewed were the transactions that Agnew et al. labeled as "XIN" or "xin". Agnew et al. used these two labels to indicate an addition of primary waste into a tank. According to Agnew et al., "XIN" is an addition of primary waste from a plant and "xin" is a transaction that was derived. If the "Type" column indicated either an "XIN" or "xin", then the "DWXT" column was reviewed for the type of waste added to the tank. The waste types defined in the "DWXT" column that corresponded to an "XIN" or "xin" from the "Type" column were the waste types added to the time line. The vertical lines on the Primary Additions Time Line are boundaries between which the types of wastes identified have been added to the tanks. The vertical lines are spaced a minimum of three years apart.

1.3.3 Assumptions

An assumption was required in order to begin developing the total waste level graphs and the solid waste level graphs. The assumption was that the tanks did not contain waste prior to the time when Anderson (1990) started recording information.

The waste volume information taken from Anderson (1990) and the various "monthly waste status reports" required an assumption in order to apply the waste volume information to waste level formulas. The actual total waste surface and the actual solid waste surface were assumed to be flat and level.

The total waste level graphs and the solid waste level graphs required an assumption in order to make complete graphs. There were many cases within the Waste Status Summary tables (Anderson, 1990) where the tables lacked waste volume information for one or more consecutive quarters. When this occurred, it was assumed that the waste volume followed an increasing, decreasing, or horizontal linear trend across the quarters in which Anderson lacked the volume information. Because of the linear nature of the waste volume to waste level formulas used to convert waste volumes into waste levels, a linear trend in the volumes results in a linear trend of waste levels on the Waste and Level History sketches.

The solid waste level graphs required an assumption about the time period when the tanks began receiving waste. Information on the solids volume was not recorded in the Waste Status Summary tables (Anderson, 1990) until well after the tanks started receiving waste. The first accumulation of solids within the tanks was not apparent from information by Anderson. An assumption was made that the first accumulation of solids within each tank followed an increasing linear trend. The first accumulation of solids was also assumed to start at the point where the tank was considered empty. In some tanks, solids were assumed to begin accumulating when the tank first started receiving waste.

The interstitial liquid within the tanks is the liquid that fills the interstitial spaces of the solid waste. The supernatant liquid within the tanks is located above the solid waste. Once the supernatant liquid has been removed from the tanks, the liquid that remains is the interstitial liquid. The interstitial liquid level (ILL) in most tanks is unknown unless a liquid observation well (LOW) was installed. The LOW allows access for instrumentation to record ILL. Unfortunately in many tanks, the LOW's were not installed and the ILL's were not recorded until sometime after the supernatant liquid was removed. Therefore, the ILL graphs required some assumptions in order to define the ILL graph from the point

where the supernatant liquid was removed from the tank to the point where ILL data were started. One assumption was that the ILL followed a decreasing linear trend from the point where the supernatant liquid was removed from the tank to the point where salt-well pumping or jet pumping was completed. Another assumption was that the ILL followed a horizontal linear trend from the point where salt-well or jet pumping was completed to the point where the first ILL data were recorded on SACS.

1.3.4 Quality of Data

The total waste level graphs and the solids waste level graphs on the Waste and Level History sketches were developed by using the waste volume to waste level formulas. There are some limitations with the formulas that affect the waste level results. The formulas have been applied for all volumetric values. However, the formulas do not yield realistic results when the waste volume is less than the volume that can be held below the top of the knuckle. The formulas do not account for construction tolerances on the tanks, the knuckle geometry on the tanks, and the irregularities in the surface of the solid wastes.

The total waste level graphs were developed from the volume data from Anderson (1990) and the "monthly waste status reports." The frequency in which these references have their volume information updated is not consistent with the frequency in which the surface level readings of the SACS database are updated. Therefore, a discrepancy may be noticed between the total waste level graphs of the Waste and Level History sketches in Appendix C and the surface level graphs in Appendix E.

The interstitial liquid level (ILL) graphs were developed from data contained within the SACS database. The SACS custodians have qualified the data as either good or suspect. Only the data labeled as good have been plotted. However, on many tanks, the ILL data plotted exceeded the total waste level data. This situation is a contradiction to the definition of interstitial liquid. Even though the SACS custodians have labeled the data as good, the data quality seems questionable. The questionable data were graphed anyway. It was not the function of this document to judge or qualify the ILL data nor to discuss in detail this situation.

1.4 Temperatures

1.4.1 Surveillance Techniques

Interior tank temperatures of the single-shell tanks in BY Tank Farm are monitored with thermocouples. Thermocouples are simple devices that develop a millivoltage when parts of the thermocouple are exposed to temperature differentials. The millivoltage can be converted to a temperature reading based upon a specific voltage versus temperature curve inherent to the type of thermocouple being used. Thermocouples are attached to a fabricated assembly called a thermocouple tree. The number of thermocouples attached to the tree varies as a function of the depth of the tank as well as the thermocouple tree design. The thermocouples are spaced at intervals, along trees that have many thermocouples, so that a vertical temperature profile of the tank contents can be developed. The thermocouple tree is installed in a riser and left in place inside the tank. If necessary, the thermocouple tree can be removed from the tank.

1.4.2 Source of Data

The source of the interior tank temperature data presented in this document is from the Westinghouse Hanford Company's Surveillance Analysis Computer System (SACS). SACS is a database that stores temperature data along with other types of surveillance data. PCSACS software on a personal computer is the user interface to the SACS database via the Hanford Local Area Network (HLAN). The SACS database was queried back to 1950 for temperature data. Temperature data identified by the query were categorized and located by SACS in several types of files. These files were evaluated for their usefulness in this document.

The SACS database for temperature data contained one of two types of files depending on the specific tank. One type of file contained data that were not correlated to thermocouple, thermocouple tree, or riser. This type of file was not used in this document because the lack of information made the data unusable. The second type of file contained interior tank temperature data that were correlated to a particular thermocouple, thermocouple tree, and/or riser. Files of the second type were the only files from SACS that were used in this document for temperature data. After the SACS data files were evaluated, the files that were selected for use in this document were imported using PCSACS into spreadsheets in Microsoft Excel® software.

1.4.3 Development of Data

Interior tank temperature data imported from SACS into spreadsheets (Microsoft Excel®) were rearranged onto separate spreadsheets depending on the data qualifier assigned by SACS custodians. The SACS database custodians labeled the interior tank temperature data using three data qualifiers or categories. The categories are good (G), transcribed (T), and suspect (S). The temperature data were then filtered to remove all the S data, leaving only the G and T data. The filtered data were used to develop graphs of individual thermocouple data. The graphs were developed within Microsoft Excel®. There were two conditions about the temperature data that were evaluated before the graphs of individual thermocouple data were developed. The first condition evaluated was the number of data points from a particular thermocouple. If a thermocouple had five or less data points, then a graph was not developed for that particular thermocouple. The second condition evaluated was the time span between consecutive data points. If the time span between consecutive data points was greater than 36 months, then the graph was shown as discontinuous across the span (see Appendix D).

The thermocouple elevations that were identified on the individual thermocouple graphs were determined from design drawings listed in the narratives and from the *Thermocouple Status Single Shell and Double Shell Tanks* (Tran, 1993). Tran's document contained design drawing references along with thermocouple elevations. If the design drawings listed in Tran's document could be verified for the individual tanks, then the thermocouple elevations listed by Tran were used. If the design drawings listed in Tran's document could not be verified for an individual tank or if there was no design drawings located, then the thermocouple elevations were labeled as unknown. If Tran's document lacked information about thermocouple elevations for a particular tank and design drawings were located, then the thermocouple elevations were labeled as approximate.

1.4.4 Assumptions

The transcribed data points are data points that have not been verified or validated by Westinghouse Hanford Company. Transcribed data were assumed to be good data and were included in the graphs of individual thermocouple data and the statistics. Individual judgements were not made on particular transcribed data points even though they had a high probability of being suspect. Verification and/or validation of data is not the function of this document.

1.4.5 Quality of Data

The quality of the interior tank temperature data is noted by the three category labels assigned by the custodians of the SACS database. The good and suspect data points have been verified and/or validated by Westinghouse Hanford Company. The transcribed data points have not been reviewed by Westinghouse Hanford Company. The transcribed data could be classified as either good or suspect at a later date.

This document has treated the transcribed data as good data. However, an area where the transcribed data points have a high probability of being suspect is when the temperature data values are below 45-50°F. The approximate temperature of the surrounding soil is 45-50°F and the soil will prevent the temperature of the tank from dropping below this point. Some of the tanks have many data points below the 45-50°F range and should be evaluated carefully as to whether or not they should be considered as good data points.

1.5 Waste Surface Level

1.5.1 Surveillance Techniques

One of two types of surface level devices are used to monitor waste levels in a single-shell tank. These devices are: a level indicating transmitter or Food Instrument Corporation (FIC) gauge, and a level indicator assembly or manual tape.

The Food Instrument Corporation gauge is based on conductivity. A plummet is lowered into the tank. When the plummet contacts an electrically conducting surface that is in contact with the edge of the tank, a circuit is completed between the probe and the tank which is grounded to the instrument. This triggers the drive motor to stop and the motor brake to engage. The brake is held for 60 seconds, before the motor raises the plummet. The plummet is raised until the circuit is broken. This device can be read automatically, manually, or both. The automatic FIC reading is automatically read in the field and loaded on the surveillance automated computer system (SACS). FIC readings are also read manually in the field and entered into the SACS.

The manual tape flake boxes are an access point for measuring liquid levels manually if other devices fail or do not exist. A hand crank on the flake box is used to lower the tape probe until liquid is contacted and a circuit is completed between the tank and the instruments (similar to the FIC gauge). If the circuit is not closed, the probe is lowered until the tape is slack; then a measurement is recorded.

1.5.2 Source of Data

The data recorded from January 1, 1991 to the present for the waste surface levels were obtained from the SACS. PCSACS software on a personal computer is the user interface to the SACS database. The information was parsed in a spreadsheet in Microsoft Excel® software and displayed on graphs. Since the intrusion FIC is fixed at a certain elevation, it only records that elevation unless there is an unexplained addition. The device does not truly measure the waste surface level, so the data were not displayed.

1.5.3 Development of Data

Surface level data imported from SACS into spreadsheets (Microsoft Excel®) were rearranged onto separate spreadsheets depending on the data qualifier assigned by SACS custodians. The SACS database custodians label the surface level data using three data qualifiers or categories. The categories are good (G), transcribed (T), and suspect (S). The surface level data were then filtered to remove all the S data, leaving only the G and T data. The good and transcribed data were displayed on graphs. The graphs show waste level versus time. The data are displayed using the best representative scale on the y axis. If the tank has more than one device to measure the waste surface level, an individual graph was made to display the data from each device. The safety limit maximum waste level is placed in the title of each graph (Dougherty, 1995). Current information on the waste surface levels is in Appendix E.

1.5.4 Assumptions

The data obtained from PCSACS are the best available data. The data quality designation, instrument type, and level measurement are accurate. The devices are in good condition and give accurate readings assuming the following: internal tank temperature changes do not cause the tape, wire, or probe to change length; the tape, wire, and probe are straight; the surface profile of the waste is flat; and changes in atmospheric temperature do not effect the portions of the measuring device exposed to the atmosphere.

1.5.5 Quality of Data

Surface level readings may be affected by plummet (i.e., manual tape) error, flushing water accumulation, waste surface irregularities, and gas generation. Crystalline wastes (i.e., salt cake) can build up gradually on the end of the plummet and contact the waste which indicates a false surface level increase. Significant level discrepancies occur when the encrusting waste breaks off or when the measuring instrument plummet is flushed to remove the encrusting salt cake. Flushing the Food Instrument Corporation gauge, manual tapes, or any other equipment may cause accumulated wash water to collect under the plummet which can also indicate a false increase in the overall volume of waste within the tank. Surface level readings are often difficult to obtain from tanks with a relatively dry waste surface of salt cake. Some tanks have crystalline waste built up on internal tank equipment (e.g., pumps, thermocouples, and other protruding equipment). As the supernatant liquid is pumped from the tanks, the crystalline structure may remain attached to the equipment and be suspended above the liquid. Therefore, an accurate surface level measurement would be difficult if the breakup of the crystalline structure was inconsistent and a nonuniform waste surface was created. Steel tapes or wires that are

bent or warped from operation or those discarded on the waste surface are other sources of altered surface level readings.

Data from the SACS were obtained electronically from the Westinghouse Hanford Company surveillance group and were plotted. The data are actual surface levels recorded from the surveillance equipment. If the surveillance equipment in a particular tank riser was removed from service, the readings may show a level change when a new instrument and/or riser is used, especially if the waste surface shows severe heterogeneity.

The data used to produce the plots and the data obtained from the surveillance group have been verified as identical. However, errors in the data prior to the exchange of information could still exist. The SACS data were understood to be unverified prior to the exchange. Westinghouse Hanford Company qualified the data with G, S, and T for good, suspect, and transcribed, respectively. Data that is labeled transcribed has not been validated or verified by Westinghouse Hanford Company. The criteria for determining data labeled good or suspect is unknown.

1.6 Riser Configuration

1.6.1 Source of Data

The riser configuration drawings and tables in this report were compiled from design and/or as-built drawings including engineering change notices dated before November 1, 1995, the *Riser Configuration Document for Single-Shell Waste Tanks* (Alstad, 1993), and *Waste Tank Risers Available for Sampling* (Lipnicki, 1995b).

1.6.2 Development of Data

There are two drawings and a table in Appendix F that show each tank's approximate riser locations, construction materials, dimensions, and riser function. Alstad (1993) was used as a guide; however, the design and as-built drawings and engineering change notices take precedence. The tables in Appendix F contain the riser number, diameter, sampling, and description of each riser and nozzle. The sampling column lists risers that are tentatively available for sampling (Lipnicki, 1995b). The description and comment column describes the riser's intended use and, if applicable, gives a brief explanation, date, and number of the pertaining engineering change notices in parentheses.

1.6.3 Assumptions

The design and as-built drawings are the best available data. All the engineering change notices written against the referenced drawings are released and accurate. Since figures or sources were not listed in Lipnicki (1995), the riser numbers labeled tentatively available for sampling are assumed to be the same as riser numbers listed in Alstad (1993).

1.6.4 Quality of Data

The riser configuration section of this document is a mixture of data from three main sources: design and as-built drawings, *Riser Configuration Document for Single-Shell Waste Tanks* (Alstad,

1993), and *Waste Tank Risers Available for Sampling* (Lipnicki, 1995b). All these sources do not agree all the time. Alstad (1993) and Lipnicki (1995) reference the design and as-built drawings in their respective documents. The design and as-built drawings contain a plan view of the tank dome and a table explaining the function of each riser. Sometimes the plan view and table do not match. If there was a discrepancy, a comment was made below the table for that tank. Other design and as-built drawings show a cross-sectional view of the tank. Changes made to the structure of a tank may not have been documented by an engineering change notice. The drawings and tables are intended to give the reader information as to approximate location, number of risers, and what equipment the riser might contain. The drawings are not to scale.

1.7 Photographs and Montages

1.7.1 Source of Data

The photographs include an aerial photograph of the tank farm and a photographic montage of each tank interior, if available (see Appendix G). All of the photographs were obtained from Boeing Computer Services Richland-Photography. The aerial photographs were reviewed to determine the clearest and most recent representation of the BY Tank Farm to be used in this document. The montages were created from sets of interior tank photographs. These sets were also reviewed to determine which ones were the clearest and most recent photographs available. Only interior tank photographs representing the waste surface were used. In some cases, existing montages were the clearest and most recent; therefore, a new montage was not created.

1.7.2 Development of Data

The tank farm aerial photograph was labeled to show tank orientation, identifiable equipment, and structures. Arrows were placed on the tank farm aerial photograph to indicate the cascade overflows. The clearest and most recent montage of the tank interior was labeled to show identifiable monitoring equipment, piping, and risers. A table was also developed listing aerial photograph numbers, interior tank montage numbers, photographic set numbers, and the date (see Appendix G).

1.7.3 Quality of Data

The interior tank photographs may not represent the actual colors of the waste surface due to possible alteration of colors during copying of the original photographs. To see the colors of the original montage, an original may be ordered through Boeing Computer Services Richland-Photography. Also, radiation could affect the film distorting the apparent colors of the waste. Some tanks had fogging problems in the vapor space which prevented use of the latest photographs. The montage may not reflect the current waste level and waste type due to pumping, additions, mixing, and/or settling of the waste after the photographs were taken. Also, the equipment configuration may not reflect tank upgrades and/or maintenance.

1.8 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimates

The Tank Layer Model (TLM), Supernatant Mixing Model (SMM), and Inventory Estimates developed by Los Alamos National Laboratory (LANL) are presented in Appendix H along with their

approach and development sections. The TLM, SMM, and Inventory Estimates presented in this document represent an estimated waste content of the tanks in BY Tank Farm based on an inventory estimate date of December 31, 1993.

1.8.1 Source of Data

The TLM, SMM, Inventory Estimates, and their approach and development sections presented in this document are from the *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3* (Agnew et al., 1996).

1.8.2 Development of Data

The data presented in Appendix H were selectively taken from the *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3* (Agnew et al., 1996) document to include the TLM, SMM, and the Inventory Estimates for BY Tank Farm. The introduction for Agnew's document was included in its entirety. Any reference to appendices in Agnew's introduction and tables in Appendix H are the appendices of his document. The TLM Working Worksheet (Agnew, 1996, Appendix C) was included for only BY Tank Farm. The SMM and TLM Volume Tables (Agnew, 1996, Appendix D) was included for all tanks. The Inventory Estimates (Agnew, 1996, Appendix E) was included for only BY Tank Farm.

2.0 BY Tank Farm

2.0.1 BY Tank Farm Information

The BY Tank Farm is located west of Baltimore Avenue, south of 12th Street, and north of the BX Tank Farm in the 200-East Area. The farm contains twelve 100 series, dish bottom design, single-shell tanks built in 1948 and 1949 (Welty, 1988). The 100 series tanks are 75 feet in diameter with an operating capacity of 758,000 gallons (Hanlon, 1996b) (see tank cross-section in Appendix F). The tanks are constructed of a reinforced concrete shell with a steel liner on the interior bottom and sides. The tanks were designed to hold non-boiling waste at a maximum fluid temperature of 220°F (Leach and Stahl, 1993). The dome of each tank is penetrated by risers varying in diameter from 4 to 42 inches. All of the tanks have at least eight feet of earth cover.

The twelve tanks were constructed at different elevations with connecting overflow lines that allowed waste to cascade from tank to tank and from BX Tank Farm. There are four cascade sequences in the BY Tank Farm. One cascade is from Tank 241-BY-101 through -102 and -103. The second is from Tank 241-BY-104 through -105 and -106. The third is from Tank 241-BY-107 through -108 and -109, and the fourth is from Tank 241-BY-110 through -111 and -112.

2.0.2 BY Tank Farm Waste and Level History

The Waste and Level History sketches in Appendix C present the waste history and level history of BY Tank Farm.

2.0.3 BY Tank Farm Temperature History

Interior tank temperature data for BY Tank Farm is quite limited compared to the span of time in which the tanks have been operating. Information about the various temperature monitoring devices and their locations throughout history is also quite limited. The information that was available came from the Surveillance Analysis Computer System (SACS) database. The SACS database had several types of temperature data files available. Data from the files were available as far back as early 1974.

2.0.4 BY Tank Farm Occurrences

Only the occurrences determined as significant are included. The reports presented are incomplete because not all of the documentation on occurrences for BY Tank Farm could be located.

2.0.5 BY Tank Farm Current Status

The tanks in BY Tank Farm entered service from 1950 to 1953 (Anderson, 1990). The dates the tanks entered service are based on when the tank first received waste or test water. This date may vary in other documents. The total waste volume for all of the tanks is approximately 4,680,000 gallons as of November 30, 1995 (Hanlon, 1996b). All tanks are out of service. Tanks 241-BY-101, -102, -104, -109, -110, -111, and -112 are categorized as sound and Tanks 241-BY-103, -105, -106, -107, and -108 are assumed leakers. Tanks 241-BY-103, -104, -105, -106, -107, -108, -110, -111, and -112 are on a

watch list. See Appendix E for waste surface level graphs. The risers tentatively available for sampling are listed in Appendix F.

2.0.6 BY Tank Farm Photograph and Tank Montages

The photographs for BY Tank Farm include an aerial photograph of the farm and a montage of interior tank photographs for each tank. The aerial photograph shows the tank orientation, equipment, and structures. Arrows were placed between the tanks to represent the cascade overflow lines and the flow directions. The interior tank photographs were arranged into montages to show the waste surface, monitoring equipment, piping, and risers in each tank. The photographs and a table listing all photographs, montage numbers, photograph set numbers, and dates of the photographs in this document are in Appendix G.

2.0.7 BY Tank Farm Tank Layer Model, Supernatant Mixing Model, and Inventory Estimates

The Tank Layer Model (TLM), Supernatant Mixing Model (SMM), and Inventory Estimates developed by Los Alamos National Laboratory (Agnew et al., 1996) for BY Tank Farm are presented in Appendix H along with their introduction sections.

2.1 Tank 241-BY-101

2.1.1 Waste and Level History of Tank 241-BY-101

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-101.

2.1.2 Temperature History of Tank 241-BY-101

Interior tank temperature data for Tank 241-BY-101 were recorded by two separate thermocouple tree arrangements. One thermocouple tree provided data from 14 thermocouples and the other tree provided data from only 6 thermocouples. Drawing H-2-35968, Rev. 1, indicates that there is a thermocouple tree designed as shown on Drawing H-2-34304, Sht. 1 Rev. 6, with 14 thermocouples. The Surveillance Analysis Computer System (SACS) indicates that this thermocouple tree is located in riser 1. Engineering Change Notices (ECN) No. 169757 and No. 193140 indicate that there is a thermocouple tree designed as shown on Drawing H-2-83312, Sht. 2, Rev. 0, and is located in riser 5. The SACS also indicates that this thermocouple tree is located in riser 5. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple trees located at risers 1 and 5 are the only sources of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and files of temperature data for thermocouples correlated to a riser number. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the files that tied the temperature data to riser 1 and riser 5 were used in this document. The earliest data retrieved from SACS were from mid March 1993.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple in riser 1. Graphs were not created for the thermocouples in riser 5 due to lack of data. The following statistical information was taken from all 20 thermocouples. The maximum temperature was 84°F taken by thermocouple 2 in riser 5 on April 4, 1994. The minimum temperature was 60.6°F taken by thermocouple 9 in riser 1 on March 31, 1994. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 71°F.

2.1.3 Occurrences for Tank 241-BY-101

No significant occurrences are associated only with Tank 241-BY-101.

2.1.4 Current Status of Tank 241-BY-101

Tank 241-BY-101 entered service during the first quarter of 1950 (Anderson, 1990) and as of November 30, 1995 stores approximately 387,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 85 inches on October 5, 1994. The maximum waste surface level was 144 inches on January 2

and 19, 1991. See Appendix E for details on waste surface level. The tank is out of service with interim stabilization and intrusion prevention completed. The tank is listed as sound and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-101 has 22 risers with one tentatively available for sampling: one 4-inch riser (No. 4) (Lipnicki, 1995b).

2.1.5 Interior Montage of Tank 241-BY-101

The clearest and most recent set of interior tank photographs was taken on September 19, 1989. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.1.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-101

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-101 are presented in Appendix H along with their introduction sections.

2.2 Tank 241-BY-102

2.2.1 Waste and Level History for Tank 241-BY-102

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-102.

2.2.2 Temperature History of Tank 241-BY-102

There is no interior tank temperature data in this document for Tank 241-BY-102. The Surveillance Analysis Computer System (SACS) database was reviewed on January 8, 1996. The SACS database contained only one type of file for temperature data: a historical file that contained data for thermocouples without correlation to a riser number. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document.

2.2.3 Occurrences for Tank 241-BY-102

An occurrence report was issued in August 1974 because of increased radiation levels in a drywell. The increased activity was attributed to the migration of preexisting contamination that had leaked from Tank 241-BY-103.

2.2.4 Current Status of Tank 241-BY-102

Tank 241-BY-102 entered service during the third quarter of 1950 (Anderson, 1990) and as of November 30, 1995 stores approximately 277,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 72 inches on November 26, 1994. The maximum waste surface level was 167 inches on March 11, 1991 and April 15, 1991. See Appendix E for details on waste surface level. The tank is out of service with interim stabilization and partial interim isolation completed. The tank is listed as sound and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-102 has 16 risers with three tentatively available for sampling: two 4-inch risers (Nos. 4 and 14) and one 12-inch riser (No. 10A) (Lipnicki, 1995b).

2.2.5 Interior Montage of Tank 241-BY-102

The clearest and most recent set of interior tank photographs was taken on September 11, 1987. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.2.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-102

The Tank Layer Model (TLM), Supernatant Mixing Model (SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-102 are presented in Appendix H along with their introduction sections.

2.3 Tank 241-BY-103

2.3.1 Waste and Level History for Tank 241-BY-103

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-103.

2.3.2 Temperature History of Tank 241-BY-103

Interior tank temperature data for Tank 241-BY-103 were recorded by 14 thermocouples attached to one thermocouple tree. Drawing H-2-35239, Rev. 1, indicates that the thermocouple tree is designed as shown on Drawing H-2-34304, Sht. 1 Rev. 6, with 14 thermocouples. The Surveillance Analysis Computer System (SACS) indicates that the thermocouple tree is located in riser 1. Drawing H-2-83312, Sht. 2, Rev. 0, indicates that there is a thermocouple tree installed in riser 4. However, SACS did not contain any temperature data from this thermocouple tree. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple tree located at riser 1 is the only source of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and a file of temperature data for 14 thermocouples correlated to riser 1. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the file that tied the temperature data to riser 1 were used in this document. The earliest data retrieved from SACS were from mid March 1993.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple. The following statistical information was taken from all 14 thermocouples. The maximum temperature was 82.4°F taken by thermocouple 2 on March 23 and 27, 1993 and by thermocouple 3 on March 18, 1993. The minimum temperature was 63.5°F taken by thermocouple 9 and 10 on May 6, 1994. The maximum and minimum temperatures are labeled as a good data points within SACS. The average temperature for all the thermocouples is 76°F.

2.3.3 Occurrences for Tank 241-BY-103

An occurrence report was issued in January 1990 when water from rapidly melting snow entered the tank through the pump pits.

2.3.4 Current Status of Tank 241-BY-103

Tank 241-BY-103 entered service during the fourth quarter of 1950 (Anderson, 1990) and as of November 30, 1995 stores approximately 400,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 146.75 inches on January 1, 1995 and July 2, 1995. The maximum waste surface level was 158.75 inches on October 1, 1995. See Appendix E for details on waste surface level. Tank 241-BY-103 was added to the Ferrocyanide Watch List in January 1991. The tank is out of service with

partial interim isolation completed. The tank is listed as an assumed leaker and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-103 has 25 risers with five tentatively available for sampling: three 4-inch risers (Nos. 4, 9A, and 12A), one 14-inch riser (No. 9B), and one 18-inch riser (No. 10B) (Lipnicki, 1995b).

2.3.5 Interior Montage of Tank 241-BY-103

The clearest and most recent set of interior tank photographs was taken on June 6, 1977. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.3.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-103

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-103 are presented in Appendix H along with their introduction sections.

2.4 Tank 241-BY-104

2.4.1 Waste and Level History for Tank 241-BY-104

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-104.

2.4.2 Temperature History of Tank 241-BY-104

Interior tank temperature data for Tank 241-BY-104 were recorded by two separate thermocouple tree arrangements. Both thermocouple trees provided temperature data for six thermocouples. Drawing H-2-90342, Sht. 2, Rev. 2, indicates that the thermocouple tree located in riser 1 is designed as shown on that drawing. The Surveillance Analysis Computer System (SACS) also indicates that this thermocouple tree is located in riser 1. Drawing H-2-90342, Sht. 2, Rev. 2 indicates that the other thermocouple tree located is designed as shown on Drawing H-2-90342, Sht. 3, Rev. 0 and is located in riser 10B. The SACS also indicates that this thermocouple tree is located in riser 10B. Drawing H-2-35239, Rev. 1, indicates that there is a thermocouple tree designed as shown on Drawing H-2-34304, Sht. 1, Rev. 6, with 14 thermocouples installed in the tank. However, SACS did not contain any temperature data from this thermocouple tree. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple trees located at risers 1 and 10B are the only sources of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and files of temperature data for thermocouples correlated to a riser number. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the files that tied the temperature data to riser 1 and riser 10B were used in this document. The earliest data retrieved from SACS were from mid March 1993.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple in riser 1 and 10B. The following statistical information was taken from all 12 thermocouples. The maximum temperature was 129.02°F taken by thermocouple 2 in riser 1 on March 23, 24, 28 and on April 1, 1993. The minimum temperature was 71.9°F taken by thermocouple 6 in riser 1 on May 6, 1994. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 106°F.

2.4.3 Occurrences for Tank 241-BY-104

No significant occurrences are associated only with Tank 241-BY-104.

2.4.4 Current Status of Tank 241-BY-104

Tank 241-BY-104 entered service during the first quarter of 1950 (Anderson, 1990) and as of November 30, 1995 stores approximately 406,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level

was 125.25 inches on April 1, 1992. The maximum waste surface level was 131.75 inches on numerous dates from February 1, 1991 through March 4, 1991. See Appendix E for details on waste surface level. Tank 241-BY-104 was added to the Ferrocyanide Watch List in January 1991. The tank is out of service with interim stabilization and intrusion prevention completed. The tank is listed as sound and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-104 has 19 risers with one tentatively available for sampling: one 4-inch riser (No. 4) (Lipnicki, 1995b).

2.4.5 Interior Montage of Tank 241-BY-104

The clearest and most recent set of interior tank photographs was taken on September 7, 1989. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.4.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-104

The Tank Layer Model (TLM), Supernatant Mixing Model (SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-104 are presented in Appendix H along with their introduction sections.

2.5 Tank 241-BY-105

2.5.1 Waste and Level History for Tank 241-BY-105

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-105.

2.5.2 Temperature History of Tank 241-BY-105

Interior tank temperature data for Tank 241-BY-105 were recorded by two separate thermocouple tree arrangements. One thermocouple tree provided temperature data for 14 thermocouples and the other tree provided data for only 6. Drawing H-2-35239, Rev. 1, indicates that there is a thermocouple tree designed as shown on Drawing H-2-34304, Sht. 1 Rev. 6, with 14 thermocouples. However, temperature data were only available from thermocouples 1 through 12. The Surveillance Analysis Computer System (SACS) indicates that this thermocouple tree is located in riser 1. Drawing H-2-90342, Sht. 2, Rev. 2, indicates that the thermocouple tree is designed as shown on that drawing and is located in riser 10C. The SACS also indicates that this thermocouple tree is located in riser 10C. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple trees located at risers 1 and 10C are the only sources of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and files of temperature data for thermocouples correlated to a riser number. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the files that tied the temperature data to riser 1 and riser 10C were used in this document. The earliest data retrieved from SACS were from early May 1985.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple in riser 1 and 10B. The following statistical information was taken from all 18 thermocouples. The maximum temperature was 235.06°F taken by thermocouple 6 in riser 10C on June 4, 1995. The minimum temperature was 53.6°F taken by thermocouple 6 in riser 1 on December 3, 1986. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 118°F.

2.5.3 Occurrences for Tank 241-BY-105

No significant occurrences are associated only with Tank 241-BY-105.

2.5.4 Current Status of Tank 241-BY-105

Tank 241-BY-105 entered service during the second quarter of 1951 (Anderson, 1990) and as of November 30, 1995 stores approximately 503,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 166 inches on numerous dates from March 4, 1994 through January 1, 1995. The

maximum waste surface level was 181.75 inches on January 7, 1991. See Appendix E for details on waste surface level. Tank 241-BY-105 was added to the Ferrocyanide Watch List in January 1991. The tank is out of service with partial interim isolation completed. The tank is listed as an assumed leaker and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-105 has 21 risers with two tentatively available for sampling: one 4-inch riser (No. 12A) and one 12-inch riser (No. 5) (Lipnicki, 1995b).

2.5.5 Interior Montage of Tank 241-BY-105

The clearest and most recent set of interior tank photographs was taken on July 1, 1986. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.5.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-105

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-105 are presented in Appendix H along with their introduction sections.

2.6 Tank 241-BY-106

2.6.1 Waste and Level History of Tank 241-BY-106

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-106.

2.6.2 Temperature History of Tank 241-BY-106

Interior tank temperature data for Tank 241-BY-106 were recorded by six thermocouples attached to one thermocouple tree. Drawing H-2-90342, Sht. 2, Rev. 2, indicates that the thermocouple tree is designed as shown on that drawing and is located in riser 1. The Surveillance Analysis Computer System (SACS) also indicates that the thermocouple tree is located in riser 1. Drawing H-2-35239, Rev. 1, indicates that there is a thermocouple tree designed as shown on Drawing H-2-34304, Sht. 1, Rev. 6, with 14 thermocouples installed in the tank. However, SACS did not contain any temperature data from this thermocouple tree. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple tree located at riser 1 is the only source of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and a file of temperature data for the six thermocouples correlated to riser 1. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the file that tied the temperature data to riser 1 were used in this document. The earliest data retrieved from SACS were from early February 1975.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple. The following statistical information was taken from all six thermocouples. The maximum temperature was 172.0°F taken by thermocouple 1 on February 7, 1975. The minimum temperature was 70°F taken by thermocouple 6 on February 1, 1988. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 115°F.

2.6.3 Occurrences for Tank 241-BY-106

No significant occurrences are associated only with Tank 241-BY-106.

2.6.4 Current Status of Tank 241-BY-106

Tank 241-BY-106 entered service during the second quarter of 1953 (Anderson, 1990) and as of November 30, 1995 stores approximately 642,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 212.5 inches on January 9 and 10, 1996. The maximum waste surface level was 244.5 inches on July 2, 1995. The tank is out of service with partial interim isolation completed. Tank 241-BY-106 was added to the Ferrocyanide Watch List in January 1991. The tank is listed as an assumed leaker and

is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-106 has 19 risers with two tentatively available for sampling: one 4-inch riser (No. 10B) and one 12-inch riser (No. 5) (Lipnicki, 1995b).

2.6.5 Interior Montage of Tank 241-BY-106

The clearest and most recent set of interior tank photographs was taken on November 4, 1982. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.6.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-106

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-106 are presented in Appendix H along with their introduction sections.

2.7 Tank 241-BY-107

2.7.1 Waste and Level History of Tank 241-BY-107

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-107. The assumed interstitial liquid level (ILL) for this tank does not follow the assumptions developed in the introduction due to the lack of information on the salt-well and jet pumping activities. It was assumed for this tank that the ILL followed a decreasing trend from the point where the supernatant liquid was removed from the tank to the point where interim stabilization was completed.

2.7.2 Temperature History of Tank 241-BY-107

Interior tank temperature data for Tank 241-BY-107 were recorded by 14 thermocouples attached to one thermocouple tree. Drawing H-2-34638, Rev. 5, indicates that the thermocouple tree is designed as shown on Drawing H-2-34304, Sht. 1 Rev. 6, with 14 thermocouples. The Surveillance Analysis Computer System (SACS) indicates that the thermocouple tree is located in riser 1. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple tree located at riser 1 is the only source of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and a file of temperature data for 14 thermocouples correlated to riser 1. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the file that tied the temperature data to riser 1 were used in this document. The earliest data retrieved from SACS were from late November 1974.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple. The following statistical information was taken from all 14 thermocouples. The maximum temperature was 98.42°F taken by thermocouple 1 on August 3, 1994. The minimum temperature was 68.9°F taken by thermocouple 10 on February 14, 1995. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 81°F.

2.7.3 Occurrences for Tank 241-BY-107

Occurrence reports were issued in 1979 and 1980 when activity increased in the drywells from migrating contamination. The migration was attributed to melting snow, nearby water bibs, and condensate from a steam cleaner.

2.7.4 Current Status of Tank 241-BY-107

Tank 241-BY-107 entered service during the third quarter of 1950 (Anderson, 1990) and as of November 30, 1995 stores approximately 266,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level

was 102.75 inches on April 16, 1994. The maximum waste surface level was 107.5 inches on April 1, 1994. See Appendix E for details on waste surface level. Tank 241-BY-107 was added to the Ferrocyanide Watch List in January 1991. The tank is out of service with interim stabilization and intrusion prevention completed. The tank is listed as an assumed leaker and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-107 has 22 risers with five tentatively available for sampling: two 4-inch risers (Nos. 2 and 3), one 12-inch riser (No. 8), and two 18-inch risers (Nos. 9B and 11B) (Lipnicki, 1995b).

2.7.5 Interior Montage of Tank 241-BY-107

The clearest and most recent set of interior tank photographs was taken on October 15, 1986. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.7.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-107

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-107 are presented in Appendix H along with their introduction sections.

2.8 Tank 241-BY-108

2.8.1 Waste and Level History of Tank 241-BY-108

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-108.

2.8.2 Temperature History of Tank 241-BY-108

Interior tank temperature data for Tank 241-BY-108 were recorded by 10 thermocouples attached to one thermocouple tree. ECN No. 151426 indicates that the thermocouple tree is designed as shown on Drawing H-2-34304, Sht. 1 Rev. 6, with 14 thermocouples. However, temperature data were only available from thermocouples 1 through 10. The Surveillance Analysis Computer System (SACS) indicates that the thermocouple tree is located in riser 8. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple tree located at riser 8 is the only source of temperature data for this document. The temperature data were obtained from the SACS database on January 8, 1996. The earliest data retrieved from SACS were from mid September 1974.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple. The following statistical information was taken from all 10 thermocouples. The maximum temperature was 140°F taken by thermocouple 1 on October 8 and December 17, 1974. The minimum temperature was 51°F taken by thermocouple 1 on November 9, 1991. The maximum and minimum temperatures are labeled as a good data points within SACS. The average temperature for all the thermocouples is 88°F.

2.8.3 Occurrences for Tank 241-BY-108

An occurrence report was issued in January 1980 when about 2,600 gallons of water from rapidly melting snow entered the tank through the pits.

2.8.4 Current Status of Tank 241-BY-108

Tank 241-BY-108 entered service during the first quarter of 1951 (Anderson, 1990) and as of November 30, 1995 stores approximately 228,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 82.5 inches on January 1, 1995. The maximum waste surface level was 88.5 inches on numerous dates from February 3, 1993 through March 1, 1993. See Appendix E for details on waste surface level.

Tank 241-BY-108 was added to the Ferrocyanide Watch List in January 1991. The tank is out of service with interim stabilization and intrusion prevention completed. The tank is listed as an assumed leaker and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-108 has 21 risers with six tentatively available for sampling: three 4-inch risers (Nos. 1, 2, and 11B) and three 12-inch risers (Nos. 5, 9B, and 12A) (Lipnicki, 1995b).

2.8.5 Interior Montage of Tank 241-BY-108

The clearest and most recent set of interior tank photographs was taken on October 15, 1986. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.8.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-108

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-108 are presented in Appendix H along with their introduction sections.

2.9 Tank 241-BY-109

2.9.1 Waste and Level History of Tank 241-BY-109

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-109.

2.9.2 Temperature History of Tank 241-BY-109

There are no interior tank temperature data in this document for Tank 241-BY-109. The Surveillance Analysis Computer System (SACS) database was reviewed on January 8, 1996. The SACS database contained only one type of file for temperature data, a historical file that contained data for thermocouples without correlation to a riser number. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document.

2.9.3 Occurrences for Tank 241-BY-109

No significant occurrences are associated only with Tank 241-BY-109.

2.9.4 Current Status of Tank 241-BY-109

Tank 241-BY-109 entered service during the first quarter of 1953 (Anderson, 1990) and as of November 30, 1995 stores approximately 423,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual FIC level gauge as of October 1995. The minimum waste surface level was 121.9 inches on October 2, 1995. The maximum waste surface level was 180.9 inches on March 25, 1991 and June 16, 1991. See Appendix E for details on waste surface level. The tank is out of service with partial interim isolation completed. The tank is listed as sound and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-109 has 19 risers with four tentatively available for sampling: four 12-inch risers (Nos. 9A, 10A, 10B, and 12C) (Lipnicki, 1995b).

2.9.5 Interior Montage of Tank 241-BY-109

The clearest and most recent set of interior tank photographs was taken on October 15, 1986. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.9.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-109

The Tank Layer Model (TLM), Supernatant Mixing Model (SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-109 are presented in Appendix H along with their introduction sections.

2.10 Tank 241-BY-110

2.10.1 Waste and Level History of Tank 241-BY-110

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-110.

2.10.2 Temperature History of Tank 241-BY-110

Interior tank temperature data for Tank 241-BY-110 were recorded by two separate thermocouple trees. Both thermocouple trees provided temperature data for six thermocouples. Drawing H-2-90342, Sht. 2, Rev. 2, indicates that the thermocouple tree is designed as shown on that drawing and is located in riser 1. The Surveillance Analysis Computer System (SACS) also indicates that this thermocouple tree design is located in riser 1. Drawing H-2-90342, Sht. 2, Rev. 2, indicates that a thermocouple tree is designed as shown on Drawing H-2-90342, Sht. 3, Rev. 0 and is located in riser 10A. The SACS also indicates that this thermocouple tree is located in riser 10A. Drawing H-2-34638, Rev. 5, indicates that there is a thermocouple tree designed as shown on Drawing H-2-34304, Sht. 1, Rev. 6, with 14 thermocouples installed in the tank. However, SACS did not contain any temperature data from this thermocouple tree. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple trees located at risers 1 and 10A are the only sources of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and files of temperature data for thermocouples correlated to a riser number. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the files that tied the temperature data to riser 1 and riser 10A were used in this document. The earliest data retrieved from SACS were from early February 1975.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple in riser 1 and 10A. The following statistical information was taken from all 12 thermocouples. The maximum temperature was 144°F taken by thermocouples 1 and 2 in riser 1 on February 1, 1975. The minimum temperature was 68.5°F taken by thermocouple 6 in riser 10A on April 6, 1994. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 99°F.

2.10.3 Occurrences for Tank 241-BY-110

No significant occurrences are associated only with Tank 241-BY-110.

2.10.4 Current Status of Tank 241-BY-110

Tank 241-BY-110 entered service during the first quarter of 1952 (Anderson, 1990) and as of November 30, 1995 stores approximately 398,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of April 1995. The minimum waste surface level was

97.75 inches on July 2, 1992. The maximum waste surface level was 152 inches on July 1, 1991. See Appendix E for details on waste surface level. Tank 241-BY-110 was added to the Ferrocyanide Watch List in January 1991. The tank is out of service with interim stabilization and intrusion prevention completed. The tank is listed as sound and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-110 has 19 risers with four tentatively available for sampling: one 4-inch riser (No. 5), two 12-inch risers (Nos. 7, and 12B) and one 18-inch riser (No. 10B) (Lipnicki, 1995b).

2.10.5 Interior Montage of Tank 241-BY-110

The clearest and most recent set of interior tank photographs was taken on July 26, 1984. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.10.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-110

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-110 are presented in Appendix H along with their introduction sections.

2.11 Tank 241-BY-111

2.11.1 Waste and Level History of Tank 241-BY-111

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-111.

2.11.2 Temperature History of Tank 241-BY-111

Interior tank temperature data for Tank 241-BY-111 were recorded by six thermocouples attached to one thermocouple tree. ECN No. 169757 indicates that the thermocouple tree located in riser 14 is designed as shown on Drawing H-2-83312, Sht. 2, Rev. 0. The Surveillance Analysis Computer System (SACS) also indicates that this thermocouple tree is located in riser 14. Drawing H-2-83312, Sht. 2, Rev. 0, also indicates that there is a thermocouple tree designed as shown on that drawing installed in the tank at riser 5. Drawing H-2-62437, Rev. 2, indicates another thermocouple tree that may be installed in the tank. However, SACS did not contain any temperature data from these 2 thermocouple trees. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple tree located at riser 14 is the only source of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and a file of temperature data for 6 thermocouples correlated to riser 1. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the file that tied the temperature data to riser 14 were used in this document. The earliest data retrieved from SACS were from late November 1974.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple. The following statistical information was taken from all 6 thermocouples. The maximum temperature was 111°F taken by thermocouple 1 on February 26, 1978. The minimum temperature was 57°F taken by thermocouples 1 and 2 on March 28, 1977. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 77°F.

2.11.3 Occurrences for Tank 241-BY-111

No significant occurrences are associated only with Tank 241-BY-111.

2.11.4 Current Status of Tank 241-BY-111

Tank 241-BY-111 entered service during the first quarter of 1952 (Anderson, 1990) and as of November 30, 1995 stores approximately 459,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 162 inches on April 5, 1994 and July 4, 1995. The maximum waste surface level was 165.5 inches on August 1, 1991. See Appendix E for details on waste surface level. Tank 241-BY-111 was added

to the Ferrocyanide Watch List in January 1991. The tank is out of service with interim stabilization and intrusion prevention completed. The tank is listed as sound and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-111 has 17 risers with four tentatively available for sampling: one 4-inch riser (No. 4) and three 12-inch risers (Nos. 5, 10B, and 12A) (Lipnicki, 1995b).

2.11.5 Interior Montage of Tank 241-BY-111

The clearest and most recent set of interior tank photographs was taken on October 31, 1986. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.11.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-111

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-111 are presented in Appendix H along with their introduction sections.

2.12 Tank 241-BY-112

2.12.1 Waste and Level History of Tank 241-BY-112

The Waste and Level History sketch in Appendix C presents the waste history and level history of Tank 241-BY-112.

2.12.2 Temperature History of Tank 241-BY-112

Interior tank temperature data for Tank 241-BY-112 were recorded by 6 thermocouples attached to one thermocouple tree. Drawing H-2-83312, Sht. 2, Rev. 0, indicates that the thermocouple tree is designed as shown on that drawing and is located in riser 2. The Surveillance Analysis Computer System (SACS) also indicates that this thermocouple tree is located in riser 2. ECN No. 169757 indicates that there is another thermocouple tree designed as shown on Drawing H-2-83312, Sht. 2, Rev. 0, installed in the tank at riser 14. However, SACS did not contain any temperature data from this thermocouple tree. In the past, there may have been other risers and equipment used to monitor the temperature in the tank. However, the thermocouple tree located at riser 2 is the only source of temperature data for this document.

The temperature data were obtained from the SACS database on January 8, 1996. The SACS database contained two file types for temperature data: a historical file of temperature data that contained data for thermocouples without correlation to a riser number and a file of temperature data for 6 thermocouples correlated to riser 1. Since there was no way to correlate the data in the historical file with a particular thermocouple, thermocouple tree, or riser, data from this file were not included in this document. Only data from the file that tied the temperature data to riser 14 were used in this document. The earliest data retrieved from SACS were from early August 1974.

Graphs of individual thermocouple data are presented in Appendix D. A graph was created for each thermocouple. The following statistical information was taken from all 6 thermocouples. The maximum temperature was 144°F taken by thermocouples 1 and 2 on December 9, 1976. The minimum temperature was 41°F taken by thermocouple 6 on April 8, 1975. The maximum and minimum temperatures are labeled as good data points within SACS. The average temperature for all the thermocouples is 84°F.

2.12.3 Occurrences for Tank 241-BY-112

No significant occurrences are associated only with Tank 241-BY-112.

2.12.4 Current Status of Tank 241-BY-112

Tank 241-BY-112 entered service during the first quarter of 1952 (Anderson, 1990) and as of November 30, 1995 stores approximately 291,000 gallons of waste (Hanlon, 1996b). The waste surface level in the tank is measured with a manual tape as of January 1996. The minimum waste surface level was 112.5 inches on July 8, 1995. The maximum waste surface level was 114.25 inches on numerous dates from March 2, 1992 through October 6, 1992. See Appendix E for details on waste surface level. Tank 241-BY-112 was added to the Ferrocyanide Watch List in January 1991. The tank is out of

service with interim stabilization and intrusion prevention completed. The tank is listed as sound and is passively ventilated. A plan view in Appendix F depicts the approximate riser locations as of February 2, 1996. Tank 241-BY-112 has 24 risers with seven tentatively available for sampling: four 4-inch risers (Nos. 1, 18, 20, and 21), one 6-inch riser (No. 14), and two 12-inch risers (Nos. 10A and 10B) (Lipnicki, 1995b).

2.12.5 Interior Montage of Tank 241-BY-112

The clearest and most recent set of interior tank photographs was taken on April 14, 1988. Other interior tank photographs are available, but only the photographs showing the waste surface were used to create a montage. The montage has labels identifying some of the monitoring equipment, piping, and risers in the tank. The montage and photographic information are shown in Appendix G.

2.12.6 Tank Layer Model, Supernatant Mixing Model, and Inventory Estimate of Tank 241-BY-112

The Tank Layer Model(TLM), Supernatant Mixing Model(SMM), and Inventory Estimate developed by Los Alamos National Laboratory (Agnew et al., 1996) for Tank 241-BY-112 are presented in Appendix H along with their introduction sections.

GLOSSARY

This glossary of Hanford terminology has been compiled from numerous sources. A lot of the terms have come from Anderson(1991), Jungfleisch(1984) and Agnew(1996). These definitions may conflict with other sources.

1C	First-cycle decontamination waste from the bismuth phosphate(BiPO_4) process at B and T Plants consisting of by-products co-precipitated from a solution containing plutonium (contains 10% of the original fission product activity and 2% of the products). By-product cake solution was mixed with product waste and neutralized with 50% caustic. Coating waste from removing aluminum fuel element cladding was added and comprised about 24% of the waste.
1C1	First-cycle decontamination waste from the bismuth phosphate(BiPO_4) process, 1944-49 (LANL defined waste #3)
1C2	First-cycle decontamination waste from the bismuth phosphate(BiPO_4) process, 1950-56 (LANL defined waste #4)
224	224-U Waste. LaF_3 finishing waste from BiPO_4 process and uranium recovery in the 224 buildings by T Plant and B Plant and the Plutonium Finishing Plant (LANL defined waste #7)
2C	Second-cycle decontamination waste from the bismuth phosphate(BiPO_4) process at B and T Plants (see second-cycle decontamination waste)
2C1	Second-cycle decontamination waste from the bismuth phosphate(BiPO_4) process, 1944-49 (LANL defined waste #5)
2C2	Second-cycle decontamination waste from the bismuth phosphate(BiPO_4) process, 1950-56 (LANL defined waste #6)
5-6	Waste from cell 5 tank 6 in B Plant; the hot waste collected in the bottom of cell 5 when the liquid boiled over during dissolving and neutralizing phases of the BiPO_4 process.
Active Drywell	Drywell in which radiation readings of greater than 50 counts per second are detected. The readings must be consistent as to depth and radiation level for repeated readings to be considered active.

