Sta 4. (2)

SEP 19 1996

ENGINEERING DATA TRANSMITTAL

1. EDT 617543

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Data Assessment and Interpretation	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: Tank 241-S-107/Waste Management/DAI/TWRS Technical Basis	6. Design Authority/ Design Agent/Cog. Engr.: Brett C. Simpson	7. Purchase Order No.: N/A
8. Originator Remarks: This document is being released into the supporting document system for retrievability purposes.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 241-S-107
11. Receiver Remarks: 11A. Design Baseline Document? [] Yes [X] No For release.		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 09/05/96

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-ER-589	N/A	0	Tank Characterization Report for Single-Shell Tank 241-S-107	N/A	2	1	1

16. KEY

Approval Designator (F)	Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN
		Design Authority	1	1	R.J. Cash 9/16/96 S7-14
		Design Agent			
2	1	Cog.Eng. B.C. Simpson 9/17/96			
2	1	Cog. Mgr. J.G. Kristofzski 9/16/96			
		QA			
		Safety			
		Env.			

18.	19.	20.	21. DOE APPROVAL (if required)
A.E. Young 9-5-96 Signature of EDT Originator / Date	N/A Authorized Representative for Receiving Organization / Date	J.G. Kristofzski 9/16/96 Design Authority/ Cognizant Manager / Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (05/96) GEF097

BD-7400-172-1

SEP 19 1996

ENGINEERING DATA TRANSMITTAL

1. EDT 617543

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Data Assessment and Interpretation	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: Tank 241-S-107/Waste Management/DAI/TWRS Technical Basis	6. Design Authority/ Design Agent/Cog. Engr.: Brett C. Simpson	7. Purchase Order No.: N/A
8. Originator Remarks: This document is being released into the supporting document system for retrievability purposes.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 241-S-107
11. Receiver Remarks: For release.	11A. Design Baseline Document? [] Yes [X] No	12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 09/05/96

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-ER-589	N/A	0	Tank Characterization Report for Single-Shell Tank 241-S-107	N/A	2	1	1

16. KEY

Approval Designator (F)	Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN
		Design Authority	1	1	R.J. Cash 9/16/96 S7-14
		Design Agent			
2	1	Cog.Eng. B.C. Simpson 9/17/96			
2	1	Cog. Mgr. J.G. Kristofzski 9/16/96			
		QA			
		Safety			
		Env.			

18.	19.	20.	21. DOE APPROVAL (if required)
A.E. Young 9-5-96 Signature of EDT Originator Date	N/A Authorized Representative for Receiving Organization Date	J.G. Kristofzski 9/16/96 Design Authority/ Cognizant Manager Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (05/96) GEF097

Tank Characterization Report for Single-Shell Tank 241-S-107

Brett C. Simpson
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: EDT-617543 UC: 2070
Org Code: 79400 Charge Code: N4G4D
B&R Code: EW 3120074 Total Pages: 374

Key Words: Tank Characterization Report, TCR, Single-Shell Tank, Single-Shell, SST, Tank 241-S-107, Tank S-107, S-107, S Farm

Abstract: This document summarizes the information on the historical uses, present status, and the sampling and analysis results of waste stored in Tank 241-S-107. This report supports the requirements of Tri-Party Agreement Milestone M-44-09.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Release Approval Date 9/19/96

DATE: HANFORD RELEASE
STA: 4 ID: 2
SEP 19 1996
Release Stamp

Approved for Public Release

WHC-SD-WM-ER-589, Rev. 0

UC-2070

Tank Characterization Report for Single-Shell Tank 241-S-107

B. C. Simpson
J. G. Field
Westinghouse Hanford Company

D. W. Engel
D. S. Daly
Pacific Northwest National Laboratory

Date Published
September 1996

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

Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington

Management and Operations Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

Approved for public release; distribution is unlimited

EXECUTIVE SUMMARY

This characterization report summarizes the available information on the historical uses and the current status of single-shell tank 241-S-107. It provides the analytical results of the September 1995 sampling and analysis effort. This report supports the requirements of *Hanford Federal Facility Agreement and Consent Order* Milestone M-44-09 (Ecology et al. 1996).

Tank 241-S-107 is a single-shell underground waste storage tank located in the 200 West Area S Tank Farm on the Hanford Site. It is the first in a three-tank cascade series that includes tanks 241-S-108 and 241-S-109. Tank 241-S-107 received REDOX waste during 1952 and REDOX cladding waste from 1954 to 1967. In 1967, the tank received zirconium cladding waste. From 1968 to 1980, the tank received transfers of REDOX evaporator bottoms waste, cladding waste, and transfers of supernate waste such as 242-T Evaporator (saltcake) waste, B Plant low-level waste, organic wash waste, REDOX ion exchange waste, decontamination waste, PUREX high-level waste, PUREX low-level waste, N Reactor waste, partially neutralized feed, double-shell slurry feed, laboratory waste, REDOX waste, Battelle Northwest waste, cesium supernatant recovery waste, 224-U (LaF_3) waste and noncomplexed waste (Agnew et al. 1995). Approximately 1,310 kL (346 kgal) of waste remained after a final transfer in the third quarter of 1980 when the tank was removed from service. The inventory was changed to 1,423 kL (376 kgal) in 1993 to account for discrepancies in surface topography.

A description and status of tank 241-S-107 are summarized in Table ES-1 and Figure ES-1. The tank has an operating capacity of 2,870 kL (758 kgal) and currently contains 1,423 kL (376 kgal) of waste, which is composed of 53 kL (14 kgal) of supernatant, 1,109 kL (293 kgal) of sludge, and 261 kL (69 kgal) of saltcake (Hanlon 1996). The tank waste surface level data from May 1993 to the present ranges from 3.66 m (12 ft) to 3.71 m (12.1 ft).

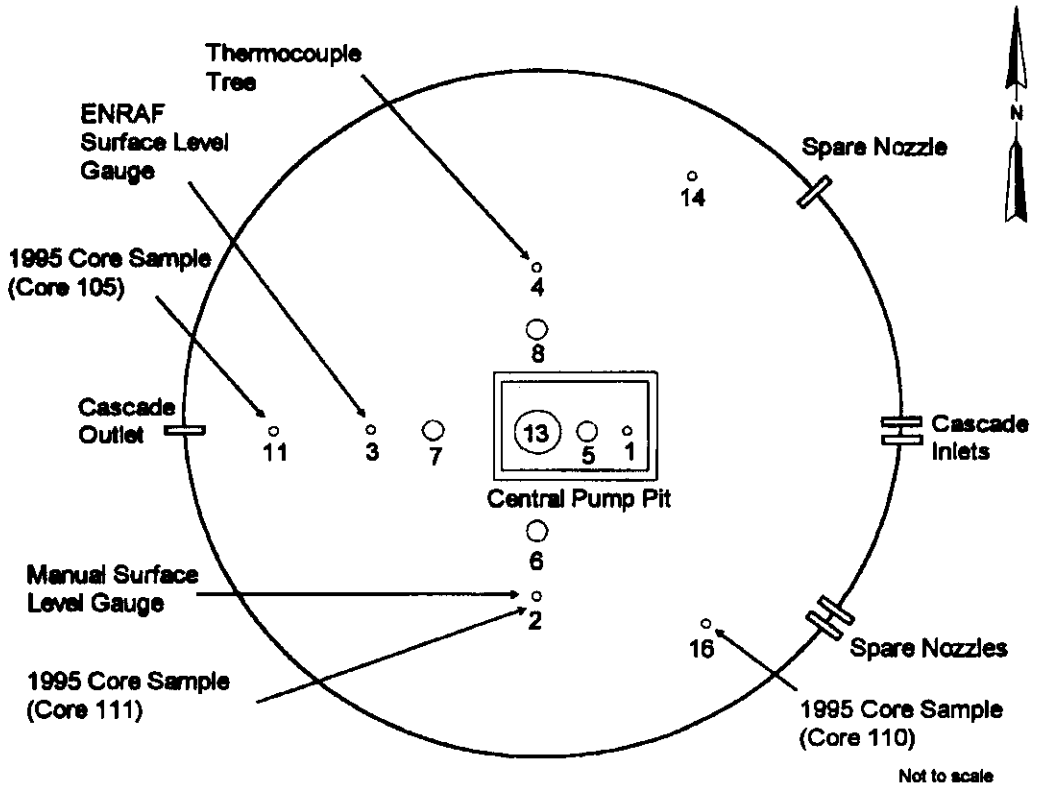
This report summarizes the collection and analysis of a set of samples which were obtained in September 1995. The sampling event was performed to satisfy the requirements of the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995), and the *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology* (Kupfer et al. 1995). The tank is not on any Watch List.

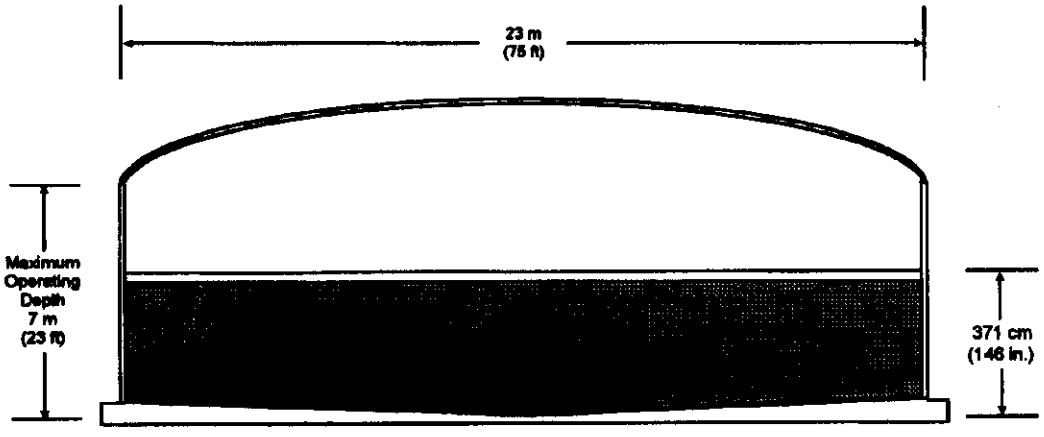
The sampling effort consisted of taking three eight-segment core samples by the push-mode core sampling method. Three cores were taken because this tank was anticipated to be very heterogeneous, and the available riser configuration was favorable for quantifying spatial variability. Core 105 was taken from riser 11, core 110 from riser 16, and core 111 from riser 2. Hydrostatic head fluid was used in the sampling process.

Table ES-1. Description and Status of Tank 241-S-107.

TANK DESCRIPTION	
Type	Single-Shell
Constructed	1950-1951
In-service	1952
Diameter	23 m (75 ft)
Maximum operating depth	7 m (23 ft)
Capacity	2,870 kL (758 kgal)
Bottom Shape	Dish
Ventilation	Passive
TANK STATUS	
Total waste volume	1,423 L (376 kgal)
Supernatant volume	53 kL (14 kgal)
Saltcake volume	261 kL (69 kgal)
Sludge volume	1,109 kL (293 kgal)
Drainable interstitial liquid volume	170 kL (45 kgal)
Waste surface level	3.71 m (12.2 ft)
Mean temperature (January 1988 to July 1993)	42 °C (107 °F)
Integrity	Sound
Watch List	None
SAMPLING DATES	
Push-mode core samples	September 1995
SERVICE STATUS	
Partial isolation	December 1982
Interim stabilized	Not completed

Figure ES-1. Profile of Tank 241-S-107.





Total Tank Volume: 2,870 kL (758 kgal)
Waste Volume: 1,420 kL (376 kgal)
Sludge Volume: 1,109 kL (293 kgal)
Saltcake Volume: 261 kL (69 kgal)
Supernate Volume: 53 kL (14 kgal)
(Hanlon 1996)

Not to Scale

The overall tank mean weight percent water was 32.1 percent with a relative standard deviation of 7.2 percent. Only one sample, core 111, segment 4, upper half, showed weight percent water results lower than 17 percent and there was no discernable exotherm. Hydrostatic head fluid intrusion appears to be negligible.

All total alpha results were well below the notification limit of 34.6 μCi/g. The average total alpha for the tank was 0.9 μCi/g, and the highest detected total alpha activity was 3.46 μCi/g from the lower half duplicate of segment 3, core 111. The highest upper limit value to a one-sided 95 percent confidence interval on the mean for this data set was 9.17 μCi/g.

No exothermic reactions in excess of the safety screening limits were observed in the differential scanning calorimetric analyses (Raphael 1996). The exothermic change in enthalpy with the greatest magnitude was -415 J/g (dry) for core 111, segment 8, bottom quarter. The computation of a 95 percent confidence interval on the mean, required by the safety screening DQO, indicated the upper limit was -471 J/g (dry).

The maximum flammability in the tank headspace was measured in riser 2 at four to five percent of the lower flammability limit (LFL). However, drill string measurements indicate that caution should be used during sampling and other intrusive tank activities. Gases trapped in the waste and released by core sampling may reach flammable concentrations before being dispersed in the atmosphere.

The heat load in the tank produced by radioactive decay is estimated to be 3.54 kW (12,100 Btu/hr). The boundary classifying high- and low-heat tanks is 11.7 kW (40,000 Btu/hr) (Bergmann 1991). Surveillance data show that the tank temperature has gradually decreased during the last three years. The maximum tank temperature measured on June 9, 1996 was 37.7 °C (99.9 ° F).

The top region, including the supernatant (approximately 44 cm [17 in.]), accounts for approximately 12 percent of the tank waste by volume. It is made up of mostly soluble species and contains modest concentrations of radionuclides. Specific comparisons with historical predictions (Agnew et al. 1996) were not performed because this waste composition was estimated by the supernatant mixing model subroutine, which is not within the scope of the historical DQO. The waste is rich in several species that were not predicted by Agnew et al. (1996) to be present in substantial quantities (phosphate, oxalate, fluoride, aluminum and chromium). The chromium content in this region is particularly high (16,000 μg/g versus 1,380 μg/g expected). The interface layer contacting the supernatant is high in moisture. Moisture then falls off with increasing depth as temperature increases, following expected distribution behavior based on physical principles.

The middle region, approximately the next 124 cm (49 in.), accounts for approximately 34 percent of the tank waste by volume. Qualitatively, it agrees well with several predictions regarding its physical and chemical properties. It is largely insoluble, very cohesive, and demonstrates high variability. Physical processes, transaction history, and interactions between waste types figure prominently in the observed behavior of the samples

from the middle region. High levels of zirconium and fluoride were observed. Although they were anticipated from process history, they were not expected in the quantities suggested by sampling.

The bottom region, approximately the last 198 cm (78 in.), of the tank accounts for 54 percent of the tank waste by volume. When compared against historical predictions, the samples give mixed results. One waste type, REDOX high-level waste, met the volume and configuration criteria for the detailed historical comparison. This waste is very insoluble and cohesive, and it has a relatively high radionuclide content. These characteristics agree with Agnew et al. (1996) predictions, and the waste type meets minimum threshold criteria for further investigation. However, several specific analytes compare poorly.

Chromium, iron and nitrate do not agree between predicted and observed values for REDOX high-level waste. Chromium and nitrate are highly affected by solubility. Possible reasons for the poor comparisons observed: microconvection, analyte washout (for Cr), radiolytic degradation (for NO_3^-) or a poor estimate of solubility in Agnew et al. (1996). Soluble chromium in substantial quantities would dramatically change the predicted composition of REDOX waste in all tanks. Furthermore, if supported by data from other REDOX tanks, economic and technology assumptions regarding pretreatment and disposal would be impacted. A poor iron comparison, observed in previous tanks, may result from an excessive source term from process corrosion that was used in Agnew et al. (1996).

Although the predicted and observed aluminum values compared well initially, further analysis revealed a deficiency in the analytical preparation method. The waste matrices are highly insoluble, and up to two-thirds of the aluminum in the waste may not have been quantitated by the acid digestion preparation. Therefore, assumptions made regarding the undetected aluminum were included in the results. When analyzing such matrices, fusion preparation may be necessary to achieve complete quantitation.

Although Agnew et al. (1996) predicts coating wastes in the lower region of the tank, no distinct layer was observed. Thus, either differences between REDOX high-level waste and REDOX coating waste are minor, or no separate distinguishable waste type was discharged to the tank. Table ES-2 provides a summary of the major analytes and analytes of concern. Figure ES-1 illustrates the present tank configuration.

Table ES-2. Major Analytes and Analytes of Concern.[1]

Analyte	Mean Concentration	RSD (Mean)	Projected Inventory
Safety Screening Analytes			
Water Content (solids)	32.1 weight percent	7.2 percent	8.12E+05 kg
Total alpha activity	0.9 μCi/g	13.6 percent	2,200 Ci
Flammable Gas	5 percent lower flammability limit		
Anions	**μg/g**	**percent**	**kg**
Chloride	2,080	7.0	5,080
Fluoride	14,300	30.5	34,800
Nitrate	57,900	5.3	141,000
Nitrite	30,900	7.1	75,300
Phosphate	21,600	29.4	52,700
Oxalate	4,180	24.3	10,200
Sulfate	2,430	19.5	5,930
Metals	**μg/g**	**percent**	**kg**
Aluminum[3]	49,700 *149,100*	16.2	121,000 *363,000*
Chromium	3,530	26.5	610
Iron	2,300	18.1	610
Nickel	1,280	24.7	120
Silicon	2,180	28.9	210
Sodium	86,700	9.2	211,000
Uranium	6,830	10.4	16,700
Zirconium	9,720	33.6	23,700
Radionuclides	**μCi/g**	**percent**	**Ci**
^{137}Cs	83.6	9.0	204,000
^{90}Sr	158.3	13.6	385,000
Physical Properties	**g/mL**	**percent**	
Density[2]	1.78	1.86	n/a
Carbon	**μg C/g**	**percent**	**kg C**
TOC Carbon	1,700	11.8	4,150

Notes:

n/a = not applicable

RSD (Mean) = relative standard deviation of the mean

[1]Calculations are based on 1.78 g/mL density of sludge and 1,370 kL solid waste volume.

[2]Average of selected segment density analyses.

[3]Italics indicate total estimated aluminum concentration. Regular font indicates quantitated value.

This page intentionally left blank.

1.0 INTRODUCTION

This characterization report presents an overview of single-shell tank 241-S-107 and its waste components. It provides estimated concentrations and inventories for the waste constituents based on the latest sampling and analysis activities and background tank information. Tank 241-S-107 was sampled in September 1995 to satisfy the requirements of the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995), and the *Interim Data Quality Objectives for Waste Pretreatment and Vitrification* (Kupfer et al. 1995).

Tank 241-S-107 was removed from service and declared inactive in 1980. Interim stabilization and intrusion prevention have not been completed (Hanlon 1996). The analyte concentrations reported in this document reflect the best estimates of the waste composition based on available analytical data and historical models. This report supports the requirements of the *Hanford Federal Facility Agreement and Consent Order*, Milestone M-44-09 (Ecology et al. 1996). It will be reviewed and updated as additional information is obtained.

1.1 PURPOSE

The purpose of this report is to summarize the information about the use and contents of tank 241-S-107. Where possible, this information will be used to assess issues associated with safety, operations, environmental, and process development activities. This report also serves as a reference point for more detailed information concerning tank 241-S-107.

1.2 SCOPE

The September 1995 core sampling event for tank 241-S-107 supported the tank waste evaluation of the safety screening and historical DQOs. From the three core samples, analyses were performed as directed in the *Tank 241-S-107 Sample and Analysis Plan* (Kelly 1995). Primary safety screening analyses included differential scanning calorimetry (DSC) to evaluate fuel level and energetics, thermogravimetric analysis (TGA) to determine moisture content, total alpha activity to evaluate criticality potential, and flammable gas concentration to determine explosion or deflagration potential.

Selected subsegment and composite samples were analyzed as directed for historical assessment. From these samples, principal anions, cations, water content, and radionuclides were measured to evaluate a prediction model developed from past process history data and to calculate an inventory of the tank contents. Specific analysis for lithium was conducted by inductively coupled plasma atomic emission spectrometry (ICP/AES) to check for sample

contamination by the hydrostatic head fluid used during the push-mode core sampling process. Bromide was analyzed by ion chromatography (IC) as a secondary check for hydrostatic head fluid infiltration.

2.0 HISTORICAL TANK INFORMATION

This four part section describes tank 241-S-107 based on historical information. The first part details the current condition of the tank. The second part discusses the tank's design, transfer history, and the process sources that contributed to the tank waste, and it includes an estimate of the current contents based on process history. The third part describes events that may be related to tank safety issues, such as potentially hazardous tank contents or off-normal operating temperatures. The fourth part summarizes available surveillance data for the tank. Solid and liquid level data are used to determine tank integrity (leaks) and to provide clues to internal activity in the solid layers of the tank. Temperature data are provided to evaluate the heat-generating characteristics of the waste.

2.1 TANK STATUS

As of February 29, 1996, tank 241-S-107 contained approximately 1,423 kL (376 kgal) of noncomplexed waste (Hanlon 1996). The liquid level was determined using an ENRAF[1] automatic surface level gauge and photographic evaluation. The solid waste volume was estimated using a combination of photographic evaluation, a sludge level measurement device, and assumptions based on the tank's geometry (Hanlon 1996). The amounts of the waste phases in the tank are shown in Table 2-1.

Table 2-1. Summary Tank Contents Status.[1]

Waste Form	Volume	
	Kilolitters	(Kilogallons)
Total Waste	1,423	376
Supernatant liquid	53	14
Sludge	1,109	293
Saltcake	261	69
Drainable interstitial liquid	170	45
Drainable liquid remaining	223	59
Pumpable liquid remaining	197	52

Note:
[1]Hanlon (1996)

[1]ENRAF is a registered trademark of the ENRAF Corporation, Houston, Texas.

Tank 241-S-107 is a sound, passively ventilated tank. It was partially interim isolated as of December 1982. The tank is not on any Watch List. All monitoring systems were in compliance with documented standards as of February 29, 1996 (Hanlon 1996).

2.2 TANK DESIGN AND BACKGROUND

Information for this section was taken from Anderson (1990), Alstad (1993), Leach and Stahl (1993) and tank construction drawings.

The S Tank Farm was constructed between 1950 and 1951 in the 200 West Area and contains 12 type II 100 series cylindrical tanks. These tanks have a 2,870 kL (758 kgal) design capacity, and 23 m (75 ft) diameter with a 7 m (23 ft) operating depth. Built as one of the second generation tank farms, the tanks in the 241-S Tank Farm were designed for nonboiling waste with a maximum fluid temperature of 104 °C (220 °F).

A 7.5 cm (3 in.) cascade overflow line connects three tanks in a series. Tank 241-S-107 is first tank in a three-tank cascade that includes tanks 241-S-108 and 241-S-109. Each tank is 30 cm (1 ft) lower in elevation than the previous tank. The cascade overflow height is approximately 7.25 m (23.7 ft) from the tank bottom and 60 cm (2 ft) below the top of the steel liner (Brevick et al. 1994b).

The tanks have a dished bottom with a 1.2 m (4 ft) radius knuckle. Similar to all other single-shell tank farms, the 241-S Tank Farm tanks are designed with a primary mild steel liner and a concrete dome with risers. The riser layout was modified from the first generation to provide better access to the tank. The tanks are set on a reinforced concrete foundation. Lead flashing was used to protect the joints where the steel liner met the concrete dome. Each tank was covered with approximately 2.63 m (8.63 ft) of overburden (Brevick et al. 1994b).

Until June 1994, the surface level was monitored through riser 3 with a Food Instrument Corporation (FIC) gauge. Currently, the surface level is monitored with an ENRAF® surface level gauge that automatically collects and enters data into the Tank Monitoring and Control System (TMACS). Tank 241-S-107 has 12 risers ranging in size from 10 cm (4 in.) in diameter to 1.1 m (3.5 ft) in diameter. A plan view illustrating the riser configuration is shown as Figure 2-1. Table 2-2 shows riser number, size, and descriptions. Risers 11 and 14, which are 10 cm (4 in.) in diameter, and risers 6 and 7 which are 30 cm (12 in.) in diameter are available for use. A tank cross section showing the approximate waste level and a schematic of the tank equipment is shown in Figure 2-2. Tank 241-S-107 is out of service as are all single-shell tanks.

Figure 2-1. Riser Configuration for Tank 241-S-107.

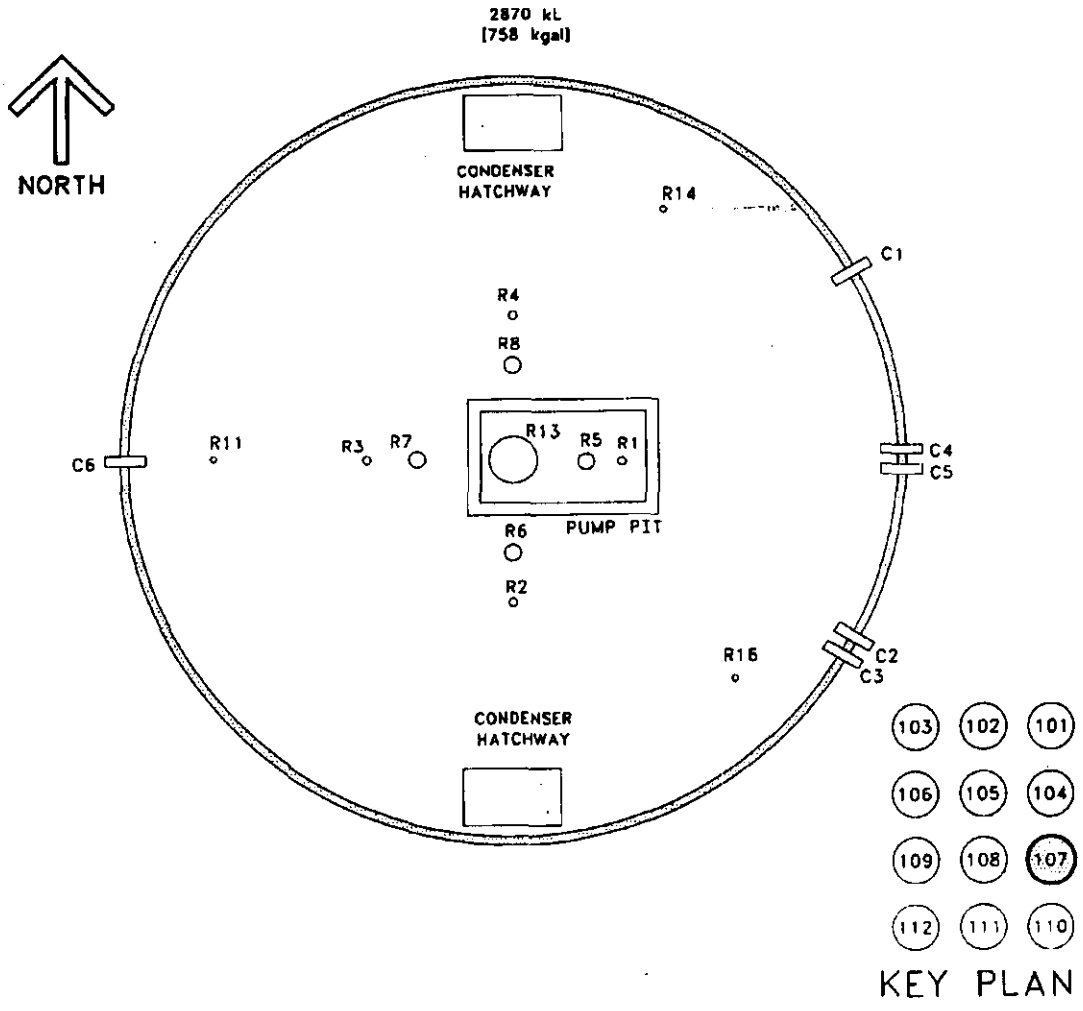


Table 2-2. Tank 241-S-107 Risers.[1,2]

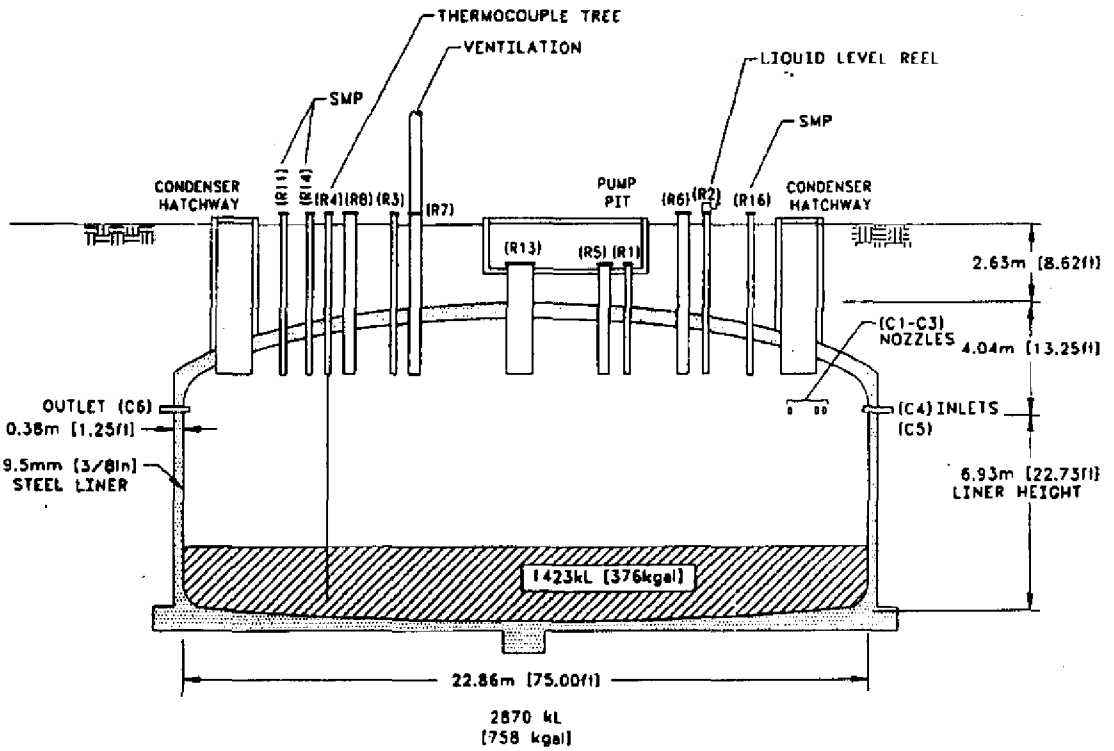
Riser Number	Diameter (in.)	Description and Comments
R1	4	(Connector nozzle) pump pit drain, weather covered
R2	4	Flange with spool piece, bench mark, breather filter
R3	4	ENRAF gauge
R4	4	Thermocouple tree, manual B-221
R5	12	Saltwell screen and pump, weather covered
R6	12	Flange/B-222 observation port
R7	12	Blind flange
R8	12	Below grade
R11	4	Flange/sludge measurement port
R13	42	(Slurry distributor), weather covered
R14	4	Flange/sludge measurement port
R16	4	Benchmark, blanked
Nozzle Number	**Diameter (in.)**	**Description and Comments**
C1	3	Spare nozzle
C2	3	Spare nozzle
C3	3	Spare nozzle
C4	3	Cascade inlet nozzle
C5	3	Cascade inlet nozzle
C6	3	Cascade outlet nozzle

Notes:

[1]Alstad (1993)

[2]Hanford Drawings H-2-01783 Rev. 3 (WHC 1972)
H-2-37530 Rev. 0 (WHC 1995)
H-2-73186 Rev. 4 (WHC 1988)

Figure 2-2. Tank 241-S-107 Configuration.



2.3 PROCESS KNOWLEDGE

The following subsections provide the process history of tank 241-S-107, describe the wastes transferred in and out of the tank, and gives an estimate of current tank constituents. Information is taken from the *Waste Status and Transaction Record Summary for the Northeast Quadrant* (Agnew et al. 1995), and the *Hanford Tank Chemical and Radionuclide Inventories, HDW Model Rev. 3* (Agnew et al. 1996).

2.3.1 Waste Transfer History

Tank 241-S-107 first received REDOX type 1 (R1) waste and waste water during the third quarter of 1952. The tank received type 1 (CWR1) and type 2 (CWR2) REDOX cladding waste from 1954 to 1967 and zirconium cladding (CWZr1) waste in 1967 (Agnew et al. 1995).

From 1962 to 1980 the tank received transfers of REDOX evaporator bottoms waste, cladding waste, and transfers of supernate waste from the following sources: B Plant low-level waste, organic wash waste, REDOX ion exchange waste, decontamination waste, ion exchange waste, PUREX high-level waste, PUREX low-level waste, N Reactor waste, partially neutralized feed, double-shell slurry feed, laboratory waste, REDOX waste, Battelle Northwest waste, cesium supernatant recovery waste, 224-U (LaF_3) waste and noncomplexed waste. For a description of these waste types, refer to the *Hanford Defined Wastes: Chemical and Radionuclide Compositions* (Agnew et al. 1996). Table 2-3 provides a summary of the tank's waste transfer history.

Approximately 1,310 kL (346 kgal) of waste remained in tank 241-S-107 after a final transfer in 1980 when the tank was removed from service. The surface level measurement increased 2.8 cm (1.10 in.) in September 1991 when water was added to the tank to install a saltwell screen. The reference baseline was adjusted to reflect this water addition. No change to the volume was reported in Agnew et al. (1995) for this water addition. An adjustment of 83 kL (22 kgal) was made in the second quarter of 1993; another adjustment of 30 kL (8 kgal) was made in the fourth quarter of 1993 bringing the current volume estimate to 1,310 kL (376 kgal) of waste. It is not clear whether the first adjustment was caused by a Food Instrument Corporation gauge repair or discovery of discrepancies in surface topography. The second adjustment resulted from the accounting for discrepancies in the surface topography.

Table 2-3. Summary of Tank 241-S-107 Waste Input History.[1] (3 sheets)

Transfer Source	Waste Type Received	Time Period	Waste Volume Kiloliters	(Kilogallons)
REDOX Plant	REDOX waste REDOX cladding waste	1952 to 1967	20,185	5,332
241-TX-118	242-T evaporator saltcake waste	1962 to 1963	3,683	973
241-S-103	REDOX waste Noncomplexed waste	1973 to 1978	2,377	628
241-S-110	REDOX waste B Plant low-level waste Organic wash waste REDOX ion exchange waste Decontamination waste Cladding waste Ion exchange waste Evaporator bottoms waste 224-U waste	1974 to 1975	4,217	1,114
241-BX-106	B Plant low-level waste Cladding waste Organic wash waste Ion exchange waste	1974	1,049	277
241-C-104	PUREX high-level waste B Plant high-level waste N Reactor waste Battelle Northwest waste Ion exchange waste PUREX low-level waste	1974	1,355	358
241-SX-111	Evaporator bottoms waste REDOX ion exchange waste	1974	2,847	752

Table 2-3. Summary of Tank 241-S-107 Waste Input History.[1] (3 sheets)

Transfer Source	Waste Type Received	Time Period	Waste Volume Kiloliters	(Kilogallons)
241-C-103	REDOX waste B Plant high-level waste Organic wash waste Ion exchange waste Decontamination waste Cladding waste Ion exchange waste Evaporator bottoms waste PUREX low-level waste Battelle Northwest waste N Reactor waste	1974	1,151	304
241-S-104	REDOX waste	1974 to 1975	30	8
241-S-101	Cladding waste Laboratory waste Battelle Northwest waste N Reactor waste Decontamination waste PUREX low level waste B Plant high level waste Evaporator bottoms waste Partial neutralized feed Double shell slurry feed	1974 to 1980	795	210
241-BX-103	Battelle Northwest waste Ion exchange waste PUREX low-level waste N Reactor waste Laboratory waste Evaporator bottoms waste Cladding waste	1974	1,488	393
241-U-107	Battelle Northwest waste Decontamination waste N Reactor waste Laboratory waste	1974 to 1975	1,257	332
241-BX-104	B Plant low-level waste Ion exchange waste Cesium supernatant recovery waste	1975	1,401	370

Table 2-3. Summary of Tank 241-S-107 Waste Input History.[1] (3 sheets)

Transfer Source	Waste Type Received	Time Period	Waste Volume Kilolitters	(Kilogallons)
241-S-102	Evaporator bottoms waste Double-shell slurry feed	1976 to 1980	1,230	325
241-SX-104	Evaporator bottoms waste	1976	659	174
241-SX-105	Partially neutralized feed Double-shell slurry feed	1976	1,007	266
241-SY-102	Noncomplexed waste Partially neutralized feed	1977 to 1980	16,672	4,404
241-SY-103	R1 and R2	1980	4,811	1,271

Note:
[1]Agnew et al. (1995)

2.3.2 Historical Estimation of Tank Contents

The following is an estimate of the contents in tank 241-S-107 based on historical transfer data. The historical data used for the estimate are *Waste Status and Transaction Record Summary for the Southwest Quadrant, Rev. 2* (Agnew et al. 1995), and the *Hanford Tank Chemical and Radionuclide Inventories, HDW Model Rev. 3* (Agnew et al. 1996). As of May 1995, the historical tank content estimate (HTCE) document (Brevick et al. 1994a) was being revised to reflect these documents. The WSTRS is a compilation of available waste transfer and volume status data. The Hanford Defined Waste (HDW) model provides the assumed typical compositions for Hanford Site waste types. The supernatant mixing model (SMM) subroutine calculates the volumes and compositions of several of the evaporator concentrates and comingled supernatants. In some cases, the available data are incomplete, thereby reducing the usefulness of the transfer data and the modeling results derived from it. The HDW and SMM then takes the WSTRS data, models the waste deposition processes, and, using additional composition data (which may introduce additional error or bias), generates an estimate of the tank contents. Thus, these model predictions can only be considered an estimate that requires further evaluation using analytical data.

The latest Agnew et al. (1996) estimates state that tank 241-S-107 contains the following: 348 kL (92 kgal) of REDOX (R1) waste, 337 kL (89 kgal) of type 1 REDOX cladding waste (CWR1) waste, 49 kL (13 kgal) of REDOX salt cake (RSLTCK), 68 kL (18 kgal) of type 1 zirconium cladding waste (CWZr1) waste, 160 kL (42 kgal) type 2 REDOX cladding waste (CWR2), 148 kL (39 kgal) of type 2 242-T Evaporator saltcake (SMMT2) waste, 178 kL

(47 kgal) of type 1 242-S Evaporator saltcake (SMMS1) waste, 83 kL (22 kgal) of type 2 242-S Evaporator salt slurry (SMMS2) waste, and 53 kL (14 kgal) of supernatant (see Figure 2-3). Conventional interpretation of the HDW model describes the waste as stratified chronologically with the bottom, largest layer consisting of R1 waste followed by a CWR1 waste layer, an RSLTCK waste layer, a CWZrl waste layer, a SMMT2 waste layer, a SMMS1 waste layer, and a top layer of SMMS2 waste (including the supernatant).

Based on Agnew et al. (1996), the R1 (bottom) layer should contain large (3 weight percent or more) quantities of aluminum, chromium, iron, sodium, and nitrite. This waste type should also contain appreciable (greater than 50 μCi/g) quantities of ^{90}Sr, and ^{137}Cs that give it high radioactivity. CWR1 waste has high (2 weight percent or more) concentrations of uranium, sodium, aluminum, nitrate, nitrite, and hydroxide; moderate (up to 0.5 weight percent) quantities of calcium, carbonate and iron; and low (less than 5 μCi/g) concentrations of strontium and cesium. Aluminum and uranium concentrations are predicted to be significantly higher than that found in R1 waste.

The CWZrl waste layer should have a large concentration of sodium, zirconium [as $ZrO(OH)_2$], fluoride, hydroxides, and nitrates; and moderate quantities of iron, ammonia, and potassium. REDOX waste has conspicuously low levels of phosphate and phosphorous. The plutonium/total alpha concentration should be approximately half of that for CWR1 waste type, and the strontium and cesium concentrations should be smaller than the CWR1 waste type.

The SMMT2, SMMS1, and SMMS2 waste compositions are similar: all should contain large quantities of sodium and nitrate, nitrite, sulfate, phosphate, carbonate, hydroxide and aluminum; and moderate quantities of calcium, iron, chromium, uranium, potassium, ethylenediaminetetraacetic acid (EDTA), N-(hydroxylethyl)-ethylenediaminetriacetic acid (HEDTA) and total organic carbon (TOC). The plutonium/total alpha concentration for the SMMT2 and SMMS1 waste types should be similar and much lower than CWZrl waste. The radioactivity for the evaporator concentrated waste types should be higher than for CWR1 and CWZrl waste but lower than for R1 waste.

At the present level of sampling/analytical resolution, differences between SMMT2, SMMS1, and SMMS2 may not be discernable. The R1, CWR1, CWZrl, T2SLTCK, SMMS1 and SMMS2 waste types can be distinguished from one another by observing the following predicted properties: the R1 contains the highest concentration of chromium and low concentrations of phosphate, and the CWR1 contains the highest concentration of aluminum. The REDOX saltcake shares many properties of both R1 and CWR1 wastes and may not be distinguishable from them. The CWZrl does not contain aluminum, but it does contain the highest zirconium concentration (zirconium is not found in R1 and CWR1 waste). The saltcake/salt slurry wastes are probably more granular in appearance and texture and are made up of mostly soluble species. The R1, CWR1 and CWZrl are probably smoother and creamier in appearance and texture and are made up of mostly insoluble species. However, visual cues are not sufficient in many cases to distinguish compositionally different wastes. Table 2-4 shows an estimate of expected waste constituents and concentrations.

Figure 2-3. Tank Layer Model for Tank 241-S-107.

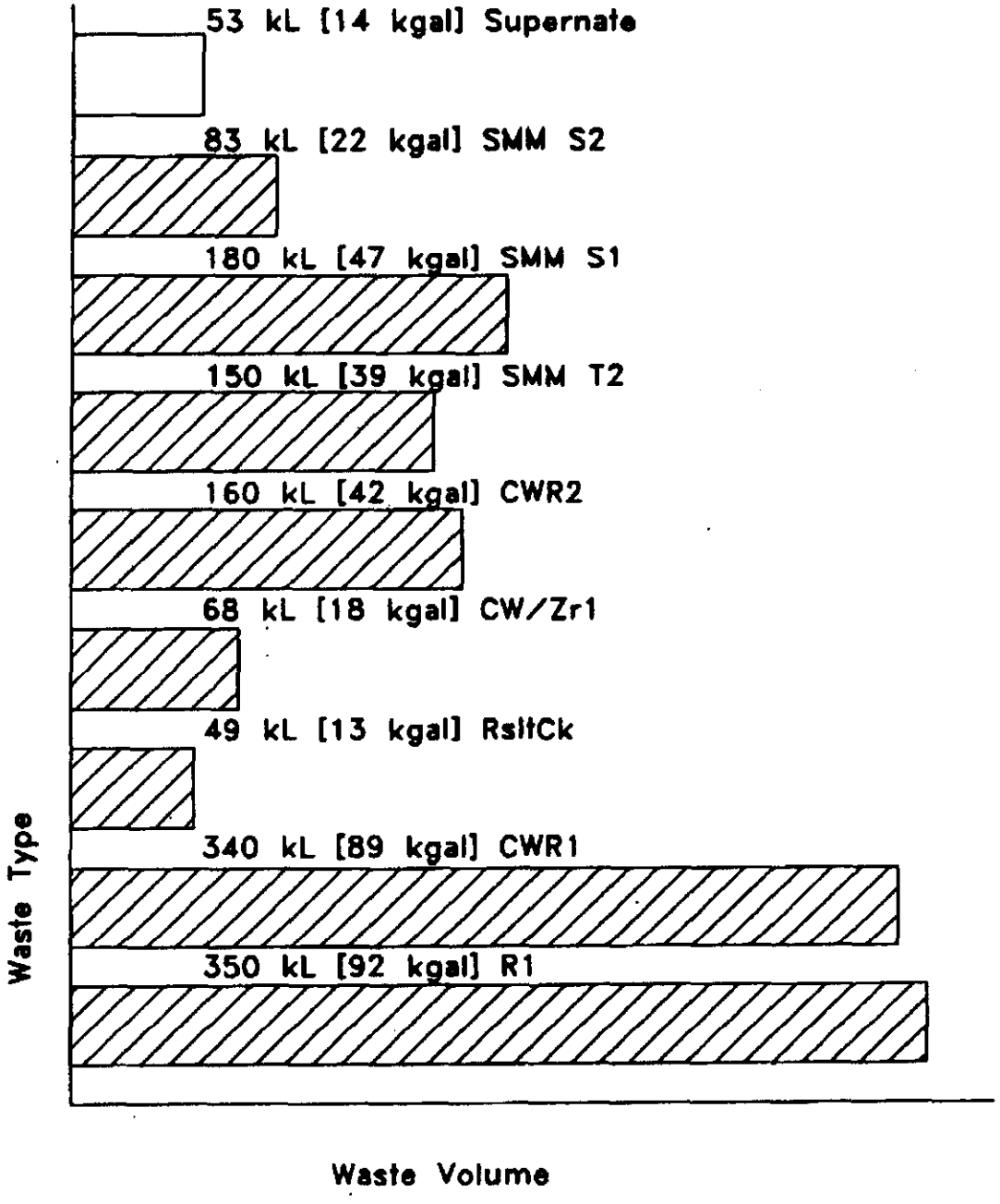


Table 2-4. Tank 241-S-107 Historical Inventory Estimate (Agnew et al. 1996).[1,2] (2 Sheets)

Total Inventory Estimate			
Physical Properties			
Total solid waste	2.16E+06 kg (376 kgal)		
Heat load[2]	3.37 kW (1.15E+04 Btu/hr)		
Bulk density	1.51 (g/cc)		
Water wt%	45.1		
Total Organic Carbon wt% Carbon (wet)	0.271		
Chemical Constituents	**mol/L**	**ppm**	**kg**
Na^{+}	5.56	8.44E+04	1.82E+05
Al^{3+}	4.67	8.33E+04	1.79E+05
Fe^{3+} (total Fe)	0.346	1.28E+04	2.75E+04
Cr^{3+}	0.234	8.04E+03	1.73E+04
Bi^{3+}	2.54E-04	35.0	75.5
La^{3+}	8.03E-06	0.737	1.59
Hg^{2+}	2.29E-03	304	655
Zr (as $ZrO(OH)_2$)	4.45E-02	2.68E+03	5.78E+03
Pb^{2+}	6.44E-02	8.81E+03	1.90E+04
Ni^{2+}	1.47E-02	569	1.23E+03
Sr^{2+}	2.68E-06	0.155	0.334
Mn^{4+}	8.17E-04	29.6	63.9
Ca^{2+}	0.131	3.48E+03	7.50E+03
K^{1+}	2.42E-02	625	1.35E+03
OH^{-}	18.8	2.11E+05	4.54E+05
NO_3^{-}	1.45	5.92E+04	1.28E+05
NO_2^{-}	1.26	3.82E+04	8.22E+04

Table 2-4. Tank 241-S-107 Historical Inventory Estimate (Agnew et al. 1996).[1,2] (2 Sheets)

Chemical Constituents (cont'd)	mol/L	ppm	kg
CO_3^{2-}	0.224	8.89E+03	1.92E+04
PO_4^{3-}	1.86E-02	1.17E+03	2.51E+03
SO_4^{2-}	6.07E-02	3.85E+03	8.29E+03
Si (as SiO_3^{2-})	2.95E-02	547	1.18E+03
F^-	0.267	3.35E+03	7.23E+03
Cl^-	5.93E-02	1.39E+03	2.99E+03
$C_6H_5O_7^{3-}$	6.02E-03	752	1.62E+03
$EDTA^{4-}$	6.77E-03	1.29E+03	2.78E+03
$HEDTA^{3-}$	1.31E-02	2.37E+03	5.11E+03
glycolate$^-$	2.88E-02	1.43E+03	3.07E+03
acetate$^-$	1.41E-03	54.9	118
oxalate^{2-}	6.87E-06	0.399	0.860
DBP	3.86E-03	678	1.46E+03
Butanol	3.86E-03	189	407
NH_3	7.62E-02	856	1.84E+03
$Fe(CN)_6^{4-}$	0	0	0
Radiological Constituents			
Pu		0.814 (μCi/g)	29.2 (kg)
U	0.107 (mol/L)	1.68E+04 (μg/g)	3.62E+04 (kg)
Cs[2]	8.59E-02 (Ci/L)	56.7 (μCi/g)	1.22E+05 (Ci)
Sr[2]	0.292 (Ci/L)	193 (μCi/g)	4.17E+05 (Ci)

Notes:

[1]These predictions have not been validated and should be used with caution. Small differences appear to exist among the inventory above and the inventories calculated from the two sets of concentrations. These differences are being evaluated.

[2]Calculational error in HDW model inventory estimate. Errata from Los Alamos National Laboratory pending.

2.4 SURVEILLANCE DATA

Tank 241-S-107 surveillance consists of surface level measurements (liquid and solid), temperature monitoring inside the tank (waste and headspace), and leak detection well (drywell) monitoring for radioactivity outside the tank. The data are significant because they provide the basis for determining tank integrity.

Changes in liquid level measurements are an indicator that there may be a major leak from a tank. Solid surface level measurements can indicate physical changes and consistency in the solid layers of a tank such as those caused by gas generation and retention. Drywells around the perimeter of the tank may show increased radioactivity resulting from a leak to the soil. Interpreting photographs of the tank's interior is another method to determine waste volume, resolve measurement anomalies, and determine tank integrity.

2.4.1 Surface Level Readings

Tank 241-S-107 surface level is monitored with an automatic ENRAF® system. If the automated system fails, manual field measurements will be conducted daily. An average surface level measurement of 3.71 m (12.2 ft) was obtained on June 12, 1996. The maximum allowable increase from the 3.66 m (12.0 ft) baseline is 5 cm (2 in.). The maximum allowable decrease is 2.5 cm (1 in.).

The surface level data from May 1993 to the present indicate an increasing trend and the readings range from 3.71 m (12.1 ft) to 3.66 m (12.0 ft). Additionally, the inventory was changed to 1,423 kL (376 kgal) in 1993 to account for discrepancies in surface topography. A graphical representation of the quarterly surface level measurements is shown in Figure 2-4.

2.4.2 Internal Tank Temperatures

Tank 241-S-107 has six thermocouples on a single tree in riser 4. Thermocouple 1 is 14.6 cm (0.48 ft) from the tank bottom. Thermocouple 2 is 74.4 cm (2.44 ft) from the tank bottom. Thermocouples 3 through 5 are at 61 cm (2 ft) intervals above thermocouple 2. Thermocouple 6 is 7.45 m (24.44 ft) from the tank bottom.

From January 1988 to July 1993, the average temperature was 42 °C (107 °F), the maximum temperature was 59 °C (139 °F), and the minimum temperature was 26 °C (78 °F). The temperature has gradually decreased since 1993. On June 9, 1996, the maximum tank temperature was 37.7 °C (99.9 °F). Tank 241-S-107 has a semi-annual temperature monitoring requirement. A graph of the high temperature (for all thermocouples) is shown in Figure 2-5. Plots of the thermocouple readings for tank 241-S-107 are in the supporting document for the HTCE (Brevick et al. 1994b).

Figure 2-4. Tank 241-S-107 Level History.

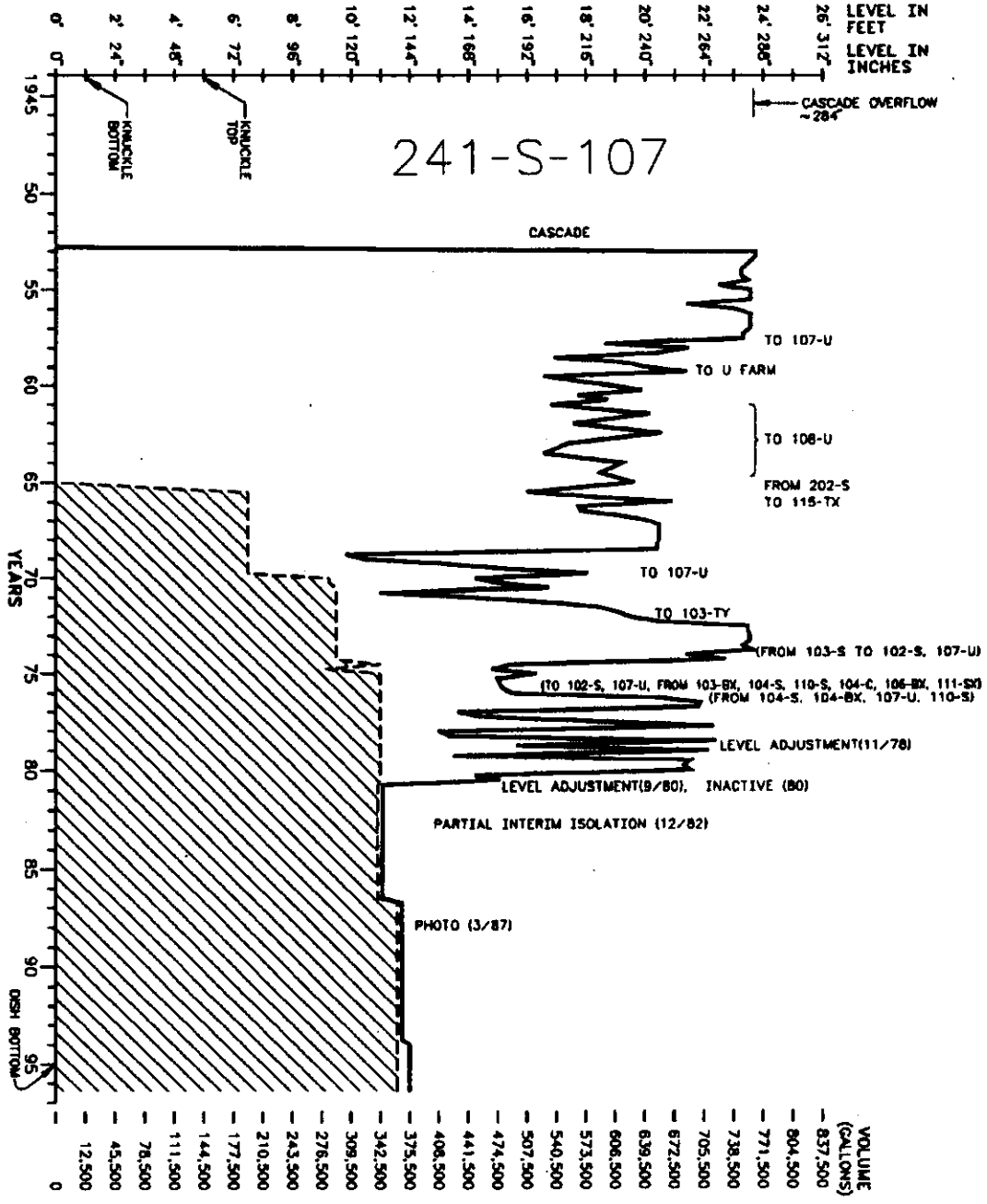
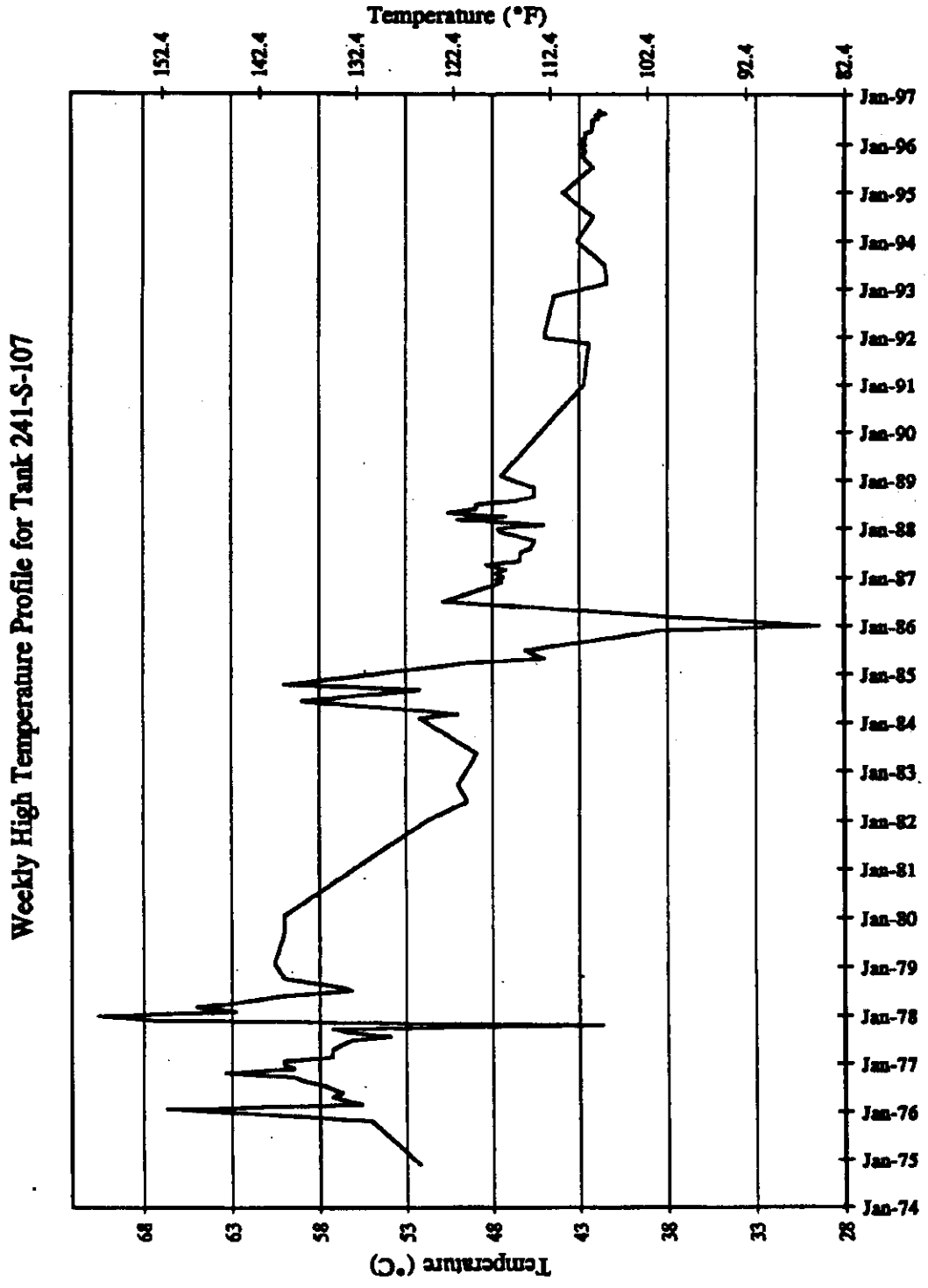


Figure 2-5. Tank 241-S-107 Weekly High Temperature Plot.



2.4.3 Drywells

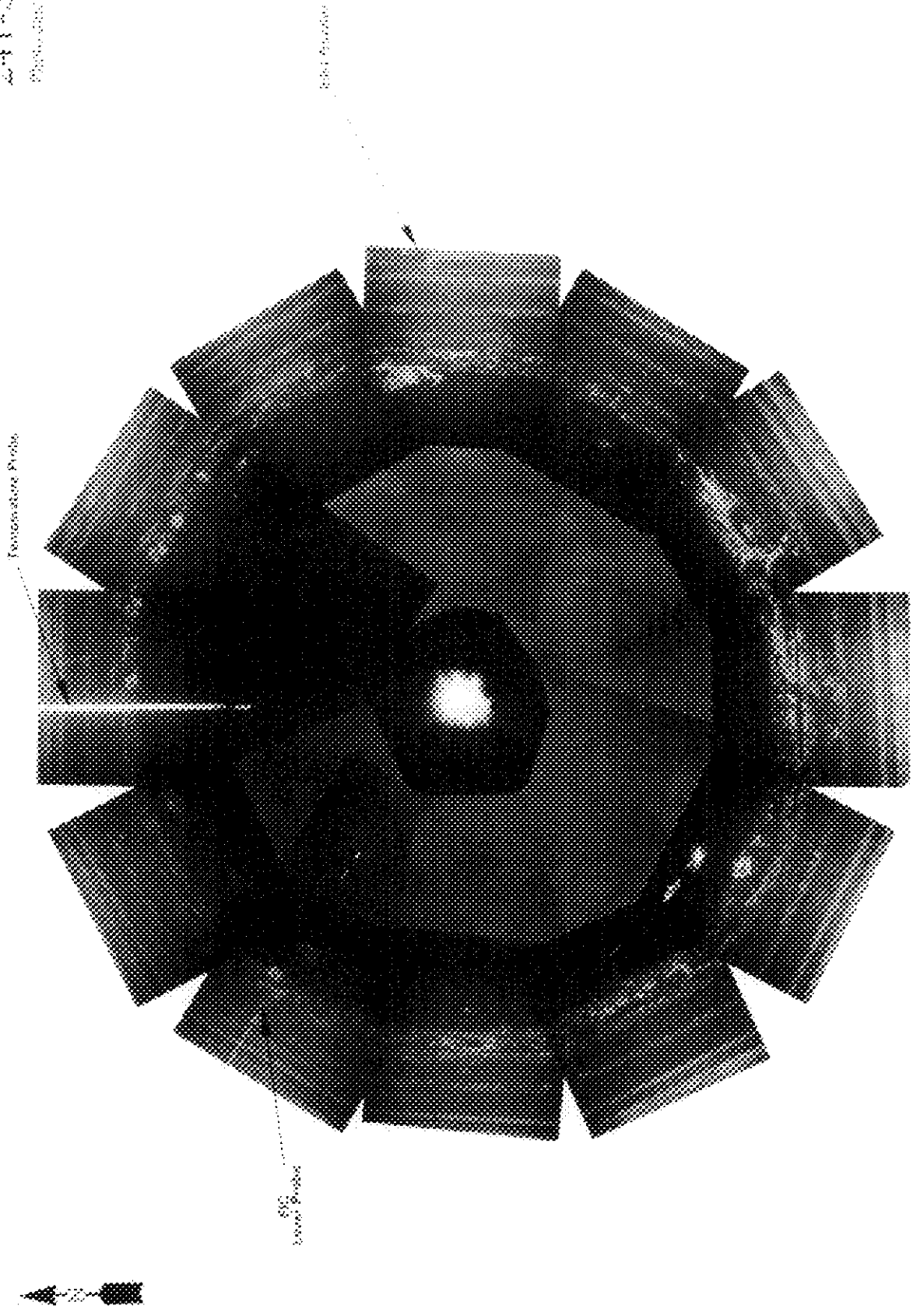
Tank 241-S-107 has six drywells with no measurements above background.

2.4.4 Tank 241-S-107 Photographs

Figure 2-6, an internal photographic montage of Tank 241-S-107, taken March 12, 1987, shows reasonable detail around the perimeter of the tank but is blurred in the center. A small amount of solid material appears to be clinging to the tank sides. The waste appears to be sludge. The waste history diagram indicates that the tank contains almost all solid material. Equipment visible in the photographs are a Food Instrument Corporation gauge, a thermocouple tree, and an inlet nozzle. A correction in the estimated waste volume was made after the photographs were taken. This correction was attributed to improvements in estimating waste volume by accounting for surface geometry. Current measurements estimate that the tank holds about 1,423 kL (376 kgal) of waste.

This page intentionally left blank.

Figure 2-6. Photographic Montage of Tank 241-S-107.



3.0 TANK SAMPLING OVERVIEW

Analytical results have been reported for seven historical sample events for tank 241-S-107 since 1973. The 1995 sample event is described first, followed by the next most recent sampling event in 1980. Results for the 1995 sample event are included in Appendix A. Appendix C summarizes results for earlier historical sample events.

3.1 DESCRIPTION OF THE 1995 SAMPLING EVENT

Three push-mode core samples (cores 105, 110, and 111) were collected from tank 241-S-107 between September 18 and 30, 1995. These cores were sent to Westinghouse Hanford Company 222-S laboratory for analysis. Hydrostatic head fluid (HHF) was used during the sampling process for all segments except segment 1 of cores 105 and 110. In addition to core samples, deionized water and HHF blanks were sent to the 222-S Laboratory. Chain-of-custody forms were generated for each sample and are shown in Raphael (1996).

The push-mode core sampling method was selected by the Characterization Technical Basis group as the best method for obtaining a vertical profile of the tank waste as required by the safety screening DQO (Dukelow et al. 1995). Primary safety screening analyses include the following: total alpha activity to determine criticality potential, DSC to ascertain the fuel energy value, TGA to obtain the total moisture content, and dome vapor surveys to determine flammable gas percent. In addition, comprehensive ICP/AES and IC analyses were required for selected subsegments and composite samples to assess data for compliance with historical requirements and as a check for HHF contamination. Sampling and analytical requirements from the applicable DQOs are summarized in Table 3-1.

Table 3-1. Integrated Data Quality Objective Requirements for Tank 241-S-107.[1]

Sampling Event	Applicable DQOs	Sampling Requirements	Applicable References
Push-mode core sampling	Safety Screening ▸ Energetics ▸ Moisture content ▸ Total alpha ▸ Flammable gas	Core samples from a minimum of two risers separated radially to the maximum extent possible.	Dukelow et al. (1995)
	Historical		Simpson and McCain (1995)
	Pretreatment		Kupfer et al. (1995)

Note:
[1]Kelly (1995)

3.1.1 Sample Handling

The riser 11 core sample, identified as core 105, was extruded by the 222-S Laboratory between September 19 and 22, 1995. The sample was composed of eight separate segments labeled with distinct identification numbers. Samples one through eight were identified as samples 95-2437 through 95-2468, respectively (segment #1 was the top segment). Less than 10 mL of liquid was collected from cask liners for all core segments, and no extrusion difficulties were encountered.

The riser 16 core sample, identified as core 110, was extruded by the 222-S Laboratory between September 25 and 28, 1995. The sample was composed of eight separate segments labeled with distinct identification numbers. Samples one through eight were identified as samples 95-2511 through 95-2554, respectively (segment #1 was the top segment). An additional sample, labeled 3A, was collected when the sampler pintle rod was pulled prior to pushing the sampler into the waste. Less than 10 mL of liquid was collected from cask liners for all core segments, and no extrusion difficulties were encountered.

The riser 2 core sample, identified as core 111, was extruded by the 222-S Laboratory between September 29 and October 4, 1995. The sample was composed of eight separate segments labeled with distinct identification numbers. Samples one through eight were identified as samples 95-2595 through 95-2638, respectively (segment #1 was the top segment). Less than 10 mL of liquid was collected from cask liners for all core segments, and no extrusion difficulties were encountered.

Table 3-2 describes cores 105, 110, and 111, including segment numbers, phase (solid or liquid), color, texture, and amount of material recovered. A total of 709.8 grams of liquid were recovered including supernatant from segment 1, drainable liquid from segment 2, and liner liquid from core 111, segment 8. The first segments from all three cores were liquid (supernatant). There was less than 10 percent liner liquid. No problems were noted during extrusions.

All archiving requirements listed in the tank characterization plan were performed, including those required by the pretreatment DQO.

3.1.2 Sample Analysis

For a safety evaluation, the safety screening DQO requires determining the total alpha activity, energetics, water content, and flammable gas. Because HHF was used during the sampling process, some of the percent water results may be biased high. To determine the extent of possible HHF contamination, the samples were analyzed for lithium by ICP/AES and for bromide by IC. Lithium bromide is used as a tracer in the HHF; the HHF should be the only source of lithium or bromide in the waste.

Table 3-2. Cores 105, 110 and 111 Push-Mode Core Sample Description (3 sheets).[1]

Segment	Sample ID	Sample Weight (grams)	Segment Description
Core 105, Riser 11			
1	95-2437	62.1	Recovered yellow clear liquid. No solids present.
2	95-2438	293.1	Recovered 18.9 cm (7.5 in.) of solids and 145.3 g of drainable liquid. Solids and drainable liquid were dark-brown to black. Solids were sludgy.
3	95-2463	257.6	Recovered 38 cm (15 in.) of solids and no drainable liquid. Upper half solids were white and gray on the lower portion and black on the top. Solids did not retain shape. Lower half solids had a gray inner layer. They were smeared on the outside by dark brown sludge, and appeared drier than upper layer solids.
4	95-2464	476.3	Recovered 48 cm (19 in.) of solids and no drainable liquid. Lower half solids were gray-green covered with a brown (shiny) skin. Upper half solids were gray to light brown (to yellow). The material retained its shape.
5	95-2465	455.4	Recovered 48 cm (19 in.) of solids and no drainable liquid. Lower half solids were brown, and drier than the upper half. The upper half solids were gray-green and coated with a brown skin. The top 8 cm was slightly darker and shiny. All solids retained shape.
6	95-2466	483.3	Recovered 40.6 cm (16 in.) of solids and no drainable liquid. Lower and upper half solids were sludge, cream to light brown. The sludge retained its shape.
7	95-2467	541.7	Recovered 48 cm (19 in.) of solids and no drainable liquid. Lower and upper half solids were brown and the material retained its shape.
8	95-2468	361.5	Recovered 34 cm (13.5 in.) of solids and no drainable liquid. Lower and upper half solids were cream-light brown sludge and retained shape.

Table 3-2. Cores 105, 110 and 111 Push-Mode Core Sample Description (3 sheets).[1]

Segment	Sample ID	Sample Weight (grams)	Segment Description
Core 110, Riser 16			
1	95-2511	77.7	Recovered yellow, clear liquid. No solids present.
2	95-2512	313.6	Recovered 25.4 cm (10 in.) of solids and 103.6 g of drainable liquid. Drainable liquid was black and opaque. Solids consisted of black sludgy material with a high moisture content.
3	95-2513	425.9	Recovered 48 cm (19 in.) of solids and no drainable liquid. Lower half solids were white/cream, covered with a gray-brown coat. Upper half solids were wetter (with a tendency to flow), black in color, and contained hard chunks.
3A	95-2549	345	Recovered 30.5 cm (12 in.) of solids and no drainable liquid. Solids maintained shape and were cream/yellow smooth sludge.
4	95-2550	435.3	Recovered 40.6 cm (16 in.) of solids and no drainable liquid. Solids maintained shape and were light brown to cream smooth sludge. The top part of the upper half showed some yellow.
5	95-2551	478	Recovered 43.2 cm (17 in.) of solids and no drainable liquid. Solids retained shape and were light brown to cream smooth sludge.
6	95-2552	483.5	Recovered 43.2 cm (17 in.) of solids and no drainable liquid. Solids retained shape and were light brown to cream smooth sludge.
7	95-2553	542.5	Recovered 43.2 (17 in.) of solids and no drainable liquid. Solids retained shape and were brown sludge (upper half) to light brown/creamy sludge (lower half).
8	95-2554	449.5	Recovered 45.7 (18 in.) of solids and no drainable liquid. Solids retained shape and were brown sludge (upper half) to light brown sludge (lower half).