Airlift Circulator	A device installed in aging waste tanks to promote mixing of the supernate. By maintaining motion within the body of the liquid, the circulators minimize superheat buildup and, consequently, minimize burping.
AR	Washed PUREX sludge from the 244-AR Vault (LANL defined waste #31)
Assumed Leaker	A waste storage tank for which past surveillance data has indicated a loss of liquid attributed to a breach of integrity. In 1984, the designations of "suspect leaker," "questionable integrity," "confirmed leaker," "declared leaker," "dormant", and "borderline" were merged into one category called "assumed leaker."
B	High-level waste from PUREX acidified waste processed through B Plant to extract strontium (LANL defined waste #32)
BG	Below grade
BL	B Plant low-level waste beginning 1968 (LANL defined waste #33)
BM	Bench mark
BNW	Battelle Northwest Laboratory waste
BSLTCK	Salt cake waste generated from the 242-B Evaporator, 1951-53 (LANL defined waste #41)
BYSLTCK	Salt cake waste generated from in-tank solidification units 1 and 2 in BY Tank Farm, 1965-74 (LANL defined waste #44)
Cascade	Eleven of the single-shell tank farms (all except the AX Tank Farm) were equipped with overflow lines between tanks. The tanks were connected in series and were placed at different elevations creating a downhill gradient for liquids to flow (cascade) from one tank to another. Thus, multiple tanks could be filled with one pump.
Catch Tanks	Small capacity single-shell tanks associated with diversion boxes and diverter stations. The tanks are designed to receive any transfer line clean out, spills or leakage from the boxes, or leakage from the adjacent pipe encasement.

CC	Complexant concentrate waste or concentrated complexant; concentrated product from evaporating dilute complexed waste which contained high concentrations of organic complexants, such as HEDTA, EDTA, and citric acid.
CCPLX	Complexant concentrate or concentrated complexant waste; see CC.
CCW	Concentrated customer waste; the product of concentrating waste received from 100N or the Fast Flux Test Facility having phosphate and/or sulfate concentrations which, after concentration, exhibit the characteristics of a complexed liquid.
CEM	Cement
CF	Cesium feed; a PUREX sludge supernate.
CPLX	Complexed waste; dilute waste containing relatively high concentrations of organic chelating agents such as EDTA and HEDTA from B Plant waste fractionization.
Crib	An underground structure filled with aggregate designed to receive liquid waste, usually through a perforated pipe. The filtration and ion exchange properties of the soil in and around the crib were used to contain the radionuclides.
CSR	Waste (supernate) from cesium recovery of tank supernate at B Plant (LANL defined waste #35)
CW	Coating (cladding) waste produced at PUREX from dissolution of Zircaloy or aluminum fuel cladding.
CWZR1	Coating (cladding) waste (PUREX), Zircaloy cladding; 1968-72 (LANL defined waste #23)
CWZR2	Coating (cladding) waste (PUREX), Zircaloy cladding; 1983-88 (LANL defined waste #47); see NCRW and PD; also known as CWP/ZR2
CWP	Coating (cladding) waste (PUREX)
CWP1	Coating (cladding) waste (PUREX); (LANL defined waste #21, CWP/Al, 1956-60)
CWP2	Cladding (coating) waste (PUREX), (LANL defined waste #22, CWP/Al, 1961-72)

CWP/ZR	Now called PD or NCRW
CWR1	REDOX cladding (coating) waste, (LANL defined waste #15, CWR/Al, 1952-60)
CWR2	Coating (cladding) waste (REDOX), (LANL defined waste #16, CWL/Al with some Zr, 1961-72)
DC	Dilute complexed waste characterized by organic carbon including organic complexants: EDTA, citric acid, HEDTA, and iminodiacetate.
DE	Diatomaceous Earth; Diatomite(SiO_2); a light friable siliceous material derived from diatom (algal) remains; added to some underground waste storage tanks to absorb residual liquids.
Ditch	A linear excavation often used for the temporary diversion or disposal of process waste streams.
Diversion Box	A below grade, concrete enclosure containing the remotely maintained jumpers and spare nozzles for routing waste solution to storage tank farms.
DSSF	Double-shell slurry feed; Waste concentrated in evaporators until the solution is nearly saturated with sodium aluminate without exceeding receiver tank composition limits. This form is not as concentrated as double-shell slurry.
Drywell	A steel casing, generally 6-inch internal diameter, drilled into the ground to various depths (but do not reach the water table) and used to insert monitoring instruments for measuring the presence of radioactivity or moisture content.
DW	Decontamination waste; a wash solution from equipment decontamination at T Plant (LANL defined waste #39)
EB	Evaporator bottoms; a slurry from the evaporators
EF	Evaporator feed; various supernatant liquids whose composition depends on the source
EVAP	Evaporator feed (post 1976 designation)
Evaporator Feed	Any waste liquid that can be concentrated to form salt cake; e.g., aged waste, low heat waste, dilute interstitial liquor, and other radioactive waste solutions.

FD	Feed dilute
Ferrocyanide	An ion composed of iron and cyanide with the chemical formula of $\text{Fe}(\text{CN})_6^{4-}$.
H_2O	Water
HDRL	Hanford defense residual liquor; late 1970s designation for terminal liquors remaining after evaporation; includes complexed and noncomplexed waste, partially neutralized waste, and DSSF (see RESID).
HLO	Hanford Laboratory Operations; also, Hanford laboratory operations waste; laboratory waste from the 300 Area
HS	Hot Semiworks (C Plant); a pilot facility with a variety of operations. Also, Hot or Strontium Semiworks waste (LANL defined waste #28); see SSW.
ILL	Interstitial liquid level
Inactive Tank	A tank that has been removed from liquid-processing service, has been pumped to less than 33,000 gallons of waste, and will be, or is in the process of being, stabilized followed by intrusion prevention. This includes all tanks not in active or active-restricted categories. Also included are inactive spare tanks that would be used if an active tank failed.
Interim Isolation	An administrative designation reflecting the completion of the physical effort required to minimize the addition of liquids into an inactive storage tank, process vault, sump, catch tank, or diversion box. (In June 1993, "interim isolation" was replaced by "intrusion prevention".)
Interim Stabilization	A tank which contains less than 50,000 gallons of drainable interstitial liquid and less than 5,000 gallons of supernate. If a jet pump was used to achieve interim stabilization, then the jet pump flowrate must have been at or below 0.05 gallons per minute before interim stabilization was completed.
Interstitial Liquid	The interstitial liquid within the tanks is the liquid that fills the interstitial(voids) spaces of the solid waste.
Intrusion Prevention	An administrative designation reflecting the completion of the physical effort required to minimize the addition of liquids into an inactive storage tank, process vault, catch tank, sump, or diversion box.

IWW	Inorganic wash waste (i.e., concentrated neutralized high-level waste from PUREX); see NCAW and P. This was also designated as IWW because it is bottoms waste from the #1 acid concentrator.
IX	Ion exchange waste from the cesium recovery process at B Plant
Knuckle	Point where the side wall and the bottom curved surface of a tank meet.
Level Adjustment	Any update in the waste inventory (or tank level) in a tank. The adjustments usually result from surveillance observations or historical investigations.
Liquid Observation Well (LOW)	A liquid observation well is a fiber glass or tefzel-reinforced epoxy-polyester resin, 89 mm (3.5 inches) diameter pipe that is capped on the bottom end. This end is placed within 25 mm (1 inch) above the bottom portion of the steel tank liner. Three types of probes are used in the LOW to monitor changes in the interstitial liquid level: acoustic, gamma, and neutron.
LW	Laboratory waste from the 222-S Building
Mixed Waste	Waste containing both radioactive and hazardous (dangerous as defined in WAC 173-303) waste.
MW	Waste from the bismuth phosphate process (which extracted plutonium) containing all the uranium, approximately 90% of the original fission product activity, and approximately 1% of the product. This waste was brought to the neutral point with 50% caustic and then treated with an excess of sodium carbonate. This procedure yielded almost completely soluble waste at a minimum total volume. The exact composition of the carbonate compounds was not known, but was assumed to be a uranium phosphate carbonate mixture. The term "metal" was the code word for plutonium.
MW1	Metal waste from BiPO_4 , 1944-49 (LANL defined waste #1, same as MW)
MW2	Metal waste from BiPO_4 , 1950-56 (LANL defined waste #2, same as MW)
N	Phosphate decontamination waste from N Reactor (LANL defined waste #40)

NCAW	Neutralized current acid waste, primary high-level waste stream from PUREX process (LANL defined waste #45, formerly P3, 1983-88)
NCPLX	Non-complexed waste; general term for supernates and salt well liquors that did not contain organic complexants.
NCRW	Neutralized cladding removal waste, same as CWP/Zr.
NIT	HNO ₃ /KMNO ₄ solution added during evaporator operation
Non-Complexed	General waste term applied to all Hanford Site liquors not identified as complexed (containing organics).
Out-of-Service-Tank	A tank that does not meet the definition of an in-service tank. Before September 1988, these tanks were defined as inactive. (Note: All single-shell tanks are out of service.)
OWW	Organic Wash Waste; The solvent used in PUREX was treated before reuse by washing with potassium permanganate and sodium carbonate, followed by dilute nitric acid.
OWW1	Organic wash waste, 1956-62, also known as CARB (LANL defined waste #24)
OWW2	Organic wash waste, 1963-67 (LANL defined waste #25)
OWW3	Organic wash waste, 1968-72 (LANL defined waste #26)
P	High-level neutralized acid waste from PUREX
P1	PUREX high-level waste, 1956-62 (LANL defined waste #17)
P2	PUREX high-level waste, 1963-67 (LANL defined waste #18)
P2'	1968-1972, assigned to P2.
P3	1983-1988, now called PXNAW or NCAW.
Partial Interim Isolation	The administrative designation for completing the physical effort required for interim isolation, except for isolating the risers and piping that will be required for jet pumping or for other methods of stabilization.
PASF	PUREX ammonia scrubber feed (LANL defined waste #48)
PD	PUREX decladding waste

PFeCN1	Ferrocyanide sludge produced by in-plant scavenging (using 0.005 M ferrocyanide) of waste from uranium recovery (LANL defined waste #9)
PFeCN2	Same as PFeCN1 except 0.0025 M ferrocyanide used (LANL defined waste #10)
pH	A measure of the hydrogen ion concentration in solution.
PL	Low-level waste from PUREX
PL1	PUREX low-level waste (LANL defined waste #20)
PL2	1983-88, now called PXMSC, among other things.
Primary Addition	An addition of waste from a specific plant or process vault.
PSS	PUREX sludge supernate; produced by leaching PUREX sludge
PXMSC	Dilute, non-complexed waste from PUREX misc. streams
PXNAW	Aging waste from PUREX high level waste; see NCAW (LANL defined waste #45, formerly P3, 1983-88)
R	High-level waste from REDOX
R1	REDOX waste, 1952-57 (LANL defined waste #13)
R2	REDOX waste, 1958-66 (LANL defined waste #14)
RESID	Hanford defense residual liquor (see HDRL)
Riser	A vertical pipe through a tank dome (access to the tank interior).
RIX	REDOX ion exchange waste produced at B Plant by extracting cesium from REDOX supernate
RSLTCK	Salt-cake waste from the REDOX concentrator (LANL defined waste #43)
RSN	REDOX supernate
SACS	Surveillance analysis computer system

Salt Cake	Crystallized nitrate and other salts deposited in waste tanks, usually after the waste is concentrated by evaporation.
Salt Well	A hole drilled or sluiced into salt cake and lined with a cylindrical screen to permit drainage and jet pumping of interstitial liquids.
Scavenged Waste	Waste which has been treated with ferrocyanide to remove cesium from the supernate by precipitating it into a sludge.
Self-Concentrating Waste	Liquid, high-level radioactive waste whose decaying radionuclides heat the solution sufficiently to boil off (i.e., evaporate) the water, thus concentrating the waste.
SIX	Waste from removing cesium from PUREX sludge supernate by ion exchange at B Plant
Sluicing, or sluiced	To wash with water. At Hanford, this has meant to dissolve or suspend waste in solution using a high pressure water stream.
Slurry	Insoluble material suspended in water or aqueous solution.
SMM	Supernatant Mixing Model (created at LANL) that calculates the composition of tank liquids and concentrates as linear combinations of supernates from the <i>Hanford Defined Wastes: Chemical and Radionuclide Compositions</i> (Agnew, 1995a)
SMP	Sludge measuring port
SMMA1	Solids from concentrate calculated by SMM. Waste type is tank dependent.
SMMA2	Solids from concentrate calculated by SMM. Waste type is tank dependent.
Sound	The integrity classification of a waste storage tank for which surveillance data indicate no loss of liquid attributed to a breach of integrity.
SRR	Sluiced PUREX sludge from A and AX Tank Farms sent to B Plant to recover strontium from 1967-76 (LANL defined waste #34). The sludge returned from B Plant was sent to the AR Vault and the supernate was sent to 241-C-105.

SRS	Strontium sludge; PUREX sludges sluiced for strontium recovery at B Plant were washed in the AR Vault with supernate from 241-C-105, and the resulting supernates were sent to CSR.
SST	Single-shell tank
SSW	Strontium Semiworks waste; produced from the strontium extraction process at the Strontium Semiworks after 1961
Stabilization	The removal or immobilization, as completely as possible, of the liquid contained in a radioactive waste storage tank by pumping via a salt well, adding diatomaceous earth, etc.
Supernatant or Supernate	Liquid floating above the solids in the waste storage tanks. Supernate is usually derived by subtracting the solids level measurement from the liquid level measurement.
T1SLTCK	Salt-cake waste generated from the 242-T Evaporator, 1951-56 (LANL defined waste #42)
T2SLTCK	Salt-cake waste generated from the 242-T Evaporator, 1965-76
Tank Farm	An area containing underground storage tanks for storing waste.
TBP	Tributyl phosphate, a solvent used in the uranium extraction process at U Plant; also, a waste which is sometimes called uranium recovery waste (UR).
Terminal Liquor	The concentrated supernatant liquid decanted from the evaporator bottoms (produced by the evaporators), which may not be concentrated further without forming solids that was unacceptable for storage in single-shell tanks (see HDRL). Terminal liquor is characterized by a caustic concentration of approximately 5.5 M (the caustic molarity was lower if the aluminum salt saturation was reached first).
TFeCN	Ferrocyanide sludge produced by in-tank or in-farm scavenging (LANL defined waste #11)
TH1	Thoria high-level or cladding waste, 1966 (LANL defined waste #29, formerly TH66)
TH2	Thoria high-level or cladding waste, 1970 (LANL defined waste #30, formerly TH70)

TH66	See TH1.
TH70	Thoria 1970.
Thermocouple	Thermocouples are simple devices that develop a millivoltage when parts of the thermocouple are exposed to temperature differentials. The millivoltage can be converted to a temperature reading based upon a specific voltage versus temperature curve inherent to the type of thermocouple being used. Thermocouples are attached to a fabricated assembly called a thermocouple tree.
Thermocouple Tree	Thermocouples are attached to a fabricated assembly called a thermocouple tree. The number of thermocouples attached to the tree varies as a function of the depth of the tank as well as the thermocouple tree design. The thermocouples are spaced at intervals, along trees that have many thermocouples, so that a vertical temperature profile of the tank contents can be developed. The thermocouple tree is installed in a riser and left in place inside the tank.
Thorium	A chemical element which is fertile material. Fertile means that when it is subjected to radiation in a nuclear reactor, it will be converted, in this case, to ²³³ U, a potential fuel.
TLM	Tank Layer Model (created at LANL and derived from <i>Waste Status and Transaction Record Summary</i> database) models the volumes of wastes in the tanks.
Trench	A linear excavation used for the disposal of solid waste.
TRUEX	Transuranic extraction process
UNK	Unknown waste type (LANL defined waste)
UR	Uranium recovery operation in U Plant, 1952-57. Created uranium recovery waste (UR) (LANL defined waste #8), also known as tributyl phosphate (TBP) waste, and FeCN (scavenging wastes). See TFeCN and PFeCN.

Watch List Tank	An underground storage tank requiring special safety precautions because the tank potentially could release high-level radioactive waste if uncontrolled increases in pressure or temperature occur. Special restrictions have been placed on the tanks by "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137, National Defense Authorization Act for Fiscal Year 1991, November 5, 1990, Public Law 101-501 (also called the Wyden Amendment).
WC	Weather cover
WESF	Waste Encapsulation and Storage Facility
WTR	Water; flush water from miscellaneous sources.
Wyden Amendment	See watch list tank.
Z	Waste discharged from Z Plant (PFP) (LANL defined waste #27)

REFERENCES

Agnew, S.F., R.A. Corbin, T.B. Duran, K.A. Jurgensen, T.P. Ortiz, and B.L. Young; September 1995; *Waste Status and Transaction Record Summary for the Northeast Quadrant*; WHC-SD-WM-TI-615, Rev. 1; Los Alamos National Laboratory, Los Alamos, New Mexico.

Agnew, S.F., J. Boyer, R.A. Corbin, T.B. Duran, J. FitzPatrick, K.A. Jurgensen, T.P. Ortiz, and B.L. Young; May 1996; *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3*; LA-UR-96- 858 ; Los Alamos National Laboratory, Los Alamos, New Mexico.

Alstad, A.T.; September 1991; *Riser Configuration Document for Single-Shell Waste Tanks*; WHC-SD-RE-TI-053, Rev. 8; Westinghouse Hanford Company, Richland, Washington.

Alstad, A.T.; December 1993; *Riser Configuration Document for Single-Shell Waste Tanks*; WHC-SD-RE-TI-053, Rev. 9; Westinghouse Hanford Company, Richland, Washington.

Anderson, J.D.; June 1990; *A History of the 200 Areas Tank Farms*; WHC-MR-0132; Westinghouse Hanford Company, Richland, Washington.

Ballinger, M.Y., and R.B. Hall; March 1991; *A History of Major Hanford Facilities and Processes Involving Radioactive Material*; PNL-6964 HEDR; Pacific Northwest Laboratory, Richland, Washington.

Borsheim, G.L., and N.W. Kirch; March 1991; *Summary of Single-Shell Tank Waste Stability*; WHC-EP-0347; Westinghouse Hanford Company, Richland, Washington.

Brevick, C.H., L.A. Gaddis, and W.W. Pickett; June 1994; *Historical Tank Content Estimate for the Northeast Quadrant of the Hanford 200 East Area*; WHC-SD-WM-ER-349, Rev. 0A; ICF Kaiser Hanford, Richland, Washington.

Carter, G.J.; May 1986a; *Waste Status Summary, April 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Carter, G.J.; June 1986b; *Waste Status Summary, May 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Carter, G.J.; July 1986c; *Waste Status Summary, June 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Carter, G.J.; August 1986d; *Waste Status Summary, July 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Carter, G.J.; September 1986e; *Waste Status Summary, August 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Carter, G.J.; October 1986f; *Waste Status Summary, September 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Caudill H.L.; June 1965; *Design Criteria for a Second In-Tank Waste Solidification System*; RL-SEP-499; General Electric Company, Richland, Washington.

Caudill H.L.; March 1967; *Design Criteria Modifications for Increased Capacity in the First In-Tank Solidification System*; ISO-869; Isochem, Inc., Richland, Washington.

Dougherty, L.F.; March 23, 1995; *Single-Shell Tank Interim Operational Safety Requirements*; WHC-SD-WM-OSR-005, Rev. 0B; Westinghouse Hanford Company, Richland, Washington.

Duncan, D.R., B.A. Mayancsik, J.A. Pottmeyer, E.J. Vejvoda, J.A. Reddick, K.M. Sheldon, and M.I. Weyns; February 1993; *Characterization of Past and Present Solid Waste Streams from the Plutonium Finishing Plant*; WHC-EP-0621; Westinghouse Hanford Company, Richland, Washington.

Escobar, G.A.; December 1986a; *Waste Status Summary, October 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Escobar, G.A.; December 1986b; *Waste Status Summary, November 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Escobar, G.A.; January 1987a; *Waste Status Summary, December 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Escobar, G.A.; February 1987b; *Waste Status Summary, January 1987*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Gerber, M.S.; September 1992; *Legend and Legacy: Fifty Years of Defense Production at the Hanford Site*; WHC-MR-0293, Rev. 2; Westinghouse Hanford Company, Richland, Washington.

Gerber, M.S.; October 1993b; *The Hanford Site: An Anthology of Early Histories*; WHC-MR-0435; Westinghouse Hanford Company, Richland, Washington.

Gerber, M.S.; November 1993c; *A Brief History of the PUREX and UO₂ Facilities*; WHC-MR-0437; Westinghouse Hanford Company, Richland, Washington.

Gerber, M.S.; April 1994a; *Dramatic Change at T Plant*; WHC-MR-0452; Westinghouse Hanford Company, Richland, Washington.

Gerber, M.S.; 1996; Correspondence to C.V. Salois of ICF Kaiser Hanford; Westinghouse Hanford Company, Richland, Washington.

Godfrey, W.L.; June 1965; *242-T Evaporator Facility, Information Manual*; RL-SEP-396; Hanford Atomic Products Operation, General Electric Company, Richland, Washington.

Hanlon, B.M.; March 1990a; *Tank Farm Surveillance and Waste Status Summary Report for November 1989*; WHC-EP-0182-20; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; March 1990b; *Tank Farm Surveillance and Waste Status Summary Report for December 1989*; WHC-EP-0182-21; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; March 1990c; *Tank Farm Surveillance and Waste Status Summary Report for January 1990*; WHC-EP-0182-22; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; April 1990d; *Tank Farm Surveillance and Waste Status Summary Report for February 1990*; WHC-EP-0182-23; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; June 1990e; *Tank Farm Surveillance and Waste Status Summary Report for March 1990*; WHC-EP-0182-24; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; June 1990f; *Tank Farm Surveillance and Waste Status Summary Report for April 1990*; WHC-EP-0182-25; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; August 1990g; *Tank Farm Surveillance and Waste Status Summary Report for May 1990*; WHC-EP-0182-26; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; September 1990h; *Tank Farm Surveillance and Waste Status Summary Report for June 1990*; WHC-EP-0182-27; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; November 1990i; *Tank Farm Surveillance and Waste Status Summary Report for July 1990*; WHC-EP-0182-28; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1991a; *Tank Farm Surveillance and Waste Status Summary Report for August 1990*; WHC-EP-0182-29; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1991b; *Tank Farm Surveillance and Waste Status Summary Report for November 1990*; WHC-EP-0182-32; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1991c; *Tank Farm Surveillance and Waste Status Summary Report for September 1990*; WHC-EP-0182-30; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1991d; *Tank Farm Surveillance and Waste Status Summary Report for October 1990*; WHC-EP-0182-31; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1991e; *Tank Farm Surveillance and Waste Status Summary Report for January 1991*; WHC-EP-0182-34; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; April 1991f; *Tank Farm Surveillance and Waste Status Summary Report for December 1990*; WHC-EP-0182-33; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; May 1991g; *Tank Farm Surveillance and Waste Status Summary Report for February 1991*; WHC-EP-0182-35; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; June 1991h; *Tank Farm Surveillance and Waste Status Summary Report for March 1991*; WHC-EP-0182-36; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; July 1991i; *Tank Farm Surveillance and Waste Status Summary Report for April 1991*; WHC-EP-0182-37; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; August 1991j; *Tank Farm Surveillance and Waste Status Summary Report for May 1991*; WHC-EP-0182-38; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; September 1991k; *Tank Farm Surveillance and Waste Status Summary Report for June 1991*; WHC-EP-0182-39; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; September 1991l; *Tank Farm Surveillance and Waste Status Summary Report for July 1991*; WHC-EP-0182-40; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; October 1991m; *Tank Farm Surveillance and Waste Status Summary Report for August 1991*; WHC-EP-0182-41; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; November 1991n; *Tank Farm Surveillance and Waste Status Summary Report for September 1991*; WHC-EP-0182-42; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1992a; *Tank Farm Surveillance and Waste Status Summary Report for October 1991*; WHC-EP-0182-43; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1992b; *Tank Farm Surveillance and Waste Status Summary Report for November 1991*; WHC-EP-0182-44; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; March 1992c; *Tank Farm Surveillance and Waste Status Summary Report for December 1991*; WHC-EP-0182-45; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; April 1992d; *Tank Farm Surveillance and Waste Status Summary Report for January 1992*; WHC-EP-0182-46; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; May 1992e; *Tank Farm Surveillance and Waste Status Summary Report for February 1992*; WHC-EP-0182-47; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; June 1992f; *Tank Farm Surveillance and Waste Status Summary Report for March 1992*; WHC-EP-0182-48; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; July 1992g; *Tank Farm Surveillance and Waste Status Summary Report for April 1992*; WHC-EP-0182-49; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; August 1992h; *Tank Farm Surveillance and Waste Status Summary Report for May 1992*; WHC-EP-0182-50; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; September 1992i; *Tank Farm Surveillance and Waste Status Summary Report for June 1992*; WHC-EP-0182-51; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; October 1992j; *Tank Farm Surveillance and Waste Status Summary Report for July 1992*; WHC-EP-0182-52; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; November 1992k; *Tank Farm Surveillance and Waste Status Summary Report for August 1992*; WHC-EP-0182-53; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; December 1992l; *Tank Farm Surveillance and Waste Status Summary Report for September 1992*; WHC-EP-0182-54; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1993a; *Tank Farm Surveillance and Waste Status Summary Report for October 1992*; WHC-EP-0182-55; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1993b; *Tank Farm Surveillance and Waste Status Summary Report for November 1992*; WHC-EP-0182-56; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1993c; *Tank Farm Surveillance and Waste Status Summary Report for December 1992*; WHC-EP-0182-57; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; March 1993d; *Tank Farm Surveillance and Waste Status Summary Report for January 1993*; WHC-EP-0182-58; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; April 1993e; *Tank Farm Surveillance and Waste Status Summary Report for February 1993*; WHC-EP-0182-59; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; May 1993f; *Tank Farm Surveillance and Waste Status Summary Report for March 1993*; WHC-EP-0182-60; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; July 1993g; *Tank Farm Surveillance and Waste Status Summary Report for April 1993*; WHC-EP-0182-61; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; August 1993h; *Tank Farm Surveillance and Waste Status Summary Report for May 1993*; WHC-EP-0182-62; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; October 1993i; *Tank Farm Surveillance and Waste Status Summary Report for June 1993*; WHC-EP-0182-63; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; November 1993j; *Tank Farm Surveillance and Waste Status Summary Report for July 1993*; WHC-EP-0182-64; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; December 1993k; *Tank Farm Surveillance and Waste Status Summary Report for August 1993*; WHC-EP-0182-65; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1994a; *Tank Farm Surveillance and Waste Status Summary Report for September 1993*; WHC-EP-0182-66; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1994b; *Tank Farm Surveillance and Waste Status Summary Report for October 1993*; WHC-EP-0182-67; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1994c; *Tank Farm Surveillance and Waste Status Summary Report for November 1993*; WHC-EP-0182-68; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; April 1994d; *Tank Farm Surveillance and Waste Status Summary Report for December 1993*; WHC-EP-0182-69; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; May 1994e; *Tank Farm Surveillance and Waste Status Summary Report for January 1994*; WHC-EP-0182-70; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; May 1994f; *Tank Farm Surveillance and Waste Status Summary Report for February 1994*; WHC-EP-0182-71; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; June 1994g; *Tank Farm Surveillance and Waste Status Summary Report for March 1994*; WHC-EP-0182-72; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; July 1994h; *Tank Farm Surveillance and Waste Status Summary Report for April 1994*; WHC-EP-0182-73; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; August 1994i; *Tank Farm Surveillance and Waste Status Summary Report for May 1994*; WHC-EP-0182-74; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; September 1994j; *Tank Farm Surveillance and Waste Status Summary Report for June 1994*; WHC-EP-0182-75; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; November 1994k; *Waste Tank Summary for Month Ending July 31, 1994*; WHC-EP-0182-76; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; November 1994l; *Waste Tank Summary for Month Ending August 31, 1994*; WHC-EP-0182-77; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; November 1994m; *Waste Tank Summary for Month Ending September 30, 1994*; WHC-EP-0182-78; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; December 1994n; *Waste Tank Summary for Month Ending October 31, 1994*; WHC-EP-0182-79; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1995a; *Waste Tank Summary for Month Ending November 30, 1994*; WHC-EP-0182-80; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1995b; *Waste Tank Summary for Month Ending December 31, 1994*; WHC-EP-0182-81; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; March 1995c; *Waste Tank Summary for Month Ending January 31, 1995*; WHC-EP-0182-82; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; April 1995d; *Waste Tank Summary for Month Ending February 28, 1995*; WHC-EP-0182-83; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; May 1995e; *Waste Tank Summary for Month Ending March 31, 1995*; WHC-EP-0182-84; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; June 1995f; *Waste Tank Summary for Month Ending April 30, 1995*; WHC-EP-0182-85; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; July 1995g; *Waste Tank Summary for Month Ending May 31, 1995*; WHC-EP-0182-86; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; August 1995h; *Waste Tank Summary for Month Ending June 30, 1995*; WHC-EP-0182-87; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; September 1995i; *Waste Tank Summary for Month Ending July 31, 1995*; WHC-EP-0182-88; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; October 1995j; *Waste Tank Summary for Month Ending August 31, 1995*; WHC-EP-0182-89; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; December 1995k; *Waste Tank Summary for Month Ending September 30, 1995*; WHC-EP-0182-90; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; January 1996a; *Waste Tank Summary for Month Ending October 31, 1995*; WHC-EP-0182-91; Westinghouse Hanford Company, Richland, Washington.

Hanlon, B.M.; February 1996b; *Waste Tank Summary for Month Ending November 30, 1995*; WHC-EP-0182-92; Westinghouse Hanford Company, Richland, Washington.

HEW; January 11, 1944; *CVI, Specifications for Construction of Composite Storage Tanks Bldg. No. 241, Project 9536*; CVI 73550; Hanford Engineer Works, Richland, Washington.

Jungfleisch, F.M.; March 1984; *Preliminary Estimation of the Waste Inventories in Hanford Tanks Through 1980*; SD-WM-TI-057; Rockwell Hanford Operations, Richland, Washington.

Leach, C.E., and S.M. Stahl; August 1993; *Hanford Site Tank Farm Facilities Interim Safety Basis*, Vols. 1 & 2; WHC-SD-WM-ISBN-001; Westinghouse Hanford Company, Richland, Washington.

Lipnicki, J.; August 1995a; *Waste Tank Risers Available for Sampling*; WHC-SD-WM-TI-710, Rev. 1; Westinghouse Hanford Company, Richland, Washington.

Lipnicki, J.; December 1995b; *Waste Tank Risers Available for Sampling*; WHC-SD-WM-TI-710, Rev. 2; Westinghouse Hanford Company, Richland, Washington.

McCann, D.C.; August 1981a; *Waste Status Summary, July 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; September 1981b; *Waste Status Summary, August 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; October 1981c; *Waste Status Summary, September 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; November 1981d; *Waste Status Summary, October 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; December 1981e; *Waste Status Summary November 1981*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; April 1982a; *Waste Status Summary, March 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; May 1982b; *Waste Status Summary, April 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; June 1982c; *Waste Status Summary, May 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; July 1982d; *Waste Status Summary, June 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; August 1982e; *Waste Status Summary, July 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; September 1982f; *Waste Status Summary, August 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; October 1982g; *Waste Status Summary, September 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; November 1982h; *Waste Status Summary, October 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; December 1982i; *Waste Status Summary, November 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; January 1983a; *Waste Status Summary, December 1982*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; February 1983b; *Waste Status Summary, January 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; March 1983c; *Waste Status Summary, February 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; April 1983d; *Waste Status Summary, March 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; May 1983e; *Waste Status Summary, April 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; June 1983f; *Waste Status Summary, May 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; July 1983g; *Waste Status Summary, June 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; August 1983h; *Waste Status Summary, July 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; September 1983i; *Waste Status Summary, August 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; October 1983j; *Waste Status Summary, September 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; November 1983k; *Waste Status Summary, October 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; December 1983l; *Waste Status Summary, November 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; January 1984a; *Waste Status Summary, December 1983*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; February 1984b; *Waste Status Summary, January 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; March 1984c; *Waste Status Summary, February 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; April 1984d; *Waste Status Summary, March 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; May 1984e; *Waste Status Summary, April 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; June 1984f; *Waste Status Summary, May 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; July 1984g; *Waste Status Summary, June 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C.; August 1984h; *Waste Status Summary, July 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C., and T.S. Vail; September 1984i; *Waste Status Summary, August 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C., and T.S. Vail; October 1984j; *Waste Status Summary, September 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C., and T.S. Vail; November 1984k; *Waste Status Summary, October 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C., and T.S. Vail; December 1984l; *Waste Status Summary, November 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C., and T.S. Vail; January 1985a; *Waste Status Summary, December 1984*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C., and T.S. Vail; February 1985b; *Waste Status Summary, January 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

McCann, D.C., and T.S. Vail; March 1985c; *Waste Status Summary, February 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Mudd, O.C.; February 1981a; *Waste Status Summary, January 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

Mudd, O.C.; March 1981b; *Waste Status Summary, February 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

Mudd, O.C.; April 1981c; *Waste Status Summary, March 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

Mudd, O.C.; May 1981d; *Waste Status Summary, April 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

Mudd, O.C.; June 1981e; *Waste Status Summary, May 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

Mudd, O.C., and D.C. McCann; July 1981f; *Waste Status Summary, June 1981*; RHO-CD-14; Rockwell Hanford Operations, Richland, Washington.

Pianka, E.W.; January 24, 1995; *Soil Load above Hanford Waste Storage Tanks*; WHC-SD-WM-TI-665, Rev. 0A; Westinghouse Hanford Company, Richland, Washington.

PNL; 1991; *Resource Book — Decommissioning of Contaminated Facilities at Hanford*; PNL-7008 (originally BNWL-MA-88 in 1975, then PNL-MA-588); Battelle Pacific Northwest Laboratories, Richland, Washington.

Rockwell; August 1985; *200 Areas Fact Book*; Rockwell Hanford Company, Richland, Washington.

Rodenhizer, D.G.; 1987; *Hanford Waste Tank Sluicing History*; SD-WM-TI-302; Westinghouse Hanford Company, Richland, Washington.

Shefcik, J.J.; December 1964; *Process Specifications for In-Tank Solidification of Radiochemical Wastes*, RL-SEP-115; General Electric Company, Richland, Washington.

Thurman, J.M.; March 1987a; *Waste Status Summary, February 1987*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Thurman, J.M.; April 1987b; *Waste Status Summary, March 1987*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Thurman, J.M.; May 1987c; *Waste Status Summary, April 1987*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Thurman, J.M.; June 1987d; *Waste Status Summary, May 1987*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Thurman, J.M.; July 1987e; *Waste Status Summary, June 1987*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Thurman, J.M.; August 1987f; *Waste Status Summary for July 1987*; WHC-SP-0038-1; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; September 1987g; *Waste Status Summary for August 1987*; WHC-SP-0038-2; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; October 1987h; *Waste Status Summary for September 1987*; WHC-SP-0038-3; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; November 1987i; *Waste Status Summary for October 1987*; WHC-SP-0038-4; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; December 1987j; *Waste Status Summary for November 1987*; WHC-SP-0038-5; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; January 1988a; *Waste Status Summary for December 1987*; WHC-SP-0038-6; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; February 1988b; *Waste Status Summary for January 1988*; WHC-SP-0038-7; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; March 1988c; *Waste Status Summary for February 1988*; WHC-SP-0038-8; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; April 1988d; *Waste Status Summary for March 1988*; WHC-SP-0038-9; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; June 1988e; *Tank Farm Surveillance and Waste Status Summary Report for April 1988*; WHC-EP-0182-1; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; August 1988f; *Tank Farm Surveillance and Waste Status Summary Report for May 1988*; WHC-EP-0182-2; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; August 1988g; *Tank Farm Surveillance and Waste Status Summary Report for June 1988*; WHC-EP-0182-3; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; September 1988h; *Tank Farm Surveillance and Waste Status Summary Report for July 1988*; WHC-EP-0182-4; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; December 1988i; *Tank Farm Surveillance and Waste Status Summary Report for August 1988*; WHC-EP-0182-5; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; December 1988j; *Tank Farm Surveillance and Waste Status Summary Report for September 1988*; WHC-EP-0182-6; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; December 1988k; *Tank Farm Surveillance and Waste Status Summary Report for October 1988*; WHC-EP-0182-7; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; January 1989a; *Tank Farm Surveillance and Waste Status Summary Report for November 1988*; WHC-EP-0182-8; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; January 1989b; *Tank Farm Surveillance and Waste Status Summary Report for December 1988*; WHC-EP-0182-9; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; March 1989c; *Tank Farm Surveillance and Waste Status Summary Report for January 1989*; WHC-EP-0182-10; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; April 1989d; *Tank Farm Surveillance and Waste Status Summary Report for February 1989*; WHC-EP-0182-11; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; May 1989e; *Tank Farm Surveillance and Waste Status Summary Report for March 1989*; WHC-EP-0182-12; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; June 1989f; *Tank Farm Surveillance and Waste Status Summary Report for April 1989*; WHC-EP-0182-13; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; July 1989g; *Tank Farm Surveillance and Waste Status Summary Report for May 1989*; WHC-EP-0182-14; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; August 1989h; *Tank Farm Surveillance and Waste Status Summary Report for June 1989*; WHC-EP-0182-15; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; September 1989i; *Tank Farm Surveillance and Waste Status Summary Report for July 1989*; WHC-EP-0182-16; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; October 1989j; *Tank Farm Surveillance and Waste Status Summary Report for August 1989*; WHC-EP-0182-17; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; November 1989k; *Tank Farm Surveillance and Waste Status Summary Report for September 1989*; WHC-EP-0182-18; Westinghouse Hanford Company, Richland, Washington.

Thurman, J.M.; February 1990; *Tank Farm Surveillance and Waste Status Summary Report for October 1989*; WHC-EP-0182-19; Westinghouse Hanford Company, Richland, Washington.

Tran, T.T.; April 27, 1993; *Thermocouple Status Single-Shell and Double-Shell Waste Tanks*; WHC-SD-WM-TI-553; Westinghouse Hanford Company, Richland, Washington.

U.S. DOE; December 1987; *EIS, Disposal of Hanford Defense High Level, Transuranic, and Tank Wastes*, Vols. 1-5; DOE/EIS-0113; Department of Energy, Richland, Washington.

Vail, T.S.; April 1985a; *Waste Status Summary, March 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S.; May 1985b; *Waste Status Summary, April 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S.; June 1985c; *Waste Status Summary, May 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S.; July 1985d; *Waste Status Summary, June 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S.; August 1985e; *Waste Status Summary, July 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S.; September 1985f; *Waste Status Summary, August 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S.; October 1985g; *Waste Status Summary, September 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S.; November 1985h; *Waste Status Summary, October 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S., and G.D. Murry; December 1985i; *Waste Status Summary, November 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S., and G.D. Murry; January 1986a; *Waste Status Summary, December 1985*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S., and G.D. Murry; February 1986b; *Waste Status Summary, January 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S., and G.J. Carter; March 1986c; *Waste Status Summary, February 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Vail, T.S., and G.J. Carter; April 1986d; *Waste Status Summary, March 1986*; RHO-RE-SR-14; Rockwell Hanford Operations, Richland, Washington.

Welty, R.K.; September 1988; *Waste Storage Tank Status and Leak Detection Criteria*; WHC-SD-WM-TI-356, Vols. 1 and 2; Westinghouse Hanford Company, Richland, Washington.

Wilson, G.R., and I.E. Reep; December 1991; *A Plan to Implement Remediation of Waste Tank Safety Issues at the Hanford Site*; WHC-EP-0422, Rev. 1; Westinghouse Hanford Company, Richland, Washington.

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

MW:

TBP:

TBP:
CW:
IC:

CW:

EB:

EVAP:
NCPLX:TANK INFO:

CONSTRUCTED 1948-1949
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 1996a
- ♦♦♦ MCCANN 1982b
- ♦♦♦ THURMAN 1990

NOTES:

- 1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
- 2) ANDERSON 1990 INDICATES THE TANK WAS EMPTIED BUT DOES NOT PROVIDE VOLUME DATA FOR THE ASSOCIATED TIME PERIOD.
- 3) IN JUNE 1993, INTERIM ISOLATION WAS REPLACED BY INTRUSION PREVENTION.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS
SEE APPENDIX A

BYSLTCK: SALTCAKE WASTE 1965-1974
CW: COATING (CLADDING) WASTE
EB: EVAPORATOR BOTTOMS
EVAP: EVAPORATOR FEED
MW: METAL WASTE
NCPLX: NON-COMPLEXED WASTE
TBP: TRIBUTYL PHOSPHATE
WTR: WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - TOTAL WASTE LEVEL (SOLIDS)
- - - SOLIDS LEVEL
- ++++ ASSUMED SOLIDS LEVEL
- INTERSTITIAL LIQUID LEVEL
- ||||| ASSUMED INTERSTITIAL LIQUID LEVEL
- ▨ SOLIDS

BY TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-101 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1950-1995
SOUND/STABILIZED TANK
WATCH LIST: N/A

SIZE	BLOG NO.	DWG NO.	DATE
B	241	ES-TKS-E39	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

REFERENCES

- * ANDERSON 1990
- ** WELTY 1988
- *** BORSHTEIN AND KIRCH 1991
- ◆◆◆ HANLON 1996a
- ◆◆◆ MCANN 1982b
- ◆◆◆ MCANN 1983e
- ◆◆◆ HANLON 1991 & 1991m

NOTES:

- 1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
- 2) ANDERSON 1990 INDICATES THE TANK WAS EMPTIED BUT DOES NOT PROVIDE VOLUME DATA FOR THE ASSOCIATED TIME PERIOD.
- 3) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:
FOR MORE COMPLETE DEFINITIONS
SEE APPENDIX A

- BSLTCK: SALTCAKE WASTE 1965-1974
- CW: COATING (CLADDING) WASTE
- EB: EVAPORATOR BOTTOMS
- EVAP: EVAPORATOR FEED
- MM: METAL WASTE
- NCPLX: NON-COMPLEXED WASTE
- TBP: TRIBUTYL PHOSPHATE
- WTR: WATER

LEGEND

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

BY TANK FARM

CASCADE

U.S. DEPARTMENT OF ENERGY

RICHLAND FIELD OFFICE

241-BY-102 SINGLE-SHELL TANK

WASTE & LEVEL HISTORY 1950-1995

WATCH LIST: N/A

SIZE	B	SCALE	NONE	JOB NO.	ES-TKS-E40
DATE	5/96	DATE	5/96	DATE	5/96

CONSTRUCTED 1948-1949
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

TANK INFO:

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

MW:

TBP:

CW:

WTR:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

LEVEL IN
FEET
INCHES
~284" CASCADE OVERFLOW

KNUCKLE
TOP
KNUCKLE
BOTTOM

CASCADE *

CASCADE FULL*

EMPTIED*(SEE NOTE 2)

FROM 105-BY*
pH 9.4***
FROM 107-BY*

(TO TRENCHES BC-19, BC-20, BC-21 & IC-22)*

FROM 102-C*

(TO 105-BY FROM 103-BY)*

(FROM 102-BX, 103-BY, 103-BX TO 105-BY)*

(FROM 103-BX, 106-BX, TO 105-BY)*

(TO 110-BY, 111-BX, FROM 112-BY)*, pH >14.0***

INACTIVE(77)*

LEVEL ADJUSTMENT (6/78)*
SALTWELL PUMPING COMPLETED(12/78)**

LEVEL ADJUSTMENT (4/82), PARTIAL INTERIM ISOLATION (12/82)**
LEVEL ADJUSTMENT (4/83)

PHOTO (9/87)

PH 13.4*** LEVEL ADJUSTMENTS (7/91 & 8/91)***

JET PUMPING COMPLETED(3/95)
INTERIM STABILIZED(4/95)*

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)
PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

MW:
TBP:
P:
MW:

CW:
CW:
EB:

BSLITCK

TANK INFO:

CONSTRUCTED 1948-1949
DESIGN CAPACITY 158,000 GAL
BOTTOM 400 FT
75 FOOT DIAMETER TANK

REFERENCES

- * ANDERSON 1990
- ** WELTY 1988
- *** BORSHEIM AND KIRCH 1991
- **** HANLON 1996a
- ***** MCCANN 1982b
- ***** THURMAN, 1987e, 1987f, 1987g & 1987h

NOTES:

- 1) TRANSFER SOURCES AND DESTINATIONS ARE NOT AVAILABLE FOR ALL LEVEL CHANGES. FOR MORE DETAILS ABOUT TRANSFER INFORMATION SEE ANDERSON 1990.
- 2) ANDERSON 1990 INDICATES THE TANK WAS EMPTIED BUT DOES NOT PROVIDE VOLUME DATA FOR THE ASSOCIATED TIME PERIOD.
- 3) INTERSTITIAL LIQUID LEVEL IS UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A

- BSLITCK: SALTCAKE WASTE 1965-1974
- CW: COATING/CLADDING WASTE
- CW2: COATING/CLADDING WASTE 1961-1972
- EB: EVAPORATOR BOTTOMS
- MW: METAL WASTE
- OMW: ORGANIC WASH WASTE
- P: PUREX HIGH-LEVEL WASTE
- TBP: TRIBUTYL PHOSPHATE
- WTR: WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - TOTAL WASTE LEVEL (SOLIDS)
- ++++ ASSUMED SOLIDS LEVEL
- ===== INTERSTITIAL LIQUID LEVEL
- ||||| SOLIDS

BY TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY

RICHLAND FIELD OFFICE
IOF KAISER HANFORD

241-BY-103 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1950-1995
ASSUMED LEAKER/NON-STABILIZED
WATCH LIST: FERROCYNANIDE

SIZE	BUILD NO.	DWG NO.	DATE
B	241	ES-TKS-E41	5/96
SCALE	NONE	SHEET 1 OF 1	

CASCADE *

NO CASCADE OVERFLOW

EMPTIED * (SEE NOTE 2) (TO 104-C, 105-C, 109-BY) * pH 9.3 ***
FROM 110-BY *
pH 9.2 ***
SCAVENGED *
FROM 106-C, 103-C *

(TO 101-BY FROM 111-BY) *
(FROM 111-BY, 102-BY, 102-C) *
(TO 101-BY, 102-BY) *
(FROM 106-BX TO 102-BY) * FROM 106-BY *
(FROM 101-B, 102-BX TO 102-BY, 109-BY) *

ASSUMED LEAKER (73) *

SEE NOTE 3

SALTWELL PUMPING COMPLETED (11/78) **

LEVEL ADJUSTMENT (2/80) *

LEVEL ADJUSTMENT (4/82), PARTIAL INTERIM ISOLATION (12/82) **

(LEVEL ADJUSTMENTS 6/87, 7/87, 8/87, 9/87) *

PHOTO (9/89)
pH 13.3 *** LEVEL ADJUSTMENT (4/90) *
pH 13.5 ***

VOLUME
(GALLONS)

870,500

837,500

804,500

771,500

738,500

705,500

672,500

639,500

606,500

573,500

540,500

507,500

474,500

441,500

408,500

375,500

342,500

309,500

276,500

243,500

210,500

177,500

144,500

111,500

78,500

45,500

12,500

0

0

0

0

0

0

0

0

0

0

0

0

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0

0

0

0

0

0

0

0

0

0

0

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

MW:

MW:
TBP:TBP:
CW:CW:
IX:
EB:EVAP:
NCPLX:

TANK INFO:

CONSTRUCTED 1948-1949
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 1996a
- ◇◇ HANLON 1991c

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

BYSLTCK: SALTCAKE WASTE 1965-1974
CW: COATING (CLADDING) WASTE
EB: EVAPORATOR BOTTOMS
EVAP: EVAPORATOR FEED
IX: ION EXCHANGE WASTE
MW: METAL WASTE
NCPLX: NON-COMPLEXED WASTE
TBP: TRIBUTYL PHOSPHATE

LEGEND

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

BY TANK FARM
CASCADE

CASCADE FROM BX FARM

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-104 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1950-1995
SOUND/STABILIZED TANK
WATCH LIST: FERROCYANIDE

SIZE	BLG NO.	DWG NO.	DATE
B	241	ES-TKS-E42	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

BYSLTCK:

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

MW:

TBP:
MW:

TBP:
CW:

CW:
EB:

EVAP:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

WTR:

BYSLTCK:
CEM:

TANK INFO:

CONSTRUCTED 1948-1949
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 1996a

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

- BYSLTCK: SALTCAKE WASTE 1965-1974
- CEM: CEMENT
- CW: COATING (CLADDING) WASTE
- EB: EVAPORATOR BOTTOMS
- EVAP: EVAPORATOR FEED
- MW: METAL WASTE
- TBP: TRIBUTYL PHOSPHATE
- WTR: WATER

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - - TOTAL WASTE LEVEL (SOLIDS)
- - - - SOLIDS LEVEL
- ++++ ASSUMED SOLIDS LEVEL
- □ □ □ INTERSTITIAL LIQUID LEVEL
- ||||| ASSUMED INTERSTITIAL LIQUID LEVEL
- ||||| SOLIDS

BY TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-105 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1951-1995
ASSUMED LEAKER/NON-STABILIZED
WATCH LIST: FERROCYANIDE

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E43	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

REFERENCES

- * ANDERSON 1990
- ** MELTY 1988
- *** BORSHELM AND KIRCH 1991
- ◇ HANLON 1986a
- ◇◇ MCCANN 1982b

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
- BSLICK: SALTCAKE WASTE, 1965-1974
- EW: EVAPORATOR BOTTOMS WASTE
- EW: EVAPORATOR FEED
- MW: METAL WASTE
- PRECN1: FERROCYNANIDE WASTE
- PRECN2: FERROCYNANIDE WASTE
- TBP: TRIBUTYL PHOSPHATE
- WTR: WATER
- 1C: FIRST CYCLE DECONTAMINATION WASTE

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - TOTAL WASTE LEVEL (SOLIDS)
- SOLIDS LEVEL
- ++++ ASSUMED SOLIDS LEVEL
- ===== INTERSTITIAL LIQUID LEVEL
- +++++ ASSUMED INTERSTITIAL LIQUID LEVEL
- ||||| LIQUID LEVEL
- |||| SOLIDS

BY TANK FARM

CASCADE

U.S. DEPARTMENT OF ENERGY

RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-106 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1995
ASSUMED LEAKER/NON-STABILIZED
WATCH LIST: FERROCYNANIDE

SIZE	BLDG NO.	DWG NO.	JOB NO.	SHEET	DATE
B	241	ES-TKS-E44	5/96	1 OF 1	

TANK INFO:

CONSTRUCTED 1948-1949
NOMINAL CAPACITY: 758,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

WASTE TYPES ADDED

TIME LINE
(ANDERSON 1990)

WTR:
1C:
TBP:

WTR:
CW:

WTR:
EB:

WTR:
EB:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

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BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

WTR:
1C:
TBP:

WTR:
CW:

WTR:
EB:

WTR:
EB:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

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BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

WTR:
BSLICK:

LEVEL IN
FEET
LEVEL IN
INCHES

NO CASCADE OVERFLOW

SCAVENGED *
FROM WR VAULT*
(pH 9.4, 8.8, 9.8)***
(pH 10.0, 9.4, 9.8, 9.7)***
(pH 8.8, 9.2, 9.6)***
TO #8 & #10 BC DITCH
pH 9.4***

(TO BC-86, BC-2 CRIB)*

FROM 107-C*

FROM 107-C*

FROM 102-C*
(FROM 102-C, 103-BY)*
TO 103-BY*
FROM 106-BY*

pH >14.0*** FROM 105-BY*
TO 109-BY*
TO 109-BY*

INACTIVE (77)*
SALTWELL PUMPING COMPLETED (78)**

LEVEL ADJUSTMENT (4/82), PHOTO (11/82)
PARTIAL INTERIM ISOLATION (12/82)**

ASSUMED LEAKER (84)◇

pH 13.5***

VOLUME
(GALLONS)

837,500

870,500

804,500

771,500

736,500

705,500

672,500

639,500

606,500

573,500

540,500

507,500

474,500

441,500

408,500

375,500

342,500

309,500

276,500

243,500

210,500

177,500

144,500

111,500

78,500

45,500

12,500

0

0' 0"

2' 24"

4' 48"

6' 72"

8' 96"

10' 120"

12' 144"

14' 168"

16' 192"

18' 216"

20' 240"

22' 264"

24' 288"

26' 312"

KNUCKLE
BOTTOM

KNUCKLE
TOP

1945

50

55

60

65

70

75

80

85

90

95

DISH
BOTTOM

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

1C:
TBP:

CW:
TBP:

TBP:
CW:

EB:

EVAP:

TANK INFO:

CONSTRUCTED 1948-1949
NOMINAL CAPACITY: 750,000 GAL
DISH BOTTOM, 4 FOOT RADIUS KNUCKLE
75 FOOT DIAMETER TANK

REFERENCES

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

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

1C1:
UR:

PFeCN1:
PFeCN2:

WTR:

BYSLTCK:

VOLUME
(GALLONS)

— 870,500
— 837,500
— 804,500
— 771,500
— 738,500
— 705,500
— 672,500
— 639,500
— 606,500
— 573,500
— 540,500
— 507,500
— 474,500
— 441,500
— 408,500
— 375,500
— 342,500
— 309,500
— 276,500
— 243,500
— 210,500
— 177,500
— 144,500
— 111,500
— 78,500
— 45,500
— 12,500
— 0

NOTES:

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

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS
SEE APPENDIX A

BKSLTCK: BYSALTCAKE WASTE 1965-1974
CW: COATING (CLADDING) WASTE
EB: EVAPORATOR BOTTOMS
EVAP: EVAPORATOR FEED
PFeCN1: FEROCYANIDE WASTE
PFeCN2: FEROCYANIDE WASTE
TBP: TRIBUTYL PHOSPHATE
UR: URANIUM RECOVERY WASTE
WTR: WATER
1C: FIRST CYCLE DECONTAMINATION WASTE
1C1: FIRST CYCLE DECONTAMINATION WASTE 1944-1945

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - TOTAL WASTE LEVEL (SOLIDS)
- - - SOLIDS LEVEL
- + + + + + ASSUMED SOLIDS LEVEL
- □ □ □ □ INTERSTITIAL LIQUID LEVEL
- | | | | | ASSUMED INTERSTITIAL LIQUID LEVEL
- ▨ SOLIDS

BY TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-107 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1950-1995
ASSUMED LEAKER/STABILIZED TANK
WATCH LIST: FEROCYANIDE

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E45	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

WASTE TYPES ADDED	1C:	TBP:	EB:	EVAP:
TIME LINE	TBP:			
(ANDERSON 1990)				
PRIMARY ADDITIONS	PfECN1:			
TIME LINE	PfECN2:			
(AGNEW 1995b)				

TANK INFO:
CONSTRUCTED 1948-1949
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 1996a
- ◆ HANLON 1991n

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

BSLCTK: SALTCAKE WASTE 1965-1974
CW: COATING (CLADDING) WASTE
EB: EVAPORATOR BOTTOMS
EVAP: EVAPORATOR FEED
PfECN1: FERROCYNANIDE WASTE
PfECN2: FERROCYNANIDE WASTE
TBP: TRIBUTYL PHOSPHATE
WTR: WATER
1C: FIRST CYCLE DECONTAMINATION WASTE

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - TOTAL WASTE LEVEL (SOLIDS)
- - - SOLIDS LEVEL
- ++++ ASSUMED SOLIDS LEVEL
- /// SOLIDS

BY TANK FARM

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-108 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1951-1995
ASSUMED LEAKER/STABILIZED TANK
WATCH LIST: FERROCYNANIDE

SIZE	BLDG NO.	OWE NO.	DATE
B	241	ES-TKS-E46	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

TBP:
MW:

TBP:

TBP:
CW:

OWW:
EB:
CW:

EVAP:
NCPLX:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

WTR:

BYSLTCK:

TANK INFO:

CONSTRUCTED 1948-1949
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 1996a
- ◇◇ VAIL 1985d

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

BYSLTCK: SALTCAKE WASTE 1965-1974

CW: COATING (CLADDING) WASTE

EB: EVAPORATOR BOTTOMS

EVAP: EVAPORATOR FEED

MW: METAL WASTE

NCPLX: NON-COMPLEXED WASTE

OWW: ORGANIC WASH WASTE

TBP: TRIBUTYL PHOSPHATE

WTR: WATER

1C: FIRST CYCLE DECONTAMINATION WASTE

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - TOTAL WASTE LEVEL (SOLIDS)
- - - SOLIDS LEVEL
- ++++ ASSUMED SOLIDS LEVEL
- □ □ □ INTERSTITIAL LIQUID LEVEL
- ▨ SOLIDS

BY TANK FARM CASCADE

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-109 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1953-1995
SOUND/NON-STABILIZED TANK
WATCH LIST: N/A

SIZE	BLOG NO.	DWG NO.	DATE
B	241	ES-TKS-E47	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

MW:

TBP:
OWW:
CW:

CW:
EB:

EVAP:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

MW1:
MW2:
WTR:

CWP2:

BYSLTCK:

TANK INFO:

CONSTRUCTED 1948-1949
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 1996a
- ◇◇ HANLON 1991n

NOTES:

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

GLOSSARY OF WASTE TERMS:
FOR MORE COMPLETE DEFINITIONS SEE APPENDIX A

BYSLTCK: SALTCAKE WASTE 1965-1974
CW: COATING (CLADDING) WASTE
CWP2: COATING (CLADDING) WASTE 1961-1972
EB: EVAPORATOR BOTTOMS
EVAP: EVAPORATOR FEED
NW: METAL WASTE
OWW: ORGANIC WASH WASTE
TBP: TRIBUTYL PHOSPHATE
MW1: METAL WASTE 1944-1949
MW2: METAL WASTE 1950-1952
WTR: WATER

LEGEND

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

**BY TANK FARM
CASCADE**

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-111 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1995
SOUND/STABILIZED TANK
WATCH LIST: FERROCYANIDE

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E49	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

WASTE TYPES ADDED
TIME LINE
(ANDERSON 1990)

MW:

TBP:
CW:CW:
EB:

EVAP:

PRIMARY ADDITIONS
TIME LINE
(AGNEW 1995b)

MW1:
MW2:PF₆CN2:
UR:

CWP2:

WTR:
BYSLTCK:

TANK INFO:

CONSTRUCTED 1948-1949
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 1996a
- ◇ HANLON 1991n

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 UNKNOWN.

GLOSSARY OF WASTE TERMS:

FOR MORE COMPLETE DEFINITIONS
SEE APPENDIX A

BYSLTCK: SALTCAKE WASTE 1965-1974
CW: COATING (CLADDING) WASTE
CWP2: COATING (CLADDING) WASTE 1961-72
DW: DECONTAMINATION WASTE
EB: EVAPORATOR BOTTOMS
EVAP: EVAPORATOR FEED
MW: METAL WASTE
PF₆CN2: PLANT FERROCYANIDE WASTE
TBP: TRIBUTYL PHOSPHATE
UR: URANIUM RECOVERY WASTE
WTR: WATER
MW1: METAL WASTE 1944-1949
MW2: METAL WASTE 1950-1952

LEGEND

- TOTAL WASTE LEVEL (SUPERNATE)
- - - TOTAL WASTE LEVEL (SOLIDS)
- - - SOLIDS LEVEL
- + + + + ASSUMED SOLIDS LEVEL
- □ □ □ INTERSTITIAL LIQUID LEVEL
- + + + + ASSUMED INTERSTITIAL LIQUID LEVEL
- ▨ SOLIDS

BY TANK FARM
CASCADE

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
ICF KAISER HANFORD

241-BY-112 SINGLE-SHELL TANK
WASTE & LEVEL HISTORY 1952-1995
SOUND/STABILIZED TANK
WATCH LIST: FERROCYANIDE

SIZE	BLDG NO.	DWG NO.	DATE
B	241	ES-TKS-E50	5/96
SCALE	NONE	JOB NO.	SHEET 1 OF 1

241-BY-101 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950	290	113			
2	661	248			
3	744	278			
4	744	278			
1-1951	744	278			
2	744	278			
3					
4					
1-1952	758	283			
2	758	283			
3	758	283			
4	758	283			
1-1953	758	283			
2	758	283			
3	758	283			
4	758	283			
1-1954	1	8			
2					
3					
4					
1-1955	681	255			
2	750	280			
3	750	280			
4	750	280			
1-1956	750	280			
2	750	280			
3	750	280			
4	750	280			
1-1957	717	268			
2	262	103			
3	40	22			
4	40	22			
1-1958	40	22			
2	59	29			
3	59	29			
4	59	29			
1-1959	59	29			
2	59	29			
3	59	29			
4	60	29			
1-1960	60	29			
2	60	29			
3	60	29			
4	394	151			
1-1961					
2	483	183			

241-BY-101 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	728	272			
1-1962					
2	728	272			
3					
4	728	272			
1-1963					
2	730	273	37	21	
3					
4	741	277	37	21	
1-1964					
2	744	278	37	21	
3					
4	744	278	37	21	
1-1965					
2	582	219	0	0	
3	601	226			
4	541	204			
1-1966	590	222			
2	612	230			
3	585	220	0	0	
4	409	156	0	0	
1-1967	409	156	0	0	
2	407	155	0	0	
3	407	155	109	47	
4	406	155	376	144	
1-1968	406	155	378	145	
2	406	155	378	145	
3	407	155	378	145	
4	407	155	29	18	
1-1969	407	155	281	110	
2	407	155	274	107	
3	739	276	310	120	
4	737	275	332	128	
1-1970	737	275	337	130	
2	744	278	337	130	
3	743	278	337	130	
4	747	279	340	131	
1-1971	745	278	340	131	
2	733	274	386	148	
3	736	275	386	148	
4	737	275	398	152	
1-1972	737	275	398	152	
2	739	276	398	152	
3	740	277	418	159	
4	734	274	418	159	

241-BY-101 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	738	276	418	159	
2	737	276	418	159	
3	738	276	418	159	
4	739	276	418	159	
1-1974	740	277	418	159	
2	746	279	418	159	
3	748	279	418	159	
4	747	279	398	152	
1-1975	747	279	398	152	
2	728	272	398	152	
3	728	272	398	152	
4	728	272	398	152	
1-1976	728	272	398	152	
2	728	272	398	152	
3	733	274	398	152	
4	579	218	398	152	
1-1977	458	174	398	152	
2	447	170	439	167	
3	447	170	439	167	
4	447	170	439	167	
1-1978	450	171	439	167	
2	450	171	439	167	
3	447	170	439	167	
4	447	170	439	167	
1-1979	447	170	439	167	
2	447	170	439	167	
3	447	170	439	167	
4	447	170	439	167	
1-1980	447	170	439	167	
2	447	170	439	167	
3	447	170	439	167	
4	443	169	439	167	
1-1981	443	169	439	167	
2	443	169	439	167	
3	443	169	439	167	
4	443	169	439	167	
1-1982	443	169	439	167	
2	425	162	425	162	
3	425	162	425	162	
4	425	162	425	162	
1-1983	425	162	425	162	
2	425	162	425	162	
3	425	162	425	162	
4	425	162	425	162	
1-1984	387	148	387	148	
2	387	148	387	148	

241-BY-101 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	387	148	387	148	
4	387	148	387	148	
1-1985	387	148	387	148	
2	387	148	387	148	
3	387	148	387	148	
4	387	148	387	148	
1-1986	387	148	387	148	
2	387	148	387	148	
3	387	148	387	148	54
4	387	148	387	148	57
1-1987	387	148	387	148	58
2	387	148	387	148	61
3	387	148	387	148	61
4	387	148	387	148	62
1-1988	387	148	387	148	61
2	387	148	387	148	64
3	387	148	387	148	66
4	387	148	387	148	66
1-1989	387	148	387	148	65
2	387	148	387	148	66
3	387	148	387	148	67
4	387	148	387	148	67
1-1990	387	148	387	148	68
2	387	148	387	148	
3	387	148	387	148	69
4	387	148	387	148	70
1-1991	387	148	387	148	70
2	387	148	387	148	71
3	387	148	387	148	71
4	387	148	387	148	72
1-1992	387	148	387	148	72
2	387	148	387	148	
3	387	148	387	148	
4	387	148	387	148	72
1-1993	387	148	387	148	72
2	387	148	387	148	73
3	387	148	387	148	71
4	387	148	387	148	73
1-1994	387	148	387	148	73
2	387	148	387	148	74
3	387	148	387	148	76
4	387	148	387	148	76
1-1995	387	148	387	148	73
2	387	148	387	148	74
3	387	148	387	148	76

241-BY-102 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3	480	182			
4	744	278			
1-1951	744	278			
2	744	278			
3					
4					
1-1952	758	283			
2	758	283			
3	758	283			
4	758	283			
1-1953	758	283			
2	758	283			
3	758	283			
4	758	283			
1-1954	497	188			
2					
3					
4					
1-1955	326	126			
2	720	269			
3	720	269			
4	720	269			
1-1956	720	269			
2	720	269			
3	720	269			
4	720	269			
1-1957	722	270			
2	488	185			
3	400	153	18	14	
4	43	23	18	14	
1-1958	43	23	18	14	
2	43	23	18	14	
3	43	23	18	14	
4	43	23	18	14	
1-1959	43	23	18	14	
2	46	24	18	14	
3	46	24	18	14	
4	46	24	18	14	
1-1960	46	24	18	14	
2	48	25			
3	48	25			
4	48	25			
1-1961					
2	48	25			

241-BY-102 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	51	26	18	14	
1-1962					
2	51	26	18	14	
3					
4	54	27	18	14	
1-1963					
2	48	25	29	18	
3					
4	48	25	29	18	
1-1964					
2	48	25	29	18	
3					
4	442	188	29	18	
1-1965					
2	700	262	0	0	
3	728	272	0	0	
4	728	272	0	0	
1-1966	730	273	0	0	
2	733	274	0	0	
3	733	274	0	0	
4	722	270	0	0	
1-1967	631	237	0	0	
2	593	223	0	0	
3	597	225	0	0	
4	608	229	0	0	
1-1968	561	211	0	0	
2	593	223	0	0	
3	601	226	314	122	
4	578	218	250	98	
1-1969	510	193	250	98	
2	590	222	250	98	
3	607	228	250	98	
4	583	219	250	98	
1-1970	630	237	250	98	
2	596	224	250	98	
3	639	240	250	98	
4	530	200	250	98	
1-1971	601	226	250	98	
2	637	239	155	64	
3	623	234	155	64	
4	579	218	155	64	
1-1972	630	237	197	79	
2	618	232	197	79	
3	609	229	197	79	
4	590	222	246	97	

241-BY-102 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	590	222	194	78	
2	631	237	194	78	
3	637	239	194	78	
4	635	238	208	83	
1-1974	630	237	208	83	
2	629	236	208	83	
3	628	236	208	83	
4	629	236	200	80	
1-1975	629	236	200	80	
2	629	236	200	80	
3	629	236	200	80	
4	629	236	200	80	
1-1976	629	236	200	80	
2	626	235	200	80	
3	626	235	200	80	
4	626	235	200	80	
1-1977	593	223	200	80	
2	450	171	233	92	
3	436	166	436	166	
4	436	166	436	166	
1-1978	436	166	436	166	
2	417	159	417	159	
3	417	159	417	159	
4	417	159	417	159	
1-1979	417	159	417	159	
2	417	159	417	159	
3	417	159	417	159	
4	417	159	417	159	
1-1980	417	159	417	159	
2	417	159	417	159	
3	417	159	417	159	
4	417	159	417	159	
1-1981	417	159	417	159	
2	417	159	417	159	
3	417	159	417	159	
4	417	159	417	159	
1-1982	417	159	417	159	
2	440	167	425	162	
3	440	167	425	162	
4	440	167	425	162	
1-1983	440	167	425	162	
2	440	167	425	162	
3	440	167	425	162	
4	440	167	425	162	
1-1984	432	165	417	159	
2	432	165	417	159	

241-BY-102 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	432	165	417	159	
4	432	165	417	159	
1-1985	432	165	417	159	
2	432	165	417	159	
3	432	165	417	159	
4	432	165	417	159	
1-1986	432	165	417	159	
2	432	165	417	159	
3	432	165	417	159	169
4	432	165	417	159	170
1-1987	432	165	417	159	169
2	432	165	417	159	171
3	432	165	417	159	170
4	432	165	417	159	171
1-1988	432	165	417	159	170
2	432	165	417	159	170
3	432	165	417	159	171
4	432	165	417	159	171
1-1989	432	165	417	159	170
2	432	165	417	159	171
3	432	165	417	159	171
4	432	165	417	159	171
1-1990	432	165	417	159	171
2	432	165	417	159	
3	432	165	417	159	172
4	432	165	417	159	171
1-1991	432	165	417	159	171
2	405	155	405	155	98
3	341	131	341	131	95
4	341	131	341	131	89
1-1992	341	131	341	131	90
2	341	131	341	131	
3	341	131	341	131	89
4	341	131	341	131	89
1-1993	341	131	341	131	90
2	341	131	341	131	90
3	341	131	341	131	91
4	341	131	341	131	90
1-1994	341	131	341	131	91
2	341	131	341	131	88
3	341	131	341	131	88
4	341	131	341	131	88
1-1995	277	108	277	108	88
2	277	108	277	108	88
3	277	108	277	108	87

241-BY-103 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3					
4	429	163			
1-1951	744	278			
2	744	278			
3					
4					
1-1952	664	249			
2	664	249			
3	664	249			
4	664	249			
1-1953	664	249			
2	745	278			
3	745	278			
4	745	278			
1-1954	382	146			
2					
3					
4					
1-1955	128	54			
2	739	276			
3	739	276			
4	739	276			
1-1956	739	276			
2	739	276			
3	739	276			
4	739	276			
1-1957	732	274			
2	733	274			
3	26	17			
4	447	170			
1-1958	736	275			
2	730	273			
3	730	273			
4	730	273			
1-1959	728	272			
2	722	270			
3	722	270			
4	722	270			
1-1960	722	270			
2	722	270			
3	722	270			
4	722	270			
1-1961					
2	722	270			

241-BY-103 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	736	275			
1-1962					
2	725	271			
3					
4	725	271			
1-1963					
2	722	270	21	15	
3					
4	722	270	21	15	
1-1964					
2	714	267	21	15	
3					
4	739	276	21	15	
1-1965					
2	596	224	0	0	
3	703	263	0	0	
4	494	187	0	0	
1-1966	519	196	0	0	
2	590	222	0	0	
3	662	248	0	0	
4	739	276	0	0	
1-1967	541	204	0	0	
2	615	231	0	0	
3	526	199	0	0	
4	526	199	0	0	
1-1968	569	214	0	0	
2	569	214	0	0	
3	456	173	0	0	
4	519	196	0	0	
1-1969	213	85	0	0	
2	566	213	0	0	
3	483	183	1	8	
4	542	205	8	10	
1-1970	239	94	3	9	
2	442	168	4	9	
3	439	167	4	9	
4	700	262	9	11	
1-1971	711	266	65	31	
2	689	258	128	54	
3	714	267	142	59	
4	398	152	202	81	
1-1972	443	169	298	116	
2	454	173	351	135	
3	620	233	428	163	
4	476	181	48	25	

241-BY-103 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	469	178	469	178	
2	483	183	469	178	
3	461	175	458	174	
4	464	176	458	174	
1-1974	464	176	458	174	
2	464	176	458	174	
3	469	178	469	178	
4	461	175	461	175	
1-1975	461	175	461	175	
2	461	175	461	175	
3	461	175	461	175	
4	461	175	461	175	
1-1976	461	175	461	175	
2	461	175	461	175	
3	461	175	461	175	
4	461	175	461	175	
1-1977	461	175	461	175	
2	461	175	461	175	
3	461	175	461	175	
4	461	175	461	175	
1-1978	461	175	461	175	
2	461	175	461	175	
3	461	175	461	175	
4	461	175	461	175	
1-1979	461	175	461	175	
2	461	175	461	175	
3	461	175	461	175	
4	461	175	461	175	
1-1980	461	175	461	175	
2	461	175	461	175	
3	461	175	461	175	
4	461	175	458	174	
1-1981	461	175	458	174	
2	461	175	458	174	
3	461	175	458	174	
4	470	178	458	174	
1-1982	470	178	458	174	
2	467	177	459	174	
3	467	177	459	174	
4	467	177	459	174	
1-1983	467	177	459	174	
2	467	177	459	174	
3	467	177	459	174	
4	467	177	459	174	
1-1984	472	179	464	176	
2	472	179	464	176	

241-BY-103 LEVEL HISTORY

Year	Total (K gal)	Total (ln)	Solids (K gal)	Solids (ln)	ILL (in)
3	472	179	464	176	
4	472	179	464	176	
1-1985	472	179	464	176	
2	472	179	464	176	
3	472	179	464	176	
4	472	179	464	176	
1-1986	472	179	464	176	
2	472	179	464	176	181
3	472	179	464	176	181
4	472	179	464	176	181
1-1987	472	179	464	176	182
2	472	179	462	175	150
3	419	160	419	160	144
4	410	157	410	157	144
1-1988	410	157	410	157	143
2	410	157	410	157	142
3	410	157	410	157	141
4	410	157	410	157	141
1-1989	410	157	410	157	141
2	410	157	410	157	142
3	410	157	410	157	141
4	410	157	410	157	142
1-1990	410	157	400	153	142
2	400	153	400	153	142
3	400	153	400	153	141
4	400	153	400	153	142
1-1991	400	153	400	153	143
2	400	153	400	153	143
3	400	153	400	153	142
4	400	153	400	153	142
1-1992	400	153	400	153	142
2	400	153	400	153	
3	400	153	400	153	
4	400	153	400	153	141
1-1993	400	153	400	153	139
2	400	153	400	153	142
3	400	153	400	153	142
4	400	153	400	153	140
1-1994	400	153	400	153	141
2	400	153	400	153	141
3	400	153	400	153	141
4	400	153	400	153	141
1-1995	400	153	400	153	141
2	400	153	400	153	141
3	400	153	400	153	141

241-BY-104 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950	11	11			
2	11	11			
3	11	11			
4	11	11			
1-1951	200	80			
2	744	278			
3					
4					
1-1952	758	283			
2	758	283			
3	758	283			
4	758	283			
1-1953	758	283			
2	758	283			
3	758	283			
4	758	283			
1-1954	758	283			
2					
3					
4					
1-1955					
2	112	48			
3	714	267			
4	78	36			
1-1956	78	36			
2	78	36			
3	403	154	303	118	
4	546	206	323	125	
1-1957	563	212	323	125	
2	571	215	277	108	
3	598	225	244	96	
4	574	216	244	96	
1-1958	574	216	244	96	
2	574	216	244	96	
3	574	216	244	96	
4	571	215	244	96	
1-1959	571	215	244	96	
2	571	215	244	96	
3	567	214	244	96	
4	567	214	244	96	
1-1960	567	214	244	96	
2	563	212	244	96	
3	563	212	244	96	
4	563	212	244	96	
1-1961					
2	565	213	244	96	

241-BY-104 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	703	283	244	96	
1-1962					
2	717	268	244	96	
3					
4	717	268	244	96	
1-1963					
2	714	267	263	103	
3					
4	714	267	263	103	
1-1964					
2	714	267	263	103	
3					
4	714	267	263	103	
1-1965					
2	717	268	227	90	
3	717	268	227	90	
4	717	268	227	90	
1-1966	717	268	227	90	
2	717	268	227	90	
3	717	268	227	90	
4	719	269	227	90	
1-1967	719	269	227	90	
2	205	82	205	82	
3	249	98	244	96	
4	653	245	244	96	
1-1968	730	273	244	96	
2	546	206	212	85	
3	741	277	244	96	
4	741	277	244	96	
1-1969	741	277	244	96	
2	741	277	233	92	
3	740	277	244	96	
4	748	279	240	95	
1-1970	211	84	206	82	
2	579	218	44	23	
3	623	234	112	48	
4	664	249	131	55	
1-1971	677	254	150	62	
2	701	262	150	62	
3	662	248	425	162	
4	662	248	618	232	
1-1972	662	248	618	232	
2	670	251	618	232	
3	664	249	310	120	
4	707	265	310	120	

241-BY-104 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	668	250	469	178	
2	693	259	469	178	
3	697	261	469	178	
4	657	246	628	236	
1-1974	718	269	469	178	
2	719	269	469	178	
3	718	269	469	178	
4	717	268	469	178	
1-1975	717	268	469	178	
2	717	268	469	178	
3	717	268	469	178	
4	717	268	469	178	
1-1976	717	268	469	178	
2	717	268	469	178	
3	719	269	469	178	
4	670	251	469	178	
1-1977	634	238	469	178	
2	634	238	469	178	
3	631	237	623	234	
4	631	237	623	234	
1-1978	634	238	623	234	
2	634	238	623	234	
3	634	238	623	234	
4	634	238	623	234	
1-1979	634	238	623	234	
2	634	238	623	234	
3	634	238	623	234	
4	634	238	623	234	
1-1980	634	238	623	234	
2	634	238	623	234	
3	634	238	623	234	
4	634	238	623	234	
1-1981	634	238	623	234	
2	634	238	623	234	
3	634	238	623	234	
4	634	238	623	234	
1-1982	634	238	623	234	
2	634	238	634	238	
3	634	238	634	238	
4	634	238	634	238	
1-1983	634	238	634	238	
2	634	238	634	238	
3	435	166	435	166	
4	435	166	435	166	
1-1984	407	155	407	155	
2	407	155	407	155	

241-BY-104 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	406	155	406	155	
4	406	155	406	155	
1-1985	406	155	406	155	
2	406	155	406	155	
3	406	155	406	155	
4	406	155	406	155	
1-1986	406	155	406	155	82
2	406	155	406	155	82
3	406	155	406	155	80
4	406	155	406	155	84
1-1987	406	155	406	155	84
2	406	155	406	155	85
3	406	155	406	155	80
4	406	155	406	155	
1-1988	406	155	406	155	85
2	406	155	406	155	87
3	406	155	406	155	84
4	406	155	406	155	86
1-1989	406	155	406	155	85
2	406	155	406	155	86
3	406	155	406	155	87
4	406	155	406	155	86
1-1990	406	155	406	155	84
2	406	155	406	155	
3	406	155	406	155	86
4	406	155	406	155	87
1-1991	406	155	406	155	87
2	406	155	406	155	86
3	406	155	406	155	89
4	406	155	406	155	89
1-1992	406	155	406	155	88
2	406	155	406	155	
3	406	155	406	155	
4	406	155	406	155	84
1-1993	406	155	406	155	88
2	406	155	406	155	88
3	406	155	406	155	89
4	406	155	406	155	87
1-1994	406	155	406	155	87
2	406	155	406	155	88
3	406	155	406	155	87
4	406	155	406	155	89
1-1995	406	155	406	155	89
2	406	155	406	155	89
3	406	155	406	155	88

241-BY-105 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3					
4					
1-1951					
2	20	15			
3					
4					
1-1952	491	186			
2	491	186			
3	491	186			
4	491	186			
1-1953	491	186			
2	495	187			
3	497	188			
4	497	188			
1-1954	497	188			
2	497	188			
3	1	8			
4	399	153	14	13	
1-1955	222	88	16	13	
2	222	88	16	13	
3	260	102	16	13	
4	371	142	16	13	
1-1956	551	208	350	135	
2	708	265	384	147	
3	403	154	384	147	
4	706	264	384	147	
1-1957	706	264	384	147	
2	409	156	384	147	
3	417	159	213	85	
4	428	163	213	85	
1-1958	428	163	213	85	
2	431	164	213	85	
3	431	164	213	85	
4	429	163	213	85	
1-1959	428	163	213	85	
2	428	163	213	85	
3	428	163	213	85	
4	428	163	213	85	
1-1960	428	163	213	85	
2	428	163	213	85	
3	428	163	213	85	
4	428	163	213	85	
1-1961					
2	519	196	213	85	

241-BY-105 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	711	266	213	85	
1-1962					
2	711	266	213	85	
3					
4	711	266	213	85	
1-1963					
2	711	266	222	88	
3					
4	711	266	222	88	
1-1964					
2	708	265	222	88	
3					
4	708	265	222	88	
1-1965					
2	711	266	186	75	
3	711	266	186	75	
4	711	266	186	75	
1-1966	711	266	186	75	
2	208	83	186	75	
3	178	72	0	7	
4	326	126	0	7	
1-1967	323	125	0	7	
2	323	125	0	7	
3	326	126	39	22	
4	326	126	88	39	
1-1968	605	227	88	39	
2	495	187	88	39	
3	411	157	158	65	
4	741	277	158	65	
1-1969	670	251	165	67	
2	671	251	153	63	
3	494	187	194	78	
4	675	253	189	76	
1-1970	745	278	191	77	
2	631	237	216	86	
3	722	270	299	116	
4	681	255	299	116	
1-1971	675	253	340	131	
2	668	250	469	178	
3	700	262	469	178	
4	711	266	653	245	
1-1972	678	254	653	245	
2	701	262	653	245	
3	642	241	591	222	
4	664	249	591	222	

241-BY-105 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	666	250	628	236	
2	666	250	628	236	
3	657	246	628	236	
4	657	246	628	236	
1-1974	656	246	628	236	
2	652	245	628	236	
3	628	236	628	236	
4	626	235	626	235	
1-1975	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1976	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1977	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1978	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1979	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1980	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1981	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1982	626	235	626	235	
2	546	206	546	206	
3	546	206	546	206	
4	546	206	546	206	
1-1983	546	206	546	206	
2	546	206	546	206	
3	546	206	546	206	
4	546	206	546	206	
1-1984	503	190	503	190	
2	503	190	503	190	

241-BY-105 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	503	190	503	190	
4	503	190	503	190	
1-1985	503	190	503	190	
2	503	190	503	190	
3	503	190	503	190	
4	503	190	503	190	
1-1986	503	190	503	190	161
2	503	190	503	190	161
3	503	190	503	190	160
4	503	190	503	190	161
1-1987	503	190	503	190	162
2	503	190	503	190	
3	503	190	503	190	161
4	503	190	503	190	162
1-1988	503	190	503	190	161
2	503	190	503	190	162
3	503	190	503	190	162
4	503	190	503	190	162
1-1989	503	190	503	190	162
2	503	190	503	190	162
3	503	190	503	190	162
4	503	190	503	190	162
1-1990	503	190	503	190	163
2	503	190	503	190	
3	503	190	503	190	163
4	503	190	503	190	164
1-1991	503	190	503	190	165
2	503	190	503	190	165
3	503	190	503	190	164
4	503	190	503	190	164
1-1992	503	190	503	190	166
2	503	190	503	190	
3	503	190	503	190	
4	503	190	503	190	156
1-1993	503	190	503	190	166
2	503	190	503	190	165
3	503	190	503	190	164
4	503	190	503	190	165
1-1994	503	190	503	190	165
2	503	190	503	190	165
3	503	190	503	190	166
4	503	190	503	190	166
1-1995	503	190	503	190	166
2	503	190	503	190	166
3	503	190	503	190	167

241-BY-106 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3					
4					
1-1951					
2					
3					
4					
1-1952					
2					
3					
4					
1-1953	0	0			
2	758	283			
3	758	283			
4	755	282			
1-1954	756	282			
2	756	282			
3	756	282			
4	15	13			
1-1955	728	272	40	22	
2	736	275	107	46	
3	736	275	107	46	
4	746	279	120	51	
1-1956	551	208	150	62	
2	723	270	180	73	
3	629	236	164	67	
4	717	268	168	69	
1-1957	722	270	111	48	
2	725	271	111	48	
3	739	276	111	48	
4	257	101	111	48	
1-1958	257	101	111	48	
2	257	101	111	48	
3	257	101	111	48	
4	257	101	111	48	
1-1959	241	95	111	48	
2	252	99	111	48	
3	252	99	111	48	
4	252	99	111	48	
1-1960	252	99	111	48	
2	252	99	111	48	
3	252	99	111	48	
4	252	99	111	48	
1-1961					
2	249	98	111	48	

241-BY-106 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	505	191	111	48	
1-1962					
2	623	234	111	48	
3					
4	623	234	111	48	
1-1963					
2	620	233	150	62	
3					
4	620	233	150	62	
1-1964					
2	620	233	150	62	
3					
4	620	233	150	62	
1-1965					
2	620	233	103	45	
3	620	233	103	45	
4	620	233	103	45	
1-1966	620	233	103	45	
2	620	233	103	45	
3	744	278	103	45	
4	744	278	103	45	
1-1967	395	151	103	45	
2	272	106	103	45	
3	741	277	103	45	
4	740	277	103	45	
1-1968	739	276	103	45	
2	253	99	103	45	
3	253	99	103	45	
4	253	99	103	45	
1-1969	736	275	105	46	
2	737	275	93	41	
3	732	274	96	42	
4	732	274	95	42	
1-1970	733	274	103	45	
2	743	278	96	42	
3	689	258	98	43	
4	675	253	164	67	
1-1971	689	258	249	98	
2	706	264	288	112	
3	670	251	288	112	
4	706	264	288	112	
1-1972	580	218	296	115	
2	655	246	296	115	
3	697	261	296	115	
4	704	263	563	212	

241-BY-106 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	710	266	447	170	
2	677	254	494	187	
3	704	263	494	187	
4	692	259	494	187	
1-1974	692	259	494	187	
2	701	262	494	187	
3	697	261	494	187	
4	697	261	420	160	
1-1975	697	261	420	160	
2	697	261	351	135	
3	697	261	351	135	
4	681	255	351	135	
1-1976	681	255	351	135	
2	681	255	351	135	
3	684	256	351	135	
4	684	256	351	135	
1-1977	593	223	593	223	
2	593	223	593	223	
3	626	235	626	235	
4	626	235	626	235	
1-1978	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1979	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1980	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1981	626	235	626	235	
2	626	235	626	235	
3	626	235	626	235	
4	626	235	626	235	
1-1982	626	235	626	235	
2	642	241	642	241	
3	642	241	642	241	
4	642	241	642	241	
1-1983	642	241	642	241	
2	642	241	642	241	
3	642	241	642	241	
4	642	241	642	241	
1-1984	642	241	642	241	
2	642	241	642	241	

241-BY-106 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	642	241	642	241	
4	642	241	642	241	
1-1985	642	241	642	241	
2	642	241	642	241	
3	642	241	642	241	
4	642	241	642	241	
1-1986	642	241	642	241	
2	642	241	642	241	
3	642	241	642	241	223
4	642	241	642	241	223
1-1987	642	241	642	241	225
2	642	241	642	241	224
3	642	241	642	241	223
4	642	241	642	241	223
1-1988	642	241	642	241	223
2	642	241	642	241	225
3	642	241	642	241	222
4	642	241	642	241	225
1-1989	642	241	642	241	223
2	642	241	642	241	224
3	642	241	642	241	225
4	642	241	642	241	224
1-1990	642	241	642	241	225
2	642	241	642	241	
3	642	241	642	241	225
4	642	241	642	241	225
1-1991	642	241	642	241	226
2	642	241	642	241	225
3	642	241	642	241	225
4	642	241	642	241	225
1-1992	642	241	642	241	225
2	642	241	642	241	
3	642	241	642	241	
4	642	241	642	241	225
1-1993	642	241	642	241	225
2	642	241	642	241	225
3	642	241	642	241	225
4	642	241	642	241	225
1-1994	642	241	642	241	225
2	642	241	642	241	225
3	642	241	642	241	226
4	642	241	642	241	225
1-1995	642	241	642	241	224
2	642	241	642	241	224
3	642	241	642	241	178

241-SY-107 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3	11	11			
4	106	46			
1-1951	744	278			
2	744	278			
3					
4					
1-1952	758	283			
2	758	283			
3	334	129			
4	1	8			
1-1953	743	278	1	8	
2	758	283	1	8	
3	758	283	1	8	
4	758	283	1	8	
1-1954	758	283	1	8	
2	758	283	1	8	
3	101	44	44	23	
4	35	20	1	8	
1-1955	276	108	72	34	
2	48	25	46	24	
3	739	276	142	59	
4	177	72	147	61	
1-1956	180	73	160	66	
2	225	89	168	69	
3	87	39	87	39	
4	755	282	150	62	
1-1957	524	198	150	62	
2	722	270	150	62	
3	486	184	178	72	
4	172	70	172	70	
1-1958	172	70	172	70	
2	172	70	172	70	
3	172	70	172	70	
4	574	216	150	62	
1-1959	744	278	150	62	
2	771	288	150	62	
3	771	288	150	62	
4	771	288	150	62	
1-1960	771	288	150	62	
2	771	288	150	62	
3	771	288	150	62	
4	771	288	150	62	
1-1961					
2	733	274	150	62	

241-BY-107 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	736	275	150	62	
1-1962					
2	736	275	150	62	
3					
4	736	275	150	62	
1-1963					
2	736	275	178	72	
3					
4	728	272	178	72	
1-1964					
2	730	273	178	72	
3					
4	730	273	178	72	
1-1965					
2	730	273	150	62	
3	730	273	150	62	
4	730	273	150	62	
1-1966					
2	730	273	150	62	
3	733	274	150	62	
4	733	274	150	62	
1-1967					
2	733	274	150	62	
3	733	274	150	62	
4	733	274	150	62	
1-1968					
2	733	274	150	62	
3	733	274	150	62	
4	730	273	150	62	
1-1969					
2	728	272	150	62	
3	726	271	150	62	
4	649	243	150	62	
1-1970					
2	651	244	58	29	
3	678	254	61	30	
4	638	239	43	23	
1-1971					
2	656	246	106	46	
3	624	234	117	50	
4	674	253	117	50	
1-1972					
2	605	227	117	50	
3	664	249	117	50	
4	689	258	117	50	
1-1972					
2	634	238	117	50	
3	648	243	117	50	
4	646	242	117	50	

241-BY-107 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	649	243	175	71	
2	635	238	175	71	
3	633	238	175	71	
4	659	247	175	71	
1-1974	653	245	175	71	
2	492	186	444	169	
3	492	186	444	169	
4	491	186	183	74	
1-1975	367	141	367	141	
2	367	141	367	141	
3	367	141	367	141	
4	367	141	367	141	
1-1976	367	141	367	141	
2	367	141	367	141	
3	367	141	367	141	
4	367	141	367	141	
1-1977	367	141	367	141	
2	367	141	367	141	
3	367	141	367	141	
4	367	141	367	141	
1-1978	326	126	326	126	
2	326	126	326	126	
3	326	126	326	126	
4	326	126	326	126	
1-1979	326	126	326	126	
2	326	126	326	126	
3	326	126	326	126	
4	326	126	326	126	
1-1980	326	126	326	126	
2	326	126	326	126	
3	326	126	326	126	
4	326	126	326	126	
1-1981	326	126	326	126	
2	326	126	326	126	
3	326	126	326	126	
4	326	126	326	126	
1-1982	326	126	326	126	
2	356	137	356	137	
3	356	137	356	137	
4	356	137	356	137	
1-1983	356	137	356	137	
2	356	137	356	137	
3	356	137	356	137	
4	356	137	356	137	
1-1984	266	104	266	104	
2	266	104	266	104	

241-SY-107 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	266	104	266	104	
4	266	104	266	104	
1-1985	266	104	266	104	
2	266	104	266	104	
3	266	104	266	104	
4	266	104	266	104	
1-1986	266	104	266	104	
2	266	104	266	104	
3	266	104	266	104	
4	266	104	266	104	63
1-1987	266	104	266	104	61
2	266	104	266	104	62
3	266	104	266	104	61
4	266	104	266	104	63
1-1988	266	104	266	104	63
2	266	104	266	104	62
3	266	104	266	104	62
4	266	104	266	104	64
1-1989	266	104	266	104	63
2	266	104	266	104	62
3	266	104	266	104	63
4	266	104	266	104	62
1-1990	266	104	266	104	64
2	266	104	266	104	
3	266	104	266	104	63
4	266	104	266	104	63
1-1991	266	104	266	104	63
2	266	104	266	104	61
3	266	104	266	104	62
4	266	104	266	104	62
1-1992	266	104	266	104	63
2	266	104	266	104	
3	266	104	266	104	
4	266	104	266	104	61
1-1993	266	104	266	104	63
2	266	104	266	104	61
3	266	104	266	104	63
4	266	104	266	104	63
1-1994	266	104	266	104	62
2	266	104	266	104	62
3	266	104	266	104	62
4	266	104	266	104	63
1-1995	266	104	266	104	63
2	266	104	266	104	62
3	266	104	266	104	62

241-BY-108 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
1-1950				
2				
3				
4				
1-1951	20	15		
2	538	203		
3				
4				
1-1952	753	281		
2	753	281		
3	753	281		
4	753	281		
1-1953	753	281		
2	687	257		
3	687	257		
4	687	257		
1-1954	702	263		
2	702	263		
3	266	104		
4	127	54		
1-1955	78	36	33	19
2	140	58	98	43
3	376	144	197	79
4	200	80	200	80
1-1956	713	267	205	82
2	179	73	179	73
3	523	198	194	78
4	656	246	201	81
1-1957	722	270	201	81
2	722	270	249	98
3	213	85	213	85
4	211	84	210	84
1-1958	211	84	210	84
2	211	84	210	84
3	211	84	210	84
4	244	96	210	84
1-1959	557	210		
2	744	278		
3	744	278		
4	744	278	210	84
1-1960	744	278	210	84
2	738	276	210	84
3	738	276	210	84
4	738	276	210	84
1-1961				
2	706	264	210	84

241-BY-108 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
3				
4	706	264	210	84
1-1962				
2	706	264	210	84
3				
4	706	264	210	84
1-1963				
2	703	263	202	81
3				
4	703	263	202	81
1-1964				
2	695	260	202	81
3				
4	697	261	202	81
1-1965				
2	700	262	178	72
3	700	262	178	72
4	700	262	178	72
1-1966				
2	700	262	178	72
3	700	262	178	72
4	697	261	178	72
1-1967				
2	697	261	178	72
3	697	261	178	72
4	697	261	178	72
1-1968				
2	695	260	178	72
3	557	210	178	72
4	657	246	125	53
1-1969				
2	604	227	125	53
3	582	219	165	67
4	585	220	222	88
1-1970				
2	574	216	194	78
3	574	216	233	92
4	706	264	224	89
1-1971				
2	657	246	176	71
3	740	277	194	78
4	659	247	65	31
1-1972				
2	692	259	98	43
3	385	147	385	147
4	388	149	388	149
1-1973				
2	381	146	381	146
3	381	146	381	146
4	381	146	381	146
1-1974				
2	381	146	381	146
3	381	146	381	146
4	312	121	304	118

241-BY-108 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
1-1973	312	121	304	118
2	304	118	304	118
3	304	118	304	118
4	304	118	304	118
1-1974	304	118	304	118
2	304	118	304	118
3	304	118	304	118
4	359	138	359	138
1-1975	359	138	359	138
2	359	138	359	138
3	359	138	359	138
4	359	138	359	138
1-1976	359	138	359	138
2	359	138	359	138
3	359	138	359	138
4	359	138	359	138
1-1977	359	138	359	138
2	359	138	359	138
3	359	138	359	138
4	359	138	359	138
1-1978	359	138	359	138
2	359	138	359	138
3	359	138	359	138
4	359	138	359	138
1-1979	359	138	359	138
2	359	138	359	138
3	359	138	359	138
4	359	138	359	138
1-1980	359	138	359	138
2	359	138	359	138
3	359	138	359	138
4	359	138	359	138
1-1981	359	138	359	138
2	359	138	359	138
3	359	138	359	138
4	359	138	359	138
1-1982	359	138	359	138
2	253	99	253	99
3	253	99	252	99
4	253	99	252	99
1-1983	253	99	252	99
2	253	99	252	99
3	253	99	252	99
4	253	99	252	99
1-1984	239	94	239	94
2	239	94	239	94

241-SY-108 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)
3	228	90	228	90
4	228	90	228	90
1-1985	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1986	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1987	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1988	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1989	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1990	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1991	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1992	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1993	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1994	228	90	228	90
2	228	90	228	90
3	228	90	228	90
4	228	90	228	90
1-1995	228	90	228	90
2	228	90	228	90
3	228	90	228	90

241-SY-109 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3					
4					
1-1951					
2					
3					
4					
1-1952					
2					
3					
4					
1-1953	448	170			
2	448	170			
3	44	23			
4	44	23			
1-1954	281	110			
2	408	156			
3	34	20			
4	477	181			
1-1955	551	208			
2	237	94			
3	34	20			
4	34	20			
1-1956	34	20			
2	722	270			
3	722	270	36	21	
4	722	270	66	31	
1-1957	722	270	66	31	
2	66	31	66	31	
3	48	25	46	24	
4	48	25	46	24	
1-1958	48	25	46	24	
2	46	24	46	24	
3	46	24	46	24	
4	46	24	46	24	
1-1959	47	25	46	24	
2	47	25	46	24	
3	47	25	46	24	
4	47	25	46	24	
1-1960	47	25	46	24	
2	47	25	46	24	
3	47	25	46	24	
4	47	25	46	24	
1-1961					
2	48	25	46	24	

241-BY-109 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	51	26	46	24	
1-1962					
2	623	234	46	24	
3					
4	623	234	46	24	
1-1963					
2	623	234	76	35	
3					
4	634	238	76	35	
1-1964					
2	629	236	76	35	
3					
4	623	234	76	35	
1-1965					
2	642	241	57	28	
3	642	241	57	28	
4	642	241	57	28	
1-1966	642	241	57	28	
2	642	241	57	28	
3	139	58	57	28	
4	486	184	57	28	
1-1967	642	241	57	28	
2	742	277	57	28	
3	742	277	57	28	
4	742	277	57	28	
1-1968	743	278	57	28	
2	269	105	57	28	
3	556	210	37	21	
4	596	224	54	27	
1-1969	558	210	72	34	
2	596	224	87	39	
3	655	246	79	36	
4	593	223	114	49	
1-1970	607	228	190	77	
2	574	216	120	51	
3	579	218	128	54	
4	598	225	142	59	
1-1971	589	222	150	62	
2	608	229	128	54	
3	618	232	128	54	
4	598	225	153	63	
1-1972	623	234	153	63	
2	600	226	222	88	
3	620	233	260	102	
4	612	230	334	129	

241-BY-109 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	613	230	381	148	
2	602	226	398	152	
3	603	227	398	152	
4	587	221	411	157	
1-1974	594	223	411	157	
2	581	219	433	165	
3	602	226	433	165	
4	557	210	425	162	
1-1975	571	215	425	162	
2	541	204	425	162	
3	565	213	425	162	
4	598	225	425	162	
1-1976	576	217	425	162	
2	585	220	425	162	
3	593	223	425	162	
4	596	224	425	162	
1-1977	459	174	425	162	
2	442	168	433	165	
3	444	169	433	165	
4	447	170	433	165	
1-1978	458	174	433	165	
2	455	173	433	165	
3	458	174	433	165	
4	461	175	433	165	
1-1979	466	177	433	165	
2	466	177	433	165	
3	466	177	433	165	
4	466	177	433	165	
1-1980	466	177	433	165	
2	466	177	433	165	
3	466	177	433	165	
4	466	177	433	165	
1-1981	466	177	433	165	
2	466	177	433	165	
3	466	177	433	165	
4	466	177	433	165	
1-1982	466	177	433	165	
2	466	177	433	165	
3	466	177	433	165	
4	466	177	433	165	
1-1983	466	177	433	165	
2	466	177	433	165	
3	466	177	433	165	
4	466	177	433	165	
1-1984	474	180	441	168	
2	474	180	441	168	

241-BY-109 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	474	180	441	168	
4	474	180	441	168	
1-1985	474	180	441	168	
2	474	180	441	168	
3	474	180	441	168	
4	474	180	441	168	
1-1986	474	180	441	168	175
2	474	180	441	168	176
3	474	180	441	168	176
4	474	180	441	168	177
1-1987	474	180	441	168	177
2	474	180	441	168	177
3	474	180	441	168	176
4	474	180	441	168	176
1-1988	474	180	441	168	177
2	474	180	441	168	177
3	474	180	441	168	177
4	474	180	441	168	177
1-1989	474	180	441	168	176
2	474	180	441	168	176
3	474	180	441	168	177
4	474	180	441	168	177
1-1990	474	180	441	168	177
2	474	180	441	168	
3	474	180	441	168	178
4	474	180	441	168	178
1-1991	474	180	441	168	179
2	458	174	441	168	180
3	423	161	423	161	153
4	423	161	423	161	145
1-1992	423	161	423	161	135
2	423	161	423	161	
3	423	161	423	161	133
4	423	161	423	161	136
1-1993	423	161	423	161	135
2	423	161	423	161	136
3	423	161	423	161	135
4	423	161	423	161	137
1-1994	423	161	423	161	137
2	423	161	423	161	131
3	423	161	423	161	127
4	423	161	423	161	126
1-1995	423	161	423	161	122
2	423	161	423	161	120
3	423	161	423	161	118

241-BY-110 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1980					
2					
3					
4					
1-1981					
2					
3					
4					
1-1982	638	239			
2	653	245			
3	722	270			
4	732	274			
1-1983	732	274			
2	731	273			
3	731	273			
4	731	273			
1-1984	731	273			
2	731	273			
3	37	21			
4	261	102	51	26	
1-1985	729	273	121	51	
2	640	240	85	38	
3	238	94			
4	722	270	148	61	
1-1986	724	271	150	62	
2	724	271			
3	722	270	211	84	
4	229	91	229	91	
1-1987	442	168	210	84	
2	697	261	205	82	
3	224	89	211	84	
4	304	118	210	84	
1-1988	607	228	210	84	
2	604	227	210	84	
3	611	230	210	84	
4	717	268	210	84	
1-1989	717	268	210	84	
2	716	268	210	84	
3	716	268	210	84	
4	739	276	210	84	
1-1990	739	276	210	84	
2	739	276	210	84	
3	739	276	210	84	
4	739	276	210	84	
1-1991					
2	708	265	210	84	

241-BY-110 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	708	265	210	84	
1-1962					
2	708	265	210	84	
3					
4	708	265	210	84	
1-1963					
2	706	264	246	97	
3					
4	706	264	246	97	
1-1964					
2	706	264	246	97	
3					
4	706	264	246	97	
1-1965					
2	703	263	230	91	
3	706	264	230	91	
4	713	267	230	91	
1-1966	706	264	230	91	
2	706	264	230	91	
3	700	262	230	91	
4	700	262	230	91	
1-1967	706	264	230	91	
2	697	261	230	91	
3	693	259	230	91	
4	693	259	230	91	
1-1968	706	264	230	91	
2	706	264	230	91	
3	706	264	230	91	
4	706	264	230	91	
1-1969	701	262	230	91	
2	642	241	189	76	
3	692	259	123	52	
4	703	263	123	52	
1-1970	627	235	201	81	
2	519	196	190	77	
3	664	249	211	84	
4	697	261	277	108	
1-1971	675	253	277	108	
2	690	258	277	108	
3	708	265	277	108	
4	645	242	277	108	
1-1972	628	236	277	108	
2	714	267	277	108	
3	667	250	277	108	
4	644	242	277	108	