Table 3-2. Cores 105, 110 and 111 Push-Mode Core Sample Description (3 sheets).[1]

Segment	Sample ID	Sample Weight (grams)	Segment Description
Core 111, Riser 2			
1	95-2595	218.1	Recovered yellow, clear liquid. No solids present.
2	95-2596	342.1	Recovered 48 cm (19 in.) of solids and 79.9 g of drainable liquid. Drainable liquid was black and opaque. Solids were dark brown sludge that maintained shape.
3	95-2597	339.1	Recovered 27.9 cm (11 in.) of solids and no drainable liquid. Lower half solids were light brown and creamy and maintained shape. Upper half solids were dark brown sludge with some slurry (saltcake).
4	95-2598	421.0	Recovered 40.6 cm (16 in.) of solids and no drainable liquid. Lower half solids were smooth, light brown sludge that maintained shape. Upper half solids were pastel green overlain by a thin brownish coat, with chunks and did not maintain shape. Upper half texture resembled a sludge-saltcake mixture.
5	95-2599	481.2	Recovered 48 cm (19 in.) of solids and no drainable liquid. Solids were brown sludge.
6	95-2600	474.0	Recovered 45.7 cm (18 in.) of solids and no drainable liquid. Lower half solids were brown. Upper half solids were light brown. All solids were smooth and sludgy.
7	95-2637	543.4	Recovered 48 cm (19 in.) of solids and no drainable liquid. Solids were grey-brown, smooth, sludge.
8	95-2638	405.0	Recovered 43.2 cm (17 in.) of solids and 23.1 g of liner liquid. Solids were smooth and sticky sludge that maintained shape. Lower half solids were yellowish grey on top and tan on bottom and were subdivided for analysis. Upper half solids were grayish brown.

Note:
[1]Raphael (1996)

Segments 3 to 8 were subsampled into half-segments for solids analysis, except for core 111, segment 8 in which the lower half was subdivided. Each subdivided solid sample was homogenized using a spatula. Segment 1 of each core was drainable liquid, and segment 2 from each core was part drainable liquid and part solids. Solids were analyzed on a whole segment basis, and drainable liquid samples were analyzed separately.

Composite analyses and segment ICP acid digestion analyses were conducted to meet historical data quality requirements. The following segments were selected for historical analyses: segments 2 lower half, 3 upper half, 4 upper half, 5 lower half, and 8 lower half.

Appendix A lists the samples, the analyses performed, and the results. Sample procedures are given in Table 3-3.

3.2 DESCRIPTION OF THE 1980 SAMPLING EVENT

Two samples were drawn from tank 241-S-107: one foot below the liquid level surface and one foot above the sludge layer. The samples were scheduled to be examined for viscosity versus temperature analysis and chemical constituents. The tank waste was 242-S Evaporator product scheduled for cross-site transfer (Jansky 1980). Samples were likely acquired using a split-barrel sampler or a grab sampler. However, a description of techniques to extract the samples, and the riser from which the samples were extracted, were not available from historical records. Both samples contained solids.

The historical records do not indicate the procedures used in preparing the samples for analysis. Specific chemical and radiochemical constituent results were reported. Table 3-4 provides the results of the analysis.

Table 3-3. Analytical Procedures.[1] (2 sheets)

Analysis	Instrument	Preparation Procedure	Procedure Number
Energetics by DSC	Mettler™ Perkin-Elmer™	Direct	LA-514-113, Rev. B-1 LA-514-114, Rev. B-0
Percent water by TGA	Mettler™ Perkin-Elmer™	Direct	LA-560-112, Rev. A-2 LA-514-114, Rev. B-0
Total alpha activity	Alpha proportional counter	LA-549-141, Rev. D-0	LA-508-101, Rev. D-2
Flammable gas	Combustible Gas Analyzer[2]	Direct	WHC-IP-0030, IH 1.4 and IH 2.1[3]
TOC	Coulometer	Persulfate oxidation	LA-342-100, Rev. C-0
Gamma energy analysis	High-purity germanium crystal multi-channel analysis	LA-549-141 Revs. D-0 and E-0	LA-548-121, Rev. D-1
Bulk density	not applicable	Direct	LO-160-103, Rev. A-7
Specific gravity	not applicable	Direct	LA-510-112, Rev. C-3
^{90}Sr	Separation and beta counting	LA-549-141 Revs. D-0 and E-0	LA-220-101, Rev. D-1
Metals by ICP/AES	Inductively coupled plasma spectrometer	LA-549-141, Rev. D-0	LA-505-151, Rev. D-2 LA-505-161, Rev. A-1
Cyanide	Spectrophotometer	Microdistillation	LA-695-102, Rev. D-0
Anions by IC	Ion chromatography	LA-504-101, Rev. D-0	LA-533-105, Rev. C-2 LA-533-105, Rev. D-1

Notes:

Rev. = revision
Mettler™ is a registered trademark of Mettler Electronics, Anaheim, California.
Perkin-Elmer™ is a registered trademark of Perkins Research and Manufacturing Company, Inc., Canoga Park, California.
Procedures are internal procedures of Westinghouse Hanford Company, Richland, Washington.

[1]Kelly (1995).

[2]The safety screening DQO notification limit for flammable gas concentration is 25 percent of the LFL. The combustible gas monitor that sampled the tank headspace reports results as a percent of the LEL. The terms are used interchangeably (NFPA 1995).

[3] Safety Department Administrative Manuals (WHC 1992):
IH 1.4, Industrial Hygiene Direct Reading Instrument Survey
IH 2.1, Standard Operating Procedure, MSA Model 260 Combustible Gas and Oxygen Analyzer.

Table 3-4. 1980 Analytical Results.[1]

Waste Tank 241-S-107				
Composition of Tank 241-S-107 Waste				
September 22, 1980				
	30 cm (1 ft) Above Sludge		30 cm (1 ft) Below Surface	
Components	mol/L	Weight percent	mol/L	Weight percent
Physical Data				
SpG	1.431 g/mL		1.108 g/mL	
H_2O		41.65		55.94
Chemical Analysis				
Al	1.212	6.95*	0.924	6.84*
OH	2.058	5.75*	1.521	5.49*
NO_2	2.043	9.85*	1.311	8.16*
NO_3	3.27	19.42*	2.454	18.83*
PO_4	0.1116	1.28*	0.077	1.14*
CO_3	0.276	2.04*	0.285	2.73*
TOC	9.00	1.87*	8.28	2.22*
Total		88.1		101.35

Notes:

[1]Jansky (1980)

*After the data were reviewed, there appeared to be a calculation or conversion error. However, because there is no distinction between measurements, it is not possible to determine which are the original results. Because of this inconsistency, these data should not be used in making comparisons or assessments of contemporary data.

4.0 ANALYTICAL RESULTS

This section provides the analytical results associated with the September 1995 sampling of tank 241-S-107. Although analytical data are available for supernatant and sludge samples collected between 1973 and 1980, the 1995 data are considered to best represent current tank contents. The 1995 sampling and analysis were performed as directed in the *Tank 241-S-107 Push Core Sampling and Analysis Plan* (Kelly 1995). This plan integrates all documents related to sampling and analytical requirements, including applicable DQOs.

The DQOs that govern the sampling and subsequent analysis for tank 241-S-107 are the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995) and the *Interim Data Quality Objectives for Waste Pretreatment and Vitrification* (Kupfer et al. 1995). Analyses were performed at the Westinghouse Hanford Company 222-S Laboratory on 8 sample segments each from cores 105, 110 and 111.

4.1 DATA PRESENTATION

Analytical results are indexed in Table 4-1. Analytical data may also be found in Raphael (1995 and 1996), and in the Tank Characterization Database.[1]

Table 4-1. Analytical Data Presentation Tables.

Analyte	Tabulated Location
Chemical data summary	Table 4-2
Percent moisture	Tables 4-3 and 4-4
Energetics	Table 4-5
Flammable gas	Table 4-6
1995 analytical data set	Appendix A
HHF	Appendix B
Historical data	Appendix C
Statistical analysis	Attachment 1

[1]http://twins.pnl.gov:8001/refmain.htm

Data from the three cores were combined to calculate a restricted maximum likelihood (REML) mean tank concentration and relative standard deviation (RSD) of the mean for each analyte using a statistical analysis of variance (ANOVA) method (see Attachment 1). Projected inventories were calculated for radionuclides and chemical analytes. Analyte inventories were derived by multiplying the REML mean for an analyte by the estimated solid waste volume (1,370 kL [362 kgal]) and the average density (1.78 g/mL) of the tank waste. Drainable liquid results were separated from solids results, and separate means and RSDs were calculated. Drainable liquid means were not included in the overall tank inventory calculation because the supernatant contributes less than five percent to the tank waste volume.

4.2 CHEMICAL DATA SUMMARY

Table 4-2 shows the tank average (REML mean) and RSD of the mean results for metals, anions, radionuclides, and TOC. Segment results for each core and drainable liquid result are included in Appendix A.

4.2.1 Inductively Coupled Plasma/Ion Chromatography

Cations were detected using ICP/AES analyses. The only metals found routinely at a concentration of 10,000 μg/g or higher were aluminum and sodium. However, uranium, zirconium, and chromium were found intermittently at high concentrations. Tables A-1 to A-36 show segment level ICP analytical results. Anions in all segments were detected using IC analyses. High concentrations (> 10,000 μg/g) of fluoride, nitrate, nitrite, and phosphate were observed. The nitrate/nitrite ratio is approximately 2:1. Tables A-37 to A-43 show segment level IC analytical results.

4.2.2 Radionuclides

Total alpha analyses were performed on a fusion digested sample with an alpha proportional counter according to procedure LA-508-101, Rev. D-2. All total alpha results were well below the DQO notification limit of 34.6 μCi/g. The overall tank average for total alpha was 0.9 μCi/g, and the RSD of the mean was 13.6 percent. The highest observed value was 3.46 μCi/g for sample number S95T002793 (core 111, segment 3 lower half). Table A-44 shows segment data for total alpha from tank 241-S-107. Quality control problems were noted for three samples (Raphael 1996). However, no reanalysis was requested since the alpha activity was very close to background readings. For information about quality control tests and results, see Section 5.1.2.

Table 4-2. Chemical Data Summary for Tank 241-S-107.[1] (2 sheets).

Analyte	REML Mean Concentration	Relative Standard Deviation of the Mean	Projected Inventory
METALS	**µg/g**	**Percent**	**kg**
Aluminum[2]	49,700 *149,000*	16.2	121,000 *363,000*
Antimony	< DL	n/a	n/a
Arsenic	< DL	n/a	n/a
Barium	22.2	9.2	54.1
Beryllium	< DL	n/a	n/a
Bismuth	< DL	n/a	n/a
Boron	141	27.4	344
Cadmium	< DL	n/a	n/a
Calcium	487	26.5	1,190
Cerium	< DL	n/a	n/a
Chromium	3,530	26.5	8,610
Cobalt	< DL	n/a	n/a
Copper	25.9	16.1	63.2
Iron	2,300	18.1	5,610
Lanthanum	< DL	n/a	n/a
Lead	119	18.6	290
Magnesium	140	16.9	342
Manganese	564	32.9	1,380
Molybdenum	19.1	3.6	46.6
Neodymium	< DL	n/a	n/a
Nickel	1,280	24.7	3,120
Phosphorus	4,040	36.4	9,850
Potassium	538	5.7	1,310
Samarium	< DL	n/a	n/a
Selenium	< DL	n/a	n/a
Silicon	2,180	28.9	5,210
Silver	36.7	30.6	89.5

Table 4-2. Chemical Data Summary for Tank 241-S-107.[1] (2 sheets).

Analyte	REML Mean Concentration	Relative Standard Deviation of the Mean	Projected Inventory
METALS (Cont'd)	µg/g	%	kg
Sodium	86,700	9.2	211,000
Strontium	241	22.1	588
Sulfur	427	13.2	1,040
Thallium	< DL	n/a	n/a
Titanium	37.7	15.2	91.9
Uranium	6,830	10.4	16,700
Vanadium	< DL	n/a	n/a
Zinc	223	43.6	544
Zirconium	9,720	33.6	23,700
ANIONS	µg/g	Percent	kg
Chloride	2,080	7.0	5,080
Fluoride	14,300	30.5	34,800
Carbonate (TIC)	10,700	3.1	26,000
Nitrate	57,900	5.3	141,000
Nitrite	30,900	7.1	75,300
Oxalate	4,180	24.3	10,200
Phosphate	21,600	29.4	52,700
Sulfate	2,430	19.5	5,930
RADIONUCLIDES	µCi/g	%	Ci
^{60}Co	0.1	19.5	244
^{137}Cs	83.6	9.0	204,000
^{90}Sr	158	21.1	385,000
Total Alpha ($^{239/240}Pu$)	0.9	13.6	2,200
CARBON	µg C/g	Percent	kg C
TOC	1,700	11.8	4,150

Notes:

n/a = not applicable
< DL = below analytical detection limits

[1]Mass basis = 2.44E+09 g
[2]Italics indicate assumed data. See Section 5.1.3.3 for explanation.

Gamma isotopic analyses (^{241}Am, ^{137}Cs, ^{60}Co, ^{154}Eu, and ^{155}Eu), and ^{90}Sr analyses were also conducted. Of these, ^{90}Sr and ^{137}Cs were the primary radioactive constituents with low levels of ^{60}Co detected. All other radionuclides were below analytical detection levels (see Tables A-46 to A-50).

4.2.3 Total Organic Carbon/Total Inorganic Carbon

Only selected segments and composite samples were analyzed for TOC (Table A-48). Table 4-2 shows results for TOC based on composite data. Total inorganic carbon results (Table A-47) are also obtained from this assay and are reported as specified in Kristofzski (1995). These results are converted to carbonate and reported in Table 4-2. Conversion to carbonate is assumed because it is a final product from organic degradation, and it occurs from reactions of the alkaline media with the air.

4.3 PHYSICAL DATA SUMMARY

Physical analyses required by the SAP (Kelly 1995) included TGA and DSC. Bulk density was performed on core composite samples. No other physical assays were performed.

4.3.1 Thermogravimetric Analysis

In a TGA, the mass of a sample is measured while it is heated at a constant rate. A gas, such as nitrogen or air, is passed over the sample during the heating to remove any gaseous matter. Any decrease in the weight of a sample represents a loss of gaseous matter from the sample through evaporation or through a reaction that forms gas phase products.

Weight percent water by TGA was performed by the 222-S Laboratory under a nitrogen purge using procedures LA-560-112 and LA-514-114.

Tables 4-3 and 4-4 show the TGA percent water data for tank 241-S-107. No samples exhibiting exotherms had water contents below the safety screening threshold. Three samples exhibited percent water means below the safety screening DQO (Dukelow et al. 1995) notification limit of 17 weight percent, and several others were just fractionally above the 17 percent threshold. The fact that several samples were potentially below 17 weight percent does not in itself constitute an unsafe condition. To be considered unsafe, the energetics values for these samples must also exceed the safety screening notification limits for the tank.

Section 4.4 briefly discusses the tracer used to determine whether a sample has been contaminated and tabulates the corrected results for suspect samples. For more detail about the correction method and comprehensive results, see Winkelman (1996) and Appendix B, respectively.

Table 4-3. Solids Thermogravimetric Analysis and Gravimetric Results for Tank 241-S-107.[1] (3 sheets)

Sample Number[4]	Sample Location Segment (Portion)	Temperature Range °C	Result % H_2O	Duplicate % H_2O	Mean % H_2O
Core 105, Riser 11					
3147	Core composite[2]	40-150	26.89	30.85	28.87
2450	2 (upper half)	40-180[3]	54.78	50.63	52.71
2447	2 (lower Half)	40-190	52.79	50.38	51.59
2521	3 (upper half)	40-180[3]	49.18	47.87	48.53
2520	3 (lower half)	40-180[3]	41.07	35.31	38.19
2523	4 (upper half)	40-200[3]	40.50	40.77	40.64
2522	4 (lower half)	40-240[3]	43.71	36.31	40.01
3538	4 (lower half) gravimetric	35-105	43.5	43.7	43.6
2525	5 (upper half)	35-170	40.86	41.65	41.25
2524	5 (lower half)	35-170[3]	34.52	35.73	35.12
2527	6 (upper half)	35-190[3]	27.47	28.82	28.16
3540	6 (upper half) gravimetric	30-105	20.6	20.5	20.55
2526	6 (lower half)	35-190[3]	6.44	3.68	5.06
3539	6 (lower half) gravimetric	30-105	21.4	22.8	22.10
2529	7 (upper half)	40-170	33.08	38.16	35.62
2528	7 (lower half)	40-200	31.90	30.53	31.21
2531	8 (upper half)	40-210	30.65	27.03	28.84
2530	8 (lower half)	40-210	31.10	30.94	31.02
Core 110, Riser 16					
3154	Core composite[2]	40-120	42.45	39.22	40.84
2603	2 (lower half)	40-190	51.47	65.55	58.51
2607	3 (upper half)	35-210	45.99	41.05	43.52
2606	3 (lower half)	40-180[3]	42.61	42.30	42.46
2605	3A (upper half)	40-180[3]	44.52	41.57	43.05

Table 4-3. Solids Thermogravimetric Analysis and Gravimetric Results for Tank 241-S-107.[1] (3 sheets)

Sample Number[4]	Sample Location Segment (Portion)	Temperature Range °C	Result % H_2O	Duplicate % H_2O	Mean % H_2O
Core 110, Riser 16 (Cont'd)					
2604	3A (lower half)	40-190	35.52	39.17	37.34
2609	4 (upper half)	40-170	39.40	38.98	39.19
2608	4 (lower half)	35-200[3]	1.58	20.22	10.90
3901	4 (lower half) gravimetric	30-105	19.1	18.1	18.6
2611	5 (upper half)	40-210	22.69	24.42	23.55
2610	5 (lower half)	40-210	22.42	21.47	21.95
2686	6 (upper half)	35-220	46.59	48.74	47.67
2685	6 (lower half)	40-160	27.29	27.33	27.31
2688	7 (upper half)	35-200	31.02	35.34	33.18
2687	7 (lower half)	35-210	31.46	32.71	32.09
2690	8 (upper half)	35-210	28.30	29.25	28.77
2689	8 (lower half)	35-170	0.59	0.24	0.42
3902	8 (lower half) gravimetric	30-105	29.4	29.0	29.2
Core 111, Riser 2					
3160	Core composite[2]	40-140	37.47	39.61	38.54
2635	2 (lower half)	35-190	33.79	51.21	42.50
2653	3 (upper half)	40-120	53.49	53.75	53.62
2654	3 (lower half)	40-180	39.37	37.34	38.36
2656	4 (upper half)	35-200	33.44	37.40	35.42
2655	4 (lower half)	35-180	36.08	36.92	36.50
2658	5 (upper half)	35-210	38.89	39.14	39.02
2657	5 (lower half)	35-200[3]	31.43	30.35	30.89
2660	6 (upper half)	40-180	24.08	23.66	23.87
2659	6 (lower half)	40-160	27.18	30.02	28.60

Table 4-3. Solids Thermogravimetric Analysis and Gravimetric Results for Tank 241-S-107.[1] (3 sheets)

Sample Number[4]	Sample Location Segment (Portion)	Temperature Range °C	Result % H_2O	Duplicate % H_2O	Mean % H_2O
Core 111, Riser 2 (Cont'd)					
2662	7 (upper half)	40-180	33.85	33.63	33.74
2661	7 (lower half)	40-210	31.90	33.19	32.55
2665	8 (upper half)	40-260	35.19	32.19	33.69
2664	8 (third quarter segment)	30-290	22.72	25.78	24.25
2663	8 (bottom quarter segment)	40-200	44.22	43.88	44.05

Note:

[1]Raphael (1996)

[2]The average does not include the core composite.

[3]Includes primary and secondary integration steps, where the maximum temperature for the primary step is < 140 °C.

[4]All sample numbers begin with the prefix "595T00-."

Table 4-4. Drainable Liquid Thermogravimetric Analysis Results for Tank 241-S-107.[1]

Sample Number[3]	Core	Segment	Temperature Range °C	Result %H_2O	Duplicate % H_2O	Mean % H_2O
2443	105	1	40-120	69.55	65.45	67.50
2446	105	2	40-110	69.04	68.96	69.00
2601	110	1	35-210	70.96	70.38	70.67
2602	110	2	40-150	65.37	66.05	65.71
2629	111	1	40-180	71.72	71.24	71.48
2632	111	2	40-120	64.67	65.14	64.91

Note:

[1]Raphael (1996)

[2]Includes primary and secondary integration steps, where the maximum temperature for the primary step is < 140 °C.

[3]All sample numbers begin with the prefix "545T00-."

Although several notable observations took place, there were no strong trends obvious in the data. The tank was drier than predicted by Agnew et al. (1996) even though the presence of a supernatant layer probably prevents significant moisture loss. As expected, the surface material was wet from contact with the supernatant, routinely above 40 weight percent water.

Moisture in this tank gradually decreases as a function of depth. This is probably because of higher temperatures deeper in the tank. Even with the observed temperature gradient, the solids retain substantial moisture. The mean water content of the solids was calculated to be 32.1 percent with an RSD of the mean of 7.2 percent. The mean water content of the drainable liquid was calculated to be 66.5 percent. No RSD of the mean was computed for the drainable liquid.

4.3.2 Differential Scanning Calorimetry

In a DSC analysis, heat absorbed or emitted by a substance is measured while the substance is heated at a constant rate. The onset temperature for an endothermic event (characterized by or causing the absorption of heat) or exothermic event (characterized by or causing the release of heat) is determined graphically.

Analyses by DSC were performed under a nitrogen atmosphere using procedure LA-514-113, Rev. B-1 and a Mettler™ Model 20 differential scanning calorimeter and procedure LA-514-114, Rev. B-0 and Perkin-Elmer™ equipment. No exotherms in excess of the safety screening notification limits were observed. However, modest exotherms were observed in a few segments. No quality control problems were noted.

The DSC results based on wet weight are shown in Table 4-5. The sample number, location, weight, temperature at maximum enthalpy change, and magnitude of the enthalpy change are provided for each transition. A negative enthalpy change indicates an energy release or exotherm. A positive enthalpy change indicates energy absorbed or an endotherm. The first transition (ambient to approximately 150 °C), represents the endothermic reaction associated with the evaporation of free and interstitial water. Endotherms were usually greater than 400 J/g.

In the second transition (180 to 330 °C), both exothermic and endothermic behavior was observed. Most samples were endothermic. The endotherms were usually modest (10 to 100 J/g), but many were much larger (approximately 500 J/g). These endotherms represent the energy (heat) required to remove bound water from hydrated compounds such as aluminum hydroxide or to melt salts such as sodium nitrate. Very few exotherms were recorded. Most exotherms were modest (-20 to -70 J/g). One sample, S95T002663, the bottom quarter of segment 8 from core 111, had substantial exotherms (greater than -220 J/g); however, its water content was 44 weight percent. A possible reason for these reactions is fuel components of the sample reacting with the nitrate salts.

Table 4-5. Differential Scanning Calorimetry Results for Tank 241-S-107.[1] (7 sheets)

Sample Number[2]	Sample Location	Run	Sample Weight (mg)	Transition 1		Transition 2		Transition 3	
	Segment (Portion)			Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)
Core 105, Riser 11									
3147	Core composite	1	37.86	137	1,032				
		2	35.82	126	944.4				
2450	2 (upper half)	1	37.45	111	794.6	301	10.7	391.6	19.4
		2	36.47	111.3	881.8	301	21.0	389.7	20.7
2447	2 (lower half)	1	14.35	122	1,360				
		2	19.18	117	1,237				
2521	3 (upper half)	1	29.8	129	1,185				
		2	29.6	126	1,467				
2520	3 (lower half)	1	35.96	132	822.6	383.1	-65.7		
		2	37.22	128	832.0	389.3	-66.0		
2523	4 (upper half)	1	9.03	112	985.7				
		2	33.1	119	851.1				
2522	4 (lower half)	1	14.44	122	851.8	211	76.2		
		2	8.22	104	820.9	203	65.4		

Table 4-5. Differential Scanning Calorimetry Results for Tank 241-S-107.[1] (7 sheets)

Sample Number[2]	Sample Location	Run	Sample Weight (mg)	Transition 1		Transition 2		Transition 3	
	Segment (Portion)			Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)
2525	5 (upper half)	1	19.54	124	910.2				
		2	23.92	129	940.0	209	30.9		
2524	5 (lower half)	1	12.75	103	811.2				
		2	13.90	98	797.9				
2527	6 (upper half)	1	31.10	126	426.1	308	523.6		
		2	23.52	126.3	371.7	317	524.3		
2526	6 (lower half)	1	29.5	129	610.8	295	235		
		2	16.88	105	562.2	312	203.6		
2529	7 (upper half)	1	19.69	129	828.1	219	5.5	455	23.4
		2	15.06	124	780.7	221	4.7	454	15.3
2528	7 (lower half)	1	30.59	133	701.2	213.2	2.2	439	32.4
		2	18.85	119	832.8	211.1	7.2	448	36.7
2531	8 (upper half)	1	25.59	128	709.9	213	3.4	437	29.1
		2	25.02	121	683.4	211	5.1	437	26.8
2530	8 (lower half)	1	18.70	134	964.5	439	44.1		
		2	21.99	126	851.2	441	24.7		

Table 4-5. Differential Scanning Calorimetry Results for Tank 241-S-107.[1] (7 sheets)

Sample Number[2]	Sample Location	Run	Sample Weight (mg)	Transition 1		Transition 2		Transition 3	
	Segment (Portion)			Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)
Core 110, Riser 16									
3154	Core composite	1	61.61	129	871.8	279	88.57		
		2	45.89	125	975	279	53.12		
2603	2 (lower half)	1	47.72	105	820.5	250	-62.2		
		2	44.20	111	642.4	380	-62.8		
2607	3 (upper half)	1	24.82	126	975.9				
		2	21.08	123	967.9				
2606	3 (lower half)	1	27.00	126	843.8	229	5.8		
		2	25.00	128	986.9	229	4.1		
2605	3A (upper half)	1	26.84	128	866.2				
		2	25.17	130	1,024				
2604	3A (lower half)	1	48.23	123	714.1				
		2	55.24	117	595.6				
2609	4 (upper half)	1	39.00	117	797.9	299	31.9		
		2	39.41	123	811.2	303	33.6		
2608	4 (lower half)	1	35.78	133	524.5	303	421.4		
		2	18.30	123	366	310	547.6	488.2	2.6

Table 4-5. Differential Scanning Calorimetry Results for Tank 241-S-107.[1] (7 sheets)

Sample Number[2]	Sample Location	Run	Sample Weight (mg)	Transition 1		Transition 2		Transition 3	
	Segment (Portion)			Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)
Core 110, Riser 16 (Cont'd)									
2611	5 (upper half)	1	27.88	125	415.8	311	562.1		
		2	32.26	102	407.8	319	519.0		
2610	5 (lower half)	1	35.40	124	512.7	299	505.6		
		2	35.69	128	482.5	298	521.2		
2686	6 (upper half)	1	26.24	104	477.0	316	485.2		
		2	24.68	100	521.7	315	376.7		
2685	6 (lower half)	1	8.12	110	465	314	345.7		
		2	21.84	126	430.2	312	421.19		
2688	7 (upper half)	1	30.91	134	640.8	221	2.6	451	13.2
		2	32.64	130	648.0	221	1.6	291	5.2
2687	7 (lower half)	1	38.47	128	590.7				
		2	33.16	142	567.9				
2690	8 (upper half)	1	38.09	130	827.9	439	23.5		
		2	20.27	116	661.4	211	4.4	439	14.5
2689	8 (lower half)	1	27.62	123	848.7				
		2	51.92	121	648.3	436.3	29.0		

Table 4-5. Differential Scanning Calorimetry Results for Tank 241-S-107.[1] (7 sheets)

Sample Number[2]	Sample Location	Run	Sample Weight (mg)	Transition 1		Transition 2		Transition 3	
	Segment (Portion)			Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)	Peak (°C)	ΔH (J/g)
Core 111, Riser 2									
3160	Core composite	1	41.06	128	822.4	276	59.2		
		2	45.16	131	963.6				
2635	2 (lower half)	1	11.84	127	1318.8	297	46.9	440	40.8
		2	21.84	125	994.3	301	72.8	441	29.3
2653	3 (upper half)	1	67.14	111	569.4	354	-20.4		
		2	48.85	107	951.4				
2654	3 (lower half)	1	32.08	125	899.6	436	-25.3		
		2	46.84	117	811.7	444	-40.0		
2656	4 (upper half)	1	46.94	148	1007				
		2	53.94	150	931.3				
2655	4 (lower half)	1	29.35	143	869.5				
		2	42.94	143	924.4				
2658	5 (upper half)	1	45.77	121	826.8	265	-14.5	459	67.2
		2	36.81	121	874.9	274	-15.1		
2657	5 (lower half)	1	54.65	117	672.6	271	136.3	415.0	-20.5
		2	46.53	123	700.7	270	106.1	405.4	-15.5

Table 4-5. Differential Scanning Calorimetry Results for Tank 241-S-107.[1] (7 sheets)

Sample Number[2]	Sample Location: Segment (Portion)	Run	Sample Weight (mg)	Transition 1: Peak (°C)	Transition 1: ΔH (J/g)	Transition 2: Peak (°C)	Transition 2: ΔH (J/g)	Transition 3: Peak (°C)	Transition 3: ΔH (J/g)
Core 111, Riser 2 (Cont'd)									
2660	6 (upper half)	1	26.24	127	663.9	302	547.3		
		2	47.58	119	649.5	283	385		
2659	6 (lower half)	1	14.38	120	863	285	291.7		
		2	22.46	124	841.9	284	256.5		
2662	7 (upper half)	1	45.56	117	700.3				
		2	37.58	123	749.7				
2661	7 (lower half)	1	30.33	132	935.4	217	4.1	433	22.5
		2	35.11	125	881.7	219	4.5	437	22.9
2665	8 (upper half)	1	22.40	127	842.4	437	35.1		
		2	26.40	125	782.0	435	35.2		
2664	8 (third quarter segment)	1	36.95	129	779.7	246	65.22		
		2	57.39	129	895.7				
2663	8 (third quarter segment)	1	28.05	121	969.2	325	-221.3		
		2	22.53	122	1035	303	-232.8		

Table 4-5. Differential Scanning Calorimetry Results for Tank 241-S-107.[1] (7 sheets).

Sample Number[2]	Sample Location Core/Segment	Run	Sample Weight (mg)	Transition 1 Peak (°C)	Transition 1 ΔH (J/g)	Transition 2 Peak (°C)	Transition 2 ΔH (J/g)	Transition 3 Peak (°C)	Transition 3 ΔH (J/g)
*Drainable Liquid									
2443	Core 105, Segment 1	1	11.92	103	1329				
		2	14.41	105	1315				
2446	Core 105, Segment 2	1	12.48	117	1370				
		2	12.80	104	1304				
2601	Core 110, Segment 1	1	25.68	117	1495				
		2	25.06	115	1484				
2602	Core 110, Segment 2	1	27.16	111	1123	240	-37.4		
		2	29.30	109	1114	303	-35.4		
2629	Core 111, Segment 1	1	13.06	112	1420				
		2	13.38	113	1501				
2632	Core 111, Segment 2	1	6.66	112	1522				
		2	13.33	113	1529				

Notes:

[1]All results reported are wet basis.

[2]All sample numbers begin with the prefix "S95T00-."

Although the DSC results were reported on a wet weight basis, the safety screening DQO (Dukelow et al. 1995) requires that the exothermic reactions be evaluated on a dry weight basis to make a decision concerning tank safety. The dry weight value is obtained from the wet weight value by dividing the reported exothermic value for a subsegment by the solid fraction of the subsegment (that is, 1 minus the fractional percent water value for that subsegment). The exothermic change in enthalpy with the greatest magnitude was -415 J/g (dry).

At temperatures above 330 °C, (designated transition 3 in the tables), DSC responses were observed infrequently. Results were modest for both exotherms and endotherms.
A potential cause could be a shift in the instrument baseline at higher temperatures that resulted in a DSC response being shown where none occurred. Alternatively, the results could also represent additional reactions or a carryover of a reaction that started at a lower temperature which, in the case of an exotherm, was masked by a concurrent endotherm.

4.3.3 Bulk Density/Specific Gravity

Bulk density is a measure of mass per unit volume of solids in the tank. It is used to estimate analyte inventories in the tank given tank volume, percent water, and analyte concentration. For results, see Table A-53. The average bulk density for selected segments was 1.78 g/mL (RSD of the mean = 1.86 percent). This average bulk density was used to estimate tank inventories (see Table ES-2). The average specific gravity (mass per unit volume of liquid) for drainable liquids from segments 1 and 2 of the cores was 1.27 g/mL.

4.4 ANALYSIS FOR HYDROSTATIC HEAD FLUID CONTAMINATION

Water was used as a HHF in the acquisition of cores from tank 241-S-107. Lithium bromide was added to the HHF to act as a tracer. Core composite and segment analyses for lithium and bromide were performed according to Kelly (1995) to detect contamination of the waste samples with HHF (see Appendix B).

4.4.1 Lithium

Lithium was analyzed by ICP using procedures LA-505-151, Rev. D-2 and LA-505-161, Rev. A-1. Samples were prepared in accordance with procedure LA-505-151. None of the tank 241-S-107 lithium samples had results or detection limits exceeding the notification limit of 100 μg/g specified in the sampling analysis plan (Kelly 1995). For the analytical results for lithium, see Appendix B. No projected inventory was calculated for lithium, because it is an artifact of sampling operations. Because lithium can potentially precipitate and bias the results, bromide was requested as a secondary analysis.

4.4.2 Bromide

Bromide was analyzed by IC using procedure LA-533-105. Bromide analyses are required as confirmation when lithium results exceed the notification limit listed in Kelly (1995), or if the tank coordinator has reason to believe that lithium results are suspect. For composite sample and segment analyses, see Appendix B. Five samples (3 solid, 2 drainable liquid) exceed the notification limit and are above the detection limit. The level of intrusion is modest. Because of the high dilution factors used during analyses, eight cases occur where bromide detection limits were higher than the notification limit of 1,200 μg/g. Because of the lack of corroboration from lithium results and from inspection of the other analytical data, HHF intrusion in these cases appears to be negligible or within the uncertainty of the measurements. Therefore, no further corrections to the data were performed.

4.5 HEADSPACE VAPOR SAMPLING

A vapor survey was conducted prior to core sampling to analyze the headspace below the riser. Results from the survey are shown in Table 4-6. The results show that the maximum gas concentration was five percent of the LFL.

Table 4-6. Tank 241-S-107 Headspace Vapor Survey Results.

Flammability	Riser 2	Riser 11	Riser 16
LFL	4 to 5%	0 to 4%	0 to 3%
Vapor	**Riser 2**	**Riser 11**	**Riser 16**
Oxygen	20.7 %	20.9%	20.9%
TOC	6.5 ppm	2 to 13 ppm	0 to 10 ppm
NH_3	200 ppm max.	200 ppm max.	150 ppm

5.0 INTERPRETATION OF CHARACTERIZATION RESULTS

This section evaluates the overall quality and consistency of the results for tank 241-S-107. These results are assessed and compared against historical information and program requirements.

5.1 ASSESSMENT OF SAMPLING AND ANALYTICAL RESULTS

This section evaluates sampling and analysis factors that may impact data use or interpretation. These factors are used to assess overall data quality and consistency and to identify limitations in its use.

5.1.1 Field Observations

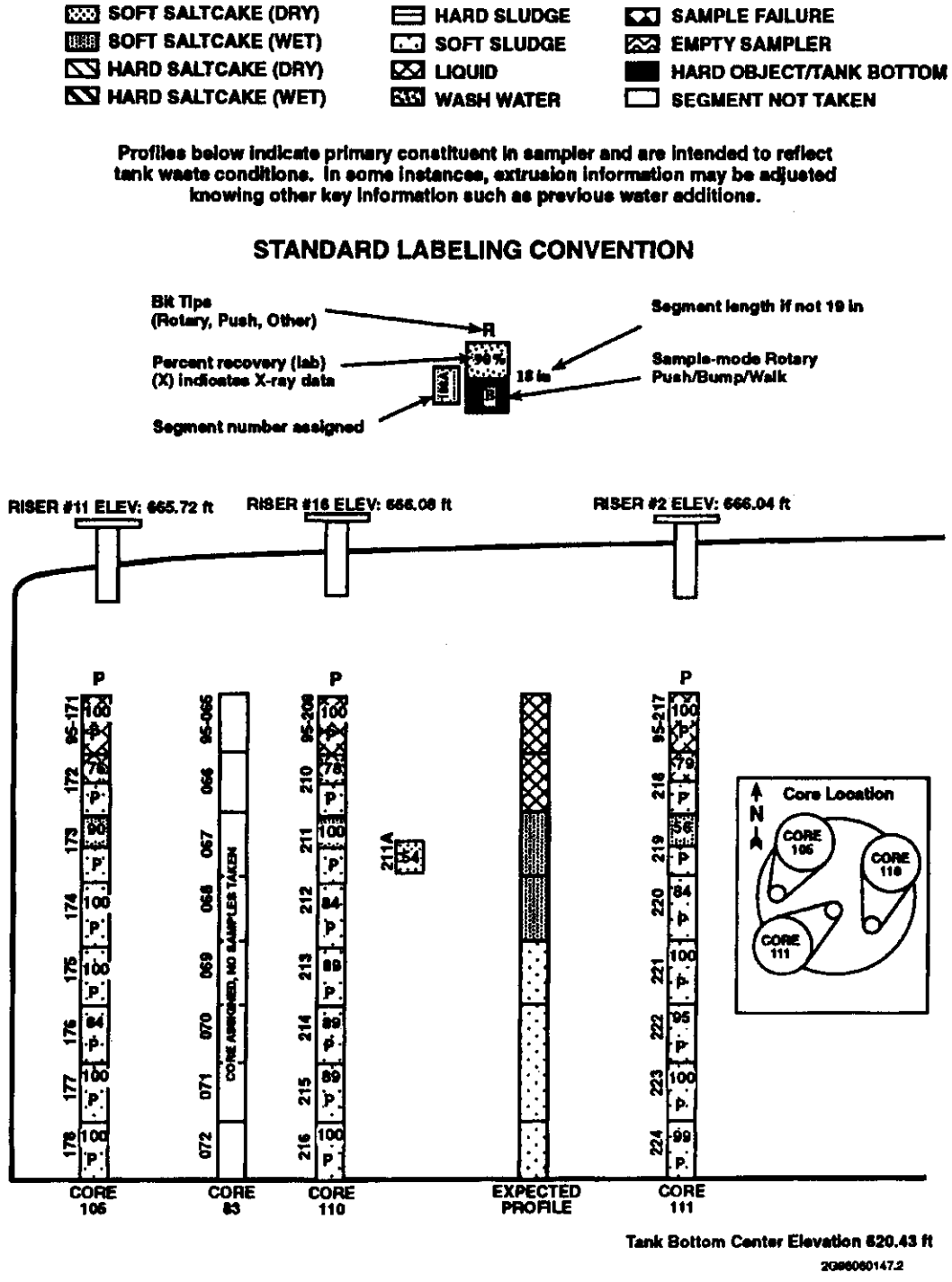
The analytical data from the 1995 sampling event was obtained from three cores: cores 105, 110, and 111. Core 105 was removed from riser 11, near the outer edge of the tank and a cascade outlet. Core 110 was removed from riser 16, also near the outer edge of the tank (approximately 120 ° counterclockwise from riser 11); and core 111 was taken from riser 2, near the center of the tank and in line with the other two risers. The position of the risers met the sampling requirements of the historical, pretreatment, and safety screening DQOs (Simpson and McCain 1995, Kupfer et al. 1995, Dukelow et al. 1995).

Sample recoveries were generally excellent for all cores and segments. Nearly complete samples were captured as a function of depth; no irregularities in sampler performance were observed. The soft, cohesive consistency of the samples was optimal for sampler performance. Figure 5-1 shows the cores and the degree of recovery from each riser sampled. The evidence indicates that nearly complete waste profiles were recovered from all risers.

5.1.2 Quality Control Assessment

The quality control assessment includes an evaluation of the four checks (blanks, duplicates, spikes, and standards) performed in conjunction with chemical analyses. Because of the large amount of data collected for tank 241-S-107, only a general evaluation and summary of some key safety and characterization areas are provided. For more detailed quality control information, refer to Raphael (1995 and 1996) or Appendix A. Kelly (1995) establishes specific accuracy and precision criteria for the four quality control checks. Samples which had one or more quality control results outside of the criteria are identified in the data package and in Appendix A.

Figure 5-1. Tank 241-S-107 Physical Core Profile.



The precision between several inorganic sample/duplicate pairs was often greater than the quality control limits set by the laboratory. (Precision is estimated by the relative percent difference [RPD], defined as the absolute value of the difference between the primary and duplicate samples, divided by their mean, times one hundred.) This lack of agreement between the primary and duplicate result does not necessarily reflect on the laboratory procedures or equipment, it may be intrinsic to the sample. It may be attributable to the very small samples used in these analyses (10 to 20 mg for DSC/TGA, up to 1 g for IC and ICP). To achieve reproducible results, the samples need to be homogeneous. The requisite degree of homogeneity may not have been achievable with the procedures and equipment in place at the time of analysis. Difficulties in producing a homogeneous subsample are probably responsible for most of the reproducibility problems observed for these (and other) analytes. Precision (RPD) is also affected by how close the result is to the analytical detection limit.

Many quality control results for precision were outside the boundaries specified by Kelly (1995). The sample matrices analyzed are so complex that high degrees of precision cannot be obtained with current methods. Although some of the sample results exceed the specified RPD criteria, reruns were not performed because the results were substantially below any established threshold criteria, or no rerun criteria were specified. Other quality control results (blanks, spikes, and standards) are within established parameters; therefore no issues with sample contamination were observed.

In summary, the samples often had precision quality control results outside the SAP boundaries. However, these precision results do not impact the usefulness of the data. The majority of blank, spike, and standard results, which relate to sample contamination, were within the SAP specified boundaries. The broad variation in the data can be attributed primarily to the spatial variability intrinsic to the Hanford tank wastes.

5.1.3 Data Consistency Checks

Comparing different analytical methods can help in assessing data consistency and quality. Two comparisons that were possible with the data set provided by the three core samples include: a comparison of phosphorus and sulfur as analyzed by ICP with phosphate and sulfate as analyzed by IC (Table 5-1) and a comparison of total beta measurements and the sum of the principal beta emitters (Table 5-2).

A mass and charge balance were calculated to help assess overall data consistency. Because the necessary data were not available, no comparison was done between total alpha measurements and the sum of the alpha emitters.

Table 5-1. Comparison of Tank 241-S-107 Mean Phosphate/Phosphorous and Sulfate/Sulfur Concentrations by Different Methods.

241-S-107 Solids						
Analyte	ICP:A (μg/g)	RSD (%)	IC (μg/g)	RSD (%)	Solubility (IC/ICP)	RPD
PO_4^{3-}	12,400	36.4	21,600	29.4	174 percent (100 percent)	54.1 percent
SO_4^{2-}	1,280	13.2	2,430	19.5	190 percent (100 percent)	62.0 percent

Notes:

ICP:A = Inductively coupled plasma, acid prepared sample result
IC = Ion chromatography result

Table 5-2. Comparison of Gross Beta Measurements and Individual Beta Emitters.

Core Composite	^{137}Cs concentration (μCi/g)	^{90}Sr concentration (μCi/g)	Sum of Beta Emitters (μCi/g)	Gross Beta concentration (μCi/g)	RPD (%)
105	79.8	236	552	532	3.7
110	67.5	164	396	353	11.4
111	87.3	122	331	nm	nm

Note:

The sum of the principal beta emitters (e.g., ^{137}Cs and ^{90}Sr) agree closely with the gross beta measurement for cores 105 and 110. This result implies there are no other substantial beta emitters present, and that the measurements are consistent.

nm = no measurement

5.1.3.1 Comparison of Results from Different Analytical Methods. The data consistency checks compare results from two or more analytical methods for a given analyte. Close agreement between the two methods can strengthen the credibility of both results. Poor agreement may bring the reliability of the data or the assumptions about the waste into question.

The analytical phosphorus mean result in the solids as determined by ICP:A was 4,040 μg/g, which converts to 12,400 μg/g of phosphate assuming that all the phosphorous is present as phosphate. This result is much lower than the IC phosphate mean result of 21,600 μg/g. Typically, the ratio of IC to ICP results indicates the degree of solubility for the analyte because insoluble phosphates are often present, and the IC does not detect them. Therefore, the ICP-derived result is usually higher. In this case, the IC result is higher, the calculated phosphate is over 100 percent soluble, and the RPD between the two phosphate estimates was 54.1 percent.

Similarly, the ICP sulfur value of 430 μg/g converts to 1,280 μg/g of sulfate assuming all the sulfur is present as sulfate. This result compares unfavorably with the IC sulfate result of 2,430 μg/g. The RPD between these two sulfate estimates was 62.0 percent.

This lack of agreement is unusual. Using propagation of error techniques, the RSD of the IC/ICP ratio for phosphate was 47 percent and for sulfate, 24 percent. One explanation is that the waste matrices may have acid insoluble phosphate and sulfate components. Alternatively, a precipitate may form during sample preparation. No precipitates were observed. However, translucent gels are known to occur with Hanford Site waste, thus, this situation may represent such a case (Lane 1978; Delegard 1980; Herting 1980). At this time, there is no adequate explanation for the discrepancies. The ion chromatography results are the results used in the mass and charge balance equations because they appear to quantitate these anions better.

5.1.3.2 Gross Beta and Sum of the Beta Emitters. Limited comparison was made between the gross beta activities with the sum of the individual beta emitters. Selected composite data was available to perform this comparison. Because of the sampling and analytical direction, total alpha, $^{239/240}$Pu (and other alpha emitters), and total beta measurements were not gathered on each sample. However, some composite results are available. For selected comparisons on the composite level results, see Table 5-2.

The activities of the individual beta emitters were summed as follows:

$$\text{Sum of beta emitters} = (2 * {}^{90}\text{Sr}) + {}^{137}\text{Cs}$$

Because ^{90}Sr is in equilibrium with its daughter product ^{90}Y, the radiochemically measured value for ^{90}Sr alone must be multiplied by 2 to obtain numbers comparable with total beta. The slight amount of ^{60}Co detected was considered negligible in this calculation.

5.1.3.3 Mass and Charge Balance. The principal objective in performing a mass and charge balance is to determine whether measurements are consistent. In calculating the balances, only the analytes detected at a concentration of 1,000 μg/g or greater were considered (see Table 4-2).

For solids, except sodium, the cations listed in Table 5-3 were assumed to be in their most common oxide/hydroxide form, and the concentrations of the assumed species were calculated stoichiometrically. Because precipitates are neutral anions, all positive charge was attributed to the sodium cation. Acetate and carbonate were the anions assumed; they were derived from the TOC and TIC composite analyses, respectively. The other anions listed in Table 5-4 were assumed to be present primarily as sodium salts; they were expected to balance the positive charge exhibited by the cations. Sulfur is considered to be present as the sulfate ion. It is assumed to be completely water soluble, and it appears only in anion mass and charge calculations. The water soluble phosphate was included in the anion mass and charge data. Because of the observed analytical interference, it is presumed to be the total phosphate as well. The concentrations of the cations in Table 5-3, the anions in Table 5-4, and the percent water were added to calculate the mass balance in Table 5-5. The uncertainty estimates (RSDs) associated with each analyte and the uncertainty for the cation and anion totals also are given.

The mass balance was calculated from the formula below. The factor 0.0001 is the conversion factor from μg/g to weight percent.

$$\begin{aligned}\text{Mass balance} &= \%\ \text{Water} + 0.0001 \times \{\text{Total Analyte Concentration}\} \\ &= \%\ \text{Water} + 0.0001 \times \{Al(OH)_3 + FeO(OH) + Cr(OH)_3 + ZrO(OH) \\ &+ Ni(OH)_2 + Na^+ + U_3O_8 + C_2H_3O_2^- + CO_3^{-2} + F^- + Cl^- + NO_3^- + NO_2^- \\ &+ (COO)_2^{-2} + PO_4^{-3} + SiO_3^{-2} + SO_4^{-2}\}\end{aligned}$$

The total analyte concentrations calculated from the above equation was 420,000 μg/g with an RSD of 4.8 percent. The mean weight percent water obtained from thermogravimetric analysis reported in Table 4-2 is 32.1 percent. The mass balance resulting from adding the percent water to the total analyte concentration is 74.1 percent (see Table 5-5).

The following equations are the derivation of total cations, total anions, and the charge balance. Relative standard deviations are generated using propagation of error techniques and are based on an assumption of independence of the terms in the mass balance equation.

Total cations: $Na^+ / 23.0 = 3.770$ microequivalents

Total anions: $C_2H_3O_2^- / 59.0 + CO_3^{-2} / 30.0 + F^- / 19.0 + NO_3^- / 62.0 + NO_2^- / 46.0 + (COO)_2^{-2} / 44.0 + PO_4^{-3} / 31.7 + SO_4^{-2} / 48.1 = -3.805$ microequivalents

The charge balance was 0.99, with an RSD of approximately 12.4 percent. The charge balance is the absolute value of the ratio of total cations to total anions. The net charge is -35 μeq. Boundary conditions for the mass balance is 1,000,000 μg/g (100 percent) and 1.00 for the charge balance; no net charge remains.

Table 5-3. S-107 Cation Mass and Charge Data.

Analyte	Concentration (μg/g)	RSD (Mean) (%)	Assumed Species	Concentration of Assumed Species (μg/g)	Charge (μeq/g)
Aluminum	49,700 *99,400*	16.2	$Al(OH)_3$ *AlO(OH)*	143,600 *221,000*	0.00
Chromium	3,530	26.5	$Cr(OH)_3$	6,860	0.00
Iron	2,300	18.1	FeO(OH)	3,250	0.00
Nickel	1,280	24.7	$Ni(OH)_2$	2,050	0.00
Sodium	86,700	9.2	Na^+	86,700	3,770
Uranium	6,830	10.4	U_3O_8	10,500	0
Zirconium	9,720	33.6	ZrO(OH)	13,200	0.00
Totals				266,200	3,770

Note:
Italics indicate assumed data, see following paragraph for explanation

Table 5-4. S-107 Anion Mass and Charge Data.

Analyte	Concentration (μg/g)	RSD (Mean) (%)	Assumed Species	Concentration of Assumed Species	Charge (μeq/g)
TOC[1]	1,700	20.7	$C_2H_3O_2^-$	4,180	-71
TIC[1]	2,130	6.40	CO_3^{2-}	10,700	-357
Fluoride	14,300	30.5	F^-	14,300	-752
Chloride	2,080	7.0	Cl^-	2,080	-59
Nitrate	57,900	5.3	NO_3^-	57,900	-934
Nitrite	30,900	7.1	NO_2^-	30,900	-672
Oxalate	4,180	24.3	$C_2O_4^{2-}$	4,180	-71
Phosphate	21,600	29.4	PO_4^{3-}	21,600	-682
Silicon	2,180	28.9	SiO_3^{2-}	5,920	-156
Sulfate	2,430	19.5	SO_4^{2-}	2,430	-51
Totals				154,000	-3,805

Note:
[1]TOC/TIC concentrations and RSDs are derived from core composite data

Table 5-5. S-107 Mass Balance Totals.

	Concentrations (wt%)	Charge (μeq/g)
Total from Table 5-3 (cations)	26.6	3,770
Total from Table 5-4 (anions)	15.4	-3,805
Water	32.1	0.00
Subtotal	74.1	-35
Mass from assumed AlO(OH)	22.1	0.00
Grand total	95.4	-35

In summary, the above calculations yield an unreasonable mass balance value (74.1 percent) and a nearly perfect charge balance value (0.99). This suggests that the mean analytical results for the tank were an incomplete description of the tank contents. Additional assumptions regarding the species present are needed.

Because of the process history of this tank and the magnitude of the mass discrepancy, the simplest assumption, setting the net charge equal to zero, is not appropriate. There appears to be a large, neutral, unmeasured constituent present.

Previous REDOX waste materials have demonstrated high resistance to acid dissolution. Data from tank 241-S-104 (Sathyanarayana et al. 1994) and preliminary sludge washing data from tank 241-S-107 by researchers at the Pacific Northwest National Laboratory (Lumetta et al. 1996) indicates that only one-third of the aluminum present in these type wastes may be acid-soluble, and that fusion preparation is necessary to provide adequate quantitation.

If the total aluminum concentration is tripled and the insoluble aluminum is assumed to be present as AlO(OH), the resulting mass balance is 96.2 percent (see Tables 5-3 and 5-5). This assumption is reasonable, given the history of the wastes and the supporting data, and provides sufficient mass to satisfactorily account for the individual analytes that comprise the sludge with the degree of uncertainty inherent in the values used. There are alternative explanations, however, they involve additional or different assumptions regarding the species present.

With this assumption and the uncertainty regarding these measurements, the mass and charge balance calculations can be considered to be consistent. However, this calculation illustrates that a substantial contributor to the waste matrix (aluminum) is not directly measured and that perhaps this waste is not sufficiently well described by the data and assumptions presently available. Furthermore, this set of assumptions is only one of several that could be considered.

5.1.3.4 Hydrostatic Head Fluid Intrusion. There was minor evidence of HHF intrusion. However, the uncertainty in the water measurements bounds any correction introduced to the data. Thus, no corrections were performed to the data. For more information on correction methodology, refer to Winkelman (1996).

5.2 COMPARISON OF HISTORICAL AND ANALYTICAL RESULTS

Comparisons between the 1995 analytical results and data from previous sampling events for solids are inappropriate. The reasons for not comparing are a result of uncertainties about historical sample handling and analytical procedures, and because the historical solid samples do not represent the present wastes. Comparisons between liquid samples obtained in 1980 and the drainable liquid from the 1995 sample event for selected analytes are also not appropriate (see Table 3-4).

5.3 TANK WASTE PROFILE

One objective of the 1995 sampling event was to obtain a vertical profile of waste from two (or more) widely spaced risers (Kelly 1995). Full vertical profiles were obtained from all risers, thereby allowing a statistical assessment of the vertical and horizontal distribution of tank waste for many analytes. The sample recovery was excellent in all segments. Previous information on the vertical disposition of waste also was available from the tank layer model (TLM) for tank 241-S-107 (see Figure 2-3).

According to the TLM, the waste was composed of eight layers. Most layers (six of eight) are quite small with volumes less than 190 kL (50 kgal). There is a substantial heel of REDOX (R1) waste (348 kL [92 kgal] with a nearly equal amount of REDOX coating waste (CWR1) (337 kL [89 kgal]) lying on top of it. In the upper middle of the tank, there are three relatively small solids layers: REDOX saltcake, zirconium-based coating waste (CWZr1), and another layer of REDOX coating waste (CWR2).

Three smaller layers of different concentrated wastes are at the top of the tank. Designations and descriptions of these concentrated waste types are in a subroutine of the HDW model, the supernatant mixing model (SMM). The concentrated wastes are designated SMMT2 (from the second T evaporator campaign), SMMS1 (from the first S evaporator campaign), and SMMS2 (from the second S evaporator campaign). The SMMS2 layer is primarily supernatant; the other layers are primarily precipitated solids. The three concentrated solids layers are probably indistinguishable at this level of sample resolution, except for the surface layer, which is subject to more chemical and physical interactions than the other tank material.

These layers, which are made up of several different waste types, indicate that tank contents are expected to be vertically heterogeneous. The visual descriptions of the extruded cores and segments also imply that tank contents are heterogeneous vertically and horizontally to some extent (see Table 3-2). These differences may not be statistically significant.

5.3.1 Analysis of Variance Results

Random effects statistical ANOVA (analysis of variance) models were fit to concentration data from the core/segment samples. The results from these models can be used, on an analyte by analyte basis, to judge the vertical and horizontal variability in mean analyte concentration. Statistical results from these models are univariate results. Multivariate statistical results are outlined in the next section.

Two types of nested random effects ANOVA models were used. One random effects model was fit to core composite data; another was fit to core/subsegment data. The ANOVA models were fit to analyte concentration data, provided, at least 50 percent of the measurements were above the detection limits. For these analytes, the detection limit was used as the measured concentration in cases where an occasional result was below detection. Consequently, the summary statistics for these analytes are biased. The magnitude of the bias cannot be estimated.

For each analyte, estimates of mean concentration and RSDs of the mean were obtained using REML methods. Attachment 1 contains the details and the results from the ANOVA. In addition to estimates of the mean and RSDs of the mean, Attachment 1 contains estimates of the standard deviation of the mean, 95 percent confidence intervals on the mean, estimates of the variance components used to measure horizontal and vertical variability, and the p-values associated with the F-tests.

The p-values, associated with the F-tests from the ANOVA, are compared to a standard significance level ($\alpha = 0.05$). If it is less than 0.05, the analyte means are significantly different from each other. If a p-value is greater than 0.05, the analyte means are not significantly different from each other. The p-value is used to determine the significance of horizontal and vertical variability in the waste. The results are on an analyte by analyte basis.

The results from the ANOVA showed little variability in mean analyte concentration between cores. There were significant differences in the mean concentrations between risers for 3 analytes of the 37 examined (8.1 percent). Therefore, the evidence for horizontal variability is not conclusive.

The result from the ANOVA showed significant variability in mean analyte concentration between subsegments as a function of depth. There were significant differences between mean analyte concentrations in subsegments for 35 analytes of the 37 examined (95 percent),

suggesting distinct layers exist in the tank as predicted by the TLM. These layers are better identified and defined by multivariate cluster analysis. Consequently, based on the data, there is vertical variability in the waste, but little evidence for horizontal variability.

5.3.2 Multivariate Clustering

The results given in Section 5.3.1 are based on ANOVA models applied to data from individual analytes. Alternatively, the analyte concentrations from the subsegments can be analyzed using multivariate statistical methods. This section gives the results obtained from a multivariate technique known as cluster analysis. The results from the cluster analysis are given in a Pacific Northwest National Laboratory report in Attachment 1.

Analytes were selected which would provide a characteristic description of the tank and a means of differentiating discrete waste types. In the analysis performed on the samples from tank 241-S-107, 82 individual primary and duplicate results (from 41 subsegments) in a reduced data set are 82 points in 13-dimensional space. The 13 dimensions are defined by the concentrations of aluminum, chromium, iron, fluoride, lead, nickel, phosphorous, ^{90}Sr, uranium, silicon, sodium, sulfur, and zirconium.

The representation given in Figure 5-2 is useful in the interpretation of the results from the cluster analysis. This figure contains three types of information. First, it gives the relative locations of the subsegments and the core samples in the tank. Second, the cluster number for that primary/duplicate pair of results is in the boxes next to the subsegment label, as defined in Figure 5-3. Third, the right hand column lists the approximate position of the waste types as given by chronological interpretation of the TLM (Agnew et al. 1996).

The cluster analysis partitioned the data into four clusters. Figure 5-3 shows a cluster tree and the linkages among samples and clusters and the relative distances between them. The symbols at the bottom of the cluster tree in Figure 5-3 correspond to the individual subsegment in the cluster analysis. The key to the notation is as follows:

Segment number/subsegment designation/core designation/primary or duplicate.

The subsegment designation is as follows:

(U = upper, L = lower, C and D = quarter segments).

Core designation is as follows:

105 = 1, 110 = 2, 111 = 3. Primary or duplicate were denoted with a or b.

A quantitative summary of the cluster (number of samples, 10th percentile, median, and 90th percentile) were calculated from the measurements on the cluster members, and can be found in Attachment 1. In this attachment, the clusters are identified in the same manner as

given by Figures 5-2 and 5-3. From a visual comparison across clusters, it is evident that there are differences between the clusters for uranium, zirconium, chromium, phosphate, oxalate, fluoride, nickel, and iron.

Cluster analysis findings correspond to historical and process knowledge associated with the waste. The findings help with interpretation of the historical behavior of the waste in the tank.

The "1" group appears to correspond with concentrated wastes predicted at the top. Analytes with median values greater than 1 weight percent include: aluminum, chromium, sodium, phosphate, oxalate, nitrate, nitrite, and fluoride.

The "2" group corresponds with later REDOX zirconium and aluminum cladding wastes. Analytes with median values greater than 1 weight percent include: aluminum, sodium, zirconium, phosphate, nitrate, nitrite, and fluoride.

The "3" group corresponds with REDOX sludge and REDOX cladding wastes. Analytes with median values greater than 1 weight percent include: aluminum, sodium, nitrate, and nitrite.

The "4" group appears to represent a transition layer where interactions occurred between the concentrated wastes being transferred in and out of the tank and the previously deposited REDOX waste. Analytes with median values greater than 1 weight percent include: aluminum, sodium, zirconium, nitrate, and nitrite.

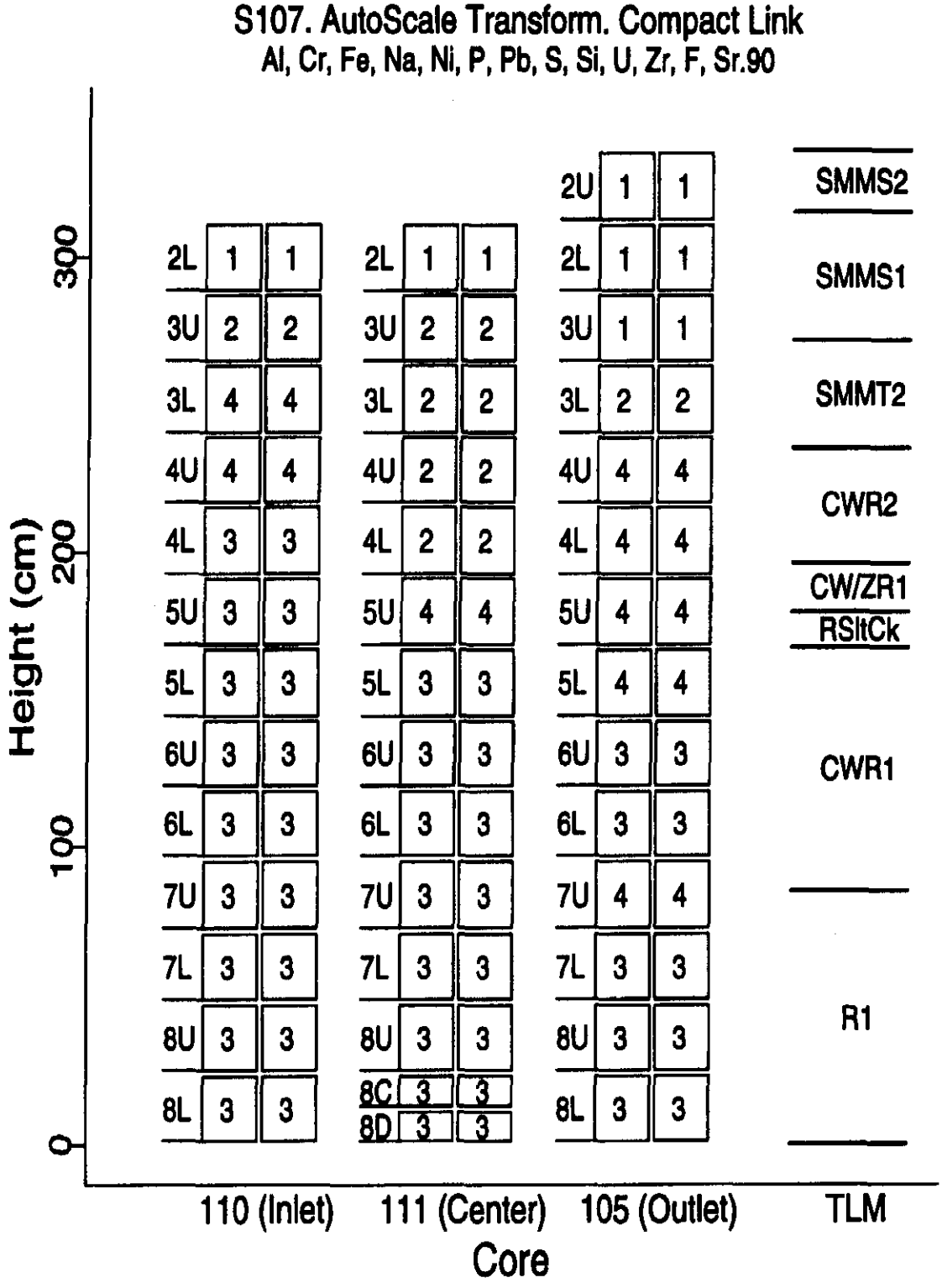
5.4 COMPARISON OF ANALYTICAL AND TRANSFER DATA

5.4.1 Gateway Historical Evaluation

In addition to the safety screening DQO, cores from tank 241-S-107 were analyzed according to the historical DQO (Simpson and McCain 1995). This DQO strives to quantify errors associated with the tank waste composition predictions based on waste transaction history, input waste compositions, and assumptions about waste and process behavior. The DQO identifies key components and their characteristic concentrations for certain waste types.

Tank 241-S-107 was selected as a tank for historical evaluation because it was expected to be a spatially complex tank (Brown et al. 1995). This definition is used to describe tanks with an active processing history containing several waste types. No specific waste types in this tank are being investigated, however, specific waste types may be revealed during the data analysis and interpretation and selected for assessment.

Figure 5-2. Tank 241-S-107 Cluster Analysis Result.



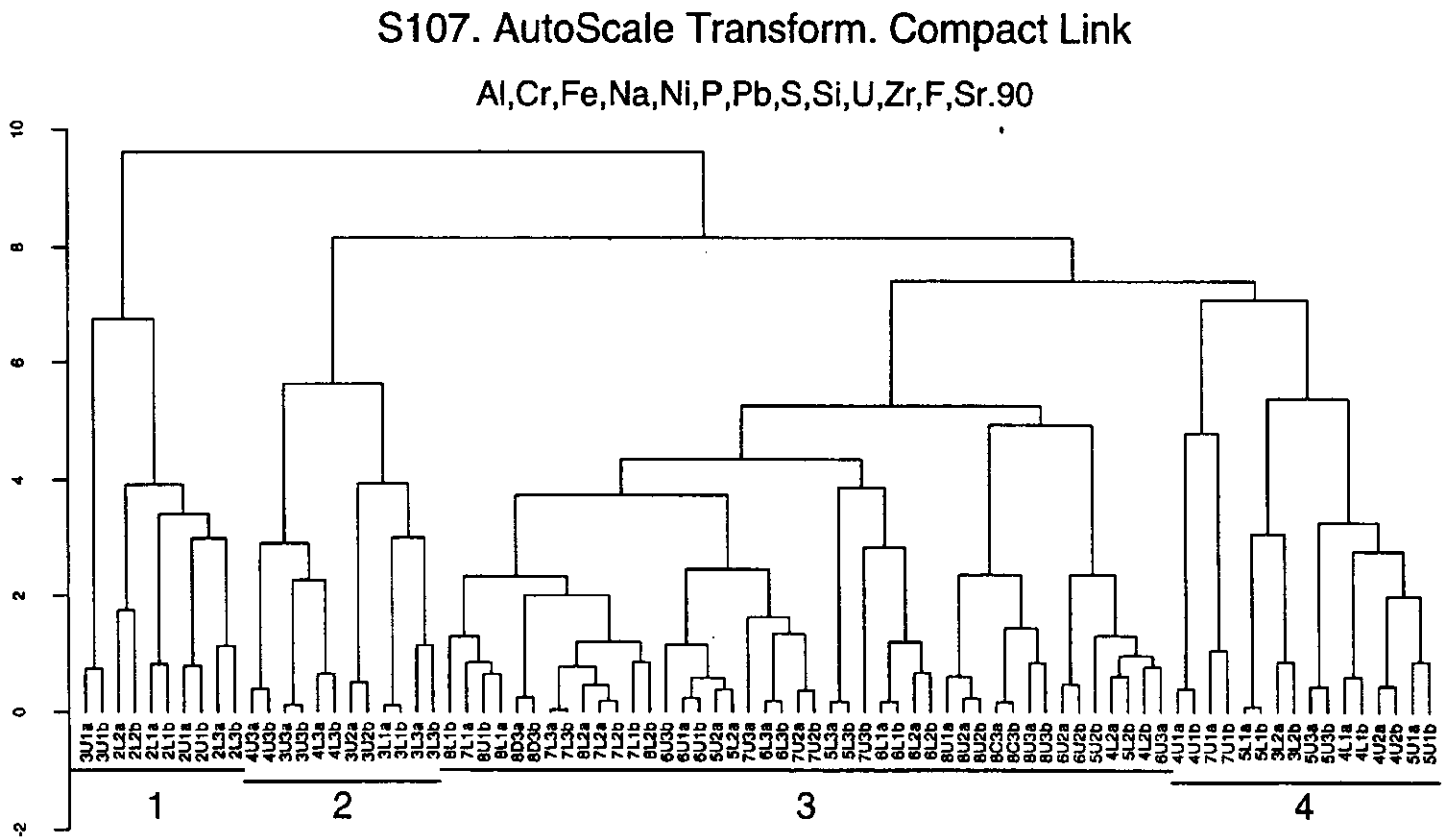


Figure 5-3. Tank 241-S-107 Sample Cluster Tree.

The first step in the evaluation is comparing the analytical results with DQO-defined concentration levels for a selected number of analytes. This comparison ensures the predicted waste type may be in the tank and at the predicted location. If the analytical results are ≥ 10 percent of the DQO levels (ratio of 0.1), the waste type and layer identification can be considered acceptable (Simpson and McCain 1995) and further analysis may proceed even though the information is uncertain.

The concentrated wastes at the top of the tank, which were predicted by the supernatant mixing model portion of the inventory model, do not have a fixed HDW composition; therefore, they are not within the scope of the DQO. There appears to be one waste type that can be compared: early REDOX high-level waste (R1). A comparison between the medians of the designated clusters (Attachment 1) and the historical DQO levels is presented. In many cases, the historical thresholds are minimum values. In this case, the gateway assessment shown in Table 5-6 appears to support the historical results, and further comparisons on an analyte basis are warranted.

Table 5-6. Comparison of REDOX Sludge Screening Analytes with Cluster Analysis Results.

Screening Analyte	Cluster Median Analytical Results	Historical DQO Concentration Level[1]	Ratio
Sodium	60,400 μg/g	27,300 μg/g	2.21
Aluminum	56,400 μg/g	56,400 μg/g	1.00
Chromium	1,180 μg/g	> 12,500 μg/g	0.094
^{137}Cs	71 μCi/g	41 μCi/g	1.73
^{90}Sr	265 μCi/g	94 μCi/g	2.82
Percent Water	28 percent	38 to 56 percent	0.74 to 0.50

Note:
[1]Historical DQO concentration levels are from Simpson and McCain (1995).

5.4.2 Additional Comparisons with HDW Model Rev. 3 Estimates

The *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3* (Agnew et al. 1996) derived estimates of tank 241-S-107 contents are shown in Table 5-7 with inventory estimates derived from the 1995 analytical results. This comparison is for informational purposes only. The model values are generated from a combination of inputs from the WSTRS (Agnew et al. 1995) and the combined HDW model. Each input contains assumptions and/or other factors (such as transfers of an unknown waste type) that may impact the estimates. Because these values have not been validated, they should be used with caution.

Table 5-7. Comparison of Historical Estimates with 1995 Core Composite Data for Tank 241-S-107. (2 sheets)

Analyte	1995 Analytical Result[1]	Inventory[2] Estimate	Relative Percent Difference	Ratio Analytical/ Estimate
METALS	µg/g	µg/g	%	
Aluminum[3]	59,400	83,300	33.5	0.71
Calcium	523	3,480	148.00	0.15
Chromium	2,840	8,040	95.6	0.35
Iron	2,280	12,800	140	0.18
Lead	127	8,810	194	0.01
Manganese	587	29.6	181	19.8
Nickel	1,400	569	84.4	2.46
Potassium	547	625	13.3	0.88
Silicon	1,280	547	80.2	2.34
Sodium	92,700	84,400	9.37	1.10
Uranium	7,380	16,800	77.9	0.44
Zirconium	4,460	2,680	50.0	1.66
IONS	µg/g	µg/g	%	
Cl^-	1,920	1,390	32.0	1.38
CO_3^{-2}	10,700	8,890	18.5	1.20
F^-	14,000	3,350	123	4.18
NO_3^-	58,000	59,200	2.05	0.98
NO_2^-	30,100	38,200	23.7	0.79
PO_4^{-3}	24,300	1,170	182	20.8
SO_4^{-2}	2,790	3,850	31.9	0.72
Oxalate	2,530	0.40	200	>10

Table 5-7. Comparison of Historical Estimates with 1995 Core Composite Data for Tank 241-S-107. (2 sheets)

Analyte	1995 Analytical Result[1]	Inventory[2] Estimate	Relative Percent Difference	Ratio Analytical/ Estimate
RADIONUCLIDES	µCi/g	µCi/g	%	
^{137}Cs	78.2	56.7	31.9	1.38
Total Alpha/$^{239/240}Pu$	1.0	0.814	20.5	1.23
^{90}Sr	174	193	10.4	0.90
PHYSICAL PROPERTIES	%	%	%	
Percent Water	36.1	45.1	22.2	0.80
CARBON	µg C/g	µg C/g	%	
Total Organic Carbon	1,700	2,710	45.8	0.63

Notes:

[1]Attachment 1

[2]Agnew et al. (1996).

[3]Aluminum concentrations are potentially greater by a factor of three because of incomplete quantitation.

The comparison between inventories based on historical estimates and analytical values gave mixed results. A total of 25 analytes were compared. Fourteen analytes (aluminum, potassium, sodium, zirconium, chloride, nitrate, nitrite, carbonate, sulfate, percent water, TOC, ^{137}Cs, ^{90}Sr and Pu [based on total alpha]) exhibited RPDs less than 50 percent and ratios between 0.5 and 2.0. Seven analytes (calcium, iron, lead, manganese, fluoride, phosphate, and oxalate) exhibited RPDs greater than 100 percent and more extreme ratios. The RPDs for the remaining five analytes in the comparison were in between the two extremes. In several cases, the analytes did not contribute meaningfully to the tank contents. Large RPDs are expected for analytes that are in trace quantities or near their detection limits.

Qualitative comparisons are possible by looking at the analytical results with respect to the predicted REDOX/REDOX coating waste constituents and the rest of the tank. Layering was expected and observed in the segments. Aluminum is predicted to be in higher quantities in

the REDOX coating waste and REDOX sludge (cluster 3) than in the SMM estimated concentrated wastes (cluster 1). In reviewing the subsegment analytical results in Appendix A and the clustering results in Attachment 1, aluminum was found in higher concentrations in the lower segments where REDOX waste was predicted.

Evidence of zirconium coating waste was observed in clusters 2 and 4. Cluster 2 may be a reasonably good description of zirconium cladding waste (CWZr1). It is present in tank 241-S-107 in larger quantities than predicted.

Several discrepancies between predicted and observed compositions were noted. However, many discrepancies may be systematic in nature and easily corrected in the Angew et al. (1996) model. Phosphate was predicted to be low in the REDOX designated sludge, and it was observed to be low in those segments. Distinctions between REDOX and REDOX coating waste composition as defined in the HDW model appears to be small. Alternatively, one or the other of these waste types may not be present. Chromium content in the REDOX waste was lower than predicted. Only 10 percent of the predicted value was observed. However, if soluble chromium is present in substantial quantities in the upper portion of the tank, the difference may be attributable to the solubility factor used in the HDW model, or perhaps the chromium was soluble initially and through subsequent transfers was moved to another tank or discharged to the ground.

For R1 waste only six HDW analyte predictions fall between the 10th and 90th percentiles described from the cluster analysis (see Table 5-8). Three other predictions are close to the 10th percentile value, but some of the apparent differences can be explained by incorporating other data about the tank not included in Agnew et al. (1996). Because the tank has elevated temperatures, was interim stabilized, and generates a modest heat load, it is drier than predicted.

Agnew et al. (1996) uses available process information, physical and chemical principles, and simplifying assumptions about the composition and behavior of the waste in the tanks. Source term errors in Agnew et al. (1996) occur when the model estimates do not correspond closely with the observations from sample data, and are outside the uncertainty bounds of the data. This is usually the result of incomplete documentation or incomplete specification of a waste type composition. Several source term errors in the model are apparent with substantial differences between predicted and observed values for iron, calcium, silicon, chromium, nitrate, phosphate, iron, and ^{90}Sr.

The predicted and analytical aluminum values agreed well until adjusting for the observed solubility behavior of aluminum. This difference in aluminum solubility has a potential impact on sample preparation, data interpretation, and disposal assumptions. It should be considered when analyzing other REDOX waste tanks. Similarly, the difference between predicted and observed chromium concentrations for REDOX waste has additional implications in those same areas.

Table 5-8. Comparison of Hanford Defined Waste--REDOX waste (R1) with 1995 Selected Cluster Analysis Results for Tank 241-S-107.

Analyte	Cluster Median Analytical Result	HDW Estimate	10th Percentile	90th Percentile
METALS	µg/g	µg/g	µg/g	µg/g
Aluminum[1]	56,400	75,400	24,500	118,000
Calcium	234	5,800	152	363
Chromium	1,180	30,600	846	1,690
Iron	1,160	38,100	570	2,390
Lead	33	0.00	< DL	58
Nickel	206	2005	117	1,010
Potassium	457	224	338	595
Silicon	1,060	225	406	3,440
Sodium	60,400	36,800	38,500	71,300
Uranium	8,690	3,460	2,140	13,200
IONS	µg/g	µg/g	µg/g	µg/g
Cl^-	1,860	934	1,250	2,260
F^-	150	0.00	< DL	937
NO_3^-	57,600	1,470	37,500	71,000
NO_2^-	34,300	60,600	18,800	40,600
PO_4^{-3} (total)	1,630	0.00	910	3,920
SO_4^{-2}	1,300	992	859	2,330
Oxalate	1,050	0.00	< DL	3,320
RADIONUCLIDES	µCi/g	µCi/g	µCi/g	µCi/g
^{137}Cs	71	53	54	111
^{90}Sr	265	703	3	590
PHYSICAL PROPERTIES				
Percent Water	28	66.1	3	35

Note:

[1]Aluminum values are potentially greater by a factor of three because of incomplete quantitation.

5.5 SAFETY EVALUATION

The data criteria in the safety screening DQO (Dukelow et al. 1995) are used to assess waste safety and to check for unidentified safety issues. The DQO requires samples from two widely spaced risers. This requirement was met. The three primary analyses required by the safety screening DQO include DSC to evaluate energetics, TGA to measure weight percent water, and a determination of total alpha activity. For each required analysis, a notification limit was established by the DQO which, if exceeded, could warrant further investigation to ensure tank safety. A final requirement of the safety screening DQO was to determine the flammability of tank headspace vapors. These measurements were taken prior to removing core samples. The highest measured result was less than 5 percent of the LFL, well below the safety screening limit of 25 percent (Dukelow et al. 1995).

5.5.1 Flammability Evaluation

As shown in Table 5-9, the flammable gas, organic vapor, and ammonia represent a combined total of less than 5 percent of the LFL. At the reported concentrations, hydrogen, organic vapor, and ammonia do not, individually or collectively, represent a flammability hazard.

Table 5-9. Vapor Flammability Results from 1994 Vapor Sampling and Analysis Event.[1]

Analyte	LFL	Average Concentration Range	Concentration as Percent of LFL
Flammable Vapor			0 to 5 percent
Total organics	46,000 mg/m^3	0 to 13 mg/m^3	< 0.10 percent
NH_3	150,000 ppmv	0 to 200 ppmv	< 0.13 percent
		Total:	0 to 5 percent

Note:
[1]Raphael (1995)

However, these wastes may harbor voids that contain gas mixtures that evolve from the chemical and radiolytic activity of the waste. Core sampling can release these gases. The atmosphere in the drill string in riser 2 was much different than the surrounding headspace. Measurements ranged from 5 percent to 89 percent of the LFL (Raphael 1995). These gas mixtures may be flammable before they are vented and dispersed.

Because no method of detection currently exists, care should be exercised when performing intrusive tank operations. Until a method of detection exists, or the conditions for the formation of these voids is better defined, implementation of flammable gas tank controls on tank 241-S-107 for any intrusive tank work should be strongly considered.

5.5.2 Criticality Evaluation

The safety screening DQO limit for criticality is 34.6 μCi/g (see Table 5-11); it is assessed from the total alpha activity (see Table 5-11). All results from the cores were well below this limit; the largest single result was 3.46 μCi/g and the mean for all samples was 0.90 μCi/g. The maximum upper 95 percent confidence interval limit on the mean from a sample/duplicate pair was 9.17 μCi/g. No individual result from any sample approached the notification limit.

5.5.3 Energetics Evaluation

The safety screening DQO has established a notification limit of -480 J/g (dry weight basis) for the DSC analysis. Of the samples taken from cores 105, 110, and 111, only nine had exothermic responses, and none of those samples had averages exceeding the limit. Several had substantial exotherms, ranging from -20 J/g to -415 J/g (dry). However, for all samples, the average DSC result was below the notification limit.

The calculation of an upper 95 percent confidence limit on the mean value for the sample results was also required by the safety screening DQO. The results of these calculations concluded that no sample had a 95 percent confidence interval upper limit whose magnitude exceeded the safety screening threshold of -480 J/g (dry). The upper limit value was calculated to be -471 J/g (dry). These calculations are in Raphael (1996).

Because no samples exceeded the notification limit, TOC content measurements were not taken. Selected data for individual segments and the composites from the historical DQO results give a range of mean TOC concentrations from 318 μg/g (dry) to 13,800 μg/g (dry). No sample exceeded the notification limit.

5.5.4 Heat Load Calculation

Two other factors in assessing tank waste safety are heat generation and waste temperature. Heat is generated in the tanks from radioactive decay. An estimate of the tank heat load was calculated from the 1995 radionuclide data. Only the radionuclides present in detected quantities were used in the heat load calculation.

Table 5-10 displays the calculated heat load. As shown, the estimated heat load was 3,540 W (12,100 Btu/hr). This value compares relatively well with the 2,730 W (9,330 Btu/hr) estimated from the headspace temperature (Kummerer 1994) and is below the 11,700 W (40,000 Btu/hr) threshold differentiating high-heat from low-heat tanks (Bergmann 1991). This value also compared well with the corrected model estimate of 3,370 W (11,500 Btu/hr)[2]. Because an upper temperature limit is exhibited, it may be concluded that any heat generated from radioactive sources throughout the year is dissipated.

Table 5-10. Tank 241-S-107 Projected Heat Load.

Radionuclide	Curies	Watts
^{137}Cs	2.04E+05	963
^{90}Sr	3.85E+05	2,580
Total	5.89E+05	3,540

Table 5-11 displays the analyte criteria limits for the safety related DQOs and the test plan. The number of results, which exceeded each criterion, are also included. Because the samples in which limits were exceeded have been discussed in the text, they are not addressed in Table 5-11.

[2]Calculational error found in Agnew et al. (1996) model inventory estimate. Errata to be released by Los Alamos National Laboratory.

Table 5-11. Data Quality Objective and Test Plan Decision Variables and Criteria.

Applicable DQO or Test Plan	Applicable Core(s)	Primary Decision Variable	Decision Criteria Threshold	Number Outside Threshold[1]
Safety screening,	All	Total fuel content	-480 J/g	None
Safety screening	All	Percent water[3]	17 weight percent	0
Safety screening	All	Total alpha	34.6 μCi/g; (1 g/L)[2]	None
Safety screening	All	Flammability	25% of the LFL in the headspace	None

Notes:

[1]This column lists the number of sample means outside the limit. Limit excursions for individual samples are discussed in the accompanying text.

[2]Although the actual decision criterion listed in the DQO is 1 g/L, total alpha is measured in μCi/g rather than g/L. To convert the notification limit for total alpha into a number more readily usable by the laboratory, it was assumed that all alpha decay originates from ^{239}Pu. Assuming a tank density of 1.78 (the average value obtained from sampling) and using the specific activity of ^{239}Pu (0.0615 Ci/g), the decision criterion may be converted to 34.6 μCi/g as follows:

$$\left(\frac{1\ \text{g}}{\text{L}}\right)\left(\frac{1\ \text{L}}{10^3\ \text{mL}}\right)\left(\frac{1}{\text{density}}\frac{\text{mL}}{\text{g}}\right)\left(\frac{0.0615\ \text{Ci}}{1\ \text{g}}\right)\left(\frac{10^6\ \mu\text{Ci}}{1\ \text{Ci}}\right) = \frac{61.5}{\text{density}}\frac{\mu\text{Ci}}{\text{g}}$$

[3]Although three samples had mean water contents below 17 weight percent, none of them exhibited exotherms.

This page intentionally left blank.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The waste in tank 241-S-107 was core sampled using the rotary mode in September, 1995. Three DQOs governed the sampling and analysis of cores 105, 110, and 111: the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), the *Interim Data Quality Objectives for Waste Pretreatment and Vitrification* (Kupfer et al. 1994), and the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995). In addition, an internal letter (Kristofzski 1995) directed the laboratories to perform all feasible analyses of the waste samples on an opportunistic basis. Sample analyses were performed at the Westinghouse Hanford Company 222-S Laboratory.

Total alpha activities were approximately 10 percent or less of the safety screening limit. The DSC and TGA measurements were almost always far from their notification limits. Only nine samples observed had detectable exotherms. The DSC value with the greatest magnitude was observed in core 111, segment 8 at -415 J/g (dry); the rest of the exotherms observed were below -106 J/g (dry). The estimated tank heat load of 3,540 W (12,100 Btu/hr) was well below the 11,700 W (40,000 Btu/hr) limit that separates high-heat from low-heat load tanks.

The highest LFL measured from the tank headspace was less than 5.0 percent, which is significantly lower than the 25 percent limit. However, measurements in the drill string suggest that caution be exercised during sampling. There was evidence of gas generation and retention in the sludge. During the course of sampling, a vapor sample obtained from the drill string had a much different composition than the surrounding headspace, suggesting that a void or gas bubble had been disturbed by sampling. This type of structure has long been suspected as a possibility in the wastes, but no evidence of them has been encountered until now. Gases trapped in the waste are released by core sampling and may reach flammable concentrations before being dispersed in the atmosphere. Implementation of flammable gas controls on this tank when performing intrusive tank work is strongly recommended.

Analytical data confirm several assumptions regarding the composition and structure of the waste in the tank and shed new light on several other assumptions. The data reflect that tank 241-S-107 has had an active processing history; many wastes have been introduced to the tank, and it has a high degree of spatial variability. Three distinct regions, with very different chemical and physical properties, exist in the tank. These regions are quantified using the results of the PNNL cluster analysis. The specified groups also correspond to the clusters identified in that study.

The top region (group 1), including the supernatant, accounts for approximately 12 percent of the tank waste by volume (approximately 44 cm [17 in.]). It is made up of mostly soluble species and contains modest concentrations of radionuclides. Specific comparisons with historical predictions were not performed because this waste composition was estimated by the SMM and is not within the scope of the historical DQO at this time. Another observation regarding this material is that there are several species present in elevated

concentrations that were not predicted by Agnew et al. (1996) to be present in substantial quantity (phosphate, oxalate, fluoride, aluminum and chromium). Chromium content in this region is high (16,000 μg/g observed versus 1,380 μg/g expected [Agnew et al. 1996]). The interface layer contacting the supernatant is high in moisture. Moisture content then falls off as a function of depth in the other regions as temperature increases, following expected distribution behavior based on physical principles.

The middle region (groups 2 and 4), accounting for approximately 34 percent of the tank waste by volume (approximately the next 124 cm [49 in.]), agrees with several predictions regarding its physical and chemical properties. It is largely insoluble, very cohesive, and demonstrates high variability. Physical processes, transaction history, and interactions between groups 1 and 3 figure prominently in the observed behavior of the two groups. High levels of zirconium and fluoride were observed. They were anticipated from process history but not in the volumes suggested from sampling. No specific comparisons were performed between model estimates and analytical results because the layers did not meet the configuration criteria established in the historical DQO. However, by inspecting the results, the group 2 data set appears to describe zirconium cladding waste reasonably well.

The bottom region of the tank (group 3) accounts for 54 percent of the waste by volume (approximately the final 198 cm [78 in.]). The sample data gave mixed results when compared against historical prediction. One waste type, REDOX high-level waste, met the volume and configuration criteria for proceeding with historical comparison.

This material is very insoluble and cohesive and has a relatively high radionuclide content. These characteristics agree well with the HDW model predictions, and the waste type passes the gateway analysis. However, several of the specific analytes compare poorly. Chromium, iron, and nitrate do not agree well between predicted and observed values for REDOX high-level waste.

Chromium and nitrate are affected by solubility, and the poor comparison may be the result of a mechanism such as microconvection, analyte washout (for Cr), radiolytic degradation (for NO_3^-) or a poor estimate of solubility in the HDW model. Soluble chromium in substantial quantities would dramatically change the predicted composition of REDOX waste in all tanks. Furthermore, if supported by data from other REDOX tanks, economic and technology assumptions about pretreatment and disposal would be affected. The poor iron comparison has been observed in previous tanks. It is probably from an excessive source term from process corrosion that was used in the HDW model.

Although the predicted and observed aluminum values compared well initially, further analysis revealed a deficiency in the sample preparation and analysis. The waste matrices are highly insoluble, and up to two-thirds of the aluminum in the waste may not have been quantitated by the acid digestion preparation. Therefore, assumptions were made regarding the undetected aluminum and included in the results. When analyzing matrices such as these, fusion preparation may be necessary to achieve complete quantitation. Although the HDW

model predicts coating wastes in the lower region of the tank, no distinct layer was observed; therefore differences between REDOX high-level waste and REDOX coating waste are probably minor.

In summary, the analytical results from the 1995 core sampling show that tank 241-S-107 is safe when compared to the safety screening data quality objectives (Raphael 1995 and 1996). Although some exothermic activity was observed, the fuel content estimate based on the TOC results do not indicate an organic/nitrate problem is present. In addition, adequate moisture is present for samples exhibiting exothermic behavior, thereby reducing the potential for reaction propagation. The tank heat load and headspace flammability were both well below their established limits.

This page intentionally left blank.

7.0 REFERENCES

Agnew, S. F., P. Baca, R. A. Corbin, T. B. Duran, and K. A. Jurgensen, 1995, *Waste Status and Transaction Record Summary for the Northeast Quadrant*, WHC-SD-WM-TI-614, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

Agnew, S. F., J. Boyes, R. A. Corbin, T. B. Duran, J. R. Fitzpatrick, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1996, *Hanford Tank Chemical and Radionuclide Inventories, HDW Model Rev. 3*, LA-UR-96-858 Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

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

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

Bergmann, L. M., 1991, *Single-Shell Tank Isolation Safety Analysis Report*, WHC-SD-WM-SAR-006, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

Brevick, C. H., L. A. Gaddis, and W. W. Pickett, 1994a, *Historical Tank Content Estimate for the Southwest Quadrant of the Hanford 200 East Area*, WHC-SD-WM-ER-352, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

Brevick, C. H., L. A. Gaddis, and A. C. Walsh, 1994b, *Supporting Document for the Southwest Quadrant Historical Tank Contents Estimate Report for S-Tank Farm*, WHC-SD-WM-ER-323, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Brown, J. G., 1978a, *Salt Well Sample 4251*, (internal memo 60120-78-106 to G. A. Olsen, October 16), Rockwell Hanford Operations, Richland, Washington.

Brown, J. G., 1978b, *Analysis of 107-S Cross-Site Transfer Material*, (internal memo 60120-78-091 to K. G. Carothers, September 7), Rockwell Hanford Operations, Richland, Washington.

Brown, T. M., S. J. Eberlein, and T. J. Kunthara, 1995, *Tank Waste Characterization Basis*, WHC-SD-WM-TA-164, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Delegard, C. H., 1980, *Viscosity/Cooling Data for Tanks 107-S and 105-BX Waste Liquors* (Letter 65124-068-80 to D. E. Bowers, January 28), Rockwell Hanford Operations, Richland, Washington.

DeLorenzo, D. J., A. T. DiCenso, D. B. Hiller, K. W. Johnson, J. H. Rutherford, B. C. Simpson, and D. J. Smith, 1994, *Tank Characterization Reference Guide*, WHC-SD-WM-TI-648, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

DOE, 1995, *Hanford Analytical Services Quality Assurance Plan*, DOE/RL-94-55, Rev. 2, U.S. Department of Energy, Richland, Washington.

Dukelow, G. T., J. W. Hunt, H. Babad, and J. E. Meacham, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

Ecology, EPA, and DOE, 1996, *Hanford Federal Facility Agreement and Consent Order,* as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

Hanlon, B. M., 1996, *Waste Tank Summary Report for Month Ending February 29, 1996*, WHC-EP-0182-95, Westinghouse Hanford Company, Richland, Washington.

Herting, D. L., 1980, *Solubility of Phosphate in Defense Waste* (Letter 65453-80-317 to H. J. Eding, October 29), Rockwell Hanford Operations, Richland, Washington.

Horton, J. E., 1975, *Analysis of Sludge from Tank 107-S*, (internal memorandum to W. R. Christensen, February 14), Atlantic Richfield Hanford Company, Richland, Washington.

Jansky, M. T., 1980, *Viscosity/Cooling Curves for Tank 107-S Waste*, (internal letter 65453-80-270 to D. E. Bowers, September 22), Rockwell Hanford Operations, Richland, Washington.

Kelly, S. E., 1995, *Tank 241-S-107 Push Mode Core Sampling and Analysis Plan*, WHC-SD-WM-TSAP-057, Westinghouse Hanford Company, Richland, Washington.

Kristofzski, J. G., 1995, *Directions for Opportunistic Analyses* (Letter 75310-95-103 to J. H. Baldwin, September 13), Westinghouse Hanford Company, Richland, Washington.

Kummerer, M. 1994, *Topical Report on Heat Removal Characteristics of Waste Storage Tanks*, WHC-SD-WM-SARR-010, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Kupfer, M. J., J. M. Conner, R. A. Kirkbride, and J. R. Mobley, 1994, *Interim Data Quality Objectives for Waste Pretreatment and Vitrification*, WHC-SD-WM-DQO-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Kupfer, M. J., W. W. Schultz, and J. T. Slankas, 1995, *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology*, WHC-SD-WM-TA-154, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Lane, T. A., 1978, *Crosscountry Transfer 103/107-S Material*, (internal memo 60120-78-056 to J. O. Honeyman, July 10), Rockwell Hanford Operations, Richland, Washington.

Leach, C. E., and S. M. Stahl, 1993, *Hanford Site Tank Farm Facilities Interim Safety Basis*, WHC-SD-WM-ISB-001, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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

Lumetta, G. J., B. M. Rapko, M. J. Wagner, J. Liu, and Y. L. Chen, 1996, *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY 1996 Studies*, PNNL-11278, Pacific Northwest National Laboratory, Richland, Washington.

NFPA, 1995, *National Fire Codes*, "Laser Fire Protection." National Fire Prevention Association, Quincy, Massachusetts.

Raphael, G. F., 1996, *Final Report for Tank 241-S-107 Push Mode Cores 105, 110, and 111*, WHC-SD-WM-DP-156, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Raphael, G. F., 1995, *45 Day Safety Screening Results for Tank 241-S-107 Push Mode Cores 105, 110, and 111*, WHC-SD-WM-DP-156, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Sant, W.H., 1973, *242-Feed Samples T-178 (11-6-73) 107-S*, (internal memorandum to R. L. Walser, December 7), Atlantic Richfield Hanford Company, Richland, Washington.

Sathyanarayana, L. C. Amato, A. T. DiCenso, J. D. Franklin, K. W. Johnson, G. L. Nuttall, and B. C. Simpson, 1994, *Tank Characterization Report for Single-Shell Tank 241-S-104*, WHC-SD-WM-ER-370, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Simpson, B. C., and D. J. McCain, 1995, *Historical Model Evaluation Data Requirements*, WHC-SD-WM-DQO-018, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Walser, R. L., 1973, *242-Feed Samples T-476 (11-16-73) 107-S*, (internal memorandum to W. H. Sant, December 7), Atlantic Richfield Hanford Company, Richland, Washington.

Winkelman, W. D., 1996, *Technical Basis and Spreadsheet Documentation for Correcting Waste Tank Core Samples for Water Intrusion Based on a LiBr Tracer*, WHC-SD-WM-CSWD-081, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC, 1972, *75-Ft. Composite Tank Sections, 241-S-107*, Drawing H-2-1783, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988, *Piping Waste Tank Isolation, Tank 241-S-107*, Drawing H-2-73186, Rev. 4, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, *Fire Protection Engineering Surveys Instructions*, WHC-IP-0030, Westinghouse Hanford Company, Richland, Washington.

WHC, 1995, *107-S Tank Arrangement As-Built, ECN-706164*, Drawing H-2-37530, Westinghouse Hanford Company, Richland, Washington.

Wheeler, R. E., 1974, *Analysis of Tank Farm Samples T-8078*, (internal memorandum to R. L. Walser, December 17), Atlantic Richfield Hanford Company, Richland, Washington.

APPENDIX A

ANALYTICAL RESULTS FROM 1996 CORE SAMPLING

This page intentionally left blank.

A.0 ANALYTICAL RESULTS FROM 1996 CORE SAMPLING

A.1 INTRODUCTION

Appendix A reports the chemical, radiochemical and physical characteristics of tank 241-S-107 in table form and in terms of the specific concentrations of metals, ions, radionuclides, and physical properties.

Each data table lists the following: laboratory sample identification; sample origin (core/segment/subsegment); an original and duplicate result for each sample; a sample mean; a mean for the tank in which both core means are weighted equally; an RSD (mean); and a projected tank inventory for the particular analyte using the weighted mean and the appropriate conversion factors. The projected tank inventory column is not applicable to the percent water, DSC, or specific gravity data. The data are listed in standard notation for values greater than 0.001 and less than 100,000. Values outside these limits are listed in scientific notation.

The tables are numbered A-1 through A-57. A description of the units and symbols used in the analyte tables and the references used in compiling the analytical data (Raphael 1996) are found in the List of Terms and Section 7.0, respectively. For information on sampling rationale, locations, and descriptions of sampling events, see Section 3.0.

A.2 ANALYTE TABLE DESCRIPTION

The "Sample Number" column lists the laboratory sample for which the analyte was measured.

Column two specifies the core and segment from which each sample was derived.

Column three specifies the subsegment or whole segment for which the analyte was measured.

The Result and Duplicate columns are self-explanatory. The "Sample Mean" column is the average of the result and duplicate values. If the result and duplicate values were both nondetected or detected, then the mean is expressed as a nondetected or detected value, respectively. If one of the two values is nondetected and one is detected, then the sample mean is reported as a detected value. The result and duplicate values, as well as the result/duplicate means, are reported in the tables exactly as found in the original laboratory data package. The means may appear to have been rounded up in some cases and rounded down in others. This is because the analytical results given in the tables may have fewer significant figures than originally reported, not because the means were incorrectly calculated.

The overall (or analyte concentration) means for the waste in tank 241-S-107 were calculated as follows:

The drainable liquid means were calculated by averaging the sample means from the top two core segments for each core, and then averaging the three core means to obtain the overall mean. Similar to the discussion above regarding the sample and duplicate means, if 50 percent or more of the individual sample and duplicate results were detected, then the overall mean was expressed as a detected value. If greater than 50 percent of the individual results were nondetected, then the overall mean was expressed as a nondetected value.

To obtain the overall weighted mean for the sludge portion of the tank contents, the individual sample result and duplicate pairs were first averaged. The sample means within a given subsegment (upper half, lower half, or whole) were then averaged to obtain a subsegment mean. The subsegment means within a given segment were then averaged to obtain a segment mean, the segment means within a given core were averaged to obtain a core mean, and finally the three core means were averaged to obtain the overall mean. Not all of these steps are necessary for each analyte or for each subsegment, but the procedure to be followed is the same. Values from Segment 3A, Core 110 were not included in calculations because of sampling irregularities. All other values, including those below the detection level (indicated by the less-than symbol, <) were used in calculating the overall means. The incorporation of nondetected results provides the most conservative concentration. The same 50 percent rule specified for the drainable liquid results above also applies to the sludge data. Because the use of nondetected data in the means and inventory estimates causes a high bias, the results should be used with caution.

The RSD (mean) (in percent) is 100 times the standard deviation of the mean divided by the overall tank mean. The standard deviation of the mean was estimated using standard analysis of variance (ANOVA) statistical techniques. If the overall mean for a given analyte was detected, then an RSD (mean) was also calculated for that analyte using all the available data, because using nondetected results in the mean calculation also requires their use in the RSD (mean) calculations. Whereas, the use of nondetected results in mean calculations produces a known high bias, using these values in statistical calculations creates an unknown bias. Thus, the RSD (mean) estimates and the ANOVA results should be used with caution.

The projected inventory is the product of the overall analyte concentration mean, the volume of tank waste (1,370 kL or 53 kL for the sludge or drainable liquid portions, respectively), the density, where applicable (1.78 and 1.24 g/mL for the sludge or drainable liquid portions, respectively), and the appropriate conversion factors.

The four quality control (QC) parameters assessed on the tank 241-S-107 samples were standard recoveries, spike recoveries, duplicate analyses (RPDs), and blanks. These were summarized in Section 5.1.2, and more specific information is provided in the following

appendix tables. Sample and duplicate pairs in which any of the quality control parameters were outside their specified limits are superscripted in column 6 as follows:

QC:a -- indicates that the standard recovery was below the quality control range.

QC:b -- indicates that the standard recovery was above the quality control range.

QC:c -- indicates that the spike recovery was below the quality control range.

QC:d -- indicates that the spike recovery was above the quality control range.

QC:e -- indicates that the RPD was greater than the quality control limit range.

QC:f -- indicates that there was blank contamination.

Table A-1. Tank 241-S-107 Analytical Results: Aluminum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	47,200	44,900	46,050	49,700	16.2	121,000
S95T002914		Lower ½	20,500	19,300	19,900			
S95T002702	105:3	Upper ½	16,614	15,320.7	15,967.4			
S95T002701		Lower ½	14,006.3	13,811.4	13,908.8			
S95T002704	105:4	Upper ½	30,500	28,900	29,700			
S95T002703		Lower ½	31,200	48,500	39,850			
S95T002706	105:5	Upper ½	41,251.5	37,315.6	39,283.6			
S95T002705		Lower ½	47,074.3	47,527.8	47,301.1			
S95T002708	105:6	Upper ½	26,712.3	30,414.6	28,563.4			
S95T002707		Lower ½	20,395.6	18,902.6	19,649.1			
S95T002710	105:7	Upper ½	22,512.4	29,143.9	25,828.2			
S95T002709		Lower ½	34,717.6	63,957.7	49,337.6[QC:e]			
S95T002712	105:8	Upper ½	1.290E+05	51,000	90,000[QC:e]			
S95T002711		Lower ½	42,500	16,300	29,400			
S95T002752	110:2	Lower ½	27,700	24,500	26,100			
S95T002756	110:3	Upper ½	27,600	25,100	26,350			
S95T002755		Lower ½	31,400	34,800	33,100			
S95T002758	110:4	Upper ½	67,400	63,700	65,550			
S95T002757		Lower ½	95,800	78,500	87,150			
S95T002760	110:5	Upper ½	30,600	76,200	53,400			
S95T002759		Lower ½	34,900	92,900	63,900			

Table A-1. Tank 241-S-107 Analytical Results: Aluminum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	1.350E+05	1.210E+05	1.280E+05			
S95T002761		Lower ½	24,600	36,400	30,500			
S95T002764	110:7	Upper ½	39,000	38,700	38,850			
S95T002763		Lower ½	67,600	64,800	66,200			
S95T002766	110:8	Upper ½	1.280E+05	1.240E+05	1.260E+05			
S95T002765		Lower ½	71,400	79,100	75,250			
S95T002754	110:3A	Upper ½	15,600	13,800	14,700			
S95T002753		Lower ½	22,900	22,700	22,800			
S95T002810	111:2	Lower ½	47,500	39,900	43,700			
S95T002811	111:3	Upper ½	19,000	19,400	19,200			
S95T002812		Lower ½	16,800	14,700	15,750			
S95T002814	111:4	Upper ½	43,700	42,400	43,050			
S95T002813		Lower ½	77,600	68,200	72,900			
S95T002816	111:5	Upper ½	64,800	60,700	62,750			
S95T002815		Lower ½	49,900	48,200	49,050			
S95T002818	111:6	Upper ½	88,500	31,400	59,950			
S95T002817		Lower ½	25,700	24,400	25,050			
S95T002820	111:7	Upper ½	19,100	60,300	39,700			
S95T002819		Lower ½	68,000	68,900	68,450			

Table A-1. Tank 241-S-107 Analytical Results: Aluminum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	1.100E+05	86,000	98,000			
S95T002822		C	77,500	78,500	78,000			
S95T002821		D	49,500	52,400	50,950			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	2,560	2,340	2,450[QC:c]			
S96T003302	105:3	Upper ½	3,390	3,230	3,310			
S96T003303	105:4	Upper ½	7,980	7,640	7,810[QC:d]			
S96T003304	105:5	Lower ½	5,570	5,810	5,690			
S96T003305	105:8	Lower ½	2,830	2,620	2,720			
S96T003276	110:2	Lower ½	4,670	4,130	4,400[QC:e]			
S96T003277	110:3	Upper ½	2,000	6,200	4,100			
S96T003278	110:4	Upper ½	7,460	8,100	7,780[QC:d]			
S96T003279	110:5	Lower ½	3,840	3,810	3,820[QC:c]			
S96T003280	110:8	Lower ½	4,280	4,700	4,490			
S96T003247	111:2	Lower ½	2,840	2,870	2,860			
S96T003258	111:3	Upper ½	1,620	1,450	1,540[QC:e]			
S96T003259	111:4	Upper ½	4,320	4,300	4,180			
S96T003260	111:5	Lower ½	5,950	4,860	5,400[QC:d,e]			
S96T003261	111:8	Lower ½	4,370	4,310	4,340[QC:d]			

Table A-1. Tank 241-S-107 Analytical Results: Aluminum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	58,800	49,200	54,000	59,400		145,000
S95T003156	110	N/A	70,200	64,000	67,100			
S95T003162	111	N/A	57,300	56,800	57,050			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	3,010	4,680	3,840[QC:c]			
S95T003281	110	N/A	4,150	3,880	4,020			
Liquids			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	8,295.59	7,971.78	8,133.68	7,730		410
S95T002446	105:2	DL	6,743.58	6,787.93	6,765.75			
S95T002601	110:1	DL	7,836.19	7,665.31	7,750.75			
S95T002602	110:2	DL	8,427.77	8,810.4	8,619.08			
S95T002629	111:1	DL	7,907.63	8,266.98	8,087.31			
S95T002632	111:2	DL	7,082.52	6,971.25	7,026.88			

Table A-2. Tank 241-S-107 Analytical Results: Antimony. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	25.2	22.1	23.65[QC:a,c]	< 24.8	N/A	< 60.5
S95T002914		Lower ½	26.9	24.4	25.65[QC:a]			
S95T002702	105:3	Upper ½	< 85.28	< 87.48	< 86.4			
S95T002701		Lower ½	< 92.98	< 93.02	< 93			
S95T002704	105:4	Upper ½	< 9.72	< 9.23	< 9.48[QC:a]			
S95T002703		Lower ½	< 15.7	< 14.6	< 15.2[QC:a]			
S95T002706	105:5	Upper ½	< 62.6	< 55.4	< 59[QC:a,c]			
S95T002705		Lower ½	< 97.16	< 97.7	< 97.4[QC:a]			
S95T002708	105:6	Upper ½	< 14.84	< 16.64	< 15.7[QC:c]			
S95T002707		Lower ½	< 28.9	< 31.48	< 30.2			
S95T002710	105:7	Upper ½	< 39.36	< 35.94	< 37.7[QC:a]			
S95T002709		Lower ½	< 35.38	< 37.48	< 36.4[QC:a]			
S95T002712	105:8	Upper ½	< 25.4	< 24.5	< 25.0[QC:a]			
S95T002711		Lower ½	< 10.2	< 10.3	< 10.3[QC:a]			
S95T002752	110:2	Lower ½	< 24.3	< 25.9	< 25.1[QC:a]			
S95T002756	110:3	Upper ½	< 23.6	< 21.0	< 22.3[QC:a,c]			
S95T002755		Lower ½	< 24.6	< 24.5	< 24.6[QC:a]			
S95T002758	110:4	Upper ½	< 12.3	< 13.9	< 13.1[QC:a,c]			
S95T002757		Lower ½	< 19.3	< 18.9	< 19.1[QC:a]			
S95T002760	110:5	Upper ½	< 10.8	< 13.4	< 12.1[QC:a,c]			
S95T002759		Lower ½	< 12.9	< 11.8	< 12.4[QC:a]			

Table A-2. Tank 241-S-107 Analytical Results: Antimony. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 22.8	< 20.8	< 21.8[QC:a]			
S95T002761		Lower ½	< 10.6	< 11.9	< 11.3[QC:a,c]			
S95T002764	110:7	Upper ½	< 9.91	< 10.8	< 10.4[QC:a]			
S95T002763		Lower ½	< 10.4	< 9.8	< 10.1[QC:a]			
S95T002766	110:8	Upper ½	< 24.1	< 23.4	< 23.8[QC:a]			
S95T002765		Lower ½	< 11.0	< 10.2	< 10.6[QC:a]			
S95T002754	110:3A	Upper ½	< 51.2	< 73.8	< 62.5[QC:a,c]			
S95T002753		Lower ½	< 43.9	< 42.6	< 43.3[QC:a]			
S95T002810	111:2	Lower ½	< 22.6	< 20.4	< 21.5[QC:a]			
S95T002811	111:3	Upper ½	< 11.2	< 11.5	< 11.4[QC:a]			
S95T002812		Lower ½	< 24.4	< 21.2	< 22.8[QC:a,c]			
S95T002814	111:4	Upper ½	< 19.3	< 18.7	< 19.0[QC:a]			
S95T002813		Lower ½	< 11.3	< 10.1	< 10.7[QC:a,c]			
S95T002816	111:5	Upper ½	< 17.9	< 16.8	< 17.4[QC:a]			
S95T002815		Lower ½	< 8.95	< 8.6	< 8.78[QC:a]			
S95T002818	111:6	Upper ½	< 19.5	< 19.4	< 19.5[QC:a]			
S95T002817		Lower ½	< 9.23	< 8.72	< 8.98[QC:a]			
S95T002820	111:7	Upper ½	< 11.6	< 13.6	< 12.6[QC:a,c]			
S95T002819		Lower ½	< 9.77	< 9.69	< 9.73[QC:a]			

Table A-2. Tank 241-S-107 Analytical Results: Antimony. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 16.9	< 15.5	< 16.2[QC:a]			
S95T002822		C	< 10.5	< 9.39	< 9.95[QC:a,e]			
S95T002821		D	< 12.1	< 13.5	< 12.8[QC:a]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 27.10	< 24.8	< 26.0			
S96T003302	105:3	Upper ½	< 53.00	< 50.7	< 51.9			
S96T003303	105:4	Upper ½	< 32.90	< 34.8	< 33.9			
S96T003304	105:5	Lower ½	< 22.70	< 26.5	< 24.6			
S96T003305	105:8	Lower ½	< 22.50	< 23.1	< 22.8			
S96T003276	110:2	Lower ½	< 42.50	< 42.0	< 42.3			
S96T003277	110:3	Upper ½	< 44.10	< 46.5	< 45.3			
S96T003278	110:4	Upper ½	< 23.00	< 22.8	< 22.9			
S96T003279	110:5	Lower ½	< 11.40	< 11.6	< 11.5			
S96T003280	110:8	Lower ½	< 25.30	< 23.5	< 24.4			
S96T003247	111:2	Lower ½	< 23.10	< 23.7	< 23.4			
S96T003258	111:3	Upper ½	< 36.20	< 33.6	< 34.9			
S96T003259	111:4	Upper ½	< 24.00	< 25.8	< 24.9			
S96T003260	111:5	Lower ½	< 22.40	< 25.2	< 23.8			
S96T003261	111:8	Lower ½	< 26.4	< 25.8	< 26.1			

Table A-2. Tank 241-S-107 Analytical Results: Antimony. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 26.6	< 25.5	< 26.1[QC:a]	< 25.6	N/A	< 62.8
S95T003156	110	N/A	< 23.4	< 23.7	< 23.6[QC:a]			
S95T003162	111	N/A	< 28.0	< 26.4	< 27.2[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 25.90	< 24.3	< 25.1			
S95T003281	110	N/A	< 22.40	< 23.9	< 23.2			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 80.2	< 80.2	< 80.2	< 70.9	N/A	< 3.75
S95T002446	105:2	DL	< 24.1	< 24.1	< 24.1			
S95T002601	110:1	DL	< 80.2	< 80.2	< 80.2			
S95T002602	110:2	DL	< 80.2	< 80.2	< 80.2			
S95T002629	111:1	DL	< 80.2	< 80.2	< 80.2			
S95T002632	111:2	DL	< 80.2	< 80.2	< 80.2			

Table A-3. Tank 241-S-107 Analytical Results: Arsenic. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	< 17.1	< 23.4	< 20.3[QC:e]	< 24.2	N/A	< 58.9
S95T002914		Lower ½	< 40.5	< 37.5	< 39			
S95T002702	105:3	Upper ½	< 21.32	< 21.87	< 21.6			
S95T002701		Lower ½	< 23.245	< 23.255	< 23.25			
S95T002704	105:4	Upper ½	< 16.2	< 15.4	< 15.8			
S95T002703		Lower ½	< 26.2	< 24.4	< 25.3			
S95T002706	105:5	Upper ½	< 15.65	< 13.85	< 14.8[QC:a,e]			
S95T002705		Lower ½	28.1926	33.0962	30.6444[QC:a,e]			
S95T002708	105:6	Upper ½	< 3.71	< 4.16	< 3.94[QC:e]			
S95T002707		Lower ½	< 7.225	< 7.87	< 7.55			
S95T002710	105:7	Upper ½	< 9.84	< 8.985	< 9.41			
S95T002709		Lower ½	< 8.845	< 9.37	< 9.11			
S95T002712	105:8	Upper ½	< 42.3	< 40.9	< 41.6[QC:a]			
S95T002711		Lower ½	< 17.0	< 17.1	< 17.1[QC:a]			
S95T002752	110:2	Lower ½	< 40.5	< 43.2	< 41.9			
S95T002756	110:3	Upper ½	< 39.4	< 35.2	< 37.3[QC:a,e]			
S95T002755		Lower ½	< 41.0	< 40.8	< 40.9[QC:a]			
S95T002758	110:4	Upper ½	< 20.6	< 23.2	< 21.9[QC:a,e]			
S95T002757		Lower ½	< 32.1	< 31.4	< 31.8[QC:a]			
S95T002760	110:5	Upper ½	< 17.9	< 22.4	< 20.2[QC:e]			
S95T002759		Lower ½	< 21.5	< 19.6	< 20.6[QC:a]			

Table A-3. Tank 241-S-107 Analytical Results: Arsenic. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 38	< 34.7	< 36.4			
S95T002761		Lower ½	< 17.7	< 19.8	< 18.8[QC:e]			
S95T002764	110:7	Upper ½	< 16.5	< 17.8	< 17.2			
S95T002763		Lower ½	< 17.3	< 16.3	< 16.8			
S95T002766	110:8	Upper ½	< 40.2	< 39	< 39.6			
S95T002765		Lower ½	< 18.3	< 16.9	< 17.6			
S95T002754	110:3A	Upper ½	< 85.4	< 123	< 104.2[QC:a,e]			
S95T002753		Lower ½	< 73.2	< 70.9	< 72.1			
S95T002810	111:2	Lower ½	< 37.6	< 33.9	< 35.8[QC:a]			
S95T002811	111:3	Upper ½	< 18.7	< 19.2	< 19.0[QC:a]			
S95T002812		Lower ½	< 40.7	< 35.3	< 38.0[QC:a,e]			
S95T002814	111:4	Upper ½	< 32.1	< 31.1	< 31.6			
S95T002813		Lower ½	< 18.8	< 16.8	< 17.8[QC:a,e]			
S95T002816	111:5	Upper ½	< 29.9	< 28	< 29.0			
S95T002815		Lower ½	< 14.9	< 14.3	< 14.6			
S95T002818	111:6	Upper ½	< 32.6	< 32.3	< 32.5			
S95T002817		Lower ½	< 15.4	< 14.5	< 15.0			
S95T002820	111:7	Upper ½	< 19.4	< 22.7	< 21.1[QC:e]			
S95T002819		Lower ½	< 16.3	< 16.1	< 16.2			

Table A-3. Tank 241-S-107 Analytical Results: Arsenic. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 28.1	< 25.8	< 27.0			
S95T002822		C	< 17.5	< 15.6	< 16.6[QC:e]			
S95T002821		D	< 20.2	< 22.6	< 21.4[QC:e]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.1			
S96T003280	110:8	Lower ½	< 42.20	< 39.2	< 40.7			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5			

Table A-3. Tank 241-S-107 Analytical Results: Arsenic. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 44.3	< 42.7	< 43.5	< 42.7	N/A	< 105
S95T003156	110	N/A	< 39.1	< 39.5	< 39.3			
S95T003162	111	N/A	< 46.6	< 43.9	< 45.3			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	< 37.40	< 39.9	< 38.7			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 20.05	< 20.05	< 20.05	< 23.4		< 1.24
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 20.05	< 20.05	< 20.05			
S95T002602	110:2	DL	< 20.05	< 20.05	< 20.05			
S95T002629	111:1	DL	< 20.05	< 20.05	< 20.05			
S95T002632	111:2	DL	< 20.05	< 20.05	< 20.05			

Table A-4. Tank 241-S-107 Analytical Results: Barium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	16.2	15.2	15.7	22.2	9.2	54.1
S95T002914		Lower ½	< 20.4	< 18.8	< 19.6			
S95T002702	105:3	Upper ½	54.3147	52.4401	53.3774			
S95T002701		Lower ½	38.2302	37.8296	38.0299			
S95T002704	105:4	Upper ½	< 8.10	< 7.69	< 7.90			
S95T002703		Lower ½	13.5	15.3	14.4[QC:e]			
S95T002706	105:5	Upper ½	18.0673	18.1258	18.0966			
S95T002705		Lower ½	47.8302	47.9176	47.8739			
S95T002708	105:6	Upper ½	< 3.71	< 4.16	< 3.94[QC:e]			
S95T002707		Lower ½	< 7.225	< 7.87	< 7.55			
S95T002710	105:7	Upper ½	18.2732	20.9664	19.6198[QC:e]			
S95T002709		Lower ½	17.9735	23.5992	20.7863[QC:e]			
S95T002712	105:8	Upper ½	39.8	22.1	30.95[QC:a,e]			
S95T002711		Lower ½	26.0	20.6	23.3[QC:a,e]			
S95T002752	110:2	Lower ½	29.9	24.4	27.15[QC:e]			
S95T002756	110:3	Upper ½	38.5	39.5	39.0[QC:a]			
S95T002755		Lower ½	28.4	35.4	31.9[QC:a,e]			
S95T002758	110:4	Upper ½	19.8	19.1	19.45[QC:a]			
S95T002757		Lower ½	< 16.2	< 15.7	< 16.0[QC:a]			
S95T002760	110:5	Upper ½	< 8.97	< 11.2	< 10.1[QC:e]			
S95T002759		Lower ½	< 10.7	< 9.81	< 10.3[QC:a]			

Table A-4. Tank 241-S-107 Analytical Results: Barium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 19.0	< 17.4	< 18.2			
S95T002761		Lower ½	< 8.85	< 9.88	< 9.37			
S95T002764	110:7	Upper ½	15.1	14.9	15.0			
S95T002763		Lower ½	22.7	21.8	22.25			
S95T002766	110:8	Upper ½	40.7	39.3	40.0			
S95T002765		Lower ½	35.1	39.1	37.1			
S95T002754	110:3A	Upper ½	52.3	< 61.5	56.9[QC:a,e]			
S95T002753		Lower ½	48.9	49.8	49.35			
S95T002810	111:2	Lower ½	21.4	18.1	< 19.8[QC:e]			
S95T002811	111:3	Upper ½	12.7	13.0	12.85			
S95T002812		Lower ½	31.9	28.6	30.25			
S95T002814	111:4	Upper ½	< 16.1	< 15.6	< 15.9			
S95T002813		Lower ½	< 9.41	< 8.38	< 8.90[QC:e]			
S95T002816	111:5	Upper ½	< 14.9	< 14.0	< 14.5			
S95T002815		Lower ½	< 7.46	< 7.18	< 7.32			
S95T002818	111:6	Upper ½	< 16.3	< 16.1	< 16.2			
S95T002817		Lower ½	< 7.69	< 7.27	< 7.48			
S95T002820	111:7	Upper ½	14.9	23.3	19.1[QC:e]			
S95T002819		Lower ½	23.8	24.1	23.95			

Table A-4. Tank 241-S-107 Analytical Results: Barium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	52.2	46.4	49.3[QC:e]			
S95T002822		C	57.5	56.3	56.9			
S95T002821		D	28.5	30.1	29.3			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 22.60	< 20.7	< 21.7			
S96T003302	105:3	Upper ½	< 44.20	< 42.3	< 43.3			
S96T003303	105:4	Upper ½	< 27.40	< 29.0	< 28.2			
S96T003304	105:5	Lower ½	< 18.90	< 22.1	< 20.5			
S96T003305	105:8	Lower ½	< 18.70	< 19.3	< 19.0			
S96T003276	110:2	Lower ½	< 35.40	< 35.0	< 35.2			
S96T003277	110:3	Upper ½	< 36.80	< 38.7	< 37.8			
S96T003278	110:4	Upper ½	< 19.20	< 19.0	< 19.1			
S96T003279	110:5	Lower ½	< 95.20	< 97.0	< 96.1			
S96T003280	110:8	Lower ½	< 21.10	< 19.6	< 20.4			
S96T003247	111:2	Lower ½	< 19.20	< 19.8	< 19.5			
S96T003258	111:3	Upper ½	< 30.10	< 28.0	< 29.1			
S96T003259	111:4	Upper ½	< 20.00	< 21.5	< 21.0			
S96T003260	111:5	Lower ½	< 18.60	< 21.0	< 19.8			
S96T003261	111:8	Lower ½	< 22.00	< 21.5	< 21.8			

Table A-4. Tank 241-S-107 Analytical Results: Barium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 22.2	< 21.3	< 21.8[QC:a]	< 21.4	N/A	< 52.4
S95T003156	110	N/A	< 19.5	< 19.8	< 19.7[QC:a]			
S95T003162	111	N/A	< 23.3	< 22.0	< 22.7[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 21.60	< 20.2	< 20.9			
S95T003281	110	N/A	< 18.70	< 19.9	< 19.3			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 20.05	< 20.05	< 20.05	< 20.1	N/A	< 1.06
S95T002446	105:2	DL	< 20.05	< 20.05	< 20.05			
S95T002601	110:1	DL	< 20.05	< 20.05	< 20.05			
S95T002602	110:2	DL	< 20.05	< 20.05	< 20.05			
S95T002629	111:1	DL	< 20.05	< 20.05	< 20.05			
S95T002632	111:2	DL	< 20.05	< 20.05	< 20.05			

Table A-5. Tank 241-S-107 Analytical Results: Beryllium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	1.13	< 1.17	1.15	< 1.43	N/A	< 3.49
S95T002914		Lower ½	< 2.04	< 1.88	< 1.96			
S95T002702	105:3	Upper ½	< 2.132	< 2.187	< 2.16			
S95T002701		Lower ½	3.4593	3.4317	3.4455			
S95T002704	105:4	Upper ½	< 0.810	< 0.769	< 0.790			
S95T002703		Lower ½	< 1.31	< 1.22	< 1.27			
S95T002706	105:5	Upper ½	< 1.565	< 1.385	< 1.48[QC:e]			
S95T002705		Lower ½	3.2287	3.3108	3.26975			
S95T002708	105:6	Upper ½	< 0.371	< 0.416	< 0.394[QC:e]			
S95T002707		Lower ½	< 0.7225	< 0.787	< 0.755			
S95T002710	105:7	Upper ½	< 0.984	< 0.8985	< 0.941			
S95T002709		Lower ½	< 0.8845	< 0.937	< 0.911			
S95T002712	105:8	Upper ½	< 2.11	< 2.04	< 2.08			
S95T002711		Lower ½	< 0.852	< 0.855	< 0.854			
S95T002752	110:2	Lower ½	< 2.03	< 2.16	< 2.10			
S95T002756	110:3	Upper ½	2.81	2.81	2.81			
S95T002755		Lower ½	< 2.05	< 2.04	< 2.05			
S95T002758	110:4	Upper ½	< 1.03	< 1.16	< 1.10[QC:e]			
S95T002757		Lower ½	< 1.62	< 1.57	< 1.60			
S95T002760	110:5	Upper ½	< 0.897	< 1.12	< 1.01[QC:e]			
S95T002759		Lower ½	< 1.07	< 0.981	< 1.03			

Table A-5. Tank 241-S-107 Analytical Results: Beryllium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 1.90	< 1.74	< 1.82			
S95T002761		Lower ½	< 0.885	< 0.988	< 0.9365			
S95T002764	110:7	Upper ½	< 0.826	< 0.888	< 0.857			
S95T002763		Lower ½	< 0.867	< 0.817	< 0.842			
S95T002766	110:8	Upper ½	< 2.01	< 1.95	< 1.98			
S95T002765		Lower ½	< 0.916	< 0.847	< 0.882			
S95T002754	110:3A	Upper ½	< 4.27	< 6.15	< 5.21[QC:e]			
S95T002753		Lower ½	< 3.66	< 3.55	< 3.61			
S95T002810	111:2	Lower ½	< 1.88	< 1.7	< 1.79			
S95T002811	111:3	Upper ½	< 0.935	< 0.959	< 0.947			
S95T002812		Lower ½	< 2.04	< 1.76	< 1.9[QC:e]			
S95T002814	111:4	Upper ½	< 1.61	< 1.56	< 1.59			
S95T002813		Lower ½	< 0.941	< 0.838	< 0.890[QC:e]			
S95T002816	111:5	Upper ½	< 1.49	< 1.4	< 1.45			
S95T002815		Lower ½	< 0.746	< 0.718	< 0.732			
S95T002818	111:6	Upper ½	< 1.63	< 1.61	< 1.62			
S95T002817		Lower ½	< 0.769	< 0.727	< 0.748			
S95T002820	111:7	Upper ½	< 0.970	< 1.14	< 1.06[QC:e]			
S95T002819		Lower ½	< 0.814	< 0.807	< 0.811			

Table A-5. Tank 241-S-107 Analytical Results: Beryllium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 1.41	< 1.29	< 1.35			
S95T002822		C	< 0.877	< 0.782	< 0.830[QC:e]			
S95T002821		D	< 1.01	< 1.12	< 1.07			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 2.260	< 2.07	< 21.7			
S96T003302	105:3	Upper ½	< 4.420	< 4.23	< 4.33			
S96T003303	105:4	Upper ½	< 2.740	< 2.90	< 2.33			
S96T003304	105:5	Lower ½	< 1.890	< 2.21	< 2.05			
S96T003305	105:8	Lower ½	< 1.870	< 1.93	< 19.0			
S96T003276	110:2	Lower ½	< 3.540	< 3.50	< 3.52			
S96T003277	110:3	Upper ½	< 3.680	< 3.87	< 3.78			
S96T003278	110:4	Upper ½	< 1.920	< 1.90	< 1.91			
S96T003279	110:5	Lower ½	< 0.952	< 0.970	< 0.961			
S96T003280	110:8	Lower ½	< 2.110	< 1.96	< 2.04			
S96T003247	111:2	Lower ½	< 1.920	< 1.98	< 1.95			
S96T003258	111:3	Upper ½	< 3.010	< 2.80	< 2.91			
S96T003259	111:4	Upper ½	< 2.000	< 2.15	< 2.08			
S96T003260	111:5	Lower ½	< 1.860	< 2.10	< 1.98			
S96T003261	111:8	Lower ½	< 2.200	< 2.15	< 2.18			

Table A-5. Tank 241-S-107 Analytical Results: Beryllium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 2.22	< 2.13	< 2.18	< 2.14	N/A	< 5.24
S95T003156	110	N/A	< 1.95	< 1.98	< 1.97			
S95T003162	111	N/A	< 2.33	< 2.2	< 2.27			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 2.16	< 2.02	< 2.09			
S95T003281	110	N/A	< 1.870	< 1.99	< 1.93			
Liquids			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 2.005	< 2.005	< 2.005	< 2.01	N/A	< 0.106
S95T002446	105:2	DL	< 2.00	< 2.00	< 2.00			
S95T002601	110:1	DL	< 2.005	< 2.005	< 2.005			
S95T002602	110:2	DL	< 2.005	< 2.005	< 2.005			
S95T002629	111:1	DL	< 2.005	< 2.005	< 2.005			
S95T002632	111:2	DL	< 2.005	< 2.005	< 2.005			

Table A-6. Tank 241-S-107 Analytical Results: Bismuth. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	193	174	183.5[QC:a]	< 41.3	N/A	< 101
S95T002914		Lower ½	171	162	166.5[QC:a]			
S95T002702	105:3	Upper ½	56.0238	72.8436	64.4337[QC:e]			
S95T002701		Lower ½	< 46.49	< 46.51	< 46.5			
S95T002704	105:4	Upper ½	< 16.2	< 15.4	< 15.8[QC:a]			
S95T002703		Lower ½	< 26.2	< 24.4	< 25.3[QC:a]			
S95T002706	105:5	Upper ½	< 31.3	< 27.7	< 29.5[QC:a,e]			
S95T002705		Lower ½	< 48.58	< 48.85	< 48.7[QC:a]			
S95T002708	105:6	Upper ½	< 7.42	< 8.32	< 7.87[QC:e]			
S95T002707		Lower ½	< 14.45	< 15.74	< 15.1			
S95T002710	105:7	Upper ½	< 19.68	< 17.97	< 18.8			
S95T002709		Lower ½	< 17.69	< 18.74	< 18.2			
S95T002712	105:8	Upper ½	< 42.3	< 40.9	< 41.6[QC:a]			
S95T002711		Lower ½	< 17.0	< 17.1	< 17.1[QC:a]			
S95T002752	110:2	Lower ½	178	151	164.5[QC:a,e]			
S95T002756	110:3	Upper ½	< 39.4	< 35.2	< 37.3[QC:a,e]			
S95T002755		Lower ½	< 41.0	< 40.8	< 40.9[QC:a]			
S95T002758	110:4	Upper ½	< 20.6	< 23.2	< 21.9[QC:a,e]			
S95T002757		Lower ½	< 32.1	< 31.4	< 31.8[QC:a]			
S95T002760	110:5	Upper ½	< 17.9	< 22.4	< 20.2[QC:a,e]			
S95T002759		Lower ½	< 21.5	< 19.6	< 20.6[QC:a]			

Table A-6. Tank 241-S-107 Analytical Results: Bismuth. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 38.0	< 34.7	< 36.4			
S95T002761		Lower ½	< 17.7	< 19.8	< 18.8[QC:a,e]			
S95T002764	110:7	Upper ½	< 16.5	< 17.8	< 17.2			
S95T002763		Lower ½	< 17.3	< 16.3	< 16.8			
S95T002766	110:8	Upper ½	< 40.2	< 39	< 39.6			
S95T002765		Lower ½	< 18.3	< 16.9	< 17.6			
S95T002754	110:3A	Upper ½	< 85.4	< 123	< 104.2[QC:a,e]			
S95T002753		Lower ½	< 73.2	< 70.9	< 72.05[QC:a]			
S95T002810	111:2	Lower ½	182	163	172.5[QC:a,e]			
S95T002811	111:3	Upper ½	29.7	30.4	30.05[QC:a]			
S95T002812		Lower ½	< 40.7	< 35.3	< 38.0[QC:a,e]			
S95T002814	111:4	Upper ½	< 32.1	< 31.1	< 31.6[QC:a]			
S95T002813		Lower ½	< 18.8	< 16.8	< 17.8[QC:a,e]			
S95T002816	111:5	Upper ½	< 29.9	< 28	< 29.0[QC:a]			
S95T002815		Lower ½	< 14.9	< 14.3	< 14.6[QC:a]			
S95T002818	111:6	Upper ½	< 32.6	< 32.3	< 32.5			
S95T002817		Lower ½	< 15.4	< 14.5	< 15.0[QC:a]			
S95T002820	111:7	Upper ½	< 19.4	< 22.7	< 21.1[QC:e]			
S95T002819		Lower ½	< 16.3	< 16.1	< 16.2			

Table A-6. Tank 241-S-107 Analytical Results: Bismuth. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 28.1	< 25.8	< 27.0			
S95T002822		C	< 17.5	< 17.5	< 17.5			
S95T002821		D	< 20.2	< 22.6	< 21.4[QC:e]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.2			
S96T003280	110:8	Lower ½	< 42.20	< 39.2	< 40.7			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.0	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5			

Table A-6. Tank 241-S-107 Analytical Results: Bismuth. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 44.3	< 42.7	< 43.5[QC:a]	< 42.7	N/A	< 1.05
S95T003156	110	N/A	< 39.1	< 39.5	< 39.3[QC:a]			
S95T003162	111	N/A	< 46.6	< 43.9	< 45.3[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	< 37.40	< 39.9	< 38.7			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 40.1	N/A	< 2.12
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 40.1	< 40.1	< 40.1			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-7. Tank 241-S-107 Analytical Results: Boron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	79.9	73.0	76.45	141	27.4	344
S95T002914		Lower ½	204	167	185.5[QC:e]			
S95T002702	105:3	Upper ½	61.5149	66.6812	64.0981[QC:b]			
S95T002701		Lower ½	822.494	807.628	815.061[QC:b]			
S95T002704	105:4	Upper ½	42.8	40.7	41.75			
S95T002703		Lower ½	52.0	71.1	61.55[QC:e]			
S95T002706	105:5	Upper ½	63.2895	78.1915	70.7405[QC:e]			
S95T002705		Lower ½	124.41	121.698	123.054			
S95T002708	105:6	Upper ½	14.5188	16.2434	15.3811[QC:b,e]			
S95T002707		Lower ½	26.2625	42.3674	34.315[QC:b,e]			
S95T002710	105:7	Upper ½	35.1003	25.9053	30.5028[QC:e]			
S95T002709		Lower ½	22.5923	26.7106	24.6515[QC:e]			
S95T002712	105:8	Upper ½	77.8	124	100.9[QC:a,e]			
S95T002711		Lower ½	43.7	46.6	45.15[QC:a]			
S95T002752	110:2	Lower ½	29.3	66.4	47.85[QC:e]			
S95T002756	110:3	Upper ½	315	312	313.5[QC:a]			
S95T002755		Lower ½	261	278	269.5[QC:a]			
S95T002758	110:4	Upper ½	69.5	109	89.25[QC:a,e]			
S95T002757		Lower ½	61.3	56.8	59.05[QC:a]			
S95T002760	110:5	Upper ½	120	131	125.5			
S95T002759		Lower ½	144	101	122.5[QC:a,e]			

Table A-7. Tank 241-S-107 Analytical Results: Boron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	84.2	81.3	82.75[QC:b]			
S95T002761		Lower ½	50.4	207	128.7[QC:e]			
S95T002764	110:7	Upper ½	43.4	44.0	43.7[QC:b]			
S95T002763		Lower ½	98.1	93.3	95.7[QC:b]			
S95T002766	110:8	Upper ½	170	166	168[QC:b]			
S95T002765		Lower ½	118	121	119.5[QC:b]			
S95T002754	110:3A	Upper ½	424	545	484.5[QC:a,e]			
S95T002753		Lower ½	769	729	749			
S95T002810	111:2	Lower ½	125	104	114.5[QC:e]			
S95T002811	111:3	Upper ½	44.9	46.8	45.85			
S95T002812		Lower ½	1,480	1,320	1,400			
S95T002814	111:4	Upper ½	279	259	269[QC:b]			
S95T002813		Lower ½	62.5	52.5	57.5[QC:e]			
S95T002816	111:5	Upper ½	54.8	51.7	53.25[QC:b]			
S95T002815		Lower ½	26.5	26.2	26.35[QC:b]			
S95T002818	111:6	Upper ½	126	33.8	79.9[QC:e]			
S95T002817		Lower ½	39.2	37.1	38.15[QC:b]			
S95T002820	111:7	Upper ½	25.2	48.1	36.65[QC:b,e]			
S95T002819		Lower ½	30.9	31.6	31.25			

Table A-7. Tank 241-S-107 Analytical Results: Boron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	37.2	45.8	41.5[QC:e]			
S95T002822		C	75.2	29.1	52.15[QC:e]			
S95T002821		D	118	124	121[QC:b]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	414	311.0	362.5[QC:e]			
S96T003302	105:3	Upper ½	2,050	1,580	1,820[QC:e]			
S96T003303	105:4	Upper ½	1,060	867.0	963.5[QC:e]			
S96T003304	105:5	Lower ½	532	840.0	686.0[QC:e]			
S96T003305	105:8	Lower ½	676	813.0	744.5[QC:e]			
S96T003276	110:2	Lower ½	951	898.0	924.5			
S96T003277	110:3	Upper ½	338	462.0	400.0[QC:e]			
S96T003278	110:4	Upper ½	262	750.0	506.0[QC:e]			
S96T003279	110:5	Lower ½	588	451.0	519.5[QC:e]			
S96T003280	110:8	Lower ½	633	513.0	573.0[QC:e]			
S96T003247	111:2	Lower ½	438	347.0	392.5[QC:e]			
S96T003258	111:3	Upper ½	419	259.0	339.0[QC:e]			
S96T003259	111:4	Upper ½	326	466.0	396.0[QC:e]			
S96T003260	111:5	Lower ½	468	611.0	539.5[QC:e]			
S96T003261	111:8	Lower ½	560	818.0	689.0[QC:e]			

Table A-7. Tank 241-S-107 Analytical Results: Boron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	78.8	73.3	76.05	100	N/A	246.0
S95T003156	110	N/A	47.2	99.2	73.2[QC:e]			
S95T003162	111	N/A	162	142	152[QC:e]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	620	527.0	573.5[QC:e]			
S95T003281	110	N/A	769	583.0	676.0[QC:e]			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	37.7195	35.2649	36.4922	35.7		1.89
S95T002446	105:2	DL	32.2602	33.6481	32.9541			
S95T002601	110:1	DL	37.7211	36.1459	36.9335			
S95T002602	110:2	DL	38.916	39.2612	39.0886			
S95T002629	111:1	DL	33.5165	34.9434	34.23			
S95T002632	111:2	DL	35.7683	32.7761	34.2722			

Table A-8. Tank 241-S-107 Analytical Results: Cadmium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	34.2	31.6	32.9[QC:a]	< 4.51		< 11.0
S95T002914		Lower ½	35.3	31.4	33.35[QC:a,e]			
S95T002702	105:3	Upper ½	19.0747	17.9772	18.526			
S95T002701		Lower ½	< 4.649	< 4.651	< 4.65			
S95T002704	105:4	Upper ½	0.884	1.19	1.037[QC:a,e]			
S95T002703		Lower ½	< 1.31	< 1.22	< 1.27[QC:a]			
S95T002706	105:5	Upper ½	< 3.13	< 2.77	< 2.95[QC:a,e]			
S95T002705		Lower ½	< 4.858	< 4.885	< 4.87[QC:a]			
S95T002708	105:6	Upper ½	< 0.742	< 0.832	< 0.787[QC:e]			
S95T002707		Lower ½	< 1.445	< 1.574	< 1.51			
S95T002710	105:7	Upper ½	< 1.968	< 1.797	< 1.88			
S95T002709		Lower ½	< 1.769	< 1.874	< 1.82			
S95T002712	105:8	Upper ½	< 2.11	< 2.04	< 2.08[QC:a]			
S95T002711		Lower ½	< 0.852	< 0.947	< 0.900[QC:a]			
S95T002752	110:2	Lower ½	27.2	23.1	25.15[QC:a,e]			
S95T002756	110:3	Upper ½	8.11	8.34	8.225[QC:a]			
S95T002755		Lower ½	< 2.05	< 2.17	< 2.11[QC:a]			
S95T002758	110:4	Upper ½	1.08	1.53	1.305[QC:a,e]			
S95T002757		Lower ½	< 1.62	< 1.57	< 1.60[QC:a]			
S95T002760	110:5	Upper ½	< 0.897	< 1.12	< 1.01[QC:a,e]			
S95T002759		Lower ½	< 1.07	< 0.981	< 1.03[QC:a]			

Table A-8. Tank 241-S-107 Analytical Results: Cadmium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 1.90	< 1.74	< 1.82			
S95T002761		Lower ½	1.05	< 0.988	1.02[QC:a]			
S95T002764	110:7	Upper ½	1.32	1.43	1.375[QC:a]			
S95T002763		Lower ½	1.03	0.908	0.969[QC:e]			
S95T002766	110:8	Upper ½	< 2.01	< 1.95	< 1.98			
S95T002765		Lower ½	< 0.916	0.861	0.889[QC:a]			
S95T002754	110:3A	Upper ½	< 4.27	< 6.15	< 5.21[QC:a,e]			
S95T002753		Lower ½	< 3.66	< 3.55	< 3.61[QC:a]			
S95T002810	111:2	Lower ½	18.1	16.0	17.05[QC:a,e]			
S95T002811	111:3	Upper ½	2.9	2.89	2.895[QC:a]			
S95T002812		Lower ½	3.50	3.09	3.295[QC:a,e]			
S95T002814	111:4	Upper ½	5.45	4.79	5.12[QC:e]			
S95T002813		Lower ½	2.00	1.69	1.845[QC:a,e]			
S95T002816	111:5	Upper ½	1.75	1.64	1.695			
S95T002815		Lower ½	1.94	1.98	1.96			
S95T002818	111:6	Upper ½	< 1.63	< 1.61	< 1.62[QC:a]			
S95T002817		Lower ½	0.940	0.886	0.913			
S95T002820	111:7	Upper ½	1.34	1.37	1.355			
S95T002819		Lower ½	< 0.814	< 0.807	< 0.811[QC:a]			