241-BY-110 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	672	252	277	108	
2	653	245	277	108	
3	706	264	277	108	
4	673	252	277	108	
1-1974	670	251	277	108	
2	690	258	277	108	
3	688	258	277	108	
4	689	258	296	115	
1-1975	684	256	296	115	
2	645	242	296	115	
3	667	250	296	115	
4	673	252	296	115	
1-1976	684	256	296	115	
2	684	256	296	115	
3	678	254	296	115	
4	678	254	296	115	
1-1977	609	229	376	144	
2	532	201	376	144	
3	549	207	469	178	
4	560	211	469	178	
1-1978	571	215	469	178	
2	579	218	469	178	
3	582	219	469	178	
4	585	220	469	178	
1-1979	585	220	469	178	
2	552	208	469	178	
3	530	200	469	178	
4	530	200	469	178	
1-1980	508	192	505	191	
2	508	192	505	191	
3	508	192	505	191	
4	508	192	505	191	
1-1981	508	192	505	191	
2	508	192	505	191	
3	508	192	505	191	
4	508	192	505	191	
1-1982	508	192	505	191	
2	508	192	505	191	
3	508	192	505	191	
4	508	192	505	191	
1-1983	508	192	505	191	
2	507	192	505	191	
3	420	160	420	160	
4	420	160	420	160	
1-1984	404	154	404	154	
2	404	154	404	154	

241-BY-110 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	400	153	400	153	
4	400	153	400	153	
1-1985	398	152	398	152	
2	398	152	398	152	
3	398	152	398	152	
4	398	152	398	152	
1-1986	398	152	398	152	
2	398	152	398	152	
3	398	152	398	152	68
4	398	152	398	152	72
1-1987	398	152	398	152	71
2	398	152	398	152	72
3	398	152	398	152	72
4	398	152	398	152	73
1-1988	398	152	398	152	74
2	398	152	398	152	73
3	398	152	398	152	73
4	398	152	398	152	74
1-1989	398	152	398	152	74
2	398	152	398	152	74
3	398	152	398	152	74
4	398	152	398	152	74
1-1990	398	152	398	152	74
2	398	152	398	152	
3	398	152	398	152	74
4	398	152	398	152	76
1-1991	398	152	398	152	76
2	398	152	398	152	75
3	398	152	398	152	74
4	398	152	398	152	74
1-1992	398	152	398	152	74
2	398	152	398	152	
3	398	152	398	152	
4	398	152	398	152	74
1-1993	398	152	398	152	74
2	398	152	398	152	75
3	398	152	398	152	75
4	398	152	398	152	75
1-1994	398	152	398	152	74
2	398	152	398	152	76
3	398	152	398	152	75
4	398	152	398	152	76
1-1995	398	152	398	152	75
2	398	152	398	152	75
3	398	152	398	152	75

241-BY-111 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3					
4					
1-1951					
2					
3					
4					
1-1952	758	283			
2	758	283			
3	758	283			
4	758	283			
1-1953	759	283			
2	758	283			
3	758	283			
4	758	283			
1-1954	758	283			
2	758	283			
3	758	283			
4	24	16			
1-1955	11	11			
2					
3					
4					
1-1956					
2	526	199			
3	26	17			
4	26	17			
1-1957	35	20	26	17	
2	706	264	26	17	
3	706	264	26	17	
4	706	264	26	17	
1-1958	706	264	26	17	
2	706	264	26	17	
3	706	264	26	17	
4	706	264	26	17	
1-1959	711	266	26	17	
2	711	266	26	17	
3	711	266	26	17	
4	711	266	26	17	
1-1960	711	266	26	17	
2	711	266	26	17	
3	711	266	26	17	
4	711	266	26	17	
1-1961					
2	711	266	26	17	

241-BY-111 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	614	231	26	17	
1-1962					
2	714	267	26	17	
3					
4	714	267	26	17	
1-1963					
2	717	268	24	16	
3					
4	717	268	24	16	
1-1964					
2	717	268	24	16	
3					
4	717	268	24	16	
1-1965					
2	739	276	26	17	
3	367	141	26	17	
4	343	132	26	17	
1-1966	29	18	26	17	
2	585	220	26	17	
3	741	277	26	17	
4	741	277	26	17	
1-1967	739	276	26	17	
2	739	276	26	17	
3	739	276	26	17	
4	752	281	26	17	
1-1968	36	21	26	17	
2	629	236	26	17	
3	576	217	145	60	
4	640	240	145	60	
1-1969	541	204	48	25	
2	800	226	52	26	
3	570	215	101	44	
4	642	241	142	59	
1-1970	618	232	266	104	
2	668	250	290	113	
3	666	250	323	125	
4	695	260	673	252	
1-1971	685	257	673	252	
2	693	259	686	257	
3	697	261	686	257	
4	692	259	686	257	
1-1972	688	258	194	78	
2	686	257	112	48	
3	653	245	142	59	
4	662	248	142	59	

241-BY-111 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	650	244	142	59	
2	649	243	142	59	
3	624	234	142	59	
4	677	254	142	59	
1-1974	677	254	142	59	
2	711	266	142	59	
3	673	252	142	59	
4	673	252	299	116	
1-1975	673	252	299	116	
2	673	252	299	116	
3	673	252	299	116	
4	670	251	299	116	
1-1976	670	251	299	116	
2	670	251	299	116	
3	670	251	299	116	
4	670	251	299	116	
1-1977	670	251	299	116	
2	615	231	299	116	
3	510	193	510	193	
4	615	231	615	231	
1-1978	615	231	615	231	
2	615	231	615	231	
3	615	231	615	231	
4	615	231	615	231	
1-1979	615	231	615	231	
2	615	231	615	231	
3	615	231	615	231	
4	615	231	615	231	
1-1980	615	231	615	231	
2	615	231	615	231	
3	615	231	615	231	
4	622	234	622	234	
1-1981	622	234	622	234	
2	622	234	622	234	
3	622	234	622	234	
4	622	234	622	234	
1-1982	622	234	622	234	
2	649	243	648	243	
3	649	243	648	243	
4	649	243	648	243	
1-1983	649	243	648	243	
2	649	243	648	243	
3	648	243	648	243	
4	648	243	648	243	
1-1984	466	177	466	177	
2	466	177	466	177	

241-BY-111 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	461	175	461	175	
4	462	175	461	175	
1-1985	459	174	459	174	
2	459	174	459	174	
3	459	174	459	174	
4	459	174	459	174	
1-1986	459	174	459	174	87
2	459	174	459	174	87
3	459	174	459	174	86
4	459	174	459	174	88
1-1987	459	174	459	174	86
2	459	174	459	174	87
3	459	174	459	174	87
4	459	174	459	174	86
1-1988	459	174	459	174	86
2	459	174	459	174	86
3	459	174	459	174	87
4	459	174	459	174	87
1-1989	459	174	459	174	88
2	459	174	459	174	86
3	459	174	459	174	87
4	459	174	459	174	86
1-1990	459	174	459	174	85
2	459	174	459	174	
3	459	174	459	174	85
4	459	174	459	174	85
1-1991	459	174	459	174	84
2	459	174	459	174	84
3	459	174	459	174	85
4	459	174	459	174	85
1-1992	459	174	459	174	85
2	459	174	459	174	
3	459	174	459	174	
4	459	174	459	174	84
1-1993	459	174	459	174	84
2	459	174	459	174	84
3	459	174	459	174	84
4	459	174	459	174	85
1-1994	459	174	459	174	84
2	459	174	459	174	83
3	459	174	459	174	85
4	459	174	459	174	85
1-1995	459	174	459	174	85
2	459	174	459	174	84
3	459	174	459	174	84

241-BY-112 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1950					
2					
3					
4					
1-1951					
2					
3					
4					
1-1952	252	99			
2	271	106			
3	294	114			
4	362	139			
1-1953	389	149			
2	400	153			
3	394	151			
4	394	151			
1-1954	394	151			
2	394	151			
3	394	151			
4	1	8			
1-1955	1	8			
2	5	9			
3					
4					
1-1956					
2	477	181			
3	697	261			
4	697	261			
1-1957	695	260			
2	183	74			
3	631	237			
4	755	282			
1-1958	755	282			
2	755	282			
3	755	282			
4	755	282			
1-1959	755	282			
2	755	282			
3	755	282			
4	755	282			
1-1960	755	282			
2	741	277			
3	741	277			
4	741	277			
1-1961					
2	741	277			

241-BY-112 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3					
4	741	277			
1-1962					
2	741	277			
3					
4	741	277			
1-1963					
2	744	278	29	18	
3					
4	744	278	29	18	
1-1964					
2	755	282	29	18	
3					
4	755	282	29	18	
1-1965					
2	279	109	24	16	
3	48	25	24	16	
4	312	121	24	16	
1-1966	730	273	24	16	
2	730	273	24	16	
3	744	278	24	16	
4	744	278	24	16	
1-1967	750	280	24	16	
2	751	281	24	16	
3	751	281	24	16	
4	756	282	24	16	
1-1968	547	206	24	16	
2	605	227	17	14	
3	612	230	2	8	
4	574	216	2	8	
1-1969	722	270	43	23	
2	725	271	59	29	
3	703	263	79	36	
4	689	258	79	36	
1-1970	708	265	85	38	
2	706	264	94	42	
3	712	266	145	60	
4	704	263	164	67	
1-1971	700	262	255	100	
2	699	262	59	29	
3	716	268	166	68	
4	722	270	194	78	
1-1972	664	249	296	115	
2	672	252	334	129	
3	670	251	334	129	
4	663	249	315	122	

241-SY-112 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
1-1973	689	258	288	112	
2	679	254	288	112	
3	688	268	311	121	
4	703	263	331	128	
1-1974	681	255	331	128	
2	702	263	331	128	
3	703	263	331	128	
4	711	266	310	120	
1-1975	706	264	310	120	
2	706	264	310	120	
3	706	264	310	120	
4	673	252	310	120	
1-1976	340	131	310	120	
2	310	120	310	120	
3	310	120	310	120	
4	310	120	310	120	
1-1977	310	120	310	120	
2	310	120	310	120	
3	310	120	310	120	
4	310	120	310	120	
1-1978	310	120	310	120	
2	310	120	310	120	
3	310	120	310	120	
4	310	120	310	120	
1-1979	310	120	310	120	
2	310	120	310	120	
3	310	120	310	120	
4	310	120	310	120	
1-1980	310	120	310	120	
2	310	120	310	120	
3	310	120	310	120	
4	310	120	310	120	
1-1981	310	120	310	120	
2	310	120	310	120	
3	310	120	310	120	
4	310	120	310	120	
1-1982	310	120	310	120	
2	304	118	301	117	
3	304	118	301	117	
4	304	118	301	117	
1-1983	304	118	301	117	
2	304	118	301	117	
3	301	117	301	117	
4	301	117	301	117	
1-1984	291	113	291	113	
2	291	113	291	113	

241-BY-112 LEVEL HISTORY

Year	Total (K gal)	Total (in)	Solids (K gal)	Solids (in)	ILL (in)
3	291	113	291	113	
4	291	113	291	113	
1-1985	291	113	291	113	
2	291	113	291	113	
3	291	113	291	113	
4	291	113	291	113	
1-1986	291	113	291	113	
2	291	113	291	113	
3	291	113	291	113	38
4	291	113	291	113	39
1-1987	291	113	291	113	
2	291	113	291	113	
3	291	113	291	113	
4	291	113	291	113	40
1-1988	291	113	291	113	40
2	291	113	291	113	40
3	291	113	291	113	41
4	291	113	291	113	41
1-1989	291	113	291	113	42
2	291	113	291	113	42
3	291	113	291	113	42
4	291	113	291	113	42
1-1990	291	113	291	113	42
2	291	113	291	113	
3	291	113	291	113	43
4	291	113	291	113	43
1-1991	291	113	291	113	43
2	291	113	291	113	
3	291	113	291	113	43
4	291	113	291	113	43
1-1992	291	113	291	113	43
2	291	113	291	113	
3	291	113	291	113	
4	291	113	291	113	43
1-1993	291	113	291	113	
2	291	113	291	113	
3	291	113	291	113	
4	291	113	291	113	
1-1994	291	113	291	113	
2	291	113	291	113	44
3	291	113	291	113	44
4	291	113	291	113	43
1-1995	291	113	291	113	44
2	291	113	291	113	45
3	291	113	291	113	44

241-BY-101
Thermocouple 1, Riser 1
 Elevation .5 ft.

241-BY-101
Thermocouple 2, Riser 1
 Elevation 2.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-101
Thermocouple 3, Riser 1
 Elevation 4.5 ft.

241-BY-101
Thermocouple 4, Riser 1
 Elevation 6.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-101
Thermocouple 5, Riser 1
 Elevation 8.5 ft.

241-BY-101
Thermocouple 6, Riser 1
 Elevation 10.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-101
Thermocouple 7, Riser 1
 Elevation 12.5 ft.

241-BY-101
Thermocouple 8, Riser 1
 Elevation 14.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-101
Thermocouple 9, Riser 1
 Elevation 16.5 ft.

241-BY-101
Thermocouple 10, Riser 1
 Elevation 18.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-101
Thermocouple 11, Riser 1
 Elevation 20.5 ft.

241-BY-101
Thermocouple 12, Riser 1
 Elevation 22.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-101
Thermocouple 13, Riser 1
 Elevation 26.5 ft.

241-BY-101
Thermocouple 14, Riser 1
 Elevation 30.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-103
Thermocouple 1
 Elevation .3 ft.

241-BY-103
Thermocouple 2
 Elevation 2.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-103
Thermocouple 3
 Elevation 4.3 ft.

241-BY-103
Thermocouple 4
 Elevation 6.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-103
Thermocouple 5
 Elevation 8.3 ft.

241-BY-103
Thermocouple 6
 Elevation 10.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-103
Thermocouple 7
 Elevation 12.3 ft.

241-BY-103
Thermocouple 8
 Elevation 14.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-103
Thermocouple 9
 Elevation 16.3 ft.

241-BY-103
Thermocouple 10
 Elevation 18.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-103
Thermocouple 11
 Elevation 20.3 ft.

241-BY-103
Thermocouple 12
 Elevation 22.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-103
Thermocouple 13
 Elevation 28.3 ft.

241-BY-103
Thermocouple 14
 Elevation 30.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-104
Thermocouple 1, Riser 1
 Elevation .4 ft.

241-BY-104
Thermocouple 2, Riser 1
 Elevation 2.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-104
Thermocouple 1, Riser 10B
 Elevation 1.3 ft.

241-BY-104
Thermocouple 2, Riser 10B
 Elevation 3.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-105
Thermocouple 5, Riser 1
 Elevation 8.3 ft.

241-BY-105
Thermocouple 6, Riser 1
 Elevation 10.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-105
Thermocouple 9, Riser 1
 Elevation 16.3 ft.

241-BY-105
Thermocouple 12, Riser 1
 Elevation 22.3 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-105
Thermocouple 3, Riser 10C
 Elevation 4.7 ft.

241-BY-105
Thermocouple 4, Riser 10C
 Elevation 6.7 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-106
Thermocouple 1
 Elevation .7 ft.

241-BY-106
Thermocouple 2
 Elevation 2.7 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-106
Thermocouple 5
 Elevation 8.7 ft.

241-BY-106
Thermocouple 6
 Elevation 24.7 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-107
Thermocouple 1
Elevation .5 ft.

241-BY-107
Thermocouple 2
Elevation 2.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-107
Thermocouple 5
Elevation 8.5 ft.

241-BY-107
Thermocouple 6
Elevation 10.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-107
Thermocouple 9
 Elevation 16.5 ft.

241-BY-107
Thermocouple 10
 Elevation 18.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-107
Thermocouple 11
 Elevation 20.5 ft.

241-BY-107
Thermocouple 12
 Elevation 22.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-107
Thermocouple 13
 Elevation 26.5 ft.

241-BY-107
Thermocouple 14
 Elevation 30.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-108
Thermocouple 1
 Elevation .5 ft.

241-BY-108
Thermocouple 2
 Elevation 2.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-108
Thermocouple 9
 Elevation 16.5 ft.

241-BY-108
Thermocouple 10
 Elevation 18.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-110
Thermocouple 1, Riser 10A
 Elevation 1.1 ft.

241-BY-110
Thermocouple 2, Riser 10A
 Elevation 3.1 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-110
Thermocouple 3, Riser 10A
 Elevation 5.1 ft.

241-BY-110
Thermocouple 4, Riser 10A
 Elevation 8.1 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-110
Thermocouple 5, Riser 10A
 Elevation 11.1 ft.

241-BY-110
Thermocouple 6, Riser 10A
 Elevation 25.1 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-111**Thermocouple 1**

Approximate Elevation .2 ft.

241-BY-111**Thermocouple 2**

Approximate Elevation 2.2 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-111

Thermocouple 3

Approximate Elevation 5.2 ft.

241-BY-111

Thermocouple 4

Approximate Elevation 9.2 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-111**Thermocouple 5**

Approximate Elevation 13.2 ft.

241-BY-111**Thermocouple 6**

Approximate Elevation 24.2 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-112

Thermocouple 1

Approximate Elevation .2 ft.

241-BY-112

Thermocouple 2

Approximate Elevation 1.2 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-112

Thermocouple 3

Approximate Elevation 3.2 ft.

241-BY-112

Thermocouple 4

Approximate Elevation 5.5 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

241-BY-112

Thermocouple 5

Approximate Elevation 8.5 ft.

241-BY-112

Thermocouple 6

Approximate Elevation 24.2 ft.

Data obtained from WHC Surveillance Analysis Computer System (SACS), Jan 8, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

E-3

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Date obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

B-7

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

E-11

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Data obtained from WHC Surveillance Analysis Computer System (SACS), February 20, 1996.

Intentionally left blank.

241-BY-101

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

NOT TO SCALE
F-2

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-101			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		TEMPERATURE PROBE
2	4"		COVERED W/CONCRETE, BG
3	4"		PIT DRAIN, WC [PLUGGED ECN-132358 11/28/90]
4	4"	X	BREATHER FILTER, G-1 HOUSING
5	12"		LIQUID LEVEL REEL, WC [BM CEO-38521 12/11/86] [REMOVE LIQUID LEVEL REEL & ADD THERMOCOUPLE TREE ECN-604380 11/09/93 & ECN-700727 11/10/93]
6	12"		COVERED W/CONCRETE
7	12"		SALTWELL SCREEN & PUMP, WC
8	12"		COVERED W/CONCRETE, WC
9	42"		ADAPTER PLATE, WC
9A	4"		B-436 LOW
9B	18"		OBSV PORT [NOT USABLE, 45° SWEEP CEO-39570 07/15/87]
10	42"		COVER PLATE, WC [REMOVED FROM SCHEDULE ECN-604380 11/09/93]
10A**	12***		[OBSV PORT CEO-39570 07/15/87 & ECN-604380 11/09/93]
10B***	4****		[FLANGED ECN-604380 11/09/93]
10C***	4****		[LEVEL REEL ECN-604380 11/09/93]
10D***	4****		[FLANGED ECN-604380 11/09/93]
11	42"		ADAPTER PLATE, WC
11A	12"		PUMP
11B	N/A		TANK FILL
12	42"		ADAPTER PLATE, WC
12A	12"		DIP LEG
13	42"		COVER
N1	3"		C1 & C2 SPARE INLET
N2	3"		C1 & C2 SPARE INLET
N3	3"		C3 & C4 SPARE INLET
N4	3"		C3 & C4 SPARE INLET
N5	3"		"B" NOZZLE INLET
N6	3"		"A" NOZZLE OUTLET, PLUGGED

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73251, Rev. 3
 H-2-37101, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

- * Denotes risers tentatively available for sampling (Lipnicki 1995)
- ** Created by CEO-39570.
- *** Created by ECN-604380.
- **** H-2-37101 Rev. 0 and the figure in H-2-73251 Rev. 3 indicate the diameter is 12 inches; the table in H-2-73251 rev. 3 indicates the diameter is 4 inches.

241-BY-102

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 198.0m [649.6ft]
(WHC-SD-WM-TI-665, Rev. 0A)

NOT TO SCALE
F4

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-102			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		B-436 LOW
2	4"		COVERED W/CONCRETE, BG
3	4"		PIT DRAIN
4	4"	X	SMP
5	12"		LIQUID LEVEL REEL (BM CEO-36522 12/11/86)
6	12"		COVERED W/CONCRETE
7	12"		SALTWELL SCREEN AND PUMP
8	12"		COVERED W/CONCRETE
9	42"		SLURRY PUMP, WC
10	42"		CONDENSATE DRAIN, WC
10A	12"	X	OBSV PORT/B-222 [VAPOR PROBE INSTALLED/WILL BE REMOVED WITHIN 90 DAYS ECN-626462L 11/02/95]
11	42"		WC
12	42"		INSTRUMENTATION PIT, WC
12A	2"		WC
13	42"		AIR CIRCULATOR, BLANKED W/ 18"
14	4"	X	BREATHER FILTER
N1	3"		CASCADE INLET, PLUGGED
N2	3"		SPARE, PLUGGED
N3	3"		SPARE, PLUGGED
N4	3"		SPARE, PLUGGED
N5	3"		SPARE, PLUGGED
N6	3"		CASCADE OUTLET, PLUGGED

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73244, Rev. 5
 H-2-73245, Rev. 2

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

Lipnicki 1995 has a riser 9B available for sampling. Alsted 1993 lists riser 9B in the table but does not show a location in the figure. The drawings referenced and the ECNs written against those drawings do not list, mention, or show riser 9B.

- Denotes risers tentatively available for sampling (Lipnicki 1995)

241-BY-103

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

NOT TO SCALE
F-6

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-103			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		TEMPERATURE PROBE
2	4"		COVERED W/CONCRETE, BG
3	4"		PIT DRAIN
4	4"	X	SMP
5	12"		LIQUID LEVEL REEL [REMOVE LIQUID LEVEL REEL INSTALL TEMPERATURE/VAPOR PROBE ECN-623910 07/14/95]
6	12"		COVERED W/CONCRETE
7	12"		SALTWELL SCREEN AND PUMP
8	12"		SPARE
9A	4"	X	OBSV PORT, WC
9B	14"	X	WC
10	42"		COVER PLATE [BM CEO-36523 12/11/86]
10A	4"		B-436 LOW
10B	18"	X	BLANKED W/0.25" PLATE, 4" BLIND FLANGE [(DIA. CHANGED TO 12") OBSV PORT ECN-614461 10/10/94]
10C	14"		AIRLIFT CIRCULATOR IN TANK, 4" RISER W/BLIND FLANGE
10D**	4***		[BLIND FLANGE CEO-43872 11/06/87] [HEATED VAPOR ASSEMBLY ECN-614461 10/10/94]
11	42"		ADAPTER PLATE, WC
11A	12"		OBSV PORT
11B	2.5"		SUPERNATANT PUMP
12	42"		RISER PIT, BG
12A	4"	X	BREATHER FILTER [LIQUID LEVEL REEL/AIR FILTER ECN-623910 07/14/95 & ECN-623978 08/24/95]
12B	14"		AIR LIFT CIRCULATOR, BG
12C	18"		BLANKED W/ 18" DIA. PLATE, BG
13	42"		PUMP PIT, ADAPTER RING
13A	4"		BLIND FLANGE
13B	14"		AIRLIFT CIRCULATOR, BLIND FLANGE
WP***	2"		4 WELL POINTS W/ SCREENS
N1	3"		SPARE NOZZLE, PLUGGED
N2	3"		SPARE NOZZLE, PLUGGED
N3	3"		SPARE INLET, PLUGGED
N4	3"		SPARE NOZZLE, PLUGGED
N5	3"		SPARE NOZZLE, PLUGGED

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73246, Rev. 5
 H-2-37103, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

- Denotes risers tentatively available for sampling (Lipnicki 1995)
- ** Created by CEO-43872.
- *** Created by ECN-101632.

241-BY-104

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 198.2m [650.4ft]
(WHC-SD-WM-TI-665, Rev. 0A)

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

NOT TO SCALE
F-8

241-BY-104			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		TEMPERATURE PROBE, B-221
2	4"		COVERED W/CONCRETE, BG
3	4"		SPARE [PLUGGED ECN-132359 12/03/90]
4	4"	X	BREATHER FILTER, G-1 HOUSING
5	12"		LIQUID LEVEL REEL (LIQUID LEVEL REEL ON 4" SPOOL CEO-39571 07/15/87) [4" DIA. ECN-626680 10/23/95]
6	12"		COVERED W/CONCRETE
7	12"		SALTWELL SCREEN & PUMP
8	12"		COVERED W/CONCRETE
9	42"		COVER PLATE, WC
10	42"		ADAPTER PLATE [BM CEO-36921 12/11/86]
10A	18"		VENT INTAKE [VAPOR ASSEMBLY ON 18" TO 4" ADAPTOR & SPLIT SPOOL ECN-166521L 05/25/94 & ECN-189223L 03/10/94]
10B	4"		FLANGE [TEMPERATURE PROBE ECN-176624 06/01/93]
10C	4"		B-436 LOW
11	42"		COVER PLATE, WC
12	42"		LEAD SHEILDING
12A	18"		CAPPED
12B	4"		SPARE
13	42"		COVER PLATE
13A**	12***		[OBSV PORT CEO-39571 07/15/87]
N1	3"		SPARE, CAPPED
N2	3"		SPARE
N3	3"		SPARE
N4	3"		SPARE, CAPPED
N5	3"		INLET
N6	3"		OUTLET

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73252, Rev. 2
 H-2-37104, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

- * Denotes risers tentatively available for sampling (Lipnicki 1995)
- ** Created by CEO-39571. CEO-39571 explained the diameter and what the riser is used for; however, there was no figure or explanation as to the location.

241-BY-105

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 197.9m [649.4ft]
(WHC-SD-WM-TI-665, Rev. 0A)

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-105

NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		TEMPERATURE PROBE, B-221
2	4"		COVERED W/CONCRETE, BG
3	4"		DRAIN
4	4"		BLIND FLANGE [BREATHER FILTER (DOG LEG RISER) ECN-617142 11/14/93]
5	12"	X	OBSV PORT/B-221 [LIQUID LEVEL REEL ON 4" SPOOL CEO-39569 07/15/87]
6	12"		COVERED W/CONCRETE
7	12"		SALTWELL PUMP [OBSV PORT CEO-39569 07/15/87]
8	12"		COVERED W/CONCRETE
9	42"		SLUICE PIT
10	42"		COVER PLATE
10A	4"		B-436 LOW
10B	18"		AIR DUCT
10C	14"		AIR CIRCULATOR IN TANK/4" SMP
11	42"		SLUICE PIT, WC
12	42"		COVER PLATE
12A	4"	X	BREATHER FILTER [VAPOR ASSEMBLY/BREATHER OFFSET ECN-189223L 03/10/94] [SPARE ECN-617142 11/14/93]
12B	18"		AIR DUCT
12C	14"		AIR LIFT CIRCULATOR, BG
13	42"		COVER PLATE
13A	4"		OBSV PORT (NOT USED CEO-39569 07/15/87)
13B	14"		AIR CIRCULATOR [(DIA CHANGED TO 12") SALTWELL RISER CEO-39569 07/15/87]
N1	3"		SPARE INLET, CAPPED
N2	3"		SPARE INLET, CAPPED
N3	3"		SPARE INLET, CAPPED
N4	3"		SPARE INLET, CAPPED
N5	3"		OVERFLOW
N6	3"		OVERFLOW

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73247, Rev. 5
 H-2-37105, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

* Denotes risers tentatively available for sampling (Lipnicki 1995)

241-BY-106

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 197.6m [648.3ft]
(WHC-SD-WM-TI-665, Rev. 0A)

NOT TO SCALE
F-12

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-106			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		TEMPERATURE PROBE, B-221
2	4"		COVERED W/CONCRETE, BG
3	4"		PIT DRAIN
4	4"		SMP [BREATHER FILTER W/Y OFFSET ADAPTER ECN-189271L 09/06/94]
5	12"	X	OBSV PORT/B-221 [LIQUID LEVEL REEL ON 4" SPOOL CEO-39572 07/15/87 & ECN-626674 12/21/95]
6	4"		COVERED W/CONCRETE
7	12"		FLANGE [OBSV PORT CEO-39572 07/15/87]
8	12"		COVERED W/CONCRETE
9	42"		MINI COOLER
10	42"		COVER PLATE [BM CEO-36919 12/11/86]
10A	18"		VENT DUCT [BREATHER FILTER CEO-39572 07/15/87]
10B	4"	X	B-436 LOW [VAPOR ASSEMBLY/BREATHER FILTER OFFSET ADAPTER ECN-189223L 03/10/94] [SPARE ECN-189271L 09/06/94]
10C	14"		AIR CIRCULATOR
11	42"		SLUICE PIT, WC
12	42"		COVER PLATE [BM CEO-36919 12/11/86]
12A	18"		WELDED PLATE, BG
12B	4"		LIQUID LEVEL REEL [BLIND FLANGE ECN-189269 09/07/94]
12C	14"		AIRLIFT CIRCULATOR, BG
13	42"		SPARE
N1	3"		SPARE INLET, CAPPED
N2	3"		SPARE INLET, CAPPED
N3	3"		SPARE INLET, CAPPED
N4	3"		SPARE INLET, CAPPED
N5	3"		OVERFLOW

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73248, Rev.5
 H-2-37106, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

• Denotes risers tentatively available for sampling (Lipnicki 1995)

241-BY-107

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 198.0m [649.7ft]
(WHC-SD-WM-TI-665, Rev. 0A)

NOT TO SCALE
F-14

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-107			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		TEMPERATURE PROBE
2	4"	X	DRAIN, WC
3	4"	X	BREATHER FILTER
4	4"		LIQUID LEVEL REEL
5	12"		BLIND FLANGE [TEMPERATURE VAPOR PROBE ECN-198934 02/17/94]
6	12"		PUMP, WC
7	12"		B-436 LOW
8	12"	X	B-222 OBSV PORT
9	42"		COVER PLATE
9A	12"		AIR CIRCULATOR, BG
9B	18"	X	BLIND FLANGE
10	42"		COVER PLATE
10A	18"		FLANGE, BG
10B	12"		BLIND FLANGE
11	42"		COVER PLATE
11A	12"		AIR CIRCULATOR, BG
11B	18"	X	BLIND FLANGE
12	42"		COVER PLATE [BM CEO-36918 12/08/86]
12A	12"		AIR CIRCULATOR
12B	18"		BLIND FLANGE, BG
13	42"		BG
14	**		**
N1	3"		SPARE INLET, CAPPED
N2	3"		SPARE INLET, CAPPED
N3	3"		SPARE INLET, CAPPED
N4	3"		SPARE INLET, CAPPED
N5	3"		OVERFLOW
N6	3"		OVERFLOW

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73249, Rev. 2
 H-2-37107, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

~ Denotes risers tentatively available for sampling (Lipnicki 1995)

** Size and exact location & elevation unknown (see H-2-73249, Rev. 2).

241-BY-108

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 197.8m [648.9ft]
(WHC-SD-WM-TI-665, Rev. 0A)

NOT TO SCALE
F-16

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-108			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"	X	FLANGE [VAPOR ASSEMBLY ECN-814461 10/10/94] [AIR FILTER ECN-623909 06/22/95]
2	4"	X	DRAIN
3	4"		BREATHER FILTER [TEMP/VAPOR PROBE ECN-623909 06/22/95]
4	4"		LIQUID LEVEL REEL [BM CEO-36917 12/11/86]
5	12"	X	FLANGE
6	12"		PUMP, WC
7	12"		SMP, BG
8	12"		TEMPERATURE PROBE
9	42"		COVER PLATE
9B	12"	X	SPARE W/SPOOL
10	42"		COVER PLATE, WELDED
10A	12"		AIR CIRCULATION
10B	18"		FLANGE
11	42"		COVER PLATE, WELDED
11A	12"		AIR CIRCULATOR, BG
11B	4"	X	FLANGE
12	42"		COVER PLATE
12A	12"	X	AIR CIRCULATOR [MULTIPOINT ADAPTER & VAPOR PROBE ECN 626622 12/11/95]
12B	12"		OBSV PORT
13	42"		SPARE, BG
14	**		**
N1	3"		SPARE INLET, CAPPED
N2	3"		SPARE INLET, CAPPED
N3	3"		SPARE INLET, CAPPED
N4	3"		SPARE INLET, CAPPED
N5	3"		OVERFLOW
N6	3"		OVERFLOW, CAPPED

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73250, Rev. 5
 H-2-37108, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

- * Denotes risers tentatively available for sampling (Lipnicki 1995)
- ** Size and exact location & elevation unknown (see H-2-73250, Rev. 5).

241-BY-109

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 197.4m [647.7ft]
(WHC-SD-WM-TI-665, Rev. 0A)

NOT TO SCALE

F-18

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-109			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		SPARE, BG
2	4"		PIT DRAIN
3	4"		SPARE, BG
4	4"		FIC [BM CEO-36916 12/11/86]
5	4"		COVERED W/CONCRETE
6	12"		SALTWELL PUMP
7	12"		COVERED W/CONCRETE
8	12"		COVERED W/CONCRETE
9	42"		ADAPTER PLATE
9A	12"	X	FLANGE
10	42"		ADAPTER PLATE
10A	12"	X	BREATHER FILTER, G1 HOUSING
10B	12"	X	OBSV PORT
11	42"		COVER PLATE
12	42"		ADAPTER PLATE
12A	4"		BLIND FLANGE
12B	12"		B-436 LOW
12C	12"	X	FLANGE
13	42"		PUMP
N1	3"		VALVE PIT DRAIN
N2	3"		SPARE, CAPPED
N3	3"		SPARE, CAPPED
N4	3"		INLET
N5	3"		INLET

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73253, Rev. 2
 H-2-37109, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

• Denotes risers tentatively available for sampling (Lipnicki 1995)

241-BY-110

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 198.1m [649.9ft]

NOT TO SCALE
F-20

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-110			
NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		TEMPERATURE PROBE, B-221
2	4"		PIT DRAIN, WC [PLUGGED ECN-132360 12/06/90]
3	4"		B-436 LOW
4	4"		LIQUID LEVEL REEL [FLANGE ECN-626661 10/31/95] [MANUAL TAPE ECN-626475 12/21/95]
5	12"	X	SPARE [(CHANGE DIA. TO 4") LIQUID LEVEL REEL ECN-626661 10/31/95] [SPARE ECN-626475 12/21/95]
6	12"		SALTWELL SCREEN AND PUMP
7	12"	X	FLANGE, BG
8	12"		TEMPERATURE PROBE
9	42"		ADAPTER PLATE
9A	12"		AIRLIFT CIRCULATOR, CUT OFF
9B	12"		FLANGE, BG
10	42"		ADAPTER PLATE
10A	12"		BREATHER FILTER, G1 HOUSING
10B	18"	X	OBSV PORT
11	42"		ADAPTER PLATE
11A	12"		AIRLIFT CIRCULATOR, CUT OFF, BG
11B	12"		FLANGE, BG
12	42"		ADAPTER PLATE [BM CEO-41135 06/03/87]
12B	12"	X	BLIND FLANGE [HEATED VAPOR PROBE ON 12" TO 4" ADAPTER ECN-614479L 10/24/94]
N1	3"		SPARE
N2	3"		SPARE
N3	3"		SPARE
N4	3"		SPARE
N5	3"		INLET
N6	3"		OUTLET

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73254, Rev. 2
 H-2-37110, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

- Denotes risers tentatively available for sampling (Lipnicki 1995)

241-BY-111

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

Approximate Grade Elevation 198.1m [649.3ft]

NOT TO SCALE
F-22

Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-111

NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"		B-436 LOW
2	4"		NOT USABLE, BG
3	4"		PT DRAIN, WC
4	4"	X	BREATHER FILTER, G1 HOUSING
5	12"	X	FLANGE
6	12"		NOT USABLE, WC
7	12"		SALTWELL PUMP AND SCREEN
8	12"		NOT USABLE, WC
9	42"		TRANSFER PUMP, WC
10	42"		ADAPTER PLATE
10B	12"	X	AIRLIFT CIRCULATOR, BLIND FLANGE [BM CEO-36924 12/11/86]
11	42"		COVER PLATE, WC
12	42"		ADAPTER PLATE
12A	12"	X	OBSV PORT [VAPOR ASSEMBLY ON A 12" TO 4" ADAPTER ECN-614494L 1103/94]
13	42"		COVER PLATE, WC
14	6"		FLANGED
15	6"		LIQUID LEVEL REEL
N1	3"		SPARE
N2	3"		SPARE
N3	3"		SPARE INLET
N4	3"		INLET
N5	3"		OUTLET
N6	3"		INLET LINE V304

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73255, Rev. 2
 H-2-37111, Rev. 0

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [ ] denote Engineering Change Notices (ECN) made against the reference drawings.

- * Denotes risers tentatively available for sampling (Lipnicki 1995)

241-BY-112

2,869,300 Liters
[758,000 Gallons]

TANK RISER LOCATION

NOT TO SCALE
F-24Ref: H-2-1312, Rev. 2
H-2-1746, Rev. 2
H-2-1313, Rev. 4

241-BY-112

NO.	DIA.	SAMPLING*	DESCRIPTION AND COMMENTS
1	4"	X	BREATHER FILTER, G1 HOUSING
2	4"		FLANGE
3	4"		PIT DRAIN, WC
4	4"		FLANGE, BG
5	4"		SPARE
6	12"		NOT USABLE, WC
7	12"		SALTWELL PUMP AND SCREEN, WC
8	12"		NOT USABLE, WC
9	42"		ADAPTER PLATE, WC
10	42"		ADAPTER PLATE
10A	12"	X**	OBSV PORT
10B	4"	X**	FLANGE
11	42"		CONDENSER, WC
12	42"		ADAPTER PLATE, WC
12A	4"		BLIND FLANGE
13	42"		ELECTRIC HEATER & AIR CIRCULATOR, WC
14	6"	X	BLIND FLANGE, WC
15	6"		B-436 LOW
16	6"		BLIND FLANGE & 24" I.D. CAISSON COVER
17	4"		SPARE
18	4"	X	SPARE (BM CEO-36923 12/11/86)
19	4"		LIQUID LEVEL REEL
20	4"	X	FLANGE
21	4"	X	SPARE
N1	3"		SPARE
N2	3"		SPARE
N3	3"		SPARE
N4	3"		SPARE
N5	3"		INLET

Ref: WHC-SD-RE-TI-053, Rev.9 *WHC-SD-WM-TI-710, Rev.2
 WHC-SD-WM-TI-553, Rev.0 H-2-73256, Rev. 2
 H-2-37112, Rev. 0 H-2-34682, Rev. 2

If there was a discrepancy between the documents and the drawings, the drawings shall take precedence.

Comments placed in [] denote Engineering Change Notices (ECN) made against the reference drawings.

- Denotes risers tentatively available for sampling (Lipnicki 1995)
- ** Riser 10A & 10B are reversed and both listed as 12" diameter risers in Lipnicki 1995 and Alstad 1993.

BY TANK FARM PHOTOS

TANK #	MONTAGE #	ORIGINAL PHOTO SET #	DATE
BY Farm Aerial Photo	N/A	93030994-97CN	N/A
241-BY-101	94011379-51CN	89-092046	9/19/89
241-BY-102	94011379-52CN	87-05373	9/11/87
241-BY-103	94011379-53CN	89-090749	9/7/89
241-BY-104	94011379-54CN	107314	4/27/83
241-BY-105	94011379-59CN	86-04191	7/1/86
241-BY-106	94011379-24CN	104475	11/4/82
241-BY-107	94011379-60CN	86-06761	10/15/86
241-BY-108	94011379-61CN	86-06762	10/15/86
241-BY-109	94011379-23CN	86-06763	10/15/86
241-BY-110	94011379-22CN	84-05108	7/26/84
241-BY-111	94011379-21CN	86-06972	10/31/86
241-BY-112	94011379-20CN	88-01299	4/14/88

BY Tank Farm

BEST AVAILABLE COPY

241-BY-101

Photo date: 9-19-89

BEST AVAILABLE COPY

241-BY-102

Photo date: 9-11-87

BEST AVAILABLE COPY

241-BY-103

Photo date: 9.7.89

BEST AVAILABLE COPY

241-BY-104

Photo date: 4-27-83

BEST AVAILABLE COPY

Photo date: 1 Nov

241-BY-106

Photo date: 11-4-82

BEST AVAILABLE COPY

241-BY-107

Photo Date: 10/18/80

BEST AVAILABLE COPY

241-BY-108

Photo Date: 10/15/80

Temperature Probe
12" Riser R 8
Manual Tags

BEST AVAILABLE COPY

241-BY-109

Photo date: 10-15-86

BEST AVAILABLE COPY

241-BY-110

Photo date: 7-26-84

BEST AVAILABLE COPY

241-BY-111

Photo date: 10-31-86

G-13

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Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3

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May 1996

Executive Summary

This estimate for the chemical and radionuclide compositions of the 177 Hanford High Level Waste storage tanks is the third major revision in a developing model called the Hanford Defined Waste (HDW) model. This model is composed of four parts:

- 1) a compilation of transaction records for all the tanks called the Waste Status and Transaction Record Summary (WSTRS);
- 2) a derivation called the Tank Layer Model (TLM) of solids histories for each tank based on primary additions of waste;
- 3) a calculation of supernatant blending and concentration with the Supernatant Mixing Model (SMM); and
- 4) a combination of process information along with some transaction information to derive compositions for about fifty Hanford Defined Wastes (HDW's), each of which has both sludge and supernatant layers.

All of this information is combined together in a spreadsheet to produce total chemical and radionuclide compositions for each tank's waste as well as a composition for its TLM and SMM blends. Furthermore, each tank's inventory is also represented by a linear combination of TLM sludges and SMM supernatants, each expressed in kgal of original waste. Thus, the genealogy of each tank's waste can be traced back to the plant and process from which it derived. These estimates comprise some 33 non-radioactive species and 4 radionuclides, Pu-239, U-238, Cs-137, and Sr-90. The 33 non-radioactive species in the model are Na, Al, Fe, Cr, Bi, La, Hg, Zr, Pb, Ni, Sr(stable), Mn, Ca, K, OH, nitrate, nitrite, carbonate, phosphate, sulfate, silicate, F, Cl, citrate, EDTA, HEDTA, glycolate, acetate, oxalate, DBP, butanol, ammonia, and ferrocyanide.

Also reported are total site inventories for DST's, SST's, as well as the total inventory of waste placed into cribs and trenches from the waste tanks during the history of Hanford. These estimates do not cover all waste additions to cribs since many streams went into the cribs directly from the plants. Such streams as stack scrubbing and process condensates were often sent directly to cribs from the plants.

Tank leaks represent a very small amount of the total waste. Many "leaks" are not actually measured volumes and are only assumed to have occurred at some nominal value. This is because ground activity occurred in the vicinity of a tank even though there was no measurable change in its inventory. HDW estimated leak inventory, then, does not provide for leaks that did not have a measurable effect on inventory. Only those leaks that actually resulted in a measurable volume loss from a tank are included in the leak estimate.

I. Background

One of the most important tasks involving the Hanford waste tanks is the estimation of those tank's contents. Such estimates are very important for three reasons: first, to establish safety limits during intrusive activities associated with these tanks; second, to establish a planning basis for future disposal; and third, to allow assays from one tank's waste to be used to validate, compare, and assess hazards among other tank's with similar waste inventories.

It is clear that direct assays of tank wastes will always be an important and ongoing need for the Hanford tanks. However, it is equally clear that it will be very difficult if not impossible to adequately address all issues with respect to waste tanks by sampling and assay alone. Representative sampling is undoubtedly the most difficult aspect of deriving tank inventories from assays alone. Both the extremely heterogeneous nature of tank waste and the limited access provided by riser pathways to waste in these seventy-five foot diameter underground tanks contribute to difficulties in using assays alone to derive tank inventories. Furthermore, there are safety issues, such as elevated amounts of soluble organic in dry nitrate waste, that are difficult to address by sampling alone since they could involve relatively small inaccessible regions of waste within a tank.

Finally, in order to make sense out of the highly variable results that often come from a tank's waste assays, it is necessary to couch those results in terms of the particular process and storage history of that tank. The HDW model estimates provide just such a needed sitewide framework for each of the 177 Hanford tanks.

II. Approach

The HDW model is described schematically in Fig. 1. The model begins with a process and transaction dataset that derives from a variety of sources. From this dataset, a balanced tank-by-tank quarterly summary transaction spreadsheet is derived called the Waste Status and Transaction Record Summary (WSTRS). At the end of each quarter, all tanks' volumes are reconciled with their reported status at that time and in the process, unknown transactions are recorded to accommodate otherwise unexplained gains or losses at the end of each quarter.

Using these fill records, the Tank Layer Model (TLM) provides a definition of the sludge and salt cake layers within each tank. The TLM is a volumetric and chronological description of tank inventory based on a defined set of waste solids layers. Each solids layer is attributed to a particular waste addition or process, and any solids layers that have unknown origin are assigned as such and contribute to the uncertainty of that tank's inventory. The TLM simply associates each layer of sludge within a tank with a process waste addition. As indicated in Fig. 1, the TLM analysis depends only on information from WSTRS.

The Supernatant Mixing Model (SMM) is an algorithm written in C++ and installed as a spreadsheet macro that describes the supernatant and concentrates within each of the tanks. The SMM uses information from both WSTRS and the TLM and describes supernatants and concentrates in terms of kgal (1 kgal = 1,000 gal) of each of the process waste additions.

Together the WSTRS, TLM, and SMM define each tank's waste in terms of a linear combination of HDW sludges and supernatants. In order to provide information on the elemental composition of each tank, the Hanford Defined Wastes (HDW's) compositions describes each of the HDW's based on process historical information. Each HDW has both supernatant and sludge layers, its total amount of waste set by WSTRS, and its sludge volume determined by the TLM. Thus, the HDW compositions depend on all prior model components—process/transaction dataset, WSTRS, TLM, and SMM.

Each tank's total inventory is calculated as

$$\text{tank}_i = \frac{\sum_j \text{tlm}_j \text{hdw}_j^{\text{sl}}}{\text{slVol}_i} + \frac{\sum_j \text{smm}_j \text{hdw}_j^{\text{su}}}{\text{suVol}_i}$$

Fig. 1. Schematic of overall strategy.

where

- tank_i = composition vector for tank i
 $\text{hdw}_{j,\text{sl}}$ = composition vector for HDW sludge j
 $\text{hdw}_{j,\text{su}}$ = composition vector for HDW supernatant j
 tlm_{ij} = kgal of hdw sludge j for tank i
 smm_{ij} = kgal of hdw supernatant j for tank i
 slVol_i = sludge kgal for tank i
 suVol_i = supernatant concentrate kgal for tank i .

The first term is the TLM solids inventory and is reported as

$$\text{tank}_i^{\text{sl}} = \frac{\sum_j \text{tlm}_j \text{hdw}_j^{\text{sl}}}{\text{slVol}_i}$$

while the second term is the SMM inventory reported as

$$\text{tank}_i^{\text{su}} = \frac{\sum_j \text{smm}_j \text{hdw}_j^{\text{su}}}{\text{suVol}_i}$$

These inventory estimates for each tank also appear in the Historical Tank Content Estimate reports for each of four quadrants.¹

IIa. Approach—Waste Status and Transaction Record Summary

The WSTRS is a spreadsheet of qualified fill records² with information extracted from Jungfleisch-83³ and Anderson-91⁴, and checked by Ogden Environmental and LANL against quarterly summary reports. The WSTRS reports, although largely representative of the waste histories of the tanks, are nevertheless incomplete in that there are a number of unrecorded transactions that have occurred for many tanks. Included within the WSTRS report, then, is a comparison of the tank volume that is calculated based on the fill records that are present in WSTRS with the measured volume of each tank. This comparison is made for each quarter to record any unknown waste additions or removals that may have occurred during that quarter.

The Rev. 3 estimates include new information from the Logbook Dataset⁵ and have extensive revisions in the latter four evaporator campaigns: 242-S (S1 and S2) and 242-A (A1 and A2). The Logbook Dataset contains extremely detailed tank level information from about 1975 to 1992 and has allowed Rev. 3 to accommodate the blending that occurred during these campaigns. In Rev. 1, each campaign's waste was blended over many years of operation, then concentrated in one single step and distributed over all the bottoms receivers. In contrast, Rev. 3 blends the evaporator concentrates on about a quarterly basis thereby providing much better representation of these evaporator campaigns.

¹Brevick, C. H., et al., "Historical Tank Content Estimate of the Northeast (Southwest, Northwest, Southeast) Quadrant of the Hanford 200 East Area," WHC-SD-WM-ER-349 thru 352, Rev. 0, June 1994.

²(a) Agnew, S. F., et al., "Waste Status and Transaction Record Summary for the NE Quadrant" WHC-SD-WM-TI-615, Rev. 1, October 1994. (b) Agnew, S. F., et al. "Waste Status and Transaction Record Summary for the SW Quadrant," WHC-SD-WM-TI-614, Rev. 1, October 1994. (c) Agnew, S. F., et al. "Waste Status and Transaction Record Summary for the NW Quadrant," WHC-SD-WM-TI-669, Rev. 1, October 1994.

³(a) Jungfleisch, F. M. "Hanford High-Level Defense Waste Characterization—A Status Report," RH-CD-1019, July 1980. (b) Jungfleisch, F. M. "Supplementary Information for the Preliminary Estimation of Waste Tank Inventories in Hanford Tanks through 1980," SD-WM-TI-058, June 1983. (c) Jungfleisch, F. M. "Preliminary Estimation of Waste Tank Inventories in Hanford Tanks through 1980," SD-WM-TI-057, March 1984.

⁴Anderson, J. D. "A History of the 200 Area Tank Farms," WHC-MR-0132, June 1990.

⁵Brevick and Gaddis, "Tank Farm Logbook Dataset," in preparation.

Transactions were added to WSTRS to resolve the many unknown level changes for each quarter according to a set of rules resulting in an updated WSTRS that is known as Rev. 3. This unknown transaction resolution was only completed for all unknowns larger than 50 kgal, although many smaller transaction unknowns were accommodated as well. The following rules were used for unknown transaction resolution for the various tank categories.

Evaporator feed and bottoms receivers:

During an evaporator campaign, unknown waste transfers at the end of each quarter are resolved by sending wastes to or receiving wastes from an evaporator feed tank for tanks identified as either bottoms receivers or feed tanks for those campaigns.

Self-concentrating tanks:

Certain tanks in S, SX, A, and AX farms were allowed to self concentrate. Any losses or additions to these tanks are assigned to condensate or water, respectively.

Sluicing receivers:

For tanks associated with a sluicing campaign (either UR or SRR), unknown transactions are resolved by either sending or receiving from the sluicing receiver tank for that campaign. Unassigned losses from the sluicing receivers, then, are sent directly to the process.

Salt-well pumping and stabilization:

If an unknown loss occurs during salt well pumping stabilization of a tank, then the unknown is resolved by sending waste to the active salt well receiver at that time.

Historical use of tank:

If none of the above rules apply, then the historical use of the tank is used to assign the transaction. For example, C-105 was used as a supernatant feed tank for the CSR campaign and supplied ~1,500 kgal per quarter for several years. However, there is one quarter (1971q2) where C-105 loses 1,748 kgal without an assigned transaction. Because of C-105's process history, this transaction is assigned to CSR feed. Likewise, there are a number of large supernatant losses in A and AX Farms during sluicing for sludge recovery. These supernatant losses are assigned as feed to AR, which are the slurries transferred to AR Vault for solids separation, washing, dissolution, and feed to SRR.