Table A-8. Tank 241-S-107 Analytical Results: Cadmium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 1.41	< 1.29	< 1.35			
S95T002822		C	< 0.877	< 0.782	< 0.830[QC:e]			
S95T002821		D	< 1.01	1.21	1.11[QC:e]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 2.260	< 2.07	< 2.17			
S96T003302	105:3	Upper ½	< 4.420	< 4.23	< 4.33			
S96T003303	105:4	Upper ½	< 2.740	< 2.90	< 2.82			
S96T003304	105:5	Lower ½	< 1.890	< 2.21	< 2.05			
S96T003305	105:8	Lower ½	< 1.870	< 1.93	< 1.90			
S96T003276	110:2	Lower ½	< 3.540	< 3.50	< 3.52			
S96T003277	110:3	Upper ½	< 3.680	< 3.87	< 3.78			
S96T003278	110:4	Upper ½	< 1.920	< 1.90	< 1.91			
S96T003279	110:5	Lower ½	< 0.952	< 0.970	< 0.961			
S96T003280	110:8	Lower ½	< 2.110	< 1.96	< 2.04			
S96T003247	111:2	Lower ½	< 1.920	< 1.98	< 1.95			
S96T003258	111:3	Upper ½	< 3.010	< 2.80	< 2.91			
S96T003259	111:4	Upper ½	< 2.000	< 2.15	< 2.08			
S96T003260	111:5	Lower ½	< 1.860	< 2.10	< 1.98			
S96T003261	111:8	Lower ½	< 2.200	< 2.15	< 2.18			

Table A-8. Tank 241-S-107 Analytical Results: Cadmium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	3.46	2.62	3.04[QC:a,e]	3.98		9.74
S95T003156	110	N/A	3.97	4.24	4.105[QC:a]			
S95T003162	111	N/A	4.80	4.78	4.79[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 2.160	< 2.02	< 2.09			
S95T003281	110	N/A	< 1.870	< 1.99	< 1.93			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	N/A	< 4.01	< 4.01	< 4.01	<3.68	N/A	< 0.195
S95T002446	105:2	N/A	< 2.00	< 2.00	< 2.00			
S95T002601	110:1	N/A	< 4.01	< 4.01	< 4.01			
S95T002602	110:2	N/A	< 4.01	< 4.01	< 4.01			
S95T002629	111:1	N/A	< 4.01	< 4.01	< 4.01			
S95T002632	111:2	N/A	< 4.01	< 4.01	< 4.01			

Table A-9. Tank 241-S-107 Analytical Results: Calcium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	667	545	606[QC:e]	487	26.5	1,190
S95T002914		Lower ½	739	630	684.5[QC:e]			
S95T002702	105:3	Upper ½	5,003.03	4,853.86	4,928.44			
S95T002701		Lower ½	545.556	565.052	555.304			
S95T002704	105:4	Upper ½	196	186	191[QC:a]			
S95T002703		Lower ½	66.3	87.4	76.85[QC:a,e]			
S95T002706	105:5	Upper ½	119.8	99.5409	109.671[QC:a,e]			
S95T002705		Lower ½	99.8252	< 48.85	74.3376[QC:a,e]			
S95T002708	105:6	Upper ½	118.524	132.042	125.283			
S95T002707		Lower ½	194.135	223.794	208.964[QC:e]			
S95T002710	105:7	Upper ½	257.693	246.115	251.904			
S95T002709		Lower ½	252.879	679.092	465.986[QC:e]			
S95T002712	105:8	Upper ½	250	197	223.5[QC:a,e]			
S95T002711		Lower ½	293	299	296[QC:a]			
S95T002752	110:2	Lower ½	2,090	1,480	1,785			
S95T002756	110:3	Upper ½	1,940	1,900	1,920			
S95T002755		Lower ½	158	114	136[QC:a,e]			
S95T002758	110:4	Upper ½	< 20.6	< 23.2	< 21.9[QC:a,e]			
S95T002757		Lower ½	195	137	166[QC:a,e]			
S95T002760	110:5	Upper ½	180	130	155[QC:e]			
S95T002759		Lower ½	146	187	166.5[QC:a,e]			

Table A-9. Tank 241-S-107 Analytical Results: Calcium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	175	165	170[QC:b]			
S95T002761		Lower ½	285	312	298.5			
S95T002764	110:7	Upper ½	204	201	202.5			
S95T002763		Lower ½	236	231	233.5[QC:b]			
S95T002766	110:8	Upper ½	334	325	329.5			
S95T002765		Lower ½	216	238	227			
S95T002754	110:3A	Upper ½	< 85.4	< 123	< 104[QC:a,e]			
S95T002753		Lower ½	137	118	127.5[QC:e]			
S95T002810	111:2	Lower ½	838	783	810.5			
S95T002811	111:3	Upper ½	676	693	684.5			
S95T002812		Lower ½	419	365	392[QC:e]			
S95T002814	111:4	Upper ½	473	430	451.5			
S95T002813		Lower ½	340	288	314[QC:e]			
S95T002816	111:5	Upper ½	272	252	262			
S95T002815		Lower ½	239	229	234			
S95T002818	111:6	Upper ½	255	226	240.5[QC:b,e]			
S95T002817		Lower ½	194	187	190.5			
S95T002820	111:7	Upper ½	367	378	372.5[QC:b]			
S95T002819		Lower ½	283	294	288.5[QC:b]			

Table A-9. Tank 241-S-107 Analytical Results: Calcium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	395	300	347.5[QC:b,e]			
S95T002822		C	367	353	360[QC:b]			
S95T002821		D	223	240	231.5[QC:b]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	55.70	< 41.4	48.6			
S96T003302	105:3	Upper ½	461	725.0	593.0[QC:e]			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	73.40	73.00	73.20			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	19.60	19.3[QC:d]			
S96T003280	110:8	Lower ½	< 42.0	< 39.2	< 40.6			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6[QC:d]			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5[QC:d]			

Table A-9. Tank 241-S-107 Analytical Results: Calcium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	576	549	562.5	523	N/A	1,280
S95T003156	110	N/A	486	489	487.5			
S95T003162	111	N/A	506	529	517.5			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	41.10	42.1[QC:d]			
S95T003281	110	N/A	< 37.40	< 39.9	< 38.7			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 40.1		< 2.12
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 40.1	< 40.1	< 40.1			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-10. Tank 241-S-107 Analytical Results: Cerium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	41.4	38.6	40.0	< 28.8		< 70.2
S95T002914		Lower ½	< 40.5	< 37.5	< 39.0			
S95T002702	105:3	Upper ½	< 42.64	< 43.74	< 43.2			
S95T002701		Lower ½	< 46.49	< 46.51	< 46.5			
S95T002704	105:4	Upper ½	< 16.2	< 15.4	< 15.8			
S95T002703		Lower ½	< 26.2	< 24.4	< 25.3			
S95T002706	105:5	Upper ½	< 31.3	< 27.7	< 29.5[QC:e]			
S95T002705		Lower ½	< 48.58	< 48.85	< 48.7			
S95T002708	105:6	Upper ½	< 7.42	< 8.32	< 7.87[QC:e]			
S95T002707		Lower ½	< 14.45	< 15.74	< 15.1			
S95T002710	105:7	Upper ½	< 19.68	< 17.97	< 18.8			
S95T002709		Lower ½	26.1692	28.0743	27.1217			
S95T002712	105:8	Upper ½	< 42.3	< 40.9	< 41.6			
S95T002711		Lower ½	35.7	35.5	35.6			
S95T002752	110:2	Lower ½	< 40.5	< 43.2	< 41.9			
S95T002756	110:3	Upper ½	< 39.4	< 35.2	< 37.3[QC:e]			
S95T002755		Lower ½	< 41.0	< 40.8	< 40.9			
S95T002758	110:4	Upper ½	< 20.6	< 23.2	< 21.9[QC:e]			
S95T002757		Lower ½	< 32.1	< 31.4	< 31.8			
S95T002760	110:5	Upper ½	< 17.9	< 22.4	< 20.2[QC:e]			
S95T002759		Lower ½	< 21.5	< 19.6	< 20.6			

Table A-10. Tank 241-S-107 Analytical Results: Cerium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 38.0	< 34.7	< 36.4			
S95T002761		Lower ½	< 17.7	< 19.8	< 18.8[QC:e]			
S95T002764	110:7	Upper ½	< 16.5	< 17.8	< 17.2			
S95T002763		Lower ½	24.7	23.7	24.2			
S95T002766	110:8	Upper ½	< 40.2	< 39.0	< 39.6			
S95T002765		Lower ½	25.9	29.4	27.65[QC:e]			
S95T002754	110:3A	Upper ½	< 85.4	< 123	< 104[QC:e]			
S95T002753		Lower ½	< 73.2	< 70.9	< 72.1			
S95T002810	111:2	Lower ½	< 37.6	< 33.9	< 35.8			
S95T002811	111:3	Upper ½	< 18.7	< 19.2	< 19.0			
S95T002812		Lower ½	< 40.7	< 35.3	< 38.0[QC:e]			
S95T002814	111:4	Upper ½	< 32.1	< 31.1	< 31.6			
S95T002813		Lower ½	< 18.8	< 16.8	< 17.8[QC:e]			
S95T002816	111:5	Upper ½	< 29.9	< 28.0	< 29.0			
S95T002815		Lower ½	< 14.9	< 14.3	< 14.6			
S95T002818	111:6	Upper ½	< 32.6	< 32.3	< 32.5			
S95T002817		Lower ½	< 15.4	< 14.5	< 15.0			
S95T002820	111:7	Upper ½	< 19.4	< 22.7	< 21.1[QC:e]			
S95T002819		Lower ½	21.0	22.1	21.55			

Table A-10. Tank 241-S-107 Analytical Results: Cerium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	31.4	33.7	32.55			
S95T002822		C	35.5	36.1	35.8			
S95T002821		D	< 20.2	< 22.6	< 21.4[QC:e]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.2			
S96T003280	110:8	Lower ½	< 42.20	< 39.2	< 40.7			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5			

Table A-10. Tank 241-S-107 Analytical Results: Cerium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 44.3	< 42.7	< 43.5	< 42.7	N/A	< 105
S95T003156	110	N/A	< 39.1	< 39.5	< 39.3			
S95T003162	111	N/A	< 46.6	< 43.9	< 45.3			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	< 37.40	< 39.9	< 38.7			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 40.1	N/A	< 2.12
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 40.1	< 40.1	< 40.1			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-11. Tank 241-S-107 Analytical Results: Chromium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	23,900	22,000	22,950	3,530	26.5	8,610
S95T002914		Lower ½	23,600	21,200	22,400			
S95T002702	105:3	Upper ½	9,978.91	9,645.42	9,812.16			
S95T002701		Lower ½	1,433	1,415.91	1,424.45			
S95T002704	105:4	Upper ½	1,980	1,870	1,925			
S95T002703		Lower ½	2,340	3,030	2,685			
S95T002706	105:5	Upper ½	3,899.85	3,754.5	3,827.17			
S95T002705		Lower ½	2,250.01	2,274.05	2,262.03			
S95T002708	105:6	Upper ½	809.16	914.767	861.963[QC:e]			
S95T002707		Lower ½	1,184.64	1,181.55	1,183.1			
S95T002710	105:7	Upper ½	1,650.7	1,961.11	1,805.9			
S95T002709		Lower ½	1,051.05	1,228.8	1,139.92			
S95T002712	105:8	Upper ½	1,270	1,110	1,190			
S95T002711		Lower ½	1,140	1,150	1,145			
S95T002752	110:2	Lower ½	16,900	14,700	15,800			
S95T002756	110:3	Upper ½	3,380	3,280	3,330			
S95T002755		Lower ½	1,750	1,850	1,800			
S95T002758	110:4	Upper ½	2,380	1,930	2,155			
S95T002757		Lower ½	1,090	1,080	1,085			
S95T002760	110:5	Upper ½	721	682	701.5			
S95T002759		Lower ½	1,020	998	1,009			

Table A-11. Tank 241-S-107 Analytical Results: Chromium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	1,040	1,010	1,025			
S95T002761		Lower ½	1,330	1,550	1,440			
S95T002764	110:7	Upper ½	2,080	2,070	2,075			
S95T002763		Lower ½	1,270	1,210	1,240			
S95T002766	110:8	Upper ½	1,240	1,120	1,180			
S95T002765		Lower ½	962	1,070	1,016			
S95T002754	110:3A	Upper ½	1,580	1,550	1,565			
S95T002753		Lower ½	1,630	1,650	1,640			
S95T002810	111:2	Lower ½	13,500	11,300	12,400			
S95T002811	111:3	Upper ½	1,730	1,790	1,760			
S95T002812		Lower ½	1,440	1,220	1,330			
S95T002814	111:4	Upper ½	1,900	1,800	1,850			
S95T002813		Lower ½	2,740	2,410	2,575			
S95T002816	111:5	Upper ½	3,960	3,700	3,830			
S95T002815		Lower ½	1,810	1,750	1,780			
S95T002818	111:6	Upper ½	1,050	1,130	1,090			
S95T002817		Lower ½	1,420	1,360	1,390			
S95T002820	111:7	Upper ½	1,240	2,390	1,815			
S95T002819		Lower ½	803	817	810			

Table A-11. Tank 241-S-107 Analytical Results: Chromium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	1,210	1,280	1,245			
S95T002822		C	1,210	1,200	1,205			
S95T002821		D	1,280	1,370	1,325			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	1,270	1,210	1,240			
S96T003302	105:3	Upper ½	832	731.0	781.5			
S96T003303	105:4	Upper ½	834	813.0	823.5			
S96T003304	105:5	Lower ½	577	633.0	605.0			
S96T003305	105:8	Lower ½	1,370	1,350	1,360			
S96T003276	110:2	Lower ½	1,390	1,200	1,300[QC:e]			
S96T003277	110:3	Upper ½	1,280	1,430	1,360[QC:e]			
S96T003278	110:4	Upper ½	1,070	1,100	1,080			
S96T003279	110:5	Lower ½	466	472.0	469.0			
S96T003280	110:8	Lower ½	1,360	1,350	1,360			
S96T003247	111:2	Lower ½	808	805.0	806.5			
S96T003258	111:3	Upper ½	562	506.0	534.0[QC:e]			
S96T003259	111:4	Upper ½	313	287.0	300.0			
S96T003260	111:5	Lower ½	248	225.0	236.5			
S96T003261	111:8	Lower ½	1,470	1,440	1,460			

Table A-11. Tank 241-S-107 Analytical Results: Chromium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	2,940	2,430	2,685	2,830	N/A	6,950
S95T003156	110	N/A	2,730	2,860	2,795			
S95T003162	111	N/A	3,070	2,990	3,030			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	1,020	1,340	1,180[QC:e]			
S95T003281	110	N/A	1,110	1,110	1,110			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	1,260.84	1,220.19	1,240.52	1,220	N/A	64.7
S95T002446	105:2	DL	1,095.59	1,117.59	1,106.59			
S95T002601	110:1	DL	1,211.17	1,185.66	1,198.41			
S95T002602	110:2	DL	1,337.83	1,417.42	1,377.63			
S95T002629	111:1	DL	1,215.99	1,264.71	1,240.35			
S95T002632	111:2	DL	1,164.25	1,153.34	1,158.79			

Table A-12. Tank 241-S-107 Analytical Results: Cobalt. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	9.62	9.63	9.625	< 5.49	N/A	< 13.4
S95T002914		Lower ½	9.90	9.35	9.625			
S95T002702	105:3	Upper ½	8.6864	9.2122	8.9493			
S95T002701		Lower ½	< 9.298	< 9.302	< 9.30			
S95T002704	105:4	Upper ½	< 3.24	< 3.08	< 3.16			
S95T002703		Lower ½	< 5.23	< 4.88	< 5.06			
S95T002706	105:5	Upper ½	< 6.26	< 5.54	< 5.90[QC:a,c]			
S95T002705		Lower ½	< 9.716	< 9.77	< 9.74[QC:a]			
S95T002708	105:6	Upper ½	< 1.484	< 1.664	< 1.57[QC:c]			
S95T002707		Lower ½	< 2.89	< 3.148	< 3.02			
S95T002710	105:7	Upper ½	< 3.936	< 3.594	< 3.77			
S95T002709		Lower ½	< 3.538	< 3.748	< 3.64			
S95T002712	105:8	Upper ½	< 8.46	< 8.18	< 8.32[QC:a]			
S95T002711		Lower ½	< 3.41	< 3.42	< 3.42[QC:a]			
S95T002752	110:2	Lower ½	9.70	< 8.64	9.17[QC:c]			
S95T002756	110:3	Upper ½	< 7.87	< 7.01	< 7.44[QC:a,c]			
S95T002755		Lower ½	< 8.20	< 8.16	< 8.18[QC:a]			
S95T002758	110:4	Upper ½	< 4.11	< 4.64	< 4.38[QC:a,c]			
S95T002757		Lower ½	< 6.42	< 6.29	< 6.36[QC:a]			
S95T002760	110:5	Upper ½	< 3.59	< 4.47	< 4.03[QC:c]			
S95T002759		Lower ½	< 4.3	< 3.92	< 4.11[QC:a]			

Table A-12. Tank 241-S-107 Analytical Results: Cobalt. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 7.51	< 6.94	< 7.23			
S95T002761		Lower ½	< 3.54	< 3.95	< 3.75			
S95T002764	110:7	Upper ½	< 3.3	< 3.55	< 3.43			
S95T002763		Lower ½	< 3.47	< 3.27	< 3.37			
S95T002766	110:8	Upper ½	< 8.05	< 7.80	< 7.93			
S95T002765		Lower ½	< 3.66	< 3.39	< 3.53			
S95T002754	110:3A	Upper ½	< 17.1	< 24.6	< 20.9[QC:a,e]			
S95T002753		Lower ½	< 14.6	< 14.2	< 14.4			
S95T002810	111:2	Lower ½	< 7.52	< 6.79	< 7.16[QC:a]			
S95T002811	111:3	Upper ½	< 3.74	< 3.83	< 3.79[QC:a]			
S95T002812		Lower ½	< 8.15	< 7.06	< 7.61[QC:e]			
S95T002814	111:4	Upper ½	< 6.42	< 6.23	< 6.33			
S95T002813		Lower ½	< 3.77	< 3.35	< 3.56[QC:e]			
S95T002816	111:5	Upper ½	< 5.95	< 5.59	< 5.77			
S95T002815		Lower ½	< 2.98	< 2.87	< 2.93			
S95T002818	111:6	Upper ½	< 6.51	< 6.46	< 6.49			
S95T002817		Lower ½	< 3.08	< 2.91	< 3.00			
S95T002820	111:7	Upper ½	< 3.88	< 4.55	< 4.22[QC:e]			
S95T002819		Lower ½	< 3.26	< 3.23	< 3.25			

Table A-12. Tank 241-S-107 Analytical Results: Cobalt. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 5.63	< 5.16	< 5.395			
S95T002822		C	< 3.51	< 3.13	< 3.32[QC:e]			
S95T002821		D	< 4.04	< 4.49	< 4.27			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 9.030	< 8.28	< 8.66			
S96T003302	105:3	Upper ½	< 17.70	< 16.9	< 17.3			
S96T003303	105:4	Upper ½	< 11.00	< 11.6	< 11.3			
S96T003304	105:5	Lower ½	< 7.560	< 8.82	< 8.19			
S96T003305	105:8	Lower ½	< 7.490	< 7.70	< 7.60			
S96T003276	110:2	Lower ½	< 14.20	< 14.0	< 14.1			
S96T003277	110:3	Upper ½	< 14.70	< 15.5	< 15.1			
S96T003278	110:4	Upper ½	< 7.670	< 7.59	< 7.63			
S96T003279	110:5	Lower ½	< 3.810	< 3.88	< 3.85			
S96T003280	110:8	Lower ½	< 8.430	< 7.84	< 8.14			
S96T003247	111:2	Lower ½	< 7.690	< 7.91	< 7.80			
S96T003258	111:3	Upper ½	< 12.10	< 11.2	< 11.7			
S96T003259	111:4	Upper ½	< 8.010	< 8.59	< 8.35			
S96T003260	111:5	Lower ½	< 7.450	< 8.39	< 7.92			
S96T003261	111:8	Lower ½	< 8.790	< 8.59	< 8.69			

Table A-12. Tank 241-S-107 Analytical Results: Cobalt. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 8.87	< 8.51	< 8.69[QC:a]	< 8.54	N/A	< 20.8
S95T003156	110	N/A	< 7.82	< 7.91	< 7.87[QC:a]			
S95T003162	111	N/A	< 9.33	< 8.79	< 9.06[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 8.630	< 8.10	< 8.37			
S95T003281	110	N/A	< 7.480	< 7.98	< 7.73			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 8.02	< 8.02	< 8.02	< 8.02	N/A	< 0.425
S95T002446	105:2	DL	< 8.02	< 8.02	< 8.02			
S95T002601	110:1	DL	< 8.02	< 8.02	< 8.02			
S95T002602	110:2	DL	< 8.02	< 8.02	< 8.02			
S95T002629	111:1	DL	< 8.02	< 8.02	< 8.02			
S95T002632	111:2	DL	< 8.02	< 8.02	< 8.02			

Table A-13. Tank 241-S-107 Analytical Results: Copper. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	15.3	12.3	13.8[QC:e]	25.9	16.1	63.2
S95T002914		Lower ½	10.5	8.45	9.475[QC:e]			
S95T002702	105:3	Upper ½	39.623	38.0629	38.843			
S95T002701		Lower ½	53.4371	52.7835	53.1103			
S95T002704	105:4	Upper ½	38.7	36.4	37.55			
S95T002703		Lower ½	63.2	65.4	64.3			
S95T002706	105:5	Upper ½	58.5127	60.6908	59.6018			
S95T002705		Lower ½	123.613	118.535	121.074			
S95T002708	105:6	Upper ½	6.1935	6.8767	6.5351			
S95T002707		Lower ½	8.6939	8.696	8.69495			
S95T002710	105:7	Upper ½	13.1761	14.8228	13.9994[QC:e]			
S95T002709		Lower ½	11.1213	13.3442	12.2327[QC:e]			
S95T002712	105:8	Upper ½	18.9	13.1	16.0[QC:a,e]			
S95T002711		Lower ½	14.1	11.7	12.9[QC:a,e]			
S95T002752	110:2	Lower ½	19.2	12.7	15.95[QC:e]			
S95T002756	110:3	Upper ½	43.1	42.5	42.8[QC:a]			
S95T002755		Lower ½	70.2	81.3	75.75[QC:a,e]			
S95T002758	110:4	Upper ½	67.3	68.2	67.75[QC:a]			
S95T002757		Lower ½	20.7	19.1	19.9[QC:a]			
S95T002760	110:5	Upper ½	8.41	9.29	8.85			
S95T002759		Lower ½	9.89	8.65	9.27[QC:a,e]			

Table A-13. Tank 241-S-107 Analytical Results: Copper. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	9.80	9.63	9.715			
S95T002761		Lower ½	10.7	9.67	10.185			
S95T002764	110:7	Upper ½	9.16	8.96	9.06			
S95T002763		Lower ½	13.8	12.4	13.1			
S95T002766	110:8	Upper ½	21.1	20.3	20.7			
S95T002765		Lower ½	13.4	14.7	14.05			
S95T002754	110:3A	Upper ½	169	173	171[QC:a]			
S95T002753		Lower ½	147	150	148.5			
S95T002810	111:2	Lower ½	13.6	11.4	12.5[QC:e]			
S95T002811	111:3	Upper ½	9.66	9.83	9.745			
S95T002812		Lower ½	30.5	26.7	28.6[QC:e]			
S95T002814	111:4	Upper ½	35.2	32.1	33.65			
S95T002813		Lower ½	26.2	22.8	24.5[QC:e]			
S95T002816	111:5	Upper ½	22.7	21.2	21.95			
S95T002815		Lower ½	31.3	30.3	30.8			
S95T002818	111:6	Upper ½	14.6	10.8	12.7[QC:e]			
S95T002817		Lower ½	11.2	10.8	11.0			
S95T002820	111:7	Upper ½	12.7	19.5	16.1[QC:e]			
S95T002819		Lower ½	15.8	16.1	15.95			

Table A-13. Tank 241-S-107 Analytical Results: Copper. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	17.3	17.2	17.25			
S95T002822		C	20.4	19.1	19.75			
S95T002821		D	13.9	14.9	14.4			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	5.530	< 4.14	4.84			
S96T003302	105:3	Upper ½	< 8.830	8.660	8.75			
S96T003303	105:4	Upper ½	< 5.480	< 5.80	< 5.64			
S96T003304	105:5	Lower ½	4.150	< 4.41	4.28			
S96T003305	105:8	Lower ½	< 3.740	< 3.85	< 3.80			
S96T003276	110:2	Lower ½	< 7.080	< 7.00	< 7.04			
S96T003277	110:3	Upper ½	< 7.360	< 7.74	< 7.55			
S96T003278	110:4	Upper ½	4.120	4.600	4.360			
S96T003279	110:5	Lower ½	<1.900	3.740	< 2.91			
S96T003280	110:8	Lower ½	< 4.220	< 3.92	< 4.07			
S96T003247	111:2	Lower ½	< 3.840	< 3.95	< 3.90			
S96T003258	111:3	Upper ½	< 6.030	< 5.61	< 5.82			
S96T003259	111:4	Upper ½	< 4.000	< 4.30	< 4.15			
S96T003260	111:5	Lower ½	4.080	< 4.19	< 4.14			
S96T003261	111:8	Lower ½	4.670	< 4.29	< 4.48			

Table A-13. Tank 241-S-107 Analytical Results: Copper. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	31.9	25.5	28.7[QC:a,c]	27.3	N/A	66.9
S95T003156	110	N/A	26.3	27.8	27.05[QC:a]			
S95T003162	111	N/A	26.8	25.7	26.25[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 4.310	< 4.05	< 4.18			
S95T003281	110	N/A	< 3.740	< 3.99	< 3.87			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 4.01	< 4.01	< 4.01	< 4.01	N/A	< 0.212
S95T002446	105:2	DL	< 4.01	< 4.01	< 4.01			
S95T002601	110:1	DL	< 4.01	< 4.01	< 4.01			
S95T002602	110:2	DL	< 4.01	< 4.01	< 4.01			
S95T002629	111:1	DL	< 4.01	< 4.01	< 4.01			
S95T002632	111:2	DL	< 4.01	< 4.01	< 4.01			

Table A-14. Tank 241-S-107 Analytical Results: Iron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	4,430	3,540	3,985	2,300	18.1	5,610
S95T002914		Lower ½	2,160	2,080	2,120			
S95T002702	105:3	Upper ½	14,856	13,718.9	14,287.4			
S95T002701		Lower ½	1,535.77	1,514.08	1,524.92			
S95T002704	105:4	Upper ½	3,620	3,410	3,515			
S95T002703		Lower ½	3,920	4,160	4,040			
S95T002706	105:5	Upper ½	3,160.44	3,260.06	3,210.25			
S95T002705		Lower ½	2,027.65	2,018.38	2,023.01			
S95T002708	105:6	Upper ½	777.539	875.797	826.668[QC:e]			
S95T002707		Lower ½	825.811	839.186	832.498			
S95T002710	105:7	Upper ½	2,000.89	2,380.24	2,190.56			
S95T002709		Lower ½	892.227	1,276.3	1,084.26			
S95T002712	105:8	Upper ½	2,500	1,270	1,885			
S95T002711		Lower ½	1,860	1,560	1,710			
S95T002752	110:2	Lower ½	9,020	6,110	7,565			
S95T002756	110:3	Upper ½	5,280	5,430	5,355			
S95T002755		Lower ½	998	1,130	1,064			
S95T002758	110:4	Upper ½	2,410	2,490	2,450			
S95T002757		Lower ½	826	813	819.5[QC:a]			
S95T002760	110:5	Upper ½	264	324	294[QC:e]			
S95T002759		Lower ½	393	460	426.5[QC:a,e]			

Table A-14. Tank 241-S-107 Analytical Results: Iron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	588	563	575.5			
S95T002761		Lower ½	1,170	1,150	1,160			
S95T002764	110:7	Upper ½	977	974	975.5			
S95T002763		Lower ½	1,260	1,220	1,240			
S95T002766	110:8	Upper ½	2,380	2,300	2,340			
S95T002765		Lower ½	1,920	2,130	2,025			
S95T002754	110:3A	Upper ½	621	614	617.5[QC:a]			
S95T002753		Lower ½	958	941	949.5			
S95T002810	111:2	Lower ½	3,840	3,250	3,545			
S95T002811	111:3	Upper ½	2,120	2,180	2,150			
S95T002812		Lower ½	537	456	496.5[QC:e]			
S95T002814	111:4	Upper ½	692	660	676			
S95T002813		Lower ½	1,370	1,200	1,285			
S95T002816	111:5	Upper ½	3,090	2,890	2,990			
S95T002815		Lower ½	2,900	2,810	2,855			
S95T002818	111:6	Upper ½	793	771	782			
S95T002817		Lower ½	1,160	1,110	1,135			
S95T002820	111:7	Upper ½	1,110	1,800	1,455			
S95T002819		Lower ½	1,410	1,440	1,425			

Table A-14. Tank 241-S-107 Analytical Results: Iron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	2,390	2,230	2,310			
S95T002822		C	2,590	2,240	2,415			
S95T002821		D	805	860	832.5			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	26.80	23.50	25.15[QC:e]			
S96T003302	105:3	Upper ½	340	697.0	518.5[QC:e]			
S96T003303	105:4	Upper ½	< 27.40	< 29.0	< 28.2			
S96T003304	105:5	Lower ½	< 18.90	< 22.1	< 20.5			
S96T003305	105:8	Lower ½	< 18.70	< 19.3	< 19.0			
S96T003276	110:2	Lower ½	< 35.4	< 35.0	< 35.2			
S96T003277	110:3	Upper ½	< 36.8	< 38.7	< 37.8			
S96T003278	110:4	Upper ½	< 19.20	< 19.0	< 19.1			
S96T003279	110:5	Lower ½	< 9.520	< 9.70	< 9.61			
S96T003280	110:8	Lower ½	< 21.10	< 19.6	< 20.4			
S96T003247	111:2	Lower ½	< 19.20	< 19.8	< 19.5			
S96T003258	111:3	Upper ½	< 30.10	< 28.0	< 29.1			
S96T003259	111:4	Upper ½	< 20.00	< 21.5	< 20.8			
S96T003260	111:5	Lower ½	< 18.60	< 21.0	< 19.8			
S96T003261	111:8	Lower ½	< 22.00	< 21.5	< 21.8[QC:d]			

Table A-14. Tank 241-S-107 Analytical Results: Iron. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	2,790	2,230	2,510	2,280	N/A	5,560
S95T003156	110	N/A	1,990	2,090	2,040			
S95T003162	111	N/A	2,330	2,230	2,280			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 21.60	23.80	< 22.7			
S95T003281	110	N/A	< 18.70	< 19.9	< 19.3			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 20.05	< 20.05	< 20.05	< 20		< 1.06
S95T002446	105:2	DL	< 20.0	< 20.0	< 20.0			
S95T002601	110:1	DL	< 20.05	< 20.05	< 20.05			
S95T002602	110:2	DL	< 20.05	< 20.05	< 20.05			
S95T002629	111:1	DL	< 20.05	< 20.05	< 20.05			
S95T002632	111:2	DL	< 20.05	< 20.05	< 20.05			

Table A-15. Tank 241-S-107 Analytical Results: Lanthanum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	44.1	40.6	42.35	< 18.6		< 44.5
S95T002914		Lower ½	22.9	20.9	21.9			
S95T002702	105:3	Upper ½	46.7128	44.7134	45.7131			
S95T002701		Lower ½	< 23.245	< 23.255	< 23.3			
S95T002704	105:4	Upper ½	< 8.1	< 7.69	< 7.90			
S95T002703		Lower ½	< 13.1	< 12.2	< 12.7			
S95T002706	105:5	Upper ½	< 15.65	< 13.85	< 14.8[QC:e]			
S95T002705		Lower ½	< 24.29	< 24.425	< 24.4			
S95T002708	105:6	Upper ½	< 3.71	< 4.16	< 3.94[QC:e]			
S95T002707		Lower ½	< 7.225	< 7.87	< 7.55			
S95T002710	105:7	Upper ½	< 9.84	10.4095	10.1			
S95T002709		Lower ½	16.367	18.4702	17.4186[QC:e]			
S95T002712	105:8	Upper ½	24.7	21.3	23[QC:e]			
S95T002711		Lower ½	20.6	20.1	20.4			
S95T002752	110:2	Lower ½	38.2	33.2	35.7[QC:e]			
S95T002756	110:3	Upper ½	54.2	53.6	53.9			
S95T002755		Lower ½	20.5	20.4	20.			
S95T002758	110:4	Upper ½	< 10.3	< 11.6	< 11.0[QC:e]			
S95T002757		Lower ½	< 16.2	< 15.7	< 16.0			
S95T002760	110:5	Upper ½	< 8.97	< 11.2	< 10.1[QC:e]			
S95T002759		Lower ½	< 10.7	< 9.81	< 10.3			

Table A-15. Tank 241-S-107 Analytical Results: Lanthanum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 19.0	< 17.4	< 18.2			
S95T002761		Lower ½	< 8.85	< 9.88	< 9.37			
S95T002764	110:7	Upper ½	9.29	9.21	9.25			
S95T002763		Lower ½	16	15.2	15.6			
S95T002766	110:8	Upper ½	21.7	21.2	21.45			
S95T002765		Lower ½	17.0	19.1	18.05[QC:e]			
S95T002754	110:3A	Upper ½	42.7	< 61.5	52.1[QC:e]			
S95T002753		Lower ½	< 36.6	< 35.5	< 36.1			
S95T002810	111:2	Lower ½	30.6	26.2	28.4[QC:e]			
S95T002811	111:3	Upper ½	15.6	15.8	15.7			
S95T002812		Lower ½	< 20.4	< 17.6	< 19.0[QC:e]			
S95T002814	111:4	Upper ½	< 16.1	< 15.6	< 15.9			
S95T002813		Lower ½	< 9.41	< 8.38	< 8.90[QC:e]			
S95T002816	111:5	Upper ½	< 14.9	< 14.0	< 14.5			
S95T002815		Lower ½	< 7.46	< 7.18	< 7.32			
S95T002818	111:6	Upper ½	< 16.3	< 16.1	< 16.2			
S95T002817		Lower ½	< 7.69	< 7.27	< 7.48			
S95T002820	111:7	Upper ½	< 9.7	< 15.3	< 12.5[QC:e]			
S95T002819		Lower ½	14.9	15.0	14.95			

Table A-15. Tank 241-S-107 Analytical Results: Lanthanum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	23.6	24.0	23.8			
S95T002822		C	26.4	25.8	26.1			
S95T002821		D	< 10.1	< 11.2	< 10.7			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 22.60	< 20.7	< 21.7			
S96T003302	105:3	Upper ½	< 44.20	< 42.3	< 43.3			
S96T003303	105:4	Upper ½	< 27.40	< 29.0	< 28.2			
S96T003304	105:5	Lower ½	< 18.90	< 22.1	< 20.5			
S96T003305	105:8	Lower ½	< 18.70	< 19.3	< 19.0			
S96T003276	110:2	Lower ½	< 35.40	< 35.0	< 35.2			
S96T003277	110:3	Upper ½	< 36.80	< 38.7	< 37.8			
S96T003278	110:4	Upper ½	< 19.20	< 19.0	< 19.1			
S96T003279	110:5	Lower ½	< 9.520	< 9.70	< 9.61			
S96T003280	110:8	Lower ½	< 21.10	< 19.6	< 20.4			
S96T003247	111:2	Lower ½	< 19.20	< 19.8	< 19.5			
S96T003258	111:3	Upper ½	< 30.10	< 28.0	< 29.1			
S96T003259	111:4	Upper ½	< 20.00	< 21.5	< 20.8			
S96T003260	111:5	Lower ½	< 18.60	< 21.0	< 19.8			
S96T003261	111:8	Lower ½	< 22.00	< 21.5	< 21.8			

Table A-15. Tank 241-S-107 Analytical Results: Lanthanum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 22.2	< 21.3	< 21.75	< 21.4	N/A	< 52.2
S95T003156	110	N/A	< 19.5	< 19.8	< 19.7			
S95T003162	111	N/A	< 23.3	< 22.0	< 22.7			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 21.60	< 20.2	< 20.9			
S95T003281	110	N/A	< 18.70	< 19.9	< 19.3			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 20.05	< 20.05	< 20.1	< 20.1	N/A	< 1.06
S95T002446	105:2	DL	< 20.0	< 20.0	< 20.1			
S95T002601	110:1	DL	< 20.05	< 20.05	< 20.1			
S95T002602	110:2	DL	< 20.05	< 20.05	< 20.1			
S95T002629	111:1	DL	< 20.05	< 20.05	< 20.1			
S95T002632	111:2	DL	< 20.05	< 20.05	< 20.1			

Table A-16. Tank 241-S-107 Analytical Results: Lead. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	333	309	321[QC:a]	119	18.6	290
S95T002914		Lower ½	249	224	236.5[QC:a]			
S95T002702	105:3	Upper ½	580.103	554.463	567.283			
S95T002701		Lower ½	89.2862	86.8037	88.045			
S95T002704	105:4	Upper ½	183	173	178[QC:a]			
S95T002703		Lower ½	200	201	200.5[QC:a]			
S95T002706	105:5	Upper ½	271.774	284.54	278.157[QC:a]			
S95T002705		Lower ½	152.834	143.082	147.958[QC:a]			
S95T002708	105:6	Upper ½	25.4773	26.8415	26.1594			
S95T002707		Lower ½	36.387	38.1199	37.2535			
S95T002710	105:7	Upper ½	75.0839	95.0023	85.0431[QC:c]			
S95T002709		Lower ½	< 17.69	23.0354	20.4[QC:c]			
S95T002712	105:8	Upper ½	< 42.3	< 40.9	< 41.6[QC:a]			
S95T002711		Lower ½	27.7	19.5	23.6[QC:a,c]			
S95T002752	110:2	Lower ½	465	368	416.5[QC:a,c]			
S95T002756	110:3	Upper ½	224	232	228[QC:a]			
S95T002755		Lower ½	95.9	103	99.45[QC:a]			
S95T002758	110:4	Upper ½	195	202	198.5[QC:a]			
S95T002757		Lower ½	71.3	70.0	70.65[QC:a]			
S95T002760	110:5	Upper ½	21.5	< 22.4	22.0[QC:a]			
S95T002759		Lower ½	31.2	38.2	34.7[QC:a,c]			

Table A-16. Tank 241-S-107 Analytical Results: Lead. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 45.7	< 34.7	< 40.2[QC:e]			
S95T002761		Lower ½	58.5	54.4	56.45[QC:a]			
S95T002764	110:7	Upper ½	36.6	35.9	36.25[QC:a]			
S95T002763		Lower ½	35.3	26.6	30.95[QC:e]			
S95T002766	110:8	Upper ½	41.9	39.5	40.7			
S95T002765		Lower ½	25.9	27.2	26.55[QC:a]			
S95T002754	110:3A	Upper ½	276	263	269.5[QC:a]			
S95T002753		Lower ½	182	182	182[QC:a]			
S95T002810	111:2	Lower ½	212	162	187[QC:a,e]			
S95T002811	111:3	Upper ½	130	136	133[QC:a]			
S95T002812		Lower ½	156	44.2	100.1[QC:a,e]			
S95T002814	111:4	Upper ½	155	142	148.5[QC:a]			
S95T002813		Lower ½	131	115	123[QC:a,e]			
S95T002816	111:5	Upper ½	153	141	147[QC:a]			
S95T002815		Lower ½	156	150	153[QC:a]			
S95T002818	111:6	Upper ½	35.2	36.3	35.75[QC:a]			
S95T002817		Lower ½	51.3	48.0	49.65[QC:a]			
S95T002820	111:7	Upper ½	35.1	57.0	46.05[QC:e]			
S95T002819		Lower ½	20.2	22.2	21.2[QC:a]			

Table A-16. Tank 241-S-107 Analytical Results: Lead. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 28.1	< 28.1	< 28.1			
S95T002822		C	30.3	32.6	31.45			
S95T002821		D	27.9	32.9	30.4[QC:c]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.2			
S96T003280	110:8	Lower ½	< 42.20	< 39.2	< 40.7			
S96T003247	111:2	Lower ½	< 38.4	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5			

Table A-16. Tank 241-S-107 Analytical Results: Lead. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	132	115	123.5[QC:a,c]	127	N/A	310
S95T003156	110	N/A	104	108	106[QC:a]			
S95T003162	111	N/A	147	153	150[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	< 37.40	< 39.9	< 38.7			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 38.9		< 2.06
S95T002446	105:2	DL	52.1488	4.1778	28.1633			
S95T002601	110:1	DL	49.7966	< 40.1	< 44.9			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-17. Tank 241-S-107 Analytical Results: Magnesium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	243	219	231[QC:a]	140	16.9	341
S95T002914		Lower ½	167	160	163.5[QC:a]			
S95T002702	105:3	Upper ½	812.246	781.779	797.012			
S95T002701		Lower ½	256.371	255.183	255.777			
S95T002704	105:4	Upper ½	112	103	107.5[QC:a]			
S95T002703		Lower ½	83.4	90.5	86.95[QC:a]			
S95T002706	105:5	Upper ½	91.9937	89.7574	90.8756[QC:a]			
S95T002705		Lower ½	173.399	164.146	168.773[QC:a]			
S95T002708	105:6	Upper ½	31.6908	35.3652	33.528			
S95T002707		Lower ½	62.6503	67.1799	64.9151			
S95T002710	105:7	Upper ½	244.938	287.995	266.466[QC:e]			
S95T002709		Lower ½	50.8192	61.4093	56.1142[QC:e]			
S95T002712	105:8	Upper ½	81.8	< 40.9	61.4[QC:a,e]			
S95T002711		Lower ½	61.3	57.4	59.35[QC:a]			
S95T002752	110:2	Lower ½	665	322	493.5[QC:a,e]			
S95T002756	110:3	Upper ½	414	403	408.5[QC:a]			
S95T002755		Lower ½	155	174	164.5[QC:a,e]			
S95T002758	110:4	Upper ½	67.2	65.9	66.55[QC:a]			
S95T002757		Lower ½	< 32.1	< 31.4	< 31.8[QC:a]			
S95T002760	110:5	Upper ½	30.1	26.8	28.45[QC:a,e]			
S95T002759		Lower ½	31.0	26.6	28.8[QC:a,e]			

Table A-17. Tank 241-S-107 Analytical Results: Magnesium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	42.2	< 34.7	< 38.5[QC:e]			
S95T002761		Lower ½	83.8	84.5	84.15[QC:a]			
S95T002764	110:7	Upper ½	131	130	130.5			
S95T002763		Lower ½	88.0	56.4	72.2[QC:e]			
S95T002766	110:8	Upper ½	94.8	89.0	91.9			
S95T002765		Lower ½	68.2	75.0	71.6			
S95T002754	110:3A	Upper ½	145	< 123	134[QC:a,e]			
S95T002753		Lower ½	273	151	212[QC:a,e]			
S95T002810	111:2	Lower ½	357	300	328.5[QC:e]			
S95T002811	111:3	Upper ½	108	112	110			
S95T002812		Lower ½	174	151	162.5[QC:e]			
S95T002814	111:4	Upper ½	76.3	73.2	74.75			
S95T002813		Lower ½	54.7	47.8	51.25[QC:e]			
S95T002816	111:5	Upper ½	60.6	53.9	57.25[QC:e]			
S95T002815		Lower ½	72.5	70.0	71.25			
S95T002818	111:6	Upper ½	63.1	58.6	60.85			
S95T002817		Lower ½	72.5	68.7	70.6			
S95T002820	111:7	Upper ½	169	249	209[QC:e]			
S95T002819		Lower ½	59.7	57.5	58.6			

Table A-17. Tank 241-S-107 Analytical Results: Magnesium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	95.4	92.8	94.1			
S95T002822		C	109	111	110			
S95T002821		D	40.5	41.1	40.8			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.2			
S96T003280	110:8	Lower ½	< 42.20	< 39.2	< 40.7			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5			

Table A-17. Tank 241-S-107 Analytical Results: Magnesium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	144	142	143[QC:a]	133		324
S95T003156	110	N/A	125	126	125.5[QC:a]			
S95T003162	111	N/A	143	120	131.5[QC:a,c]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	< 37.4	< 39.9	< 38.7			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 40.1		< 2.12
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 40.1	< 40.1	< 40.1			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-18. Tank 241-S-107 Analytical Results: Manganese. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	1,290	1,180	1,235	564	32.9	1,380
S95T002914		Lower ½	1,270	1,170	1,220			
S95T002702	105:3	Upper ½	6,462.13	6,249.67	6,355.9			
S95T002701		Lower ½	1,196.77	1,183.78	1,190.27			
S95T002704	105:4	Upper ½	49.3	46.6	47.95[QC:a]			
S95T002703		Lower ½	45.5	47.9	46.7[QC:a]			
S95T002706	105:5	Upper ½	43.5033	45.2771	44.3902[QC:a]			
S95T002705		Lower ½	56.0198	43.9771	49.9985[QC:a,c]			
S95T002708	105:6	Upper ½	71.2038	80.1952	75.6995[QC:c]			
S95T002707		Lower ½	85.4643	87.8028	86.6336			
S95T002710	105:7	Upper ½	204.598	232.287	218.442[QC:c]			
S95T002709		Lower ½	470.09	531.341	500.715[QC:c]			
S95T002712	105:8	Upper ½	462	416	439[QC:a]			
S95T002711		Lower ½	123	110	116.5[QC:a,c]			
S95T002752	110:2	Lower ½	2,430	2,000	2,215			
S95T002756	110:3	Upper ½	3,560	3,760	3,660			
S95T002755		Lower ½	128	146	137[QC:a,c]			
S95T002758	110:4	Upper ½	37.8	39.4	38.6[QC:a]			
S95T002757		Lower ½	16.5	15.3	15.9[QC:a]			
S95T002760	110:5	Upper ½	9.65	9.71	9.68[QC:a]			
S95T002759		Lower ½	8.64	7.86	8.25[QC:a]			

Table A-18. Tank 241-S-107 Analytical Results: Manganese. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	33.3	32.5	32.9			
S95T002761		Lower ½	57.7	57.7	57.7[QC:a]			
S95T002764	110:7	Upper ½	265	264	264.5[QC:a]			
S95T002763		Lower ½	592	573	582.5			
S95T002766	110:8	Upper ½	823	796	809.5			
S95T002765		Lower ½	71.2	79.1	75.15[QC:a]			
S95T002754	110:3A	Upper ½	29.1	33	31.05[QC:a,c]			
S95T002753		Lower ½	50.1	52.2	51.15[QC:a]			
S95T002810	111:2	Lower ½	938	800	869[QC:a,c]			
S95T002811	111:3	Upper ½	771	796	783.5[QC:a]			
S95T002812		Lower ½	83.2	69.5	76.35[QC:a,c]			
S95T002814	111:4	Upper ½	24.9	23.9	24.4			
S95T002813		Lower ½	25.9	22.8	24.35[QC:a,c]			
S95T002816	111:5	Upper ½	38.7	36.2	37.45			
S95T002815		Lower ½	91.4	89	90.2			
S95T002818	111:6	Upper ½	44.9	65	54.95[QC:a,c]			
S95T002817		Lower ½	90.8	87.3	89.05			
S95T002820	111:7	Upper ½	317	474	395.5[QC:c]			
S95T002819		Lower ½	515	524	519.5[QC:a]			

Table A-18. Tank 241-S-107 Analytical Results: Manganese. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	47.8	48.3	48.05			
S95T002822		C	37.2	33.6	35.4			
S95T002821		D	13.1	14.1	13.6			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	8.270	6.880	7.575[QC:e]			
S96T003302	105:3	Upper ½	157	326.0	241.5[QC:e]			
S96T003303	105:4	Upper ½	< 5.480	< 5.80	< 5.64			
S96T003304	105:5	Lower ½	< 3.780	< 4.41	< 4.10			
S96T003305	105:8	Lower ½	< 3.740	< 3.85	< 3.80			
S96T003276	110:2	Lower ½	< 7.080	< 7.00	< 7.04			
S96T003277	110:3	Upper ½	< 7.360	< 7.74	< 7.55			
S96T003278	110:4	Upper ½	< 3.840	< 3.79	< 3.82			
S96T003279	110:5	Lower ½	< 1.900	< 1.94	< 1.92			
S96T003280	110:8	Lower ½	< 4.220	< 3.92	< 4.07			
S96T003247	111:2	Lower ½	< 3.840	< 3.95	< 3.90			
S96T003258	111:3	Upper ½	< 6.030	< 5.61	< 5.82			
S96T003259	111:4	Upper ½	< 4.000	< 4.30	< 4.15			
S96T003260	111:5	Lower ½	< 3.730	< 4.19	< 3.96			
S96T003261	111:8	Lower ½	< 4.400	< 4.29	< 4.35			

Table A-18. Tank 241-S-107 Analytical Results: Manganese. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	582	494	538[QC:a,c]	587		1,430
S95T003156	110	N/A	685	726	705.5[QC:a]			
S95T003162	111	N/A	579	458	518.5[QC:a,c]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 4.310	< 4.05	< 4.18			
S95T003281	110	N/A	< 3.740	< 3.99	< 3.87			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 4.01	< 4.01	< 4.01	< 4.01		< 0.212
S95T002446	105:2	DL	< 4.01	< 4.01	< 4.01			
S95T002601	110:1	DL	< 4.01	< 4.01	< 4.01			
S95T002602	110:2	DL	< 4.01	< 4.01	< 4.01			
S95T002629	111:1	DL	< 4.01	< 4.01	< 4.01			
S95T002632	111:2	DL	< 4.01	< 4.01	< 4.01			

Table A-19. Tank 241-S-107 Analytical Results: Molybdenum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	18.2	16.8	17.5	19.1	3.6	46.6
S95T002914		Lower ½	< 20.4	< 18.8	< 19.6			
S95T002702	105:3	Upper ½	< 21.32	< 21.87	< 21.6			
S95T002701		Lower ½	< 23.245	< 23.255	< 23.3			
S95T002704	105:4	Upper ½	14.2	13.5	13.85			
S95T002703		Lower ½	21.1	21.3	21.2			
S95T002706	105:5	Upper ½	21.9491	23.7569	22.853			
S95T002705		Lower ½	< 24.29	< 24.425	< 24.4			
S95T002708	105:6	Upper ½	10.4842	11.8494	11.1668[QC:e]			
S95T002707		Lower ½	16.3639	17.099	16.7315			
S95T002710	105:7	Upper ½	21.7495	22.9079	22.3287			
S95T002709		Lower ½	18.7072	21.8844	20.2958[QC:e]			
S95T002712	105:8	Upper ½	< 21.1	< 20.4	< 20.8[QC:a]			
S95T002711		Lower ½	18.0	19.1	18.55[QC:a]			
S95T002752	110:2	Lower ½	< 20.3	< 21.6	< 21.0			
S95T002756	110:3	Upper ½	< 19.7	< 17.5	< 18.6[QC:a,e]			
S95T002755		Lower ½	< 20.5	< 20.4	< 20.45[QC:a]			
S95T002758	110:4	Upper ½	14.0	13.0	13.5[QC:a]			
S95T002757		Lower ½	< 16.2	< 15.7	< 16.0[QC:a]			
S95T002760	110:5	Upper ½	11.4	< 11.2	11.3			
S95T002759		Lower ½	12.5	12.1	12.3[QC:a]			

Table A-19. Tank 241-S-107 Analytical Results: Molybdenum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	23.4	< 17.4	20.4[QC:e]			
S95T002761		Lower ½	15.2	14.2	14.7			
S95T002764	110:7	Upper ½	19.5	19.2	19.35			
S95T002763		Lower ½	25.7	20.7	23.2[QC:e]			
S95T002766	110:8	Upper ½	21.8	< 19.5	20.7[QC:e]			
S95T002765		Lower ½	16.9	19.5	18.2[QC:e]			
S95T002754	110:3A	Upper ½	< 42.7	< 61.5	< 52.1[QC:a,e]			
S95T002753		Lower ½	< 36.6	< 35.5	< 36.1			
S95T002810	111:2	Lower ½	< 18.8	< 17.0	< 17.9			
S95T002811	111:3	Upper ½	21.0	21.5	21.25			
S95T002812		Lower ½	< 20.4	< 17.6	< 19.0[QC:e]			
S95T002814	111:4	Upper ½	17.9	17.3	17.6			
S95T002813		Lower ½	24.5	21.8	23.15[QC:e]			
S95T002816	111:5	Upper ½	33.0	31.4	32.2			
S95T002815		Lower ½	20.4	19.3	19.85			
S95T002818	111:6	Upper ½	< 16.3	< 16.1	< 16.2			
S95T002817		Lower ½	20.0	18.2	19.1			
S95T002820	111:7	Upper ½	20.1	31.8	25.95[QC:e]			
S95T002819		Lower ½	14.3	14.4	14.35			

Table A-19. Tank 241-S-107 Analytical Results: Molybdenum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	16.0	16.9	16.45			
S95T002822		C	14.0	14.4	14.2			
S95T002821		D	12.9	13.3	13.1			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 22.60	< 20.7	< 21.7			
S96T003302	105:3	Upper ½	< 44.20	< 42.3	< 43.3			
S96T003303	105:4	Upper ½	< 27.40	< 29.0	< 28.2[QC:d]			
S96T003304	105:5	Lower ½	25.70	26.30	26.00			
S96T003305	105:8	Lower ½	22.00	21.50	21.75			
S96T003276	110:2	Lower ½	< 35.40	< 35.0	< 35.2			
S96T003277	110:3	Upper ½	< 36.80	< 38.7	< 37.8			
S96T003278	110:4	Upper ½	26.00	25.90	25.95			
S96T003279	110:5	Lower ½	18.00	18.50	18.25[QC:d]			
S96T003280	110:8	Lower ½	23.80	23.50	23.65			
S96T003247	111:2	Lower ½	< 19.20	< 19.8	< 19.5			
S96T003258	111:3	Upper ½	< 30.10	< 28.0	< 29.1			
S96T003259	111:4	Upper ½	22.20	< 21.5	< 21.9			
S96T003260	111:5	Lower ½	31.20	27.00	29.10[QC:e]			
S96T003261	111:8	Lower ½	< 22.00	< 21.5	< 21.8			

Table A-19. Tank 241-S-107 Analytical Results: Molybdenum. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 22.2	< 21.3	< 21.8[QC:a]	< 21.7	N/A	< 52.9
S95T003156	110	N/A	< 19.5	< 19.8	< 19.7[QC:a]			
S95T003162	111	N/A	< 23.3	< 23.0	< 23.2[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 21.60	22.10	< 21.9			
S95T003281	110	N/A	< 18.70	19.9	< 19.3			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	43.9829	40.0888	42.0358	41		2.17
S95T002446	105:2	DL	36.6925	38.456	37.5743			
S95T002601	110:1	DL	41.0492	38.7578	39.9035			
S95T002602	110:2	DL	42.3829	44.6214	43.5022			
S95T002629	111:1	DL	42.3865	42.9855	42.686			
S95T002632	111:2	DL	40.2757	40.2857	40.2807			

Table A-20. Tank 241-S-107 Analytical Results: Neodymium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	83.8	78.1	80.95	< 53.4	N/A	< 130
S95T002914		Lower ½	55.7	51.4	53.55			
S95T002702	105:3	Upper ½	357.982	342.194	350.088			
S95T002701		Lower ½	113.633	112.187	112.91			
S95T002704	105:4	Upper ½	< 16.2	< 15.4	< 15.8			
S95T002703		Lower ½	26.2	24.4	25.3			
S95T002706	105:5	Upper ½	< 31.3	< 27.7	< 29.5[QC:e]			
S95T002705		Lower ½	< 48.58	< 48.85	< 48.7			
S95T002708	105:6	Upper ½	< 7.42	< 8.32	< 7.87[QC:e]			
S95T002707		Lower ½	< 14.45	< 15.74	< 15.1			
S95T002710	105:7	Upper ½	< 19.68	< 17.97	< 18.8			
S95T002709		Lower ½	46.6631	53.3737	50.0184[QC:e]			
S95T002712	105:8	Upper ½	69.1	61.8	65.45[QC:a,e]			
S95T002711		Lower ½	61.7	60.2	60.95[QC:a]			
S95T002752	110:2	Lower ½	75.1	64.9	70.0[QC:e]			
S95T002756	110:3	Upper ½	294	296	295[QC:a]			
S95T002755		Lower ½	< 41.0	< 40.8	< 40.9[QC:a]			
S95T002758	110:4	Upper ½	< 20.6	< 23.2	< 21.9[QC:a,e]			
S95T002757		Lower ½	< 32.1	< 31.4	< 31.8[QC:a]			
S95T002760	110:5	Upper ½	< 17.9	< 22.4	< 20.2[QC:e]			
S95T002759		Lower ½	< 21.5	< 19.6	< 20.6[QC:a]			

Table A-20. Tank 241-S-107 Analytical Results: Neodymium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 38.0	< 34.7	< 36.35			
S95T002761		Lower ½	< 17.7	< 19.8	< 18.8[QC:e]			
S95T002764	110:7	Upper ½	22	21.6	21.8			
S95T002763		Lower ½	47.5	42.8	45.15			
S95T002766	110:8	Upper ½	59.9	58.3	59.1			
S95T002765		Lower ½	48.6	54.6	51.6[QC:e]			
S95T002754	110:3A	Upper ½	< 85.4	< 123	< 104[QC:a,e]			
S95T002753		Lower ½	< 73.2	< 70.9	< 72.1			
S95T002810	111:2	Lower ½	42.2	36.7	39.45[QC:e]			
S95T002811	111:3	Upper ½	62.0	63.4	62.7			
S95T002812		Lower ½	< 40.7	< 35.3	< 38.0[QC:e]			
S95T002814	111:4	Upper ½	< 32.1	< 31.1	< 31.6			
S95T002813		Lower ½	< 18.8	< 16.8	< 17.8[QC:e]			
S95T002816	111:5	Upper ½	< 29.9	< 28.0	< 29.0			
S95T002815		Lower ½	< 14.9	< 14.3	< 14.6			
S95T002818	111:6	Upper ½	< 32.6	< 32.3	< 32.5			
S95T002817		Lower ½	< 15.4	< 14.5	< 15.0			
S95T002820	111:7	Upper ½	24.2	39.3	31.75[QC:e]			
S95T002819		Lower ½	41.4	42.3	41.85			

Table A-20. Tank 241-S-107 Analytical Results: Neodymium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	63.1	66.1	64.6			
S95T002822		C	73.4	72.5	72.95			
S95T002821		D	24.9	27.5	26.2			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5[QC:d]			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.2			
S96T003280	110:8	Lower ½	< 42.20	< 39.2	< 40.7[QC:d,b]			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6[QC:d]			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5[QC:d]			

Table A-20. Tank 241-S-107 Analytical Results: Neodymium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	47.7	< 42.7	45.2[QC:a,c]	47.3	N/A	115
S95T003156	110	N/A	50.5	52.1	51.3[QC:a]			
S95T003162	111	N/A	< 46.6	< 43.9	< 45.3[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	< 37.40	< 39.9	< 38.7[QC:d]			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 40.1		< 2.12
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 40.1	< 40.1	< 40.1			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-21. Tank 241-S-107 Analytical Results: Nickel. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	313	299	306	1,280	24.7	3,120
S95T002914		Lower ½	355	322	338.5			
S95T002702	105:3	Upper ½	200.667	205.548	203.108			
S95T002701		Lower ½	130.777	135.081	132.929			
S95T002704	105:4	Upper ½	6,970	6,540	7,760			
S95T002703		Lower ½	7,430	7,570	7,500			
S95T002706	105:5	Upper ½	5,260.11	5,525.35	5,392.73			
S95T002705		Lower ½	2,949.47	2,957.56	2,953.52			
S95T002708	105:6	Upper ½	555.834	628.207	592.02[QC:e]			
S95T002707		Lower ½	750.905	793.585	772.245			
S95T002710	105:7	Upper ½	168.39	212.31	190.35[QC:e]			
S95T002709		Lower ½	94.4566	125.423	109.94[QC:e]			
S95T002712	105:8	Upper ½	212	124	168[QC:a,e]			
S95T002711		Lower ½	143	130	136.5[QC:a]			
S95T002752	110:2	Lower ½	276	259	267.5			
S95T002756	110:3	Upper ½	164	151	157.5[QC:a]			
S95T002755		Lower ½	892	1,030	961[QC:a,e]			
S95T002758	110:4	Upper ½	4,230	4,470	4,350			
S95T002757		Lower ½	1,600	1,720	1,660			

Table A-21. Tank 241-S-107 Analytical Results: Nickel. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002760	110:5	Upper ½	586	489	537.5[QC:e]			
S95T002759		Lower ½	973	917	945[QC:a]			
S95T002762	110:6	Upper ½	484	469	476.5			
S95T002761		Lower ½	927	867	897			
S95T002764	110:7	Upper ½	105	103	104			
S95T002763		Lower ½	118	116	117			
S95T002766	110:8	Upper ½	191	195	193			
S95T002765		Lower ½	149	165	157			
S95T002754	110:3A	Upper ½	549	466	507.5[QC:a,e]			
S95T002753		Lower ½	953	949	951			
S95T002810	111:2	Lower ½	167	133	150[QC:a,e]			
S95T002811	111:3	Upper ½	110	116	113[QC:a]			
S95T002812		Lower ½	97.3	88.6	92.95			
S95T002814	111:4	Upper ½	663	636	649.5			
S95T002813		Lower ½	1,610	1,420	1,515			
S95T002816	111:5	Upper ½	5,150	4,810	4,980			
S95T002815		Lower ½	5,250	5,090	5,170			
S95T002818	111:6	Upper ½	832	1,030	931[QC:e]			
S95T002817		Lower ½	536	512	524			
S95T002820	111:7	Upper ½	163	261	212[QC:e]			
S95T002819		Lower ½	130	129	129.5			

Table A-21. Tank 241-S-107 Analytical Results: Nickel. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	196	185	190.5			
S95T002822		C	199	200	199.5			
S95T002821		D	111	120	115.5			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	12.90	< 8.28	10.6			
S96T003302	105:3	Upper ½	< 17.70	24.50	21.1			
S96T003303	105:4	Upper ½	17.00	15.90	16.45			
S96T003304	105:5	Lower ½	7.670	10.50	9.085[QC:e]			
S96T003305	105:8	Lower ½	< 7.490	< 7.70	<7.60			
S96T003276	110:2	Lower ½	< 14.20	< 14.0	< 14.1			
S96T003277	110:3	Upper ½	< 14.70	< 15.5	< 15.1			
S96T003278	110:4	Upper ½	< 7.670	< 7.59	< 7.63			
S96T003279	110:5	Lower ½	7.890	9.620	8.755[QC:e]			
S96T003280	110:8	Lower ½	< 8.430	< 7.84	< 8.14			
S96T003247	111:2	Lower ½	< 7.690	< 7.91	< 7.80			
S96T003258	111:3	Upper ½	< 12.10	< 11.2	< 11.7			
S96T003259	111:4	Upper ½	20.60	17.10	18.85[QC:e]			
S96T003260	111:5	Lower ½	15.50	15.80	15.65			
S96T003261	111:8	Lower ½	< 8.790	< 8.59	< 8.69			

Table A-21. Tank 241-S-107 Analytical Results: Nickel. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	2,230	1,870	2,050	1,400	N/A	3,410
S95T003156	110	N/A	771	822	796.5[QC:a]			
S95T003162	111	N/A	1,370	1,330	1,350			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	13.90	19.00	16.45[QC:e]			
S95T003281	110	N/A	< 7.480	< 7.98	< 7.69			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	8.5597	9.4819	9.0208	< 8.4	N/A	< 0.445
S95T002446	105:2	DL	< 8.02	< 8.02	< 8.02			
S95T002601	110:1	DL	< 8.02	< 8.02	< 8.02			
S95T002602	110:2	DL	8.7505	9.8168	9.28365			
S95T002629	111:1	DL	< 8.02	< 8.02	< 8.02			
S95T002632	111:2	DL	< 8.02	8.0552	8.04			

Table A-22. Tank 241-S-107 Analytical Results: Phosphorus. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	19,200	15,600	17,400	4,040	36.4	9,850
S95T002914		Lower ½	40,400	35,700	38,050			
S95T002702	105:3	Upper ½	26,868.8	26,710.6	26,789.7			
S95T002701		Lower ½	1,363.67	1,333.68	1,348.68			
S95T002704	105:4	Upper ½	179	167	173			
S95T002703		Lower ½	409	420	414.5			
S95T002706	105:5	Upper ½	417.086	528.8	472.943[QC:a,e]			
S95T002705		Lower ½	750.714	754.605	752.659[QC:a]			
S95T002708	105:6	Upper ½	245.002	280.835	262.918[QC:e]			
S95T002707		Lower ½	408.18	399.489	403.835			
S95T002710	105:7	Upper ½	683.642	745.564	714.603			
S95T002709		Lower ½	689.503	786.952	738.227[QC:e]			
S95T002712	105:8	Upper ½	632	583	607.5[QC:a]			
S95T002711		Lower ½	333	381	357[QC:a,e]			
S95T002752	110:2	Lower ½	29,400	27,900	28,650			
S95T002756	110:3	Upper ½	1,490	1,760	1,625			
S95T002755		Lower ½	3,660	340	2,000			
S95T002758	110:4	Upper ½	376	298	337[QC:a,e]			
S95T002757		Lower ½	162	164	163[QC:a]			
S95T002760	110:5	Upper ½	270	360	315[QC:e]			
S95T002759		Lower ½	437	459	448[QC:a]			

Table A-22. Tank 241-S-107 Analytical Results: Phosphorus. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	1,940	1,870	1,905			
S95T002761		Lower ½	329	383	356[QC:e]			
S95T002764	110:7	Upper ½	602	588	595			
S95T002763		Lower ½	756	734	745			
S95T002766	110:8	Upper ½	746	711	728.5			
S95T002765		Lower ½	352	380	366			
S95T002754	110:3A	Upper ½	378	296	337[QC:a,e]			
S95T002753		Lower ½	415	352	383.5[QC:e]			
S95T002810	111:2	Lower ½	28,700	24,500	26,600			
S95T002811	111:3	Upper ½	487	508	497.5[QC:a]			
S95T002812		Lower ½	1,080	827	953.5[QC:e]			
S95T002814	111:4	Upper ½	1,550	1,220	1,385			
S95T002813		Lower ½	1,420	1,250	1,335			
S95T002816	111:5	Upper ½	912	844	878			
S95T002815		Lower ½	352	336	344			
S95T002818	111:6	Upper ½	206	243	224.5[QC:e]			
S95T002817		Lower ½	518	506	512			
S95T002820	111:7	Upper ½	802	1,170	986[QC:e]			
S95T002819		Lower ½	534	543	538.5			

Table A-22. Tank 241-S-107 Analytical Results: Phosphorus. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	378	381	379.5			
S95T002822		C	242	235	238.5			
S95T002821		D	208	223	215.5			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	41,900	43,200	42,600			
S96T003302	105:3	Upper ½	44,700	47,000	45,800			
S96T003303	105:4	Upper ½	131	< 116	124			
S96T003304	105:5	Lower ½	264	322.0	293.0[QC:e]			
S96T003305	105:8	Lower ½	516	414.0	465.0[QC:e]			
S96T003276	110:2	Lower ½	9,710	20,600	15,200[QC:c,e]			
S96T003277	110:3	Upper ½	8,350	1,150	4,750[QC:e]			
S96T003278	110:4	Upper ½	175	200.0	187.5[QC:e]			
S96T003279	110:5	Lower ½	189	752.0	470.5[QC:e]			
S96T003280	110:8	Lower ½	471	428.0	449.5			
S96T003247	111:2	Lower ½	35,900	35,100	35,500			
S96T003258	111:3	Upper ½	60,900	66,900	63,900[QC:d]			
S96T003259	111:4	Upper ½	36,300	35,600	36,000			
S96T003260	111:5	Lower ½	400	373.0	386.5			
S96T003261	111:8	Lower ½	239	225.0	232.0			

Table A-22. Tank 241-S-107 Analytical Results: Phosphorus. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	859	7,740	4,299.5[QC:e]	2,110	N/A	5,150
S95T003156	110	N/A	802	755	778.5[QC:a]			
S95T003162	111	N/A	1,350	1,130	1,240			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	3,990	9,400	6,700[QC:e]			
S95T003281	110	N/A	5,510	3,300	4,400[QC:d,e]			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	1,518.49	1,450.37	1,484.43	1,500		79.3
S95T002446	105:2	DL	1,544.3	1,565.16	1,554.73			
S95T002601	110:1	DL	1,455.44	1,430.86	1,443.15			
S95T002602	110:2	DL	1,420.31	1,460.78	1,440.54			
S95T002629	111:1	DL	1,390.38	1,445.15	1,417.76			
S95T002632	111:2	DL	1,661	1,621.87	1,641.44			

Table A-23. Tank 241-S-107 Analytical Results: Potassium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	566	511	538.5	538	5.7	1,310
S95T002914		Lower ½	469	377	423[QC:e]			
S95T002702	105:3	Upper ½	541.1	522.904	532.002			
S95T002701		Lower ½	756.392	763.86	760.126			
S95T002704	105:4	Upper ½	460	435	447.5			
S95T002703		Lower ½	748	788	768			
S95T002706	105:5	Upper ½	778.827	811.669	795.248			
S95T002705		Lower ½	902.883	852.273	877.578			
S95T002708	105:6	Upper ½	274.314	301.929	288.121			
S95T002707		Lower ½	411.54	449.377	430.458			
S95T002710	105:7	Upper ½	506.222	535.669	520.945			
S95T002709		Lower ½	453.909	552.159	503.034[QC:e]			
S95T002712	105:8	Upper ½	542	470	506[QC:a,e]			
S95T002711		Lower ½	496	520	508[QC:a]			
S95T002752	110:2	Lower ½	479	478	478.5			
S95T002756	110:3	Upper ½	625	609	617[QC:a]			
S95T002755		Lower ½	678	680	679[QC:a]			
S95T002758	110:4	Upper ½	583	581	582[QC:a]			
S95T002757		Lower ½	361	418	389.5[QC:a,e]			

Table A-23. Tank 241-S-107 Analytical Results: Potassium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002760	110:5	Upper ½	328	279	303.5[QC:e]			
S95T002759		Lower ½	377	327	352[QC:a,e]			
S95T002762	110:6	Upper ½	470	436	453			
S95T002761		Lower ½	404	388	396			
S95T002764	110:7	Upper ½	431	450	440.5			
S95T002763		Lower ½	531	483	507			
S95T002766	110:8	Upper ½	482	481	481.5			
S95T002765		Lower ½	489	537	513			
S95T002754	110:3A	Upper ½	781	843	812[QC:a]			
S95T002753		Lower ½	556	629	592.5[QC:e]			
S95T002810	111:2	Lower ½	472	374	423[QC:e]			
S95T002811	111:3	Upper ½	615	605	610			
S95T002812		Lower ½	659	620	639.5[QC:a]			
S95T002814	111:4	Upper ½	567	523	545[QC:a]			
S95T002813		Lower ½	632	584	608[QC:a]			
S95T002816	111:5	Upper ½	864	857	860.5[QC:a]			
S95T002815		Lower ½	627	614	620.5[QC:a]			
S95T002818	111:6	Upper ½	382	365	373.5			
S95T002817		Lower ½	456	452	454[QC:a]			
S95T002820	111:7	Upper ½	525	782	653.5[QC:e]			
S95T002819		Lower ½	458	486	472			

Table A-23. Tank 241-S-107 Analytical Results: Potassium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	530	498	514			
S95T002822		C	438	399	418.5			
S95T002821		D	872	969	920.5			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	535	526.0	530.5			
S96T003302	105:3	Upper ½	537	467.0	502.0[QC:e]			
S96T003303	105:4	Upper ½	784	745.0	764.5			
S96T003304	105:5	Lower ½	588	719.0	653.5[QC:e]			
S96T003305	105:8	Lower ½	722	796.0	759.0			
S96T003276	110:2	Lower ½	863	719.0	791.0[QC:c,e]			
S96T003277	110:3	Upper ½	652	717.0	684.5			
S96T003278	110:4	Upper ½	744	735.0	739.5[QC:c]			
S96T003279	110:5	Lower ½	492	521.0	506.5			
S96T003280	110:8	Lower ½	643	656.0	649.5[QC:d]			
S96T003247	111:2	Lower ½	538	537.0	537.5			
S96T003258	111:3	Upper ½	340	365.0	352.5			
S96T003259	111:4	Upper ½	632	555.0	593.5[QC:e]			
S96T003260	111:5	Lower ½	763	669.0	716.0[QC:e]			
S96T003261	111:8	Lower ½	488	509.0	498.5			

Table A-23. Tank 241-S-107 Analytical Results: Potassium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	649	517	583[QC:e]	547		1,330
S95T003156	110	N/A	476	468	472			
S95T003162	111	N/A	539	634	586.5[QC:e]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	480	657.0	568.5[QC:c,e]			
S95T003281	110	N/A	447	442.0	444.5			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	1,388.12	1,361.02	1,374.57	1,290		68.1
S95T002446	105:2	DL	1,135.74	1,090.49	1,113.12			
S95T002601	110:1	DL	1,282.89	1,253.7	1,268.3			
S95T002602	110:2	DL	1,298.57	1,469.8	1,384.18			
S95T002629	111:1	DL	1,338.15	1,269.57	1,303.86			
S95T002632	111:2	DL	1,262.93	1,272	1,267.47			

Table A-24. Tank 241-S-107 Analytical Results: Samarium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	< 17.1	< 23.4	< 20.3[QC:c]	< 27.1	N/A	< 66.1
S95T002914		Lower ½	< 40.5	< 37.5	< 39.0			
S95T002702	105:3	Upper ½	< 42.64	< 43.74	< 43.2			
S95T002701		Lower ½	< 46.49	< 46.51	< 46.5			
S95T002704	105:4	Upper ½	< 16.2	< 15.4	< 15.8			
S95T002703		Lower ½	< 26.2	< 24.4	< 25.3			
S95T002706	105:5	Upper ½	< 31.3	< 27.7	< 29.5[QC:c]			
S95T002705		Lower ½	< 48.58	< 48.85	< 48.7			
S95T002708	105:6	Upper ½	< 7.42	< 8.32	< 7.87[QC:c]			
S95T002707		Lower ½	< 14.45	< 15.74	< 15.1			
S95T002710	105:7	Upper ½	< 19.68	< 17.97	< 18.8			
S95T002709		Lower ½	< 17.69	< 18.74	< 18.2			
S95T002712	105:8	Upper ½	< 42.3	< 40.9	< 41.6[QC:a]			
S95T002711		Lower ½	< 17.0	< 17.1	< 17.1[QC:a]			
S95T002752	110:2	Lower ½	< 40.5	< 43.2	< 41.9			
S95T002756	110:3	Upper ½	< 39.4	< 35.2	< 37.3[QC:a,c]			
S95T002755		Lower ½	< 41	< 40.8	< 40.9[QC:a]			
S95T002758	110:4	Upper ½	< 20.6	< 23.2	< 21.9[QC:a,c]			
S95T002757		Lower ½	< 32.1	< 31.4	< 31.8[QC:a]			
S95T002760	110:5	Upper ½	< 17.9	< 22.4	< 20.2[QC:c]			
S95T002759		Lower ½	< 21.5	< 19.6	< 20.6[QC:a]			

Table A-24. Tank 241-S-107 Analytical Results: Samarium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 38	< 34.7	< 36.4			
S95T002761		Lower ½	< 17.7	< 19.8	< 18.8[QC:e]			
S95T002764	110:7	Upper ½	< 16.5	< 17.8	< 17.2			
S95T002763		Lower ½	< 17.3	< 16.3	< 16.8			
S95T002766	110:8	Upper ½	< 40.2	< 39.0	< 39.6			
S95T002765		Lower ½	< 18.3	< 16.9	< 17.6			
S95T002754	110:3A	Upper ½	< 85.4	< 123	< 104[QC:a,e]			
S95T002753		Lower ½	< 73.2	< 70.9	< 72.1			
S95T002810	111:2	Lower ½	< 37.6	< 33.9	< 35.8			
S95T002811	111:3	Upper ½	< 18.7	< 19.2	< 19.0			
S95T002812		Lower ½	< 40.7	< 35.3	< 38.0[QC:e]			
S95T002814	111:4	Upper ½	< 32.1	< 31.1	< 31.6			
S95T002813		Lower ½	< 18.8	< 16.8	< 17.8[QC:e]			
S95T002816	111:5	Upper ½	< 29.9	< 28.0	< 29.0			
S95T002815		Lower ½	< 14.9	< 14.3	< 14.6			
S95T002818	111:6	Upper ½	< 32.6	< 32.3	< 32.5			
S95T002817		Lower ½	< 15.4	< 14.5	< 15.0			
S95T002820	111:7	Upper ½	< 19.4	< 22.7	< 21.1[QC:e]			
S95T002819		Lower ½	< 16.3	< 16.1	< 16.2			

Table A-24. Tank 241-S-107 Analytical Results: Samarium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 28.1	< 25.8	< 27.0			
S95T002822		C	< 17.5	16.5	17.0			
S95T002821		D	< 20.2	< 22.6	< 21.4[QC:e]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2[QC:d,e]			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.2			
S96T003280	110:8	Lower ½	< 42.20	< 39.2	< 40.7			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5			

Table A-24. Tank 241-S-107 Analytical Results: Samarium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 44.3	< 42.7	< 43.5[QC:a]	<42.7		< 104
S95T003156	110	N/A	< 39.1	< 39.5	< 39.3[QC:a]			
S95T003162	111	N/A	< 46.6	< 43.9	< 45.25[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	< 37.40	< 39.9	< 39.9			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 40.1		< 2.12
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 40.1	< 40.1	< 40.1			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-25. Tank 241-S-107 Analytical Results: Selenium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	< 17.1	< 23.4	< 20.3[QC:e]	< 32.0	N/A	< 78.0
S95T002914		Lower ½	< 40.5	< 37.5	< 39.0			
S95T002702	105:3	Upper ½	< 42.64	< 43.74	< 43.2			
S95T002701		Lower ½	< 46.49	< 46.51	< 46.5			
S95T002704	105:4	Upper ½	< 16.2	< 15.4	< 15.8			
S95T002703		Lower ½	< 26.2	< 24.4	< 25.3			
S95T002706	105:5	Upper ½	< 31.3	< 27.7	< 29.5[QC:a,e]			
S95T002705		Lower ½	48.9451	< 48.85	< 48.9[QC:a]			
S95T002708	105:6	Upper ½	7.5885	8.6911	8.14[QC:e]			
S95T002707		Lower ½	< 14.45	< 15.74	< 15.2			
S95T002710	105:7	Upper ½	< 19.68	< 17.97	< 18.8			
S95T002709		Lower ½	< 17.69	< 18.74	< 18.2			
S95T002712	105:8	Upper ½	< 42.3	< 40.9	< 41.6[QC:a]			
S95T002711		Lower ½	< 17.0	< 17.1	< 17.1[QC:a]			
S95T002752	110:2	Lower ½	< 40.5	< 43.2	< 41.9			
S95T002756	110:3	Upper ½	45.5	39.3	42.4[QC:a,e]			
S95T002755		Lower ½	46.3	54.0	50.15[QC:a,e]			
S95T002758	110:4	Upper ½	< 27.8	< 36.6	< 32.2[QC:a,e]			
S95T002757		Lower ½	< 32.1	< 31.4	< 31.8[QC:a]			
S95T002760	110:5	Upper ½	< 17.9	< 22.4	< 20.2[QC:e]			
S95T002759		Lower ½	< 21.5	< 19.6	< 20.6[QC:a]			

Table A-25. Tank 241-S-107 Analytical Results: Selenium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 38.0	< 34.7	< 36.4			
S95T002761		Lower ½	< 17.7	< 19.8	< 18.8[QC:e]			
S95T002764	110:7	Upper ½	< 16.5	< 17.8	< 17.2[QC:a]			
S95T002763		Lower ½	< 17.3	< 16.3	< 16.8			
S95T002766	110:8	Upper ½	< 40.2	< 39.0	< 39.6			
S95T002765		Lower ½	< 18.3	< 16.9	< 17.6[QC:a]			
S95T002754	110:3A	Upper ½	89.8	124	106.9[QC:a,e]			
S95T002753		Lower ½	< 73.2	< 70.9	< 72.1			
S95T002810	111:2	Lower ½	< 37.6	< 33.9	< 35.8			
S95T002811	111:3	Upper ½	< 18.7	< 19.2	< 19.0			
S95T002812		Lower ½	< 40.7	< 36.7	< 38.7			
S95T002814	111:4	Upper ½	< 32.1	< 31.1	< 31.6			
S95T002813		Lower ½	< 18.8	< 16.8	< 17.8[QC:e]			
S95T002816	111:5	Upper ½	< 29.9	< 28.0	< 29.0			
S95T002815		Lower ½	< 14.9	< 14.3	< 14.6			
S95T002818	111:6	Upper ½	< 32.6	< 32.3	< 32.5[QC:a]			
S95T002817		Lower ½	< 15.4	< 14.5	< 15.0			
S95T002820	111:7	Upper ½	< 19.4	28.4	23.9[QC:e]			
S95T002819		Lower ½	< 16.3	< 16.1	< 16.2[QC:a]			

Table A-25. Tank 241-S-107 Analytical Results: Selenium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 28.1	< 25.8	< 27.0			
S95T002822		C	19.0	15.8	17.4[QC:e]			
S95T002821		D	< 20.2	< 22.6	< 21.4[QC:e]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 45.10	< 41.4	< 43.3			
S96T003302	105:3	Upper ½	< 88.30	< 84.6	< 86.5			
S96T003303	105:4	Upper ½	< 54.80	< 58.0	< 56.4[QC:d]			
S96T003304	105:5	Lower ½	< 37.80	< 44.1	< 41.0			
S96T003305	105:8	Lower ½	< 37.40	< 38.5	< 38.0			
S96T003276	110:2	Lower ½	< 70.80	< 70.0	< 70.4			
S96T003277	110:3	Upper ½	< 73.60	< 77.4	< 75.5			
S96T003278	110:4	Upper ½	< 38.40	< 37.9	< 38.2			
S96T003279	110:5	Lower ½	< 19.00	< 19.4	< 19.2[QC:d]			
S96T003280	110:8	Lower ½	72.60	76.55	74.55			
S96T003247	111:2	Lower ½	< 38.40	< 39.5	< 39.0			
S96T003258	111:3	Upper ½	< 60.30	< 56.1	< 58.2			
S96T003259	111:4	Upper ½	< 40.00	< 43.0	< 41.5			
S96T003260	111:5	Lower ½	< 37.30	< 41.9	< 39.6			
S96T003261	111:8	Lower ½	< 44.00	< 42.9	< 43.5[QC:d]			

Table A-25. Tank 241-S-107 Analytical Results: Selenium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 44.3	< 42.7	< 43.5[QC:a]	< 42.3		< 103
S95T003156	110	N/A	< 39.1	< 39.5	< 39.3[QC:a]			
S95T003162	111	N/A	< 46.6	< 43.9	< 45.2[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 43.10	< 40.5	< 41.8			
S95T003281	110	N/A	60.70	84.60	72.65			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 40.1	< 40.1	< 40.1	< 40.1		< 2.12
S95T002446	105:2	DL	< 40.1	< 40.1	< 40.1			
S95T002601	110:1	DL	< 40.1	< 40.1	< 40.1			
S95T002602	110:2	DL	< 40.1	< 40.1	< 40.1			
S95T002629	111:1	DL	< 40.1	< 40.1	< 40.1			
S95T002632	111:2	DL	< 40.1	< 40.1	< 40.1			

Table A-26. Tank 241-S-107 Analytical Results: Silicon. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	1,080	947	1,013.5	2,180	28.9	5,210
S95T002914		Lower ½	1,710	1,350	1,530			
S95T002702	105:3	Upper ½	1,343.43	2,298.46	1,820.94			
S95T002701		Lower ½	5,516.56	5,446.18	5,481.37			
S95T002704	105:4	Upper ½	6,600	6,240	6,420			
S95T002703		Lower ½	5,730	5,510	5,620			
S95T002706	105:5	Upper ½	3,375.06	4,959.36	4,167.21			
S95T002705		Lower ½	3,322.73	3,390.45	3,356.59			
S95T002708	105:6	Upper ½	1,862.33	2,101.74	1,982.03			
S95T002707		Lower ½	3,519.41	3,632.75	3,576.08			
S95T002710	105:7	Upper ½	7,253.34	8,780.32	8,016.83			
S95T002709		Lower ½	784.931	1,163.29	974.11[QC:b,e]			
S95T002712	105:8	Upper ½	1,430	1,420	1,425			
S95T002711		Lower ½	882	991	936.5[QC:a,e]			
S95T002752	110:2	Lower ½	286	1,780	1,033			
S95T002756	110:3	Upper ½	4,070	3,820	3,945			
S95T002755		Lower ½	3,980	4,350	4,165			
S95T002758	110:4	Upper ½	3,820	4,570	4,195			
S95T002757		Lower ½	2,530	3,120	2,825			
S95T002760	110:5	Upper ½	1,720	1,370	1,545			
S95T002759		Lower ½	2,160	1,890	2,025			

Table A-26. Tank 241-S-107 Analytical Results: Silicon. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	728	716	722[QC:b]			
S95T002761		Lower ½	5,470	4,440	4,955			
S95T002764	110:7	Upper ½	345	341	343[QC:b]			
S95T002763		Lower ½	551	533	542[QC:b]			
S95T002766	110:8	Upper ½	568	529	548.5[QC:b]			
S95T002765		Lower ½	405	444	424.5[QC:b]			
S95T002754	110:3A	Upper ½	5,300	6,330	5,815			
S95T002753		Lower ½	5,550	6,480	6,015			
S95T002810	111:2	Lower ½	413	394	403.5[QC:b]			
S95T002811	111:3	Upper ½	335	329	332[QC:b]			
S95T002812		Lower ½	845	759	802[QC:b]			
S95T002814	111:4	Upper ½	736	687	711.5[QC:b]			
S95T002813		Lower ½	572	495	533.5[QC:b,c]			
S95T002816	111:5	Upper ½	2,420	2,340	2,380			
S95T002815		Lower ½	618	594	606[QC:b]			
S95T002818	111:6	Upper ½	3,250	320	1,785[QC:e]			
S95T002817		Lower ½	1,480	1,450	1,465			
S95T002820	111:7	Upper ½	2,920	4,330	3,625[QC:e]			
S95T002819		Lower ½	648	654	651[QC:b]			

Table A-26. Tank 241-S-107 Analytical Results: Silicon. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	469	817	643[QC:b,e]			
S95T002822		C	1,130	1,170	1,150			
S95T002821		D	384	409	396.5[QC:b]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	349	241.0	295.0[QC:d,e]			
S96T003302	105:3	Upper ½	5,150	4,530	4,840[QC:e]			
S96T003303	105:4	Upper ½	5,060	4,600	4,830[QC:d]			
S96T003304	105:5	Lower ½	317	368.0	342.5[QC:e]			
S96T003305	105:8	Lower ½	237	298.0	267.5[QC:d,e]			
S96T003276	110:2	Lower ½	199	613.0	406.0[QC:e]			
S96T003277	110:3	Upper ½	948	2,250	1,600[QC:e]			
S96T003278	110:4	Upper ½	348	1,990	1,170[QC:e]			
S96T003279	110:5	Lower ½	178	121.0	149.5[QC:e]			
S96T003280	110:8	Lower ½	151	111.0	131.0			
S96T003247	111:2	Lower ½	337	284.0	310.5[QC:d,e]			
S96T003258	111:3	Upper ½	425	353.0	389.0[QC:e]			
S96T003259	111:4	Upper ½	1,100	1,700	1,400			
S96T003260	111:5	Lower ½	251	216.0	233.5[QC:d,e]			
S96T003261	111:8	Lower ½	175	304.0	239.5[QC:d,e]			

Table A-26. Tank 241-S-107 Analytical Results: Silicon. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	2,340	1,240	1,790	1,280		3,120
S95T003156	110	N/A	623	1,430	1,026.5			
S95T003162	111	N/A	876	1,160	1,018			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	863	1,190	1,030[QC:d,e]			
S95T003281	110	N/A	2,250	1,480	1,860[QC:d,e]			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	135.884	125.476	130.68	85.3		4.52
S95T002446	105:2	DL	40.2195	41.5247	40.8721			
S95T002601	110:1	DL	147.18	134.242	140.711			
S95T002602	110:2	DL	48.3039	55.5976	51.9507			
S95T002629	111:1	DL	77.275	78.4339	77.8545			
S95T002632	111:2	DL	66.8988	73.0459	69.9724			

Table A-27. Tank 241-S-107 Analytical Results: Silver. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	9.38	9.08	9.23[QC:a]	36.7	30.6	89.5
S95T002914		Lower ½	17.5	16.5	17.0[QC:a]			
S95T002702	105:3	Upper ½	31.2229	33.0241	32.1235			
S95T002701		Lower ½	226.109	223.437	224.773			
S95T002704	105:4	Upper ½	10.6	10.3	10.45[QC:a]			
S95T002703		Lower ½	23.3	25.6	24.45[QC:a]			
S95T002706	105:5	Upper ½	56.6125	58.102	57.3573[QC:a]			
S95T002705		Lower ½	290.65	293.564	292.107[QC:a]			
S95T002708	105:6	Upper ½	0.8671	< 0.832	0.850			
S95T002707		Lower ½	< 1.445	< 1.574	< 1.51			
S95T002710	105:7	Upper ½	< 1.968	< 1.797	< 1.88			
S95T002709		Lower ½	< 1.769	< 1.874	< 1.82			
S95T002712	105:8	Upper ½	< 4.23	< 4.09	< 4.16[QC:a]			
S95T002711		Lower ½	< 1.70	2.49	2.10[QC:a,c]			
S95T002752	110:2	Lower ½	7.29	17.5	12.395[QC:a,c]			
S95T002756	110:3	Upper ½	141	144	142.5[QC:a]			
S95T002755		Lower ½	173	219	196[QC:a,c]			
S95T002758	110:4	Upper ½	82.8	85.8	84.3[QC:a]			
S95T002757		Lower ½	8.44	9.04	8.74[QC:a]			
S95T002760	110:5	Upper ½	4.54	3.75	4.145[QC:a,c]			
S95T002759		Lower ½	3.94	< 1.96	2.95[QC:a,c]			

Table A-27. Tank 241-S-107 Analytical Results: Silver. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 3.80	< 3.47	< 3.64			
S95T002761		Lower ½	2.01	< 1.98	< 2.00[QC:a]			
S95T002764	110:7	Upper ½	< 1.65	< 1.78	< 1.72[QC:a]			
S95T002763		Lower ½	< 1.73	< 1.63	< 1.68			
S95T002766	110:8	Upper ½	< 4.02	< 3.90	< 3.96			
S95T002765		Lower ½	< 1.83	< 1.69	< 1.76[QC:a]			
S95T002754	110:3A	Upper ½	362	384	373[QC:a]			
S95T002753		Lower ½	326	333	329.5[QC:a]			
S95T002810	111:2	Lower ½	5.87	4.73	5.30[QC:a,c]			
S95T002811	111:3	Upper ½	15.4	15.6	15.5[QC:a]			
S95T002812		Lower ½	211	188	199.5[QC:a,c]			
S95T002814	111:4	Upper ½	42.0	37.9	39.95			
S95T002813		Lower ½	24.8	21.8	23.3[QC:a,c]			
S95T002816	111:5	Upper ½	15.3	14.4	14.85			
S95T002815		Lower ½	10.5	10.1	10.3			
S95T002818	111:6	Upper ½	< 3.26	< 3.23	< 3.25[QC:a]			
S95T002817		Lower ½	< 1.54	< 1.45	< 1.50			
S95T002820	111:7	Upper ½	< 1.94	< 2.27	< 2.11[QC:c]			
S95T002819		Lower ½	< 1.63	< 1.61	< 1.62[QC:a]			

Table A-27. Tank 241-S-107 Analytical Results: Silver. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 2.81	< 2.58	< 2.70			
S95T002822		C	< 1.75	< 1.56	< 1.66[QC:e]			
S95T002821		D	< 2.02	< 2.26	< 2.14[QC:e]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	12.10	13.00	12.55			
S96T003302	105:3	Upper ½	< 8.830	10.20	9.52			
S96T003303	105:4	Upper ½	< 5.480	< 5.80	< 5.64			
S96T003304	105:5	Lower ½	5.420	5.560	5.490			
S96T003305	105:8	Lower ½	5.820	5.830	5.825			
S96T003276	110:2	Lower ½	< 7.080	< 7.00	< 7.04			
S96T003277	110:3	Upper ½	< 7.360	< 7.74	< 7.55			
S96T003278	110:4	Upper ½	< 3.840	< 3.79	< 3.82[QC:c]			
S96T003279	110:5	Lower ½	< 1.900	< 1.94	< 1.92[QC:c]			
S96T003280	110:8	Lower ½	< 4.220	< 3.92	< 4.07			
S96T003247	111:2	Lower ½	9.990	11.00	10.50			
S96T003258	111:3	Upper ½	14.90	15.10	15.00			
S96T003259	111:4	Upper ½	14.10	13.60	13.85			
S96T003260	111:5	Lower ½	< 3.730	< 4.19	< 3.96[QC:c]			
S96T003261	111:8	Lower ½	< 4.400	< 4.29	< 4.35[QC:c]			

Table A-27. Tank 241-S-107 Analytical Results: Silver. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	20.6	< 4.27	12.4[QC:a,e]	19.0		46.4
S95T003156	110	N/A	19.8	36.8	28.3[QC:a,e]			
S95T003162	111	N/A	12.8	19.9	16.35[QC:a,e]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	5.350	7.980	6.665[QC:e]			
S95T003281	110	N/A	< 3.740	< 3.99	< 3.87[QC:c]			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 4.01	< 4.01	< 4.01	< 4.01		< 0.212
S95T002446	105:2	DL	< 4.01	< 4.01	< 4.01			
S95T002601	110:1	DL	< 4.01	< 4.01	< 4.01			
S95T002602	110:2	DL	< 4.01	< 4.01	< 4.01			
S95T002629	111:1	DL	< 4.01	< 4.01	< 4.01			
S95T002632	111:2	DL	< 4.01	< 4.01	< 4.01			

Table A-28. Tank 241-S-107 Analytical Results: Sodium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	1.080E+05	95,300	1.017E+05[QC:e]	86,700	9.2	211,000
S95T002914		Lower ½	1.500E+05	1.350E+05	1.425E+05			
S95T002702	105:3	Upper ½	1.408E+05	1.388E+05	1.398E+05[QC:b]			
S95T002701		Lower ½	1.777E+05	1.748E+05	1.763E+05[QC:b]			
S95T002704	105:4	Upper ½	65,400	61,500	63,450			
S95T002703		Lower ½	1.110E+05	1.110E+05	1.110E+05[QC:b]			
S95T002706	105:5	Upper ½	1.205E+05	1.262E+05	1.234E+05			
S95T002705		Lower ½	2.029E+05	2.039E+05	2.034E+05			
S95T002708	105:6	Upper ½	30,180.7	33,763.9	31,972.3			
S95T002707		Lower ½	47,471.5	49,676.7	48,574.1			
S95T002710	105:7	Upper ½	76,071.2	79,237	77,654.1			
S95T002709		Lower ½	64,039.3	74,674.4	69,356.9			
S95T002712	105:8	Upper ½	68,800	66,500	67,650			
S95T002711		Lower ½	66,300	69,300	67,800			
S95T002752	110:2	Lower ½	1.340E+05	1.260E+05	1.300E+05			
S95T002756	110:3	Upper ½	1.440E+05	1.370E+05	1.405E+05[QC:a]			
S95T002755		Lower ½	1.560E+05	1.560E+05	1.560E+05[QC:a]			
S95T002758	110:4	Upper ½	1.040E+05	1.060E+05	1.050E+05[QC:a]			
S95T002757		Lower ½	45,900	46,300	46,100			
S95T002760	110:5	Upper ½	40,700	33,500	37,100			
S95T002759		Lower ½	38,100	38,300	38,200			

Table A-28. Tank 241-S-107 Analytical Results: Sodium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	41,200	39,300	40,250			
S95T002761		Lower ½	48,800	45,900	47,350			
S95T002764	110:7	Upper ½	55,400	54,800	55,100			
S95T002763		Lower ½	63,700	60,800	62,250			
S95T002766	110:8	Upper ½	67,000	64,700	65,850			
S95T002765		Lower ½	62,200	68,800	65,500			
S95T002754	110:3A	Upper ½	1.850E+05	1.930E+05	1.890E+05[QC:a]			
S95T002753		Lower ½	1.880E+05	1.880E+05	1.880E+05			
S95T002810	111:2	Lower ½	1.180E+05	97,600	1.078E+05[QC:b,e]			
S95T002811	111:3	Upper ½	63,000	64,200	63,600			
S95T002812		Lower ½	1.510E+05	1.330E+05	1.420E+05[QC:b,e]			
S95T002814	111:4	Upper ½	1.270E+05	1.180E+05	1.225E+05[QC:b]			
S95T002813		Lower ½	87,800	77,100	82,450			
S95T002816	111:5	Upper ½	1.050E+05	98,100	1.016E+05[QC:b]			
S95T002815		Lower ½	62,900	60,500	61,700			
S95T002818	111:6	Upper ½	39,100	42,100	40,600			
S95T002817		Lower ½	60,200	57,000	58,600			

Table A-28. Tank 241-S-107 Analytical Results: Sodium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002820	111:7	Upper ½	66,300	96,300	81,300			
S95T002819		Lower ½	50,100	50,500	50,300			
S95T002823	111:8	Upper ½	73,500	77,700	75,600			
S95T002822		C	68,200	66,700	67,450			
S95T002821		D	68,800	72,100	70,450			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	1.58 E+05	1.56 E+05	1.57 E+05			
S96T003302	105:3	Upper ½	1.67 E+05	1.72 E+05	1.70 E+05[QC:c]			
S96T003303	105:4	Upper ½	1.57 E+05	1.59 E+05	1.58 E+05[QC:d]			
S96T003304	105:5	Lower ½	78,000	84,500	81,200			
S96T003305	105:8	Lower ½	82,400	80,300	81,400[QC:d]			
S96T003276	110:2	Lower ½	1.09 E+05	1.24 E+05	1.16 E+05			
S96T003277	110:3	Upper ½	1.45 E+05	1.47 E+05	1.46 E+05			
S96T003278	110:4	Upper ½	1.15 E+05	1.21 E+05	1.18 E+05			
S96T003279	110:5	Lower ½	54,500	55,500	55,000[QC:d]			
S96T003280	110:8	Lower ½	89,400	89,000	89,200			
S96T003247	111:2	Lower ½	1.42 E+05	1.41 E+05	1.42 E+05[QC:d]			
S96T003258	111:3	Upper ½	1.90 E+05	2.02 E+05	1.96 E+05			
S96T003259	111:4	Upper ½	1.85 E+05	1.76 E+05	1.80 E+05[QC:d]			
S96T003260	111:5	Lower ½	79,100	74,800	77,000[QC:c]			
S96T003261	111:8	Lower ½	84,700	84,200	84,400[QC:d]			

Table A-28. Tank 241-S-107 Analytical Results: Sodium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest		µg/g	µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	91,200	1.02E+05	96,600	92,700	N/A	226,000
S95T003156	110	N/A	83,100	81,200	82,150			
S95T003162	111	N/A	99,300	99,400	99,350			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	70,200	1.05 E+05	87,600[QC:d,e]			
S95T003281	110	N/A	89,600	86,300	88,000			
Liquids:		µg/mL	µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	1.354E+05	1.296E+05	1.325E+05	127,000	N/A	6,720
S95T002446	105:2	DL	1.148E+05	1.144E+05	1.146E+05			
S95T002601	110:1	DL	1.272E+05	1.240E+05	1.256E+05			
S95T002602	110:2	DL	1.345E+05	1.392E+05	1.368E+05			
S95T002629	111:1	DL	1.269E+05	1.324E+05	1.297E+05			
S95T002632	111:2	DL	1.226E+05	1.201E+05	1.214E+05			

Table A-29. Tank 241-S-107 Analytical Results: Strontium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	46.0	43.2	44.6	241	22.1	588
S95T002914		Lower ½	14.0	12.9	13.45			
S95T002702	105:3	Upper ½	57.2498	54.8025	56.0262			
S95T002701		Lower ½	10.891	10.7514	10.8212			
S95T002704	105:4	Upper ½	43.0	40.5	41.75			
S95T002703		Lower ½	17.9	18.6	18.25			
S95T002706	105:5	Upper ½	15.6884	15.9943	15.8414			
S95T002705		Lower ½	11.1437	11.1492	11.1465			
S95T002708	105:6	Upper ½	27.5534	30.7826	29.168[QC:e]			
S95T002707		Lower ½	116.697	115.238	115.968			
S95T002710	105:7	Upper ½	464.268	534.956	499.612[QC:e]			
S95T002709		Lower ½	623.104	728.388	675.746[QC:e]			
S95T002712	105:8	Upper ½	1,020	816	918[QC:a,e]			
S95T002711		Lower ½	807	795	801[QC:a]			
S95T002752	110:2	Lower ½	49.2	42.6	45.9[QC:e]			
S95T002756	110:3	Upper ½	21.4	21.6	21.5[QC:a]			
S95T002755		Lower ½	6.94	7.96	7.45[QC:a,e]			
S95T002758	110:4	Upper ½	12.3	12.5	12.4[QC:a]			
S95T002757		Lower ½	5.37	5.29	5.33[QC:a]			
S95T002760	110:5	Upper ½	4.36	3.84	4.10[QC:e]			
S95T002759		Lower ½	7.50	7.19	7.345[QC:a]			

Table A-29. Tank 241-S-107 Analytical Results: Strontium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	17.2	17.3	17.25			
S95T002761		Lower ½	91.3	86.0	88.65			
S95T002764	110:7	Upper ½	381	376	378.5			
S95T002763		Lower ½	621	595	608			
S95T002766	110:8	Upper ½	905	872	888.5			
S95T002765		Lower ½	783	875	829[QC:e]			
S95T002754	110:3A	Upper ½	< 8.54	< 12.3	< 10.4[QC:a,e]			
S95T002753		Lower ½	< 7.32	< 7.09	< 7.21			
S95T002810	111:2	Lower ½	47.3	40.3	43.8[QC:e]			
S95T002811	111:3	Upper ½	118	121	119.5			
S95T002812		Lower ½	7.83	6.68	7.255[QC:e]			
S95T002814	111:4	Upper ½	6.04	5.86	5.95			
S95T002813		Lower ½	8.21	7.18	7.695[QC:e]			
S95T002816	111:5	Upper ½	13.7	12.8	13.25			
S95T002815		Lower ½	38.0	36.6	37.3			
S95T002818	111:6	Upper ½	45.6	43.5	44.55			
S95T002817		Lower ½	196	186	191			
S95T002820	111:7	Upper ½	364	595	479.5[QC:e]			
S95T002819		Lower ½	608	613	610.5			

Table A-29. Tank 241-S-107 Analytical Results: Strontium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	1,090	1,080	1,085			
S95T002822		C	1,210	1,220	1,215			
S95T002821		D	421	443	432			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 4.510	< 4.14	< 4.33			
S96T003302	105:3	Upper ½	< 8.830	< 8.46	< 8.65			
S96T003303	105:4	Upper ½	< 5.480	< 5.80	< 5.64			
S96T003304	105:5	Lower ½	< 3.780	< 4.41	< 4.10			
S96T003305	105:8	Lower ½	< 3.740	< 3.85	< 3.80			
S96T003276	110:2	Lower ½	< 7.080	< 7.00	< 7.04			
S96T003277	110:3	Upper ½	< 7.360	< 7.74	< 7.55			
S96T003278	110:4	Upper ½	< 3.840	< 3.79	< 3.82			
S96T003279	110:5	Lower ½	< 1.900	< 1.94	< 1.92			
S96T003280	110:8	Lower ½	< 4.220	< 3.92	< 4.07			
S96T003247	111:2	Lower ½	< 3.840	< 3.95	< 3.90			
S96T003258	111:3	Upper ½	< 6.030	< 5.61	< 5.82			
S96T003259	111:4	Upper ½	< 4.000	< 4.30	< 4.15			
S96T003260	111:5	Lower ½	< 3.730	< 4.19	< 3.96			
S96T003261	111:8	Lower ½	< 4.400	< 4.29	< 4.35			

Table A-29. Tank 241-S-107 Analytical Results: Strontium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	292	279	285.5[QC:a]	259	N/A	632
S95T003156	110	N/A	215	217	216[QC:a]			
S95T003162	111	N/A	261	292	276.5[QC:a,c]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 4.310	< 4.05	< 4.18			
S95T003281	110	N/A	< 3.740	< 3.99	< 3.87			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 4.01	< 4.01	< 4.01	< 4.01	N/A	< 0.212
S95T002446	105:2	DL	< 4.01	< 4.01	< 4.01			
S95T002601	110:1	DL	< 4.01	< 4.01	< 4.01			
S95T002602	110:2	DL	< 4.01	< 4.01	< 4.01			
S95T002629	111:1	DL	< 4.01	< 4.01	< 4.01			
S95T002632	111:2	DL	< 4.01	< 4.01	< 4.01			

Table A-30. Tank 241-S-107 Analytical Results: Sulfur. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	559	510	534.5[QC:a]	427	13.2	1,040
S95T002914		Lower ½	462	463	462.5[QC:a]			
S95T002702	105:3	Upper ½	665.862	639.814	652.838			
S95T002701		Lower ½	653.442	640.527	646.985			
S95T002704	105:4	Upper ½	225	209	217[QC:a]			
S95T002703		Lower ½	551	566	558.5[QC:a]			
S95T002706	105:5	Upper ½	569.545	603.054	586.3[QC:a]			
S95T002705		Lower ½	739.659	735.681	737.67[QC:a]			
S95T002708	105:6	Upper ½	161.186	183.259	172.223[QC:c]			
S95T002707		Lower ½	236.399	267.953	252.176[QC:c]			
S95T002710	105:7	Upper ½	324.776	338.005	331.391[QC:a]			
S95T002709		Lower ½	320.278	389.824	355.051[QC:a,c]			
S95T002712	105:8	Upper ½	365	342	353.5[QC:a]			
S95T002711		Lower ½	352	363	357.5[QC:a]			
S95T002752	110:2	Lower ½	520	458	489[QC:a,c]			
S95T002756	110:3	Upper ½	485	443	464[QC:a]			
S95T002755		Lower ½	467	490	478.5[QC:a]			
S95T002758	110:4	Upper ½	429	441	435[QC:a]			
S95T002757		Lower ½	225	224	224.5[QC:a]			
S95T002760	110:5	Upper ½	213	177	195[QC:a,c]			
S95T002759		Lower ½	210	202	206[QC:a]			

Table A-30. Tank 241-S-107 Analytical Results: Sulfur. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	223	195	209[QC:a,c]			
S95T002761		Lower ½	230	218	224[QC:a]			
S95T002764	110:7	Upper ½	268	270	269[QC:a]			
S95T002763		Lower ½	319	298	308.5[QC:a]			
S95T002766	110:8	Upper ½	346	335	340.5[QC:a]			
S95T002765		Lower ½	317	340	328.5[QC:a]			
S95T002754	110:3A	Upper ½	484	472	478[QC:a]			
S95T002753		Lower ½	443	449	446[QC:a]			
S95T002810	111:2	Lower ½	525	437	481[QC:a,c]			
S95T002811	111:3	Upper ½	730	749	739.5[QC:a]			
S95T002812		Lower ½	643	579	611[QC:a]			
S95T002814	111:4	Upper ½	1,090	1,030	1,060			
S95T002813		Lower ½	714	629	671.5[QC:a,c]			
S95T002816	111:5	Upper ½	979	915	947[QC:a]			
S95T002815		Lower ½	327	316	321.5			
S95T002818	111:6	Upper ½	235	253	244[QC:a]			
S95T002817		Lower ½	323	310	316.5[QC:a]			
S95T002820	111:7	Upper ½	340	516	428[QC:a,c]			
S95T002819		Lower ½	247	245	246[QC:a]			

Table A-30. Tank 241-S-107 Analytical Results: Sulfur. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	319	341	330[QC:a]			
S95T002822		C	288	281	284.5[QC:a]			
S95T002821		D	309	326	317.5[QC:a]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	528	500.0	514.0			
S96T003302	105:3	Upper ½	680	531.0	605.5			
S96T003303	105:4	Upper ½	681	679.0	680.0			
S96T003304	105:5	Lower ½	476	546.0	511.0[QC:e]			
S96T003305	105:8	Lower ½	464	451.0	457.5			
S96T003276	110:2	Lower ½	751	669.0	710.0[QC:e]			
S96T003277	110:3	Upper ½	524	575.0	549.5			
S96T003278	110:4	Upper ½	549	566.0	557.5			
S96T003279	110:5	Lower ½	318	317.5	317.5			
S96T003280	110:8	Lower ½	469	459.0	464.0			
S96T003247	111:2	Lower ½	689	679.0	684.0			
S96T003258	111:3	Upper ½	520	766.0	643.0[QC:e]			
S96T003259	111:4	Upper ½	1,440	1,180	1,310[QC:e]			
S96T003260	111:5	Lower ½	511	469.0	490.0			
S96T003261	111:8	Lower ½	366	366.0	366.0			

Table A-30. Tank 241-S-107 Analytical Results: Sulfur. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	453	401	427[QC:a,e]	463	N/A	1,130
S95T003156	110	N/A	342	358	350[QC:a]			
S95T003162	111	N/A	632	594	613[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	324	430.0	377.0			
S95T003281	110	N/A	354	370.0	362.0			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	1,242.6	1,199.21	1,220.91	1,220	N/A	64.5
S95T002446	105:2	DL	1,108.45	1,126.77	1,117.61			
S95T002601	110:1	DL	1,195.76	1,164.07	1,179.92			
S95T002602	110:2	DL	1,267.08	1,313.49	1,290.29			
S95T002629	111:1	DL	1,190.2	1,243.77	1,216.98			
S95T002632	111:2	DL	1,291.09	1,276.89	1,283.99			

Table A-31. Tank 241-S-107 Analytical Results: Thallium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	< 34.2	< 46.8	< 40.5[QC:a,e]	< 59.4		< 145
S95T002914		Lower ½	< 81.0	< 75.0	< 78.0[QC:a]			
S95T002702	105:3	Upper ½	< 85.28	< 87.48	< 86.4			
S95T002701		Lower ½	< 92.98	< 93.02	< 93.0			
S95T002704	105:4	Upper ½	< 32.4	< 30.8	< 31.6[QC:a]			
S95T002703		Lower ½	< 52.3	< 48.8	< 50.6[QC:a]			
S95T002706	105:5	Upper ½	< 62.6	< 55.4	< 59.0[QC:a,e]			
S95T002705		Lower ½	< 97.16	< 97.7	< 97.4[QC:a]			
S95T002708	105:6	Upper ½	< 14.84	< 16.64	< 15.7[QC:e]			
S95T002707		Lower ½	< 28.9	< 31.48	< 30.2			
S95T002710	105:7	Upper ½	< 39.36	< 35.94	< 37.7			
S95T002709		Lower ½	< 35.38	< 37.48	< 36.4			
S95T002712	105:8	Upper ½	< 84.6	< 81.8	< 83.2[QC:a]			
S95T002711		Lower ½	< 34.1	< 34.2	< 34.2[QC:a]			
S95T002752	110:2	Lower ½	< 81.0	< 86.4	< 83.7[QC:a]			
S95T002756	110:3	Upper ½	< 78.7	< 70.1	< 74.4[QC:a,e]			
S95T002755		Lower ½	< 82.0	< 81.6	< 81.8[QC:a]			
S95T002758	110:4	Upper ½	< 41.1	< 46.4	< 43.8[QC:a,e]			
S95T002757		Lower ½	< 64.2	< 62.9	< 63.6[QC:a]			
S95T002760	110:5	Upper ½	< 35.9	< 44.7	< 40.3[QC:a,e]			
S95T002759		Lower ½	< 43.0	< 39.2	< 41.1[QC:a]			

Table A-31. Tank 241-S-107 Analytical Results: Thallium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	< 75.1	< 69.4	< 72.3			
S95T002761		Lower ½	< 35.4	< 39.5	< 37.5[QC:a]			
S95T002764	110:7	Upper ½	< 33	< 35.5	< 34.3[QC:a]			
S95T002763		Lower ½	< 34.7	< 32.7	< 33.7			
S95T002766	110:8	Upper ½	< 80.5	< 78.0	< 79.3			
S95T002765		Lower ½	< 36.6	< 33.9	< 35.3[QC:a]			
S95T002754	110:3A	Upper ½	< 171	< 246	< 209[QC:a,e]			
S95T002753		Lower ½	< 146	< 142	< 144[QC:a]			
S95T002810	111:2	Lower ½	< 75.2	< 67.9	< 71.6[QC:a]			
S95T002811	111:3	Upper ½	< 37.4	< 38.3	< 37.9[QC:a]			
S95T002812		Lower ½	< 81.5	< 70.6	< 76.1[QC:a,e]			
S95T002814	111:4	Upper ½	< 64.2	< 62.3	< 63.3[QC:a]			
S95T002813		Lower ½	< 37.7	< 33.5	< 35.6[QC:a,e]			
S95T002816	111:5	Upper ½	< 59.5	< 55.9	< 57.7			
S95T002815		Lower ½	< 29.8	< 28.7	< 29.3[QC:a]			
S95T002818	111:6	Upper ½	< 65.1	< 64.6	< 64.9[QC:a]			
S95T002817		Lower ½	< 30.8	< 29.1	< 30.0			
S95T002820	111:7	Upper ½	< 38.8	< 45.5	< 42.2[QC:e]			
S95T002819		Lower ½	< 32.6	< 32.3	< 32.5[QC:a]			

Table A-31. Tank 241-S-107 Analytical Results: Thallium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 56.3	< 51.6	< 54.0[QC:a]			
S95T002822		C	< 35.1	< 31.3	< 33.2[QC:a,c]			
S95T002821		D	< 40.4	< 44.9	< 42.7			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 90.30	< 82.8	< 86.6			
S96T003302	105:3	Upper ½	< 177	< 169	< 173			
S96T003303	105:4	Upper ½	< 110	< 116	< 113			
S96T003304	105:5	Lower ½	< 75.60	< 88.2	< 81.9			
S96T003305	105:8	Lower ½	< 74.90	< 77.0	< 76.0			
S96T003276	110:2	Lower ½	< 142	< 140	< 141			
S96T003277	110:3	Upper ½	< 147	< 155	< 151			
S96T003278	110:4	Upper ½	< 76.70	< 75.9	< 76.3			
S96T003279	110:5	Lower ½	< 38.10	< 38.8	< 38.5			
S96T003280	110:8	Lower ½	< 84.30	< 78.4	< 81.4			
S96T003247	111:2	Lower ½	< 76.90	< 79.1	< 78.0			
S96T003258	111:3	Upper ½	< 121	< 112	< 117			
S96T003259	111:4	Upper ½	< 80.10	< 85.9	< 83.0			
S96T003260	111:5	Lower ½	< 74.50	< 83.9	< 79.2			
S96T003261	111:8	Lower ½	< 87.90	< 85.9	< 86.9			

Table A-31. Tank 241-S-107 Analytical Results: Thallium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 88.7	< 85.1	< 86.9[QC:a]	< 85		< 208
S95T003156	110	N/A	< 78.2	< 79.1	< 78.7[QC:a]			
S95T003162	111	N/A	< 93.3	< 87.9	< 90.6[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 86.30	< 81.0	< 83.7			
S95T003281	110	N/A	< 74.80	< 79.8	< 77.3			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 80.2	< 80.2	< 80.2	< 80.2		< 4.25
S95T002446	105:2	DL	< 80.2	< 80.2	< 80.2			
S95T002601	110:1	DL	< 80.2	< 80.2	< 80.2			
S95T002602	110:2	DL	< 80.2	< 80.2	< 80.2			
S95T002629	111:1	DL	< 80.2	< 80.2	< 80.2			
S95T002632	111:2	DL	< 80.2	< 80.2	< 80.2			

Table A-32. Tank 241-S-107 Analytical Results: Titanium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	13.7	14.2	13.95	37.7	15.2	91.9
S95T002914		Lower ½	11.4	10.6	11.0			
S95T002702	105:3	Upper ½	32.0347	44.5503	38.2925[QC:e]			
S95T002701		Lower ½	13.3652	12.8935	13.1294			
S95T002704	105:4	Upper ½	111	113	112			
S95T002703		Lower ½	101	122	111.5[QC:e]			
S95T002706	105:5	Upper ½	117.763	120.131	118.947[QC:a]			
S95T002705		Lower ½	54.3757	54.3643	54.37[QC:a]			
S95T002708	105:6	Upper ½	15.9756	17.8882	16.9319[QC:e]			
S95T002707		Lower ½	30.783	31.053	30.918			
S95T002710	105:7	Upper ½	69.4834	82.8181	76.1508[QC:e]			
S95T002709		Lower ½	8.9521	10.7814	9.86675[QC:e]			
S95T002712	105:8	Upper ½	11.2	8.49	9.845[QC:a,e]			
S95T002711		Lower ½	6.92	6.41	6.665[QC:a]			
S95T002752	110:2	Lower ½	142	40.8	91.4[QC:e]			
S95T002756	110:3	Upper ½	32.3	19.9	26.1[QC:a,e]			
S95T002755		Lower ½	23.3	26.4	24.85[QC:a,e]			
S95T002758	110:4	Upper ½	71.0	69.9	70.45[QC:a]			
S95T002757		Lower ½	29.2	29.5	29.35[QC:a]			
S95T002760	110:5	Upper ½	11.1	9.75	10.425[QC:e]			
S95T002759		Lower ½	17.8	16.9	17.35[QC:a]			

Table A-32. Tank 241-S-107 Analytical Results: Titanium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	15.5	14.7	15.1			
S95T002761		Lower ½	50.0	47.2	48.6			
S95T002764	110:7	Upper ½	24.4	24.0	24.2			
S95T002763		Lower ½	8.82	7.98	8.40			
S95T002766	110:8	Upper ½	9.87	9.61	9.74			
S95T002765		Lower ½	6.52	7.16	6.84			
S95T002754	110:3A	Upper ½	15.4	15.5	15.45[QC:a]			
S95T002753		Lower ½	26.0	23.5	24.75			
S95T002810	111:2	Lower ½	131	111	121[QC:a,e]			
S95T002811	111:3	Upper ½	10.5	10.8	10.65[QC:a]			
S95T002812		Lower ½	11.8	9.74	10.77[QC:e]			
S95T002814	111:4	Upper ½	14.8	13.8	14.3			
S95T002813		Lower ½	40.7	35.5	38.1[QC:e]			
S95T002816	111:5	Upper ½	95.2	89.3	92.25			
S95T002815		Lower ½	96.2	93.2	94.7			
S95T002818	111:6	Upper ½	29.3	31.0	30.15			
S95T002817		Lower ½	47.7	45.5	46.6			
S95T002820	111:7	Upper ½	16	25.5	20.75[QC:e]			
S95T002819		Lower ½	6.66	6.79	6.725			

Table A-32. Tank 241-S-107 Analytical Results: Titanium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	8.62	8.37	8.495			
S95T002822		C	9.42	9.08	9.25			
S95T002821		D	3.45	3.78	3.615			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 4.510	< 4.14	< 4.33			
S96T003302	105:3	Upper ½	< 8.830	< 8.46	< 8.65			
S96T003303	105:4	Upper ½	< 5.480	< 5.80	< 5.64			
S96T003304	105:5	Lower ½	< 3.780	< 4.41	< 4.10			
S96T003305	105:8	Lower ½	< 3.740	< 3.85	< 3.80			
S96T003276	110:2	Lower ½	< 7.080	< 7.00	< 7.04			
S96T003277	110:3	Upper ½	< 7.360	< 7.74	< 7.55			
S96T003278	110:4	Upper ½	< 3.840	< 3.79	< 3.80			
S96T003279	110:5	Lower ½	< 1.900	< 1.94	< 1.92			
S96T003280	110:8	Lower ½	< 4.220	< 3.92	< 4.07			
S96T003247	111:2	Lower ½	< 3.840	< 3.95	< 3.90			
S96T003258	111:3	Upper ½	< 6.030	< 5.61	< 5.82			
S96T003259	111:4	Upper ½	< 4.000	< 4.30	< 4.15			
S96T003260	111:5	Lower ½	< 3.730	< 4.19	< 3.96			
S96T003261	111:8	Lower ½	< 4.400	< 4.29	< 4.35			

Table A-32. Tank 241-S-107 Analytical Results: Titanium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	52.2	41.5	46.85[QC:a,e]	37.7		91.9
S95T003156	110	N/A	24	25.6	24.8[QC:a]			
S95T003162	111	N/A	43.7	39.3	41.5[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 4.310	< 4.05	< 4.18			
S95T003281	110	N/A	< 3.740	< 3.99	< 3.87			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 4.01	< 4.01	< 4.01	< 4.01		< 0.212
S95T002446	105:2	DL	< 4.01	< 4.01	< 4.01			
S95T002601	110:1	DL	< 4.01	< 4.01	< 4.01			
S95T002602	110:2	DL	< 4.01	< 4.01	< 4.01			
S95T002629	111:1	DL	< 4.01	< 4.01	< 4.01			
S95T002632	111:2	DL	< 4.01	< 4.01	< 4.01			

Table A-33. Tank 241-S-107 Analytical Results: Total Uranium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	2,240	2,070	2,155	6,830	10.4	16,700
S95T002914		Lower ½	2,010	1,830	1,920			
S95T002702	105:3	Upper ½	1,394.02	1,333.82	1,363.92			
S95T002701		Lower ½	3,834.78	3,797.18	3,815.98			
S95T002704	105:4	Upper ½	15,600	14,700	15,150			
S95T002703		Lower ½	9,650	9,740	9,695			
S95T002706	105:5	Upper ½	5,023.15	5,209.95	5,116.55			
S95T002705		Lower ½	10,052	10,111.5	10,081.7			
S95T002708	105:6	Upper ½	2,962.65	3,302.8	3,132.73			
S95T002707		Lower ½	6,409.77	6,376.45	6,393.11			
S95T002710	105:7	Upper ½	17,610.3	20,536.9	19,073.6			
S95T002709		Lower ½	9,304.83	10,456.1	9,880.46			
S95T002712	105:8	Upper ½	11,600	10,800	11,200			
S95T002711		Lower ½	9,340	9,700	9,520			
S95T002752	110:2	Lower ½	2,790	2,460	2,625			
S95T002756	110:3	Upper ½	2,730	2,740	2,735			
S95T002755		Lower ½	5,130	5,880	5,505			
S95T002758	110:4	Upper ½	6,760	7,040	6,900			
S95T002757		Lower ½	2,110	2,240	2,175			
S95T002760	110:5	Upper ½	1,330	1,120	1,225			
S95T002759		Lower ½	2,010	1,910	1,960			

Table A-33. Tank 241-S-107 Analytical Results: Total Uranium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	2,290	2,200	2,245			
S95T002761		Lower ½	9,070	8,600	8,835			
S95T002764	110:7	Upper ½	9,990	9,810	9,900			
S95T002763		Lower ½	8,770	8,390	8,580			
S95T002766	110:8	Upper ½	10,600	10,200	10,400			
S95T002765		Lower ½	8,600	9,620	9,110			
S95T002754	110:3A	Upper ½	9,850	9,970	9,910			
S95T002753		Lower ½	10,100	10,400	10,250			
S95T002810	111:2	Lower ½	1,760	1,430	1,595			
S95T002811	111:3	Upper ½	1,990	2,040	2,015			
S95T002812		Lower ½	3,100	2,750	2,925			
S95T002814	111:4	Upper ½	4,610	4,350	4,480			
S95T002813		Lower ½	3,450	3,020	3,235			
S95T002816	111:5	Upper ½	6,360	5,960	6,160			
S95T002815		Lower ½	15,200	14,700	14,950			
S95T002818	111:6	Upper ½	4,150	4,730	4,440			
S95T002817		Lower ½	11,400	10,700	11,050			
S95T002820	111:7	Upper ½	8,120	12,300	10,210			
S95T002819		Lower ½	7,620	7,670	7,645			

Table A-33. Tank 241-S-107 Analytical Results: Total Uranium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	12,900	13,300	13,100			
S95T002822		C	16,000	15,900	15,950			
S95T002821		D	4,720	4,950	4,835			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	< 226	< 207	< 217			
S96T003302	105:3	Upper ½	< 442	< 423	< 433			
S96T003303	105:4	Upper ½	< 274	< 290	< 282			
S96T003304	105:5	Lower ½	< 189	< 221	< 205			
S96T003305	105:8	Lower ½	< 187	< 193	< 190			
S96T003276	110:2	Lower ½	< 354	< 350	< 352			
S96T003277	110:3	Upper ½	< 368	< 387	< 378			
S96T003278	110:4	Upper ½	< 192	< 190	< 191			
S96T003279	110:5	Lower ½	< 95.20	< 97.0	< 96.1			
S96T003280	110:8	Lower ½	< 211	< 196	< 204			
S96T003247	111:2	Lower ½	< 192	< 198	< 195			
S96T003258	111:3	Upper ½	< 301	< 280	< 291			
S96T003259	111:4	Upper ½	< 200	< 215	< 208			
S96T003260	111:5	Lower ½	< 186	< 210	< 198			
S96T003261	111:8	Lower ½	< 220	< 215	< 218			

Table A-33. Tank 241-S-107 Analytical Results: Total Uranium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	8,870	8,210	8,540	7,380		18,000
S95T003156	110	N/A	5,800	5,820	5,810			
S95T003162	111	N/A	7,660	7,910	7,785			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 216	< 202	< 209			
S95T003281	110	N/A	< 187	< 199	< 193			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 160.4	< 160.4	< 160.4	< 167		< 8.85
S95T002446	105:2	DL	< 200	< 200	< 200			
S95T002601	110:1	DL	< 160.4	< 160.4	< 160.4			
S95T002602	110:2	DL	< 160.4	< 160.4	< 160.4			
S95T002629	111:1	DL	< 160.4	< 160.4	< 160.4			
S95T002632	111:2	DL	< 160.4	< 160.4	< 160.4			

Table A-34. Tank 241-S-107 Analytical Results: Uranium (Laser Phosphoresence)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003383	105:2	Lower ½	1,660	1,520	1,590			
S96T003384	105:3	Upper ½	1,060	1,390	1,220			
S96T003385	105:4	Upper ½	6,380	6,370	6,380[QC:c]			
S96T003386	105:5	Lower ½	14,000	20,200	17,100[QC:e]			
S96T003387	105:8	Lower ½	17,000	16,000	16,500			
S96T003390	110:2	Lower ½	2,470	3,260	2,860[QC:e]			
S96T003391	110:3	Upper ½	2,150	3,460	2,800[QC:e]			
S96T003392	110:4	Upper ½	4,910	5,370	5,140			
S96T003393	110:5	Lower ½	1,820	1,800	1,810[QC:c]			
S96T003394	110:8	Lower ½	10,700	12,700	11,700[QC:e]			
S96T003402	111:2	Lower ½	2,310	2,870	2,590[QC:e]			
S96T003403	111:3	Upper ½	1,180	1,170	1,180			
S96T003404	111:4	Upper ½	5,270	5,090	5,180			
S96T003405	111:5	Lower ½	16,800	14,500	15,600[QC:e]			
S96T003406	111:8	Lower ½	17,400	17,400	17,400			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003388	105	N/A	11,400	11,400	11,400			
S95T003395	110	N/A	5,340	5,090	5,220			

Table A-35. Tank 241-S-107 Analytical Results: Vanadium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	22.9	19.6	21.25[QC:e]	< 14.8		< 36.1
S95T002914		Lower ½	41.3	35.2	38.25[QC:e]			
S95T002702	105:3	Upper ½	< 21.32	< 21.87	< 21.6			
S95T002701		Lower ½	< 23.245	< 23.255	< 23.3			
S95T002704	105:4	Upper ½	12.3	11.8	12.05			
S95T002703		Lower ½	< 13.1	< 12.2	< 12.7			
S95T002706	105:5	Upper ½	18.9262	20.7199	19.8231[QC:a]			
S95T002705		Lower ½	< 24.29	< 24.425	< 24.4[QC:a]			
S95T002708	105:6	Upper ½	< 3.71	< 4.16	< 3.94[QC:e]			
S95T002707		Lower ½	< 7.225	< 7.87	< 7.55			
S95T002710	105:7	Upper ½	10.1203	12.3561	11.2382[QC:e]			
S95T002709		Lower ½	< 8.845	< 9.37	< 9.11			
S95T002712	105:8	Upper ½	< 21.1	< 20.4	< 20.8[QC:a]			
S95T002711		Lower ½	< 8.52	< 8.55	< 8.54[QC:a]			
S95T002752	110:2	Lower ½	29.9	24.9	27.4[QC:e]			
S95T002756	110:3	Upper ½	< 19.7	< 17.5	< 18.6[QC:a,e]			
S95T002755		Lower ½	25.9	< 20.4	< 23.2[QC:a,e]			
S95T002758	110:4	Upper ½	13.0	13.1	13.05[QC:a]			
S95T002757		Lower ½	< 16.2	< 15.7	< 16.0[QC:a]			

Table A-35. Tank 241-S-107 Analytical Results: Vanadium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002760	110:5	Upper ½	< 8.97	< 11.2	< 10.1[QC:e]			
S95T002759		Lower ½	< 10.7	< 9.81	< 10.3[QC:a]			
S95T002762	110:6	Upper ½	< 19.0	< 17.4	< 18.2			
S95T002761		Lower ½	< 8.85	< 9.88	< 9.37			
S95T002764	110:7	Upper ½	< 8.26	< 8.88	< 8.57			
S95T002763		Lower ½	< 8.67	< 8.17	< 8.42			
S95T002766	110:8	Upper ½	< 20.1	< 19.5	< 19.8			
S95T002765		Lower ½	< 9.16	< 8.47	< 8.82			
S95T002754	110:3A	Upper ½	< 42.7	< 61.5	< 52.1[QC:a,e]			
S95T002753		Lower ½	< 36.6	< 35.5	< 36.1			
S95T002810	111:2	Lower ½	28.7	24.8	26.75[QC:a,e]			
S95T002811	111:3	Upper ½	< 9.35	< 9.59	< 9.47[QC:a]			
S95T002812		Lower ½	< 20.4	< 17.6	< 19.0[QC:e]			
S95T002814	111:4	Upper ½	< 16.1	< 15.6	< 15.9			
S95T002813		Lower ½	< 9.41	< 8.38	< 8.90[QC:e]			
S95T002816	111:5	Upper ½	< 14.9	< 14.0	< 14.5			
S95T002815		Lower ½	7.81	7.89	7.85			
S95T002818	111:6	Upper ½	< 16.3	< 16.1	< 16.2			
S95T002817		Lower ½	< 7.69	< 7.27	< 7.48			
S95T002820	111:7	Upper ½	< 9.70	< 11.4	< 10.6[QC:e]			
S95T002819		Lower ½	< 8.14	< 8.07	< 8.11			

Table A-35. Tank 241-S-107 Analytical Results: Vanadium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	< 14.1	< 12.9	< 13.5			
S95T002822		C	< 8.77	< 7.93	< 8.35			
S95T002821		D	< 10.1	< 11.2	< 10.7			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	31.20	32.40	31.80			
S96T003302	105:3	Upper ½	< 44.20	< 42.3	< 43.3			
S96T003303	105:4	Upper ½	< 27.40	< 29.0	< 28.2			
S96T003304	105:5	Lower ½	< 18.90	< 22.1	< 20.5			
S96T003305	105:8	Lower ½	< 18.70	< 19.3	< 19.0			
S96T003276	110:2	Lower ½	< 35.40	< 35.0	< 35.2			
S96T003277	110:3	Upper ½	< 36.80	< 38.7	< 37.8			
S96T003278	110:4	Upper ½	< 19.20	< 19.0	< 19.1			
S96T003279	110:5	Lower ½	< 9.520	< 9.70	< 9.61			
S96T003280	110:8	Lower ½	< 21.10	< 19.6	< 20.4			
S96T003247	111:2	Lower ½	22.40	22.10	22.25			
S96T003258	111:3	Upper ½	< 30.10	< 28.0	< 29.1			
S96T003259	111:4	Upper ½	< 20.00	< 21.5	< 20.8			
S96T003260	111:5	Lower ½	< 18.60	< 21.0	< 19.8			
S96T003261	111:8	Lower ½	< 22.00	< 21.5	< 21.8			

Table A-35. Tank 241-S-107 Analytical Results: Vanadium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	< 22.2	< 21.3	< 21.8[QC:a]	< 21.4		< 52.2
S95T003156	110	N/A	< 19.5	< 19.8	< 19.7[QC:a]			
S95T003162	111	N/A	< 23.3	< 22.0	< 22.65[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	< 21.60	< 20.2	< 20.9			
S95T003281	110	N/A	< 18.70	< 19.9	< 19.3			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 20.05	< 20.05	< 20.1	< 20		< 1.06
S95T002446	105:2	DL	< 20.0	< 20.0	< 20.0			
S95T002601	110:1	DL	< 20.05	< 20.05	< 20.1			
S95T002602	110:2	DL	< 20.05	< 20.05	< 20.1			
S95T002629	111:1	DL	< 20.05	< 20.05	< 20.1			
S95T002632	111:2	DL	< 20.05	< 20.05	< 20.1			

Table A-36. Tank 241-S-107 Analytical Results: Zinc. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	147	132	139.5[QC:a]	223	43.6	544
S95T002914		Lower ½	134	142	138[QC:a]			
S95T002702	105:3	Upper ½	3,080.15	2,956.82	3,018.48			
S95T002701		Lower ½	619.246	610.863	615.054			
S95T002704	105:4	Upper ½	47.3	44.6	45.95[QC:a]			
S95T002703		Lower ½	91.4	96.7	94.05[QC:a]			
S95T002706	105:5	Upper ½	72.974	76.14	74.557[QC:a]			
S95T002705		Lower ½	474.088	94.1803	284.134[QC:a,e]			
S95T002708	105:6	Upper ½	20.2425	22.7417	21.4921[QC:e]			
S95T002707		Lower ½	23.8962	25.0137	24.455			
S95T002710	105:7	Upper ½	29.2718	31.745	30.5084[QC:a]			
S95T002709		Lower ½	13.152	30.239	21.6955[QC:a,e]			
S95T002712	105:8	Upper ½	40.2	23.3	31.75[QC:a,e]			
S95T002711		Lower ½	29.0	29.9	29.45[QC:a]			
S95T002752	110:2	Lower ½	385	311	348[QC:a,e]			
S95T002756	110:3	Upper ½	2,540	2,630	2,585			
S95T002755		Lower ½	140	154	147[QC:a]			
S95T002758	110:4	Upper ½	66.1	68.9	67.5[QC:a]			
S95T002757		Lower ½	29.0	24.2	26.6[QC:a,e]			
S95T002760	110:5	Upper ½	18.0	17.8	17.9[QC:a]			
S95T002759		Lower ½	15.7	19.5	17.6[QC:a,e]			

Table A-36. Tank 241-S-107 Analytical Results: Zinc. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	26.2	23.7	24.95[QC:a]			
S95T002761		Lower ½	30.2	31.1	30.65[QC:a]			
S95T002764	110:7	Upper ½	19.8	19.7	19.75[QC:a]			
S95T002763		Lower ½	20.6	19.8	20.2[QC:a]			
S95T002766	110:8	Upper ½	26.7	25.7	26.2[QC:a]			
S95T002765		Lower ½	19.2	21.4	20.3[QC:a]			
S95T002754	110:3A	Upper ½	56.0	62.9	59.45[QC:a,c]			
S95T002753		Lower ½	69.3	70.4	69.85[QC:a]			
S95T002810	111:2	Lower ½	108	90.7	99.35[QC:a,c]			
S95T002811	111:3	Upper ½	382	393	387.5[QC:a]			
S95T002812		Lower ½	99.4	88.4	93.9[QC:a,c]			
S95T002814	111:4	Upper ½	51.8	48.7	50.25[QC:a]			
S95T002813		Lower ½	56.7	49.2	52.95[QC:a,c]			
S95T002816	111:5	Upper ½	91.2	84.6	87.9[QC:a]			
S95T002815		Lower ½	49.5	47.9	48.7[QC:a]			
S95T002818	111:6	Upper ½	26.7	22.8	24.75[QC:a,c]			
S95T002817		Lower ½	28.4	26.7	27.55[QC:a]			
S95T002820	111:7	Upper ½	35.7	50.9	43.3[QC:a,c]			
S95T002819		Lower ½	14.4	15.0	14.7[QC:a]			

Table A-36. Tank 241-S-107 Analytical Results: Zinc. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	30.6	28.1	29.35[QC:a]			
S95T002822		C	22.1	22.8	22.45[QC:a]			
S95T002821		D	23.1	25.0	24.05[QC:a]			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	8.720	7.160	7.940[QC:e]			
S96T003302	105:3	Upper ½	109	219.0	164.0[QC:e]			
S96T003303	105:4	Upper ½	7.080	6.550	6.185			
S96T003304	105:5	Lower ½	< 3.780	< 4.41	< 4.10			
S96T003305	105:8	Lower ½	3.950	< 3.85	3.90			
S96T003276	110:2	Lower ½	< 7.080	< 7.00	< 7.04			
S96T003277	110:3	Upper ½	< 7.360	< 7.74	< 7.55			
S96T003278	110:4	Upper ½	8.450	< 3.79	< 6.12			
S96T003279	110:5	Lower ½	< 1.900	2.040	1.97			
S96T003280	110:8	Lower ½	12.10	< 3.92	8.01			
S96T003247	111:2	Lower ½	5.970	6.440	6.205			
S96T003258	111:3	Upper ½	9.630	9.850	9.740			
S96T003259	111:4	Upper ½	8.740	8.350	8.545			
S96T003260	111:5	Lower ½	6.180	< 4.19	< 5.19			
S96T003261	111:8	Lower ½	< 4.400	4.540	4.47			

Table A-36. Tank 241-S-107 Analytical Results: Zinc. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	220	196	208[QC:a,c]	234		571
S95T003156	110	N/A	304	319	311.5[QC:a]			
S95T003162	111	N/A	188	175	181.5[QC:a]			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	4.650	6.490	5.570[QC:c]			
S95T003281	110	N/A	4.250	< 3.99	4.12			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	13.9321	13.3215	13.6268	13.1		0.695
S95T002446	105:2	DL	16.1108	16.9434	16.5271			
S95T002601	110:1	DL	15.2625	15.1121	15.1873			
S95T002602	110:2	DL	10.1856	10.9931	10.5893			
S95T002629	111:1	DL	12.8794	13.1322	13.0058			
S95T002632	111:2	DL	9.5606	9.8984	9.7295			

Table A-37. Tank 241-S-107 Analytical Results: Zirconium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002915	105:2	Upper ½	165	246	205.5[QC:e]	9,720	33.6	23,700
S95T002914		Lower ½	108	321	214.5[QC:e]			
S95T002702	105:3	Upper ½	2,346.57	3,131.05	2,738.81			
S95T002701		Lower ½	63,288.6	62,573.5	62,931			
S95T002704	105:4	Upper ½	3,120	2,950	3,035			
S95T002703		Lower ½	6,580	7,260	6,920			
S95T002706	105:5	Upper ½	15,598.3	16,120.6	15,859.4			
S95T002705		Lower ½	85,879	86,502.2	86,190.6			
S95T002708	105:6	Upper ½	216.919	243.253	230.086[QC:e]			
S95T002707		Lower ½	116.556	117.628	117.092			
S95T002710	105:7	Upper ½	73.7406	88.5125	81.1266[QC:e]			
S95T002709		Lower ½	81.8953	93.3919	87.6436[QC:e]			
S95T002712	105:8	Upper ½	132	118	125[QC:a,e]			
S95T002711		Lower ½	112	593	352.5[QC:a,e]			
S95T002752	110:2	Lower ½	111	262	186.5[QC:e]			
S95T002756	110:3	Upper ½	35,700	36,700	36,200			
S95T002755		Lower ½	49,600	64,300	56,950			
S95T002758	110:4	Upper ½	23,600	24,300	23,950			
S95T002757		Lower ½	2,370	2,480	2,425			
S95T002760	110:5	Upper ½	1,180	1,020	1,100			
S95T002759		Lower ½	1,010	370	690[QC:a,e]			