The transaction data set has sometimes an arbitrary and non-unique order for transactions within each quarter. This transaction order has been largely resolved for the period 1975-present, but not for all of the remaining tanks for this estimate. Thus, a certain "historical" error is present in these DST estimates that is largely related to transaction ordering errors from 1945-1975. These errors are not very serious for the DST's, since much blending has occurred since 1981, but this transaction ordering should be completed for the entire history of Hanford in order to determine how it will affect tank inventories.

IIb. Approach—Tank Layer Model (TLM)

The TLM is a solids layer model that uses the past fill history of each tank to derive an estimate of the types of solids that reside within those tanks. The TLM^{6,7} is generated by reconciling the reported solids levels from WSTRS

⁶(a) Brevick, C. H., et al., "Supporting Document for the Historical Tank Content Estimate for A Tank Farm," WHC-SD-WM-ER-308, Rev. 0, June 1994. Likewise, reports and numbers for each farm are as follows: AX is 309, B is 310, BX is 311, BY is 312, C is 313, S is 323, SX is 324, and U is 325. These supporting documents contain much of the detailed information for each tank farm in a concise format, all released as Rev. 0 in June 1994.

⁷Agnew, S. F., et al. "Tank Layer Model (TLM) for Northeast, Southwest, and Northwest Quadrants," LA-UR-94-4269, February 1995.

for each tank (as shown in App. C) with the solids volume per cent expected for each primary waste addition (see App. A). Note that a solid's model has already been extensively used at Hanford to estimate sludge and salt cake accumulation, the results of which are reported⁸ monthly.

There are some tanks that the HDW model assumes a different waste inventory than that reported in Hanlon. This differences come about because of the difficulties that are often encountered in determining the remaining inventory in tanks with large surface heterogeneities. Also shown in App. C, then, are a list of tanks for with their Hanlon volumes and their adjusted volumes used for the HDW estimates. The sources of these discrepancies are a series of reports about stabilized tanks.⁹

The TLM is a volumetric and chronological description of tank inventory based on the HDW sludges and salt cakes. Each solids layer is attributed to a particular waste addition or process, and any solids layers that have unknown origin are assigned as such and contribute to the uncertainty of that tank's inventory. The TLM simply associates layers of solids within each tank with a waste addition or a process campaign.

The TLM uses the information obtained from the transaction history for each tank to predict solids accumulations. These predictions are made for three categories of waste tanks. The first category involves primary waste additions, which are the waste additions from process plants directly into a waste tank. The primary waste transactions are used along with solids volume reports for each tank to derive an average volume per cent solids for each HDW type. The solids accumulations are, then, also assigned to a particular HDW for the tanks where the solids information is missing or inconsistent.

A second category of waste is that where solids accumulate as a result of evaporative concentration of supernatants. All solids that accumulate in such tanks occur after they have been designated as "bottoms" receivers. These solids are assigned to one of four salt cakes, which are defined as blends over entire evaporator campaigns. The four salt cakes are BSltCk, T1SltCk, BYSltCk and RSltCk, are all defined as HDW's. The latter five evaporator campaigns T2, S1, S2, A1, and A2 all result in waste concentrates that are defined differently for each tank within the SMM.

The third category of waste is that where solids accumulate due to tank to tank transfers of solids. This category allows solids to cascade from tank to tank, for example, or accounts for solids lost during routine transfers, as was common with decladding wastes CWR and CWP, 1C, or FeCN sludges.

The results of the TLM analysis are a description of each tank's solids in terms of sludge and salt cake layers. Although interstitial liquid is incorporated within the composition for sludges and salt cakes, any residual supernatants that reside in these tanks above the solids are described by the SMM. The output of the TLM, then, can only be used to predict the inventory of the sludges and each of four salt cakes that reside within waste tanks. These TLM results are inserted into the WSTRS record and are used by the SMM in considering excluded volumes for mixing of waste supernatants.

Not all of the transactions that have occurred in the past are faithfully recorded by the WSTRS data set. Therefore, WSTRS is an incomplete document with many missing transactions. However, the two critical pieces of

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⁸Hanlon, B. M. "Tank Farm Surveillance and Waste Status and Summary Report for November 1993, "WHC-EP-0182-88, February 1994, published monthly.

⁹ (a) Swaney, S. L. "Waste Level Discrepancies between Manual Level Readings and Current Waste Inventory for Single-Shell Tanks." Internal Memo 7C242-93-038, Dec. 10, 1993. (b) Boyles, V. C. Boyles "Single Shell Tank Stabilization Record," SD-RE-TI-178 Rev. 3, July 1992. (c) Welty, R. K. "Waste Storage Tank Status and Leak Detection Criteria," SD-WM-TI-356, September 1988.

information that are used in the TLM analysis are the primary waste additions and the solids level measurements, both of which are well represented in WSTRS.

The missing transactions largely involve tank-to-tank transfers within WSTRS. These missing transactions, which are salt cake, salt slurry, and supernatant, do lead to a larger uncertainty for the compositions of the concentrated products from evaporator operations. As many as 25% of all transactions may be missing from this data set, perhaps as many as 60-80% of these missing transactions are associated with the evaporator operations. Although this information might be recovered in the future, the HDW model strategy at this time resolves as many of these unknown transactions as possible with the rules stated above.

Sludge Accumulation from Primary Waste

The TLM analysis associates a solids volume percent (vol%) with each primary waste stream. These solids vol% are those that are consistent with the solids volumes reported in Anderson-91 by comparing those solids accumulations with the primary waste additions that are recorded in WSTRS. The result of this analysis is a solids volume percent for each waste type with a range of uncertainty associated with the inherent variability of the process.

Not all of the waste types have adequate solids reports associated with them. For these waste types, a nominal value is assigned based on similarity to other waste types where there exists a solids vol%. For example, a total of 810 kgal of Hot Semi-Works waste (HS) was added to several tanks in C Farm, but these additions only constituted a small fraction of the total solids present in any of these tanks. Therefore, a nominal 5 vol% solids is assigned for that waste type.

Each TLM spreadsheet table shows the primary waste additions and the solids from those additions based on the characteristic vol% for that waste type. The TLM compares this prediction with the solids level reported for the tank and indicates either an unknown gain or loss for this tank. Once a layer is "set" in the tank, its volume appears in "Pred. layer" and type in "Layer type", thus comprising a chronological layer order from the bottom of a tank to the top, where each layer is described in terms of a volume and a type. Note that lateral variations are not accounted for in this model, and therefore this model only derives an average layer thickness. The TLM does not include any lateral distribution of those layers, which can in some cases can be quite extreme.

There are two main sources for variations in the solids vol% for each waste type. First, there is an inherent variability in each process stream, which is largely attributable to process variations. Second, solids can be added to or removed from tanks by inadvertent (or purposeful) entrainment during other supernatant transfers. In addition to these sources of variation, there are a number of other minor sources of solids changes such as compaction, subsidence following removal of salt well liquid, and dissolution of soluble salts by later dilute waste additions. Other solids variations may be due to metathesis and other chemical reactions within the tanks, such as degradation of organic complexants over time.

The TLM assigns solids changes to variability when they fall within the range established. If a change in solids falls outside of this range, the TLM associates the gain or loss of solids with a waste transfer to or from another tank or to dissolution of soluble salts in the upper existing solids layers.

Diatomaceous Earth/Cement

Diatomaceous Earth, an effective and efficient waste sorbent material, was added to the following waste storage tanks BX-102 (1971), SX-113 (1972), TX-116 (1970), TX-117 (1970), TY-106 (1972), and U-104 (1972). The additions of diatomaceous earth were used to immobilize residual supernatant liquid in tanks where the liquid removal by pumping was not feasible. The conversion factor in the TLM for Diatomaceous Earth (DE) is 0.16 kgal/ton and Cement (CEM) or (CON) is 0.12 kgal/ton. The CEM waste was only added to one tank, BY-105 (1977).

Salt Cake Accumulation

Once a tank becomes a "bottoms" receiver, the TLM assumes from that point on that any solids that accumulate are salt cake or salt slurry. Salt cake can be any one of four different types, depending on which evaporator campaign created it. These are B (242-B), T1 (early 242-T), BY (ITS #1 and #2 in BY Farm), and R (Redox self-concentrating tanks). Table 2 describes the various evaporator campaigns that resulted in concentration of waste and precipitation of solids at Hanford. For salt cake accumulation, the TLM assumes that all of the solids reported are salt cake. Two other minor evaporation campaigns involved use of Redox and B Plant evaporators for tank wastes. These minor campaigns have been associated with T2 or S1 campaigns, respectively.

The HDW model assigns waste of the five later campaigns for 242-T, 242-S, and 242-A evaporators as concentrates within the SMM. These later concentrates correspond roughly to what is known as double-shell slurry (DSS) or double-shell slurry feed (DSSF), although their early concentrates are often referred to as salt cake as well.

IIc. Approach—Supernatant Mixing Model (SMM)

The third step is to describe the composition of supernatants and concentrates within each of the tanks (note that interstitial liquid is part of the TLM sludge and salt cake definitions, not the supernatant). To accomplish this, an ideal mixing model has been developed, called the Supernatant Mixing Model. This model describes supernatants in terms of original kgal (1 kgal = 1,000 gal) of each of the HDW supernatants. The SMM is a very critical part of the definition of waste in double-shell tanks (DST's) where a large fraction of the waste supernatants now reside. For single-shell tanks, the SMM contributes largely to the composition of concentrated wastes. A block diagram of the SMM approach is shown in Fig. 2. The fundamental assumptions used for this model are ideal mixing of each tank's free supernatant volume throughout its history. In particular, the volume of solids layers within each tank defined by the TLM are excluded from mixing with any supernatant additions. In addition, all evaporator feed to and from 242-A, 242-S, and the latter 242-T operations are treated as free supernatant in all tank transactions.

The SMM calculation reads transaction information from WSTRS, sorts it to a date order, and performs a transaction by transaction accounting of all of the tank waste transactions for the history of Hanford. This algorithm accounts for residual solids accumulation as per the TLM above.

The SMM provides a description of each tank's free supernatant and supernatant concentrate based on a linear combination of Hanford Defined Waste (HDW) supernatants. The HDW supernatants have been reported in the Waste Status and Transaction Record Summaries for that tank. This linear combination of HDW supernatants represents a total volume that is usually larger (sometimes smaller) than the actual volume of free supernatant within each tank. This is because active evaporation (or dilution) of the waste during its history.

Each tank's SMM waste vector is expressed in terms of a linear combination of HDW supernatants, which in turn are used to predict a chemical and radionuclide inventory with compositions provided by the HDW (or other sources). The SMM does not allow mixing with TLM solids that have precipitated from primary waste streams. However, those solids that resulted from the later concentrator operations 242-A, 242-S, and latter 242-T, are treated as supernatants within the SMM.

SMM and TLM Output Tables

The output of the Supernatant Mixing Model is a table whose column headings are the HDW's and auxiliary wastes and whose rows are the waste tanks and processes. The auxiliary wastes are water, unk, swliq, and gas and do not appear on the HDW waste list. These auxiliary wastes are used for tracking of unknowns, evaporator runs, and gas retention in waste concentrates. The SMM table's columns (see App. D) show the HDW distribution among the tanks and processes for a particular time. These are given in kgal of original HDW supernatant. The linear combination of HDW supernatants represent a total volume that is usually larger (but sometimes smaller)

than the actual volume of free supernatant or concentrate within each tank. The reason that the SMM volume differs from the tank volume is because of active evaporation or dilution of a tank's waste.

The TLM tables are also shown in App. C and follow roughly the same format as the SMM tables. There is no concentration effect with the TLM solids and so the row sum of the TLM for each tank is equal to the TLM volume for that tank.

IId. Approach—Hanford Defined Wastes (HDW)

The fourth step in the strategy is to provide chemical and radionuclide concentrations for each of the Hanford Defined Wastes¹⁰ (HDW's). The HDW's begin with inputs of radionuclide and stable chemicals, both of which are used to define the total species in each waste stream (see Fig. 3, campaign and chemicals added). These total species are then separated into two layers, a sludge and a supernatant, that result in different concentrations of species for the two layers.

Each species is precipitated according to a single point solubility and ions precipitated in more than one salt are simply successively precipitated. Thus, the solids that precipitate are merely representative of the actual solids and are not meant to reflect the actual solids distribution. Because the supernatant is also present in the interstices of the sludge layer, this "supernatant" is included within the sludge composition. The solubility of each species is set by a macro that, when run on the HDW spreadsheet, adjusts the fraction precipitated parameter so that the supernatant concentration is equal to or less than the target solubility.

The sludge and supernatant compositions are each expressed in mol/L for the stable chemicals, with water and TOC as wt% and radionuclides in $\mu\text{Ci/g}$ and Ci/L , respectively. Each waste is kept in ion balance according to the oxidation states assumed for that species. The sludge and supernatant layers are also expressed in terms of ppm composition, for which are kept a mass balance as well. However, the

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¹⁰Agnew, S. F., et al., "Hanford Defined Wastes: Chemical and Radionuclide Compositions," LA-UR-94-2657, Rev. 2, September 1995.

Supernatant Mixing Model Block Diagram

Fig. 2. Block Diagram of SMM algorithm.

mass balances are limited by differences among water, oxide, and hydroxide with the various solids to only within $\pm 2\%$.

Block Diagram of HDW Spreadsheet

Fig. 3. Block Diagram of HDW spreadsheet.

III. Results and History of Revisions

Appendix E shows the composition and inventory for each of the 177 Hanford Waste tanks. Each tank is described by three tables and each table comprises three columns of information. Two columns describe the analyte concentrations as mol/L and ppm and the third column expresses the tank inventory in kg or MCi (1 MCi = $1e6$ Ci). The three tables represent TLM solids blend, SMM liquids blend, and total composite tank concentrations and inventories. The TLM solids composition and inventory represents the volume average blend of all of the TLM solids layers. Note that among the TLM solids definitions are four salt cake concentrates: B, T1, R, and BY. Therefore, the TLM solids inventory definition includes sludges and some salt cake.

The second table for each tank represents the SMM composite inventory for liquids and concentrates. This table represents inventories from evaporator concentrates termed T2, S1, S2, A1, and A2. Note that these concentrates actually include a lot of solids but are treated nevertheless as homogeneous mixtures that can be pumped, blended, and moved to other tanks as though they were liquid.

The HDW model provided its first estimates in June of 1994 as Rev. 0 for the NE and SW quadrants. This early revision was based on single waste types for salt cake and salt slurry for the entire site. Revision 1 was actually the first complete site inventory and was completed in Fall of 1994 for the three SST quadrants, NE, SW, and NW, while Rev. 1 for the DST SE quadrant was completed in March 1995. These estimates included many bug fixes and other corrections and also included additions for process vessel corrosion source terms (adds Fe, Cr, and Ni) as well as a hard water Ca source term. However, the Cs-137 and Sr-90 inventories were calculated too high by about 20% and all evaporator campaigns were blended into multi-year composites. These evaporator blends were an improvement over the single waste types for salt cake and salt slurry in Rev. 0, but still represented an approximation for individual tanks. Essentially, these evaporator blends were excellent representations of the total waste into a campaign and its total volume reduction, but were distributed across perhaps ten or twenty different slurry receivers that were involved in each campaign.

The next step with the HDW Estimates, Rev. 2, was an attempt to express the five later evaporator campaign on a tank by tank basis. The SMM provided the waste concentrate history step by step throughout each of the evaporator campaigns. Revision 2.1 represents a bug fix in the spreadsheet that incorrectly calculated water and TOC and another problem with miscalculation in SX Farm. This revision was based on the HDW Rev. 2 compositions, which had improved the Cs-137 and Sr-90 inventory calculation and had included chloride and potassium source terms that piggyback on the NaOH additions. Various other bug fixes and changes and additions were a mercury source term used in the decladding process, adjustments on the wastes from UR (Uranium Recovery), slight realignments of 1C and 2C waste campaigns, and other minor changes. Revision 2 also reduced the process vessel corrosion source term (Fe, Ni, Cr) for early BiPO₄ wastes and decladding wastes consistent with the fact that these processes were much less corrosive than either Purex or Redox.

The Rev. 2.1 estimates nevertheless had some problems. The most significant problem was the incomplete transaction records for the later evaporator campaigns caused incorrect distribution of waste concentrates. In particular, some tanks were impossibly over concentrated (Na in excess of 16-17 mol/L), while other slurry receivers were more dilute than they should have been. It was clear that there were severe problems in waste misdirection with Rev. 2.

To correct these problems, the Rev. 3 estimates have extensively modified WSTRS by adjusting the evaporator transactions to blend on a per quarter basis and for some quarters, wastes have been blended on an even finer time scale. This improvement in the transaction record was largely accomplished by use of a draft version of the Logbook Dataset⁵, constructed by ICF Kaiser for WHC and not yet published. Also used is an extensive set of reports from evaporator operations for 242-S and 242-T. Unfortunately, there was a lack of detailed information about the 242-T evaporator operation.

The overall inventories for the analytes have not changed significantly except for lead, manganese, and oxalate. Lead site inventories increased dramatically in Rev. 3 since these estimates included the lead coating that

covered each fuel slug. This turns out to be a major source of lead in the waste tanks and the total lead inventory increased from 3 to 280 mT. There was also an error in the concentration of manganese in OWW2, which upon correction lowered the manganese site inventory from 219 to 39 mT. The oxalate inventory increased from 23 to 69 mT because of a decrease in its solubility limit. Since 224 waste supernatant was all cribbed, decreasing oxalate solubility retains more in the waste tanks and this was the only oxalate source term.

IV. Uses and Limitations of HDW Model Estimates

The HDW Model Rev. 3 estimates represent a Hanford site inventory based on process history that is compatible with the waste types, compositions, and processing history of the site. The total site estimates will not change appreciably in the future unless the waste source terms for the various waste streams change, but it is still possible that changes in the transaction record will alter the inventory estimates of individual tanks. All estimates are valid as of 1-1-94 and Sr-90 and Cs-137 are both decayed to the same date. Therefore, these estimates do not account for the latest evaporator campaign in '95-'96, which moved and blended large amounts of waste supernatants in the DST's.

The HDW estimates are the first complete, total, ion and mass balanced inventory estimates yet provided on a per tank basis. As such, they have immediately shown that: site sodium inventory has been traditionally overestimated by about one third. Whereas previous site estimates for sodium were around 71,000 mT (mT = metric tonnes), the HDW estimate show only 40,000 mT are actually now in either the DST's or the SST's. This difference is largely due to the large amount of waste supernatant that was sent to crib, some 20,000 mT, but is also due to more subtle double counting of waste stream chemicals that has occurred in the past.

These estimates have also shown an increase in the iron inventory, which the HDW model now estimates at 1,830 mT (1,610 in the SST's and 220 in the DST's) as compared to previous estimates of 710-730 mT. These total site estimates are shown in App. E along with estimates for individual tanks.

The site inventory estimates include totals for waste sent to the cribs as well as totals for leaks with measurable volume losses. Note that the leaks from waste tanks are only a small fraction of the total inventory sent to the ground, constituting only 10% of the 2.2 MCi of Cs/Sr activity and only 2% of the 48 kg of Pu that was sent to the soil column. Thus, the amount of activity intentionally sent to the soil column dwarfs the activity inadvertently placed into the ground by leaks and spills.

There are still problems with these estimates. The evaporator blending and SMM approach naturally produce blending averages for waste supernatants that were processed during each quarter. The actual blending that occurred during these quarters may not be exactly represented in this approximation. This blending error then contributes to the overall variability in the waste predictions.

Another problem with the HDW model is that precipitated solids from waste concentration do not remain in the slurry receiver during evaporator runs. That is, liquid that is drawn from each bottoms tank following cooling is always removed as a blend of the total concentrate. This leads to an under concentration of the bottoms receiver and correspondingly an over concentration of tanks that receive and further blend and concentrate the recycled liquors. This effect systematically shifts concentrate from early receivers to later receivers and therefore increases the variability of the estimates by introducing a systematic bias in early versus late concentrates.

V. Uncertainty for the HDW Estimates

There are two main origins of variability within the HDW model—process variability (results in variability of hdw's) and transaction variability (results in variability in tlm and smm factors). Since process variability affects the HDW compositions and transaction variability affects the SMM/TLM factors, these two variabilities will be additive in the final inventory estimates.

Quantification of Process Variability

Starting with the hypothesis that the waste rate variability is the most direct measure of process variability and therefore of HDW compositional variability, the two sources of waste rate variability are:

1) Rework processing. For a given amount of fuel processed during a campaign, early batches needed to be reworked more often than later batches because the separations failed to achieve the necessary decontamination or separation factors. Note that for rework, the chemicals in the waste scale linearly with the waste volume but the radionuclides will be diluted by increasing rework;

2) Ancillary processing resulting in primary waste dilution. There are many ancillary waste streams that derive from various cell cleanup and vessel cleanout activities. These activities by and large add very little or no chemicals or radionuclides to the waste stream. Therefore, to a first approximation, this variability simply dilutes or concentrates the waste stream. This dilution or concentration simply changes the relative supernatant and sludge inventories of each component.

This approach completely neglects chemical source term variability, which derives from measurement errors during processing. This variability is in the range 3-5% and will therefore be bounded by the two main sources noted above.

The variability of every process waste rate will actually be a combination of rework and ancillary processing and there is little information about what this combination is. Assuming that the amount of chemicals used scales linearly with the volume of the waste produced for rework processing, the waste compositions within each tank will actually be independent of the amount of process rework (radionuclides, however, will be reduced in concentration by the increase in rework.)

This approach subtracts a linear trend from each waste rate due to rework over the period of a campaign and makes the assumption that the resultant variability of the waste composition is wholly attributable to ancillary processing. This results in waste composition variabilities that should be equal to or greater than the true waste composition variabilities. In principle, the HDW model would need more information to assign the correct fraction of waste rate variability to process rework.

With these assumptions in hand, an uncertainty for each HDW (Hanford Defined Waste) can be derived by resolving each HDW analyte for its upper and lower limits. An RSD (Relative Standard Deviation) for each HDW results in a set of upper and lower compositions for each component of each HDW. Note that these relative variabilities will be different in general from the overall RSD for each HDW. This is because of the fact that the solution concentrations of semi-soluble species are directly linked to their sludge inventories.

Finally, there is a fundamental correspondence that relates a tank's waste volume to a corresponding waste stream variability. That is, if a tank contains 75 kgal of a waste sludge, then the waste rate variability must be calculated for the time that it took to deposit that 75 kgal of sludge.

This is a very important point. A manifestation of waste heterogeneity within a tank is that the larger the waste sample taken from a tank, the more representative that sample will be to the mean value for that waste type. The waste rate variability quantitates that relationship. It means that the smaller the sample of waste in an assay, the less representative that assay will be for the tank contents and therefore a larger margin will occur for comparison of that assay to the HDW estimates. Conversely, the larger the amount of waste sampled, the better it will represent the tank's waste and the smaller will be the margin for HDW estimate comparisons.

There are fourteen tanks in S and SX Farms that hold nearly all of the R1 sludge, averaging 75 kgal each. Thus, each tank's sludge represents about two quarters worth of accumulation, and the variability is 12%, ranging from 10-16% depending on exactly how much sludge is in a given tank.

Most of the R2 waste sludge is on average distributed 30 kgal each among 7 tanks. At 30 kgal, the variability will be 13%, and will range from 10-16% for that set of tanks as well. It is interesting to note that despite the very different Redox campaigns, the waste rate variabilities are very similar.

There are two basic parameters from this variability analysis; a waste rate variability and a waste rate trend. The waste rate variability represents a dilution of all species while the waste rate trend does not change the chemical composition at all, since chemicals added remain proportional to waste volume. On the other hand, there will be a bias in the radionuclide concentration through a campaign as a result of the waste rate trend. Radionuclides will be more dilute early in the campaign and more concentrated late in the campaign. Thus, there is an extra source of variability for radionuclides within each campaign that is tied to the waste rate trend parameter.

For example, the waste rate trend for R1 is $\pm 73\%$ of the mean over the campaign, which places an effective RSD for the radionuclides at $\pm 50\%$. Thus, while the chemical composition variability for these tanks is within an RSD of $\pm 12\%$, the radionuclides vary with an RSD of $\pm 50\%$.

Quantification of Transaction Variability

There are three contributions to transaction variability; evaporator blending, concentrate carryover, and of course, inaccurate transaction information. As regards to inaccurate information, it is not possible to derive meaningful uncertainty estimates about what is not known. Therefore, variability estimates are only possible for the first two contributions.

Evaporator blending and concentrate carryover are now both approximations used within the HDW model. Evaporator blending assumes that all of the waste feed for a given time can be blended together and reduced in volume as a blend and then transferred to a bottoms receiver. In reality, this process was continuous feed and continuous volume reduction.

Concentrate carryover is an approximation within the HDW model whereby all liquids that are removed and recycled to the evaporator from a bottoms receiver are assumed to be homogeneous mixtures of the entire concentrate inventory of each tank. This approximation is valid for dilute wastes but increasingly invalid as wastes are concentrated. That is, waste concentrates are returned to the tanks from the evaporator and allowed to cool, sediment, and gel. Then, residual liquid is removed from these tanks and often reblended and further concentrated. The HDW model allows concentrated waste to be "carried over" into later receivers because of its assumptions and limitations. This represents a second major source of variability within the model, but it only affects concentrates.

Although these arguments provide a basis for transaction variability estimates, the task is not yet completed and therefore are not yet included in HDW Rev. 3 estimates.

VI. Summary

The HDW Rev. 3 estimates are the latest in a developing model of the tank waste inventories at Hanford. The HDW model variability estimates are not yet complete and the comparison of HDW estimates with analytical assays is also in progress. Both of these tasks are ongoing and represent the "bottom line" for the model validity.

Note, though, that comparison of HDW model results with assay data is more complex than just comparing one estimate with another. To derive a tank inventory from assay data for waste samples from within a tank is not a trivial task in and of itself. The extremely heterogeneous wastes within each tank make representative sampling problematic and this is compounded by limited access to the tank waste. Therefore, when comparing inventory estimates based on waste assays with the HDW model, one is actually comparing one model with another model and both models have significant uncertainties. Therefore, comparisons are often more effective if they are made among tank groups with similar process histories. Such grouping strategies can be very important in comparisons between assay data and HDW predictions.

Appendix C.

TLM Working Spreadsheet
May 1996

The TLM (Tank Layer Model) is a volumetric and chronological description of tank inventory based on the HDW sludges and salt cakes. Each solids layer is attributed to a particular waste addition or process, and any solids layers that have unknown origin are assigned as such and contribute to the uncertainty of that tank's inventory. Many of these unknown layers are assigned as per the history of each tank and such assignments are included in the TLM table in parentheses. The TLM for each tank simply associates layers of solids within each tank with a waste addition or a process campaign. Each tank's history is summarized by rows and its primary waste additions are all indicated.

The bolded entry in the Pred. layer column is the volume in kgal of each residual layer and the Layer Type column has information on the HDW assignment for that layer. This is the information that is used in WSTRS, which adds TLM solids layers to each tank accordingly. These result, then, also appear in the SMM/TLM tables in App. D. The TLM working spreadsheets are grouped by quadrant, which is a roughly geographical grouping of tanks that has been useful in the HDW model development.

The level discrepancies between the HDW Model-TLM and the Hanlon report are listed at the end of the appendix. These are given for volume differences greater than 10 kgal. Volume differences greater than 50 kgal were changed in the HDW Model and the new value is listed. This is further described in the Approach section (TLM) of the main text.

NE Quadrant (A, AX, B, BX, BY, C)

Table C1. TLM Working Spreadsheet Column Descriptions.

Column Headings	Descriptions
Tank	tank number
Year	year of transaction
Qtr	quarter of transaction
Meas. solids	reported solids from Anderson-91 in kgal
Solids change	calculated solids based on primary fill record or difference between solids records
Pred. layer	kgal predicted layer now in tank
Layer type	Defined Waste Type for that layer
Waste volume	summation of primary waste additions calculated for this time period
Comments	various details of each calculation

Tank	Year	Cr solids	Mass. change	Solids change	Pred layer	Layer Type	Volume	Waste	comments
BY-101	1963	2	37	37					unk assign to MW (heel)
BY-101	1967	3	109			37 (MW)			unk assign to MW (heel)
BY-101	1967	4	376						filled from BY-108,C-107,C-106
BY-101	1968	1	378						ITS campaign
BY-101	1968	4	29						ignore
BY-101	1968	1	281						
BY-101	1968	2	274						
BY-101	1968	3	310						
BY-101	1968	4	332						
BY-101	1970	1	337						
BY-101	1970	4	340						
BY-101	1971	2	366						
BY-101	1971	4	388						
BY-101	1972	3	418						
BY-101	1974	4	398						
BY-101	1977	2	439						
BY-101	1993	2	367						
BY-101	1993	4	387	350	350	350 BVSCK		ITS at ck	
BY-102	1967	3	18	18		18 (MW)		unk assign to MW, sliced, MW heel	
BY-102	1963	2	28	11	11	11 UNK (No Assign.)		Rec'd from BY-107, (unk, no TLM assignment)	
BY-102	1968	3	314					ITS campaign	
BY-102	1968	4	250						
BY-102	1971	2	155						
BY-102	1972	4	246						
BY-102	1973	1	194						
BY-102	1973	4	208						
BY-102	1974	4	200						
BY-102	1977	2	233						
BY-102	1977	3	436						
BY-102	1978	2	417						
BY-102	1983	2	341	312	312	312 BVSCK		ITS bottoms	
BY-103	1963	2	21	34		CWP2	1161	2.90 vol %	uncertain about measurements
BY-103	1966	3							uncertain about measurements
BY-103	1968	1	8						uncertain about measurements
BY-103	1968	3							uncertain about measurements
BY-103	1969	4	8						uncertain about measurements
BY-103	1970	1	3						uncertain about measurements

Tank	Year	Qtr	Mass. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-103	1970	2	4					ITS feed
BY-103	1970	4	9	-25	9	CWP2		Unk loss
BY-103	1971	1	65					
BY-103	1971	2	128					
BY-103	1971	3	142					
BY-103	1971	4	202					
BY-103	1972	1	298					
BY-103	1972	2	351					
BY-103	1972	3	428					
BY-103	1973	1	469					
BY-103	1973	3	458					
BY-103	1974	3	489					
BY-103	1974	4	481					
BY-103	1980	4	468					
BY-103	1993	2	400					
BY-103	1993	4	400	391	391	BYShCK		ITS bottoms
BY-104	1956	3	303			PFeCN/2	317	SL BY-106, BY-110, BY-107, BY-108, BY-106, BY-107
BY-104	1956	4	323					
BY-104	1957	2	277					
BY-104	1957	3	244					
BY-104	1963	2	263			PFeCN/2	228	SL BY-110, BY-108, BY-106, BY-110, BY-108, BY-108
BY-104	1965	2	227	227		PFeCN/2		Final PFeCN/2 prediction
BY-104	1967	2	206					
BY-104	1967	3	244					
BY-104	1968	2	212					
BY-104	1969	1	244					
BY-104	1969	2	233					
BY-104	1969	3	244					
BY-104	1969	4	240					
BY-104	1970	1	206					
BY-104	1970	2	44					ignore
BY-104	1970	3	112					
BY-104	1970	4	131					
BY-104	1971	1	150	-77	150	PFeCN/2		loss 77 kgal to ITS
BY-104	1971	3	425					ITS bottoms receiver
BY-104	1971	4	618					
BY-104	1972	3	310					
BY-104	1973	1	489					

Tank	Year	Qtr	Mess. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-104	1973	4	628					
BY-104	1974	1	469					
BY-104	1977	3	623					
BY-104	1993	2	328					
BY-104	1993	4	326	176	176	BYShCk		
BY-105	1954	4	14					
BY-105	1955	1	16	16	16	MW		MW heel after sluicing
BY-105	1955	4				PFeCN1	91	SL BY-108
BY-105	1956	1	350				51	SL BY-110, BY-107, BY-106
BY-105	1956	2				PFeCN2	246	SL BY-108, BY-110, BY-108, BY-106, BY-107, BY-110
BY-105	1956	2	384					ignore
BY-105	1957	3	213					
BY-105	1963	2	222	206		PFeCN2		total PFeCN prediction
BY-105	1965	2	186					
BY-105	1967	3	39					ignore
BY-105	1967	4	88					ignore
BY-105	1968	3	158	-64	142	PFeCN2		PFeCN loss to ITS
BY-105	1969	1	165					
BY-105	1969	2	153					ITS bottoms receiver
BY-105	1969	3	194					
BY-105	1969	4	189					
BY-105	1970	1	191					
BY-105	1970	2	216					
BY-105	1970	3	299					
BY-105	1971	1	340					
BY-105	1971	2	469					
BY-105	1971	4	653					
BY-105	1972	3	591					
BY-105	1973	1	628					
BY-105	1974	4	626					
BY-105	1977	1			337	BYShCk		
BY-105	1993	2	503					
BY-105	1993	4	503	-345	8	CEM	8	Cement layer 63 tons @ 0.12 kgal/ton, unk loss
BY-106	1955	1		54		PFeCN1	1461	3.7 vol %
BY-106	1955	1	40					
BY-106	1955	2	107		54	PFeCN1		
BY-106	1955	4	120					
BY-106	1956	1	150					

Tank	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-106	1956	2	180					
BY-106	1956	3	164					
BY-106	1956	4	188				-179	SL BY-105, BY-104
BY-106	1957	1		154		PFeCN2	4810	3.2 vol %
BY-106	1957	1	111	-97		PFeCN2		total PFeCN1&2 prediction
BY-106	1963	2	150					ignore
BY-106	1965	2	103					
BY-106	1969	1	106					
BY-106	1969	2	93					
BY-106	1969	3	96					
BY-106	1969	4	95					
BY-106	1970	1	103					
BY-106	1970	2	98					
BY-106	1970	3	98	-13	44	PFeCN2		loss 13 to ITS
BY-106	1970	4	164					ITS bottoms and recycle
BY-106	1971	1	249					
BY-106	1971	2	288					
BY-106	1972	1	296					
BY-106	1972	4	563					
BY-106	1973	1	447					
BY-106	1973	2	494					
BY-106	1974	4	420					
BY-106	1975	2	351					
BY-106	1977	1	593					
BY-106	1977	3	626					
BY-106	1993	2	642					
BY-106	1993	4	642	544	544	BYStCK		
BY-107	1951	3		376		1C2	1511	24.9 vol%
BY-107	1953	1	1		24	1C2	-757	loss to B-106, ignore
BY-107	1953	2		20		UR	711	2.8 vol %
BY-107	1954	3	44	-352	20	UR		washed out to B-106, ignore solids measurements
BY-107	1954	4	1					ignore solids, Use 35 kgal drawdown
BY-107	1955	1	72	28				
BY-107	1955	2	45					ignore
BY-107	1955	3		145		PFeCN1	3916	3.7 vol %
BY-107	1955	3	142					
BY-107	1955	4	147					
BY-107	1956	1	160					
BY-107	1956	2	168					
BY-107	1956	3	87	-130	43	PFeCN1	-191	SL BY-104, BY-105

Tank	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-107	1956	4	150					
BY-107	1957	1		168		PFeCN2	5211	3.2 vol %
BY-107	1957	3	178					
BY-107	1957	4	172					
BY-107	1958	4	160					
BY-107	1963	2	178					
BY-107	1965	2	150			PFeCN2		Total PFeCN1&2 layer
BY-107	1970	1	58					ignore
BY-107	1970	2	61					ignore
BY-107	1970	3	43					ignore
BY-107	1970	4	106					
BY-107	1971	1	117	-135	30	PFeCN2		ITS bottoms, loss to ITS
BY-107	1973	1	175					
BY-107	1974	2	444					
BY-107	1974	4	183					
BY-107	1975	1	367					
BY-107	1978	1	326					
BY-107	1993	2	286					
BY-107	1993	4	266	149	149	BYShCK		
BY-108	1955	1		43		PFeCN1	1162	3.7 vol %
BY-108	1955	1	33	-10				loss to B-106 and CRIB
BY-108	1955	2		24		PFeCN1	657	3.7 vol %
BY-108	1955	2	98	41				unk gain, rec from BY-107
BY-108	1955	3		23		PFeCN1	624	3.7 vol %
BY-108	1955	3	197	78				unk gain, rec from BY-107
BY-108	1955	4		43	133	PFeCN1	1161	3.7 vol %
BY-108	1955	4	200					
BY-108	1956	1	205					
BY-108	1956	2	179					
BY-108	1956	3	194					
BY-108	1956	4	201					
BY-108	1957	1		185		PFeCN2	5141	3.2 vol %
BY-108	1957	2	249					
BY-108	1957	3	213					
BY-108	1957	4	210					
BY-108	1963	2	202	-293				202, Total PFeCN1&2 layer, unk loss
BY-108	1965	2	178					
BY-108	1988	3	125					
BY-108	1989	1	165	-37	32	PFeCN2		ITS Bottoms and recycle, loss to ITS
BY-108	1989	2	222					

Tank	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-108	1969	3	194					
BY-108	1969	4	233					
BY-108	1970	1	224					
BY-108	1970	2	176					
BY-108	1970	3	194					
BY-108	1970	4	65					ignore
BY-108	1971	1	98					ignore
BY-108	1971	2	385					
BY-108	1971	3	388					
BY-108	1971	4	381					
BY-108	1972	4	304					
BY-108	1974	4	359					
BY-108	1993	2	228					
BY-108	1993	4	228	63	63	BYShCK		
BY-109	1956	3	36	36	36 (MW)			sluiced, assign to MW heel, C-104,B-103,BY-101,BY-108,BY-112
BY-109	1956	4	66					supernatant receiver for MW slurries
BY-109	1957	3	46					
BY-109	1963	2	76					
BY-109	1965	2	57					
BY-109	1968	3	37					ITS feed tank and receiver
BY-109	1968	4	54					
BY-109	1969	1	72					
BY-109	1969	2	87					
BY-109	1969	3	79					
BY-109	1969	4	114					
BY-109	1970	1	190					
BY-109	1970	2	120					
BY-109	1970	3	128					
BY-109	1970	4	142					
BY-109	1971	1	160					
BY-109	1971	2	128					
BY-109	1971	4	153					
BY-109	1972	2	222					
BY-109	1972	3	280					
BY-109	1972	4	334					
BY-109	1973	1	381					
BY-109	1973	2	398					
BY-109	1973	4	411					
BY-109	1974	2	433					

Tank	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-109	1974	4	425					
BY-109	1977	2	433					
BY-109	1993	2	423					
BY-109	1993	4	423	387	387	BYShCk		
BY-110	1952	3		181		1C2	649	24.8 vol%
BY-110	1952	4		1		DW	79	1 vol%
BY-110	1954	4	51	-111	37	1C2		drawdown to 37, loss to B-038
BY-110	1955	1	121	70				gain of PFeCN1
BY-110	1955	2	85					
BY-110	1955	3		136		PFeCN1	3668	3.7 vol %
BY-110	1955	4	148	-109	111	PFeCN1		unk loss
BY-110	1956	1	150					
BY-110	1956	3	211					
BY-110	1956	4	229				-189	SL BY-104, BY-105
BY-110	1957	1	210					
BY-110	1957	2	206					
BY-110	1957	2		167		PFeCN2	5203	3.2 vol %
BY-110	1957	3	211					
BY-110	1957	4	210	-105				173 Total PFeCN1&2 layer, unk loss
BY-110	1963	2	246					
BY-110	1965	2	230					
BY-110	1969	2	189					
BY-110	1969	3	123					
BY-110	1970	1	201					
BY-110	1970	2	190	-20	42	PFeCN2		loss to ITS
BY-110	1970	3	211					ITS bottoms and receiver
BY-110	1970	4	277					
BY-110	1974	4	296					
BY-110	1977	1	376					
BY-110	1977	3	469					
BY-110	1980	1	505					
BY-110	1993	2	398					
BY-110	1993	4	398	208	208	BYShCk		
BY-111	1952	1		116		MW	964	12 vol%
BY-111	1952	4		2		UR	56	2.8 vol %
BY-111	1955	1					390	SL BY-112
BY-111	1955	3					-630	SL UR
BY-111	1957	1	26	-92	26	MW		
BY-111	1963	2	24					

Tank	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-111	1965	2	26					
BY-111	1967	4		0		CWP2	13	2.9 vol%
BY-111	1968	3	145					ITS bottoms and recycle
BY-111	1969	1	48					
BY-111	1969	2	52					
BY-111	1969	3	101					
BY-111	1969	4	142					
BY-111	1970	1	266					
BY-111	1970	2	280					
BY-111	1970	3	323					
BY-111	1970	4	673					
BY-111	1971	2	686					
BY-111	1972	1	194					
BY-111	1972	2	112					
BY-111	1972	3	142					
BY-111	1974	4	299					
BY-111	1977	3	510					
BY-111	1977	4	615					
BY-111	1980	4	622					
BY-111	1993	2	459					
BY-111	1993	4	459	433	433	BYStCk		
BY-112	1952	3		6	2	MW	48	12 vol %
BY-112	1952	4		0		DW	80	1 vol %
BY-112	1955	1					-390	SL BY-111
BY-112	1957	2		6	6	PFeCN2	172	3.2 vol %
BY-112	1963	2	29	17				Unknown gain
BY-112	1965	2	24					
BY-112	1967	4		0		CWP2	4	2.9 vol %
BY-112	1968	2	17	-12				Unknown loss
BY-112	1968	3	2					ignore
BY-112	1969	1	43					ITS Bottoms and recycle
BY-112	1969	2	59					
BY-112	1969	3	79					
BY-112	1970	1	85					
BY-112	1970	2	94					
BY-112	1970	3	145					
BY-112	1970	4	164					
BY-112	1971	1	255					
BY-112	1971	2	59					
BY-112	1971	3	166					

Tank	Year	Qtr	Mess. solids	Solids change	Pred layer	Layer type	Waste volume	comments
BY-112	1971	4	194					
BY-112	1972	1	263					
BY-112	1972	2	334					
BY-112	1972	4	315					
BY-112	1973	1	288					
BY-112	1973	3	311					
BY-112	1973	4	331					
BY-112	1974	4	310					
BY-112	1993	2	291					
BY-112	1993	4	291	274	283	BYShCk		

Appendix D.

SMM / TLM Volumes Tables

March 1996

The SMM (Supernatant Mixing Model) provides a description of each tank's free supernatant and supernatant concentrate based on a linear combination of Hanford Defined Waste (HDW) supernatants. The output of the SMM is an table whose column are the HDW's and whose rows are the tanks and processes that hold HDW inventory. The fill of the array are composition row vectors for each tank or process and are all given in kgal (1 kgal = 1,000 gal) of original HDW. The row sum of this table represents a total volume that is usually greater than the actual volume of free supernatant or concentrate within each tank. This difference is because of active evaporation or dilution of waste sometime during its history.

The TLM table correspondingly provides composition row vectors for the TLM sludges for each tank. In contrast to the SMM, the row sum of a tank's HDW sludges does equal the total volume of the sludges predicted by the TLM. This value may be still be different from the actual solids level reported for a tank because the salt cakes from later evaporator campaigns are treated as concentrates and therefore predicted by the SMM.

The tank composition table provides a description of each tank's SMM composition in terms of per cent of HDW supernatants in rows that sum to 100%. The HDW distribution table gives per cent distribution of each HDW supernatant in columns summing to 100%.

SMM Rev. 3

TLM Rev. 3

Table D1. Descriptions of SMM Tables' Columns

Column Headings	Descriptions
Columns 2-67 (B-BO)	assigned to Defined Waste Columns
Columns 68-71 (BP-BS)	auxiliary waste definitions
<i>assume</i>	original concentration volume of waste from assumed transactions
<i>smmvol</i>	original concentration volume of HDW wastes in the tank or that went to a secondary process or crib
<i>supvol</i>	kgals of supernatant in the tank or that went to process or crib
<i>tlimvol</i>	kgals of TLM residual solids predicted in the tank
<i>tankvol</i>	total volume in kgals of waste in the tank
<i>traffic</i>	total traffic for a tank or process year to date
<i>assume trfc</i>	total traffic from assumed transactions for a tank or process year to date
<i>Max. TOC wt%</i>	maximum TOC wt% experienced by the tank for all of its history
<i>date of Max. TOC</i>	date when maximum TOC wt% occurred
<i>TOC wt% now</i>	present TOC wt% in the tank
<i>Max. Haz. Index</i>	maximum Hazard Index experienced by the tank for all of its history
<i>Haz. Ind. now</i>	present Hazard Index now

WSTR33.450	MW1	MW2	1C1	1C2	2C1	2C2	224	UR/TBP	PF=CN1	PF=CN2	TF=CN	1CF=CN	R1	R2	CWR1	CWR2	P1	P2	PT	PL1	CWP1	CWP2
A-101	0.0	0.2	3.2	13.0	0.0	4.5	2.0	43.0	0.0	0.0	0.0	0.0	0.0	220.4	20.0	42.3	25.7	50.1	30.0	0.1	23.3	144.4
A-102	0.0	0.0	0.1	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	4.1	0.5	0.0	0.0	1.0	0.0	0.2	0.0	2.0
A-103	0.2	0.1	1.2	5.1	0.0	1.7	1.1	10.5	1.0	2.3	1.5	0.7	0.7	04.3	0.7	10.7	0.0	21.0	11.0	2.1	12.3	00.0
A-104																						
A-105	0.0		0.0	0.0	0.0	0.0		0.0	0.0		0.0							0.0	0.0	0.0	0.0	0.0
A-106	0.1	0.0	0.4	1.0	0.0	0.0	0.4	5.0	0.0	0.0	0.4	0.2	32.1	3.5	0.0	3.5	0.4	4.1	0.0	0.0	3.0	10.0
AX-101	0.0	0.1	2.5	10.7	0.0	2.0	2.2	34.4	3.0	4.0	3.1	1.4	170.2	20.2	32.0	20.0	40.0	23.0	0.0	27.0	110.0	
AX-102	0.0	0.0	0.2	0.7	0.0	0.2	0.1	2.1	0.2	0.2	0.2	0.1	12.2	1.3	2.3	1.3	2.2	1.0	0.0	1.4	0.0	
AX-103	0.1	0.0	0.3	1.4	0.0	0.0	0.3	4.4	0.0	0.0	0.4	0.2	23.0	2.0	4.4	2.0	0.3	3.2	0.7	3.4	14.0	
AX-104																						
B-101																						
B-102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
B-103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
B-104			0.0	0.0	0.0	0.0		0.0														
B-105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
B-106	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
B-107	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
B-108	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
B-109																						
B-110																						
B-111	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0						0.0	0.0		0.0	0.0	
B-112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
B-201																						
B-202							7.7															
B-203							0.0															
B-204							0.0															
CK-101																						
CK-102	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.2						0.0	0.0		1.7	4.0	
CK-103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CK-104	0.1	0.0	0.3	1.3	0.0	0.4	0.3	4.0	0.0	0.4	0.3	0.2	21.0	2.0	4.0	2.0	4.2	2.3	0.0	2.3	10.0	
CK-105	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.0	0.2	0.3	0.3	0.2	0.1	0.2	0.0	
CK-106	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	
CK-107	0.0	0.0	0.0	0.0	0.0	0.0		0.2	0.0	0.0	0.0	0.0					0.0	0.0		0.0	0.0	
CK-108																						
CK-109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CK-110	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CK-111	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
CK-112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GY-101																						
GY-102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	
GY-103																						
GY-104																						
GY-105																						
GY-106																						
GY-107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GY-108	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GY-109																						
GY-110	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GY-111																						
GY-112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
G-101																						

WSTR83.45b	MW1	MW2	1C1	1C2	2C1	2C2	224	UR/TBP	PFeCH1	PFeCH2	TFeCH	1CFeCH	R1	R2	CWR1	CWR2	P1	P2	P2'	PL1	CWP1	CWP2
C-102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0			0.0	0.0
C-103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.4	0.0	0.1	0.0	0.3	0.0	0.6	0.4	0.1	2.8	5.4
C-104	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.0	0.1	0.2	0.1	0.3	0.1	0.0	0.1	0.8
C-105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-106	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C-107																						
C-108																						
C-109																						
C-110	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0		0.0	0.0	0.0
C-111			0.0					0.0				0.0						0.0	0.0		0.0	0.0
C-112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0		0.0	0.0	0.0
C-201																						
C-202																						
C-203																						
C-204																						
S-101	0.3	0.1	1.3	5.1	0.0	1.8	1.0	16.0	1.8	1.8	1.2	0.7	100.4	11.0	18.5	10.1	15.7	8.4	2.8	10.0	46.8	
S-102	0.8	0.2	2.8	13.5	0.0	4.7	2.7	39.3	4.5	3.8	2.8	1.8	230.8	25.6	42.7	25.6	38.0	20.0	5.5	20.8	100.7	
S-103	0.4	0.1	1.8	8.4	0.0	3.4	2.0	25.5	3.0	2.5	1.7	1.2	140.2	16.8	26.4	17.2	25.2	13.4	3.9	13.8	67.0	
S-104													0.0		0.0	0.0						
S-105	0.3	0.1	1.3	6.4	0.0	4.8	0.0	21.5	2.7	1.1	1.0	1.2	505.8	18.6	66.7	18.6	19.1	10.8	1.8	6.7	41.7	
S-106	0.3	0.1	1.2	5.8	0.0	4.7	0.0	19.7	2.5	1.2	1.0	1.1	489.4	24.2	58.5	17.8	24.5	10.6	5.0	7.4	45.6	
S-107	0.1	0.0	0.5	2.4	0.0	0.7	0.5	7.0	0.8	0.7	0.5	0.3	36.7	4.5	8.9	4.4	7.5	3.9	1.4	4.1	18.2	
S-108	0.4	0.1	1.7	8.1	0.0	8.5	0.0	25.0	3.5	1.4	1.3	1.8	532.2	31.7	85.7	25.5	24.7	14.7	3.1	8.8	55.4	
S-109	0.4	0.1	1.6	7.7	0.0	8.2	0.0	25.7	3.3	1.5	1.3	1.8	585.5	32.2	80.3	24.3	23.7	14.2	4.1	9.1	54.8	
S-110	0.2	0.1	1.0	4.1	0.0	2.2	0.4	14.4	1.9	2.4	1.3	0.7	182.1	12.9	24.9	10.2	18.0	8.0	3.5	12.8	58.4	
S-111	0.4	0.1	1.9	8.1	0.0	5.2	1.1	28.0	3.4	2.8	1.8	1.4	464.7	29.0	82.2	22.1	32.4	15.4	6.5	15.0	76.7	
S-112	0.4	0.1	1.8	8.5	0.0	8.8	0.0	29.6	3.7	1.5	1.4	1.7	684.6	33.5	90.1	28.9	29.2	15.5	3.7	9.6	59.4	
SX-101	0.1	0.0	0.4	2.0	0.0	0.7	0.4	6.0	0.7	0.6	0.4	0.3	38.9	4.0	8.9	3.9	5.8	3.1	0.9	3.2	15.4	
SX-102	0.8	0.2	3.9	19.4	0.0	5.5	4.8	57.0	6.5	6.5	4.3	2.5	278.1	36.8	51.3	34.8	54.4	30.1	8.9	36.1	165.2	
SX-103	0.9	0.3	4.2	22.9	0.0	6.7	7.2	66.7	7.8	6.5	4.4	3.0	271.6	38.2	53.8	41.3	62.4	33.4	9.2	36.1	167.7	
SX-104	0.7	0.2	3.4	14.2	0.0	4.7	2.9	44.0	5.1	4.9	3.3	2.0	258.7	29.3	47.6	27.5	42.9	23.1	7.3	27.7	128.8	
SX-105	1.0	0.2	4.8	19.7	0.0	6.7	5.2	82.0	7.1	7.2	4.8	2.7	370.7	42.3	68.8	38.2	60.8	32.8	10.9	41.5	185.2	
SX-106	0.8	0.2	3.8	19.3	0.0	6.9	4.0	54.0	6.2	5.2	3.8	2.5	281.6	33.7	53.4	35.0	51.4	27.3	7.1	28.0	136.2	
SX-107													2.2	5.3	0.0							
SX-108													10.1	13.5	0.0							
SX-109													7.6	6.0								
SX-110																						
SX-111	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
SX-112													0.5	47.2	0.0							
SX-113													13.4									
SX-114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
SX-115																						
U-101																						
U-102	0.8	0.2	2.7	13.8	0.0	3.8	3.2	40.3	4.7	3.8	2.6	1.9	156.4	23.4	35.8	27.7	40.3	21.2	5.1	20.4	102.0	
U-103	0.9	0.2	4.0	17.3	0.0	4.5	3.2	51.3	5.8	4.8	3.3	2.3	205.8	29.7	48.5	31.7	47.4	25.3	9.4	26.1	125.5	
U-104	0.1	0.3	0.4	2.1	0.0	2.3	0.0	8.3	2.2	0.4	0.1	1.4	21.7	6.2	24.7	25.1	33.2	14.9	2.8	2.4	45.5	
U-105	0.8	0.2	3.7	16.5	0.0	4.4	3.4	48.8	5.5	4.7	3.2	2.2	189.1	28.5	45.0	30.1	45.4	24.3	6.5	25.5	122.0	
U-106	0.3	0.1	1.4	5.8	0.0	2.0	2.0	19.0	2.2	2.5	1.6	0.8	114.0	13.1	19.1	11.3	18.7	10.6	4.7	14.5	63.3	
U-107	0.5	0.1	2.3	12.2	0.0	4.3	2.6	34.4	4.0	3.3	2.3	1.8	178.6	21.5	33.9	22.2	32.8	17.4	4.6	18.0	87.2	
U-108	0.6	0.2	3.1	11.8	0.0	4.2	3.3	39.3	4.5	5.1	3.3	1.7	257.9	28.7	43.4	23.8	39.6	21.8	7.9	30.0	128.9	
U-109	0.9	0.2	3.9	12.5	0.0	4.5	2.8	42.6	4.9	5.4	3.5	2.0	273.1	34.4	46.7	26.6	45.2	24.4	8.4	31.8	137.0	