Table A-37. Tank 241-S-107 Analytical Results: Zirconium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002762	110:6	Upper ½	496	480	488			
S95T002761		Lower ½	448	449	448.5			
S95T002764	110:7	Upper ½	98.3	97.5	97.9			
S95T002763		Lower ½	132	127	129.5			
S95T002766	110:8	Upper ½	138	134	136			
S95T002765		Lower ½	73.3	82.1	77.7[QC:e]			
S95T002754	110:3A	Upper ½	1.040E+05	1.090E+05	1.065E+05[QC:a]			
S95T002753		Lower ½	92,800	95,700	94,250			
S95T002810	111:2	Lower ½	140	44.8	92.4[QC:e]			
S95T002811	111:3	Upper ½	3,370	3,460	3,415			
S95T002812		Lower ½	60,900	54,700	57,800			
S95T002814	111:4	Upper ½	11,500	10,400	10,950			
S95T002813		Lower ½	6,910	6,060	6,485			
S95T002816	111:5	Upper ½	4,260	3,990	4,125			
S95T002815		Lower ½	3,100	3,010	3,055			
S95T002818	111:6	Upper ½	213	281	247[QC:e]			
S95T002817		Lower ½	130	124	127			
S95T002820	111:7	Upper ½	78.2	136	107.1[QC:e]			
S95T002819		Lower ½	73.6	74	74.0			

Table A-37. Tank 241-S-107 Analytical Results: Zirconium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002823	111:8	Upper ½	86.7	91.0	88.85			
S95T002822		C	101	100	100.5			
S95T002821		D	66.5	70.1	68.3			
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003301	105:2	Lower ½	26.20	35.90	31.05[QC:e]			
S96T003302	105:3	Upper ½	976	1,720	1,350[QC:e]			
S96T003303	105:4	Upper ½	25.70	19.20	22.45[QC:e]			
S96T003304	105:5	Lower ½	< 3.780	< 4.41	< 4.10			
S96T003305	105:8	Lower ½	4.870	< 3.85	<4.36			
S96T003276	110:2	Lower ½	< 7.080	< 7.00	< 7.04			
S96T003277	110:3	Upper ½	28.10	16.70	22.40			
S96T003278	110:4	Upper ½	< 3.840	4.480	4.16			
S96T003279	110:5	Lower ½	< 1.900	< 1.94	< 19.2			
S96T003280	110:8	Lower ½	< 4.220	< 3.92	< 4.07			
S96T003247	111:2	Lower ½	< 3.840	< 3.95	< 3.90			
S96T003258	111:3	Upper ½	116	114.0	115.0			
S96T003259	111:4	Upper ½	200	176.0	188.0[QC:e]			
S96T003260	111:5	Lower ½	< 3.730	< 4.19	< 3.96			
S96T003261	111:8	Lower ½	< 4.400	< 4.29	< 4.35			

Table A-37. Tank 241-S-107 Analytical Results: Zirconium. (4 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites: acid digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003152	105	N/A	4,960	218	2,589	4,460		10,900
S95T003156	110	N/A	4,510	9,220	6,865			
S95T003162	111	N/A	2,960	4,880	3,920			
Composites: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S96T003300	105	N/A	39.20	52.10	45.65[QC:e]			
S95T003281	110	N/A	21.10	10.00	15.55			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	< 4.01	< 4.01	< 4.01	< 4.01		< 0.212
S95T002446	105:2	DL	< 4.01	< 4.01	< 4.01			
S95T002601	110:1	DL	< 4.01	< 4.01	< 4.01			
S95T002602	110:2	DL	< 4.01	< 4.01	< 4.01			
S95T002629	111:1	DL	< 4.01	< 4.01	< 4.01			
S95T002632	111:2	DL	< 4.01	< 4.01	< 4.01			

Table A-38. Tank 241-S-107 Analytical Results: Chloride. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: Water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002458	105:2	Upper ½	3,591	3,980	3,785.5	2,080	7.0	5,080
S95T002457		Lower ½	1,472	1,570	1,521			
S95T002726	105:3	Upper ½	1,271	1,340	1,305.5			
S95T002725		Lower ½	2,148	1,850	1,999			
S95T002728	105:4	Upper ½	2,258	2,180	2,219			
S95T002727		Lower ½	2,794	2,670	2,732			
S95T002730	105:5	Upper ½	2,550	2,650	2,600			
S95T002729		Lower ½	2,020	2,110	2,065			
S95T002732	105:6	Upper ½	1,254	1,200	1,227			
S95T002731		Lower ½	1,404	1,280	1,342			
S95T002734	105:7	Upper ½	1,760	2,050	1,905			
S95T002733		Lower ½	1,880	2,000	1,940			
S95T002736	105:8	Upper ½	2,037	2,020	2,028.5			
S95T002735		Lower ½	2,185	1,990	2,087.5			
S95T002776	110:2	Lower ½	1,704	1,710	1,707			
S95T002780	110:3	Upper ½	2,095	1,600	1,847.5			
S95T002779		Lower ½	1,408	1,480	1,444			
S95T002782	110:4	Upper ½	2,277	2,250	2,263.5			
S95T002781		Lower ½	1,316	1,420	1,368			
S95T002784	110:5	Upper ½	1,313	1,330	1,321.5			
S95T002783		Lower ½	1,445	1,250	1,347.5			

Table A-38. Tank 241-S-107 Analytical Results: Chloride. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: Water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002786	110:6	Upper ½	2,303	1,400	1,851.5			
S95T002785		Lower ½	1,464	1,500	1,482			
S95T002788	110:7	Upper ½	1,182	2,280	1,731			
S95T002787		Lower ½	2,298	2,220	2,259			
S95T002790	110:8	Upper ½	1,851	2,100	1,975.5			
S95T002789		Lower ½	3,139	3,480	3,309.5			
S95T002778	110:3A	Upper ½	2,079	6,960	4,519.5[QC:e]			
S95T002777		Lower ½	2,040	2,060	2,050			
S95T002824	111:2	Lower ½	2,532	1,560	2,046			
S95T002825	111:3	Upper ½	3,009	7,040	5,024.5[QC:e]			
S95T002826		Lower ½	3,494	2,800	3,147			
S95T002828	111:4	Upper ½	2,019	2,030	2,024.5			
S95T002827		Lower ½	2,228	2,570	2,399			
S95T002830	111:5	Upper ½	2,857	2,740	2,798.5			
S95T002829		Lower ½	2,189	2,180	2,184.5			
S95T002832	111:6	Upper ½	1,725	1,050	1,387.5			
S95T002831		Lower ½	1,858	1,850	1,854			
S95T002834	111:7	Upper ½	2,199	2,030	2,114.5			
S95T002833		Lower ½	1,853	2,220	2,036.5			

Table A-38. Tank 241-S-107 Analytical Results: Chloride. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: Water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002837	111:8	Upper ½	1,208	2,070	1,639			
S95T002836		C	1,856	1,740	1,798			
S95T002835		D	2,165	2,050	2,107.5			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003153	105	N/A	1,994	1,590	1,792	1,920	N/A	4,680
S95T003157	110	N/A	1,958	1,810	1,884			
S95T003163	111	N/A	2,030	2,120	2,075			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	3,676	3,720	3,698	3,540		188
S95T002446	105:2	DL	3,431	3,430	3,430.5			
S95T002601	110:1	DL	3,240	3,210	3,225			
S95T002602	110:2	DL	3,640	3,530	3,585			
S95T002629	111:1	DL	3,774	3,720	3,747			
S95T002632	111:2	DL	3,590	3,540	3,565			

Table A-39. Tank 241-S-107 Analytical Results: Fluoride. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002458	105:2	Upper ½	15,170	12,900	14,035	14,300	30.5	34,800
S95T002457		Lower ½	14,270	13,900	14,085			
S95T002726	105:3	Upper ½	18,450	18,300	18,375			
S95T002725		Lower ½	91,130	90,600	90,865			
S95T002728	105:4	Upper ½	73,510	70,100	71,805			
S95T002727		Lower ½	7,863	7,330	7,596.5			
S95T002730	105:5	Upper ½	17,100	20,200	18,650			
S95T002729		Lower ½	229	211	220			
S95T002732	105:6	Upper ½	180.3	180	180.15			
S95T002731		Lower ½	91.57	79.6	85.585[QC:e]			
S95T002734	105:7	Upper ½	< 111	103	107			
S95T002733		Lower ½	415	488	451.5[QC:e]			
S95T002736	105:8	Upper ½	91.75	89.3	90.525			
S95T002735		Lower ½	150.7	144	147.35			
S95T002776	110:2	Lower ½	10,050	10,200	10,125			
S95T002780	110:3	Upper ½	72,120	61,400	66,760			
S95T002779		Lower ½	< 14.1	< 14.3	< 14.2			
S95T002782	110:4	Upper ½	30,840	28,100	29,470			
S95T002781		Lower ½	1,240	1,120	1,180			
S95T002784	110:5	Upper ½	947.2	913	930.1			
S95T002783		Lower ½	149.5	125	137.25[QC:e]			

Table A-39. Tank 241-S-107 Analytical Results: Fluoride. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002786	110:6	Upper ½	< 22.46	< 22.3	< 22.4			
S95T002785		Lower ½	< 19.49	< 19.6	< 19.5			
S95T002788	110:7	Upper ½	9,042	150	4,596			
S95T002787		Lower ½	< 17.33	406	212[QC:e]			
S95T002790	110:8	Upper ½	43.44	92.3	67.87[QC:e]			
S95T002789		Lower ½	171	236	203.5[QC:e]			
S95T002778	110:3A	Upper ½	88,950	1.020E+05	95,475			
S95T002777		Lower ½	1.066E+05	1.080E+05	1.073E+05			
S95T002824	111:2	Lower ½	< 24.17	11,100	5,560			
S95T002825	111:3	Upper ½	17,670	17,600	17,635			
S95T002826		Lower ½	1.228E+05	1.210E+05	1.219E+05			
S95T002828	111:4	Upper ½	45,460	46,200	45,830			
S95T002827		Lower ½	15,580	21,500	18,540			
S95T002830	111:5	Upper ½	8,917	8,550	8,733.5			
S95T002829		Lower ½	246.3	242	244.15			
S95T002832	111:6	Upper ½	< 35.25	< 33.8	< 34.5			
S95T002831		Lower ½	696.6	1,270	983.3[QC:e]			
S95T002834	111:7	Upper ½	158.9	154	156.45			
S95T002833		Lower ½	154.9	193	173.95[QC:e]			

Table A-39. Tank 241-S-107 Analytical Results: Fluoride. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002837	111:8	Upper ½	73.88	105	89.44[QC:e]			
S95T00283		C	< 45.8	< 44.8	< 45.3			
S95T002835		D	< 97.42	< 102	< 99.7			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003153	105	N/A	7,270	14,800	11,035	14,000		34,100
S95T003157	110	N/A	14,310	15,000	14,655			
S95T003163	111	N/A	17,230	15,300	16,265			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	496.6	451	473.8	327		17.4
S95T002446	105:2	DL	376.1	366	371.05			
S95T002601	110:1	DL	284	271	277.5			
S95T002602	110:2	DL	245	282	263.5			
S95T002629	111:1	DL	448.5	445	446.75			
S95T002632	111:2	DL	< 132	< 132	< 132			

Table A-40. Tank 241-S-107 Analytical Results: Nitrate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002458	105:2	Upper ½	94,630	1.070E+05	1.008E+05[QC:e]	57,900	5.3	141,000
S95T002457		Lower ½	39,060	43,600	41,330			
S95T002726	105:3	Upper ½	36,400	40,100	38,250			
S95T002725		Lower ½	77,640	65,700	71,670			
S95T002728	105:4	Upper ½	80,330	80,500	80,415			
S95T002727		Lower ½	93,820	91,300	92,560			
S95T002730	105:5	Upper ½	87,700	90,500	89,100			
S95T002729		Lower ½	63,700	68,600	66,150			
S95T002732	105:6	Upper ½	38,350	36,100	37,225			
S95T002731		Lower ½	41,360	37,700	39,530			
S95T002734	105:7	Upper ½	53,000	59,200	56,100			
S95T002733		Lower ½	55,100	59,600	57,350			
S95T002736	105:8	Upper ½	59,160	58,600	58,880			
S95T002735		Lower ½	59,730	57,000	58,365			
S95T002776	110:2	Lower ½	46,020	47,800	46,910			
S95T002780	110:3	Upper ½	67,720	53,300	60,510			
S95T002779		Lower ½	43,110	45,700	44,405			
S95T002782	110:4	Upper ½	82,260	84,800	83,530			
S95T002781		Lower ½	47,250	50,900	49,075			
S95T002784	110:5	Upper ½	38,860	37,400	38,130			
S95T002783		Lower ½	48,730	42,700	45,715			

Table A-40. Tank 241-S-107 Analytical Results: Nitrate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002786	110:6	Upper ½	47,400	40,000	43,700			
S95T002785		Lower ½	39,900	42,300	41,100			
S95T002788	110:7	Upper ½	31,130	63,000	47,065			
S95T002787		Lower ½	60,170	59,600	59,885			
S95T002790	110:8	Upper ½	51,740	62,000	56,870			
S95T002789		Lower ½	60,420	86,200	73,310			
S95T002778	110:3A	Upper ½	69,710	74,300	72,005			
S95T002777		Lower ½	77,020	77,700	77,360			
S95T002824	111:2	Lower ½	74,700	44,500	59,600			
S95T002825	111:3	Upper ½	76,840	79,600	78,220			
S95T002826		Lower ½	76,500	74,000	75,250			
S95T002828	111:4	Upper ½	58,040	58,700	58,370			
S95T002827		Lower ½	61,010	71,900	66,455			
S95T002830	111:5	Upper ½	< 285	< 282	< 284			
S95T002829		Lower ½	74,490	71,800	73,145			
S95T002832	111:6	Upper ½	45,650	32,000	38,825			
S95T002831		Lower ½	58,420	58,100	58,260			
S95T002834	111:7	Upper ½	71,120	65,400	68,260			
S95T002833		Lower ½	64,990	76,900	70,945			

Table A-40. Tank 241-S-107 Analytical Results: Nitrate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002837	111:8	Upper ½	47,120	< 265	23,700			
S95T002836		C	62,280	61,400	61,840			
S95T002835		D	70,810	68,300	69,555			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003153	105	N/A	62,910	50,100	56,505	58,000		141,000
S95T003157	110	N/A	60,820	55,300	58,060			
S95T003163	111	N/A	57,300	61,300	59,300			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	96,530	96,800	96,665	93,400		4,950
S95T002446	105:2	DL	92,190	92,700	92,445			
S95T002601	110:1	DL	91,800	92,500	92,150			
S95T002602	110:2	DL	97,500	97,300	97,400			
S95T002629	111:1	DL	95,080	95,100	95,090			
S95T002632	111:2	DL	86,200	87,400	86,800			

Table A-41. Tank 241-S-107 Analytical Results: Nitrite. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002458	105:2	Upper ½	45,890	50,700	48,295	30,900	7.1	75,300
S95T002457		Lower ½	18,310	20,600	19,455			
S95T002726	105:3	Upper ½	16,120	17,800	16,960			
S95T002725		Lower ½	30,610	26,500	28,555			
S95T002728	105:4	Upper ½	32,650	32,000	32,325			
S95T002727		Lower ½	39,410	38,800	39,105			
S95T002730	105:5	Upper ½	39,000	41,200	40,100			
S95T002729		Lower ½	29,400	31,400	30,400			
S95T002732	105:6	Upper ½	19,610	18,200	18,905			
S95T002731		Lower ½	22,400	20,200	21,300			
S95T002734	105:7	Upper ½	31,100	36,200	33,650			
S95T002733		Lower ½	34,100	35,900	35,000			
S95T002736	105:8	Upper ½	37,550	36,600	37,075			
S95T002735		Lower ½	36,470	36,300	36,385			
S95T002776	110:2	Lower ½	22,280	22,300	22,290			
S95T002780	110:3	Upper ½	29,350	23,200	26,275			
S95T002779		Lower ½	21,140	22,500	21,820			
S95T002782	110:4	Upper ½	34,440	35,000	34,720			
S95T002781		Lower ½	20,190	22,200	21,195			
S95T002784	110:5	Upper ½	18,730	18,600	18,665			
S95T002783		Lower ½	21,870	19,100	20,485			

Table A-41. Tank 241-S-107 Analytical Results: Nitrite. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002786	110:6	Upper ½	23,210	19,700	21,455			
S95T002785		Lower ½	21,880	21,900	21,890			
S95T002788	110:7	Upper ½	15,520	34,400	24,960			
S95T002787		Lower ½	38,740	37,900	38,320			
S95T002790	110:8	Upper ½	30,710	36,900	33,805			
S95T002789		Lower ½	35,790	51,100	43,445			
S95T002778	110:3A	Upper ½	29,920	30,400	30,160			
S95T002777		Lower ½	31,940	32,300	32,120			
S95T002824	111:2	Lower ½	42,120	22,300	32,210			
S95T002825	111:3	Upper ½	36,900	37,800	37,350			
S95T002826		Lower ½	36,160	36,300	36,230			
S95T002828	111:4	Upper ½	28,300	27,900	28,100			
S95T002827		Lower ½	29,510	35,000	32,255			
S95T002830	111:5	Upper ½	44,360	42,500	43,430			
S95T002829		Lower ½	34,960	34,500	34,730			
S95T002832	111:6	Upper ½	24,550	16,200	20,375			
S95T002831		Lower ½	31,160	30,700	30,930			
S95T002834	111:7	Upper ½	38,310	35,100	36,705			
S95T002833		Lower ½	37,070	42,800	39,935			

Table A-41. Tank 241-S-107 Analytical Results: Nitrite. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002837	111:8	Upper ½	26,020	45,300	35,660			
S95T002836		C	37,670	36,200	36,935			
S95T002835		D	41,400	41,500	41,450			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003153	105	N/A	32,700	26,500	29,600	30,100		73,400
S95T003157	110	N/A	30,800	28,000	29,400			
S95T003163	111	N/A	30,010	32,500	31,255			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	47,530	47,300	47,415	46,700		2,480
S95T002446	105:2	DL	45,220	45,200	45,210			
S95T002601	110:1	DL	46,500	46,300	46,400			
S95T002602	110:2	DL	49,400	49,000	49,200			
S95T002629	111:1	DL	47,370	48,100	47,735			
S95T002632	111:2	DL	45,000	43,900	44,450			

Table A-42. Tank 241-S-107 Analytical Results: Phosphate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002458	105:2	Upper ½	1.401E+05	1.220E+05	1.311E+05[QC:e]	21,600	29.4	52,700
S95T002457		Lower ½	1.472E+05	1.430E+05	1.451E+05			
S95T002726	105:3	Upper ½	1.150E+05	1.070E+05	1.110E+05			
S95T002725		Lower ½	< 1,689	< 1,610	< 1,650			
S95T002728	105:4	Upper ½	333.7	349	341.35			
S95T002727		Lower ½	1,213	998	1,105.5			
S95T002730	105:5	Upper ½	1,100	1,100	1,100			
S95T002729		Lower ½	< 1,410	< 1,060	< 1,240			
S95T002732	105:6	Upper ½	876.9	951	913.95			
S95T002731		Lower ½	1,278	1,220	1,249			
S95T002734	105:7	Upper ½	2,000	2,740	2,370			
S95T002733		Lower ½	2,460	2,720	2,590			
S95T002736	105:8	Upper ½	1,607	1,650	1,628.5			
S95T002735		Lower ½	1,059	1,060	1,059.5			
S95T002776	110:2	Lower ½	88,900	85,100	87,000			
S95T002780	110:3	Upper ½	20,290	47,400	33,845			
S95T002779		Lower ½	1,003	1,030	1,016.5			
S95T002782	110:4	Upper ½	536.9	582	559.45			
S95T002781		Lower ½	554.4	1,210	882.2[QC:e]			
S95T002784	110:5	Upper ½	2,175	2,390	2,282.5			
S95T002783		Lower ½	584.5	2,520	1,552.25			

Table A-42. Tank 241-S-107 Analytical Results: Phosphate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002786	110:6	Upper ½	1,333	1,340	1,336.5			
S95T002785		Lower ½	1,458	1,290	1,374			
S95T002788	110:7	Upper ½	95,160	1.210E+05	1.081E+05[QC:e]			
S95T002787		Lower ½	3,491	6,460	4,975.5[QC:e]			
S95T002790	110:8	Upper ½	999.2	2,320	1,659.6[QC:e]			
S95T002789		Lower ½	1,564	4,100	2,832			
S95T002778	110:3A	Upper ½	< 1,188	< 1,180	< 1,180			
S95T002777		Lower ½	< 489.5	< 480	< 485			
S95T002824	111:2	Lower ½	3,123	1.130E+05	58,061.5[QC:e]			
S95T002825	111:3	Upper ½	26,880	24,900	25,890			
S95T002826		Lower ½	5,562	7,900	6,731			
S95T002828	111:4	Upper ½	72,400	72,800	72,600			
S95T002827		Lower ½	32,650	30,800	31,725			
S95T002830	111:5	Upper ½	2,486	1,340	1,913[QC:e]			
S95T002829		Lower ½	1,132	1,010	1,071			
S95T002832	111:6	Upper ½	1,910	1,310	1,610			
S95T002831		Lower ½	3,118	7,700	5,409[QC:e]			
S95T002834	111:7	Upper ½	3,246	3,060	3,153			
S95T002833		Lower ½	2,517	2,890	2,703.5			

Table A-42. Tank 241-S-107 Analytical Results: Phosphate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002837	111:8	Upper ½	797.6	1,090	943.8[QC:e]			
S95T002836		C	1,660	1,800	1,730			
S95T002835		D	3,261	< 933	2,100			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003153	105	N/A	11,910	81,600	46,755[QC:e]	24,300		59,300
S95T003157	110	N/A	8,488	9,720	9,104			
S95T003163	111	N/A	18,350	15,700	17,025			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	3,981	3,960	3,970.5	3,850		204
S95T002446	105:2	DL	4,582	4,220	4,401			
S95T002601	110:1	DL	2,620	2,940	2,780			
S95T002602	110:2	DL	2,910	3,030	2,970			
S95T002629	111:1	DL	3,627	3,620	3,623.5			
S95T002632	111:2	DL	< 5,330	< 5,430	< 5,380			

Table A-43. Tank 241-S-107 Analytical Results: Sulfate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002458	105:2	Upper ½	1,773	1,990	1,881.5	2,430	19.5	5,930
S95T002457		Lower ½	1,536	1,670	1,603			
S95T002726	105:3	Upper ½	1,893	1,950	1,921.5			
S95T002725		Lower ½	3,063	2,800	2,931.5			
S95T002728	105:4	Upper ½	1,602	1,340	1,471			
S95T002727		Lower ½	1,827	1,740	1,783.5			
S95T002730	105:5	Upper ½	1,960	2,020	1,990			
S95T002729		Lower ½	2,270	2,100	2,185			
S95T002732	105:6	Upper ½	769.8	720	744.9			
S95T002731		Lower ½	1,053	948	1,000.5			
S95T002734	105:7	Upper ½	1,600	1,140	1,370			
S95T002733		Lower ½	< 1,190	1,270	1,230			
S95T002736	105:8	Upper ½	1,298	1,240	1,269			
S95T002735		Lower ½	1,292	1,280	1,286			
S95T002776	110:2	Lower ½	1,936	1,970	1,953			
S95T002780	110:3	Upper ½	2,607	2,420	2,513.5			
S95T002779		Lower ½	740.6	764	752.3			
S95T002782	110:4	Upper ½	1,597	1,600	1,598.5			
S95T002781		Lower ½	842.9	897	869.95			
S95T002784	110:5	Upper ½	2,305	2,340	2,322.5			
S95T002783		Lower ½	815	735	775			

Table A-43. Tank 241-S-107 Analytical Results: Sulfate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002786	110:6	Upper ½	1,450	1,300	1,375			
S95T002785		Lower ½	1,235	1,260	1,247.5			
S95T002788	110:7	Upper ½	1,992	36,600	19,296			
S95T002787		Lower ½	1,607	1,600	1,603.5			
S95T002790	110:8	Upper ½	1,024	1,270	1,147			
S95T002789		Lower ½	1,999	2,360	2,179.5			
S95T002778	110:3A	Upper ½	2,589	3,390	2,989.5			
S95T002777		Lower ½	1,841	1,860	1,850.5			
S95T002824	111:2	Lower ½	1,453	2,070	1,761.5			
S95T002825	111:3	Upper ½	5,701	5,750	5,725.5			
S95T002826		Lower ½	4,104	3,840	3,972			
S95T002828	111:4	Upper ½	6,100	6,150	6,125			
S95T002827		Lower ½	4,683	5,460	5,071.5			
S95T002830	111:5	Upper ½	3,419	2,810	3,114.5			
S95T002829		Lower ½	1,361	1,290	1,325.5			
S95T002832	111:6	Upper ½	1,738	1,640	1,689			
S95T002831		Lower ½	1,829	1,900	1,864.5			
S95T002834	111:7	Upper ½	1,308	1,230	1,269			
S95T002833		Lower ½	1,133	2,220	1,676.5			

Table A-43. Tank 241-S-107 Analytical Results: Sulfate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002837	111:8	Upper ½	901	1,300	1,100.5			
S95T002836		C	2,279	2,320	2,299.5			
S95T002835		D	4,361	4,220	4,290.5			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003153	105	N/A	3,444	3,190	3,317	2,790		6,800
S95T003157	110	N/A	3,358	3,180	3,269			
S95T003163	111	N/A	1,774	1,820	1,797			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	3,896	3,810	3,853	3,640		193
S95T002446	105:2	DL	3,739	4,380	4,059.5			
S95T002601	110:1	DL	2,760	2,790	2,775			
S95T002602	110:2	DL	2,910	2,950	2,930			
S95T002629	111:1	DL	2,870	2,880	2,875			
S95T002632	111:2	DL	5,390	5,330	5,360			

Table A-44. Tank 241-S-107 Analytical Results: Oxalate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002458	105:2	Upper ½	30,760	29,300	30,030	4,180	24.3	10,200
S95T002457		Lower ½	13,470	14,800	14,135			
S95T002726	105:3	Upper ½	3,189	3,870	3,529.5			
S95T002725		Lower ½	1,731	< 1,420	1,580			
S95T002728	105:4	Upper ½	1,811	1,980	1,895.5			
S95T002727		Lower ½	1,501	1,910	1,705.5			
S95T002730	105:5	Upper ½	2,860	2,470	2,665			
S95T002729		Lower ½	6,560	4,820	5,690			
S95T002732	105:6	Upper ½	342.6	388	365.3[QC:e]			
S95T002731		Lower ½	3,341	1,030	2,185.5			
S95T002734	105:7	Upper ½	3,490	4,370	3,930			
S95T002733		Lower ½	< 919	2,050	1,480			
S95T002736	105:8	Upper ½	477.8	414	445.9[QC:e]			
S95T002735		Lower ½	141.6	170	155.8[QC:e]			
S95T002776	110:2	Lower ½	13,670	15,300	14,485			
S95T002780	110:3	Upper ½	< 1,053	< 1,050	< 1,050			
S95T002779		Lower ½	1,369	2,320	1,844.5			
S95T002782	110:4	Upper ½	2,256	1,510	1,883			
S95T002781		Lower ½	882.1	1,230	1,056.05			
S95T002784	110:5	Upper ½	1,518	< 421	970[QC:e]			
S95T002783		Lower ½	869.4	2,170	1,519.7			

Table A-44. Tank 241-S-107 Analytical Results: Oxalate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002786	110:6	Upper ½	3,004	1,160	2,082			
S95T002785		Lower ½	2,813	1,280	2,046.5			
S95T002788	110:7	Upper ½	9,583	39,800	24,691.5			
S95T002787		Lower ½	1,447	5,610	3,528.5			
S95T002790	110:8	Upper ½	429.6	1,040	734.8[QC:e]			
S95T002789		Lower ½	854.1	2,700	1,777.05			
S95T002778	110:3A	Upper ½	9,037	< 1,040	5,040			
S95T002777		Lower ½	4,103	4,550	4,326.5			
S95T002824	111:2	Lower ½	362	11,700	6,031			
S95T002825	111:3	Upper ½	6,022	5,370	5,696			
S95T002826		Lower ½	< 1,866	< 1,700	< 1,780			
S95T002828	111:4	Upper ½	2,488	2,220	2,354			
S95T002827		Lower ½	3,018	3,070	3,044			
S95T002830	111:5	Upper ½	2,687	1,390	2,038.5			
S95T002829		Lower ½	536.9	474	505.45[QC:e]			
S95T002832	111:6	Upper ½	1,534	1,080	1,307			
S95T002831		Lower ½	1,401	1,080	1,240.5			
S95T002834	111:7	Upper ½	687.5	26,100	13,393.8[QC:e]			
S95T002833		Lower ½	929.4	1,060	994.7[QC:e]			

Table A-44. Tank 241-S-107 Analytical Results: Oxalate. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: water digest			µg/g	µg/g	µg/g	µg/g	%	kg
S95T002837	111:8	Upper ½	< 222.8	219	221			
S95T002836		C	1,481	< 362	< 922[QC:e]			
S95T002835		D	3,281	< 824	< 2,050			
Composites			µg/g	µg/g	µg/g	µg/g	%	kg
S95T003153	105	N/A	2,001	< 1,920	1,960	2,530		6,170
S95T003157	110	N/A	2,370	2,820	2,595			
S95T003163	111	N/A	2,634	3,450	3,042			
Liquids:			µg/mL	µg/mL	µg/mL	µg/mL	%	kg
S95T002443	105:1	DL	1,312	1,210	1,261	967		51.2
S95T002446	105:2	DL	1,185	1,330	1,257.5			
S95T002601	110:1	DL	670	686	678			
S95T002602	110:2	DL	773	776	774.5			
S95T002629	111:1	DL	760.2	757	758.6			
S95T002632	111:2	DL	< 1,070	< 1,070	< 1,070			

Table A-45. Tank 241-S-107 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002456	105:2	Upper ½	0.921	0.894	0.9075[QC:c]	0.9	13.6	2,200
S95T002455		Lower ½	0.669	0.547	0.608[QC:c,e]			
S95T002714	105:3	Upper ½	2.56	1.63	2.095[QC:e]			
S95T002713		Lower ½	1.470	1.560	1.515			
S95T002716	105:4	Upper ½	1.36	1.23	1.295			
S95T002715		Lower ½	0.801	0.822	0.8115			
S95T002718	105:5	Upper ½	0.736	0.818	0.777			
S95T002717		Lower ½	1.23	1.23	1.23			
S95T002720	105:6	Upper ½	0.0284	0.0216	0.025[QC:e]			
S95T002719		Lower ½	0.349	0.474	0.4115[QC:e]			
S95T002722	105:7	Upper ½	0.552	0.659	0.6055[QC:e]			
S95T002721		Lower ½	0.829	0.803	0.816			
S95T002724	105:8	Upper ½	0.561	0.580	0.5705			
S95T002723		Lower ½	0.902	0.317	0.6095[QC:e]			
S95T002737	110:2	Lower ½	1.40	1.45	1.425			
S95T002741	110:3	Upper ½	2.16	3.30	2.73[QC:e]			
S95T002740		Lower ½	1.17	1.36	1.265[QC:e]			
S95T002743	110:4	Upper ½	0.945	1.05	0.9975[QC:a]			
S95T002742		Lower ½	0.195	0.224	0.2095[QC:e]			
S95T002745	110:5	Upper ½	0.0584	0.0836	0.0710[QC:a,e]			
S95T002744		Lower ½	0.0487	0.0603	0.0545[QC:a,e]			

Table A-45. Tank 241-S-107 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002747	110:6	Upper ½	0.108	0.107	0.1075			
S95T002746		Lower ½	0.140	0.180	0.16[QC:a,e]			
S95T002749	110:7	Upper ½	0.592	0.586	0.589[QC:a]			
S95T002748		Lower ½	0.520	0.501	0.5105			
S95T002751	110:8	Upper ½	0.320	0.472	0.396[QC:a,e,f]			
S95T002750		Lower ½	0.479	0.511	0.495[QC:a]			
S95T002739	110:3A	Upper ½	1.85	2.01	1.93			
S95T002738		Lower ½	2.25	2.23	2.24			
S95T002791	111:2	Lower ½	0.474	0.275	0.3745[QC:f,a,e]			
S95T002792	111:3	Upper ½	3.06	2.73	2.895[QC:e]			
S95T002793		Lower ½	3.20	3.46	3.33			
S95T002795	111:4	Upper ½	1.18	1.08	1.13			
S95T002794		Lower ½	0.634	0.726	0.680[QC:e]			
S95T002797	111:5	Upper ½	0.698	0.885	0.7915[QC:e]			
S95T002796		Lower ½	1.100	1.080	1.090			
S95T002799	111:6	Upper ½	0.363	0.337	0.35			
S95T002798		Lower ½	0.611	0.635	0.623			
S95T002801	111:7	Upper ½	0.534	0.585	0.5595			
S95T002800		Lower ½	0.884	0.789	0.8365[QC:e]			
S95T002804	111:8	Upper ½	0.567	0.682	0.6245[QC:e]			
S95T002803		C	0.577	0.625	0.601			
S95T002802		D	0.295	0.254	0.2745[QC:e]			

Table A-45. Tank 241-S-107 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T003148	105	N/A	0.861	0.864	0.8625	0.969		2,360
S95T003155	110	N/A	0.911	0.920	0.9155			
S95T003161	111	N/A	1.180	1.080	1.130			
Liquids:			µCi/mL	µCi/mL	µCi/mL	µCi/mL	%	Ci
S95T002446	105:2	DL	< 0.00486	< 0.00652	< 0.00569[QC:b,d]			
S95T003397	110:2	DL	< 0.00237	< 0.00194	< 0.00216			
S95T002632	111:2	DL	< 0.0189	0.0197	0.0193			

Table A-46. Tank 241-S-107 Analytical Results: Total Beta.

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S96T003383	105:2	Lower ½	193	212.0	202.5			
S96T003384	105:3	Upper ½	128	155.0	141.5[QC:e]			
S96T003385	105:4	Upper ½	114	115.0	114.5			
S96T003386	105:5	Lower ½	143	171.0	157.0[QC:e]			
S96T003387	105:8	Lower ½	1,250	1,250	1,250			
S96T003390	110:2	Lower ½	288	328.0	308.0[QC:e]			
S96T003391	110:3	Upper ½	66.50	114.0	90.25[QC:e]			
S96T003392	110:4	Upper ½	137	136.0	136.5[QC:b]			
S96T003393	110:5	Lower ½	56.50	58.80	57.65[QC:c]			
S96T003394	110:8	Lower ½	1,040	1,230	1,140[QC:e]			
S96T003402	111:2	Lower ½	227	251.0	239.0			
S96T003403	111:3	Upper ½	113	105.0	109.0			
S96T003404	111:4	Upper ½	103	91.40	97.20[QC:e]			
S96T003405	111:5	Lower ½	181	161.0	171.0[QC:e]			
S96T003406	111:8	Lower ½	1,390	1,340	1,360			
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S96T003388	105	N/A	542	522.0	532.0			
S95T003395	110	N/A	348	358.0	353.0			

Table A-47. Tank 241-S-107 Analytical Results: Total Inorganic Carbon.

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids			µg C/g	µg C/g	µg C/g	µg C/g	%	kg
S96T003289	105:2	Lower ½	1,880	1,920	1,900	2,130	3.1	
S96T003290	105:3	Upper ½	1,910	1,670	1,790[QC:e]			
S96T003291	105:4	Upper ½	1,880	1,710	1,800			
S96T003292	105:5	Lower ½	2,040	1,870	1,960			
S96T003293	105:8	Lower ½	2,360	2,350	2,360			
S96T003263	110:2	Lower ½	2,410	2,080	2,240[QC:e]			
S96T003264	110:3	Upper ½	1,760	1,990	1,880[QC:e]			
S96T003265	110:4	Upper ½	1,890	1,880	1,880			
S96T003266	110:5	Lower ½	1,340	1,360	1,350			
S96T003267	110:8	Lower ½	2,820	2,760	2,790			
S96T002645	111:2	Lower ½	1,690	1,820	1,760			
S96T002653	111:3	Upper ½	3,160	3,710	3,440[QC:d,e]			
S96T003249	111:4	Upper ½	1,440	1,460	1,450			
S96T003250	111:5	Lower ½	2,390	2,200	2,300			
S96T003251	111:8	Lower ½	1,890	1,650	1,770[QC:e]			
Composites			µg C/g	µg C/g	µg C/g	µg C/g	%	kg
S96T003288	105	N/A	2,100	2,080	2,090			
S95T003268	110	N/A	2,180	1,910	2,040[QC:e]			
S95T003160	111	N/A	2,310	2,210	2,260			

Table A-48. Tank 241-S-107 Analytical Results: Total Organic Carbon.

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids			µg C/g	µg C/g	µg C/g	µg C/g	%	kg
S96T003289	105:2	Lower ½	4,530	4,680	4,600	1,700	11.8	
S96T003290	105:3	Upper ½	7,380	6,780	7,080			
S96T003291	105:4	Upper ½	832	978.0	905.0[QC:d,e]			
S96T003292	105:5	Lower ½	1,620	2,230	1,920[QC:e]			
S96T003293	105:8	Lower ½	305	354.0	329.5[QC:e]			
S96T003263	110:2	Lower ½	6,970	5,860	6,420[QC:e]			
S96T003264	110:3	Upper ½	3,700	3,890	3,800[QC:e]			
S96T003265	110:4	Upper ½	715	1,010	862.5[QC:e]			
S96T003266	110:5	Lower ½	860	847.0	853.5			
S96T003267	110:8	Lower ½	397	349.0	373.0[QC:e]			
S96T002645	111:2	Lower ½	3,890	3,680	3,780			
S96T002653	111:3	Upper ½	5,840	5,770	5,800[QC:e]			
S96T003249	111:4	Upper ½	1,510	1,470	1,490			
S96T003250	111:5	Lower ½	977	1,180	1,080[QC:e]			
S96T003251	111:8	Lower ½	182	167.0	178.0[QC:e]			
Composites			µg C/g	µg C/g	µg C/g	µg C/g	%	kg
S96T003288	105	N/A	1,420	1,520	1,470			
S95T003268	110	N/A	1,620	1,430	1,520[QC:a,c,e]			
S95T003160	111	N/A	1,890	2,300	2,100[QC:e]			

Table A-49. Tank 241-S-107 Analytical Results: Americium-241. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002456	105:2	Upper ½	< 0.6763	< 0.898	< 0.787[QC:e]	< 0.824	N/A	< 2,010
S95T002455		Lower ½	< 0.5315	< 0.704	< 0.618[QC:e]			
S95T002714	105:3	Upper ½	< 0.8914	< 0.46	< 0.676[QC:e]			
S95T002713		Lower ½	1.164	1.19	1.177			
S95T002716	105:4	Upper ½	< 0.5739	< 0.773	< 0.673[QC:e]			
S95T002715		Lower ½	< 0.6851	< 0.687	< 0.686			
S95T002718	105:5	Upper ½	< 0.9127	< 0.616	< 0.764[QC:e]			
S95T002717		Lower ½	< 0.6652	<0.675	< 0.670			
S95T002720	105:6	Upper ½	< 0.5201	<0.53	< 0.525			
S95T002719		Lower ½	< 0.5421	< 0.527	< 0.535			
S95T002722	105:7	Upper ½	< 0.9696	< 1.03	< 1.00			
S95T002721		Lower ½	< 0.8914	< 0.863	< 0.877			
S95T002724	105:8	Upper ½	< 2.347	< 2.33	< 2.34			
S95T002723		Lower ½	< 2.717	< 2.48	< 2.60			
S95T002737	110:2	Lower ½	< 1.215	< 0.600	< 0.908[QC:e]			
S95T002741	110:3	Upper ½	0.9328	1.80	1.3664[QC:e]			
S95T002740		Lower ½	< 0.576	< 0.444	< 0.510[QC:e]			
S95T002743	110:4	Upper ½	0.4569	0.456	0.45645			
S95T002742		Lower ½	< 0.4446	< 0.454	< 0.449			
S95T002745	110:5	Upper ½	< 0.4039	< 0.410	< 0.407			
S95T002744		Lower ½	< 0.1725	< 0.159	< 0.166			

Table A-49. Tank 241-S-107 Analytical Results: Americium-241. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002747	110:6	Upper ½	< 0.5383	<0.595	< 0.567			
S95T002746		Lower ½	< 0.5553	< 0.568	< 0.562			
S95T002749	110:7	Upper ½	< 0.9395	<0.848	< 0.894			
S95T002748		Lower ½	< 0.8116	< 0.810	< 0.811			
S95T002751	110:8	Upper ½	< 0.8467	< 0.847	< 0.847			
S95T002750		Lower ½	< 0.8473	< 0.855	< 0.851			
S95T002739	110:3A	Upper ½	1.337	1.37	1.3535			
S95T002738		Lower ½	1.23	1.64	1.435[QC:e]			
S95T002791	111:2	Lower ½	0.7282	0.687	0.708			
S95T002792	111:3	Upper ½	1.359	1.45	1.4045			
S95T002793		Lower ½	1.711	1.98	1.8455[QC:e]			
S95T002795	111:4	Upper ½	< 0.5166	< 0.296	< 0.406[QC:e]			
S95T002794		Lower ½	< 0.5529	< 0.622	< 0.587[QC:e]			
S95T002797	111:5	Upper ½	< 0.2785	< 0.281	< 0.280			
S95T002796		Lower ½	< 0.2575	< 0.263	< 0.260			
S95T002799	111:6	Upper ½	< 0.4746	< 0.494	< 0.484			
S95T002798		Lower ½	< 0.5616	< 0.562	< 0.562			
S95T002801	111:7	Upper ½	< 0.3082	< 0.31	< 0.309			
S95T002800		Lower ½	< 0.3335	< 0.344	< 0.339			
S95T002804	111:8	Upper ½	< 1.948	< 1.94	< 1.94			
S95T002803		C	< 0.8105	< 0.826	< 0.818			
S95T002802		D	< 0.2807	< 0.285	< 0.283			

Table A-49. Tank 241-S-107 Analytical Results: Americium-241. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T003148	105	N/A	< 0.6496	< 0.619	< 0.634	< 0.634		< 1,550
S95T003155	110	N/A	< 0.5658	< 0.569	< 0.567			
S95T003161	111	N/A	< 0.6607	< 0.742	< 0.701[QC:e]			

Table A-50. Tank 241-S-107 Analytical Results: Cesium-137. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002456	105:2	Upper ½	63.25	67	65.125	83.6	9.0	204,000
S95T002455		Lower ½	51.55	48.1	49.825			
S95T002714	105:3	Upper ½	69.1	52.8	60.95[QC:e]			
S95T002713		Lower ½	78.55	79.6	79.075			
S95T002716	105:4	Upper ½	88.94	90	89.47			
S95T002715		Lower ½	135.7	134	134.85			
S95T002718	105:5	Upper ½	114.6	119	116.8			
S95T002717		Lower ½	120.7	124	122.35			
S95T002720	105:6	Upper ½	107.3	111	109.15			
S95T002719		Lower ½	76.53	75.1	75.815			
S95T002722	105:7	Upper ½	136.2	140	138.1			
S95T002721		Lower ½	70.48	69.2	69.84			
S95T002724	105:8	Upper ½	62.37	61.6	61.985			
S95T002723		Lower ½	64.87	66.1	65.485			
S95T002737	110:2	Lower ½	62.04	29.1	45.57[QC:e]			
S95T002741	110:3	Upper ½	42.44	65.6	54.02[QC:e]			
S95T002740		Lower ½	78.95	74.9	76.925			
S95T002743	110:4	Upper ½	95.08	97.7	96.39			
S95T002742		Lower ½	53.69	54.8	54.245			
S95T002745	110:5	Upper ½	45.11	45.6	45.355			
S95T002744		Lower ½	55.67	50.2	52.935			

Table A-50. Tank 241-S-107 Analytical Results: Cesium-137. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002747	110:6	Upper ½	52.32	59.2	55.76[QC:e]			
S95T002746		Lower ½	78.99	86.8	82.895			
S95T002749	110:7	Upper ½	110.2	98.6	104.4[QC:e]			
S95T002748		Lower ½	76.15	73.5	74.825			
S95T002751	110:8	Upper ½	71.3	71.4	71.35			
S95T002750		Lower ½	75.44	79.9	77.67			
S95T002739	110:3A	Upper ½	70.12	64.6	67.36			
S95T002738		Lower ½	69.15	73.5	71.325			
S95T002791	111:2	Lower ½	62.97	60.3	61.635			
S95T002792	111:3	Upper ½	95	96.8	95.9			
S95T002793		Lower ½	90.1	91.7	90.9			
S95T002795	111:4	Upper ½	72.24	69.3	70.77			
S95T002794		Lower ½	97.62	117	107.31[QC:e]			
S95T002797	111:5	Upper ½	167.6	183	175.3			
S95T002796		Lower ½	152.2	151	151.6			
S95T002799	111:6	Upper ½	81.31	81.7	81.505			
S95T002798		Lower ½	112.3	116	114.15			
S95T002801	111:7	Upper ½	85.35	87.2	86.275			
S95T002800		Lower ½	58.8	60.1	59.45			
S95T002804	111:8	Upper ½	59.49	61.4	60.445			
S95T002803		C	59.89	59.5	59.695			
S95T002802		D	62.73	60.3	61.515			

Table A-50. Tank 241-S-107 Analytical Results: Cesium-137. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T003148	105	N/A	82.85	76.8	79.825	78.2		191,000
S95T003155	110	N/A	65.78	69.3	67.54			
S95T003161	111	N/A	91.92	82.6	87.26			

Table A-51. Tank 241-S-107 Analytical Results: Cobalt-60. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002456	105:2	Upper ½	0.06861	0.0676	0.068105	0.1	19.5	244
S95T002455		Lower ½	0.06314	0.0617	0.06242			
S95T002714	105:3	Upper ½	0.16	0.121	0.1405[QC:e]			
S95T002713		Lower ½	0.09228	0.0819	0.08709[QC:e]			
S95T002716	105:4	Upper ½	0.1568	0.162	0.1594			
S95T002715		Lower ½	0.6011	0.578	0.58955			
S95T002718	105:5	Upper ½	0.3349	0.34	0.33745			
S95T002717		Lower ½	0.218	0.234	0.226			
S95T002720	105:6	Upper ½	0.02272	< 0.0157	0.0192[QC:e]			
S95T002719		Lower ½	0.0697	0.0637	0.0667			
S95T002722	105:7	Upper ½	< 0.04808	< 0.0561	< 0.0521[QC:e]			
S95T002721		Lower ½	< 0.03515	< 0.0369	< 0.0360			
S95T002724	105:8	Upper ½	< 0.1554	< 0.198	< 0.177[QC:e]			
S95T002723		Lower ½	< 0.1552	< 0.176	< 0.166[QC:e]			
S95T002737	110:2	Lower ½	0.09096	< 0.0456	0.0683[QC:e]			
S95T002741	110:3	Upper ½	0.1042	0.125	0.1146[QC:e]			
S95T002740		Lower ½	0.1053	0.0905	0.0979[QC:e]			
S95T002743	110:4	Upper ½	0.3057	0.319	0.31235			
S95T002742		Lower ½	0.1147	0.133	0.12385[QC:e]			
S95T002745	110:5	Upper ½	0.02949	< 0.0225	0.0260[QC:e]			
S95T002744		Lower ½	0.04003	0.0351	0.037565[QC:e]			

Table A-51. Tank 241-S-107 Analytical Results: Cobalt-60. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002747	110:6	Upper ½	< 0.03661	< 0.0375	< 0.0371			
S95T002746		Lower ½	0.06224	0.0832	0.07272[QC:e]			
S95T002749	110:7	Upper ½	< 0.0440	0.0433	0.0437			
S95T002748		Lower ½	< 0.02399	< 0.026	< 0.0250			
S95T002751	110:8	Upper ½	< 0.02601	< 0.0293	< 0.0277[QC:e]			
S95T002750		Lower ½	< 0.02045	< 0.0306	< 0.0255[QC:e]			
S95T002739	110:3A	Upper ½	0.0723	0.0668	0.06955			
S95T002738		Lower ½	0.1092	0.105	0.1071			
S95T002791	111:2	Lower ½	< 0.04498	< 0.0448	< 0.0449			
S95T002792	111:3	Upper ½	0.142	0.138	0.140			
S95T002793		Lower ½	0.07613	0.0851	0.080615[QC:e]			
S95T002795	111:4	Upper ½	0.07618	0.0672	0.07169[QC:e]			
S95T002794		Lower ½	0.2063	0.22	0.21315			
S95T002797	111:5	Upper ½	0.3739	0.424	0.39895[QC:e]			
S95T002796		Lower ½	0.2737	0.258	0.26585			
S95T002799	111:6	Upper ½	0.08794	0.0756	0.08177[QC:e]			
S95T002798		Lower ½	0.06034	0.0713	0.06582[QC:e]			
S95T002801	111:7	Upper ½	0.02232	0.0256	0.02396[QC:e]			
S95T002800		Lower ½	< 0.01656	< 0.0151	< 0.0158			
S95T002804	111:8	Upper ½	< 0.1171	< 0.11	< 0.116			
S95T002802		D	< 0.01304	< 0.0107	< 0.0119[QC:e]			
S95T002803		C	< 0.05415	< 0.0714	< 0.0628[QC:e]			

Table A-51. Tank 241-S-107 Analytical Results: Cobalt-60. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T003148	105	N/A	0.1214	0.137	0.1292[QC:e]	0.634		1,550
S95T003155	110	N/A	< 0.04025	< 0.0863	< 0.0633[QC:e]			
S95T003161	111	N/A	0.09337	0.0822	0.087785[QC:e]			

Table A-52. Tank 241-S-107 Analytical Results: Europium-154. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002456	105:2	Upper ½	0.8807	0.794	0.83735	< 0.171		< 418
S95T002455		Lower ½	0.3916	0.397	0.3943			
S95T002714	105:3	Upper ½	0.2919	0.278	0.28495			
S95T002713		Lower ½	< 0.08518	0.109	0.0971[QC:e]			
S95T002716	105:4	Upper ½	< 0.05432	< 0.0412	< 0.048[QC:e]			
S95T002715		Lower ½	< 0.061	< 0.0574	< 0.0592			
S95T002718	105:5	Upper ½	< 0.06066	< 0.0483	< 0.0545[QC:e]			
S95T002717		Lower ½	< 0.05752	< 0.0725	< 0.065[QC:e]			
S95T002720	105:6	Upper ½	< 0.0321	< 0.0297	< 0.0309			
S95T002719		Lower ½	< 0.04874	< 0.0562	< 0.0525[QC:e]			
S95T002722	105:7	Upper ½	< 0.109	< 0.0921	< 0.101[QC:e]			
S95T002721		Lower ½	< 0.1549	< 0.145	< 0.150			
S95T002724	105:8	Upper ½	< 0.5814	< 0.679	< 0.630[QC:e]			
S95T002723		Lower ½	< 0.6545	< 0.519	< 0.587[QC:e]			
S95T002737	110:2	Lower ½	0.6414	0.273	0.4572[QC:e]			
S95T002741	110:3A	Upper ½	0.1685	0.252	0.21025[QC:e]			
S95T002740		Lower ½	< 0.05412	< 0.0524	< 0.0533			
S95T002743	110:4	Upper ½	< 0.02866	< 0.0297	< 0.0292			
S95T002742		Lower ½	< 0.04082	< 0.044	< 0.0424			
S95T002745	110:5	Upper ½	< 0.02958	< 0.0503	< 0.0399[QC:e]			
S95T002744		Lower ½	< 0.02337	< 0.0226	< 0.0230			

Table A-52. Tank 241-S-107 Analytical Results: Europium-154. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002747	110:6	Upper ½	< 0.05168	< 0.0576	< 0.0546			
S95T002746		Lower ½	< 0.05936	< 0.0515	< 0.0554[QC:e]			
S95T002749	110:7	Upper ½	< 0.1062	< 0.108	< 0.107			
S95T002748		Lower ½	< 0.113	0.162	0.138[QC:e]			
S95T002751	110:8	Upper ½	< 0.09601	0.187	0.142[QC:e]			
S95T002750		Lower ½	< 0.1453	< 0.152	< 0.149			
S95T002739	110:3	Upper ½	< 0.05575	< 0.0573	< 0.0565			
S95T002738		Lower ½	< 0.1262	< 0.113	< 0.120[QC:e]			
S95T002791	111:2	Lower ½	0.4883	0.385	0.43665[QC:e]			
S95T002792	111:3	Upper ½	0.6023	0.558	0.58015			
S95T002793		Lower ½	< 0.07404	< 0.0672	< 0.0706			
S95T002795	111:4	Upper ½	< 0.07618	< 0.0672	< 0.0717[QC:e]			
S95T002794		Lower ½	< 0.05607	< 0.0614	< 0.0587			
S95T002797	111:5	Upper ½	< 0.03008	< 0.0313	< 0.0307			
S95T002796		Lower ½	< 0.02597	< 0.0262	< 0.0261			
S95T002799	111:6	Upper ½	< 0.03371	< 0.0355	< 0.0346			
S95T002798		Lower ½	< 0.003908	<0.0438	< 0.0238[QC:e]			
S95T002801	111:7	Upper ½	< 0.05607	<0.0865	< 0.0713[QC:e]			
S95T002800		Lower ½	0.1926	0.171	0.1818[QC:e]			
S95T002804	111:8	Upper ½	< 0.4115	< 0.415	< 0.413			
S95T002803		C	< 0.2263	< 0.229	< 0.228			
S95T002802		D	0.0964	< 0.0981	< 0.0973			

Table A-52. Tank 241-S-107 Analytical Results: Europium-154. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T003148	105	N/A	< 0.08897	< 0.095	< 0.0920	< 0.097	N/A	< 237
S95T003155	110	N/A	< 0.09936	< 0.0977	< 0.0985			
S95T003161	111	N/A	< 0.1082	< 0.0929	< 0.101[QC:e]			

Table A-53. Tank 241-S-107 Analytical Results: Europium-155. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002456	105:2	Upper ½	0.4832	0.612	0.5476[QC:e]	< 0.283		< 691
S95T002455		Lower ½	0.3277	0.31	0.31885			
S95T002714	105:3	Upper ½	< 0.2237	< 0.186	< 0.205[QC:e]			
S95T002713		Lower ½	< 0.2305	< 0.229	< 0.230			
S95T002716	105:4	Upper ½	< 0.1796	< 0.166	< 0.173			
S95T002715		Lower ½	< 0.2201	< 0.22	< 0.220			
S95T002718	105:5	Upper ½	< 0.2526	< 0.246	< 0.249			
S95T002717		Lower ½	< 0.2712	< 0.273	< 0.272			
S95T002720	105:6	Upper ½	< 0.1683	< 0.172	< 0.170			
S95T002719		Lower ½	< 0.1777	< 0.174	< 0.176			
S95T002722	105:7	Upper ½	< 0.4127	< 0.422	< 0.417			
S95T002721		Lower ½	< 0.3832	< 0.369	< 0.376			
S95T002724	105:8	Upper ½	< 0.9989	< 1.03	< 1.01			
S95T002723		Lower ½	< 1.135	< 1.01	< 1.07[QC:e]			
S95T002737	110:2	Lower ½	< 0.5468	< 0.286	< 0.416[QC:e]			
S95T002741	110:3	Upper ½	< 0.1294	< 0.163	< 0.146[QC:e]			
S95T002740		Lower ½	< 0.1783	< 0.177	< 0.178			
S95T002743	110:4	Upper ½	< 0.08813	< 0.0857	< 0.0869			
S95T002742		Lower ½	< 0.1402	< 0.144	< 0.142			
S95T002745	110:5	Upper ½	< 0.1656	< 0.166	< 0.166			
S95T002744		Lower ½	< 0.06625	< 0.062	< 0.0641			

Table A-53. Tank 241-S-107 Analytical Results: Europium-155. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002747	110:6	Upper ½	< 0.1785	< 0.192	< 0.185			
S95T002746		Lower ½	< 0.2331	< 0.236	< 0.235			
S95T002749	110:7	Upper ½	< 0.3964	< 0.36	< 0.378			
S95T002748		Lower ½	< 0.2774	< 0.282	< 0.280			
S95T002751	110:8	Upper ½	< 0.3022	< 0.294	< 0.298			
S95T002750		Lower ½	< 0.3683	< 0.379	< 0.374			
S95T002739	110:3A	Upper ½	< 0.1581	< 0.151	< 0.155			
S95T002738		Lower ½	< 0.259	< 0.266	< 0.263			
S95T002791	111:2	Lower ½	0.4078	< 0.242	0.325[QC:e]			
S95T002792	111:3	Upper ½	< 0.2373	< 0.242	< 0.240			
S95T002793		Lower ½	< 0.2088	< 0.207	< 0.208			
S95T002795	111:4	Upper ½	< 0.1637	< 0.156	< 0.160			
S95T002794		Lower ½	< 0.1746	< 0.198	< 0.186[QC:e]			
S95T002797	111:5	Upper ½	< 0.1062	< 0.108	< 0.107			
S95T002796		Lower ½	< 0.09831	< 0.1	< 0.0991			
S95T002799	111:6	Upper ½	< 0.1529	< 0.16	< 0.156			
S95T002798		Lower ½	< 0.1821	< 0.181	< 0.182			
S95T002801	111:7	Upper ½	< 0.1234	< 0.124	< 0.124			
S95T002800		Lower ½	< 0.1381	< 0.141	< 0.140			
S95T002804	111:8	Upper ½	< 0.6937	< 0.717	< 0.705			
S95T002803		C	< 0.3371	< 0.347	< 0.342			
S95T002802		D	< 0.1134	< 0.115	< 0.114			

Table A-53. Tank 241-S-107 Analytical Results: Europium-155. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T003148	105	N/A	< 0.2697	< 0.258	< 0.264	< 0.256		< 623
S95T003155	110	N/A	< 0.2383	< 0.241	< 0.240			
S95T003161	111	N/A	< 0.2762	< 0.25	< 0.263			

Table A-54. Tank 241-S-107 Analytical Results: Strontium-89/90. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002456	105:2	Upper ½	107	101	104	158	21.1	385,000
S95T002455		Lower ½	98.2	93	95.6			
S95T002714	105:3	Upper ½	63.8	50.6	57.2			
S95T002713		Lower ½	10.6	10.5	10.55			
S95T002716	105:4	Upper ½	13.8	15.9	14.85			
S95T002715		Lower ½	26.7	27.2	26.95			
S95T002718	105:5	Upper ½	16	15.9	15.95			
S95T002717		Lower ½	30.3	31.3	30.8			
S95T002720	105:6	Upper ½	1.22	0.834	1.027			
S95T002719		Lower ½	56	57.7	56.85			
S95T002722	105:7	Upper ½	136	150	143			
S95T002721		Lower ½	467	476	471.5			
S95T002724	105:8	Upper ½	542	548	545			
S95T002723		Lower ½	616	636	626			
S95T002737	110:2	Lower ½	112	122	117			
S95T002741	110:3	Upper ½	17.9	25.3	21.6			
S95T002740		Lower ½	11.8	11.9	11.85			
S95T002743	110:4	Upper ½	18.7	19.9	19.3			
S95T002742		Lower ½	5.47	5.62	5.545			
S95T002745	110:5	Upper ½	1.84	2.00	1.92			
S95T002744		Lower ½	3.27	2.90	3.085			

Table A-54. Tank 241-S-107 Analytical Results: Strontium-89/90. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Solids: fusion			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T002747	110:6	Upper ½	3.10	3.02	3.06			
S95T002746		Lower ½	17.0	17.7	17.35			
S95T002749	110:7	Upper ½	260	225	242.5			
S95T002748		Lower ½	437	441	439			
S95T002751	110:8	Upper ½	482	517	499.5			
S95T002750		Lower ½	494	546	520			
S95T002739	110:3A	Upper ½	15.2	15.6	15.4			
S95T002738		Lower ½	17.5	17.6	17.55			
S95T002791	111:2	Lower ½	81.4	63.5	72.45			
S95T002792	111:3	Upper ½	75.8	71.7	73.75			
S95T002793		Lower ½	7.32	7.54	7.43			
S95T002795	111:4	Upper ½	22.1	21.6	21.85			
S95T002794		Lower ½	22.7	26.1	24.4			
S95T002797	111:5	Upper ½	21.9	26.4	24.15			
S95T002796		Lower ½	23.1	23.5	23.3			
S95T002799	111:6	Upper ½	7.21	6.88	7.045			
S95T002798		Lower ½	52.1	57.3	54.7			
S95T002801	111:7	Upper ½	271	270	270.5			
S95T002800		Lower ½	554	558	556			
S95T002804	111:8	Upper ½	596	575	585.5			
S95T002803		C	717	708	712.5			
S95T002802		D	272	314	293			

Table A-54. Tank 241-S-107 Analytical Results: Strontium-89/90. (3 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean	Overall Mean	RSD (Mean)	Projected Inventory
Composites			µCi/g	µCi/g	µCi/g	µCi/g	%	Ci
S95T003148	105	N/A	269	203	236	174		424,000
S95T003155	110	N/A	166	162	164			
S95T003161	111	N/A	115	129	122			

Table A-55. Tank 241-S-107 Analytical Results: Weight Percent Water. (4 sheets)

Sample Number	Sample Location		Result		Duplicate		Sample Mean	Overall Mean	RSD (Mean)
	Core: Segment	Segment Portion	% H_2O	Temperature Range (°C)	% H_2O	Temperature Range (°C)	% H_2O	% H_2O	%
Solids									
S95T002450[1]	105:2	Upper ½	54.78	40-170	50.63	40-180	52.70	32.1[2]	7.2[2]
S95T002447[1]		Lower ½	52.79	40-140	50.38	40-190	51.59	25.8[1]	14.5[1]
S95T002521[1]	105:3	Upper ½	22.88	40-120	26.35	40-80	24.62		
S95T002520[1]		Lower ½	24.26	40-90	17.43	40-90	20.84		
S95T002523[1]	105:4	Upper ½	40.50	40-200	40.77	40-200	40.64		
S95T002522[1]		Lower ½	43.71	40-240	36.31	40-240	40.01		
S95T002525[2]	105:5	Upper ½	40.86	35-170	41.65	35-160	41.25		
S95T002524[2]		Lower ½	34.52	35-170	35.73	35-160	35.12		
S95T002527[2]	105:6	Upper ½	27.50	35-180	28.82	35-190	28.16		
S95T002526[2]		Lower ½	6.440	35-100	3.68	35-190	5.060		
S95T002529[1]	105:7	Upper ½	33.08	40-160	38.16	40-170	35.62		
S95T002528[1]		Lower ½	31.90	40-200	30.53	40-180	31.21		
S95T002531[1]	105:8	Upper ½	30.65	40-190	27.03	40-210	28.84		
S95T002530[1]		Lower ½	31.10	40-200	30.94	40-210	31.02		
S95T002603[1]	110:2	Lower ½	51.47	40-190	65.55	40-190	58.48		
S95T002607[2]	110:3	Upper ½	45.99	35-200	41.05	35-210	43.52		
S95T002606[1]		Lower ½	22.10	40-90	21.38	40-100	21.74		
S95T002605[1]	110:3A	Upper ½	25.93	40-110	19.24	40-80	22.59		
S95T002604[1]		Lower ½	35.52	40-180	39.17	40-190	37.34		

Table A-55. Tank 241-S-107 Analytical Results: Weight Percent Water. (4 sheets)

Sample Number	Sample Location		Result		Duplicate		Sample Mean	Overall Mean	RSD (Mean)
	Core: Segment	Segment Portion	% H_2O	Temperature Range (°C)	% H_2O	Temperature Range (°C)	% H_2O	% H_2O	%
Solids									
S95T002609[1]	110:4	Upper ½	39.40	40-170	38.98	40-150	39.19		
S95T002608[2]		Lower ½	1.580	35-200	20.22	35-170	10.90		
S95T002611[1]	110:5	Upper ½	22.69	40-210	24.42	40-190	23.55		
S95T002610[1]		Lower ½	22.42	40-180	21.47	40-210	21.95		
S95T002686	110:6	Upper ½	46.59	35-220	48.74	35-220	47.67		
S95T002685[1]		Lower ½	27.29	40-160	27.33	40-160	27.31		
S95T002688[2]	110:7	Upper ½	31.02	35-200	35.34	35-170	33.18		
S95T002687[2]		Lower ½	31.46	35-210	32.71	35-190	32.09		
S95T002690[2]	110:8	Upper ½	28.30	35-200	29.25	35-210	28.77		
S95T002689[2]		Lower ½	0.59	35-170	0.24	35-170	0.415		
S95T002635[2]	111:2	Lower ½	33.79	35-190	51.21	35-180	42.50		
S95T002653[1]	111:3	Upper ½	53.49	40-120	53.75	40-120	53.62		
S95T002654[1]		Lower ½	39.37	40-120	37.34	40-180	38.36		
S95T002656[2]	111:4	Upper ½	33.44	35-180	37.40	35-200	35.42		
S95T002655[2]		Lower ½	36.08	35-170	36.92	35-180	36.50		
S95T002658[2]	111:5	Upper ½	38.89	35-210	39.14	35-210	39.02		
S95T002657[2]		Lower ½	31.43	35-200	30.35	35-170	30.89		
S95T002660[1]	111:6	Upper ½	24.08	40-180	23.66	40-150	23.87		
S95T002659[1]		Lower ½	27.18	40-160	30.02	40-160	28.60		

Table A-55. Tank 241-S-107 Analytical Results: Weight Percent Water. (4 sheets)

Sample Number	Sample Location		Result		Duplicate		Sample Mean	Overall Mean	RSD (Mean)
	Core: Segment	Segment Portion	% H_2O	Temperature Range (°C)	% H_2O	Temperature Range (°C)	% H_2O	% H_2O	%
Solids									
S95T002662[1]	111:7	Upper ½	33.85	40-180	33.63	40-180	33.74		
S95T002661[1]		Lower ½	31.90	40-210	33.19	40-210	32.55		
S95T002665[1]	111:8	Upper ½	35.19	40-260	32.19	40-230	33.69		
S95T002664[2]		C	22.72	130-280	25.78	100-250	24.25		
S95T002663[1]		D	44.22	40-200	43.88	40-200	44.05		
Solids: gravimetric									
S95T003538	105:4	Lower ½	43.70	N/A	43.50	N/A	43.60		
S95T003540	105:6	Upper ½	20.55	N/A	20.50	N/A	20.55		
S95T003539		Lower ½	22.40	N/A	22.80	N/A	22.10		
S95T003901	110:4	Lower ½	19.10	N/A	18.10	N/A	18.60		
S95T003902	110:8	Lower ½	29.40	N/A	29.00	N/A	29.20		
Solid composites									
S95T003147[1]	105	N/A	26.89	40-120	30.85	40-150	28.87	36.1	
S95T003154[1]	110	N/A	42.45	40-120	39.22	40-120	40.84		
S95T003160[1]	111	N/A	37.47	40-140	39.61	40-180	38.54		
Liquids									
S95T002443[1]	105:1	DL	69.55	40-120	65.45	40-120	67.50	68.2	
S95T002446[1]	105:2	DL	69.04	40-110	68.96	40-110	69.00		
S95T002601[2]	110:1	DL	70.96	35-210	70.38	35-210	70.67		

Table A-55. Tank 241-S-107 Analytical Results: Weight Percent Water. (4 sheets)

Sample Number	Sample Location		Result		Duplicate		Sample Mean	Overall Mean	RSD (Mean)
	Core: Segment	Segment Portion	% H_2O	Temperature Range (°C)	% H_2O	Temperature Range (°C)	% H_2O	% H_2O	%
Liquids									
S95T002602[1]	110:2	DL	65.37	40-150	66.05	40-150	65.71		
S95T002629[1]	111:1	DL	71.72	40-180	71.24	40-180	71.48		
S95T002632[1]	111:2	DL	64.67	40-110	65.14	40-120	64.91		

Notes:

[1]Perkin-Elmer™
[2]Mettler™

Table A-56. Tank 241-S-107 Analytical Results: Energetics. (6 sheets)

Sample Number	Sample Location		Run	Sample Weight	Transition 1		Transition 2		Transition 3	
	Core: Segment	Segment Portion		mg	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)
Solids										
S95T002450[1]	105:2	Upper ½	1	37.450	111	794.6	301	10.7	392	-19.4
			2	36.470	111	881.8	301	21.0	400	-20.7
S95T002447[1]		Lower ½	1	14.350	122	1360	---	---	---	---
			2	19.180	117	1237	---	---	---	---
S95T002521[2]	105:3	Upper ½	1	29.830	129	1185	---	---	---	---
			2	29.600	126	1467	---	---	---	---
S95T002520[2]		Lower ½	1	35.960	132	822.6	383	-65.72	---	---
			2	37.220	128	832.0	389	-65.99	---	---
S95T002523[1]	105:4	Upper ½	1	9.025	112	985.7	---	---	---	---
			2	33.090	119	851.1	---	---	---	---
S95T002522[1]		Lower ½	1	14.444	122	851.8	211	76.2	---	---
			2	8.222	104	820.9	203	65.4	---	---
S95T002525[2]	105:5	Upper ½	1	19.540	124	910.2	---	---	---	---
			2	23.920	129	940.0	209	30.87	---	---
S95T002524[2]		Lower ½	1	12.750	103	811.2	---	---	---	---
			2	13.900	98	797.9	---	---	---	---

Table A-56. Tank 241-S-107 Analytical Results: Energetics. (6 sheets)

Sample Number	Sample Location		Run	Sample Weight	Transition 1		Transition 2		Transition 3	
	Core: Segment	Segment Portion		mg	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)
Solids										
S95T002527[2]	105:6	Upper ½	1	31.100	126	426.1	308	523.6	---	---
			2	23.520	126	371.7	317	524.3	---	---
S95T002526[2]		Lower ½	1	29.500	129	610.8	295	235	---	---
			2	16.880	105	562.2	312	203.6	---	---
S95T002529[1]	105:7	Upper ½	1	19.685	129	828.1	219	5.5	455	23.4
			2	15.060	124	780.7	221	4.7	454	15.3
S95T002528[1]		Lower ½	1	30.590	133	701.2	213	2.2	439	32.4
			2	18.854	119	832.8	211	7.2	448	36.7
S95T002531[1]	105:8	Upper ½	1	25.592	128	709.9	213	3.4	437	29.1
			2	25.020	121	663.4	211	5.1	437	26.8
S95T002530[1]		Lower ½	1	18.703	134	964.5	439	44.1	---	---
			2	21.986	126	851.2	441	24.7	---	---
S95T002603[1]	110:2	Lower ½	1	47.715	105	820.5	250	-65.2	---	---
			2	44.200	111	642.4	380	-62.8	---	---
S95T002607[1]	110:3	Upper ½	1	24.815	126	975.9	---	---	---	---
			2	21.077	123	967.9	---	---	---	---
S95T002606[1]		Lower ½	1	27.000	126	843.8	229	5.8	---	---
			2	24.995	128	986.9	229	4.1	---	---

Table A-56. Tank 241-S-107 Analytical Results: Energetics. (6 sheets)

Sample Number	Sample Location		Run	Sample Weight	Transition 1		Transition 2		Transition 3	
	Core: Segment	Segment Portion		mg	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)
Solids										
S95T002605[1]	110:3A	Upper ½	1	26.835	128	866.2	---	---	---	---
			2	25.166	130	1024	---	---	---	---
S95T002604[1]		Lower ½	1	48.230	123	714.1	---	---	---	---
			2	55.236	117	595.6	---	---	---	---
S95T002609[1]	110:4	Upper ½	1	39.000	117	797.9	299	31.9	---	---
			2	39.410	123	811.2	303	33.6	---	---
S95T002608[1]		Lower ½	1	35.780	133	524.5	303	421.4	---	---
			2	18.300	123	366.0	310	547.6	488	2.6
S95T002611[2]	110:5	Upper ½	1	27.88	125	415.8	311	562.1	---	---
			2	32.260	102	407.8	319	519.0	---	---
S95T002610[1]		Lower ½	1	35.401	124	512.7	299	505.6	---	---
			2	35.688	128	482.5	298	521.2	---	---
S95T002686	110:6	Upper ½	1	26.240	104	477.0	316	485.2	---	---
			2	24.680	100	521.7	315	376.7	---	---
S95T002685[2]		Lower ½	1	8.120	110	465.0	314	345.7	---	---
			2	21.840	126	430.2	312	421.9	---	---

Table A-56. Tank 241-S-107 Analytical Results: Energetics. (6 sheets)

Sample Number	Sample Location		Run	Sample Weight	Transition 1		Transition 2		Transition 3	
	Core: Segment	Segment Portion		mg	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)
Solids										
S95T002688[1]	110:7	Upper ½	1	30.907	134	640.8	221	2.6	451	13.2
			2	32.642	130	648.0	221	1.6	291	5.2
S95T002687[2]		Lower ½	1	38.470	128	590.7	---	---	---	---
			2	33.160	142	567.9	---	---	---	---
S95T002690[1] October	110:8	Upper ½	1	21.970	120	663.7	213	4.2	437	19.8
			2	25.170	129	800.1	215	6.1	439	21.9
S95T002690[1] November[3]		Upper ½	1	38.089	130	827.9	439	23.5	---	---
			2	20.271	116	661	211	4.4	439	14.5
S95T002689[1]		Lower ½	1	27.617	123	848.7	---	---	---	---
			2	51.924	121	648.3	436	29.0	---	---
S95T002635[1] October	111:2	Lower ½	1	27.238	121	997.5	303	48.1	455	29.9
			2	42.228	113	618.8	305	38.5	459	26.6
S95T002635[1] November[3]	111:2	Lower ½	1	11.836	127	1318.8	297	46.9	440	40.8
			2	21.838	125	994.3	301	72.8	441	29.3
S95T002653[1]	111:3	Upper ½	1	67.144	111	569.4	354	-20.4	---	---
			2	48.847	107	951.4	---	---	---	---
S95T002654[1]		Lower ½	1	32.080	125	899.6	436	-25.3	---	---
			2	46.840	117	811.7	444	-40.0	---	---

Table A-56. Tank 241-S-107 Analytical Results: Energetics. (6 sheets)

Sample Number	Sample Location		Run	Sample Weight	Transition 1		Transition 2		Transition 3	
	Core: Segment	Segment Portion		mg	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)
Solids										
S95T002656[2]	111:4	Upper ½	1	46.940	148	1007	---	---	---	---
			2	53.940	150	931.3	---	---	---	---
S95T002655[2]		Lower ½	1	29.35	143	869.5	---	---	---	---
			2	42.940	143	924.4	---	---	---	--
S95T002658[1]	111:5	Upper ½	1	45.772	121	826.8	265	-14.5	459	67.2
			2	36.806	121	874.9	274	-15.1	---	---
S95T002657[1]		Lower ½	1	54.645	117	672.6	271	136.3	415	-20.5
			2	46.526	123	700.7	270	106.1	405	-15.5
S95T002660[1]	111:6	Upper ½	1	26.243	127	663.9	302	547.3	---	---
			2	47.580	119	649.5	283	385.0	---	---
S95T002659[1]		Lower ½	1	14.38.2	120	863.0	285	291.7	---	---
			2	22.460	124	841.9	284	256.5	---	---
S95T002662[1]	111:7	Upper ½	1	45.560	117	700.3	---	---	---	---
			2	37.580	123	749.7	---	---	---	---
S95T002661[1]		Lower ½	1	30.329	132	935.4	217	4.1	433	22.5
			2	35.107	125	881.7	219	4.5	437	22.9

Table A-56. Tank 241-S-107 Analytical Results: Energetics. (6 sheets)

Sample Number	Sample Location		Run	Sample Weight	Transition 1		Transition 2		Transition 3	
	Core: Segment	Segment Portion		mg	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)
Solids										
S95T002665[1]	111:8	Upper ½	1	22.400	127	842.4	437	35.1	---	---
			2	26.400	125	782.0	435	35.2	---	---
S95T002664[2]		C	1	36.950	129	779.7	246	65.22	---	---
			2	57.390	129	895.7	---	---	---	---
S95T002663[1]		D	1	28.050	121	969.2	325	-221.3	---	---
			2	22.531	122	1035	303	-232.8	---	---
Solid composite										
S95T003147[2]	105	N/A	1	37.860	137	1032	---	---	---	---
			2	35.820	126	944.4	---	---	---	---
S95T003154[2]	110	N/A	1	61.610	129	871.8	279	88.57	--	---
			2	45.890	125	975.0	279	53.12	---	---
S95T003160[2]	111	N/A	1	41.060	128	822.4	276	59.29	---	---
			2	45.160	131	963.6	---	---	---	---
Drainable Liquid										
S95T002443[2]	105:1	DL	1	11.920	103	1329	---	---	---	---
			2	13.540	105	1315	---	---	---	---
S95T002446[2]	105:2	DL	1	12.480	117	1370	---	---	---	---
			2	12.800	104	1304	---	---	---	---

Table A-56. Tank 241-S-107 Analytical Results: Energetics. (6 sheets)

Sample Number	Sample Location		Run	Sample Weight	Transition 1		Transition 2		Transition 3	
	Core: Segment	Segment Portion		mg	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)	Peak Temp. (°C)	ΔH (J/g)
Drainable Liquid										
S95T002601[2]	110:1	DL	1	25.680	117	1495	---	---	---	---
			2	25.060	115	1484	---	---	---	---
S95T002602[1]	110:2	DL	1	27.156	111	1123	240	-37.4	---	---
			2	29.302	109	1115	303	-35.4	---	---
S95T002629[1]	111:1	DL	1	13.060	112	1420	---	---	---	---
			2	13.377	113	1501	---	---	---	---
S95T002632[1]	111:2	DL	1	6.661	112	1522	---	---	---	---
			2	13.332	113	1529	---	---	---	---

Notes:

[1]Mettler™

[2]Perkin-Elmer™

[3]Replicate data with no exotherms. Original data also had no exotherms.