[illegible]

H-30

WSTRE3.45h	MW1	MW2	1C1	1C2	2C1	2C2	224	UNTBP	PFCN1	PFCN2	TFCHN	1CFCHN	R1	R2	CWR1	CWR2	P1	P2	P3	PL1	CWF1	CWF2
AS-106	1.4	0.8	8.8	37.8	0.0	22.8	3.5	118.2	13.8	10.5	7.0	8.3	414.7	80.9	102.5	86.4	135.2	66.9	11.4	56.8	292.6	
AS-107	0.0	0.0	0.1	0.3	0.0	0.1	0.1	1.0	0.1	0.1	0.1	0.0	8.5	0.6	1.1	0.7	1.5	0.7	0.2	0.6	2.9	
AS-107	0.8	0.2	2.9	13.1	0.0	4.0	1.7	43.6	8.0	5.8	4.1	1.8	144.3	20.7	32.5	25.5	58.4	31.4	6.3	37.3	197.7	
AP-101	6.0	0.0	0.2	0.7	0.0	0.4	0.2	3.1	0.3	0.9	0.2	0.1	10.0	1.2	2.0	1.3	2.4	1.3	0.3	1.8	8.4	
AP-102	0.8	0.2	2.7	12.5	0.0	4.1	2.3	38.8	4.4	4.1	2.8	1.7	204.5	23.3	39.0	24.2	55.2	26.9	6.7	22.8	108.9	
AP-102	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.7	0.1	0.1	0.0	0.0	2.5	0.3	0.5	0.3	0.6	0.3	0.1	0.4	1.9	
AP-104																						
AP-105	0.3	0.1	1.5	6.7	0.0	4.0	1.8	31.3	2.8	3.4	2.0	1.0	102.7	11.8	20.3	13.8	24.0	13.4	2.9	18.9	84.7	
AP-106	0.1	0.0	0.9	2.4	0.0	1.5	0.6	11.3	0.9	1.2	0.7	0.4	37.3	4.3	7.4	8.0	8.7	4.8	1.1	6.8	30.4	
AP-107																						
AP-108	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.3	
AW-101	0.7	0.3	3.8	17.7	0.0	14.8	2.7	82.6	7.5	10.6	6.1	2.8	281.2	32.5	58.5	40.4	89.7	39.8	7.8	58.0	263.6	
AW-102	0.2	0.1	1.2	14.0	0.0	2.8	1.3	23.7	2.0	2.4	1.5	0.8	87.5	10.8	16.4	10.9	18.2	16.1	2.4	13.7	61.9	
AW-103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
AW-104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
AW-105	0.1	0.0	0.5	2.2	0.0	1.5	0.4	11.5	0.9	1.1	0.7	0.3	33.9	3.9	6.8	4.4	8.1	4.5	0.9	6.4	25.6	
AW-106	0.2	0.1	1.3	5.7	0.0	3.2	1.4	28.2	2.2	2.8	1.8	0.8	95.5	14.3	15.5	11.8	15.8	11.0	2.5	14.9	68.2	
AY-101	0.0	0.0	0.3	1.0	0.0	0.5	0.5	8.0	0.5	1.0	0.5	0.3	16.1	7.3	3.2	2.2	4.8	3.3	0.5	5.1	21.5	
AY-102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
AZ-101	0.0	0.0	0.2	0.7	0.0	0.2	0.1	2.3	0.3	0.3	0.2	0.1	11.5	1.4	2.3	1.4	2.3	1.3	0.4	1.9	7.0	
AZ-102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.3	
BY-101	2.1	0.8	9.9	47.8	0.0	14.7	11.2	141.6	16.2	14.7	9.9	6.3	672.7	87.7	132.4	88.1	137.0	73.5	21.6	80.4	372.7	
BY-102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BY-103	1.0	0.3	4.6	23.1	0.0	8.0	4.7	66.6	7.6	8.9	4.8	3.0	352.2	41.7	66.2	42.4	86.9	35.5	9.9	37.7	178.2	
COND																						
CWB	343.2	1.3	5616.7	6365.9	6174.2	21063.5	1463.9	1984.0	11343.2	21895.3	10413.3	2531.8					33.9				278.1	
CWR	0.0	0.0	4.7	3.4	0.4	71.1	0.0	270.1	56.9	23.5	6.7	3.8	2736.9	1818.2	15.7	25.1	20289.0	5854.9	825.3	258.9	1431.0	
GROUT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.3	
LEAK	82.0	0.0	14.1	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	132.5	68.0	6.0	34.0	0.9	0.4	0.0	0.0	0.9	
PCOND																						
R2025													364.5	236.3	4.5	15.3						
RCORD																						
RR	0.0	0.0	0.2	0.0	0.0	1.8		3.8	0.8	2.0	0.3						440.9	146.6	9.7	4.9	51.9	
TFCHN	41.9		313.8	182.0	8.5	413.3		5348.3	1142.8		576.7									102.0		
UWE	0.0		0.5	0.3	0.1	13.3		25.8	2.4		0.0						2753.5	1160.9	148.7	19.7	186.9	
UR	22823.5	12048.5	165.7	658.7	7.5			1007.3	787.8	106.8												
WBT																						
A1COND																						
A2COND																						
BCOND																						
BYCOND																						
S1COND																						
S2COND																						
T1COND																						
T2COND																						
A1-In		6.5	186.7	829.4	0.2	181.5	81.7	2230.3	240.1	483.1	267.4	67.5	6065.9	852.4	1314.1	960.2	3485.7	1422.4	383.5	270.2	10849.5	
A2-In																						
B-In			23872.7	9449.4	1112.5	1317.3		9580.0														
BY-In	4.7	1.1	235.7	52.5	0.4	44.8	3.3	1187.4	444.8	2152.9	1627.0	0.8	18.9	8.8	10.9	13.3	1952.2	1546.0	75.4	8071.9	28008.0	
S1-In	154.3	45.7	708.0	3125.3	0.6	1830.5	338.4	10549.2	1282.8	843.5	678.1	541.4	189854.1	9886.0	24305.1	8556.9	10884.4	5759.5	1780.6	5583.4	28012.5	
S2-In	94.1	21.9	375.3	1784.6	0.3	515.8	347.4	5150.9	586.0	495.3	334.9	231.6	23425.0	3075.9	4949.8	3246.9	4821.1	2558.9	672.0	2815.9	12986.5	

WHC-SD-WM-ER-312, Rev. 1

WSTRS3.45h	MW1	MW2	1C1	1C2	2C1	2C2	224	UR/TSF	PF+CR1	PF+CR2	TF+CN	1CF+CN	R1	R2	CWR1	CWR2	P1	P2	PT	PL1	CWP1	CWP2
T1-h	1434.6		20847.2	10848.9	862.6			8005.9				180.6										
T2-h	613.1	294.7	2813.3	18138.2	2.2	5259.6	2.2	67786.1	8049.4	3481.0	2500.0	3606.1	86682.6	27489.6	38863.7	48900.6	86816.6	32298.9		1249.0	18688.6	104431.9
STATLOSS																						
B-h	6.7		1848.1	1143.9	76.6	384.3		4481.8	172.2													
BY-h	1.8	0.6	73.9	38.0	0.2	19.8	5.8	612.2	146.4	711.0	417.6	2.4	123.9	29.7	38.6	37.1	678.9	712.4		196.9	3714.9	13313.3
B1-h																						
B2-h																						
T1-h	319.3		1846.8	2246.0	78.7			8473.1				1033.4										
T2-h																						
A1-h																						
P-h	0.0	0.0	0.7	0.6	0.0	0.1		6.7	1.8	6.2	6.2	0.1	8634.6	6712.3	480.1	436.3	7.6	3.7		1.8	30.4	243.6
propump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

WSTR2.49	CWZ1	OWW1	OWW2	OWW3	Z	HS	TH1	TH2	AR	B	BL	SRH	SRV	CSR	DE	CEM	MT	Salt Shury	DW	N	B'	B-SRCS	M'	T1-SRCS
A-101	8.5	12.4	24.9	52.4	37.1	8.8	2.5	5.6	93.8	33.0	217.7	163.3	127.3	426.3			14.7							
A-102	0.2	0.2	0.4	1.0	0.7	0.2	0.0	0.1	2.0	0.6	4.2	3.4		8.0			0.3							
A-103	3.2	4.7	9.1	20.7	13.8	3.8	1.0	2.2	40.6	13.2	86.9	89.7		165.3			5.5							
A-104																								
A-105		0.0	0.0	0.0						0.0	0.0			0.0						0.0			0.0	
A-106	1.2	1.7	3.8	8.8	4.8	0.9	0.3	0.6	5.5	3.0	21.8	12.0		50.8			2.3			18.5	5.5		1.4	10.7
AX-101	6.6	9.7	19.0	43.0	28.9	7.3	2.0	4.6	85.0	28.3	178.8	142.2		342.8			11.5			99.3	34.7		11.0	61.5
AX-102	0.4	0.8	1.4	2.3	1.8	0.4	0.1	0.2	2.5	2.7	8.8	5.3		19.8			0.9			8.3	2.1		0.6	4.0
AX-103	0.9	1.3	2.7	5.3	3.7	0.9	0.2	0.6	8.1	2.5	28.2	15.5		43.4			1.6			12.6	4.2		1.3	6.1
AX-104																								
B-101																								
B-102	0.0	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.0			0.3						0.0	0.0		0.4	0.0
B-103	0.0	0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.1			0.3						0.0	0.0		0.2	0.0
B-104																							5.2	
B-105	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0						0.0	0.0		0.0	0.0
B-106	0.0	0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0			0.1						0.0	0.0		0.3	0.0
B-107		0.0																					0.0	0.0
B-108	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0						0.0	0.0		0.0	0.0
B-109																								
B-110																								
B-111		0.0	0.0	0.0		0.0	0.0			0.0	0.0			0.0						0.0			0.0	
B-112	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0						0.0	0.0		0.0	0.0
B-201																								
B-202										7.2										21.3				
B-203																				0.0				
B-204																				0.9				
BX-101																								
BX-102		0.0	0.0	3.8		1.0	0.0			1.7	0.2			2.3						0.0			0.0	
BX-103	0.0	0.0	0.0	0.1		0.0	0.0	0.0	0.2	0.0	0.2	0.1		1.1						0.0	0.0		0.0	0.0
BX-104	0.8	0.9	1.8	3.8	3.8	0.5	0.2	0.4	4.8	0.9	15.0	8.4		35.7			1.3			12.7	4.5		1.1	7.8
BX-105	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	0.4	0.1	1.1	0.7		2.6			0.1			0.9	0.3		0.1	0.5
BX-106	0.0	0.0	0.1	0.4		0.1	0.0	0.0	0.8	0.1	0.6	0.4		0.6						0.0	0.0		0.1	0.0
BX-107		0.0	0.0			0.0	0.0							0.7						0.0			0.0	
BX-108																								
BX-109		0.0												0.0										
BX-110	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0						0.0	0.0		0.0	0.0
BX-111	0.0	0.0	0.0	0.2		0.0	0.0	0.0	0.1	0.0	0.1	0.1		0.3						0.0	0.0		0.0	0.0
BX-112	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.1	0.1		0.1						0.0	0.0		0.0	0.0
BY-101																								
BY-102	0.0	0.0	0.1	0.2		0.0	0.0	0.0	0.9	0.1	0.7	1.1		0.9						0.0	0.0		0.0	0.0
BY-103																								
BY-104																								
BY-105																								
BY-106																								
BY-107	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0						0.0	0.0		0.0	0.0
BY-108	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0						0.0	0.0		0.0	0.0
BY-109																								
BY-110	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0			0.0	0.0		0.0	0.0
BY-111																								
BY-112	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0						0.0	0.0		0.0	0.0
C-101																								

WTR13.405	CW21	OWW1	OWW2	OWW3	Z	H2	TH1	TH2	AR	g	ML	SRW	SRW'	CGR	DE	CEM	MT	Leak	Shut	DW	N	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'-6023	
C-102		0.0	0.0	0.0		0.0	0.0	0.0	0.1	3.8	0.4	4.5	37.0	8.2	0.0			0.0		0.0	0.0											0.1	
C-103		0.0	0.2	2.8		0.0	2.1	0.0	0.0	0.2	0.1	0.8	0.8	1.7	0.0			0.0		0.0	0.0											0.1	
C-104		0.0	0.1	0.1		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0		0.0	0.0											0.3	
C-105		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0		0.0	0.0											0.9	
C-106		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0		0.0	0.0											0.9	
C-107													1.1																				
C-108																																	
C-109		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0					0.0	0.0											0.0	
C-110		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0					0.0	0.0											0.0	
C-111		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0					0.0	0.0											0.0	
C-112		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0					0.0	0.0											0.0	
C-201																																	
C-202																																	
C-203																																	
C-204																																	
E-101		2.2	3.5	5.6	18.2	13.4	2.8	0.7	1.7	3.6	2.5	52.8	16.5	180.3				6.0		48.6	20.7											30.7	
E-102		0.2	0.1	14.1	38.4	38.4	4.7	1.8	3.9	11.3	5.8	118.5	28.1	338.7				68.4		118.8	38.3												28.1
E-103		0.7	0.1	8.1	24.2	24.2	3.0	1.0	2.6	8.9	3.9	78.1	25.1	218.2				34.4		78.5	24.3												82.9
E-104		1.8	3.5	8.7	18.3	0.8	1.8	0.4	1.8	0.1	1.8	41.1	3.4	222.9						78.8	32.2												48.1
E-105		6.0	4.5	8.1	10.0	0.5	2.1	0.5	1.7	0.7	2.1	82.9	4.0	323.9						82.1	50.9												42.2
E-106		1.8	1.8	2.8	6.8	0.8	1.0	0.3	0.7	8.1	1.8	27.5	16.1	62.9				2.2		22.6	7.9												13.7
E-107		2.2	4.8	11.2	20.8	0.8	2.6	0.8	2.3	0.2	2.6	88.9	8.3	348.8						113.5	58.5												80.0
E-108		6.8	4.4	10.7	21.8	0.7	2.8	0.8	2.3	0.2	2.8	75.1	8.0	285.7						116.0	64.7												87.1
E-109		3.1	4.0	5.3	21.1	8.4	2.8	1.0	2.2	1.9	2.9	70.9	12.8	238.6						83.2	25.3												37.1
E-110		6.8	6.8	10.8	20.4	8.3	4.1	1.0	2.8	4.9	3.8	117.0	17.7	418.6						117.0	62.7												94.4
E-111		7.8	4.9	11.8	22.3	0.9	2.9	0.8	2.4	0.2	2.7	70.3	5.8	372.4						118.9	62.3												83.2
E-112		1.3	1.2	2.2	5.6	5.2	0.7	0.2	0.6	1.8	0.8	18.1	5.8	53.4				2.7		18.5	8.4												11.9
E-101		11.7	12.3	18.7	58.3	81.3	8.5	2.7	6.2	18.2	9.4	187.8	63.3	542.9				0.1		171.2	64.4												108.6
E-102		14.0	13.5	23.4	80.2	88.2	7.7	2.7	6.5	19.6	9.9	194.5	73.4	508.9				1.5		183.1	97.0												131.9
E-103		8.1	8.9	15.4	44.4	38.1	8.9	2.0	4.7	11.1	6.9	182.4	48.2	433.1				8.5		126.0	94.9												84.3
E-104		12.6	13.9	21.4	84.7	81.8	10.8	3.0	6.8	15.9	10.0	228.3	72.6	689.8				4.8		196.0	90.0												118.7
E-105		11.6	11.0	18.3	48.3	81.2	8.1	2.1	5.3	13.9	7.8	182.3	51.0	435.0				73.9		188.7	48.7												107.9
E-106																																	
E-107																																	
E-108																																	
E-109																																	
E-110																																	
E-111		0.0	0.0	0.0	0.2		0.0	0.0	0.0	0.0	0.0	0.2		5.5						0.0	0.0											0.0	
E-112																																	
E-113																																	
E-114		0.0	0.0	0.0	0.3		0.0	0.0	0.0	0.0	0.0	3.8		27.2						0.0	0.0											0.0	
E-115																																	
E-116																																	
E-101		9.1	8.5	15.6	38.9	38.7	4.4	1.8	3.8	10.9	5.7	109.5	41.4	283.9				14.3		118.0	30.9												82.2
E-102		10.8	10.2	17.8	48.3	52.8	5.8	2.0	4.9	11.9	7.2	137.5	51.4	583.3				17.9		142.9	38.5												101.9
E-103		7.1	8.6	15.8	17.5	0.2	0.2	0.3	0.3	0.1				0.0						62.4	0.2												37.2
E-104		10.3	9.8	17.0	43.9	48.9	5.6	1.9	4.8	12.0	7.1	128.5	52.0	388.6				2.8		137.7	38.8												84.6
E-105		3.7	4.5	6.4	21.9	18.1	3.9	1.1	2.3	6.1	3.3	83.6	28.9	222.1						101.8	30.0												34.5
E-106		7.4	7.0	12.3	31.5	32.8	4.0	1.4	3.4	9.0	5.0	87.8	33.0	278.9				38.3		101.8	31.4												88.9
E-107		7.8	8.4	13.8	44.3	38.6	8.4	2.1	4.8	12.8	6.8	152.2	51.4	433.8						185.9	40.0												71.3
E-108																																	
E-109		9.0	10.8	15.9	47.0	31.8	9.0	2.2	4.9	14.0	7.2	181.1	62.9	808.9						128.4	71.7												78.3

WSTR3.466	CWZ1	QWW1	QWW2	QWW3	Z	HS	TH1	TH2	AR	B	BL	SPR	SPR'	CSR	DE	CEM	NIT	SoR Shury	DW	N	B'	S-SbCs	BL'	T1-SbCs
U-110																								
U-111	4.4	4.2	7.4	18.8	18.7	2.4	0.8	2.0	6.0	3.0	59.8	20.7		171.3			13.8		81.9	20.0		4.8		40.8
U-112																								
U-201																								
U-202																								
U-203																								
U-204																								
T-101	0.6	0.4	0.8	1.7	3.0	0.1	0.1	0.2	0.3	0.3	7.1	2.0		16.5					5.8	0.0		0.1		5.7
T-102																								
T-103	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.2			0.5					0.0			0.0		0.0
T-104	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.2		1.1					0.3	0.2		0.0		0.2
T-105																								
T-106																								
T-107																								
T-108																								
T-109																								
T-110																								
T-111																								
T-112																								
T-201																								
T-202																								
T-203																								
T-204																								
TX-101	0.1	0.1	0.2	0.5	0.5	0.1	0.0	0.1	0.2	0.1	1.8	0.8		5.4			0.2		1.9	0.7		0.1		1.2
TX-102	7.1	5.1	11.1	21.8	25.1	1.1	0.8	2.5	4.0	2.8	37.8	28.3		93.1					73.2	0.2		1.2		88.0
TX-103	2.8	2.1	4.4	8.8	15.3	0.4	0.3	1.0	0.6	1.3	19.1	8.0		43.8					30.5	0.3		0.5		26.8
TX-104	1.4	1.1	2.3	4.4	8.5	0.2	0.2	0.5	0.9	0.7	11.1	6.8		18.7					14.8	0.1		0.2		13.7
TX-105	22.7	16.1	34.6	70.2	84.8	3.5	2.7	8.2	0.7	10.8	102.7	6.5		305.8					235.9	0.3		4.0		218.8
TX-106	11.0	8.2	17.3	34.1	58.9	1.7	1.3	4.0	3.1	5.3	98.7	24.7		144.1					114.5	0.4		1.9		106.7
TX-107	0.2	0.1	0.3	0.5	1.0	0.0	0.0	0.1	0.1	0.1	1.2	0.9		2.1					1.7	0.0		0.0		1.5
TX-108	3.4	2.8	5.3	10.5	14.7	0.5	0.4	1.3	0.2	0.0	0.0	0.0		0.0					38.4	0.1		0.6		32.9
TX-109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0					0.0	0.0		0.0		0.0
TX-110	14.3	10.5	22.3	44.3	73.8	2.2	1.7	5.2	4.0	8.8	87.3	29.7		188.0					148.6	0.4		2.5		137.4
TX-111	10.8	8.0	18.8	33.5	57.2	1.7	1.3	3.9	3.8	5.3	70.3	28.5		142.5					112.6	0.3		1.9		104.2
TX-112	24.7	17.8	38.3	80.9	99.3	4.1	3.2	8.1	0.4	12.3	82.2	2.1		312.5					283.2	0.2		4.7		233.0
TX-113	20.3	15.1	36.7	63.6	17.8	2.4	1.9	6.2		8.5	47.8			183.4					206.9			2.8		152.1
TX-114	21.0	15.4	35.4	65.7	32.3	3.0	2.3	7.8		8.4	81.9			209.2					222.5			3.3		185.3
TX-115	25.2	18.5	43.3	78.9	51.4	3.2	2.5	7.4	1.2	8.1	82.8	7.1		240.2					255.9	0.2		3.6		208.6
TX-116	11.7	7.8	21.5	25.4		0.2	0.3			0.1				0.0					102.4			0.3		85.3
TX-117	24.0	18.4	52.2	56.0		0.5	0.7	1.0		0.8	6.1			8.5					190.9			0.8		128.5
TX-118	3.8	2.8	5.8	11.8	18.0	0.8	0.5	1.3	1.8	1.8	28.8	10.1		75.1			1.1		41.4	4.8		1.3		32.4
TY-101	0.0																		0.0					0.0
TY-102	1.1	0.5	1.7	3.4	5.3	0.2	0.1	0.4	0.1	0.5	6.3	0.8		14.3					11.3	0.0		0.2		10.5
TY-103	1.8	1.1	2.4	4.8	3.4	0.2	0.2	0.5		0.7	6.1			18.9					19.4			0.2		15.5
TY-104																								
TY-105																								
TY-106																								
AB-101	3.2	2.7	5.8	13.8	7.5	1.9	0.5	1.5	7.8	8.1	50.8	12.8		178.7				0.3	57.8	23.5		41.7		28.4
AB-102	15.0	19.7	40.0	84.8	88.3	13.3	3.8	8.8	139.8	57.1	494.5	242.4		982.0				22.3	251.0	89.1		18.9		134.4
AB-103	12.7	14.2	27.5	53.0	152.3	9.7	3.4	7.7	60.9	21.2	741.8	99.8		402.7				10.7	406.7	97.1		27.1		108.1
AB-104	11.5	12.4	25.8	53.4	85.5	8.8	2.2	5.4	52.4	22.5	608.5	132.3		374.5					328.1	90.0		10.1		101.8

WSTRES3.45h	CWZ1	OWW1	OWW2	OWW3	Z	HS	TH1	TH2	AR	B	BL	BRH	BRH'	CSA	DE	CEM	INT	Est Shury	DW	H	F'	P-SnCS	BL'	T1-SnCS
T1-In																								
T2-In	18035.0	12282.2	30170.8	43135.1	25278.4	1650.2	1380.7	3781.2	355.2	4874.0	38287.3	2888.1		117057.8					180486.3	88.5		428.0		70.0
STATLOSS																						2030.2		134318.8
0-het																								
0Y-het	11.1	385.9	54.0	4741.4	1.3	658.4	303.6	632.2	21.0	471.5	604.1	4.4		6786.7										
S1-het																								
S2-het																								
T1-het																								
T2-het																								
A1-het																								
H-het	0.5	3.8	0.2	180.9		3.2	2.1	6.9		4.9	88.5			259.8										
crumpump	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0										

WSTR63.450	R in	RShCh	T2 in	T2-ShCh	BY in	BY-ShCh	S1 in	S1-ShCh	S2 in	S2-ShCh	A1 in	A1-ShCh	A2 in	A2-ShCh	P2	PL2	CW2/2	BP /Cyle	BP #/Cyle	PASP	WTR	GAS
A-101		70.6				317.4															1266.0	8.1
A-102		1.3				7.1															23.3	0.1
A-103		29.3				146.1															497.3	2.0
A-104																						
A-105																					0.0	
A-106		8.8				19.4															150.5	0.0
AX-101		55.0				300.2															1003.9	4.4
AX-102		2.7				8.6															80.5	0.0
AX-103		7.0				33.3															180.5	0.0
AX-104																						
B-101																						
B-102		0.0				0.1															0.2	
B-103		0.0																			0.2	
B-104																					0.8	
B-105		0.0																			0.0	
B-106		0.0																			0.8	
B-107																					0.1	
B-108		0.0																			0.0	
B-109						36.2																
B-110						0.0																
B-111						1.0															0.0	
B-112		0.0				2.3															0.0	
B-201																						
B-202																						
B-203																						
B-204																						
BX-101						0.8																
BX-102																					0.5	
BX-103		0.0				1.6															0.9	
BX-104		7.0				0.5															75.8	1.0
BX-105		0.8				0.7															6.3	0.1
BX-106		0.0				7.0															3.3	
BX-107																					0.0	
BX-108																						
BX-109																					0.0	
BX-110		0.0				0.0															0.0	
BX-111		0.0				0.9															0.8	
BX-112		0.0				0.7															0.4	
BY-101																						
BY-102		0.0				6.4															3.1	
BY-103						0.0																
BY-104																						
BY-105						0.0																
BY-106																						
BY-107		0.0				0.0															0.0	
BY-108		0.0				0.0															0.0	
BY-109																						
BY-110		0.0				0.0															0.0	
BY-111																						
BY-112		0.0				0.0															0.0	
C-101																						

WSTRB3.45h	R in	RSNCh	T2 in	T2-SNCh	BY in	BY-SNCh	S1 in	S1-SNCh	S2 in	S2-SNCh	A1 in	A1-SNCh	A2 in	A2-SNCh	P3	PL2	CW2/2	BP /Cpts	BP /NCpts	PASF	WTR	GAS
C-102						0.0															0.0	
C-103		0.0				18.2															84.8	
C-104		0.3				0.9															5.5	
C-105		0.0				0.0															0.0	
C-106																					0.0	
C-107																						
C-108																						
C-109																						
C-110																					0.0	
C-111																					0.0	
C-112																					0.0	
C-201																						
C-202																						
C-203																						
C-204																						
S-101		32.4				1.3															340.7	0.0
S-102		70.7				2.7															734.2	0.1
S-103		42.8				2.2															504.7	0.3
S-104		0.6																			0.0	
S-105		54.1																			375.3	
S-106		128.4																			652.8	
S-107		11.8				0.7															124.9	2.4
S-108		80.8																			848.7	
S-109		78.4																			745.6	
S-110		82.3				0.4															355.3	
S-111		136.0				2.7															778.4	
S-112		85.7																			688.7	
SX-101		11.8				0.4															129.2	
SX-102		84.5				13.8															808.8	
SX-103		80.9				6.1															528.9	
SX-104		83.1				4.7															808.4	
SX-105		123.3				6.7															1187.8	
SX-106		86.3				4.5															1070.6	0.8
SX-107		42.4																			80.5	
SX-108		131.9																			24.0	
SX-109		38.8																			7.4	
SX-110																					30.0	
SX-111		0.3																			0.4	
SX-112		12.8																			27.6	
SX-113																					32.9	
SX-114		4.2																			15.8	
SX-115																						
U-101						3.3															480.0	
U-102		60.7				3.5															804.2	
U-103		68.3																			38.8	
U-104		3.0				4.4															582.3	
U-105		63.9				6.0															354.0	
U-106		38.6				3.0															538.6	0.4
U-107		55.1				3.8															785.6	
U-108		65.5				1.5															817.5	
U-109		84.7																				

WTRSR3.45b	R in	RSCR	T2 in	T2-SRCh	BY in	BY-SRCh	S1 in	S1-SRCh	S2 in	S2-SRCh	A1 in	A1-SRCh	A2 in	A2-SRCh	P3	PL2	CWZr2	BP /Cyls	BP /RCyls	PAS/P	WTR	GAS
AN-106		120.2				560.9									2.4	786.3	42.3				3923.6	13.0
AN-106		1.7				3.7									0.0	0.1	0.1				37.7	0.0
AN-107		44.7				682.4									0.5	71.4	1.1				1956.7	
AP-101		2.9				8.8									0.0	129.0	70.6			983.7	491.6	0.0
AP-102		62.9				135.4									0.1	4.5	3.3			5.0	1475.4	0.1
AP-103		0.7				2.2									25.4	32.0	15.4			41.0	619.2	0.0
AP-104																					5.1	
AP-106		29.2				89.5									0.2	1512.5	797.0			643.1	4280.4	0.4
AP-106		10.6				32.3									2.5	549.7	283.0			281.4	2062.2	0.1
AP-107																				1115.0	18.0	
AP-108		0.1				0.4									14.4	96.0	1.9			112.6	433.4	0.0
AW-101		78.7				294.9									1.0	2261.2	1137.8				4101.7	29.0
AW-102		25.7				56.3									0.1	1132.1	542.2			424.6	3032.1	0.4
AW-103		0.0				0.0									0.0	10.3	220.5				71.2	0.0
AW-104		0.0				0.1									0.0	934.5	0.3				67.4	0.0
AW-105		9.5				34.0									0.1	543.7	514.0			80.9	1363.2	0.2
AW-106		33.0				68.3									0.2	1227.5	597.3			528.5	3481.7	0.2
AY-101		13.4				36.1									0.0	21.6	0.6				512.4	0.0
AY-102		0.0				0.1									4.2	1.1	0.5			0.7	366.0	0.0
AZ-101		3.6				12.4									663.4	10.9	0.0				1560.8	0.1
AZ-102		0.1				0.8									378.4	12.1	0.0				1615.2	0.0
BY-101		219.1				17.4															2221.5	8.0
BY-102		0.0				0.1									0.0	0.3	0.0				347.9	0.0
BY-103		109.0				66.8															1490.4	
COND																						
CRB																					31829.2	
CSR		2589.9				41.9															13263.9	
GROUT		0.1				0.3									0.0	4.5	2.7			0.5	271.8	0.0
LEAK		19.0																			63.0	
PCOND																						
A2025		271.5																			263.3	
BCOND																						
BR																					438.7	
TPCN																					1178.3	
ARK																					2212.4	
UR																					33245.6	
VENT																						
A1COND																						
A2COND																						
BCOND																						
BYCOND																						
S1COND																						
S2COND																						
T1COND																						
T2COND																						
A1-in		1897.1				55899.2															81414.9	41.0
A2-in																					20.1	
S-in																					429.5	
BY-in		7.1				1683.0															5889.2	
S1-in		36474.7				718.7															206345.1	
S2-in		7247.8				414.8				41.0											82869.5	1.7

WETRE3.456	SWKLC	UNK	assume	mmVal	expVal	dmVal	rankVal	traffic	mean tr.	Max. TOC wt%	Date of Max. TOC	TOC wt% new	Max. Max. Index	Max. Ind. New
A-101		188.3	828.4	3895.2	850.0	3	853	18572	4854	8.40	1878.50	1.24	17.81	1.10
A-102		29.3	18.2	98.5	38.0	3	41	70415	67881	4.81	1878.80	0.78	14.35	1.14
A-103		69.5	368.9	1538.1	368.0	3	371	16485	4181	4.34	1878.80	1.33	12.08	1.14
A-104		0.0	0.0	0.0	0.0	28	28	18472		2.07	1882.83		2.70	
A-105		0.0	0.0	0.1	0.0	18	19	5978	842	1.40	1888.95		2.28	
A-106		19.4	78.8	438.2	75.0	50	125	38588	8083	5.30	1874.50	1.17	17.78	0.80
AK-101		137.5	735.5	3164.0	735.0	13	748	14884	4456	5.08	1878.28		17.48	1.13
AK-102		7.3	33.0	176.7	33.0	8	39	11257	4332	1.47	1878.63	1.18	7.92	0.84
AK-103		17.8	87.9	428.0	88.0	14	112	13838	4186	2.73	1878.08	1.20	10.06	1.06
AK-104		0.0	0.0	0.0	0.0	7	7	5895	828	2.18	1878.45		7.45	
B-101		0.0	0.0	0.0	0.0	113	113	8188	589	0.55	1874.80		0.88	
B-102		5.8	0.8	4.0	4.0	28	32	4153	1792	0.30	1877.20	0.09	0.88	0.36
B-103		0.3	0.3	2.0	0.0	58	58	11841	1782	0.43	1873.70		0.83	
B-104		2.0	5.2	8.0	5.0	368	371	2802	232	0.00	1874.95	0.00	0.00	0.00
B-105		0.0	0.0	0.1	0.0	158	158	8895	3241	0.61	1873.10		0.41	
B-106		0.3	0.5	1.8	1.0	118	117	17458	1600	0.11	1878.20	0.11	0.28	0.28
B-107		0.7	0.0	1.0	1.0	184	185	4254	365	0.02	1863.53	0.00	0.05	0.03
B-108		0.0	0.0	0.0	0.0	84	84	4988	2688	0.84	1873.45		0.73	
B-109		4.0	38.2	39.2	30.0	57	127	4911	2425	0.79	1880.95	0.73	0.84	0.85
B-110		0.0	0.0	0.0	0.0	246	246	8386	802	0.86	1880.28		0.85	
B-111		0.0	1.0	1.0	1.0	236	237	8555	5885	0.85	1876.20	0.85	0.77	0.85
B-112		0.7	2.3	3.0	3.0	30	33	8787	5883	0.71	1873.10	0.53	0.61	0.85
B-201		1.0	1.0	1.0	1.0	28	28	58	55	0.00	1881.48		0.02	
B-202		5.7	24.8	41.8	0.0	27	27	243	282	0.30	1880.71		0.22	
B-203		1.0	0.0	1.0	1.0	50	51	287	317	0.01	1882.53	0.00	0.02	0.01
B-204		2.0	0.0	2.8	1.0	48	50	372		0.01	1882.53	0.00	0.02	0.00
BK-101		0.3	0.8	1.0	1.0	42	43	27738	780	0.85	1878.78	0.53	0.88	0.85
BK-102		0.4	0.3	18.6	0.0	95	95	10179	3813	0.40	1877.10		1.03	
BK-103		0.2	3.0	4.7	4.0	82	86	35884	2724	0.58	1877.10	0.58	1.33	0.77
BK-104		11.2	56.3	258.8	58.0	41	99	24788	1555	2.05	1876.03	1.01	4.44	0.88
BK-105		1.3	5.0	21.0	5.0	48	51	11350	4284	1.08	1880.80	1.03	1.01	0.88
BK-106		3.9	12.1	18.7	18.0	31	46	18218	3782	0.86	1876.85	0.83	0.83	0.72
BK-107		0.1	0.0	0.0	1.0	344	345	2388		0.31	1873.21	0.30	0.85	0.85
BK-108		0.0	0.0	0.0	0.0	28	28	2714	1834	0.40	1873.86		0.70	
BK-109		0.0	0.0	0.0	0.0	183	183	7585	723	0.55	1874.96		0.61	
BK-110		1.0	0.0	1.0	0.0	188	188	3014	431	0.85	1876.20		0.60	
BK-111		17.1	2.0	20.8	0.0	211	213	3288	1682	0.85	1871.85		0.78	
BK-112		0.2	0.8	1.8	1.0	184	185	1228	334	1.08	1878.82	1.08	1.04	1.04
BY-101						387	387	8640	3513	0.87	1876.85		0.83	
BY-102		2.3	9.3	17.4	11.0	330	341	21863	8671	1.11	1878.53	0.86	1.06	1.06
BY-103		0.0	0.0	0.0	0.0	400	400	28940	1589	0.85	1876.20		2.42	
BY-104		0.0	0.0	0.0	0.0	326	326	8785	3088	0.87	1876.85		0.96	
BY-105		0.0	0.0	0.0	0.0	503	503	7401	2438	0.78	1873.10		0.87	
BY-106		0.0	0.0	0.0	0.0	642	642	10828	1587	1.33	1877.80		1.28	
BY-107		0.0	0.0	0.0	0.0	286	286	13781	1223	0.85	1876.20		0.85	
BY-108		0.0	0.0	0.0	0.0	228	228	13354	2388	0.86	1871.80		0.85	
BY-109						423	423	33306	6813	0.83	1872.80		0.82	
BY-110		0.0	0.0	0.0	0.0	398	398	12685	1842	1.53	1878.60		1.47	
BY-111						489	489	10804	1731	0.83	1878.63		1.07	
BY-112		0.0	0.0	0.0	0.0	281	281	38988	31010	1.00	1872.33		0.85	
C-101		0.0		0.0	0.0	88	88	4810	3	0.82	1872.85		1.25	

WETRE2.486	SWLQ	UNK	assumes	mmVol	aspVol	dmVol	rankVol	traffs	assum trf.	Max. TOC wt%	date of Max. TOC	TOC wt% now	Max. Hrs. Ind.	Max. Ind. Now
C-102		0.0	0.0	0.0	0.0	423	423	19819	1780	0.85	1978.20		1.85	
C-103		23.4	103.9	169.4	133.0	62	198	10282	1113	2.48	1975.28	1.72	8.32	4.38
C-104		1.8	3.8	16.8	5.0	290	295	25290	1484	6.88	1978.71	1.08	16.85	1.27
C-106		0.0	0.0	0.0	0.0	150	150	26291	1758	0.98	1988.28		2.40	
C-107		27.0	4.9	32.0	32.0	187	229	11045	2998	0.70	1978.08	0.08	2.23	0.98
C-108			1.1	1.1	0.0	275	275	4374	393	5.74	1984.03		18.06	
C-108		0.0	0.0	0.0	0.0	66	66	6799	2104	0.77	1988.28		2.07	
C-108		6.0		6.0	4.0	62	66	4870	1041	0.87	1970.03		2.34	
C-110		0.0	0.0	0.0	0.0	187	187	3730		0.71	1968.72		3.88	
C-111		0.0	0.0	0.0	0.0	57	57	6059	1207	1.15	1970.47		2.47	
C-112		0.0	0.0	0.0	0.0	104	104	6778	1061	0.35	1974.22		0.84	
C-201		2.0		2.0	0.0	2	2	277	87	2.54	1988.97		11.19	
C-202						1	1	285	285	2.31	1964.47		11.19	
C-202		4.3	0.8	5.2	0.0	5	5	204	202	9.50	1955.87		11.19	
C-204		22.7	36.5	61.3	0.0	3	3	285	202	3.89	1955.87		11.19	
S-101		48.8	210.7	1089.6	218.0	211	427	7039	3187	0.89	1979.07	0.73	0.85	0.85
S-103		99.9	396.0	2428.0	348.0	4	949	80240	78998	2.26	1978.81	0.67	6.37	0.85
S-103		78.3	234.4	1800.0	238.0	8	248	8191	8927	1.81	1978.82	0.87	1.48	0.86
S-104		1.1	0.6	1.7	1.0	293	284	3497	852	0.01	1974.97	0.01	0.01	0.01
S-106		79.2	398.0	1703.2	406.0	2	407	2958	2922	0.29	1974.97	0.29	0.28	0.28
S-106		86.9	437.3	2208.4	447.0	32	478	3779	3885	0.38	1978.72	0.37	0.30	0.29
S-107		48.5	91.9	478.5	122.1	254	378	18358	8772	1.19	1980.53	0.84	1.21	1.04
S-108		112.6	477.6	2480.5	487.0	5	802	3485	2480	0.36	1974.80	0.35	0.28	0.28
S-108		88.8	483.0	2641.7	484.0	19	807	2824	2837	0.37	1974.85	0.37	0.30	0.30
S-110		42.6	276.7	1303.6	277.0	113	380	12889	1088	0.81	1977.35	0.61	0.80	0.50
S-111		85.0	453.9	2880.1	480.0	78	838	4072	4144	0.56	1985.57	0.56	0.41	0.41
S-112		114.0	504.1	2622.3	517.0	6	523	2550	2548	0.36	1978.95	0.36	0.28	0.28
SX-101		78.5	128.8	481.6	148.0	310	488	7141	1417	0.67	1980.34	0.44	0.64	0.83
SX-102		133.6	430.4	3212.1	484.0	68	843	15087	5491	1.05	1978.97	1.03	0.72	0.72
SX-103		119.1	538.9	3291.6	540.0	112	852	8881	4936	1.07	1978.47	1.01	0.78	0.76
SX-104		118.8	435.3	2785.9	445.0	189	614	6279	3236	1.08	1978.95	0.92	0.72	0.69
SX-106		185.7	817.1	4029.2	628.0	56	883	11308	4470	1.07	1978.85	0.98	0.78	0.70
SX-106		186.4	526.2	3298.8	537.0	1	538	33617	10318	2.32	1976.47	0.81	7.28	0.86
SX-107		0.0	67.8	100.4	0.0	104	104	4387	737	0.02	1974.83		0.01	
SX-108		8.2	153.9	187.7	0.0	87	87	4696	742	0.02	1968.72		0.01	
SX-108		2.8	45.7	82.7	0.0	280	280	2894	688	0.02	1973.97		0.01	
SX-110			30.0	30.0	0.0	82	82	7146	506	0.37	1978.28		0.83	
SX-111		0.2	0.5	7.2	0.0	125	125	8218	881	0.99	1974.47		0.88	
SX-112		26.3	17.3	114.4	0.0	82	82	3782	806	0.01	1965.95		0.01	
SX-113		28.1	3.3	74.3	0.0	31	31	724						
SX-114		0.7	13.7	84.3	0.0	181	181	7828	881	0.88	1973.22		0.97	
SX-115		0.0		0.0	0.0	12	12	2044	278					
U-101		3.0		3.0	3.0	22	25	5280	808	0.36	1980.22		0.13	
U-102		73.5	328.3	1952.4	331.0	43	374	8889	8174	1.18	1978.04	0.98	1.82	0.73
U-103		132.0	389.6	2482.8	436.0	32	488	10152	8906	1.18	1978.80	0.82	1.34	0.72
U-104		25.5	85.1	410.0	43.0	78	123	3584	861	0.24	1978.72	0.20	0.13	0.13
U-106		100.7	374.0	2370.5	388.0	32	418	6044	4905	1.35	1978.80	1.00	1.47	0.74
U-106		82.6	198.0	1319.8	200.0	28	228	4848	2867	1.28	1978.10	1.13	1.83	0.80
U-107		114.5	308.0	2067.9	330.0	76	408	16446	4618	1.01	1978.48	0.84	0.78	0.68
U-108		132.6	381.2	2841.5	438.0	28	488	9287	4188	1.02	1977.48	0.98	0.71	0.71
U-109		136.1	395.6	2880.1	418.0	48	483	8815	3886	1.18	1978.10	1.13	0.78	0.78

WTRSS3.48L	SWLQ	UNK	assume	atomVal	expVal	shnVal	tanVal	traff	assum trf.	Max. TOC wt%	date of Max. TOC	TOC wt% now	Max. Haz. Index	Haz. Ind. Now
U-110	0.0		0.0	0.0	188	186	4112	100						
U-111	89.1	283.0	1286.2	303.0	28	329	8525	4334	1.33	1978.10	0.64	1.23	0.68	
U-112	4.0		4.0	4.0	45	49	959	964						
U-201	1.0	0.0	1.0	1.0	4	5	45							
U-202	1.0		1.0	1.0	4	5	47							
U-203	0.5	0.4	4.0	1.0	2	3	44							
U-204	1.0		1.0	1.0	2	3	13							
T-101	35.1	23.2	120.9	85.0	37	102	6240	201	0.58	1977.73	0.36	0.78	0.78	
T-102	13.0		13.0	13.0	19	32	3113	2190	0.34	1972.73		0.68		
T-103	8.1	0.2	8.1	8.0	18	27	8174	1071	0.32	1973.23	0.04	0.63	0.62	
T-104	1.7	1.0	8.8	2.0	442	445	3498	36	0.76	1978.00	0.57	0.85	0.85	
T-105	0.0		0.0	0.0	88	88	6087	3137	1.78	1980.48		0.73		
T-106	7.0		7.0	2.0	19	21	3173	2205	0.38	1974.53		0.64		
T-107	8.0		8.0	8.0	171	180	5011	282	0.58	1978.48		0.53		
T-108	0.0		0.0	0.0	44	44	4285	3028	0.29	1974.48		0.61		
T-109					58	58	2485	1899	0.24	1973.73		0.51		
T-110	0.7		3.4	3.1	378	378	22835		0.00	1983.01	0.00	0.02	0.00	
T-111	2.2	0.7	2.9	2.1	458	458	21807	21953	0.00	1983.03	0.00	0.01	0.00	
T-112	8.0		8.0	7.0	80	87	28432	23884	0.75	1977.88		0.53		
T-201	1.0		1.0	1.0	28	29	55		0.01	1978.73		0.02		
T-202	0.0		0.0	0.0	21	21	87	118	0.00	1988.23		0.02		
T-203					35	35	173		0.03	1977.73		0.02		
T-204	0.0		0.0	0.0	38	38	85		0.00	1973.48		0.03		
TX-101	2.3	10.1	38.8	11.0	78	87	26338	8623	2.55	1975.53	0.52	4.42	0.80	0.80
TX-102	23.6	211.5	812.4	215.0	2	217	11785	8003	0.88	1978.80	0.88	0.80	0.88	0.88
TX-103	55.6	138.5	400.0	154.0	3	157	13088	10102	0.43	1978.35	0.37	0.58	0.58	0.58
TX-104	27.8	47.4	195.4	47.0	18	85	5487	3854	1.27	1979.23	0.84	0.98	0.98	0.98
TX-105	78.8	585.0	2421.1	601.0	8	809	9857	8130	0.37	1973.10	0.35	0.41	0.34	0.34
TX-106	38.7	334.4	1273.6	336.0	5	341	14808	10883	0.65	1978.48	0.62	0.65	0.62	0.62
TX-107	27.2	5.4	48.3	28.0	8	38	8221	2584	0.98	1978.85	0.23	1.01	0.84	0.84
TX-108	48.8	102.3	407.6	128.0	6	134	10289	8472	0.43	1978.88	0.32	0.42	0.38	0.38
TX-109	0.0	0.0	0.2	0.0	384	384	7831	1847	1.42	1982.24		1.38		
TX-110	71.4	410.8	1683.5	425.0	37	462	11824	11514	0.62	1979.73	0.61	0.60	0.60	0.60
TX-111	41.3	320.3	1256.6	327.0	43	370	10000	9416	0.88	1978.10	0.88	0.68	0.68	0.68
TX-112	84.1	586.0	2480.0	625.0	34	849	4287	3501	0.33	1978.88	0.32	0.31	0.31	0.31
TX-113	66.7	407.0	1712.0	424.0	183	607	7808	4415	0.27	1974.35	0.26	0.25	0.25	0.25
TX-114	58.7	487.7	1980.5	473.0	62	535	10814	9538	0.28	1974.78	0.28	0.27	0.27	0.27
TX-115	75.7	548.5	2321.9	560.0	8	568	10352	8111	0.34	1982.26	0.34	0.32	0.32	0.32
TX-116	23.8	170.0	575.5	172.0	391	563	8172	3454	0.08	1970.10	0.08	0.10	0.10	0.10
TX-117	41.0	306.2	1335.2	306.0	226	832	11127	8435	0.14	1971.10	0.14	0.14	0.14	0.14
TX-118	67.4	215.3	860.4	240.0	45	285	14862	12380	1.54	1978.88	0.43	1.89	0.82	0.82
TY-101	0.0	0.0	0.0	0.0	118	118	4130	552	0.00	1974.07		0.00		
TY-102	8.0	30.4	126.2	35.0	29	84	8106	4152	0.42	1978.35	0.38	0.41	0.41	0.41
TY-103	21.7	37.6	172.4	54.0	106	182	18481	4261	0.75	1988.32	0.24	1.05	0.30	0.30
TY-104	6.0		6.0	3.0	43	48	3815	1436	0.18	1974.53		0.17		
TY-105	7.6		104.8	73.0	158	231	8237		0.00	1978.88	0.00	0.00	0.00	0.00
TY-106					21	21	5052	5033	0.00	1971.48		0.00		
AN-101	0.4	271.0	437.5	1898.8	740.0		740	7078	1178	3.85	1984.04	0.28	11.80	0.45
AN-102		385.2	1854.2	7408.0	1080.0		1080	3884		1.53	1984.24	1.53	1.02	1.02
AN-103	20.8	402.4	1804.5	8111.4	951.0	2	883	4736	377	1.08	1986.08	1.08	0.83	0.83
AN-104		338.8	1486.7	8147.9	1058.0		1058	2381		1.44	1983.99	1.08	0.87	0.87

WTRSR3.45b	SWLQ	UNK	assum	sumVol	mapVol	dmVol	transVol	trans	assum trf.	Max. TOC wt%	date of Max. TOC	TOC wt% now	Max. Haz. Index	Haz. Ind. Now
AM-105		711.0	3484.0	11702.1	1130.0		1130	2185		1.39	1985.60	1.39	0.84	0.84
AM-106		8.2	17.5	110.9	21.0		21	1067		1.00	1982.02	0.98	0.86	0.86
AM-107		285.6	1851.2	4904.5	1063.0		1063	1187		1.48	1984.24	1.48	1.18	1.18
AP-101	0.7	36.9	93.6	1929.1	1060.0		1060	2710	104	0.24	1989.28	0.08	0.62	0.79
AP-102		212.8	847.4	4328.4	1103.0		1103	3088		0.95	1984.24	0.95	0.85	0.85
AP-103	0.1	10.2	471.7	1425.9	1131.0		1131	2861	99	0.19	1993.99	0.19	0.90	0.90
AP-104		5.8		27.0	18.0		18	1090						
AP-105	7.0	268.9	1478.5	8902.4	820.0		820	1683		1.03	1989.15	0.99	0.83	0.83
AP-106	2.5	88.2	636.7	4389.8	1127.0		1127	2063		0.88	1986.64	0.39	0.96	0.96
AP-107		22.0		1158.0	1110.0		1110	1153						
AP-108	0.0	32.0	285.4	1240.8	1131.0		1131	1182	233	0.24	1981.68	0.23	0.93	0.93
AW-101	33.4	431.0	2401.9	12398.1	1078.0	61	1138	10301	417	1.81	1981.75	1.14	1.09	0.91
AW-102	218.9	241.3	988.4	7075.8	978.0		979	101581	6078	1.81	1981.75	0.87	1.82	0.91
AW-103	0.0	28.2	7.9	328.2	283.0	263	648	6232	74	1.32	1981.89	0.00	1.12	0.07
AW-104	0.0	89.3	43.0	1063.0	1020.0	103	1123	15343	247	1.43	1985.24	0.04	1.04	0.77
AW-105	2.9	90.8	422.2	3282.9	800.0	240	1040	7099	1270	1.36	1982.48	0.38	1.09	0.80
AW-106	143.5	272.4	1118.1	7991.5	1107.0	1	1108	28782	571	1.18	1983.98	0.58	1.11	0.80
AY-101	15.0	96.7	149.9	1410.9	948.0	33	981	6702	1392	1.36	1986.50	1.22	2.96	2.86
AY-102	0.0	5.6	19.9	718.1	678.1	32	711	20986	2878	1.69	1978.00	0.21	1.41	0.86
AZ-101		72.3	928.9	2438.1	831.0	29	980	6323	3654	1.64	1979.24	0.08	1.89	0.22
AZ-102		5.5	176.9	2048.9	920.0	43	983	8812	3367	1.63	1978.00	0.02	5.93	0.10
BY-101		406.0	1801.3	8708.4	1100.0		1100	1806	1630	1.17	1978.39	1.14	0.83	0.78
BY-102		60.1	825.0	826.2	678.1	71	747	35493	34787	1.16	1977.31	0.00	0.90	0.01
BY-103		247.5	959.6	4805.7	744.0		744	2433	2021	1.61	1978.24	0.89	1.42	0.78
COND				616.0	616.0		616							
CRB		872.4	40743.4	121208.5	111701.0		111701							
CSR		2136.5	13240.3	75393.5	25638.0		25638							
GROUT	0.0	48.8	4.1	1080.0	1001.0		1001							
LEAK		11.1	91.7	548.1	428.0		428							
PCOND				57995.0	57995.0		57995							
R2029		6.6	410.3	1182.0	733.0		733							
RCOND				23261.0	23261.0		23261							
SRH		77.1	882.1	2020.8	895.0		895							
TPCH		286.7	5310.4	11889.5	11183.0		11183							
UNK		166.2	6587.1	14067.7	7269.0		7269							
UN		642.7	56048.2	71700.3	70680.0		70680							
YENT				1113.0	1113.0		1113							
A1COND				8373.0	8273.0		8273							
A2COND				47867.0	47867.0		47867							
BCOND				7820.0	7820.0		7820							
BYCOND				38738.0	38738.0		38738							
S1COND				41897.0	41897.0		41897							
S2COND				4631.0	4631.0		4631							
T1COND				10580.0	10580.0		10580							
T2COND				29650.0	29650.0		29650							
A1-in		10183.3	188595.0	267201.5	35750.0		35750							
A2-in			0.0	20.1	80.0		80							
G-in		803.3	26247.7	45844.7	15574.0		15574							
BY-in		3228.3	968.1	71536.8	57987.0		57987							
S1-in		32323.2	434799.8	876084.4	87393.0		87393							
S2-in		10950.0	89778.9	276997.7	26327.0		26327							

WSTRS3.45A	MW1	MW2	1C1	1C2	2C1	2C2	234	UR/TBP	FFeCH1	FFeCH2	TFeCH	1CFeCH	R1	R2	CWR1	CWR2	P1	P2	P2'	PL1	CWP1	CWP2	CWZ-1	OWW1	OWW2	OWW3	Z
A-101																	3.0										
A-102																											
A-103																											
A-104																	1.0										
A-105																		18.0									
A-106																											
AX-101																		10.0									
AX-102																			1.0								
AX-103																		14.0									
AX-104																		7.0									
B-101	3.0																										
B-102	3.0																						1.0				
B-103	3.0																										
B-104					121.0	173.0	11.0																				
B-105					12.0	18.0																					
B-106																											
B-107				184.0																							
B-108				34.0																							
B-109																											
B-110						143.0	100.0																13.0				
B-111						208.0																					
B-112						14.0																					
B-201							28.0																				
B-202							27.0																				
B-203							80.0																				
B-204							48.0																				
BX-101	28.0																										
BX-102	23.0																						8.0				
BX-103	84.0																						8.0				
BX-104	41.0																										
BX-105	48.0																										
BX-106	3.0																										
BX-107				213.0	131.0																						
BX-108				13.0	13.0																						
BX-109					34.0			158.0																			
BX-110				88.0	88.0																						
BX-111					32.0																						
BX-112					132.0																						
BY-101	37.0																										
BY-102	18.0																										
BY-103																											
BY-104																											
BY-105	18.0																						8.0				
BY-106																											
BY-107				24.0				20.0		84.0																	
BY-108										43.0																	
BY-109	38.0									133.0																	
BY-110					37.0					111.0																	
BY-111	25.0																										
BY-112	2.0																										
C-101	3.0								30.0													20.0	25.0				
C-102	6.0								18.0													23.0	330.0	13.0			
C-103																						37.0					

WSTRS3.45b	MW1	MW2	1C1	1C2	2C1	2C2	224	UR/TRP	PFcCN1	PFcCN2	TFcCN	1CFcCN	R1	R2	CWR1	CWR2	P1	P2	P2'	PL1	CWP1	CWP2	CW2r1	OWW1	OWW2	OWW3	Z
C-104	3.0															15.0		2.0		10.0	88.0	89.0	27.0				31.0
C-105								15.0													135.0						
C-106								15.0													34.0						
C-107			218.0																			37.0					
C-108								28.0				12.0															
C-109												45.0															
C-110								187.0																			
C-111								36.0				5.0									16.0						
C-112								15.0				72.0									13.0	3.0					
C-201	1.0																										
C-202																											
C-203	4.0																										
C-204	2.0																										
S-101													92.0		28.0												
S-102													4.0														
S-103													9.0														
S-104													108.0		24.0												
S-105													2.0														
S-106															32.0												
S-107													92.0		89.0	42.0								18.0			
S-108													5.0														
S-109															13.0												
S-110													88.0		24.0												
S-111													96.0		12.0												
S-112													3.0		3.0												
SX-101													154.0														
SX-102													58.0														
SX-103													10.0														
SX-104													99.0														
SX-105													15.0	9.0													
SX-106															83.0	24.0											
SX-107															89.0	18.0											
SX-108															44.0	16.0											
SX-110																32.0											
SX-111															42.0	41.0											
SX-112															44.0	25.0											
SX-113															2.0												
SX-114															11.0	37.0											
SX-115															6.0												
U-101	22.0																										
U-102	43.0																										
U-103	32.0																										
U-104	40.0																										
U-105	32.0																										
U-106	28.0																										
U-107																76.0											
U-108	3.0																26.0										
U-109	24.0															24.0											
U-110	24.0							182.0																			
U-111								13.0					13.0														
U-112								32.0					7.0														
U-201																											

WETBES-624	HW1	HW2	IS1	IS2	IS3	IS4	IS5	IS6	IS7	IS8	IS9	IS10	IS11	IS12	IS13	IS14	IS15	IS16	IS17	IS18	IS19	IS20	IS21	IS22	IS23	IS24	IS25	IS26	IS27	IS28	IS29	IS30	IS31	IS32	IS33	IS34	IS35	IS36	IS37	IS38	IS39	IS40	IS41	IS42	IS43	IS44	IS45	IS46	IS47	IS48	IS49	IS50	IS51	IS52	IS53	IS54	IS55	IS56	IS57	IS58	IS59	IS60	IS61	IS62	IS63	IS64	IS65	IS66	IS67	IS68	IS69	IS70	IS71	IS72	IS73	IS74	IS75	IS76	IS77	IS78	IS79	IS80	IS81	IS82	IS83	IS84	IS85	IS86	IS87	IS88	IS89	IS90	IS91	IS92	IS93	IS94	IS95	IS96	IS97	IS98	IS99	IS100	IS101	IS102	IS103	IS104	IS105	IS106	IS107	IS108	IS109	IS110	IS111	IS112	IS113	IS114	IS115	IS116	IS117	IS118	IS119	IS120	IS121	IS122	IS123	IS124	IS125	IS126	IS127	IS128	IS129	IS130	IS131	IS132	IS133	IS134	IS135	IS136	IS137	IS138	IS139	IS140	IS141	IS142	IS143	IS144	IS145	IS146	IS147	IS148	IS149	IS150	IS151	IS152	IS153	IS154	IS155	IS156	IS157	IS158	IS159	IS160	IS161	IS162	IS163	IS164	IS165	IS166	IS167	IS168	IS169	IS170	IS171	IS172	IS173	IS174	IS175	IS176	IS177	IS178	IS179	IS180	IS181	IS182	IS183	IS184	IS185	IS186	IS187	IS188	IS189	IS190	IS191	IS192	IS193	IS194	IS195	IS196	IS197	IS198	IS199	IS200	IS201	IS202	IS203	IS204	IS205	IS206	IS207	IS208	IS209	IS210	IS211	IS212	IS213	IS214	IS215	IS216	IS217	IS218	IS219	IS220	IS221	IS222	IS223	IS224	IS225	IS226	IS227	IS228	IS229	IS230	IS231	IS232	IS233	IS234	IS235	IS236	IS237	IS238	IS239	IS240	IS241	IS242	IS243	IS244	IS245	IS246	IS247	IS248	IS249	IS250	IS251	IS252	IS253	IS254	IS255	IS256	IS257	IS258	IS259	IS260	IS261	IS262	IS263	IS264	IS265	IS266	IS267	IS268	IS269	IS270	IS271	IS272	IS273	IS274	IS275	IS276	IS277	IS278	IS279	IS280	IS281	IS282	IS283	IS284	IS285	IS286	IS287	IS288	IS289	IS290	IS291	IS292	IS293	IS294	IS295	IS296	IS297	IS298	IS299	IS300	IS301	IS302	IS303	IS304	IS305	IS306	IS307	IS308	IS309	IS310	IS311	IS312	IS313	IS314	IS315	IS316	IS317	IS318	IS319	IS320	IS321	IS322	IS323	IS324	IS325	IS326	IS327	IS328	IS329	IS330	IS331	IS332	IS333	IS334	IS335	IS336	IS337	IS338	IS339	IS340	IS341	IS342	IS343	IS344	IS345	IS346	IS347	IS348	IS349	IS350	IS351	IS352	IS353	IS354	IS355	IS356	IS357	IS358	IS359	IS360	IS361	IS362	IS363	IS364	IS365	IS366	IS367	IS368	IS369	IS370	IS371	IS372	IS373	IS374	IS375	IS376	IS377	IS378	IS379	IS380	IS381	IS382	IS383	IS384	IS385	IS386	IS387	IS388	IS389	IS390	IS391	IS392	IS393	IS394	IS395	IS396	IS397	IS398	IS399	IS400	IS401	IS402	IS403	IS404	IS405	IS406	IS407	IS408	IS409	IS410	IS411	IS412	IS413	IS414	IS415	IS416	IS417	IS418	IS419	IS420	IS421	IS422	IS423	IS424	IS425	IS426	IS427	IS428	IS429	IS430	IS431	IS432	IS433	IS434	IS435	IS436	IS437	IS438	IS439	IS440	IS441	IS442	IS443	IS444	IS445	IS446	IS447	IS448	IS449	IS450	IS451	IS452	IS453	IS454	IS455	IS456	IS457	IS458	IS459	IS460	IS461	IS462	IS463	IS464	IS465	IS466	IS467	IS468	IS469	IS470	IS471	IS472	IS473	IS474	IS475	IS476	IS477	IS478	IS479	IS480	IS481	IS482	IS483	IS484	IS485	IS486	IS487	IS488	IS489	IS490	IS491	IS492	IS493	IS494	IS495	IS496	IS497	IS498	IS499	IS500	IS501	IS502	IS503	IS504	IS505	IS506	IS507	IS508	IS509	IS510	IS511	IS512	IS513	IS514	IS515	IS516	IS517	IS518	IS519	IS520	IS521	IS522	IS523	IS524	IS525	IS526	IS527	IS528	IS529	IS530	IS531	IS532	IS533	IS534	IS535	IS536	IS537	IS538	IS539	IS540	IS541	IS542	IS543	IS544	IS545	IS546	IS547	IS548	IS549	IS550	IS551	IS552	IS553	IS554	IS555	IS556	IS557	IS558	IS559	IS560	IS561	IS562	IS563	IS564	IS565	IS566	IS567	IS568	IS569	IS570	IS571	IS572	IS573	IS574	IS575	IS576	IS577	IS578	IS579	IS580	IS581	IS582	IS583	IS584	IS585	IS586	IS587	IS588	IS589	IS590	IS591	IS592	IS593	IS594	IS595	IS596	IS597	IS598	IS599	IS600	IS601	IS602	IS603	IS604	IS605	IS606	IS607	IS608	IS609	IS610	IS611	IS612	IS613	IS614	IS615	IS616	IS617	IS618	IS619	IS620	IS621	IS622	IS623	IS624	IS625	IS626	IS627	IS628	IS629	IS630	IS631	IS632	IS633	IS634	IS635	IS636	IS637	IS638	IS639	IS640	IS641	IS642	IS643	IS644	IS645	IS646	IS647	IS648	IS649	IS650	IS651	IS652	IS653	IS654	IS655	IS656	IS657	IS658	IS659	IS660	IS661	IS662	IS663	IS664	IS665	IS666	IS667	IS668	IS669	IS670	IS671	IS672	IS673	IS674	IS675	IS676	IS677	IS678	IS679	IS680	IS681	IS682	IS683	IS684	IS685	IS686	IS687	IS688	IS689	IS690	IS691	IS692	IS693	IS694	IS695	IS696	IS697	IS698	IS699	IS700	IS701	IS702	IS703	IS704	IS705	IS706	IS707	IS708	IS709	IS710	IS711	IS712	IS713	IS714	IS715	IS716	IS717	IS718	IS719	IS720	IS721	IS722	IS723	IS724	IS725	IS726	IS727	IS728	IS729	IS730	IS731	IS732	IS733	IS734	IS735	IS736	IS737	IS738	IS739	IS740	IS741	IS742	IS743	IS744	IS745	IS746	IS747	IS748	IS749	IS750	IS751	IS752	IS753	IS754	IS755	IS756	IS757	IS758	IS759	IS760	IS761	IS762	IS763	IS764	IS765	IS766	IS767	IS768	IS769	IS770	IS771	IS772	IS773	IS774	IS775	IS776	IS777	IS778	IS779	IS780	IS781	IS782	IS783	IS784	IS785	IS786	IS787	IS788	IS789	IS790	IS791	IS792	IS793	IS794	IS795	IS796	IS797	IS798	IS799	IS800	IS801	IS802	IS803	IS804	IS805	IS806	IS807	IS808	IS809	IS810	IS811	IS812	IS813	IS814	IS815	IS816	IS817	IS818	IS819	IS820	IS821	IS822	IS823	IS824	IS825	IS826	IS827	IS828	IS829	IS830	IS831	IS832	IS833	IS834	IS835	IS836	IS837	IS838	IS839	IS840	IS841	IS842	IS843	IS844	IS845	IS846	IS847	IS848	IS849	IS850	IS851	IS852	IS853	IS854	IS855	IS856	IS857	IS858	IS859	IS860	IS861	IS862	IS863	IS864	IS865	IS866	IS867	IS868	IS869	IS870	IS871	IS872	IS873	IS874	IS875	IS876	IS877	IS878	IS879	IS880	IS881	IS882	IS883	IS884	IS885	IS886	IS887	IS888	IS889	IS890	IS891	IS892	IS893	IS894	IS895	IS896	IS897	IS898	IS899	IS900	IS901	IS902	IS903	IS904	IS905	IS906	IS907	IS908	IS909	IS910	IS911	IS912	IS913	IS914	IS915	IS916	IS917	IS918	IS919	IS920	IS921	IS922	IS923	IS924	IS925	IS926	IS927	IS928	IS929	IS930	IS931	IS932	IS933	IS934	IS935	IS936	IS937	IS938	IS939	IS940	IS941	IS942	IS943	IS944	IS945	IS946	IS947	IS948	IS949	IS950	IS951	IS952	IS953	IS954	IS955	IS956	IS957	IS958	IS959	IS960	IS961	IS962	IS963	IS964	IS965	IS966	IS967	IS968	IS969	IS970	IS971	IS972	IS973	IS974	IS975	IS976	IS977	IS978	IS979	IS980	IS981	IS982	IS983	IS984	IS985	IS986	IS987	IS988	IS989	IS990	IS991	IS992	IS993	IS994	IS995	IS996	IS997	IS998	IS999	IS1000	IS1001	IS1002	IS1003	IS1004	IS1005	IS1006	IS1007	IS1008	IS1009	IS1010	IS1011	IS1012	IS1013	IS1014	IS1015	IS1016	IS1017	IS1018	IS1019	IS1020	IS1021	IS1022	IS1023	IS1024	IS1025	IS1026	IS1027	IS1028	IS1029	IS1030	IS1031	IS1032	IS1033	IS1034	IS1035	IS1036	IS1037	IS1038	IS1039	IS1040	IS1041	IS1042	IS1043	IS1044	IS1045	IS1046	IS1047	IS1048	IS1049	IS1050	IS1051	IS1052	IS1053	IS1054	IS1055	IS1056	IS1057	IS1058	IS1059	IS1060	IS1061	IS1062	IS1063	IS1064	IS1065	IS1066	IS1067	IS1068	IS1069	IS1070	IS1071	IS1072	IS1073	IS1074	IS1075	IS1076	IS1077	IS1078	IS1079	IS1080	IS1081	IS1082	IS1083	IS1084	IS1085	IS1086	IS1087	IS1088	IS1089	IS1090	IS1091	IS1092	IS1093	IS1094	IS1095	IS1096	IS1097	IS1098	IS1099	IS1100	IS1101	IS1102	IS1103	IS1104	IS1105	IS1106	IS1107	IS1108	IS1109	IS1110	IS1111	IS1112	IS1113	IS1114	IS1115	IS1116	IS1117	IS1118	IS1119	IS1120	IS1121	IS1122	IS1123	IS1124	IS1125	IS1126	IS1127	IS1128	IS1129	IS1130	IS1131	IS1132	IS1133	IS1134	IS1135	IS1136	IS1137	IS1138	IS1139	IS1140	IS1141	IS1142	IS1143	IS1144	IS1145	IS1146	IS1147	IS1148	IS1149	IS1150	IS1151	IS1152	IS1153	IS1154	IS1155	IS1156	IS1157	IS1158	IS1159	IS1160	IS1161	IS1162	IS1163	IS1164	IS1165	IS1166	IS1167	IS1168	IS1169	IS1170	IS1171	IS1172	IS1173	IS1174	IS1175	IS1176	IS1177	IS1178	IS1179	IS1180	IS1181	IS1182	IS1183	IS1184	IS1185	IS1186	IS1187	IS1188	IS1189	IS1190	IS1191	IS1192	IS1193	IS1194	IS1195	IS1196	IS1197	IS1198	IS1199	IS1200	IS1201	IS1202	IS1203	IS1204	IS1205	IS1206	IS1207	IS1208	IS1209	IS1210	IS1211	IS1212	IS1213	IS1214	IS1215	IS1216	IS1217	IS1218	IS1219	IS1220	IS1221	IS1222	IS1223	IS1224	IS1225	IS1226	IS1227	IS1228	IS1229	IS1230	IS1231	IS1232	IS1233	IS1234	IS1235	IS1236	IS1237	IS1238	IS1239	IS1240	IS1241	IS1242	IS1243	IS1244	IS1245	IS1246	IS1247	IS1248	IS1249	IS1250	IS1251	IS1252	IS1253	IS1254	IS1255	IS1256	IS1257	IS1258	IS1259	IS1260	IS1261	IS1262	IS1263	IS1264	IS1265	IS1266	IS1267	IS1268	IS1269	IS1270	IS1271	IS1272	IS1273	IS1274	IS1275	IS1276	IS1277	IS1278	IS1279	IS1280	IS1281	IS1282	IS1283	IS1284	IS1285	IS1286	IS1287	IS1288	IS1289	IS1290	IS1291	IS1292	IS1293	IS1294	IS1295	IS1296	IS1297	IS1298	IS1299	IS1300	IS1301	IS1302	IS1303	IS1304	IS1305	IS1306	IS1307	IS1308	IS1309	IS1310	IS1311	IS1312	IS1313	IS1314	IS1315	IS1316	IS1317	IS1318	IS1319	IS1320	IS1321	IS1322	IS1323	IS1324	IS1325	IS1326	IS1327	IS1328	IS1329	IS1330	IS1331	IS1332	IS1333	IS1334	IS1335	IS1336	IS1337	IS1338	IS1339	IS1340	IS1341	IS1342	IS1343	IS1344	IS1345	IS1346

WBTRE3.486/MS	TH1	TH2	AR	S	BL	SWR	CBR In	CBR	DE	CEM	MIT	Soil Shury	DW	N	R In	P-SnCh	T1 In	T1-SnCh	R In	R-SnCh	T2 In	T2-SnCh	BY In	BY-SnCh	S1 In	S1-SnCh	S2 In
A-101																											
A-102							3.0																				
A-103				3.0																							
A-104				27.0																							
A-105																											
A-106				21.0				29.0																			
AX-101								3.0																			
AX-102					5.0																						
AX-103																											
AX-104																											
G-101					8.0	20.0											85.0										
G-102																	24.0										
G-103																	56.0										
G-104																	61.0										
G-105																	130.0										
G-106																	118.0										
G-107																											
G-108																	80.0										
G-109																	84.0										
G-110																											
G-111													1.0														
G-112																								16.0			
P-201																											
P-202																											
P-203																											
P-204																											
EX-101						13.0																					
EX-102										88.0																	
EX-103																											
EX-104																											
EX-105																											
EX-106																											
EX-109																								28.0			
EX-107																											
EX-108																											
EX-110																											
EX-111																								42.0			
EX-112																								179.0			
BY-101																									360.0		
BY-102																									312.0		
BY-103																									381.0		
BY-104																									176.0		
BY-105																									337.0		
BY-106																									844.0		
BY-107																									148.0		
BY-108																									63.0		
BY-109																									387.0		
BY-110																									206.0		
BY-111																									423.0		
BY-112																									283.0		
C-101																											
C-102				28.0																							
C-103					25.0																						

WTRB3.4B	NS	TH1	TH2	AR	B	BL	SAR	CSR In	CSR	DE	CEM	HT	Sak Shury	OW	N	B In	B-SkCh	T1 In	T1-SkCh	R In	RRSkCh	T2 In	T2-SkCh	SY In	SY-SkCh	S1 In	S1-SkCh	S2 In
C-104			24.0					11.0																				
C-105																												
C-106				98.0		52.0																						
C-107							20.0																					
C-108																												
C-109		7.0																										
C-110																												
C-111																												
C-112		1.0																										
C-201		1.0																										
C-202		1.0																										
C-203		1.0																										
C-204		1.0																										
S-101																					80.0							
S-102																												
S-103																												
S-104																					161.0							
S-105																												
S-106																												
S-107																					12.0							
S-108																												
S-109																												
S-110																												
S-111																												
S-112																												
EX-101																					156.0							
EX-102																												
EX-103																					102.0							
EX-104																					70.0							
EX-105																					31.0							
EX-106																					1.0							
EX-107																					17.0							
EX-108																												
EX-109																					190.0							
EX-110																					30.0							
EX-111																					42.0							
EX-112																					23.0							
EX-113										29.0																		
EX-114																					133.0							
EX-115																					6.0							
JA-101																												
JA-102																												
JA-103																												
JA-104										39.0																		
JA-105																												
JA-106																												
JA-107																												
JA-108																												
JA-109																												
JA-110																												
JA-111																												
JA-112																												
JA-201																												

WB103-08419	TH1	TH2	JAR	B	ML	SRH	CSR In	CSR	DE	CEM	INT	Salt Shurt	DW	IN	B In	B-80C3	T1 In	T1-80C3	R In	80-80C3	12 In	12-80C3	87 In	87-80C3	81 In	81-80C3	62 In
T-202																											
T-203																											
T-204																											
T-205																											
T-206																											
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T-230																											
T-231																											
T-232																											
T-233																											

WATER3.400	NS	TH1	TH2	AR	B	BL	SNR	CER in	CER	DE	CEM	WIT	Salt Sherry	DW	N	B in	B-SnCh	T1 in	T1-SnCh	R in	R-SnCh	T2 in	T2-SnCh	BY in	BY-SnCh	S1 in	S1-SnCh	S2 in
AP-104																												
AP-105																												
AP-106																												
AP-107																												
AP-108																												
AW-101																												
AW-102																												
AW-103																												
AW-104																												
AW-105																												
AW-106																												
AY-101						13.0	5.0	8.0		7.0																		
AY-102							27.9																					
AZ-101							1.0																					
AZ-102								28.0																				
BY-101																												
BY-102														4.9														
BY-103																												

UNIT/AS.400/55-200W	A1 W	A1-500C	A2 W	A2-500C	P2	H2	CW2/2	BP C2/2	BP H2/2	PAF	WTR	GAS	BYWLD	UMH	SECURE	SEVTE	SEVTE/1
A-101																3.0	953
A-102																3.0	41
A-103																3.0	271
A-104																23.0	23
A-105																18.0	116
A-106																13.0	123
A-107																8.0	206
A-108																14.0	112
A-109																7.0	7
A-110																113.0	113
A-111																28.0	22
A-112																99.0	69
A-113																399.0	271
A-114																184.0	184
A-115																118.0	117
A-116																184.0	186
A-117																84.0	84
A-118																97.0	127
A-119																244.0	246
A-120																228.0	237
A-121																20.0	23
A-122																28.0	25
A-123																27.0	27
A-124																95.0	11
A-125																45.0	90
A-126																42.0	43
A-127																25.0	25
A-128																41.0	49
A-129																44.0	47
A-130																31.0	40
A-131																344.0	345
A-132																38.0	38
A-133																182.0	183
A-134																198.0	198
A-135																211.0	211
A-136																184.0	185
A-137																387.0	387
A-138																335.0	341
A-139																400.0	400
A-140																335.0	335
A-141																501.0	503
A-142																642.0	642
A-143																238.0	238
A-144																222.0	222
A-145																432.0	432
A-146																385.0	385
A-147																498.0	498
A-148																381.0	381
A-149																85.0	85
A-150																433.0	433
A-151																82.0	183

WSTR53.46b	A2-SR5b	A1 In	A1-SR5b	A2 In	A2-SR5b	P3	PL2	CW2r/2	BP /Cpts	BP /r/Cpts	PASf	WTR	GAS	SWLQ	UNK	ssume	dmVal	tsndVal
C-104																	236.0	235
C-105																	190.0	190
C-106																	187.0	228
C-107																	276.0	275
C-108																	86.0	85
C-109																	82.0	86
C-110																	187.0	187
C-111																	87.0	87
C-112																	104.0	104
C-201																	2.0	2
C-202																	1.0	1
C-203																	8.0	5
C-204																	3.0	3
S-101																	211.0	427
S-102																	4.0	849
S-103																	8.0	248
S-104																	283.0	284
S-105																	2.0	407
S-106																	32.0	478
S-107																	253.8	378
S-108																	8.0	802
S-109																	13.0	907
S-110																	113.0	380
S-111																	78.0	838
S-112																	8.0	822
SX-101																	310.0	488
SX-102																	88.0	843
SX-103																	112.0	882
SX-104																	188.0	814
SX-105																	88.0	883
SX-106																	1.0	838
SX-107																	104.0	104
SX-108																	87.0	87
SX-109																	280.0	280
SX-110																	82.0	82
SX-111																	128.0	128
SX-112																	82.0	82
SX-113																	31.0	31
SX-114																	181.0	181
SX-115																	12.0	12
U-101																	22.0	28
U-102																	43.0	374
U-103																	32.0	488
U-104																	78.0	122
U-105																	32.0	418
U-106																	38.0	228
U-107																	78.0	288
U-108																	38.0	488
U-109																	48.0	483
U-110																	188.0	188
U-111																	28.0	328
U-112																	45.0	48
U-201																	4.0	5

WTRB3.4B	B2-SRSt	A1 In	A1-SRCh	A2 In	A2-SRSt	P3	PL2	CWZrZ	BP /Cgls	BP /RCgls	PASP	WTR	GAS	SWLR2	UNK	expense	InvVal	InstVal
AP-104																		18
AP-105																		620
AP-106																		1127
AP-107																		1110
AP-108																		1131
AW-101							61.0										61.0	1139
AW-102																		979
AW-103								363.0									363.0	848
AW-104							96.0	5.0									103.0	1123
AW-105							25.0	215.0									240.0	1040
AW-106																	1.0	1106
AY-101																	33.0	881
AY-102							4.0										31.9	711
AZ-101							27.0	1.0									29.0	880
AZ-102							13.0	3.0									43.0	863
BY-101																		1100
BY-102	41.0																70.9	747
BY-103																		744

Appendix E.**Inventory Estimates***May 1996*

Each tank's inventory estimate is given in three tables: TLM Solids Composite, SMM Composite, and Total Inventory Estimates. Furthermore, each table expresses analyte average concentration as mol/L or ppm as well as kg or MCl inventories. Total site inventories in Mmoles and kg are also shown for Rev. 3 as well as for previous revisions, Rev. 1 and Rev. 2. These site inventories are further broken down into DST, SST, Crib, and Leak destinations.

NE Quadrant

Single-Shell Tank 241-BY-101			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	2.39E+06 kg	(387 kgal)	
Heat Load	2.70 kW	(9.21E+03 BTU/hr)	
Bulk Density		1.63 (g/cc)	
Void Fraction		0.739	
Water wt%		38.1	
TOC wt% C (wet)		0.405	
Na ⁺	11.7	1.65E+05	3.94E+05
Al ³⁺	1.94	3.21E+04	7.67E+04
Fe ³⁺ (total Fe)	2.59E-02	886	2.12E+03
Cr ³⁺	4.59E-02	1.47E+03	3.50E+03
Bi ³⁺	8.13E-04	104	249
La ³⁺	2.92E-06	0.249	0.594
Hg ²⁺	3.28E-05	4.03	9.63
Zr (as ZrO(OH) ₂)	2.68E-04	15.0	35.9
Pb ²⁺	5.13E-03	652	1.56E+03
Ni ²⁺	1.23E-02	442	1.05E+03
Sr ²⁺	3.25E-06	0.175	0.417
Mn ²⁺	2.94E-03	99.1	237
Ca ²⁺	7.44E-02	1.83E+03	4.37E+03
K ⁺	3.41E-02	818	1.95E+03
OH ⁻	9.50	9.90E+04	2.36E+05
NO ₃ ⁻	5.81	2.21E+05	5.27E+05
NO ₂ ⁻	1.58	4.45E+04	1.06E+05
CO ₃ ²⁻	0.634	2.33E+04	5.57E+04
PO ₄ ³⁻	0.100	5.84E+03	1.39E+04
SO ₄ ²⁻	0.181	1.07E+04	2.54E+04
Si (as SiO ₂) ³	7.09E-02	1.22E+03	2.92E+03
F ⁻	5.39E-02	628	1.50E+03
Cl ⁻	0.115	2.50E+03	5.97E+03
C ₆ H ₅ O ₇ ³⁻	2.17E-02	2.52E+03	6.01E+03
EDTA ⁴⁻	4.87E-03	861	2.06E+03
HEDTA ⁵⁻	6.57E-04	111	264
glycolate ⁻	1.53E-02	703	1.68E+03
acetate ⁻	2.90E-02	1.05E+03	2.51E+03
oxalate ²⁻	2.50E-06	0.135	0.322
DBP	2.30E-02	3.76E+03	8.98E+03
butanol	2.30E-02	1.05E+03	2.50E+03
NH ₃	9.31E-03	97.0	232
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		9.64E-02 (μCi/g)	3.84 (kg)
U	0.213 (M)	3.12E+04 (μg/g)	7.44E+04 (kg)
Ca	0.229 (Ci/L)	140 (μCi/g)	3.35E+03 (Ci)
Sr	0.114 (Ci/L)	70.1 (μCi/g)	1.67E+03 (Ci)

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

Single-Shell Tank 241-SY-101			
SMM Composite Inventory Estimate			
Total Supernatant Wt	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%†	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Co ³⁺	0	0	0
Ba ²⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Be ²⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) [‡]	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-101			
Total Inventory Estimate*			
Total Waste	2.39E+06 kg	(387 kgal)	
Heat Load	2.70 kW	(9.21E+03 BTU/hr)	
Bulk Density†		1.63 (g/cc)	
Water wt%†		38.1	
TOC wt% C (wet)†		0.405	
Na ⁺	11.7	1.65E+05	3.94E+05
Al ³⁺	1.94	3.21E+04	7.67E+04
Fe ³⁺ (total Fe)	2.59E-02	886	2.12E+03
Ca ²⁺	4.59E-02	1.47E+03	3.50E+03
Be ²⁺	8.13E-04	104	249
La ³⁺	2.92E-06	0.249	0.594
Hg ²⁺	3.28E-05	4.03	9.63
Zr (as ZrO(OH) ₂)	2.68E-04	15.0	35.9
Pb ²⁺	5.13E-03	652	1.56E+03
Ni ²⁺	1.23E-02	442	1.05E+03
Sr ²⁺	3.25E-06	0.175	0.417
Mn ²⁺	2.94E-03	99.1	237
Ca ²⁺	7.44E-02	1.83E+03	4.37E+03
K ⁺	3.41E-02	818	1.95E+03
OH ⁻	9.50	9.90E+04	2.36E+05
NO ₃ ⁻	5.81	2.21E+05	5.27E+05
NO ₂ ⁻	1.58	4.45E+04	1.06E+05
CO ₃ ²⁻	0.634	2.33E+04	5.57E+04
PO ₄ ³⁻	0.100	5.84E+03	1.39E+04
SO ₄ ²⁻	0.181	1.07E+04	2.54E+04
Si (as SiO ₂) ²⁻	7.09E-02	1.22E+03	2.92E+03
F ⁻	5.39E-02	628	1.50E+03
Cl ⁻	0.115	2.50E+03	5.97E+03
C ₆ H ₅ O ₇ ³⁻	2.17E-02	2.52E+03	6.01E+03
EDTA ⁴⁻	4.87E-03	861	2.06E+03
HEDTA ³⁻	6.57E-04	111	264
glycolate ⁻	1.53E-02	703	1.68E+03
acetate ⁻	2.90E-02	1.05E+03	2.51E+03
oxalate ²⁻	2.50E-06	0.135	0.322
DBP	2.30E-02	3.76E+03	8.98E+03
butanol	2.30E-02	1.05E+03	2.50E+03
NH ₃	9.31E-03	97.0	232
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		9.64E-02 (μCi/g)	3.84 (kg)
U	0.213 (M)	3.12E+04 (μg/g)	7.44E+04 (kg)
Ca	0.229 (Ci/L)	140 (μCi/g)	3.35E+03 (Ci)
Sr	0.114 (Ci/L)	70.1 (μCi/g)	1.67E+03 (Ci)

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

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

Single-Shell Tank 241-BY-102			
TLM Solids Composite Inventory Estimate ^a			
Total Solid Waste	2.03E+06 kg	(330 kgal)	
Heat Load	2.23 kW	(7.61E+03 BTU/hr)	
Bulk Density		1.62 (g/cc)	
Void Fraction		0.756	
Water wt%		37.8	
TOC wt% C (wet)		0.425	
Na ⁺	12.0	1.70E+03	3.45E+03
Al ³⁺	2.03	3.37E+04	6.84E+04
Fe ³⁺ (total Fe)	2.17E-02	744	1.51E+03
Co ²⁺	4.80E-02	1.54E+03	3.12E+03
Bi ³⁺	8.50E-04	109	222
La ³⁺	3.05E-06	0.261	0.529
Hg ²⁺	3.43E-05	4.23	8.58
Zr (as ZrO(OH) ₂)	2.81E-04	15.7	32.0
Pb ²⁺	5.36E-03	684	1.39E+03
Ni ²⁺	1.28E-02	462	938
B ³⁺	3.40E-06	0.183	0.372
Mn ²⁺	3.08E-03	104	211
Ca ²⁺	7.40E-02	1.82E+03	3.70E+03
K ⁺	3.56E-02	838	1.74E+03
OH ⁻	9.37	9.80E+04	1.99E+05
NO3 ⁻	6.07	2.31E+05	4.70E+05
NO2 ⁻	1.65	4.66E+04	9.47E+04
CO3 ²⁻	0.377	2.13E+04	4.33E+04
PO4 ³⁻	8.66E-02	5.06E+03	1.03E+04
SO4 ²⁻	0.185	1.10E+04	2.22E+04
Si (as SiO ₂) ⁺	7.41E-02	1.28E+03	2.60E+03
F ⁻	5.63E-02	658	1.34E+03
Cl ⁻	0.120	2.62E+03	5.32E+03
C ₆ H ₅ O ₇ ³⁻	2.27E-02	2.64E+03	5.36E+03
EDTA ⁴⁻	5.09E-03	903	1.83E+03
HEDTA ³⁻	6.87E-04	116	235
glycolate ⁻	1.60E-02	738	1.50E+03
acetate ⁻	3.03E-02	1.10E+03	2.23E+03
oxalate ²⁻	2.61E-06	0.141	0.287
DBP	2.41E-02	3.94E+03	8.01E+03
butanol	2.41E-02	1.10E+03	2.23E+03
NH ₃	9.73E-03	102	207
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		0.101 (μCi/g)	3.41 (kg)
U	0.133 (M)	1.39E+03 (μg/g)	3.95E+04 (kg)
Cs	0.204 (Ci/L)	125 (μCi/g)	2.55E+05 (Ci)
Sr	0.123 (Ci/L)	75.8 (μCi/g)	1.54E+05 (Ci)

^aUnknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

Single-Shell Tank 241-BY-102			
RMD Composite Inventory Estimate			
Total Supernatant Wa	5.53E+04 kg	(11.0 kgal)	
Heat Load	4.16E-02 kW	(142 BTU/hr)	
Bulk Density*	1.33 (g/cc)		
Water wt%†	58.3		
TOC wt% C (wet)	0.979		
Na ⁺	6.72	1.16E+05	6.43E+03
Al ³⁺	1.10	2.24E+04	1.24E+03
Fe ³⁺ (total Fe)	2.18E-03	91.5	5.06
Co ²⁺	2.30E-02	902	49.8
Ba ²⁺	7.59E-04	120	6.61
La ³⁺	3.11E-06	0.326	1.80E-02
Hg ²⁺	7.01E-06	1.06	5.86E-02
Zr (as ZrO(OH) ₂)	2.58E-04	17.7	0.980
Pb ²⁺	1.12E-03	174	9.63
Ni ²⁺	1.76E-03	77.8	4.30
Br ⁻	1.04E-06	6.85E-02	3.78E-03
Mn ²⁺	3.18E-03	131	7.27
Ca ²⁺	9.82E-03	296	16.4
K ⁺	3.56E-02	1.05E+03	57.9
OH ⁻	4.75	6.08E+04	3.36E+03
NO ₃ ⁻	2.13	1.00E+05	5.54E+03
NO ₂ ⁻	1.56	5.42E+04	2.99E+03
CO ₃ ²⁻	0.312	1.41E+04	778
PO ₄ ³⁻	6.07E-02	4.34E+03	240
SO ₄ ²⁻	0.187	1.36E+04	749
Si (as SiO ₂) ²⁻	3.37E-02	713	39.4
F ⁻	5.00E-02	716	39.6
Cl ⁻	0.122	3.25E+03	180
C ₆ H ₅ O ₂ ⁻	2.24E-02	3.20E+03	177
EDTA ⁴⁻	1.99E-02	4.33E+03	239
HEDTA ³⁻	3.13E-02	6.47E+03	358
glycolate ⁻	5.66E-02	3.20E+03	177
acetate ⁻	2.72E-02	1.21E+03	66.9
oxalate ²⁻	2.66E-06	0.177	9.76E-03
DBP	2.23E-02	4.47E+03	247
butanol	2.23E-02	1.25E+03	68.9
NH ₃	1.21E-02	154	8.53
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	31.3 (μCi/L)		2.17E-02 (kg)
U	4.13E-03 (M)	52.9 (μg/g)	41.0 (kg)
Ce	0.152 (Ci/L)	115 (μCi/g)	6.33E+03 (Ci)
Br	4.24E-02 (Ci/L)	32.0 (μCi/g)	1.77E+03 (Ci)

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

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

Single-Shell Tank 241-BY-102			
Total Inventory Estimate*			
Total Waste	2.09E+06 kg	(341 kgal)	
Heat Load	2.27 kW	(7.75E+03 BTU/hr)	
Bulk Density†	1.62 (g/cc)		
Water wt%†	38.3		
TOC wt% C (wet)†	0.440		
Na ⁺	11.8	1.68E+05	3.51E+05
Al ³⁺	2.00	3.34E+04	6.96E+04
Fe ³⁺ (total Fe)	2.10E-02	727	1.52E+03
Co ³⁺	4.72E-02	1.52E+03	3.17E+03
Bi ³⁺	8.47E-04	110	229
La ³⁺	3.05E-06	0.263	0.547
Hg ²⁺	3.34E-05	4.15	8.64
Zr (as ZrO(OH) ₂)	2.80E-04	15.8	32.9
Pb ²⁺	5.22E-03	670	1.40E+03
Ni ²⁺	1.24E-02	452	942
Ba ²⁺	3.32E-06	0.180	0.375
Mn ²⁺	3.08E-03	105	218
Ca ²⁺	7.19E-02	1.78E+03	3.72E+03
K ⁺	3.56E-02	863	1.80E+03
OH ⁻	9.22	9.70E+04	2.02E+05
NO ₃ ⁻	5.94	2.28E+05	4.75E+05
NO ₂ ⁻	1.64	4.68E+04	9.77E+04
CO ₃ ²⁻	0.568	2.11E+04	4.40E+04
PO ₄ ³⁻	8.58E-02	5.04E+03	1.05E+04
BO ₄ ³⁻	0.185	1.10E+04	2.30E+04
Si (as SiO ₂) ²⁻	7.28E-02	1.27E+03	2.64E+03
F ⁻	5.61E-02	660	1.38E+03
Cl ⁻	0.120	2.64E+03	5.50E+03
C ₆ H ₅ O ₇ ³⁻	2.27E-02	2.65E+03	5.53E+03
EDTA ⁴⁻	5.57E-03	993	2.07E+03
HEDTA ⁴⁻	1.68E-03	284	593
glycolate ⁻	1.73E-02	803	1.67E+03
acetate ⁻	3.02E-02	1.10E+03	2.30E+03
oxalate ²⁻	2.61E-06	0.142	0.297
DBP	2.40E-02	3.96E+03	8.25E+03
butanol	2.40E-02	1.10E+03	2.30E+03
NH ₃	9.80E-03	103	215
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		9.89E-02 (μCi/g)	3.44 (kg)
U	0.129 (M)	1.35E+03 (μg/g)	3.95E+04 (kg)
Ca	0.202 (Ci/L)	125 (μCi/g)	2.61E+03 (Ci)
Sr	0.121 (Ci/L)	74.6 (μCi/g)	1.56E+03 (Ci)

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

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

Single-Shell Tank 241-BY-103			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	2.45E+06 kg	(400 kgal)	
Heat Load	2.79 kW	(9.53E+03 BTU/hr)	
Bulk Density		1.62 (g/cc)	
Void Fraction		0.779	
Water wt%		37.7	
TOC wt% C (wet)		0.442	
Na ⁺	12.2	1.73E+05	4.23E+05
Al ³⁺	2.23	3.72E+04	9.11E+04
Fe ³⁺ (total Fe)	2.60E-02	898	2.20E+03
Cr ³⁺	4.96E-02	1.60E+03	3.90E+03
Bi ³⁺	8.79E-04	114	278
La ³⁺	3.15E-06	0.271	0.663
Hg ²⁺	1.68E-04	20.9	51.2
Zr (as ZrO(OH) ₂)	2.90E-04	16.4	40.1
Pb ²⁺	1.29E-02	1.65E+03	4.04E+03
Ni ²⁺	1.32E-02	480	1.17E+03
Sr ²⁺	3.51E-06	0.190	0.466
Mn ⁴⁺	3.18E-03	108	264
Ca ²⁺	7.90E-02	1.96E+03	4.79E+03
K ⁺	3.69E-02	892	2.18E+03
OH ⁻	9.47	9.97E+04	2.44E+05
NO ₃ ⁻	6.28	2.41E+05	5.90E+05
NO ₂ ⁻	1.71	4.86E+04	1.19E+05
CO ₃ ²⁻	0.497	1.85E+04	4.52E+04
PO ₄ ³⁻	6.70E-02	3.94E+03	9.63E+03
SO ₄ ²⁻	0.187	1.11E+04	2.72E+04
Si (as SiO ₂)	7.65E-02	1.33E+03	3.25E+03
F ⁻	5.82E-02	685	1.67E+03
Cl ⁻	0.124	2.73E+03	6.68E+03
C ₂ H ₃ O ₂ ⁻	2.34E-02	2.74E+03	6.71E+03
EDTA ⁴⁻	5.26E-03	938	2.30E+03
HEDTA ³⁻	7.11E-04	121	295
glycolate ⁻	1.65E-02	767	1.88E+03
acetate ⁻	3.13E-02	1.14E+03	2.80E+03
oxalate ²⁻	2.70E-06	0.147	0.360
DBP	2.49E-02	4.10E+03	1.00E+04
butanol	2.49E-02	1.14E+03	2.79E+03
NH ₃	1.01E-02	106	259
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		0.190 (μCi/g)	5.32 (kg)
U	2.99E-02 (M)	314 (μg/g)	1.08E+04 (kg)
Cs	0.211 (Ci/L)	130 (μCi/g)	3.19E+05 (Ci)
Sr	0.127 (Ci/L)	78.6 (μCi/g)	1.92E+05 (Ci)

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

Single-Shell Tank 241-BY-103			
EML Composite Inventory Estimate			
Total Supersatant Wt.	0 kg	(0 kgul)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%†	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Ca ²⁺	0	0	0
Ba ²⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Bi ³⁺	0	0	0
Mn ²⁺	0	0	0
Cu ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂)	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₁₀ H ₈ O ₂ ²⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-103			
Total Inventory Estimate*			
Total Waste	2.45E+06 kg	(400 kgal)	
Heat Load	2.79 kW	(9.53E+03 BTU/hr)	
Bulk Density†		1.62 (g/cc)	
Water wt%†		37.7	
TOC wt% C (wet)†		0.442	
		kg	
Na ⁺	12.2	1.73E+05	4.23E+05
Al ³⁺	2.23	3.72E+04	9.11E+04
Fe ³⁺ (total Fe)	2.60E-02	898	2.20E+03
Cr ³⁺	4.96E-02	1.60E+03	3.90E+03
Bi ³⁺	8.79E-04	114	278
La ³⁺	3.15E-06	0.271	0.663
Hg ²⁺	1.68E-04	20.9	51.2
Zr (as ZrO(OH) ₂)	2.90E-04	16.4	40.1
Pb ²⁺	1.29E-02	1.65E+03	4.04E+03
Ni ²⁺	1.32E-02	480	1.17E+03
Ba ²⁺	3.51E-06	0.190	0.466
Mn ²⁺	3.18E-03	108	264
Ca ²⁺	7.90E-02	1.96E+03	4.79E+03
K ⁺	3.69E-02	892	2.18E+03
OH ⁻	9.47	9.97E+04	2.44E+05
NO ₃ ⁻	6.28	2.41E+05	5.90E+05
NO ₂ ⁻	1.71	4.86E+04	1.19E+05
CO ₃ ²⁻	0.497	1.85E+04	4.52E+04
PO ₄ ³⁻	6.70E-02	3.94E+03	9.63E+03
SO ₄ ²⁻	0.187	1.11E+04	2.72E+04
Si (as SiO ₃ ²⁻)	7.65E-02	1.33E+03	3.25E+03
F ⁻	5.82E-02	685	1.67E+03
Cl ⁻	0.124	2.73E+03	6.68E+03
C ₆ H ₅ O ₇ ³⁻	2.34E-02	2.74E+03	6.71E+03
EDTA ⁴⁻	5.26E-03	938	2.30E+03
HEDTA ³⁻	7.11E-04	121	295
glycolate ⁻	1.65E-02	767	1.88E+03
acetate ⁻	3.13E-02	1.14E+03	2.80E+03
oxalate ²⁻	2.70E-06	0.147	0.360
DBP	2.49E-02	4.10E+03	1.00E+04
butanol	2.49E-02	1.14E+03	2.79E+03
NH ₃	1.01E-02	106	259
Fe(CN) ₆ ⁴⁻	0	0	0
		0.130 (μCi/g)	5.32 (kg)
Pu			
U	2.99E-02 (M)	314 (μg/g)	1.08E+04 (kg)
Ca	0.211 (Ci/L)	130 (μCi/g)	3.19E+05 (Ci)
Sr	0.127 (Ci/L)	78.6 (μCi/g)	1.92E+05 (Ci)