Table A-57. Tank 241-S-107 Analytical Results: Density.

Sample Number	Core: Segment	Sub-Segment	Result	Duplicate	Mean	Overall Mean	RSD (Data)
Solids			g/mL	g/mL	g/mL	g/mL	%
S96T001786	105:3	Upper ½	1.57	---	---	1.78	1.86%
S96T001787	105:4	Upper ½	1.71	---	---		
S96T001788	105:5	Lower ½	1.86	---	---		
S96T001791	110:3	Upper ½	1.69	---	---		
S96T001792	110:4	Upper ½	1.72	---	---		
S96T001793	110:5	Lower ½	1.99	---	---		
S96T001794	110:8	Lower ½	1.86	---	---		
S96T001796	111:3	Upper ½	1.67	---	---		
S96T001797	111:4	Upper ½	1.81	---	---		
S96T001798	111:5	Lower ½	1.85	---	---		
S96T001799	111:8	Lower ½	1.88	---	---		
Drainable liquids			g/mL	g/mL	g/mL	g/mL	%
S96T001785	105:2	DL	1.280	1.230	1.255	1.24	
S96T001790	110:3	DL	1.250	1.240	1.245		
S96T001795	111:2	DL	1.210	1.218	1.214		

This page intentionally left blank.

APPENDIX B

ANALYTICAL RESULTS OF HYDROSTATIC HEAD FLUID CONTAMINATION CHECK FOR SINGLE-SHELL TANK 241-S-107

This page intentionally left blank.

ANALYTICAL RESULTS OF HYDROSTATIC HEAD FLUID CONTAMINATION CHECK FOR SINGLE-SHELL TANK 241-S-107

B.1 INTRODUCTION AND ANALYTE TABLE DESCRIPTION

Appendix B reports the results of the HHF check for the 1996 push mode core sampling and analysis event. Lithium and bromide were measured to detect any contamination of the waste samples by the HHF.

The data table for each of the two analytes lists the laboratory sample identification number in column one. Sampling rationale, locations, and a description of the sampling event are discussed in Section 3.0.

Column two specifies the core and segment from which each sample was derived.

Column three contains the name of the segment portion (subsegment) from which the sample was taken. This can be the entire segment (whole), the drainable liquid portion (DL), or the upper or lower half segment portions.

The Result and Duplicate columns are self-explanatory. The "Sample Mean" column is the average of the result and duplicate values. All values, including those below the detection level (indicated by the less-than symbol, <), were averaged in calculating the sample means. If the result and duplicate values were both nondetected, the sample mean is expressed as a nondetected value. On the other hand, if one of the two values is nondetected and one is detected, or if both are detected, then the sample mean is reported as a detected value. The result and duplicate values, as well as the result/duplicate means, are reported in the tables exactly as found in the original laboratory data package. The means may appear to have been rounded up in some cases and rounded down in others. This is because the analytical results given in the tables may have fewer significant figures than originally reported, not because the means were incorrectly calculated.

The four quality control parameters assessed on the tank 241-S-107 samples were standard recoveries, spike recoveries, duplicate analyses (RPDs), and blanks. These results were summarized in Section 5.1.2., and more specific information is provided in Appendix B.

Table B-1. Tank 241-S-107 Analytical Results: Lithium. (2 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean
Solids: acid digest			µg/g	µg/g	µg/g
S95T002915	105:2	Upper 1/2	40.9	78.5	59.7[QC:e]
S95T002914		Lower 1/2	4.63	4.51	4.57
S95T002702	105:3	Upper 1/2	40.5847	29.8837	35.2342[QC:e]
S95T002701		Lower 1/2	7.4145	7.2393	7.3269
S95T002704	105:4	Upper 1/2	4.74	4.56	4.65
S95T002703		Lower 1/2	5.84	5.98	5.91
S95T002706	105:5	Upper 1/2	15.4975	15.9194	15.7085
S95T002705		Lower 1/2	14.9763	14.8236	14.9
S95T002708	105:6	Upper 1/2	48.4868	54.2219	51.3544[QC:e]
S95T002707		Lower 1/2	18.1526	19.6886	18.9206
S95T002710	105:7	Upper 1/2	8.8262	10.4379	9.63205[QC:e]
S95T002709		Lower 1/2	2.5118	2.8594	2.6856[QC:e]
S95T002712	105:8	Upper 1/2	14.4	12.8	13.6[QC:a,e]
S95T002711		Lower 1/2	65.0	82.3	73.65[QC:a,e]
S95T002752	110:2	Lower 1/2	< 4.05	< 4.32	< 4.19
S95T002756	110:3	Upper 1/2	29.1	29.6	29.35[QC:a]
S95T002755		Lower 1/2	5.34	6.13	5.735[QC:a,e]
S95T002758	110:4	Upper 1/2	12.1	12.3	12.2[QC:a]
S95T002757		Lower 1/2	4.96	6.36	5.66[QC:a,e]
S95T002760	110:5	Upper 1/2	14.2	12.0	13.1[QC:e]
S95T002759		Lower 1/2	6.41	6.04	6.225[QC:a]
S95T002762	110:6	Upper 1/2	31.8	30.2	31.0
S95T002761		Lower 1/2	41.5	38.6	40.05
S95T002764	110:7	Upper 1/2	12.9	12.8	12.85
S95T002763		Lower 1/2	26.5	25.2	25.85
S95T002766	110:8	Upper 1/2	11.8	11.7	11.75
S95T002765		Lower 1/2	10.2	12.2	11.2[QC:e]
S95T002754	110:3A	Upper 1/2	< 8.54	< 12.3	< 10.4[QC:a,e]
S95T002753		Lower 1/2	26.5	26.7	26.6
S95T002810	111:2	Lower 1/2	5.49	4.55	5.02[QC:e]

Table B-1. Tank 241-S-107 Analytical Results: Lithium. (2 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean
Solids: acid digest			µg/g	µg/g	µg/g
S95T002811	111:3	Upper 1/2	33.9	34.8	34.35
S95T002812		Lower 1/2	12.9	11.5	12.2[QC:e]
S95T002814	111:4	Upper 1/2	26.9	25.5	26.2
S95T002813		Lower 1/2	3.22	2.91	3.065
S95T002816	111:5	Upper 1/2	31.8	29.7	30.75
S95T002815		Lower 1/2	8.79	8.28	8.535
S95T002818	111:6	Upper 1/2	10.8	12.1	11.45[QC:e]
S95T002817		Lower 1/2	27.4	26	26.7
S95T002820	111:7	Upper 1/2	65.9	103	84.45[QC:e]
S95T002819		Lower 1/2	7.89	7.96	7.925
S95T002823	111:8	Upper 1/2	20.3	23.3	21.8[QC:e]
S95T002822		Lower 1/2C	10.1	12.6	11.35[QC:e]
S95T002821		Lower 1/2D	70.7	73.8	72.25
Composites			µg/g	µg/g	µg/g
S95T003152	105	Whole	16.3	16.6	16.45[QC:a]
S95T003156	110	Whole	19.5	20.5	20.0[QC:a]
S95T003162	111	Whole	28.2	27.4	27.8[QC:a]
Liquids:			µg/mL	µg/mL	µg/mL
S95T002443	105:1	DL	10.2012	9.9212	10.0612
S95T002446	105:2	DL	28.6895	28.6895	28.6895
S95T002601	110:1	DL	< 4.01	< 4.01	< 4.01
S95T002602	110:2	DL	< 4.01	< 4.01	< 4.01
S95T002629	111:1	DL	< 4.01	< 4.01	< 4.01
S95T002632	111:2	DL	12.2626	13.2484	12.7555

Table B-2. Tank 241-S-107 Analytical Results: Bromide. (2 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean
Solids: water digest			µg/g	µg/g	µg/g
S95T002458	105:2	Upper 1/2	< 262.7	273	268
S95T002457		Lower 1/2	< 263	< 261	< 262
S95T002726	105:3	Upper 1/2	< 1,172	< 1,180	< 1,180
S95T002725		Lower 1/2	< 1,788	< 1,710	< 1,750
S95T002728	105:4	Upper 1/2	< 227.4	< 225	< 226
S95T002727		Lower 1/2	< 243.7	< 254	< 249
S95T002730	105:5	Upper 1/2	< 250	< 244	< 247
S95T002729		Lower 1/2	< 599	< 452	< 526[QC:e]
S95T002732	105:6	Upper 1/2	452.7	420	436.35
S95T002731		Lower 1/2	742.6	657	699.8[QC:e]
S95T002734	105:7	Upper 1/2	< 264	< 259	< 262
S95T002733		Lower 1/2	< 263	< 258	< 261
S95T002736	105:8	Upper 1/2	< 130.9	< 129	< 130
S95T002735		Lower 1/2	902.4	864	883.2
S95T002776	110:2	Lower 1/2	< 576.3	< 599	< 588
S95T002780	110:3	Upper 1/2	< 1,263	< 1,260	< 1,260
S95T002779		Lower 1/2	457.9	487	472.45
S95T002782	110:4	Upper 1/2	< 311.2	< 316	< 314
S95T002781		Lower 1/2	159.4	166	162.7
S95T002784	110:5	Upper 1/2	< 506.2	< 505	< 506
S95T002783		Lower 1/2	184.6	175	179.8
S95T002786	110:6	Upper 1/2	986.8	972	979.4
S95T002785		Lower 1/2	1,032	1,040	1,036
S95T002788	110:7	Upper 1/2	< 792.6	< 785	< 789
S95T002787		Lower 1/2	1,037	1,150	1,093.5
S95T002790	110:8	Upper 1/2	355.3	221	288.15[QC:e]
S95T002789		Lower 1/2	1,033	857	945[QC:e]
S95T002778	110:3A	Upper 1/2	< 1,258	< 1,250	< 1,250
S95T002777		Lower 1/2	< 518.3	< 508	< 513
S95T002824	111:2	Lower 1/2	677.7	< 218	448[QC:e]

Table B-2. Tank 241-S-107 Analytical Results: Bromide. (2 sheets)

Sample Number	Core: Segment	Segment Portion	Result	Duplicate	Sample Mean
Solids: water digest			µg/g	µg/g	µg/g
S95T002825	111:3	Upper 1/2	2,246	2,120	2,183
S95T002826		Lower 1/2	< 2,239	< 2,040	< 2,140
S95T002828	111:4	Upper 1/2	< 2,254	< 2,250	< 2,250
S95T002827		Lower 1/2	< 2,291	< 2,400	< 2,350
S95T002830	111:5	Upper 1/2	490.7	494	492.35
S95T002829		Lower 1/2	247.5	242	244.75
S95T002832	111:6	Upper 1/2	< 341.6	< 327	< 334
S95T002831		Lower 1/2	1,427	1,480	1,453.5
S95T002834	111:7	Upper 1/2	187.1	170	178.55
S95T002833		Lower 1/2	170.8	198	184.4[QC:e]
S95T002837	111:8	Upper 1/2	< 267.4	282	275
S95T002836		Lower 1/2C	< 444	< 435	< 440
S95T002835		Lower 1/2D	4,643	5,010	4,826.5
Composites			µg/g	µg/g	µg/g
S95T003153	105	Whole	< 2,257	< 2,310	< 2,280
S95T003157	110	Whole	< 2,352	< 2,320	< 2,340
S95T003163	111	Whole	483.6	499	491.3
Liquids:			µg/mL	µg/mL	µg/mL
S95T002443	105:1	DL	< 521.8	< 522	< 522
S95T002446	105:2	DL	1,843	1,870	1,856.5
S95T002601	110:1	DL	< 140	< 140	< 140
S95T002602	110:2	DL	< 140	< 140	< 140
S95T002629	111:1	DL	< 1,285	< 1,290	< 1,290
S95T002632	111:2	DL	3,530	3,550	3,540

This page intentionally left blank.

APPENDIX C

HISTORICAL ANALYTICAL RESULTS

This page intentionally left blank.

HISTORICAL ANALYTICAL RESULTS

C.1 DESCRIPTION OF THE OCTOBER 1978 SAMPLING EVENT

A cloudy, green liquid sample was obtained during saltwell pumping in tank 241-S-107. A description of techniques or procedures to extract the sample was not indicated in the historical records. The sample was analyzed to determine the cause of a cross-site transfer line being plugged when waste from this tank was being moved.

No specifics were available concerning how the sample was handled once received for analysis, though a separate portion of the sample was heated to 55°C and an aliquot mixed with an equal volume of a sample from the cross-site transfer material (laboratory sample number 3148). The analysis of this sample is available in Brown (1978a).

C.2 DESCRIPTION OF THE SEPTEMBER 1978 SAMPLING EVENT

The sample was labeled dip sample 3148 and was taken from the 380-cm (150-in.) level of the tank. The sample was reported as being a cloudy, thickened gelatinous material with no obvious crystalline solids. The sample was drawn to determine the causal effects of a plugged cross-site transfer line involving waste from tank 241-S-107.

The primary purpose of the sample was to determine a viscosity-versus-temperature curve, because the material thickened at room temperature. No specifics were available concerning how the sample was handled once received for chemical analysis. Analytical results (Brown 1978b) indicated no specific constituents that would cause the gelatinous character of the extracted sample. The results of the viscosity-versus-temperature analysis were not available.

C.3 DESCRIPTION OF THE JULY 1978 SAMPLING EVENT

Historical records contain no data relative to sampling procedure, riser or sample depth. The sample was reported as being used to confirm previous tests with synthetic waste for concentration in the 242-S Evaporator (Lane 1978).

No specifics were available concerning how the sample was handled once received for analysis. The sample was concentrated - by boiling - to 35% solids to determine if a significant production of Gibbsite occurred. The synthetic waste was nearly identical to the actual sampled waste from tank 241-S-107. Analytical results are reported in Lane (1978).

C.4 DESCRIPTION OF THE 1975 SAMPLING EVENT

The sample reported on February 14, 1975, was a sludge sample collected to determine the heat load of the tank 241-S-107 waste. No information on the technique to collect the sample, the riser used, or the depth of the sample, is available from historical records.

A small portion of the sample (1.05 mL) was fused with KOH upon receipt at the analytical laboratory. The resultant melt was dissolved in concentrated HCl and then diluted to 200 mL with water. The sample was determined to be a mixture of grayish-brown, large, granular crystals. Analytical results are reported in Horton (1975).

C.5 DESCRIPTION OF THE 1974 SAMPLING EVENT

Descriptions of the technique or procedure used to obtain the sample, riser used, and sampling depth are unavailable from historical records. The sample appears to be designated for a 242-S Evaporator run.

No specifics were available concerning how the sample was handled once received for analysis. The sample was reported as a yellow liquid with no solids (Wheeler 1974).

C.6 DESCRIPTION OF THE 1973 SAMPLING EVENT

Descriptions of the technique or procedure used to extract the sample, riser used, and sampling depth are unavailable from historical records. The sample was drawn and tested due to solids plugging a jumper line from tank 241-S-107 to tank 241-S-102. The results were also reported to R. L. Walser in an internal letter for a 242-S Evaporator run (Sant 1973).

The sample drawn was liquid, but upon receipt at the analytical laboratory, the sample contained about 50 percent crystalline solids. The liquid sample was cooled to find the freezing point temperature. A separate liquid sample was diluted with water and resampled. The solid portion of the sample was dissolved and analyzed.

The analysis reported that this supernatant sample contained a high concentration of phosphate, which was the indicated cause for the jumper line being plugged (Sant 1973).

Table C-1. 1978 Analytical Results.[1]

Waste Tank 241-S-107		
Salt Well Sample 4251		
October 16, 1978		
Components	**Lab Value**	**Lab Unit**
Physical Data		
SpG	1.525	
H_2O	52.0	%
Chemical Analysis		
Na	10.4	mol/L
Al	1.206	mol/L
OH^-	4.02	mol/L
CO_3	0.15	mol/L
PO_4	0.035	mol/L
NO_3	2.62	mol/L
NO_2	2.02	mol/L
SO_4	9.00E-04	mol/L
TOC	4.0	g/L
Radiological Analysis		
^{137}Cs	4.12E+05	μCi/L

Notes:
[1]Brown (1978a)

Table C-2. 1978 Analytical Results.[1]

Waste Tank 241-S-107		
September 7, 1978		
Components	**Lab Value**	**Lab Unit**
Physical Data		
H_2O	53.7	%
Density	1.208	g/mL
Chemical Analysis		
PO_4	0.04	mol/L
CO_3	0.24	mol/L
NO_3	2.0	mol/L
NO_2	1.9	mol/L
Na	7.46	mol/L
OH^-	1.18	mol/L
Al	1.06	mol/L
TOC	11.8	mol/L
Radiological Analysis		
^{137}Cs	2.26E+05	μCi/L

Note:
[1]Brown (1978b)

Table C-3. 1978 Analytical Results.[1]

Waste Tank 241-S-107			
241-S-107 Analyses			
July 10, 1978			
	Feed	Concentrate[2]	
Component	Lab Value		Lab Unit
Chemical Analysis			
Al	1.59	2.74	mol/L
OH	1.52	2.60	mol/L
NO_2	2.58	2.35	mol/L
NO_3	3.36	2.92	mol/L
CO_3	0.19	0.18	mol/L
TOC		22.0	g/L
Radiological Analysis			
$^{89,90}Sr$	8.19E+03	7.15E+03	μCi/L

Notes:

[1] Lane (1978)

[2] 35% reduction

Table C-4. 1975 Analytical Results. [1]

Waste Tank 241-S-107		
Analysis of Sludge		
February 14, 1975		
Components	**Lab Value**	**Lab Unit**
Physical Data		
Visual	Mixture of grayish-brown large granular crystals	
Wet Density	1.48	
Dry Density	0.78	
H_2O	47.3	%
Chemical Analysis		
Al	0.753	mol/L
NO_2	0.013	mol/L
NO_3	6.59	mol/L
PO_4	2.63	mol/L
Fe	0.41	mol/L
Pu	7.20E-02	g/L
Radiological Analysis		
^{89,90}Sr	4.84E+04	Ci/L
^{137}Cs	4.19E+04	Ci/L

Note:
[1] Horton (1975)

Table C-5. 1974 Analytical Results. [1]

Waste Tank 241-S-107		
Composition of Tank 241-S-107 Waste		
December 17, 1974		
Sample # T-8078		
Components	**Lab Value**	**Lab Unit**
Physical Data		
Visible	Yellow, No solids, 150 mrad/hr	
pH	14	
SpG	1.201	
H_2O	76.65	%
Chemical Analysis		
OH	101.0	mol/L
Al	0.297	mol/L
Na	3.72	mol/L
NO_2	0.323	mol/L
NO_3	1.82	mol/L
SO_4	3.14E-02	mol/L
PO_4	0.106	mol/L
F	8.36E-03	mol/L
CO_3	0.168	mol/L
Pu	1.78E-05	g/gal
Radiological Analysis		
^{134}Cs	3.35E+03	μCi/gal
^{137}Cs	4.81E+05	μCi/gal
^{125}Sb	1.34E+02	μCi/gal
^{60}Co	54.54	μCi/gal
$^{89,90}Sr$	6.253E+03	μCi/gal

Note:
[1]Wheeler (1974)

Table C-6A. 1973 Analytical Results. [1]

Waste Tank 241-S-107		
Composition of Tank 241-S-107 Waste		
Sample Date: November 6, 1973		
Sample Number # T-178		
Components	**Lab Value**	**Lab Unit**
Chemical Analysis		
Bi^{3+}	< 0.005	mol/L
Na^{+}	3.36	mol/L
AlO_2^{-}	0.087	mol/L
OH^{-}	0.186	mol/L
NO_3^{-}	1.47	mol/L
NO_2^{-}	0.03	mol/L
CO_3^{2-}	0.095	mol/L
SO_4^{2-}	0.03	mol/L
F^{-}	0.01	mol/L
PO_4^{3-}	0.384	mol/L
Radiological Analysis		
^{239}Pu	8.10E-05	g/gal
$^{89,90}Sr$	7.50	μCi/gal
^{137}Cs	1.00E+05	μCi/gal
^{134}Cs	8.20E+01	μCi/gal
^{60}Co	2.50E-02	μCi/gal

Note:

[1] Sant (1973)

Table C-6B. 1973 Analytical Results.[1]

Waste Tank 241-S-107		
242-S-Feed Samples (Supernate)		
November 6, 1973		
Sample Number # T-178		
Components	**Lab Value**	**Lab Unit**
Physical Data		
Visible	Yellow, 50% crystals, 180 mrad/hr	
pH	12.2	
SpG	1.1071	
Chemical Analysis		
Na	2.55	mol/L
SO_4	2.96E-02	mol/L
Al	0.105	mol/L
NO_2	2.70E-02	mol/L
Fe	2.26E-04	mol/L
CO_3	9.40E-02	mol/L
OH	0.186	mol/L
NO_3	1.72	mol/L
Pu	1.43E-05	g/L
Radiological Analysis		
^{137}Cs	3.11E+04	μCi/L
^{134}Cs	31.86	μCi/L
^{60}Co	37.97	μCi/L
$^{89, 90}$Sr	6.156	μCi/L

Note:

[1] Sant (1973)

Table C-6C. 1973 Analytical Results.[1]

Waste Tank 241-S-107		
242-S-Feed Samples (Total Sample) D-4111		
Sample # T-178		
December 7, 1973		
Date Sample: November 6, 1973		
Components	**Lab Value**	**Lab Unit**
Physical Data		
SpG	1.1398	
Chemical Analysis		
Na	3.36	mol/L
SO_4	2.98E-02	mol/L
Al	8.71E-02	mol/L
NO_2	3.00E-02	mol/L
F	9.92E-03	mol/L
CO_3	9.50E-02	mol/L
NO_3	1.47	mol/L
Pu	2.14E-05	g/L
Radiological Analysis		
^{137}Cs	2.61E+04	μCi/L
^{134}Cs	21.66	μCi/L
^{60}Co	65.44	μCi/L
^{89,90}Sr	1.98	μCi/L

Note:

[1] Sant (1973)

Table C-6D. 1973 Analytical Results.[1]

Waste Tank 241-S-107		
Composition of Tank 241-S-107 Waste		
Sample Date: November 17, 1973		
Sample Number # T-476		
Components	**Lab Value**	**Lab Unit**
Chemical Analysis		
Bi^{3+}	< 0.005	mol/L
Na^{+}	3.39	mol/L
AlO_2^{-}	0.091	mol/L
OH^{-}	0.292	mol/L
NO_3^{-}	1.73	mol/L
NO_2^{-}	0.024	mol/L
CO_3^{2-}	0.099	mol/L
SO_4^{2-}	0.022	mol/L
F^{-}	0.01	mol/L
PO_4^{3-}	0.53	mol/L
Radiological Analysis		
^{239}Pu	1.07E-06	g/gal
$^{89\text{-}90}Sr$	4.40E+01	μCi/gal
^{137}Cs	8.60E+04	μCi/gal
^{134}Cs	1.50E+02	μCi/gal
^{60}Co	1.90E+02	μCi/gal

Note:
[1] Walser (1973)

Table C-6E. 1973 Analytical Results.[1]

Waste Tank 241-S-107		
242-S Feed Sample		
Sample # T-476		
Received: November 16, 1973		
Components	**Lab Value**	**Lab Unit**
Physical Data		
Visible	Yellow crystals, 75% solids, 100 mrad/hr	
pH	11.9 at 40°C	
SpG	1.1592	
Chemical Analysis		
Na	3.39	mol/L
SO_4	2.18E-02	mol/L
Al	9.07E-02	mol/L
NO_2	0.024	mol/L
F	1.03E-02	mol/L
CO_3	0.099 Rerun: 0.090	mol/L
Cl	Method being developed	mol/L
OH	0.292	mol/L
NO_3	1.73	mol/L
PO_4	0.53	mol/L
Bi	< 4.98E-03	mol/L
Pu	2.82E-05	g/L
Radiological Analysis		
^{134}Cs	40.58	μCi/L
^{137}Cs	2.28E+04	μCi/L
^{60}Co	50.05	μCi/L

Note:
[1] Walser (1973)

ATTACHMENT 1

STATISTICAL SUPPORT OF THE TANK CHARACTERIZATION REPORT (TCR): DESCRIPTION AND EXAMPLE

D. W. Engel
D. S. Daly
S. A. Hartley
C. A. Lopresti

Attachment 1 contains the text and graphics of a draft document prepared by D. W. Engel, D. S. Daly, S. A. Hartley, and C. A. Lopresti of Pacific Northwest National Laboratory, Richland, Washington.

This page intentionally left blank.

CONTENTS

1.0 INTRODUCTION Att-7
1.1 ANALYSES Att-7
1.2 DATA ANOMALIES Att-8

2.0 ANALYSIS OF VARIANCE Att-10
2.1 CORE COMPOSITES Att-10
2.2 SEGMENT-LEVEL ESTIMATES Att-12
2.3 DATA SCREENING Att-13

3.0 CLUSTER ANALYSIS Att-17
3.1 DATA SCREENING Att-17
3.2 MULTIVARIATE CLUSTERING Att-19
3.3 PRINCIPAL COMPONENT ANALYSIS Att-31

4.0 HISTORICAL COMPARISON Att-35

5.0 PROFILE PLOTS Att-40

6.0 REFERENCES Att-51

LIST OF FIGURES

1.1 Results from the Multivariate Grouping/Clustering Analysis Att-8

2.1 Residual Plots as a Result of the ANOVA Analysis Att-14

3.1 Boxplots of Original and Autoscaled Data Att-18

3.2 Dendogram of Clustering on Autoscaled Data. Code on Axis is Segment, Portion, Core, and Aliquot (e.g., 3U1a --> 3rd Segment, Upper Portion, Core 1 {1=105, 2=110, 3=111}, Primary Aliquot). Att-21

3.3 Overlay of Clustering Results onto each Core and Segment, Number in Box Denotes Grouping Identified from the Clustering Dendogram Att-22

3.4 Loadings from the Principal Component Analysis on the Autoscaled Date Att-33

3.5 All Pairs Scatterplots of the First Five Principal Components Att-34

5.1 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-41

5.2 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-42

5.3 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-43

5.4 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-44

5.5 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-45

5.6 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-46

5.7 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-47

5.8 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-48

LIST OF FIGURES (Continued)

5.9 Profile Plots for each Analyte (μg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-49

5.10 Profile Plots for each Analyte (μCi/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line Att-50

LIST OF TABLES

1.1 Data Anomalies Att-9

2.1 Tank Concentrations and Variability for Core Samples Att-11

2.2 Tank Concentrations and Variability for Segment-Level Sample Att-15

3.1 Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3 . . . . . Att-23

3.2 Agnew's Waste Types for S-107 . . . . . Att-30

4.1 Agnew and Sample-Based Estimate Comparisons Att-37

4.2 HTCE:MC and Sample-Based Estimate Comparisons Att-38

LIST OF TERMS

ANOVA: analysis of variance

CI: confidence interval: for n=4 and 95% confidence

$$CI = \hat{\mu} \pm 3.182 \cdot \frac{\hat{\sigma}}{\sqrt{4}}$$

DOE: United States Department of Energy

GEA: gamma energy analysis

HDW: Hanford defined wastes

HTCE: historical tank content estimate

IC: ion chromatography

ICP: inductively coupled plasma atomic emission spectrometry

PNNL: Pacific Northwest National Laboratory

REML: restricted maximum likelihood

RPD: relative percent difference: for two samples x_1 and x_2

$$RPD = \frac{|x_1 - x_2|}{(x_1 + x_2)/2} \cdot 100\%$$

RSD: relative percent difference

$$RSD = \frac{\sqrt{variance\ estimate}}{mean\ estimate} \cdot 100\%$$

TCR: tank characterization report

TIC: total inorganic carbon

TLM: tank layering model

TOC: total organic carbon

1.0 INTRODUCTION

Tank Characterization Reports (TCRs) are being written to describe the contents and data sampling of waste tanks at the Hanford site. Estimates of concentrations and inventories are being made from the sampled data. These estimates are based on historical records and data, recently sampled data, and expert judgement. The estimates will be used in the cleanup process of the Hanford site.

This report describes the statistical analyses that are being performed on the sampled data at Battelle, Pacific Northwest National Laboratory (PNNL)[a]. Several analyses are performed on the sampled data, along with a comparison to estimated concentrations based on historical records and data. The analyses are broken into two types: univariate and multivariate. The analyses reported in this document pertain to data sampled from Tank 241-S-107 (referred to as S-107).

1.1 ANALYSES

The univariate methods analyze one analyte (variable) at a time. These analyses include profile plots of each analyte, estimates of mean concentration and standard deviations using an analysis of variance (ANOVA) technique, and data quality checks using the profile plots, residual plots from the ANOVA analysis, and simple data screening statistics. The ANOVA results are reported in tables and can be used to estimate a tank concentration or inventory along with estimating the different components of an uncertainty estimate.

The multivariate analysis is used to group/cluster similar results from the different samples. The clustering analysis is performed on a subset of all the different analytes. The subset of selected analytes are pooled together and grouped into different clusters. The results of the analysis for S-107 are shown in Figure 1.1 and represents our best attempt at describing how the waste is distributed. These results can be compared against different estimates, such as the Agnew Tank Layering Model (Agnew 1996), which is also shown in Figure 1.1.

This report is broken into five sections, including: 1) this introduction, 2) ANOVA analyses on the core composite and segment-level data, 3) multivariate clustering, 4) comparison of sampled data to historical estimates, and 5) profile plots. A detailed description of the use of the ANOVA method discussed in Section 2 is provided as an appendix.

[a] Operated for the U.S. Department of Energy by Battelle Memorial Institute under Contract No. DE-AC06-76RLO 1830.

1.2 DATA ANOMALIES

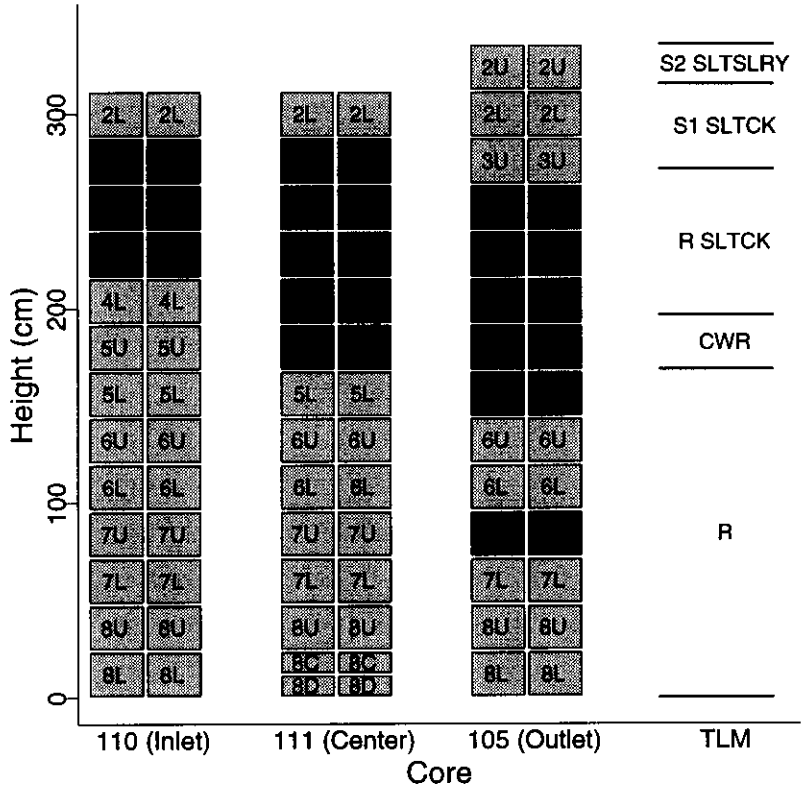


Figure 1.1 Results from the Multivariate Grouping/Clustering Analysis

Tools have been developed to check the quality of the sampled data and have been put into many of the analyses. These tools include univariate profiles of the data (Section 5), mass balance analysis, and residual plots as a result of the ANOVA analyses.

As a results of these analyses, several sample results have been identified that **MAY** be erroneous. These values are shown in Table 1.1 and have been reported to the tank coordinator **BUT** are still included in the analyses in this report. The authors of the statistical analyses would like to warn the users that some of the data used to generate the results reported in this document may be in error. And that the results may change following resolution of possible erroneous data points.

Table 1.1. Data Anomalies

Core	Segment	Analyte	Anomaly
111	3 Upper	Cl	RMIS conversion problems
111	7 Upper	Ox	RMIS conversion problems
111	2 Lower	PO4	RMIS conversion problems
110	7 Upper	Ox	RMIS conversion problems
110	7 Lower	Ox	RMIS conversion problems
110	7 Upper	SO4	RMIS conversion problems

2.0 ANALYSIS OF VARIANCE

The analysis of variance (ANOVA) is one of the most widely used statistical methods for the interpretation of tank waste data (Jensen and Liebetrau 1988, Heasler et al. 1994). With the A NOVA, a model is structured to represent the various components of variability that exist in the data. The ANOVA is used to estimate each component of variation in the model and to test the significance of each component's contribution toward the overall variability.

This section is broken into three parts: core composites, segment-level analysis, and data screening. Each subsection will briefly describe the analyses and present the results from S-107 in tabular or graphical form. A detailed description of the ANOVA techniques as applied to the tank characterization problem has been presented elsewhere (Hartley et al. 1995), and is attached as an appendix to this document.

2.1 CORE COMPOSITES

An ANOVA on the core composite data for S-107 has been completed. Each analyte/analytical method was analyzed using a nested random effects model. The random effects model is used because it is assumed that a core sample is representative of the tank population. The model used to analyze the core composite data is:

$$Y_{ij} = \mu + C_i + E_{ij} \tag{2.1}$$

where

Y_{ij} = measured value of concentration in the ith core and j^{th} sample
μ = mean concentration of the particular analyte for the tank
C_i = deviation of concentration from the mean in the ith core
E_{ij} = analytical (lab) error in the measurement (primary and duplicate).

The variables C_i and E_{ij} are assumed to be uncorrelated and normally distributed with means zero and standard deviations σ_C and σ_E. Estimates of the variance components were obtained using the restricted maximum likelihood (REML) estimation method. The REML method is similar to a maximum-likelihood method, but it first separates the likelihood into two parts: one that contains the fixed effects and one that does not (Patterson and Thompson 1971). The procedure iterates until convergence is reached for the log-likelihood objective function of the non-fixed portion.

The results of the analysis are shown in Table 2.1, where **Method** is the analytical method used at the laboratory, $\hat{\mu}$ is the estimated mean for the overall tank concentration for each analyte, **RSD($\hat{\mu}$)** is the relative standard deviation in percent units about the mean (calculated as the standard deviation for the mean divided by $\hat{\mu}$), **RSD(σ_C)** is the variation (RSD, %) about the mean due to the different cores, **RSD(σ_E)** is the variation due to the analytical measurements,

<DL is the number of samples below the detection limit, and **Obs.** is the number of samples for each analyte. Only the analytes in which at least half of the observations were greater than the detection limit were analyzed. **The authors realize that this rule may cause a bias in both the mean estimate and variance estimate**. It is assumed that the detection limit values are small compared to the rest of the data and occur in the left hand tail of the distribution, creating a conservative bias in the mean estimate, but under estimating the variance terms. If it is found through the data screening process that the detection limit is not in the left hand tail of the distribution, perhaps do to different dilution factors, then each sample will be examined individually to see if the data is used, discarded, or re-analyzed at the laboratory.

Table 2.1. Tank Concentrations and Variability for Core Samples

Analyte	Method	Mean ($\hat{\mu}$)	Units	RSD($\hat{\mu}$)	RSD(σ_C)	RSD(σ_E)	<DL	Obs.
Bromide	IC-Dionex	1700.4	µg/g	35.6	61.6	0.4	4	6
Chloride	IC-Dionex	1916.7	µg/g	4.4	3.8	9.3	0	6
Fluoride	IC-Dionex	13978.0	µg/g	11	10.3	22.8	0	6
Nitrate	IC-Dionex	57950.0	µg/g	3.3	0	8.2	0	6
Nitrite	IC-Dionex	30083.0	µg/g	3.3	0	8.2	0	6
Oxalate	IC-Dionex	2525.0	µg/g	12.7	19.1	15.2	1	6
Phosphate	IC-Dionex	24302.0	µg/g	47.6	0	116.5	0	6
Sulfate	IC-Dionex	2793.3	µg/g	17.9	30.8	4.6	0	6
Aluminum	ICP:A	59383.0	µg/g	6.7	10.1	7.9	0	6
Boron	ICP:A	100.4	µg/g	25.7	41.5	22.8	0	6
Cadmium	ICP:A	4.0	µg/g	12.8	21.2	9.1	0	6
Calcium	ICP:A	522.5	µg/g	4.2	7	2.8	0	6
Chromium	ICP:A	2836.7	µg/g	3.6	3	7.7	0	6
Copper	ICP:A	27.3	µg/g	3.6	0	8.7	0	6
Iron	ICP:A	2276.7	µg/g	6	7.3	10.4	0	6
Lead	ICP:A	126.5	µg/g	10.1	17	6	0	6
Lithium	ICP:A	21.4	µg/g	15.7	27.1	2.5	0	6
Magnesium	ICP:A	133.3	µg/g	3.9	4.4	7.1	0	6
Manganese	ICP:A	587.3	µg/g	10.1	15.8	10.8	0	6
Molybdenum	ICP:A	21.6	µg/g	5.1	8.8	0.6	6	6
Neodymium	ICP:A	48.0	µg/g	3.5	5.6	3.2	3	6

Table 2.1. Tank Concentrations and Variability for Core Samples

Analyte	Method	Mean ($\hat{\mu}$)	Units	RSD($\hat{\mu}$)	RSD(σ_C)	RSD(σ_E)	<DL	Obs.
Nickel	ICP:A	1398.8	µg/g	25.9	44.3	10.7	0	6
Phosphorus	ICP:A	2106.0	µg/g	53.7	0	131.5	0	6
Potassium	ICP:A	547.2	µg/g	6.9	8.2	12.1	0	6
Silicon	ICP:A	1278.2	µg/g	20	14.6	44.5	0	6
Silver	ICP:A	19.1	µg/g	24.9	22.1	52.5	1	6
Sodium	ICP:A	92700.0	µg/g	5.8	9.4	4.8	0	6
Strontium	ICP:A	259.3	µg/g	8.4	14.1	5.3	0	6
Sulfur	ICP:A	463.3	µg/g	16.8	28.9	5.8	0	6
Titanium	ICP:A	37.7	µg/g	17.6	29.2	12.6	0	6
Uranium	ICP:A	7378.3	µg/g	11	18.9	3.9	0	6
Zinc	ICP:A	233.7	µg/g	17	29.1	5.4	0	6
Zirconium	ICP:A	4458.0	µg/g	28.3	19.5	63.7	0	6
Cesium-137	GEA	78.2	µCi/g	7.4	12	6.1	0	6
Cobalt-60	GEA	0.1	µCi/g	26.6	38	36.9	1	6
Strontium-89/90	High Level	174.0	µCi/g	19.1	31.2	15.9	0	6
% Water	TGA using Mettler	36.1	%	10.2	17.0	6.3	0	6
Alpha	Digested Solid	1.0	µCi/g	8.4	14.3	4.2	0	6

2.2 SEGMENT-LEVEL ESTIMATES

The analysis of segment-level data from S-107 is presented in this section. Since each segment is represented by a lower and upper portion, it was possible to analyze the data using half-segment resolution. Each analyte/analytical method combination was analyzed using a nested random effects model. The model used for the analysis is:

$$Y_{ijk} = \mu + C_i + V_{ij} + E_{ijk} \qquad \textbf{2.2)}$$

where

Y_{ijk} = measured value of concentration in the ith core, jth segment, and kth sample
μ = mean concentration of the particular analyte for the tank
C_i = deviation of concentration from the mean in the ith core

V_{ij} = deviation of concentration from the mean in the ith core and j^{th} segment-portion
E_{ijk} = analytical (lab) error in the measurement.

The results of the analysis is shown in Table 2.2, where **Method** is the analytical method used at the laboratory, $\hat{\mu}$ is the estimated overall tank mean concentration, **RSD($\hat{\mu}$)** is the variation in terms of the overall tank mean (in percent units), the **RSD(σ)** values represent the relative standard deviation (RSD in %) for each factor (cores, segments, and replicate samples, respectively), and the **P-Val(V)** is the significance level used to test for vertical variability. As in Section 2.1, the variables ***C***, ***V***, and ***E*** are assumed to be uncorrelated and normally distributed with mean equal to zero and the variance components estimated using the REML method. Only analytes in which at least half of the observations were greater than the detection limit were analyzed.

2.3 DATA SCREENING

Additional results from the ANOVA have been used to screen the data looking for possible outliers. For instance, Figure 2.1 contains plots of the residuals versus the predicted value and residuals versus the normal scores for each analyte (Strontium-89/90, Sulfate, and Sulfur). The residuals are the difference between the actual sampled value and the predicted values from the ANOVA model (Equation 2.2). The normal scores are the residuals (R) normalized to a standard normal ($\{R - \bar{x}_R\}/\sigma_R$). The line shown on the Normal Scores plot represents perfect agreement to the model.

Figure 2.1 was selected because it represents three possible fits from the ANOVA model. The plots for Strontium-89/90 show that the assumption of normality is not met, since the residuals vs. normal scores are not linear and the residuals vs. predicted plots show some structure. The plots for sulfate reveal a possible outlier, which very much influences the predictions and thus we see a definite structure in the residual vs. predicted plot. The plots for sulfur tend to show agreement with the assumption of normality and also a good prediction with the model (random scatter in the residual vs. predicted plot).

Other types of data screening included examining the profile plots in Section 5 and mass balance checks. The profile plots can be used to look for outliers at each point as it corresponds to core, segment, and aliquot. The mass balance check is done by summing all of the cations, anions, and water for each unit of sample (e.g., core 105, segment 6 upper portion, and primary aliquot). The sum is done on concentrations (ppm) and compared against the physical limit of 10^6 ppm.

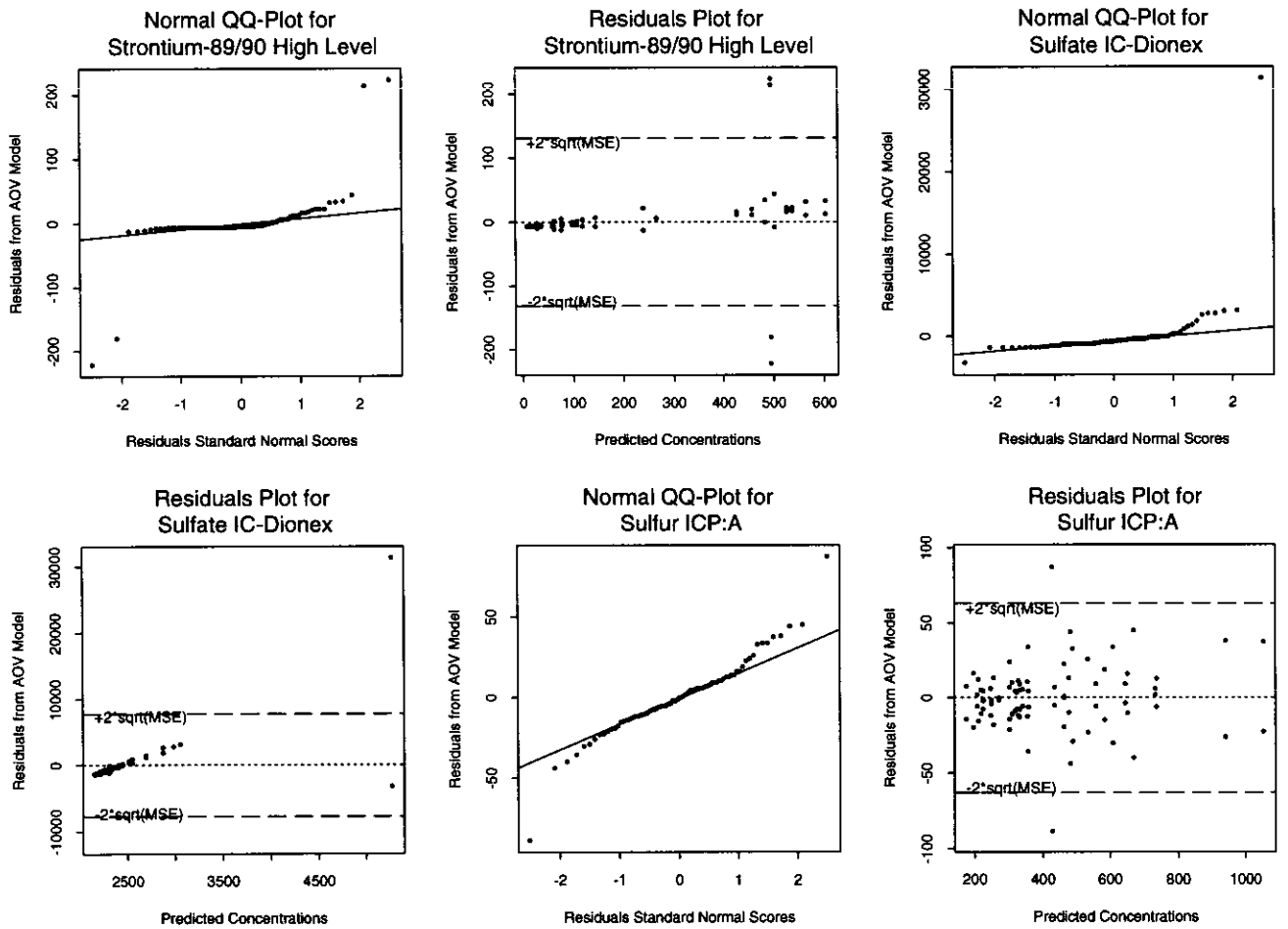


Figure 2.1. Residual Plots as a Result of the ANOVA Analysis

Table 2.2. Tank Concentrations and Variability for Segment-Level Sample.

Analyte	Method	Mean ($\hat{\mu}$)	Units	RSD($\hat{\mu}$)	RSD(σ_C)	RSD(σ_V)	RSD(σ_E)	<DL	Obs.	P-Val(V)
Chloride	IC-Dionex	2081.0	µg/g	7.0	7.5	30.3	24.8	0	82	0.0000
Fluoride	IC-Dionex	14261.0	µg/g	30.5	0.0	192.9	15.1	16	82	0.0000
Nitrate	IC-Dionex	57881.0	µg/g	5.3	0.0	32.0	15.0	3	82	0.0000
Nitrite	IC-Dionex	30856.9	µg/g	7.1	10.0	23.2	14.8	0	82	0.0000
Oxalate	IC-Dionex	4183.2	µg/g	24.3	0.0	133.0	109.2	11	82	0.0000
Phosphate	IC-Dionex	21576.4	µg/g	29.4	0.0	181.0	59.8	5	82	0.0000
Sulfate	IC-Dionex	2432.3	µg/g	19.5	0.0	50.7	159.3	2	80	0.2723
Aluminum	ICP:A	49728.4	µg/g	16.2	24.0	48.0	32.1	0	82	0.0000
Barium	ICP:A	22.2	µg/g	9.2	0.0	55.8	22.7	31	82	0.0000
Boron	ICP:A	140.9	µg/g	27.4	0.0	172.5	22.2	0	82	0.0000
Calcium	ICP:A	487.2	µg/g	26.5	0.0	167.1	18.4	3	82	0.0000
Chromium	ICP:A	3532.0	µg/g	26.5	19.0	152.3	14.4	0	82	0.0000
Copper	ICP:A	25.9	µg/g	16.1	12.5	91.0	8.9	0	82	0.0000
Iron	ICP:A	2303.3	µg/g	18.1	12.6	103.8	20.6	0	82	0.0000
Lead	ICP:A	118.6	µg/g	18.6	17.2	98.5	15.6	8	82	0.0000
Lithium	ICP:A	21.1	µg/g	14.6	0.0	84.2	53.6	2	82	0.0000
Magnesium	ICP:A	139.5	µg/g	16.9	0.0	104.8	29.7	4	82	0.0000
Manganese	ICP:A	564.2	µg/g	32.9	0.0	208.1	11.4	0	82	0.0000
Molybdenum	ICP:A	19.1	µg/g	3.6	0.7	21.5	8.8	27	82	0.0000
Nickel	ICP:A	1279.8	µg/g	24.7	0.0	156.2	6.9	0	82	0.0000
Phosphorus	ICP:A	4039.4	µg/g	36.4	0.0	229.6	22.0	0	82	0.0000
Potassium	ICP:A	538.3	µg/g	5.7	6.9	23.0	16.3	0	82	0.0000

Table 2.2. Tank Concentrations and Variability for Segment-Level Sample.

Analyte	Method	Mean ($\hat{\mu}$)	Units	RSD($\hat{\mu}$)	RSD(σ_C)	RSD(σ_V)	RSD(σ_E)	<DL	Obs.	P-Val(V)
Silicon	ICP:A	2184.3	µg/g	28.9	44.9	79.1	23.8	0	82	0.0000
Silver	ICP:A	36.7	µg/g	30.6	0.0	193.0	15.8	36	82	0.0000
Sodium	ICP:A	86657.2	µg/g	9.2	8.9	47.9	6.7	0	82	0.0000
Strontium	ICP:A	241.4	µg/g	22.1	0.0	134.6	52.4	0	82	0.0000
Sulfur	ICP:A	426.8	µg/g	13.2	19.0	45.9	7.4	0	82	0.0000
Titanium	ICP:A	37.7	µg/g	15.2	0.0	93.9	31.5	0	82	0.0000
Uranium	ICP:A	6826.3	µg/g	10.4	0.0	62.8	26.8	0	82	0.0000
Zinc	ICP:A	222.6	µg/g	43.6	0.0	275.2	20.5	0	82	0.0000
Zirconium	ICP:A	9715.5	µg/g	33.6	0.0	212.0	18.1	0	82	0.0000
Cesium-137	GEA	83.6	µCi/g	9.0	12.3	34.7	7.1	0	82	0.0000
Cobalt-60	GEA	0.1	µCi/g	19.5	19.7	100.2	10.3	29	82	0.0000
Strontium-89/90	High Level	158.3	µCi/g	21.1	0.0	130.4	41.40	0	82	0.0000
% Water	TGA Perkin Elmer	25.8	%	14.5	0.0	58.3	17.9	0	34	0.0000
% Water	TGA Mettler	32.1	%	7.2	3.2	33.3	10.5	0	48	0.0000
Alpha	Digested Solid	0.9	µCi/g	13.6	0.0	84.4	22.2	3	82	0.0000
DSC Exotherm	Mettler	13.8	J/g	60.4	0.0	319.2	27.3	0	56	0.0000
DSC Exotherm	Perkin Elmer	5.1	J/g	100.0	0.0	360.6	1.0	0	26	0.0000
DSC Exo Dry	Calculated	16.7	J/g Dry	48.8	0.0	191.2	345.6	0	82	0.2088

3.0 CLUSTER ANALYSIS

The results shown in Table 2.2 indicate that there is a strong probability of a vertical heterogeneity effect, indicated by the low p-values (V-pval < 0.01) for most of the analytes (9 of the 14) and all of the ICP samples. Defining the vertical structure of this heterogeneity (i.e., layers) is not an easy task using the ANOVA analysis, the ANOVA analysis is performed on one analyte at a time (univariate). Thus, a clustering analysis has been performed on samples from S-107 to identify the layering structure. The results of this analysis and a description of the method is described in this section.

The S-107 core sample dataset contains 82 multivariate observations. The observations may be cross-classified by core number (105 -- near the outlet, 111 -- near the center, and 110 -- near the inlet), sample size (whole, half, or quarter segment), and sample replicate (primary or duplicate).

A multivariate observation describing one analytical sample may include concentration measurements determined by IC (Cl, F, NO2, NO3, Oxa, PO4, SO4), ICP:A (Al, Ba, B, Ca, Cr, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, P, K, Si, Ag, Na, Sr, S, Ti, U, Zn, Zr) and GEA (Cs-137, Co-60, Sr-89/90). Measurements for many of these analytes, however, were not made, or were below detection limits. Therefore, the analytes available for clustering were reduced to Al, Cr, F, Fe, Na, Ni, P, Pb, S, Si, Sr-90, U, and Zr.

The objectives of the multivariate statistical analysis of the reduced dataset were:

- to describe qualitatively potential spatial structure within the wastes by identifying groups (clusters) of similar observations,
- to describe quantitatively each layer based on the numerical characteristics of the associated cluster of observations.

The application of multivariate methods to the dataset proceeded through several steps: data screening, data transformation, sample clustering, analysis of the correlation structure, and summarization of the results. Several iterations through the steps were necessary to uncover anomalies and reveal consistencies. The results reported here are a composite of the results of several iterations.

3.1 DATA SCREENING

The dataset was screened prior to clustering to identify variables and measurements that may have significant influence in the multivariate analysis and to identify possible corrective actions (variable transformations or exclusions). Screening was also used to gain a better understanding of the variables and measurements that drive the clustering.

The reduction of the set of analytes because of missing values and below detection limit measurements was described in the previous section (2.3). Screening also revealed a few measurements that eluded quality control efforts, such as measurements in excess of a millon parts per million and reported below detection limit values in excess of the reported detection limit were identified and addressed.

Disparities in the spread of measurement distributions significantly influence clustering results. Boxplots, which display the measurement distributions, show the disparities in the spread of measurement distributions across analytes (Figure 3.1). Because of the large spread of measurement distribution, it is possible to say that Al, Na, Zr, and F would dominate the clustering analysis if performed on the original measuring scale (while, perhaps, important analytes based on physical principles would have minimal influence on the analysis). A $\log_{10}$ transformation reduced the influence of both Al and Na but increased the effect of other minor

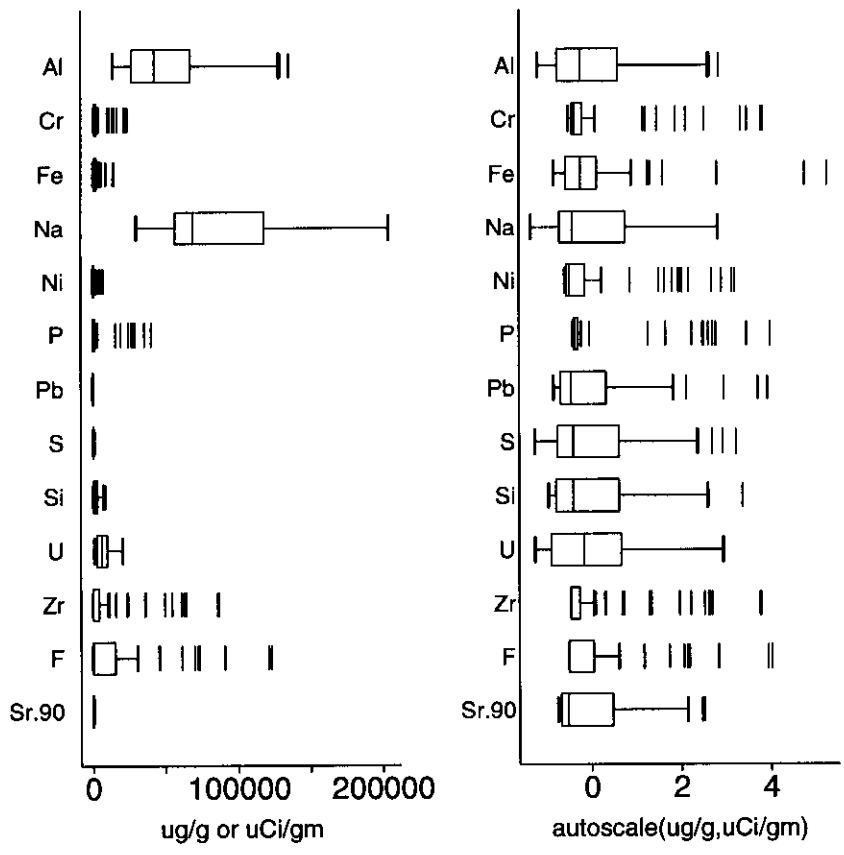


Figure 3.1 Boxplots of Original and Autoscaled Data

analytes, and thus an autoscaling transformation was used for the clustering analysis. The autoscaling works by taking each measurement in the distribution subtracting off the mean and dividing by the standard deviation (i.e., standardization).

3.2 MULTIVARIATE CLUSTERING

A multivariate observation on one sample can be thought of as defining the coordinates of a point in multi-dimensional space. In this analysis, the 82 samples in the analyte-reduced dataset identifies 82 points in a 41-dimensional space (one dimension for each analyte in the analysis dataset). A group of similar samples were identified by finding a cluster of points that were, in some sense, close together in the 41-dimension space. A quantitative summary of the cluster (number of samples, 10th percentile, median, and 90th percentile) was then calculated from measurements on the cluster members.

Hierarchial clustering (used here) begins with each point as its own cluster and proceeds iteratively until all points belong to one cluster. Each iteration begins with the calculation of distances between all possible pairings of points (or clusters). The two nearest points (or clusters) are then joined into one cluster. The process is repeated until all points belong to one cluster. The values representing distances between points (or clusters) depend upon the chosen linkage: compact, average, or single. Under compact linkage, points or clusters are joined whose farthest members are closest together. Under average linkage, points or clusters are joined whose centroids are closest, While using single linkage, points or clusters are joined whose nearest members are closest.

In general, compact linkage produces tight, spherical clusters while single linkage produces loose stringy clusters, with average linkage somewhere in between. Clustering results are usually visualized using a dendogram showing the linkages among points and clusters, and the relative distances among them (Figure 3.2).

For the S-107 dataset, groups of similar samples were identified by comparing the results of several clustering analyses. Analyses were performed on the original-scaled, $\log_{10}$ transformed data and autoscaled data. For each dataset two cluster joining rules were used (''average'' and ''complete'' linkage). The compact linkage joining rule and autoscale transformation were selected for this particular analysis. The selection of the particular techniques is not based on quantitative measures, instead is based on the professional judgement of the Statistician doing the analysis. From this, two major clusters emerged, with three distinct, but minor, subsets in the larger major clusters. Figure 3.2 presents a dendogram (cluster tree) showing the linkages among samples and clusters, and the relative distances among them.

The two major groups consist of samples from the top of the tank and the bottom of bottom, respectively. The minor groups partition the samples in the middle and bottom groups into spatially-coherent subsets. The separation among samples in these subgroups, however, may not be physically significant. A useful visualization of the clustering results that suggests spatial structure for the waste is shown in Figure 3.3. Here, the groups/clusters are distinguished by

numbers (1-4), which corresponds to the numbers featured on the dendogram. Color versions of the plots are available, however, reproducability of color plots is not a easy task and thus have been left out of this write-up. However, it is much easier to distinguish the groups with color plots, and thus the authors suggest that the reader color the different groups in Figure 3.3 (suggested color scheme: 1 --> light green, 2 --> dark green, 3 --> yellow, 4 --> brown)

A quantitative summary of the clusters can be found in Table 3.1. The clusters are identified by group number in reference to the dendogram and core plot. The number of members in each group is listed on the same line with the group number (n = 10, for group 1). The groups are listed in the table in the same order as they occur on the dendogram, with the left most group (1 -- light green in the color version) occurring first in the table and the right most group (4 -- brown) occurring last in the table. For each analyte and cluster, three values labeled 'low', 'mid' and 'hi' are listed. These correspond to the 10th percentile, median and 90th percentile of the sample distribution for the cluster members. These provide a sense of the distribution of measurements within a cluster. Some of the percentiles in Table 3.1 are listed as <DL, which stands for less than detection limit, and occurs because less than detection limit values are included in the analysis when greater than 50% of the values are actually greater than the detection limit.

From visual comparisons of these summaries across clusters, we find distinct differences in P and PO4 (phosphate is reported as the actual measured values and not converted from phosphorous as done other places in this write-up, Section 4), Cr, Zr, and F, particularly between the two major clusters. Less distinct differences between clusters for each analyte can also be observed.

Table 3.2 shows results for S-107 using historical records for predicting the waste layers (Agnew 1996). This table shows concentrations for certain analytes for each predicted waste type. The concentrations are in parts per million (ppm = μg/g) unless otherwise noted in the table. The layers predicted using the Tank Layering Model (TLM) are shown in Figure 3.3, along side the groupings.

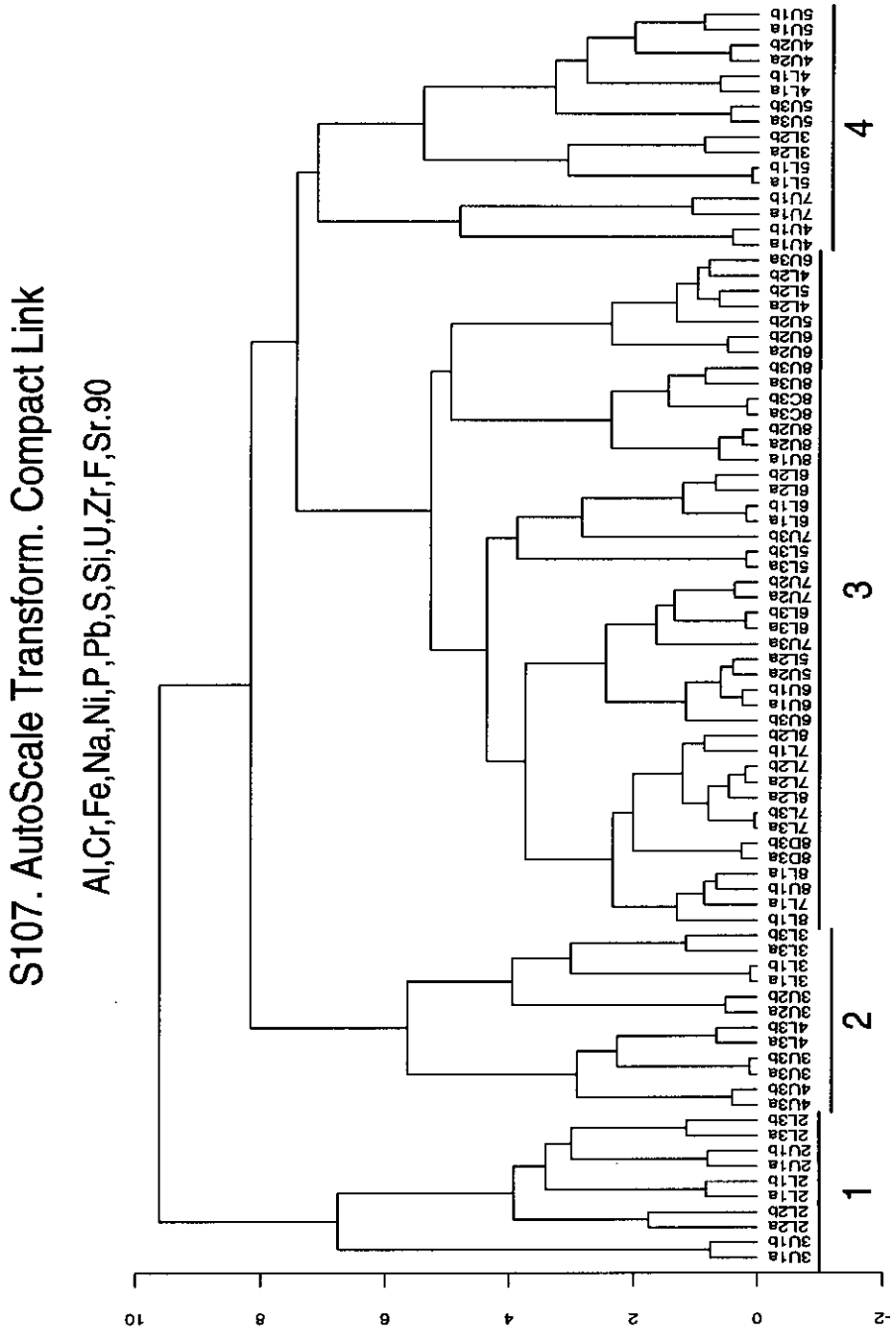


Figure 3.2 Dendogram of Clustering on Autoscaled Data. Code on Axis is Segment, Portion, Core, and Aliquot (e.g., 3U1a --> 3rd Segment, Upper Portion, Core 1 {1=105, 2=110, 3=111}, Primary Aliquot).