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

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

Single-Shell Tank 241-BY-104			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	1.86E+06 kg	(326 kgal)	
Heat Load	1.31 kW	(4.47E+03 BTU/hr)	
Bulk Density		1.51 (g/cc)	
Void Fraction		0.845	
Water wt%		46.5	
TOC wt% C (wet)		0.434	
Na ⁺	8.45	1.29E+05	2.40E+05
Al ³⁺	1.16	2.08E+04	3.86E+04
Fe ³⁺ (total Fe)	0.448	1.66E+04	3.09E+04
Cr ³⁺	2.87E-02	992	1.84E+03
Bi ³⁺	0.132	1.83E+04	3.40E+04
La ³⁺	1.74E-06	0.161	0.299
Hg ²⁺	1.96E-05	2.61	4.84
Zr (as ZrO(OH) ₂)	1.60E-04	9.70	18.0
Pb ²⁺	3.06E-03	421	783
Ni ²⁺	6.70E-02	2.61E+03	4.86E+03
Sr ²⁺	1.94E-06	0.113	0.210
Mn ²⁺	1.76E-03	64.1	119
Ca ²⁺	0.179	4.77E+03	8.87E+03
K ⁺	2.80E-02	727	1.35E+03
OH ⁻	6.56	7.41E+04	1.38E+05
NO ₃ ⁻	4.57	1.88E+05	3.50E+05
NO ₂ ⁻	1.02	3.11E+04	5.77E+04
CO ₃ ²⁻	0.410	1.64E+04	3.04E+04
PO ₄ ³⁻	0.224	1.41E+04	2.62E+04
SO ₄ ²⁻	0.181	1.16E+04	2.15E+04
Si (as SiO ₂) ⁺	7.24E-02	1.35E+03	2.51E+03
F ⁻	0.122	1.53E+03	2.85E+03
Cl ⁻	0.104	2.44E+03	4.54E+03
C ₂ H ₃ O ₂ ⁻	1.30E-02	1.63E+03	3.02E+03
EDTA ⁴⁻	2.91E-03	556	1.03E+03
HEDTA ³⁻	3.92E-04	71.4	133
glycolate ⁻	9.12E-03	454	844
acetate ⁻	1.73E-02	678	1.26E+03
oxalate ²⁻	1.49E-06	8.71E-02	0.162
DBP	1.38E-02	2.43E+03	4.52E+03
butanol	1.38E-02	677	1.26E+03
NH ₃	5.73E-03	64.6	120
Fe(CN) ₆ ⁴⁻	3.59E-02	6.46E+03	1.20E+04
Pu		6.27E-02 (μCi/g)	1.94 (kg)
U	7.04E-02 (M)	795 (μg/g)	2.07E+04 (kg)
Ca	0.123 (Ci/L)	82.0 (μCi/g)	1.52E+05 (Ci)
Sr	7.16E-02 (Ci/L)	47.5 (μCi/g)	8.83E+04 (Ci)

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

Single-Shell Tank 241-BY-104			
SMD Composite Inventory Estimates			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%†	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Cr ³⁺	0	0	0
Bi ³⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Sr ²⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂)	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shot Tank 241-BY-104			
Total Inventory Estimate*			
Total Waste	1.86E+06 kg	(326 kgal)	
Heat Load	1.31 kW	(4.47E+03 BTU/hr)	
Bulk Density†	1.51 (g/cc)		
Water wt%†	46.5		
TOC wt% C (wt)†	0.434		
Na ⁺	8.43	1.29E+05	2.40E+05
Al ³⁺	1.16	2.08E+04	3.86E+04
Fe ³⁺ (total Fe)	0.448	1.66E+04	3.09E+04
Cr ³⁺	2.87E-02	992	1.84E+03
B ³⁺	0.132	1.83E+04	3.40E+04
La ³⁺	1.74E-06	0.161	0.299
Hg ²⁺	1.96E-03	2.61	4.84
Zr (as ZrO(OH) ₂)	1.60E-04	9.70	18.0
Pb ²⁺	3.06E-03	421	783
Ni ²⁺	6.70E-02	2.61E+03	4.86E+03
Be ²⁺	1.94E-06	0.113	0.210
Mn ²⁺	1.76E-03	64.1	119
Ca ²⁺	0.179	4.77E+03	8.87E+03
K ⁺	2.80E-02	727	1.35E+03
OH ⁻	6.56	7.41E+04	1.38E+05
NO ₃ ⁻	4.57	1.88E+05	3.50E+05
NO ₂ ⁻	1.02	3.11E+04	5.77E+04
CO ₃ ²⁻	0.410	1.64E+04	3.04E+04
PO ₄ ³⁻	0.224	1.41E+04	2.62E+04
SO ₄ ²⁻	0.181	1.16E+04	2.15E+04
Si (as SiO ₂) ⁺	7.24E-02	1.35E+03	2.51E+03
F ⁻	0.122	1.53E+03	2.85E+03
Cl ⁻	0.104	2.44E+03	4.54E+03
C ₁₀ H ₈ O ₂ ⁺	1.30E-02	1.63E+03	3.02E+03
EDTA ⁴⁻	2.91E-03	556	1.03E+03
HEDTA ³⁻	3.92E-04	71.4	133
glycolate ⁻	9.12E-03	454	844
acetate ⁻	1.73E-02	678	1.26E+03
oxalate ²⁻	1.49E-06	8.71E-02	0.162
DBP	1.38E-02	2.43E+03	4.52E+03
butanol	1.38E-02	677	1.26E+03
NH ₃	5.73E-03	64.6	120
Fe(CN) ₆ ⁴⁻	3.59E-02	6.46E+03	1.20E+04
Pu		6.27E-02 (μCi/g)	1.94 (kg)
U	7.04E-02 (M)	793 (μg/g)	2.07E+04 (kg)
Cs	0.123 (Ci/L)	82.0 (μCi/g)	1.52E+05 (Ci)
Sr	7.16E-02 (Ci/L)	47.5 (μCi/g)	8.83E+04 (Ci)

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

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

Single-Shall Tank 241-BY-105			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	2.97E+06 kg	(503 kgal)	
Heat Load	2.46 kW	(8.39E+03 BTU/hr)	
Bulk Density		1.36 (g/cc)	
Void Fraction		0.794	
Water wt%		42.3	
TOC wt% C (wet)		0.416	
Na ⁺	9.33	1.41E+05	4.18E+03
Al ³⁺	1.47	2.54E+04	7.53E+04
Fe ³⁺ (total Fe)	0.293	1.05E+04	3.11E+04
Ca ²⁺	3.48E-02	1.16E+03	3.45E+03
Bi ³⁺	8.11E-02	1.09E+04	3.23E+04
La ³⁺	2.16E-06	0.193	0.572
Hg ²⁺	2.43E-05	3.13	9.27
Zr (as ZrO(OH) ₂)	1.99E-04	11.6	34.5
Pb ²⁺	3.80E-03	505	1.50E+03
Ni ²⁺	4.57E-02	1.72E+03	5.11E+03
Se ²⁺	2.41E-06	0.135	0.401
Mn ²⁺	2.18E-03	76.9	228
Ca ²⁺	0.470	1.21E+04	3.59E+04
K ⁺	3.00E-02	752	2.23E+03
OH ⁻	8.08	8.82E+04	2.62E+05
NO ₃ ⁻	4.98	1.98E+05	5.88E+05
NO ₂ ⁻	1.21	3.59E+04	1.06E+05
CO ₃ ²⁻	0.482	1.86E+04	5.50E+04
PO ₄ ³⁻	0.173	1.06E+04	3.13E+04
SO ₄ ²⁻	0.190	1.17E+04	3.47E+04
Si (as SiO ₃ ²⁻)	0.172	3.11E+03	9.21E+03
F ⁻	9.48E-02	1.16E+03	3.43E+03
Cl ⁻	0.107	2.43E+03	7.21E+03
C ₆ H ₅ O ₇ ³⁻	1.61E-02	1.95E+03	5.79E+03
EDTA ⁴⁻	3.61E-03	667	1.98E+03
HEDTA ³⁻	4.87E-04	85.7	254
glycolate ⁻	1.13E-02	545	1.62E+03
acetate ⁻	2.15E-02	813	2.41E+03
oxalate ²⁻	1.85E-06	0.105	0.310
DBP	1.71E-02	2.92E+03	8.65E+03
butanol	1.71E-02	812	2.41E+03
NH ₃	7.00E-03	76.4	227
Fe(CN) ₆ ⁴⁻	2.21E-02	3.83E+03	1.14E+04
Pu		7.50E-02 (μCi/g)	3.70 (kg)
U	0.115 (M)	1.26E+03 (μg/g)	5.22E+04 (kg)
Cs	0.149 (Ci/L)	95.5 (μCi/g)	2.83E+05 (Ci)
Sr	8.81E-02 (Ci/L)	56.6 (μCi/g)	1.68E+05 (Ci)

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

Single-Shell Tank 241-BY-105			
EMM Composite Inventory Estimate			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density ^a	0 (g/cc)		
Water wt%†	0		
TOC wt% C (wt)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Ca ²⁺	0	0	0
Ba ²⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Sr ²⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) ⁺	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₂ ⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

^aDensity is calculated based on Na, OH, and AlO₂.

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

Single-Shell Tank 241-BY-105			
Total Inventory Estimate*			
Total Waste	2.97E+06 kg	(503 kgal)	
Heat Load	2.46 kW	(8.39E+03 BTU/hr)	
Bulk Density†	1.56 (g/cc)		
Water wt%†	42.5		
TOC wt% C (wt)†	0.416		
Na ⁺	9.35	1.41E+03	4.18E+03
Al ³⁺	1.47	2.54E+04	7.53E+04
Fe ³⁺ (total Fe)	0.293	1.05E+04	3.11E+04
Co ³⁺	3.48E-02	1.16E+03	3.45E+03
Ba ²⁺	8.11E-02	1.09E+04	3.23E+04
La ³⁺	2.16E-06	0.193	0.572
Hg ²⁺	2.43E-05	3.13	9.27
Zr (as Zr(OH) ₂)	1.99E-04	11.6	34.5
Pb ²⁺	3.80E-03	505	1.50E+03
Ni ²⁺	4.57E-02	1.72E+03	5.11E+03
Sr ²⁺	2.41E-06	0.135	0.401
Mn ²⁺	2.18E-03	76.9	228
Ca ²⁺	0.470	1.21E+04	3.59E+04
K ⁺	3.00E-02	752	2.23E+03
OH ⁻	8.08	8.82E+04	2.62E+05
NO ₃ ⁻	4.98	1.98E+03	5.88E+03
NO ₂ ⁻	1.21	3.59E+04	1.06E+05
CO ₃ ²⁻	0.482	1.86E+04	5.50E+04
PO ₄ ³⁻	0.173	1.06E+04	3.13E+04
SO ₄ ²⁻	0.190	1.17E+04	3.47E+04
Si (as SiO ₂) ²⁻	0.172	3.11E+03	9.21E+03
F ⁻	9.48E-02	1.16E+03	3.43E+03
Cl ⁻	0.107	2.43E+03	7.21E+03
C ₆ H ₅ O ₇ ³⁻	1.61E-02	1.95E+03	5.79E+03
EDTA ⁴⁻	3.61E-03	667	1.98E+03
HEDTA ³⁻	4.87E-04	85.7	254
glycolate ⁻	1.13E-02	545	1.62E+03
acetate ⁻	2.15E-02	813	2.41E+03
oxalate ²⁻	1.85E-06	0.105	0.310
DBP	1.71E-02	2.92E+03	8.65E+03
butanol	1.71E-02	812	2.41E+03
NH ₃	7.00E-03	76.4	227
Fe(CN) ₆ ⁴⁻	2.21E-02	3.83E+03	1.14E+04
Pu		7.50E-02 (μCi/g)	3.70 (kg)
U	0.115 (M)	1.26E+03 (μg/g)	5.22E+04 (kg)
Cs	0.149 (Ci/L)	95.5 (μCi/g)	2.83E+03 (Ci)
Sr	8.81E-02 (Ci/L)	56.6 (μCi/g)	1.68E+03 (Ci)

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

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

Sample - Solid Tank 241-BV-106			
TLM Solid Composite Inventory Estimate ^a			
Total Solid Waste	3.84E+06 kg	(642 kg/m ³)	
Heat Load	3.91 kW	(1.34E+04 Btu/hr)	
Bulk Density	1.58 (g/cc)		
Void Fraction	0.802		
Water w/o	40.3		
TOC w/o C (wt%)	0.468		
N ₂	11.1	1.62E+05	6.20E+05
Ar	1.82	3.10E+04	1.19E+05
P ₂ (total Fe)	0.134	5.43E+03	2.09E+04
Cr	4.34E-02	1.43E+03	5.48E+03
Br	4.11E-02	5.44E+03	2.09E+04
I ₂	2.73E-06	0.240	0.923
Hg	3.07E-05	3.90	15.0
Zr (as Zr(OH) ₄)	2.51E-04	14.5	55.7
Pb	4.80E-03	630	2.42E+03
Ni	3.18E-02	1.18E+03	4.54E+03
B ⁺	3.04E-06	0.169	0.648
Mn	2.76E-03	95.8	368
Ca	0.105	2.67E+03	1.02E+04
K	3.45E-02	354	3.28E+03
OH	8.28	8.91E+04	3.42E+05
NO ₃	5.81	2.28E+05	8.75E+05
NO ₂	1.50	4.57E+04	1.68E+05
CO ₃ ⁺	0.468	1.78E+04	6.82E+04
PO ₄ ⁺	0.117	7.03E+03	2.70E+04
SO ₄ ⁺	0.188	1.14E+04	4.39E+04
Si (as SiO ₂)	7.60E-02	1.35E+03	5.19E+03
F	8.03E-02	966	3.71E+03
Cl	0.120	2.68E+03	1.03E+04
C ₂ H ₃ O ₂ ⁺	2.03E-02	2.43E+03	9.34E+03
EDTA ⁺	4.56E-03	832	3.19E+03
HEDTA ⁺	6.16E-04	107	410
glycolic ⁺	1.43E-02	680	2.61E+03
acetic ⁺	2.71E-02	1.01E+03	3.89E+03
oxalic ⁺	2.34E-06	0.130	0.500
DBP	2.16E-02	3.63E+03	1.40E+04
benzoic ⁺	2.16E-02	1.01E+03	3.89E+03
NH ₃	8.77E-03	94.3	362
Fe(CN) ₆ ⁴⁻	1.67E-02	2.86E+03	1.10E+04
Pb	9.30E-02 (μCi/g)	5.95 (kg)	
U	3.92E-02 (n)	422 (μg/g)	2.27E+04 (kg)
Ca	0.183 (Ci/L)	117 (μCi/g)	4.49E+05 (Ci)
Br	0.111 (Ci/L)	69.9 (μCi/g)	2.69E+05 (Ci)

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

Single-Shell Tank 241-BY-106			
SMM Composite Inventory Estimate			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Cl ⁻	0	0	0
Br ⁻	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as Zr(OH) ₄)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Se ³⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂ ²⁻)	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)	0 (kg)	
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-106			
Total Inventory Estimates*			
Total Waste	3.84E+06 kg	(642 kgal)	
Heat Load	3.91 kW	(1.34E+04 BTU/hr)	
Bulk Density†		1.58 (g/cc)	
Water wt%†		40.3	
TOC wt% C (wet)†		0.468	
Na ⁺	11.1	1.62E+05	6.20E+05
Al ³⁺	1.82	3.10E+04	1.19E+05
Fe ³⁺ (total Fe)	0.154	5.45E+03	2.09E+04
Cr ³⁺	4.34E-02	1.43E+03	5.48E+03
Bi ³⁺	4.11E-02	5.44E+03	2.09E+04
La ³⁺	2.73E-06	0.240	0.923
Hg ²⁺	3.07E-03	3.90	15.0
Zr (as ZrO(OH) ₂)	2.51E-04	14.5	55.7
Pb ²⁺	4.80E-03	630	2.42E+03
Ni ²⁺	3.18E-02	1.18E+03	4.54E+03
Sr ²⁺	3.04E-06	0.169	0.648
Mn ²⁺	2.76E-03	95.8	368
Ca ²⁺	0.105	2.67E+03	1.02E+04
K ⁺	3.45E-02	854	3.28E+03
OH ⁻	8.28	8.91E+04	3.42E+05
NO ₃ ⁻	5.81	2.28E+05	8.75E+05
NO ₂ ⁻	1.50	4.37E+04	1.68E+05
CO ₃ ²⁻	0.468	1.78E+04	6.82E+04
PO ₄ ³⁻	0.117	7.03E+03	2.70E+04
SO ₄ ²⁻	0.188	1.14E+04	4.39E+04
Si (as SiO ₂) ²⁻	7.60E-02	1.35E+03	5.19E+03
F ⁻	8.03E-02	966	3.71E+03
Cl ⁻	0.120	2.68E+03	1.03E+04
C ₁₀ H ₈ O ₇ ³⁻	2.03E-02	2.43E+03	9.34E+03
EDTA ⁴⁻	4.56E-03	832	3.19E+03
HEDTA ³⁻	6.16E-04	107	410
glycolate ⁻	1.43E-02	680	2.61E+03
acetate ⁻	2.71E-02	1.01E+03	3.89E+03
oxalate ²⁻	2.34E-06	0.130	0.500
DBP	2.16E-02	3.63E+03	1.40E+04
butanol	2.16E-02	1.01E+03	3.89E+03
NH ₃	8.77E-03	94.3	362
Fe(CN) ₆ ⁴⁻	1.67E-02	2.86E+03	1.10E+04
Pu		9.30E-02 (μCi/g)	5.95 (kg)
U	3.92E-02 (M)	422 (μg/g)	2.27E+04 (kg)
Cs	0.185 (Ci/L)	117 (μCi/g)	4.49E+05 (Ci)
Sr	0.111 (Ci/L)	69.9 (μCi/g)	2.69E+05 (Ci)

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

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

Single-Shell Tank 241-BY-107			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	1.50E+06 kg	(266 kgal)	
Heat Load	1.11 kW	(3.80E+03 BTU/hr)	
Bulk Density		1.49 (g/cc)	
Void Fraction		0.832	
Water wt%		47.3	
TOC wt% C (wet)		0.422	
mg			
Na ⁺	8.61	1.33E+05	1.99E+05
Al ³⁺	1.28	2.31E+04	3.48E+04
Fe ³⁺ (total Fe)	0.396	1.48E+04	2.22E+04
Cr ³⁺	2.98E-02	1.04E+03	1.56E+03
Bi ³⁺	7.66E-02	1.07E+04	1.61E+04
La ³⁺	1.81E-06	0.168	0.253
Hg ²⁺	2.55E-05	3.43	5.16
Zr (as ZrO(OH) ₂)	7.99E-04	48.9	73.4
Pb ²⁺	3.18E-03	441	663
Ni ²⁺	4.45E-02	1.75E+03	2.63E+03
Ba ²⁺	2.01E-06	0.118	0.177
Mn ²⁺	1.82E-03	67.1	101
Ca ²⁺	0.148	3.98E+03	5.97E+03
K ⁺	2.72E-02	712	1.07E+03
OH ⁻	6.72	7.66E+04	1.15E+05
NO ₃ ⁻	4.46	1.85E+05	2.79E+05
NO ₂ ⁻	1.07	3.30E+04	4.95E+04
CO ₃ ²⁻	0.400	1.61E+04	2.42E+04
PO ₄ ³⁻	0.232	1.48E+04	2.22E+04
SO ₄ ²⁻	0.168	1.08E+04	1.63E+04
Si (as SiO ₂) ²⁻	6.56E-02	1.24E+03	1.86E+03
F ⁻	0.104	1.33E+03	2.00E+03
Cl ⁻	0.101	2.39E+03	3.59E+03
C ₆ H ₅ O ₇ ³⁻	1.34E-02	1.70E+03	2.56E+03
EDTA ⁴⁻	3.02E-03	582	875
HEDTA ⁵⁻	4.07E-04	74.8	112
glycolate ⁻	9.47E-03	476	715
acetate ⁻	1.79E-02	710	1.07E+03
oxalate ²⁻	1.55E-06	9.13E-02	0.137
DBP	1.43E-02	2.55E+03	3.82E+03
butanol	1.43E-02	709	1.07E+03
NH ₃	5.97E-03	68.0	102
Fe(CN) ₆ ⁴⁻	3.07E-02	5.56E+03	8.35E+03
mg/kg			
Pu		6.69E-02 (μCi/g)	1.67 (kBq)
U	5.61E-02 (M)	639 (μg/g)	1.34E+04 (kBq)
Ce	0.127 (Ci/L)	85.4 (μCi/g)	1.28E+05 (Ci)
Sr	7.53E-02 (Ci/L)	50.5 (μCi/g)	7.58E+04 (Ci)

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

Single-Shell Tank 241-BY-107			
SMM Composite Inventory Estimate			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%†	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Cr ³⁺	0	0	0
B ³⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Br ⁻	0	0	0
Mn ⁴⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) ²⁻	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-107			
Total Inventory Estimate*			
Total Waste	1.50E+06 kg	(266 kgal)	
Heat Load	1.11 kW	(3.80E+03 BTU/hr)	
Bulk Density†		1.49 (g/cc)	
Water wt%†		47.3	
TOC wt% C (wt)†		0.422	
Na ⁺	8.61	1.33E+03	1.59E+03
Al ³⁺	1.28	2.31E+04	3.48E+04
Fe ³⁺ (total Fe)	0.396	1.48E+04	2.22E+04
Cu ²⁺	2.98E-02	1.04E+03	1.56E+03
Bi ³⁺	7.66E-02	1.07E+04	1.61E+04
La ³⁺	1.81E-06	0.168	0.253
Hg ²⁺	2.53E-03	3.43	5.16
Zr (as ZrO(OH) ₂)	7.99E-04	48.9	73.4
Pb ²⁺	3.18E-03	441	663
Ni ²⁺	4.45E-02	1.75E+03	2.63E+03
Br ⁻	2.01E-06	0.118	0.177
Mn ²⁺	1.82E-03	67.1	101
Ca ²⁺	0.148	3.94E+03	5.97E+03
K ⁺	2.72E-02	712	1.07E+03
OH ⁻	6.72	7.66E+04	1.15E+05
NO ₃ ⁻	4.46	1.85E+05	2.79E+05
NO ₂ ⁻	1.07	3.30E+04	4.95E+04
CO ₃ ²⁻	0.400	1.61E+04	2.42E+04
PO ₄ ³⁻	0.232	1.48E+04	2.22E+04
SO ₄ ²⁻	0.168	1.08E+04	1.63E+04
Si (as SiO ₂) ¹	6.56E-02	1.24E+03	1.86E+03
F ⁻	0.104	1.33E+03	2.00E+03
Cl ⁻	0.101	2.39E+03	3.59E+03
C ₆ H ₅ O ₇ ³⁻	1.34E-02	1.70E+03	2.56E+03
EDTA ⁴⁻	3.02E-03	582	875
HEDTA ³⁻	4.07E-04	74.8	112
glycolate ⁻	9.47E-03	476	715
acetate ⁻	1.79E-02	710	1.07E+03
oxalate ²⁻	1.55E-06	9.13E-02	0.137
DBP	1.43E-02	2.55E+03	3.82E+03
butanol	1.43E-02	709	1.07E+03
NH ₃	5.97E-03	68.0	102
Fe(CN) ₆ ⁴⁻	3.07E-02	5.56E+03	8.35E+03
Pu		6.69E-02 (μCi/g)	1.67 (kg)
U	5.61E-02 (M)	639 (μg/g)	1.34E+04 (kg)
Cs	0.127 (Ci/L)	85.4 (μCi/g)	1.28E+05 (Ci)
Sr	7.53E-02 (Ci/L)	50.5 (μCi/g)	7.58E+04 (Ci)

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

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

Single-Shaft Tank 241-BY-108			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	1.24E+06 kg	(228 kgal)	
Heat Load	0.503 kW	(1.72E+03 BTU/hr)	
Bulk Density		1.44 (g/cc)	
Void Fraction		0.890	
Water wt%		53.0	
TOC wt% C (wet)		0.589	
Na ⁺	6.28	1.00E+05	1.25E+05
Al ³⁺	0.593	1.11E+04	1.38E+04
Fe ³⁺ (total Fe)	0.660	2.56E+04	3.18E+04
Cr ³⁺	1.62E-02	584	725
Bi ³⁺	0.185	2.68E+04	3.33E+04
La ³⁺	8.92E-07	8.61E-02	0.107
Hg ²⁺	1.00E-05	1.40	1.73
Zr (as ZrO(OH) ₂)	8.20E-05	5.20	6.45
Pb ²⁺	1.57E-03	226	280
Ni ²⁺	0.102	4.15E+03	5.16E+03
Sr ²⁺	9.92E-07	6.04E-02	7.50E-02
Mn ²⁺	8.99E-04	34.3	42.6
Ca ²⁺	0.217	6.04E+03	7.50E+03
K ⁺	2.26E-02	615	763
OH ⁻	4.73	5.99E+04	6.94E+04
NO ₃ ⁻	3.35	1.53E+05	1.90E+05
NO ₂ ⁻	0.594	1.90E+04	2.36E+04
CO ₃ ²⁻	0.335	1.40E+04	1.74E+04
PO ₄ ³⁻	0.291	1.92E+04	2.39E+04
SO ₄ ²⁻	0.177	1.18E+04	1.46E+04
Si (as SiO ₃ ²⁻)	6.65E-02	1.30E+03	1.61E+03
F ⁻	0.158	2.09E+03	2.60E+03
Cl ⁻	9.13E-02	2.25E+03	2.79E+03
C ₆ H ₅ O ₇ ³⁻	6.63E-03	871	1.08E+03
EDTA ⁴⁻	1.49E-03	298	370
HEDTA ³⁻	2.01E-04	38.3	47.5
glycolate ⁻	4.67E-03	243	302
acetate ⁻	8.85E-03	363	451
oxalate ²⁻	7.63E-07	4.67E-02	5.80E-02
DBP	7.04E-03	1.30E+03	1.62E+03
butanol	7.04E-03	363	450
NH ₃	3.07E-03	36.3	45.1
Fe(CN) ₆ ⁴⁻	8.98E-02	1.69E+04	2.10E+04
Pu		3.43E-02 (μCi/g)	0.710 (kg)
U	8.66E-02 (M)	1.02E+03 (μg/g)	1.78E+04 (kg)
Ca	6.95E-02 (Ci/L)	48.3 (μCi/g)	6.00E+04 (Ci)
Sr	3.82E-02 (Ci/L)	26.6 (μCi/g)	3.30E+04 (Ci)

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

Single-Shell Tank 241-BY-108			
SMM Composite Inventory Estimate			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Ca ²⁺	0	0	0
Bi ³⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Sr ²⁺	0	0	0
Mn ²⁺	0	0	0
Co ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) [†]	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Ca	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-108			
Total Inventory Estimate*			
Total Waste	1.24E+06 kg	(228 kgal)	
Heat Load	0.503 kW	(1.72E+03 BTU/hr)	
Bulk Density†		1.44 (g/cc)	
Water wt%†		53.0	
TOC wt% C (wet)†		0.589	
Na ⁺	6.28	1.00E+05	1.25E+05
Al ³⁺	0.593	1.11E+04	1.38E+04
Fe ³⁺ (total Fe)	0.660	2.56E+04	3.18E+04
Ca ²⁺	1.62E-02	584	725
B ³⁺	0.185	2.68E+04	3.33E+04
La ³⁺	8.92E-07	8.61E-02	0.107
Hg ²⁺	1.00E-05	1.40	1.73
Zr (as ZrO(OH) ₂)	8.20E-05	5.20	6.45
Pb ²⁺	1.57E-03	226	280
Ni ²⁺	0.102	4.15E+03	5.16E+03
Sr ²⁺	9.92E-07	6.04E-02	7.50E-02
Mn ²⁺	8.99E-04	34.3	42.6
Cs ⁺	0.217	6.04E+03	7.50E+03
K ⁺	2.26E-02	615	763
OH ⁻	4.73	5.59E+04	6.94E+04
NO ₃ ⁻	3.55	1.53E+05	1.90E+05
NO ₂ ⁻	0.594	1.90E+04	2.36E+04
CO ₃ ²⁻	0.335	1.40E+04	1.74E+04
PO ₄ ³⁻	0.291	1.92E+04	2.39E+04
BO ₄ ³⁻	0.177	1.18E+04	1.46E+04
Si (as SiO ₃ ²⁻)	6.65E-02	1.30E+03	1.61E+03
F ⁻	0.158	2.09E+03	2.60E+03
Cl ⁻	9.13E-02	2.25E+03	2.79E+03
C ₂ H ₃ O ₂ ⁻	6.63E-03	871	1.08E+03
EDTA ⁴⁻	1.49E-03	298	370
HEDTA ³⁻	2.01E-04	38.3	47.5
glycolate ⁻	4.67E-03	243	302
acetate ⁻	8.85E-03	363	451
oxalate ²⁻	7.63E-07	4.67E-02	5.80E-02
DBP	7.04E-03	1.30E+03	1.62E+03
butanol	7.04E-03	363	450
NH ₃	3.07E-03	36.3	45.1
Fe(CN) ₆ ⁴⁻	8.98E-02	1.69E+04	2.10E+04
Pu		3.43E-02 (μCi/g)	0.710 (kg)
U	8.66E-02 (M)	1.02E+03 (μg/l)	1.78E+04 (kg)
Cs	6.93E-02 (Ci/L)	48.3 (μCi/g)	6.00E+04 (Ci)
Sr	3.82E-02 (Ci/L)	26.6 (μCi/g)	3.30E+04 (Ci)

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

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

Single-Shed Tank 241-BY-109			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	2.61E+06 kg	(423 kgal)	
Heat Load	2.77 kW	(9.45E+03 BTU/hr)	
Bulk Density		1.63 (g/cc)	
Void Fraction		0.743	
Water wt%		38.0	
TOC wt% C (wet)		0.410	
Na ⁺	11.8	1.66E+03	4.34E+03
Al ³⁺	1.96	3.25E+04	8.48E+04
Fe ³⁺ (total Fe)	2.48E-02	850	2.22E+03
Cr ³⁺	4.65E-02	1.48E+03	3.87E+03
Bi ³⁺	8.23E-04	106	275
La ³⁺	2.95E-06	0.252	0.637
Hg ²⁺	3.32E-03	4.08	10.6
Zr (as ZrO(OH) ₂)	2.71E-04	15.2	39.6
Pb ²⁺	5.19E-03	660	1.72E+03
Ni ²⁺	1.24E-02	447	1.17E+03
Sr ²⁺	3.29E-06	0.177	0.461
Mn ²⁺	2.98E-03	100	262
Ca ²⁺	7.43E-02	1.83E+03	4.77E+03
K ⁺	3.45E-02	828	2.16E+03
OH ⁻	9.46	9.88E+04	2.58E+05
NO ₃ ⁻	5.87	2.24E+05	5.83E+05
NO ₂ ⁻	1.59	4.50E+04	1.17E+05
CO ₃ ²⁻	0.619	2.28E+04	5.95E+04
PO ₄ ³⁻	9.67E-02	5.64E+03	1.47E+04
SO ₄ ²⁻	0.182	1.07E+04	2.80E+04
Si (as SiO ₂) ¹	7.18E-02	1.24E+03	3.23E+03
F ⁻	5.45E-02	636	1.66E+03
Cl ⁻	0.116	2.53E+03	6.60E+03
C ₆ H ₅ O ₇ ³⁻	2.19E-02	2.55E+03	6.64E+03
EDTA ⁴⁻	4.93E-03	871	2.27E+03
HEDTA ⁴⁻	6.65E-04	112	292
glycolate ⁻	1.55E-02	712	1.86E+03
acetate ⁻	2.93E-02	1.06E+03	2.77E+03
oxalate ²⁻	2.53E-06	0.137	0.356
DBP	2.33E-02	3.81E+03	9.93E+03
butanol	2.33E-02	1.06E+03	2.77E+03
NH ₃	9.41E-03	98.3	256
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		9.76E-02 (μCi/g)	4.24 (kg)
U	0.193 (M)	2.01E+03 (μg/g)	7.35E+04 (kg)
Ca	0.197 (Ci/L)	121 (μCi/g)	3.16E+05 (Ci)
Sr	0.119 (Ci/L)	73.3 (μCi/g)	1.91E+05 (Ci)

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

Single-Shell Tank 241-BY-109			
SMD Composite Inventory Estimate			
Total Supernatant Wt	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*		0 (g/cc)	
Water wt%		0	
TOC wt% C (wt)		0	
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Cr ³⁺	0	0	0
Bi ³⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Sr ²⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) [†]	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₈ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-109			
Total Inventory Estimate*			
Total Waste	2.61E+06 kg	(423 kgal)	
Heat Load	2.77 kW	(9.45E+03 BTU/hr)	
Bulk Density†		1.63 (g/cc)	
Water wt%†		38.0	
TOC wt% C (wet)†		0.410	
Na ⁺	11.8	1.66E+05	4.34E+05
Al ³⁺	1.96	3.25E+04	8.48E+04
Fe ³⁺ (total Fe)	2.48E-02	850	2.22E+03
Co ³⁺	4.65E-02	1.48E+03	3.87E+03
Bi ³⁺	8.23E-04	106	275
La ³⁺	2.95E-06	0.252	0.657
Hg ²⁺	3.32E-05	4.08	10.6
Zr (as ZrO(OH) ₂)	2.71E-04	15.2	39.6
Pb ²⁺	5.19E-03	660	1.72E+03
Ni ²⁺	1.24E-02	447	1.17E+03
Sr ²⁺	3.29E-06	0.177	0.461
Mn ²⁺	2.98E-03	100	262
Ca ²⁺	7.43E-02	1.83E+03	4.77E+03
K ⁺	3.45E-02	828	2.16E+03
OH ⁻	9.46	9.88E+04	2.58E+05
NO ₃ ⁻	5.87	2.24E+05	5.83E+05
NO ₂ ⁻	1.59	4.50E+04	1.17E+05
CO ₃ ²⁻	0.619	2.28E+04	5.95E+04
PO ₄ ³⁻	9.67E-02	5.64E+03	1.47E+04
SO ₄ ²⁻	0.182	1.07E+04	2.80E+04
Si (as SiO ₂)	7.18E-02	1.24E+03	3.23E+03
F ⁻	5.45E-02	636	1.66E+03
Cl ⁻	0.116	2.53E+03	6.60E+03
C ₂ H ₃ O ₂ ⁻	2.19E-02	2.55E+03	6.64E+03
EDTA ⁴⁻	4.93E-03	871	2.27E+03
HEDTA ³⁻	6.65E-04	112	292
glycolate ⁻	1.55E-02	712	1.86E+03
acetate ⁻	2.93E-02	1.06E+03	2.77E+03
oxalate ²⁻	2.53E-06	0.137	0.356
DBP	2.33E-02	3.81E+03	9.93E+03
butanol	2.33E-02	1.06E+03	2.77E+03
NH ₃	9.41E-03	98.3	256
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		9.76E-02 (μCi/g)	4.24 (kg)
U	0.193 (M)	2.01E+03 (μg/g)	7.35E+04 (kg)
Cs	0.197 (Ci/L)	121 (μCi/g)	3.16E+05 (Ci)
Sr	0.119 (Ci/L)	73.3 (μCi/g)	1.91E+05 (Ci)

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

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

Single-Shot Tank 241-BY-110			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	2.24E+06 kg	(398 kgal)	
Heat Load	1.55 kW	(5.30E+03 BTU/hr)	
Bulk Density		1.49 (g/cc)	
Void Fraction		0.839	
Water wt%		48.2	
TOC wt% C (wet)		0.479	
Na ⁺	8.32	1.29E+05	2.88E+05
Al ³⁺	1.20	2.18E+04	4.88E+04
Fe ³⁺ (total Fe)	0.375	1.41E+04	3.16E+04
Ca ²⁺	2.80E-02	981	2.20E+03
Bi ³⁺	0.104	1.46E+04	3.26E+04
La ³⁺	1.69E-06	0.158	0.353
Hg ²⁺	2.43E-05	3.28	7.35
Zr (as ZrO(OH) ₂)	8.07E-04	49.5	111
Pb ²⁺	2.96E-03	413	925
Ni ²⁺	5.90E-02	2.33E+03	5.22E+03
Sr ²⁺	1.88E-06	0.111	0.248
Mn ²⁺	1.70E-03	62.8	141
Ca ²⁺	0.148	4.00E+03	8.95E+03
K ⁺	2.64E-02	695	1.56E+03
OH ⁻	6.28	7.19E+04	1.61E+05
NO ₃ ⁻	4.33	1.81E+05	4.04E+05
NO ₂ ⁻	0.994	3.08E+04	6.89E+04
CO ₃ ²⁻	0.372	1.50E+04	3.36E+04
PO ₄ ³⁻	0.263	1.68E+04	3.77E+04
SO ₄ ²⁻	0.170	1.10E+04	2.47E+04
Si (as SiO ₂)	6.95E-02	1.31E+03	2.94E+03
F ⁻	0.124	1.59E+03	3.56E+03
Cl ⁻	9.74E-02	2.32E+03	5.20E+03
C ₆ H ₅ O ₂ ⁻	1.25E-02	1.59E+03	3.57E+03
EDTA ⁴⁻	2.81E-03	545	1.22E+03
HEDTA ³⁻	3.80E-04	70.1	157
glycolate ⁻	8.83E-03	446	998
acetate ⁻	1.67E-02	665	1.49E+03
oxalate ²⁻	1.44E-06	8.55E-02	0.191
DBP	1.33E-02	2.38E+03	5.34E+03
butanol	1.33E-02	664	1.49E+03
NH ₃	5.55E-03	63.5	142
Fe(CN) ₆ ⁴⁻	4.59E-02	8.36E+03	1.87E+04
Pu		6.27E-02 (μCi/g)	2.34 (kg)
U	5.63E-02 (M)	643 (μg/g)	2.02E+04 (kg)
Ce	0.121 (Ci/L)	81.2 (μCi/g)	1.82E+05 (Ci)
Br	6.91E-02 (Ci/L)	46.3 (μCi/g)	1.04E+05 (Ci)

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

Single-Shell Tank 241-BY-110			
SLM Composite Inventory Estimate			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%†	0		
TOC wt% C (wt)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Cr ³⁺	0	0	0
Bi ³⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Sr ²⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) [‡]	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Ce	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shall Tank 241-BY-110			
Total Inventory Estimate*			
Total Waste	2.24E+06 kg	(398 kgal)	
Heat Load	1.55 kW	(5.30E+03 BTU/hr)	
Bulk Density†		1.49 (g/cc)	
Water wt%†		48.2	
TOC wt% C (wt)†		0.479	
Na ⁺	8.32	1.29E+05	2.88E+05
Al ³⁺	1.20	2.18E+04	4.88E+04
Fe ³⁺ (total Fe)	0.375	1.41E+04	3.16E+04
Co ²⁺	2.80E-02	981	2.20E+03
Ba ²⁺	0.104	1.46E+04	3.26E+04
La ³⁺	1.69E-06	0.158	0.353
Hg ²⁺	2.43E-05	3.28	7.35
Zr (as ZrO(OH) ₂)	8.07E-04	49.5	111
Pb ²⁺	2.96E-03	413	925
Ni ²⁺	5.90E-02	2.33E+03	5.22E+03
Sr ²⁺	1.88E-06	0.111	0.248
Mn ²⁺	1.70E-03	62.8	141
Ca ²⁺	0.148	4.00E+03	8.95E+03
K ⁺	2.64E-02	695	1.56E+03
OH ⁻	6.28	7.19E+04	1.61E+05
NO ₃ ⁻	4.33	1.81E+05	4.04E+05
NO ₂ ⁻	0.994	3.08E+04	6.89E+04
CO ₃ ²⁻	0.372	1.50E+04	3.36E+04
PO ₄ ³⁻	0.263	1.68E+04	3.77E+04
SO ₄ ²⁻	0.170	1.10E+04	2.47E+04
Si (as SiO ₃ ²⁻)	6.95E-02	1.31E+03	2.94E+03
F ⁻	0.124	1.59E+03	3.56E+03
Cl ⁻	9.74E-02	2.32E+03	5.20E+03
C ₁₀ H ₈ O ₇ ²⁻	1.25E-02	1.59E+03	3.57E+03
EDTA ⁴⁻	2.81E-03	545	1.22E+03
HEDTA ³⁻	3.80E-04	70.1	157
glycolate ⁻	8.83E-03	446	998
acetate ⁻	1.67E-02	663	1.49E+03
oxalate ²⁻	1.44E-06	8.55E-02	0.191
DBP	1.33E-02	2.38E+03	5.34E+03
butanol	1.33E-02	664	1.49E+03
NH ₃	5.55E-03	63.5	142
Fe(CN) ₆ ⁴⁻	4.59E-02	8.36E+03	1.87E+04
Pu		6.27E-02 (μCi/g)	2.34 (kg)
U	5.63E-02 (M)	643 (μg/g)	2.02E+04 (kg)
Cs	0.121 (Ci/L)	81.2 (μCi/g)	1.82E+05 (Ci)
Sr	6.91E-02 (Ci/L)	46.5 (μCi/g)	1.04E+05 (Ci)

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

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

Single-Shell Tank 241-BY-111			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	2.82E+06 kg	(459 kgal)	
Heat Load	3.09 kW	(1.06E+04 BTU/hr)	
Bulk Density		1.63 (g/cc)	
Void Fraction		0.755	
Water wt%		37.8	
TOC wt% C (wet)		0.424	
Na ⁺	12.0	1.70E+03	4.79E+03
Al ³⁺	2.02	3.36E+04	9.49E+04
Fe ³⁺ (total Fe)	2.19E-02	752	2.12E+03
Co ²⁺	4.79E-02	1.53E+03	4.32E+03
Ba ²⁺	8.49E-04	109	308
La ³⁺	3.04E-06	0.260	0.735
Hg ²⁺	3.42E-03	4.22	11.9
Zr (as ZrO(OH) ₂)	2.80E-04	15.7	44.4
Pb ²⁺	5.35E-03	682	1.93E+03
Ni ²⁺	1.28E-02	461	1.30E+03
Sr ²⁺	3.39E-06	0.183	0.516
Mn ²⁺	3.07E-03	104	293
Ca ²⁺	7.40E-02	1.82E+03	5.15E+03
K ⁺	3.56E-02	856	2.42E+03
OH ⁻	9.38	9.81E+04	2.77E+05
NO ₃ ⁻	6.05	2.31E+03	6.32E+05
NO ₂ ⁻	1.64	4.65E+04	1.31E+05
CO ₃ ²⁻	0.580	2.14E+04	6.05E+04
PO ₄ ³⁻	8.73E-02	5.10E+03	1.44E+04
SO ₄ ²⁻	0.185	1.09E+04	3.09E+04
Si (as SiO ₂) ⁺	7.39E-02	1.28E+03	3.61E+03
F ⁻	5.62E-02	657	1.85E+03
Cl ⁻	0.120	2.62E+03	7.39E+03
C ₁₀ H ₇ O ₂ ⁺	2.26E-02	2.63E+03	7.43E+03
EDTA ⁴⁻	5.08E-03	900	2.54E+03
HEDTA ³⁻	6.86E-04	116	327
glycolate ⁻	1.59E-02	736	2.08E+03
acetate ⁻	3.02E-02	1.10E+03	3.10E+03
oxalate ²⁻	2.60E-06	0.141	0.398
DBP	2.40E-02	3.94E+03	1.11E+04
butanol	2.40E-02	1.10E+03	3.09E+03
NH ₃	9.71E-03	102	287
Fe(CN) ₆ ⁴⁻	0	0	0
Pb		0.101 (μCi/g)	4.74 (kg)
U	0.137 (M)	1.43E+03 (μg/g)	5.66E+04 (kg)
Ca	0.203 (Ci/L)	125 (μCi/g)	3.53E+05 (Ci)
Sr	0.123 (Ci/L)	75.6 (μCi/g)	2.14E+05 (Ci)

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

Single-Shall Tank 241-BY-111			
SMM Composite Inventory Estimate			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%†	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Cr ³⁺	0	0	0
Ba ²⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as Zr(OH) ₄)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Se ³⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) [‡]	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Ce	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Se	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-111			
Total Inventory Estimates*			
Total Waste	2.82E+06 kg	(459 kgal)	
Heat Load	3.09 kW	(1.06E+04 BTU/hr)	
Bulk Density†		1.63 (g/cc)	
Water wt%†		37.8	
TOC wt% C (wt)†		0.424	
Na ⁺	12.0	1.70E+05	4.79E+05
Al ³⁺	2.02	3.36E+04	9.49E+04
Fe ³⁺ (total Fe)	2.19E-02	732	2.12E+03
Co ²⁺	4.79E-02	1.53E+03	4.32E+03
Bi ³⁺	8.49E-04	109	308
La ³⁺	3.04E-06	0.260	0.735
Hg ²⁺	3.42E-05	4.22	11.9
Zr (as ZrO(OH) ₂)	2.80E-04	13.7	44.4
Pb ²⁺	5.35E-03	682	1.93E+03
Ni ²⁺	1.28E-02	461	1.30E+03
Ba ²⁺	3.39E-06	0.183	0.516
Mn ²⁺	3.07E-03	104	293
Ca ²⁺	7.40E-02	1.82E+03	5.15E+03
K ⁺	3.56E-02	836	2.42E+03
OH ⁻	9.38	9.81E+04	2.77E+05
NO ₃ ⁻	6.05	2.31E+05	6.52E+05
NO ₂ ⁻	1.64	4.65E+04	1.31E+05
CO ₃ ²⁻	0.580	2.14E+04	6.05E+04
PO ₄ ³⁻	8.73E-02	5.10E+03	1.44E+04
SO ₄ ²⁻	0.185	1.09E+04	3.09E+04
Si (as SiO ₂) ²⁻	7.39E-02	1.28E+03	3.61E+03
F ⁻	5.62E-02	637	1.85E+03
Cl ⁻	0.120	2.62E+03	7.39E+03
C ₆ H ₅ O ₂ ³⁻	2.26E-02	2.63E+03	7.43E+03
EDTA ⁴⁻	5.08E-03	900	2.54E+03
HEDTA ³⁻	6.86E-04	116	327
glycolate ⁻	1.59E-02	736	2.08E+03
acetate ⁻	3.02E-02	1.10E+03	3.10E+03
oxalate ²⁻	2.60E-06	0.141	0.398
DBP	2.40E-02	3.94E+03	1.11E+04
butanol	2.40E-02	1.10E+03	3.09E+03
NH ₃	9.71E-03	102	287
Fe(CN) ₆ ⁴⁻	0	0	0
Pu		0.101 (μCi/g)	4.74 (kg)
U	0.137 (M)	1.43E+03 (μg/g)	5.66E+04 (kg)
Ca	0.203 (Ci/L)	125 (μCi/g)	3.53E+05 (Ci)
Sr	0.123 (Ci/L)	75.6 (μCi/g)	2.14E+05 (Ci)

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

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

Single-Shell Tank 241-BY-112			
TLM Solids Composite Inventory Estimate*			
Total Solid Waste	1.78E+06 kg	(291 kgal)	
Heat Load	2.02 kW	(6.90E+03 BTU/hr)	
Bulk Density		1.61 (g/cc)	
Void Fraction		0.779	
Water wt%		37.8	
TOC wt% C (wt)		0.447	
Na ⁺	12.2	1.73E+03	3.08E+03
Al ³⁺	2.09	3.49E+04	6.20E+04
Fe ²⁺ (total Fe)	3.61E-02	1.25E+03	2.22E+03
Co ²⁺	4.94E-02	1.59E+03	2.83E+03
Bi ³⁺	6.76E-03	875	1.55E+03
La ³⁺	3.14E-06	0.270	0.480
Hg ²⁺	3.52E-05	4.38	7.79
Zr (as ZrO(OH) ₂)	2.89E-04	16.3	29.0
Pb ²⁺	5.51E-03	708	1.26E+03
Ni ²⁺	1.58E-02	575	1.02E+03
Sr ²⁺	3.49E-06	0.190	0.337
Mn ²⁺	3.16E-03	108	191
Ca ²⁺	7.82E-02	1.94E+03	3.45E+03
K ⁺	3.70E-02	896	1.59E+03
OH ⁻	9.10	9.59E+04	1.70E+05
NO3 ⁻	6.29	2.42E+03	4.29E+05
NO2 ⁻	1.70	4.84E+04	8.60E+04
CO3 ²⁻	0.507	1.89E+04	3.35E+04
PO4 ³⁻	7.78E-02	4.58E+03	8.13E+03
SO4 ²⁻	0.190	1.13E+04	2.01E+04
Si (as SiO ₂)	7.75E-02	1.35E+03	2.40E+03
F ⁻	6.19E-02	729	1.30E+03
Cl ⁻	0.125	2.75E+03	4.89E+03
C ₁₀ H ₈ O ₂ ²⁻	2.33E-02	2.73E+03	4.86E+03
EDTA ⁴⁻	5.24E-03	935	1.66E+03
HEDTA ³⁻	7.07E-04	120	213
glycolate ⁻	1.64E-02	764	1.36E+03
acetate ⁻	3.12E-02	1.14E+03	2.03E+03
oxalate ²⁻	2.69E-06	0.146	0.260
DBP	2.48E-02	4.09E+03	7.26E+03
butanol	2.48E-02	1.14E+03	2.02E+03
NH ₃	1.00E-02	105	188
Fe(CN) ₆ ⁴⁻	1.61E-03	270	480
Pu		0.104 (μCi/g)	3.09 (kg)
U	4.13E-02 (M)	435 (μg/g)	1.08E+04 (kg)
Ca	0.210 (Ci/L)	130 (μCi/g)	2.31E+03 (Ci)
Sr	0.126 (Ci/L)	78.3 (μCi/g)	1.39E+03 (Ci)

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

Single-Shell Tank 241-BY-112			
RMD Composite Inventory Estimate			
Total Supernatant Wa	0 kg	(0 kgal)	
Heat Load	0 kW	(0 BTU/hr)	
Bulk Density*	0 (g/cc)		
Water wt%	0		
TOC wt% C (wet)	0		
Na ⁺	0	0	0
Al ³⁺	0	0	0
Fe ³⁺ (total Fe)	0	0	0
Cr ³⁺	0	0	0
Bi ³⁺	0	0	0
La ³⁺	0	0	0
Hg ²⁺	0	0	0
Zr (as ZrO(OH) ₂)	0	0	0
Pb ²⁺	0	0	0
Ni ²⁺	0	0	0
Sr ²⁺	0	0	0
Mn ²⁺	0	0	0
Ca ²⁺	0	0	0
K ⁺	0	0	0
OH ⁻	0	0	0
NO ₃ ⁻	0	0	0
NO ₂ ⁻	0	0	0
CO ₃ ²⁻	0	0	0
PO ₄ ³⁻	0	0	0
SO ₄ ²⁻	0	0	0
Si (as SiO ₂) ⁺	0	0	0
F ⁻	0	0	0
Cl ⁻	0	0	0
C ₆ H ₅ O ₇ ³⁻	0	0	0
EDTA ⁴⁻	0	0	0
HEDTA ³⁻	0	0	0
glycolate ⁻	0	0	0
acetate ⁻	0	0	0
oxalate ²⁻	0	0	0
DBP	0	0	0
butanol	0	0	0
NH ₃	0	0	0
Fe(CN) ₆ ⁴⁻	0	0	0
Pu	0 (μCi/L)		0 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Ca	0 (Ci/L)	0 (μCi/g)	0 (Ci)
Sr	0 (Ci/L)	0 (μCi/g)	0 (Ci)

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

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

Single-Shell Tank 241-BY-112			
Total Inventory Estimate*			
Total Waste	1.78E+06 kg	(291 kgal)	
Heat Load	2.02 kW	(6.90E+03 BTU/hr)	
Bulk Density†		1.61 (g/cc)	
Water wt%		37.8	
TOC wt% C (wt)†		0.447	
Na ⁺	12.2	1.73E+05	3.08E+05
Al ³⁺	2.09	3.49E+04	6.20E+04
Fe ³⁺ (total Fe)	3.61E-02	1.25E+03	2.22E+03
Ca ²⁺	4.94E-02	1.59E+03	2.83E+03
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†Volume average for density, mass average Water wt% and TOC wt% C.

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