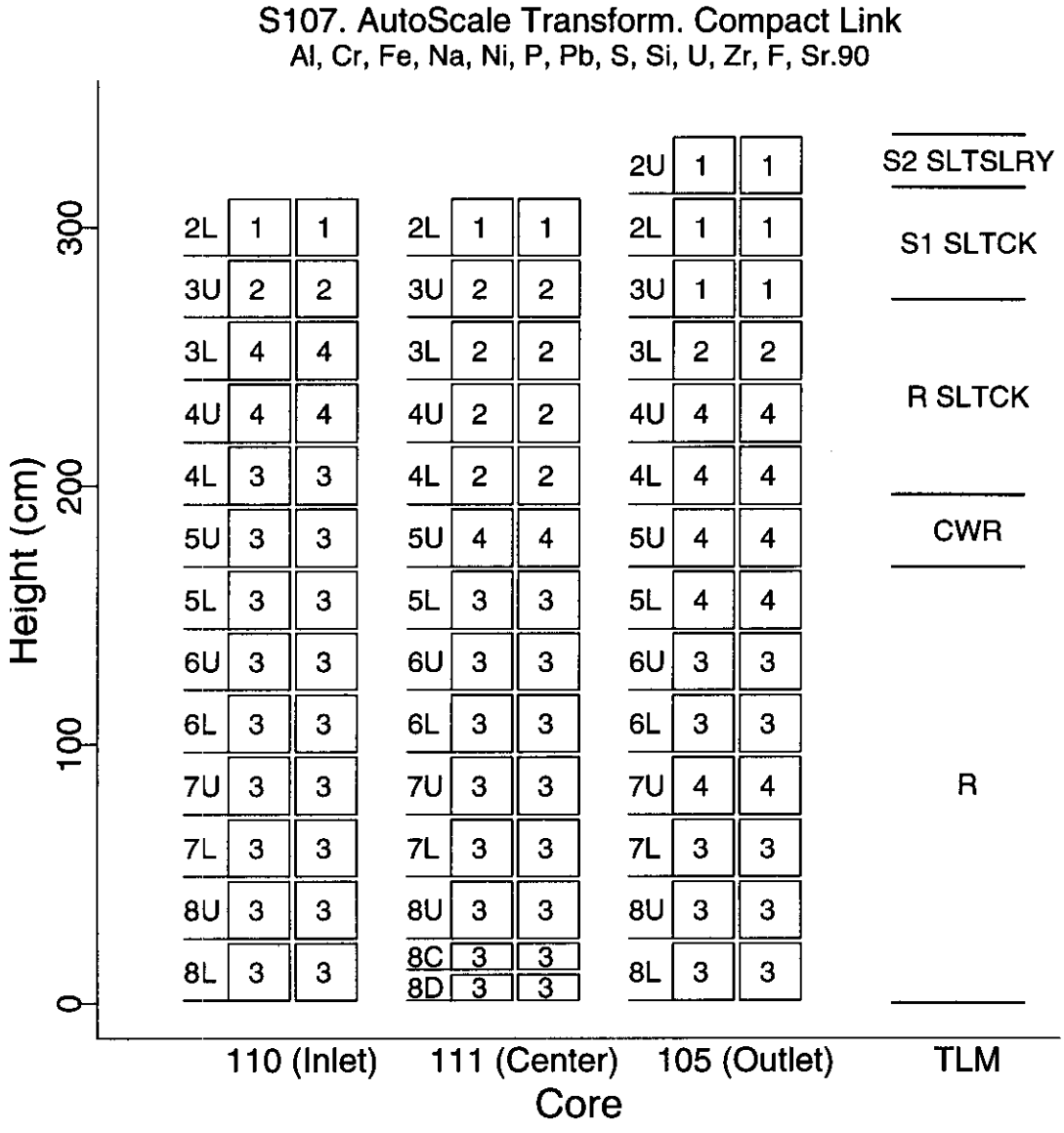


Figure 3.3 Overlay of Clustering Results onto each Core and Segment, Number in Box Denotes Grouping Identified from the Clustering Dendogram

Table 3.1. Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3.

Analyte	Low	Mid	Hi
	Group 1 (light green)	*n = 10*	
Ag	6	13	31
Al	16470	26100	47230
As	<DL	<DL	<DL
B	58	76	171
Ba	<DL	20	53
Be	<DL	<DL	<DL
Bi	71	167	183
Ca	622	810	4865
Cd	18	25	34
Ce	<DL	<DL	39
Co	<DL	9	10
Cr	9947	15800	23630
Cu	10	13	38
Fe	2152	4135	13820
K	377	478	544
La	23	36	45
Li	<DL	5	45
Mg	166	311	785
Mn	924	1280	6271
Mo	<DL	<DL	17
Na	97370	130000	141900
Nd	42	70	344
Ni	164	268	325
P	18840	27400	36170
Pb	207	321	557
S	456	515	642
Sb	<DL	<DL	25
Se	<DL	<DL	<DL
Si	383	1210	1832
Sm	17	40	43
Sr	14	45	55

Table 3.1. Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3.

Analyte	Low	Mid	Hi
Ti	11	36	132
Tl	<DL	<DL	<DL
U	1384	1920	2493
V	<DL	25	36
Zn	106	144	2972
Zr	102	206	2428
SO4	1531	1915	1998
PO4	76902	114000	143400
Oxalate	2907	13600	29450
NO3	38830	45250	95840
NO2	17630	22300	46380
F	9002	13400	18310
Cl	1333	1635	3629
Br	<DL	<DL	313
Am	0	0	0
Co-60	0	0	0
Cs-137	46	61	67
Eu	0	0	0
Sr-90	62	96	113
Group 2 (dark green)		*n = 12*	
Ag	16	92	222
Al	14070	22250	65750
As	<DL	<DL	<DL
B	47	296	1270
Ba	<DL	21	38
Be	<DL	<DL	3
Bi	<DL	<DL	25
Ca	342	509	1779
Cd	<DL	3	8
Ce	<DL	<DL	<DL
Co	<DL	<DL	<DL
Cr	1421	1795	3226

Table 3.1. Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3.

Analyte	Low	Mid	Hi
Cu	11	31	52
Fe	549	1440	4970
K	569	618	747
La	<DL	<DL	50
Li	4	19	33
Mg	57	132	388
Mn	24	427	3324
Mo	<DL	<DL	22
Na	65490	130000	172600
Nd	<DL	22	276
Ni	99	143	1344
P	540	1290	1544
Pb	87	134	217
S	494	648	1002
Sb	<DL	<DL	<DL
Se	<DL	<DL	39
Si	351	748	5312
Sm	<DL	<DL	<DL
Sr	6	9	108
Ti	11	14	35
Tl	<DL	<DL	<DL
U	2109	3060	4298
V	<DL	<DL	<DL
Zn	49	241	2348
Zr	3720	23600	62430
SO4	2629	4390	6065
PO4	<DL	25900	69900
Oxalate	<DL	1975	5140
NO3	58070	69800	77520
NO2	26640	30050	36840
F	17610	53800	118010
Cl	1867	2190	3442

Table 3.1. Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3.

Analyte	Low	Mid	Hi
Br	<DL	<DL	1782
Am	0	1	2
Co-60	0	0	0
Cs-137	66	85	98
Eu	0	0	0
Sr-90	8	22	67
	Group 3 (yellow)	*n = 44*	
Ag	<DL	<DL	4
Al	24460	56350	117700
As	<DL	<DL	<DL
B	26	49	130
Ba	<DL	15	40
Be	<DL	<DL	<DL
Bi	<DL	<DL	<DL
Ca	152	234	363
Cd	<DL	<DL	1
Ce	<DL	<DL	33
Co	<DL	<DL	<DL
Cr	846	1180	1690
Cu	9	13	20
Fe	570	1155	2387
K	338	457	595
La	<DL	<DL	23
Li	6	14	66
Mg	32	63	110
Mn	13	83	529
Mo	<DL	16	21
Na	38540	60350	71260
Nd	<DL	23	63
Ni	117	206	1013
P	227	391	778
Pb	<DL	33	58

Table 3.1. Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3.

Analyte	Low	Mid	Hi
S	204	293	350
Sb	<DL	<DL	<DL
Se	<DL	<DL	1
Si	406	1060	3439
Sm	<DL	<DL	<DL
Sr	7	378	986
Ti	7	13	47
Tl	<DL	<DL	<DL
U	2137	8685	13180
V	<DL	<DL	<DL
Zn	18	24	34
Zr	76	131	1132
SO4	859	1300	2334
PO4	910	1630	3917
Oxalate	<DL	1050	3322
NO3	37490	57550	71010
NO2	18820	34250	40590
F	<DL	150	937
Cl	1250	1860	2262
Br	<DL	210	1117
Am	0	0	0
Co-60	0	0	0
Cs-137	54	71	111
Eu	0	0	0
Sr-90	3	265	590
Group 4 (brown)		*n = 16*	
Ag	6	41	255
Al	29000	39300	64250
As	<DL	<DL	9
B	38	66	193
Ba	<DL	18	42
Be	<DL	<DL	1

Table 3.1. Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3.

Analyte	Low	Mid	Hi
Bi	<DL	<DL	<DL
Ca	<DL	117	255
Cd	<DL	<DL	2
Ce	<DL	<DL	<DL
Co	<DL	<DL	<DL
Cr	1800	2260	3825
Cu	18	62	100
Fe	1565	2690	3770
K	483	714	860
La	<DL	<DL	<DL
Li	5	11	23
Mg	63	97	209
Mn	38	46	175
Mo	<DL	18	28
Na	70750	108500	179500
Nd	<DL	<DL	<DL
Ni	552	4640	7200
P	238	474	878
Pb	95	163	237
S	275	520	827
Sb	<DL	<DL	<DL
Se	<DL	<DL	48
Si	2870	4460	6925
Sm	<DL	<DL	<DL
Sr	10	15	254
Ti	40	86	119
Tl	<DL	<DL	<DL
U	5170	8345	16600
V	<DL	11	20
Zn	38	80	147
Zr	1519	11430	75100
SO4	952	1670	2540

Table 3.1. Cluster Summaries: "low", "mid", and "hi" Denote 10th Percentile, Median, and 90th Percentile. Groups Correspond to Clusters in Figure 3.3.

Analyte	Low	Mid	Hi
PO4	<DL	1015	2245
Oxalate	1445	2290	4595
NO3	21692	74450	90900
NO2	25950	34700	41850
F	<DL	8205	50450
Cl	1620	2255	2765
Br	<DL	<DL	489
Am	0	0	0
Co-60	0	0	1
Cs-137	84	120	154
Eu	0	0	0
Sr-90	13	21	84

Table 3.2. Agnew's Waste Types for S-107

pred. sludge ppm	R1	CWR1	CWR2	CWZr1	RSltCk	S1-SltCk	S2-SltSlr	MW
Na	36763.3	52486.5	0.0	101046.7	136662.3	195353.1	215140.8	23.0
Al	75366.8	113784.7	0.0	0.0	24974.1	31032.4	36944.3	27.0
Fe	38145.3	5942.0	0.0	5650.0	811.0	1737.0	217.7	55.8
Cr	30644.3	84.2	0.0	109.0	7922.4	3049.6	1530.1	52.0
Bi	0.0	0.0	0.0	0.0	0.9	144.2	632.3	209.0
La	0.0	0.0	0.0	0.0	0.0	1.3	2.0	138.9
Hg	0.0	527.9	0.0	317.9	0.2	1.2	2.3	200.6
ZrO(OH)2	0.0	0.0	0.0	66975.5	0.2	37.6	185.7	91.2
Pb	0.0	0.0	0.0	0.0	0.0	2.2	5.4	207.2
Ni	2005.5	47.5	0.0	61.5	616.1	576.1	155.0	58.7
Sr	0.0	0.0	0.0	0.0	0.0	2.8	2.7	87.6
Mn	0.0	0.0	0.0	0.0	16.4	1600.5	501.2	54.9
Ca	5796.7	3120.4	0.0	3014.9	2129.8	1935.1	537.4	40.1
K	224.2	45.7	0.0	5964.6	673.9	1768.9	3417.7	39.1
density	1.5	1.6	0.0	1.3	1.5	1.7	1.8	
vol % solids	4.5	8.1	0.0	10.5	13.8	55.2	99.0	
void frac	0.8	0.8	0.0	0.9	0.9	0.7	0.6	
wt.% H2O	66.1	69.4	0.0	69.2	49.6	32.1	29.9	
TOC wt. % C	0.0	0.0	0.0	0.0	0.0	0.7	1.4	
free OH-	106.7	308.7	0.0	2776.4	94.1	4373.0	7492.9	17.0
OH-	213417.7	250257.6	0.0	57708.7	73059.5	89853.1	102654.0	17.0
NO3-	1470.7	28075.0	0.0	13290.1	219926.2	274256.4	174512.6	62.0
NO2-	60582.8	35164.0	0.0	299.9	56884.2	63457.6	113847.4	46.0
CO3--	8679.1	4672.0	0.0	4514.1	3378.1	16693.8	20186.4	60.0
PO4---	0.0	0.0	0.0	0.0	30.2	6004.3	17931.2	95.0
SO4--	991.9	77.8	0.0	100.7	2743.0	13081.5	28664.2	96.1
SiO3--	224.6	449.0	0.0	0.0	2478.2	2649.1	1351.0	28.1
F-	0.0	0.0	0.0	79573.5	4.9	764.1	1507.6	19.0
Cl-	934.4	190.5	0.0	139.7	2759.6	2529.6	2016.0	35.4
C6H5O7---	0.0	0.0	0.0	0.0	51.2	3103.4	5773.4	189.1
EDTA----	0.0	0.0	0.0	0.0	1.8	2359.2	5182.6	288.1
HEDTA---	0.0	0.0	0.0	0.0	0.1	4241.3	9231.2	274.1
glycolate-	0.0	0.0	0.0	0.0	27.0	3678.0	7274.4	75.0
acetate-	0.0	0.0	0.0	0.0	2.3	173.7	439.2	59.0

Table 3.2. Agnew's Waste Types for S-107

pred. sludge ppm	R1	CWR1	CWR2	CWZr1	RSltCk	S1-SltCk	S2-SltSlr	MW
oxalate--	0.0	0.0	0.0	0.0	0.0	3.2	4.8	88.0
DBP	0.0	0.0	0.0	0.0	51.7	2454.3	4790.5	210.0
butanol	0.0	0.0	0.0	0.0	18.3	866.4	1691.1	74.1
NH3	1508.8	4.6	0.0	8890.4	351.9	155.2	209.4	17.0
NiFe(CN)6--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	270.6
Pu (μCi/g)	0.0	1.6	2.9	0.5	0.1	0.1	0.0	
U (μg/g)	3461.6	28167.6	61857.9	392.3	5561.3	3536.0	1081.0	238.0
Cs (μCi/g)	53.4	2.1	2.3	1.0	194.7	176.8	295.4	
Sr (μCi/g)	703.4	1.7	1.9	0.8	175.7	116.8	34.4	

3.3 PRINCIPAL COMPONENT ANALYSIS

Principal components analysis provides a way to determine combinations of variables that drive the clustering. Again, the points can be envisioned as members of p-dimensional space. However, because of correlation among variables, the true dimensionality of the space may be much smaller than the number of variables. Image points lying along a line in 3-dimensional space which passes through the origin. The line has one dimension though it takes three coordinates to describe the location of points along it. The description of a point can be reduced to one coordinate by rotating the axes of the space so that the line becomes one of the axes. Principal components analysis provides a method to determine the rotation.

The objective in principal components analysis is to describe the space in terms of eigenvalues and orthogonal eigenvectors. The eigenvectors define the new axes while the eigenvalues describe the variation in the data set along these new axes. The most significant axes are associated with the largest eigenvalues. Hopefully, many of the eigenvalues are very small relative to the others. These identify insignificant axes and result in a reduction of the dimensionality of the space.

The elements of an eigenvector are coefficients (loadings). The magnitude of the these loadings identify the variables that contribute most to the variability in the dataset while accounting for correlation. Figure 3.4 presents the loadings for the first eight principal components of the S-107 dataset. Note that the first through fifth principal components account for 82% of the variation.

The loadings in a linear combination with the original variables project (score) the point from the original space onto the new axis (eigenvector). Scatterplots of the principal component scores help visualize the clusters identified in the cluster analysis. The plots also help identify remote points in space that might not be identified easily by other means. Figure 3.5 presents all possible scatterplots of the first five components.

Using a combination of Figures 3.4 and 3.5 one gets a good understanding of the key analytes for the different groups. For instances, from the scatterplots, we see that group 1 separates itself from the other groups, and that it has a negative effect from principal component 2 (PC2) (i.e., Cr and P have high values as shown in Table 3.1). Group 3 seems to have a high effect from PC1 (i.e., high concentrations for Al, U, and Sr-90).

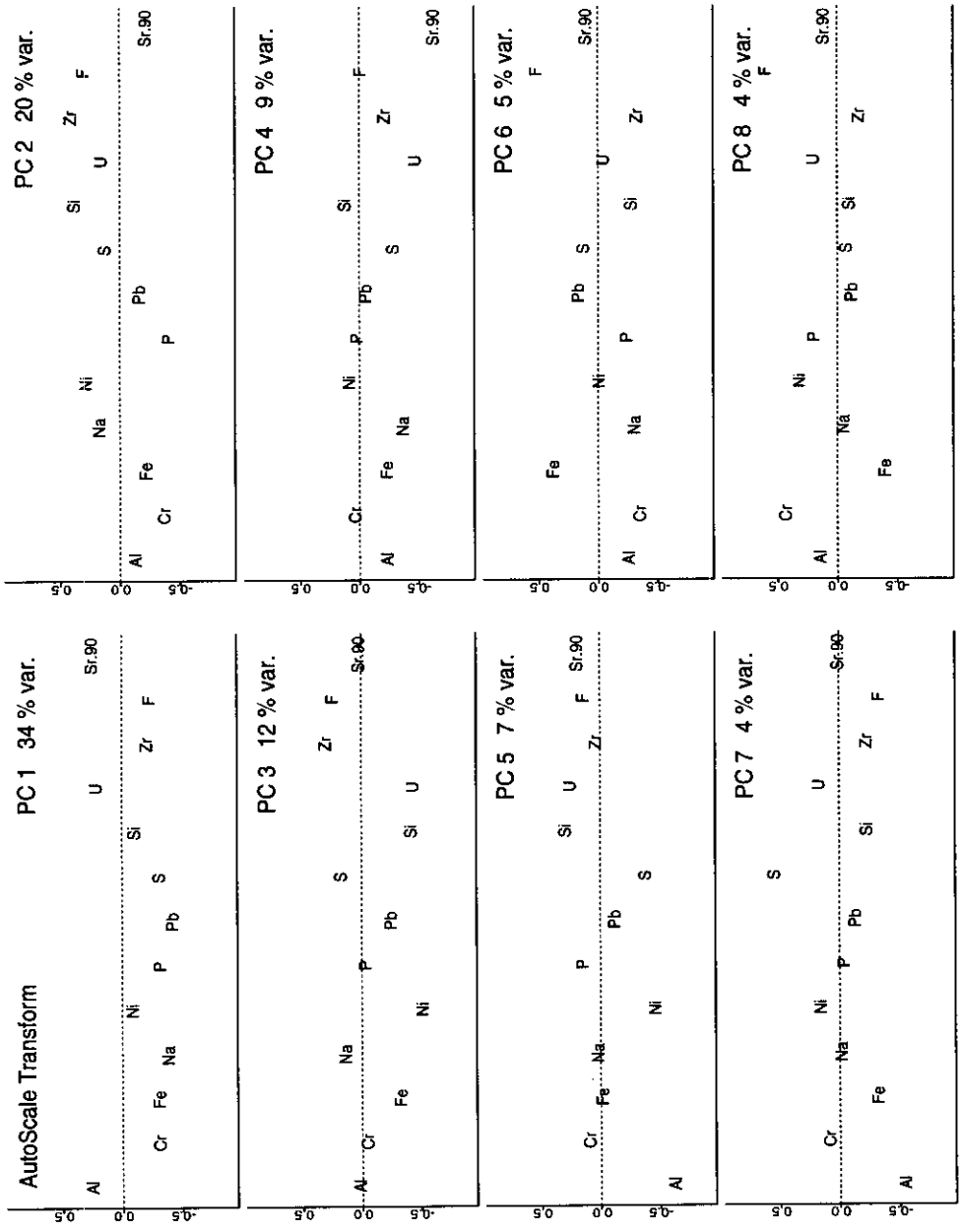


Figure 3.4 Loadings from the Principal Component Analysis on the Autoscaled Date

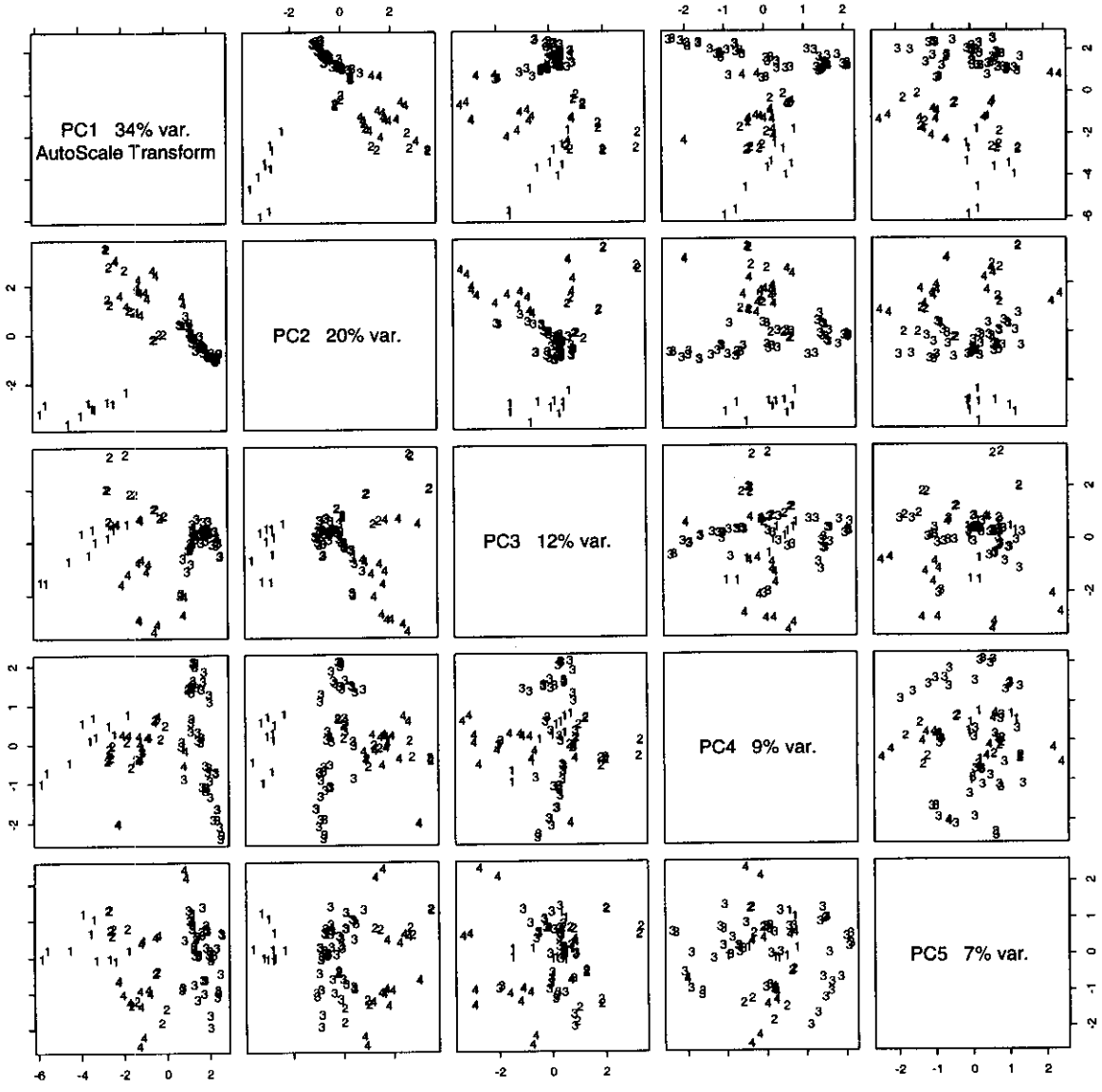


Figure 3.5 All Pairs Scatterplots of the First Five Principal Components

4.0 HISTORICAL COMPARISON

In order to gain a good understanding of the contents of each tank, an estimate of concentration based on historical information has been done using the "Agnew" model (Agnew 1995). The results of the model are being compared to sampled data from several of the tanks. The goal is to validate the model which may lead to less sampling in the future. This section describes two methods of doing the comparison of the Agnew model to sampled data from S-107.

Table 4.1 displays the composite results of the sample-based data (see Section 2.1) along with a historical estimate based on the Agnew Model (Agnew 1995). A 95% confidence interval about the sampled mean is presented along with the minimum and maximum sampled values. The lower limit of the confidence interval has not been truncated to zero. The actual interval is shown, even if negative, to show the true distribution. This interval is not only used to compare the Agnew results with the sampled data, but can also be used to test the hypothesis that the actual concentration is greater than zero. If the 95% CI contains zero, then we are not able to say, with much probability, that the actual concentration is greater than zero. From this table and using the assumption that the sampled data are normally distributed (assumed in the construction of the confidence interval), it is possible to evaluate the model based on the sampled results. The model would be said to be in good agreement with the sampled results if the modeled results (Agnew) were bounded by the confidence interval. This comparison can be done on an analyte by analyte basis. However, to say that the model, in general, is in good agreement is very subjective (e.g., does 75% of the values have to fall within the confidence interval to validate the model?).

Another comparison between the sampled data and the Agnew results has been developed using monte carlo simulation (Hartley et al. 1996). These results are currently being used to compare sample-based data with the historical-based data in a more appropriate manner. In the past, historical-based estimates, obtained from the Hanford Defined Wastes (HDW) model (Agnew 1995), and sample-based estimates were generally compared using the relative percent differences between the two (Heasler et al, 1994). Only simple comparisons of this type were possible, because no uncertainty estimate was available for the Historical Tank Content Estimate (HTCE, estimates obtained from the HDW model). Now HTCE uncertainty estimates are available, and can be seen in columns 2 and 3 of Table 4.2.

The monte carlo simulations are performed on both the sampled data and using the Agnew model. The core composite concentration and uncertainty estimate (Section 2.1) were used to simulate sampled data. Distributions were placed on several of the input parameters for the Agnew model. One thousand simulations were then performed using the sampled data and the Agnew model. The simulated results were then randomly paired and subtracted. The results of the simulation are shown in Table 4.2, where **HTCE:MC** represents the simulations using the Agnew model, **Sampling** represents the simulations with the sampled values, and **Difference** represents the difference in the paired simulation results. Several statistical calculations were performed on the differences and are listed in the **Difference** section: the mean difference

(Average), 2.5 percentile (Lower 95% CI), 97.5 percentile (Upper 95% CI) and a check to see if zero is contained in the difference distribution (Contains zero?).

The actual comparison/differences of the two estimates (HTCE:MC - Sampled) will not be included in the current TCRs being written, because the comparisons are still in the process of being completed. However, the estimates are being reported elsewhere and future versions of the TCR will reflect the progress made toward a more complete comparison of the two types of information for this tank. This method of comparison, when completed, is superior to simply looking at the relative percent differences or confidence intervals because it takes into account the quantified variabilities associated with each value. With the old method, it is highly possible to conclude that the two estimates are different, when in reality they are statistically indistinguishable if the quantified variabilities are taken into consideration.

It should be noted that the sample-based estimates used in this comparison were all derived from ICP acid results, where available. Also, some of the analyte concentrations had to be converted to another form in order to make proper comparisons. The following adjustments were made:

- Phosphorus and sulfur (from ICP results) were converted to total phosphate (PO_4) and total sulfate, respectively, for the sample-based estimates in order to match what is provided in the historically based estimates. This conversion was necessary because ion chromatography (the method used for measuring phosphate and sulfate in the sampling data) measures only the soluble portion of phosphate and sulfate. The HDW model provides an estimate for total phosphate and total sulfate (which includes both the soluble and insoluble portion of the results). Converting sampling results from their ICP estimates provided a measure of total phosphate and total sulfate, and a more appropriate comparison with the HTCE:MC for phosphate and sulfate. Phosphorus can be converted to total phosphate by multiplying by 3.06. Sulfur can be converted to total sulfate by multiplying by 3 (based on molecular weights).

- Silicon results are provided in the historical estimates as silicate, while the sample-based estimates provide them as silicon. Converting the sample-based estimate of silicon to silicate allowed a more appropriate comparison with the HTCE:MC for silicate. The sampling estimates were converted to silicate by multiplying the estimate for silicon by 2.71 (based on molecular weights).

- Nickel was used as the sample-based estimate for comparison with FeCN, since there is a direct historical stoichiometric relationship between the two analytes. Nickel replaced FeCN because Nickel was used to precipitate the FeCN.

Table 4.1. Agnew and Sample-Based Estimate Comparisons

Analyte	Method	Mean ($\hat{\mu}$)	Unit	RSD ($\hat{\mu}$)	95% Confidence Interval Lower	Upper	Min	Max	Agnew
Bromide	IC-Dionex	1700.4	µg/g	35.6	197.2	3203.6	483.6	2350.0	NA
Chloride	IC-Dionex	1916.7	µg/g	4.4	1708.5	2124.8	1590.0	2120.0	1390.0
Fluoride	IC-Dionex	13978.0	µg/g	11.0	10147.0	17810.0	7270.0	17200.0	3350.0
Nitrate	IC-Dionex	57950.0	µg/g	3.3	53131.0	62769.0	50100.0	62900.0	59200.0
Nitrite	IC-Dionex	30083.0	µg/g	3.3	27583.0	32583.0	26500.0	32700.0	38200.0
Phosphate	IC-Dionex	24302.0	µg/g	47.6	-4412.6	53016.0	8490.0	81600.0	1170.0
Sulfate	IC-Dionex	2793.3	µg/g	17.9	1552.9	4033.8	1770.0	3440.0	3850.0
Phosphorus	ICP:A	2106.0	µg/g	53.7	-702.5	4914.5	755.0	7740.0	NA
Aluminum	ICP:A	59383.0	µg/g	6.7	49552.0	69214.0	49200.0	70200.0	83300.0
Boron	ICP:A	100.4	µg/g	25.7	36.3	164.5	47.2	162.0	NA
Cadmium	ICP:A	4.0	µg/g	12.8	2.7	5.2	2.6	4.8	NA
Calcium	ICP:A	522.5	µg/g	4.2	468.4	576.6	486.0	576.0	3480.0
Chromium	ICP:A	2836.7	µg/g	3.6	2583.9	3089.4	2430.0	3070.0	8040.0
Copper	ICP:A	27.3	µg/g	3.6	24.9	29.8	25.5	31.9	NA
Iron	ICP:A	2276.7	µg/g	6.0	1939.6	2613.7	1990.0	2790.0	12800.0
Lead	ICP:A	126.5	µg/g	10.1	94.7	158.3	104.0	153.0	8810.0
Lithium	ICP:A	21.4	µg/g	15.7	13.1	29.7	16.3	28.2	NA
Magnesium	ICP:A	133.3	µg/g	3.9	120.6	146.1	120.0	144.0	NA
Manganese	ICP:A	587.3	µg/g	10.1	439.9	734.8	458.0	726.0	29.6
Molybdenum	ICP:A	21.6	µg/g	5.1	18.9	24.3	19.5	23.3	NA
Neodymium	ICP:A	48.0	µg/g	3.5	43.8	52.1	44.3	52.1	NA
Nickel	ICP:A	1398.8	µg/g	25.9	497.9	2299.8	771.0	2230.0	569.0
Potassium	ICP:A	547.2	µg/g	6.9	453.8	640.6	468.0	649.0	625.0
Silicon	ICP:A	1278.2	µg/g	20.0	642.4	1913.9	623.0	2340.0	547.0

Table 4.1. Agnew and Sample-Based Estimate Comparisons

Analyte	Method	Mean ($\hat{\mu}$)	Unit	RSD ($\hat{\mu}$)	95% Confidence Interval Lower	Upper	Min	Max	Agnew
Silver	ICP:A	19.1	µg/g	24.9	7.2	30.9	4.4	36.8	NA
Sodium	ICP:A	92700.0	µg/g	5.8	79449.0	105950.0	81200.0	102000.0	84400.0
Strontium	ICP:A	259.3	µg/g	8.4	205.1	313.5	215.0	292.0	NA
Titanium	ICP:A	37.7	µg/g	17.6	21.2	54.2	24.0	52.2	NA
Uranium	ICP:A	7378.3	µg/g	11.0	5356.5	9400.2	5800.0	8870.0	16800.0
Zinc	ICP:A	233.7	µg/g	17.0	135.1	332.2	175.0	319.0	NA
Zirconium	ICP:A	4458.0	µg/g	28.3	1319.7	7596.3	218.0	9220.0	2680.0
Oxalate	IC-Dionex	2525.0	µg/g	12.7	1731.4	3318.6	1880.0	3450.0	0.4
Cesium-137	GEA	78.2	µCi/g	7.4	63.9	92.5	65.8	91.9	56.7
Cobalt-60	GEA	0.1	µCi/g	26.6	0.0	0.1	0.0	0.1	NA
Strontium-89/90	High Level	174.0	µCi/g	19.1	91.3	256.7	115.0	269.0	193.0
Alpha	Digested Solid	1.0	µCi/g	8.4	0.8	1.2	0.9	1.2	NA
Sulfur	ICP:A	463.3	µg/g	16.8	269.4	657.3	342.0	632.0	NA
%Water	TGA Mettler	36.1	%	10.2	27.0	45.2	26.9	42.5	45.1

Table 4.2. HTCE:MC and Sample-Based Estimate Comparisons

Analyte	HTCE:MC Estimate	HTCE:MC RSD	Sampling Estimate	Sampling RSD	Difference Average	Difference 95% Confidence Interval Lower	Difference 95% Confidence Interval Upper	Contains zero?
Na	52500.0	5.3	92700.0	5.8	-39900.0	-53000.0	-28300.0	N
Al	101000.0	8.1	59400.0	6.7	41800.0	26400.0	62800.0	N
Fe	12000.0	63.0	0.0	NA	NA	NA	NA	NA
Cr	11000.0	53.3	2840.0	3.6	8110.0	-1510.0	21100.0	Y
Bi	0.0	2.9	NA	NA	NA	NA	NA	NA
La	0.0	NA	NA	NA	NA	NA	NA	NA
Pb	0.0	2.9	126.0	10.1	-126.0	-150.0	-101.0	N
Mn	0.9	2.9	587.0	10.1	-583.0	-705.0	-463.0	N
Ca	572.0	11.0	522.0	4.2	49.1	-65.4	166.0	Y
NO3	30400.0	5.3	58000.0	3.4	-27600.0	-32400.0	-22500.0	N
NO2	41800.0	6.0	30100.0	3.4	11800.0	5290.0	16400.0	N
CO3	866.0	10.9	0.0	NA	NA	NA	NA	NA
PO4	1.6	2.9	6440.0	53.7	-6320.0	-13000.0	795.0	Y
SO4	582.0	7.2	1390.0	16.9	-805.0	-1290.0	-338.0	N
Si	391.0	4.5	3490.0	19.9	-3060.0	-4380.0	-1710.0	N
Cl	845.0	7.2	1920.0	4.4	-1070.0	-1290.0	-870.0	N
FeCn	0.0	NA	1400.0	25.9	-1400.0	-2130.0	-715.0	N
Pu	0.4	9.8	0.0	NA	NA	NA	NA	NA
U	2130.0	6.9	7380.0	11.0	-5240.0	-6890.0	-3640.0	N
Cs	32.6	7.0	78.2	7.4	-45.9	-58.2	-34.0	N
Sr	271.0	29.2	174.0	19.1	96.1	-35.1	305.0	Y
H20	70.6	2.0	0.0	NA	NA	NA	NA	NA
TOC	0.0	2.9	36.1	10.2	-36.2	-42.8	-29.1	N

5.0 PROFILE PLOTS

This section contains univariate plots of the sampled data (profile plots). For these plots, the primary and duplicate results are plotted at there location within the tank (i.e., segment and core). The data are represented by a circle, however, a value represented by a triangle implies that the value is less than the detection limit and is replaced by the detection limit. The average of the primary and duplicate results are connected with a dashed line. The scale is selected to cover the range of values combining the different cores and is different for each analyte.

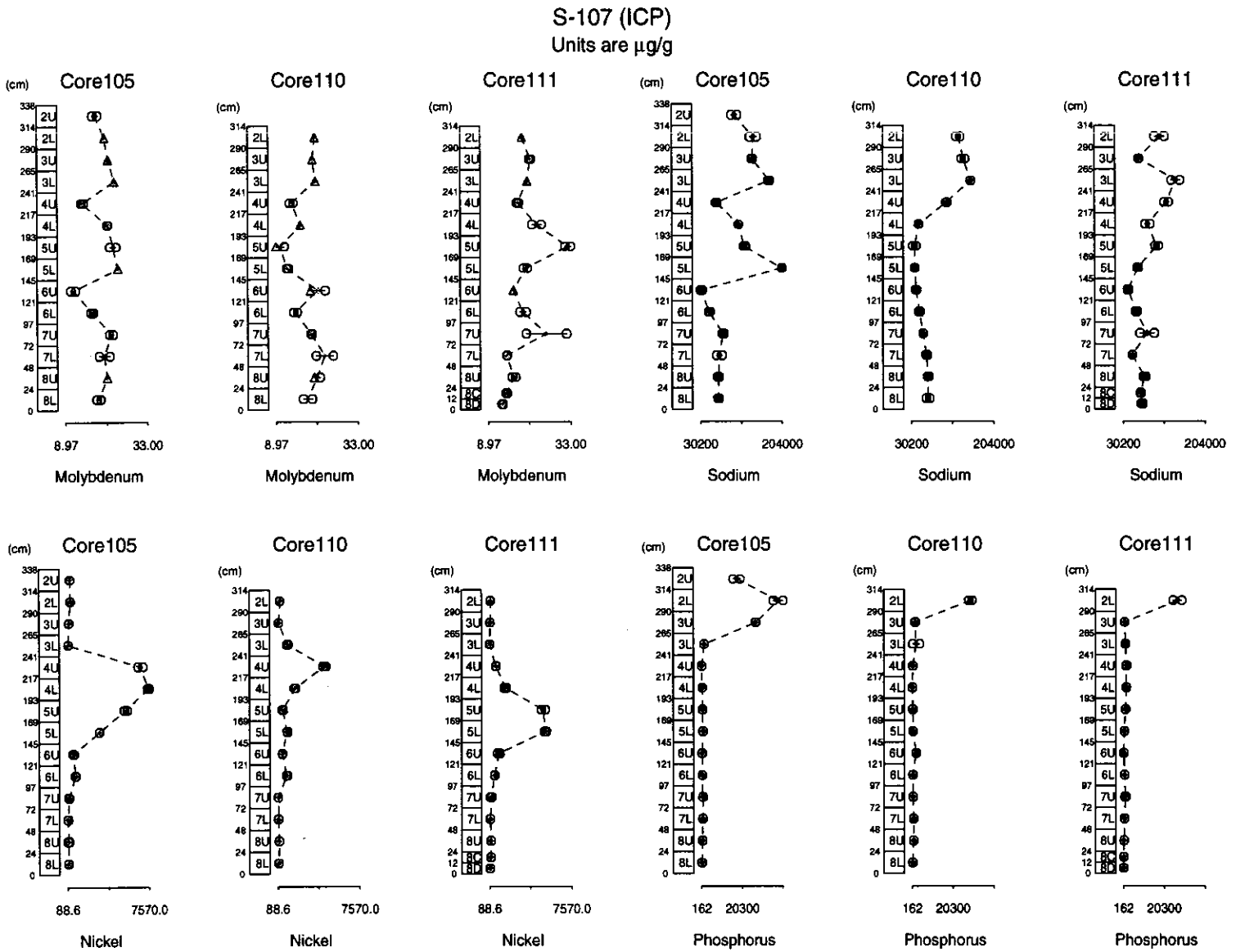


Figure 5.1 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

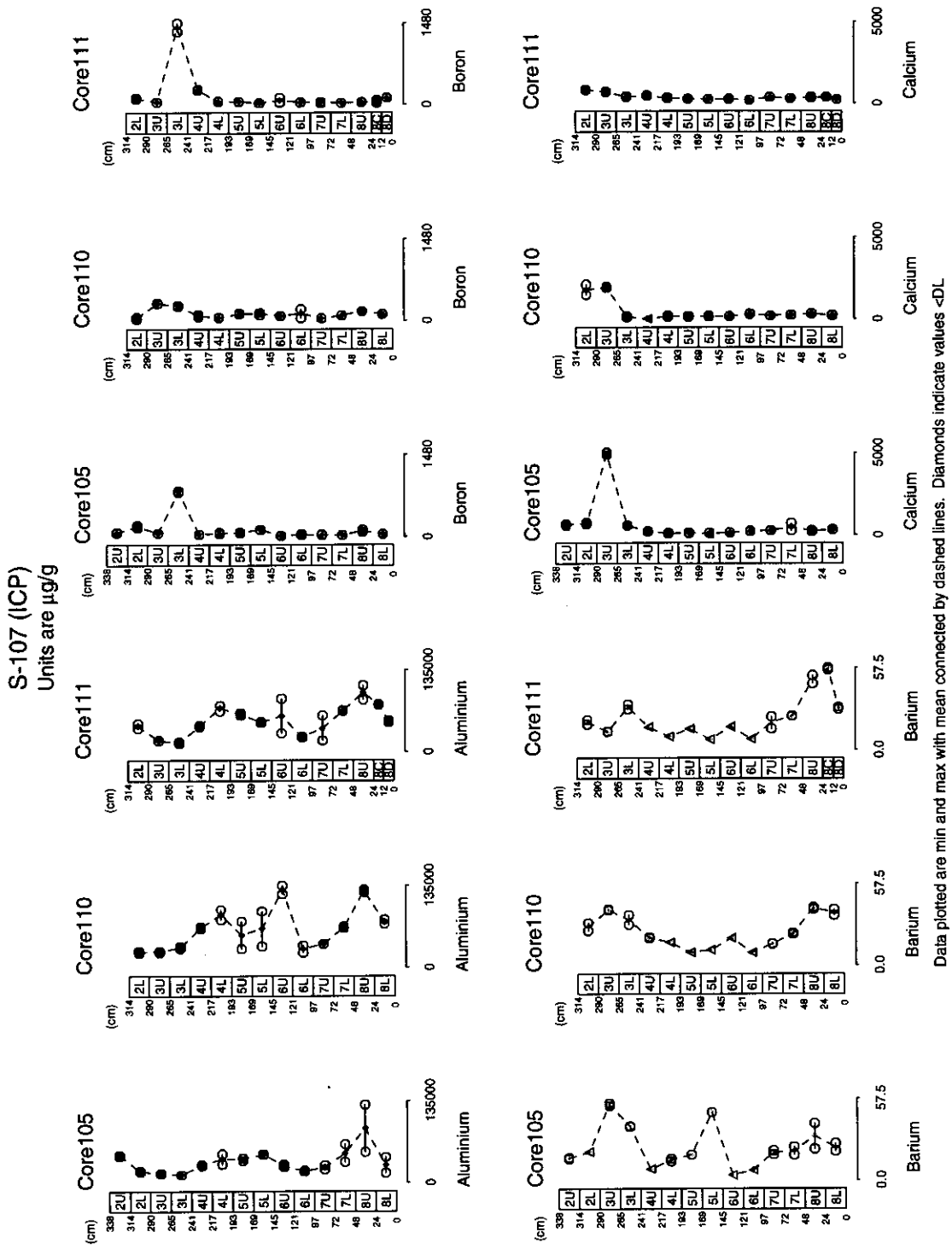


Figure 5.2 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

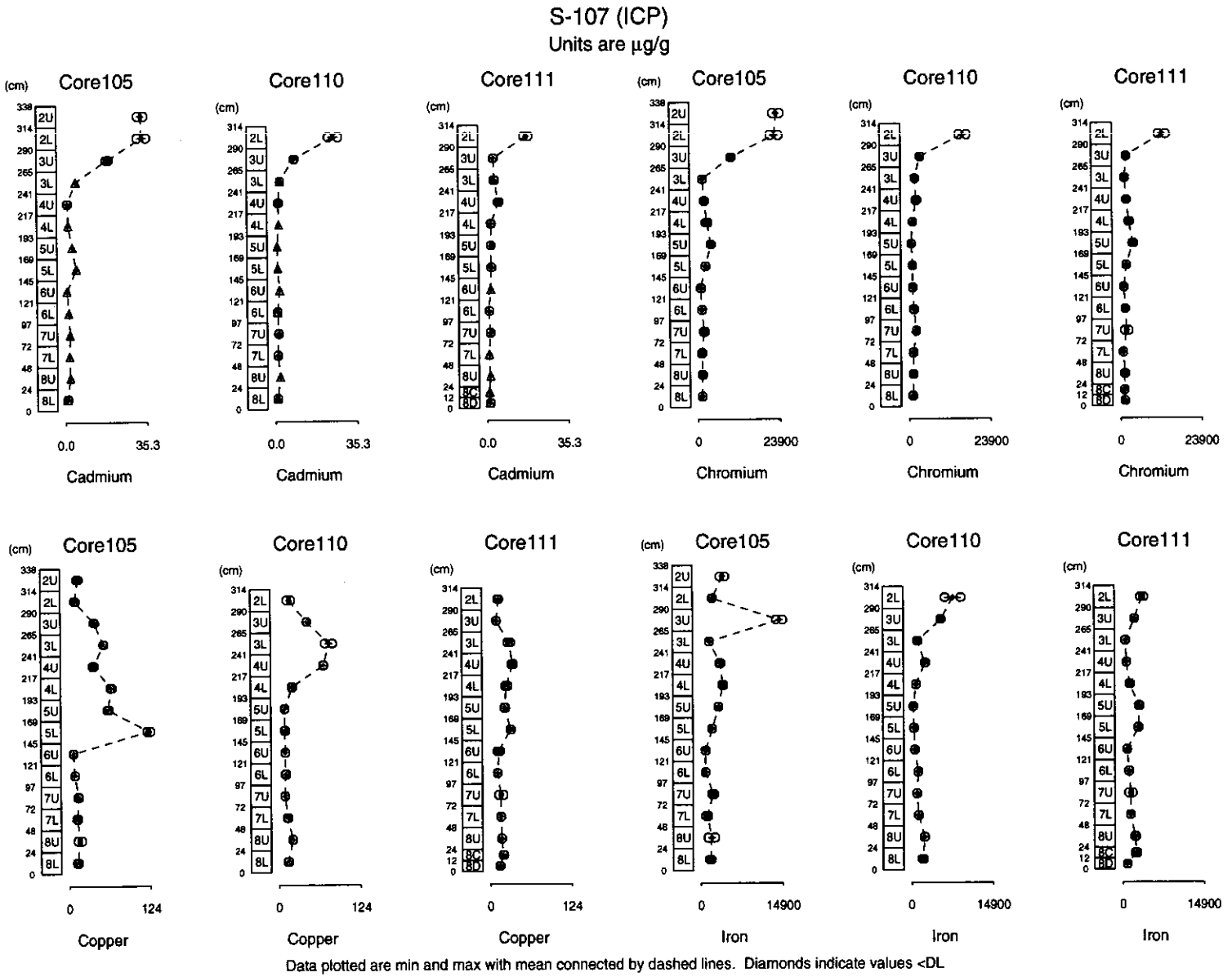


Figure 5.3 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

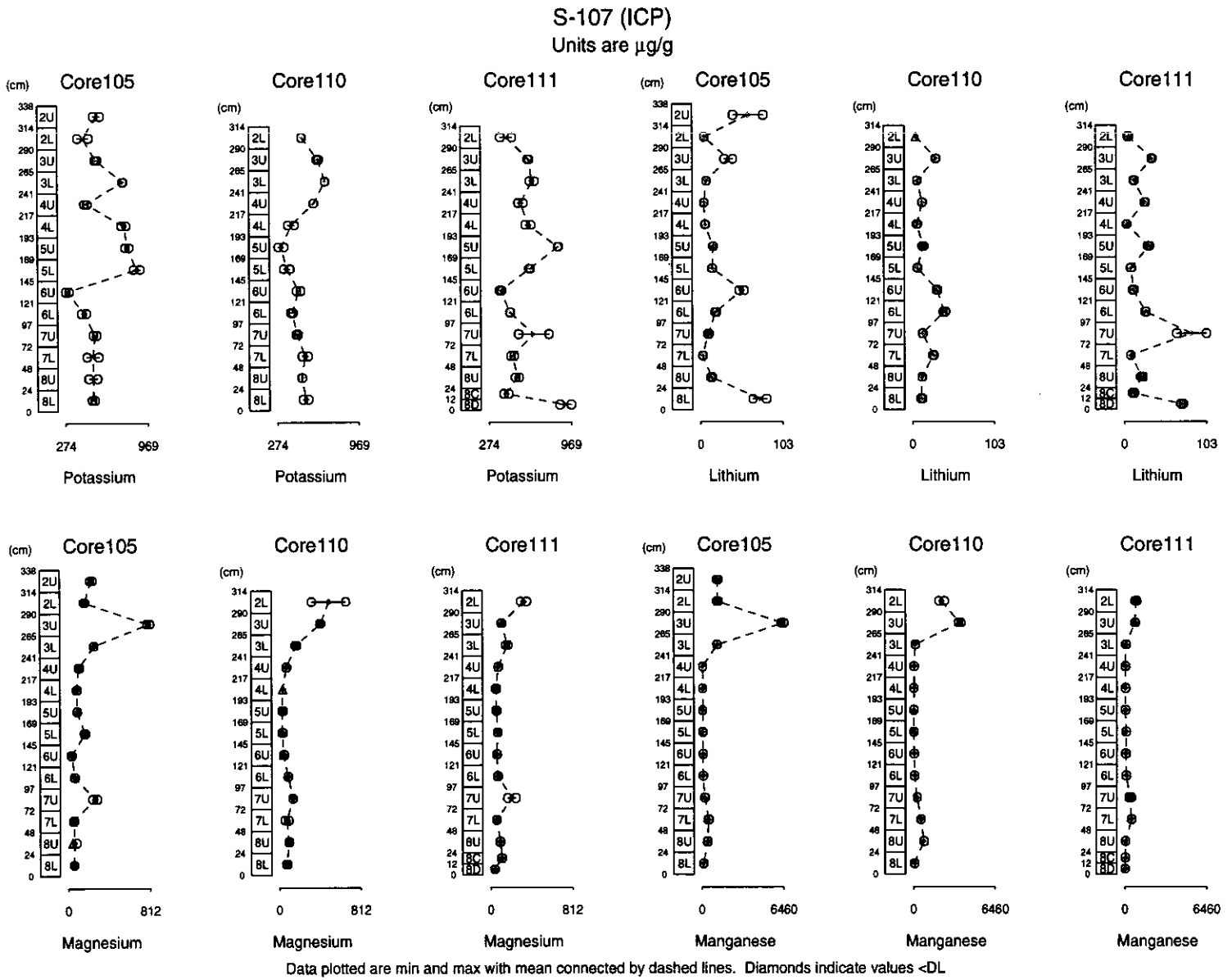


Figure 5.4 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

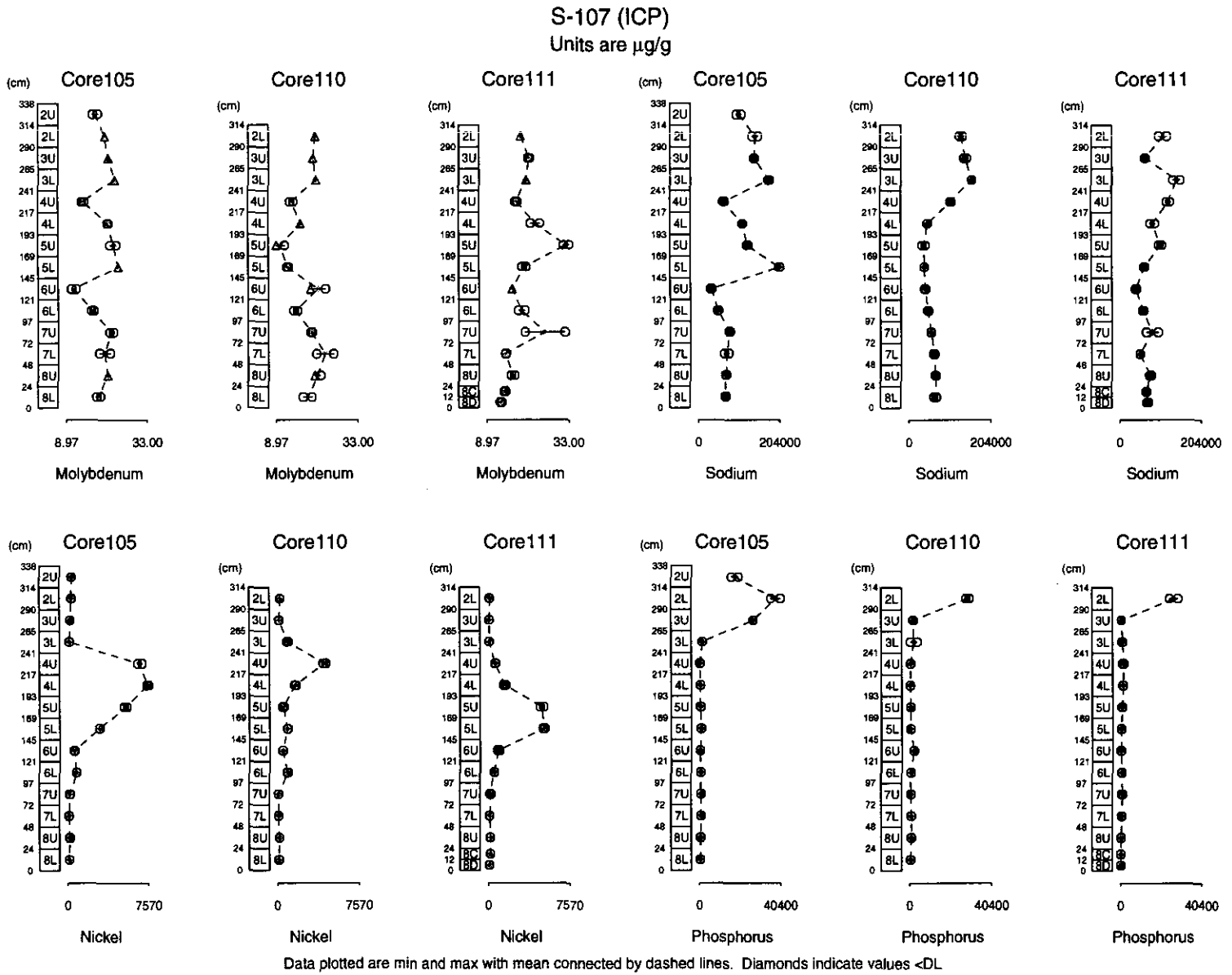


Figure 5.5 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

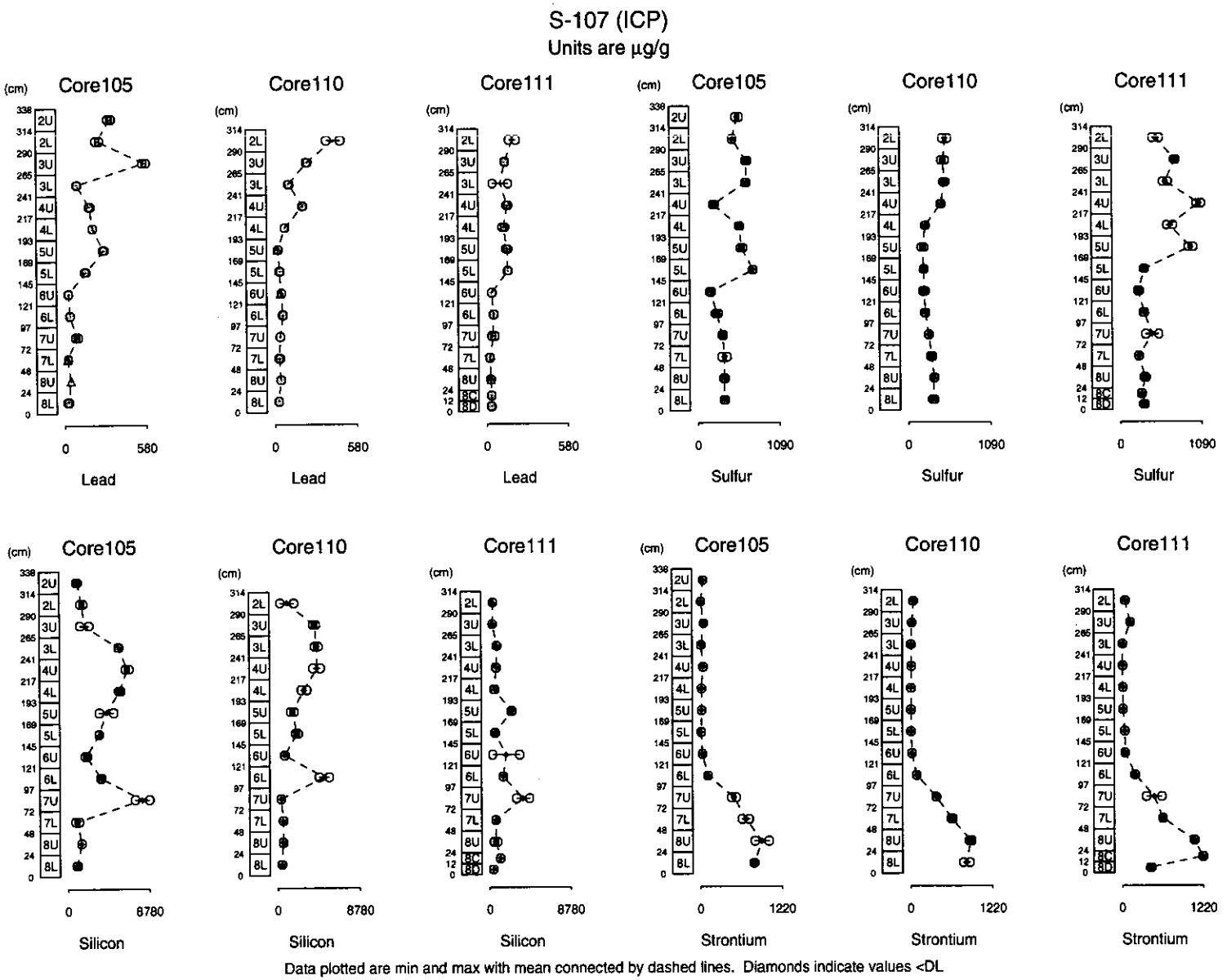


Figure 5.6 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

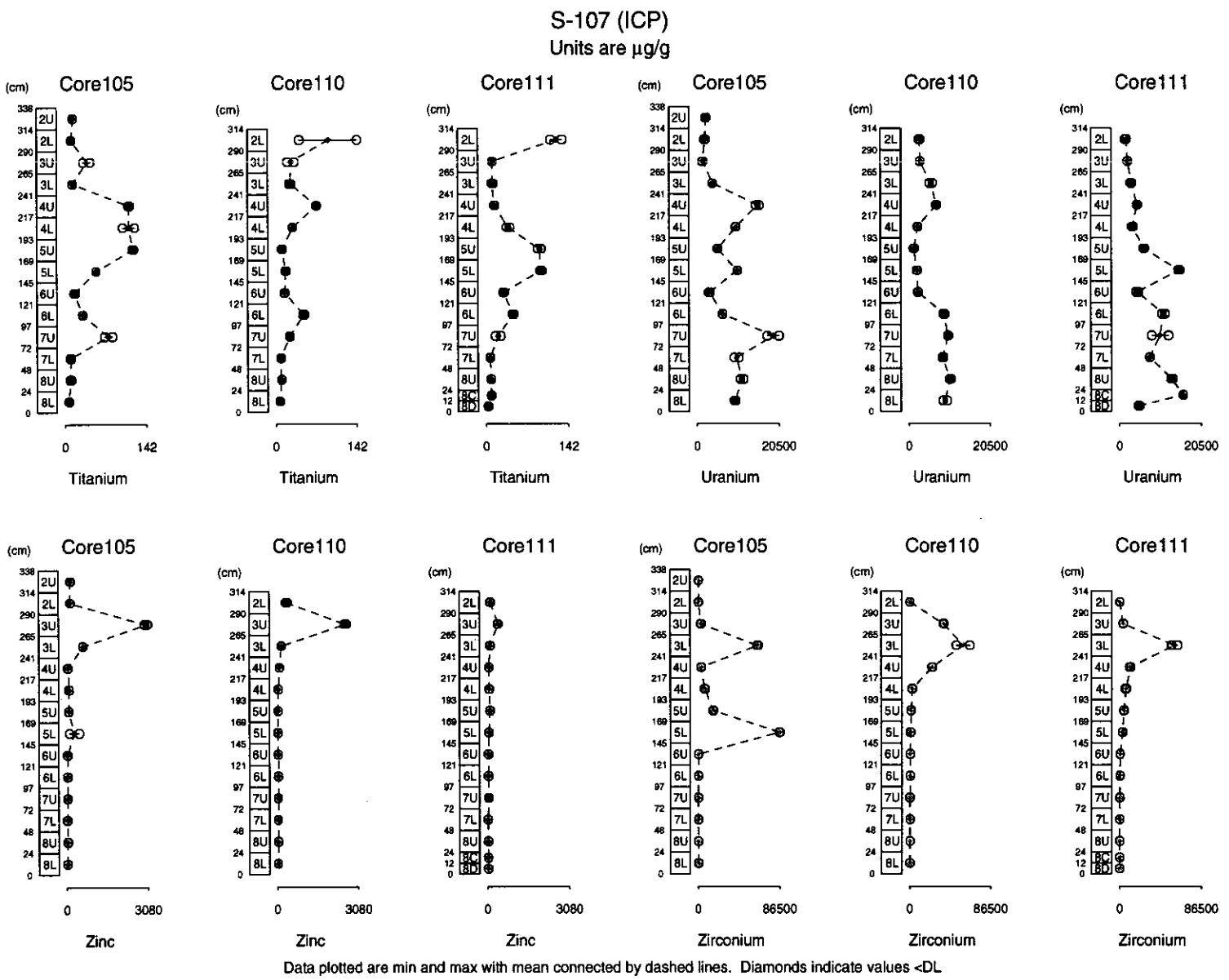


Figure 5.7 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

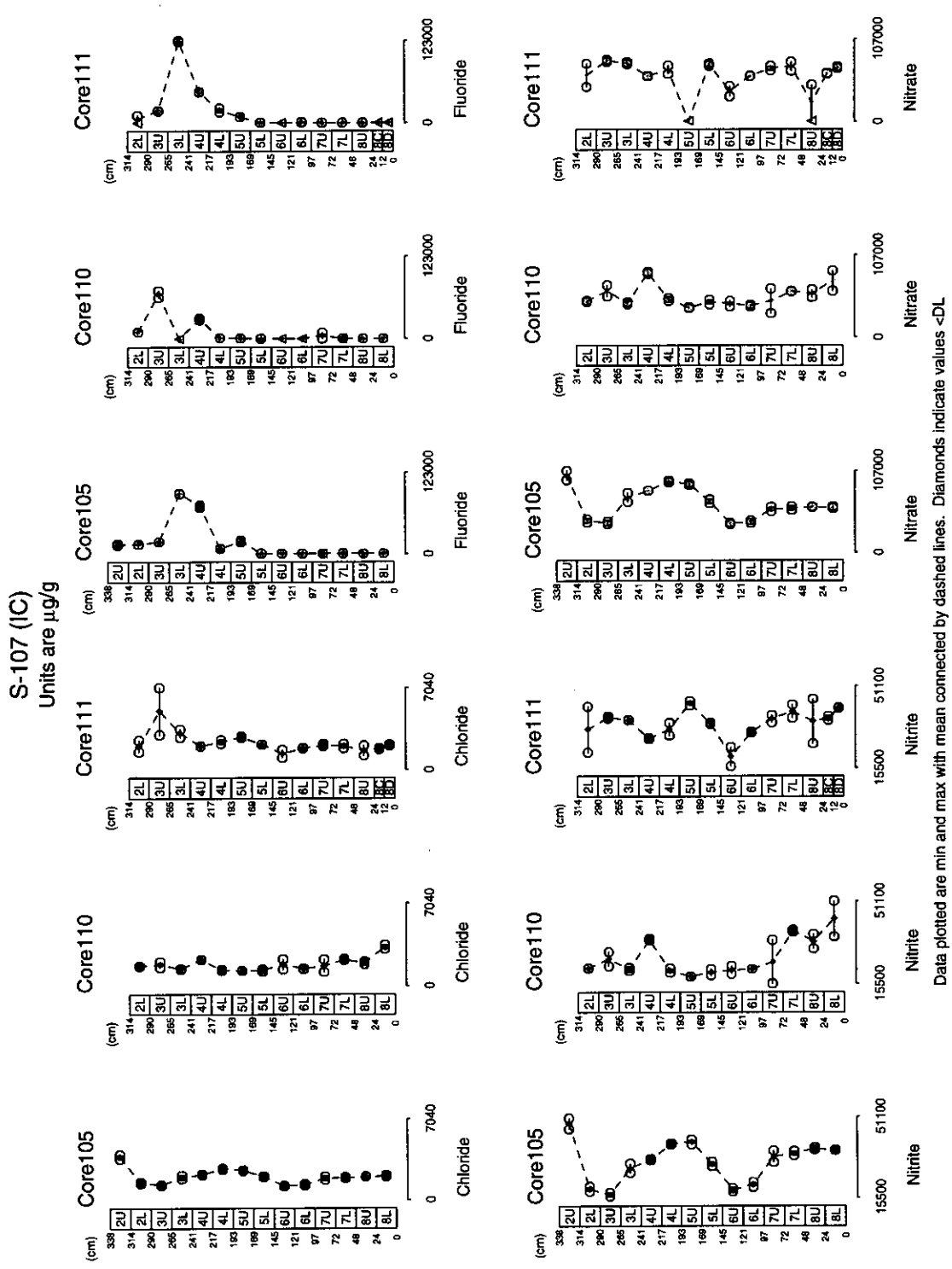


Figure 5.8 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

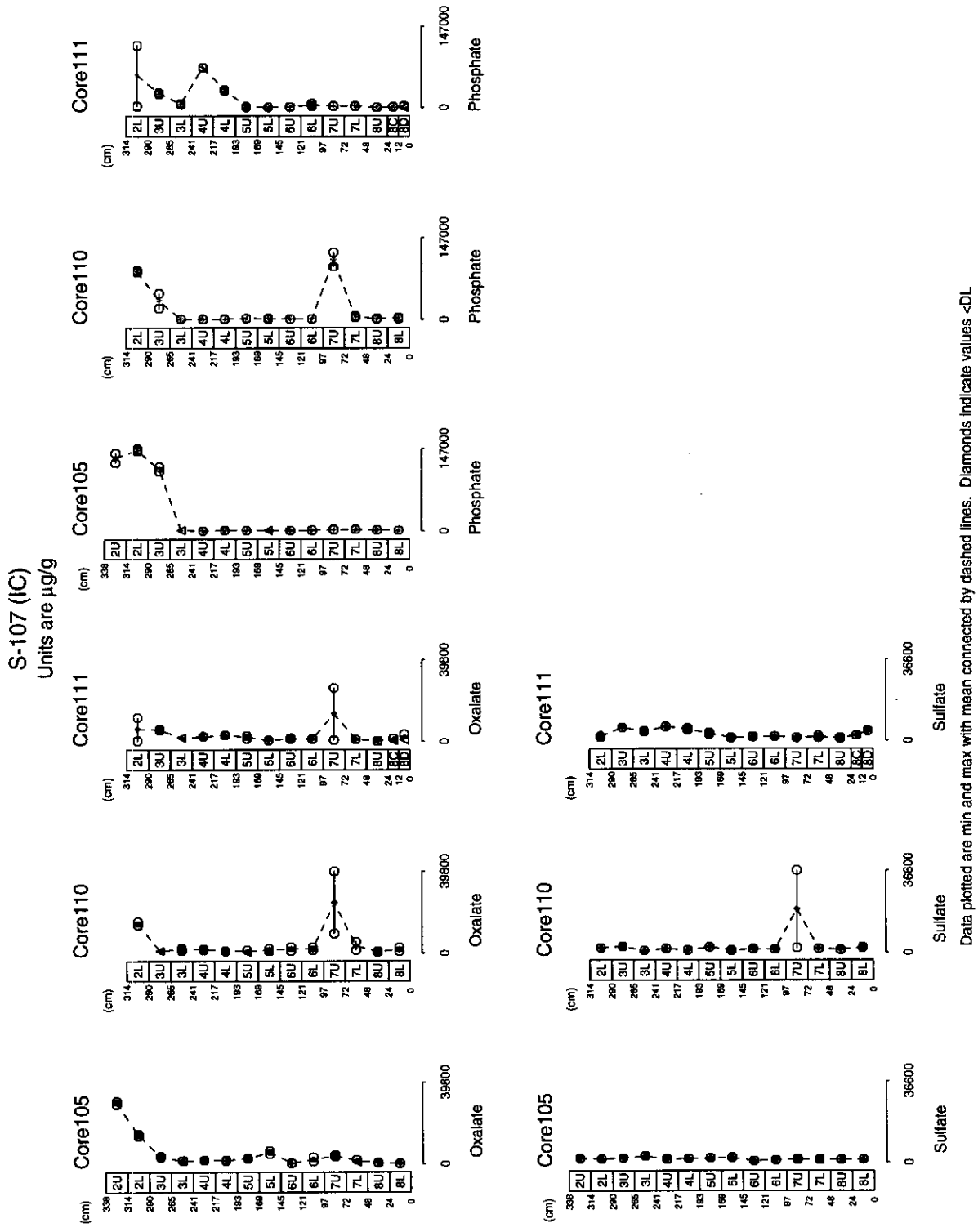


Figure 5.9 Profile Plots for each Analyte (µg/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

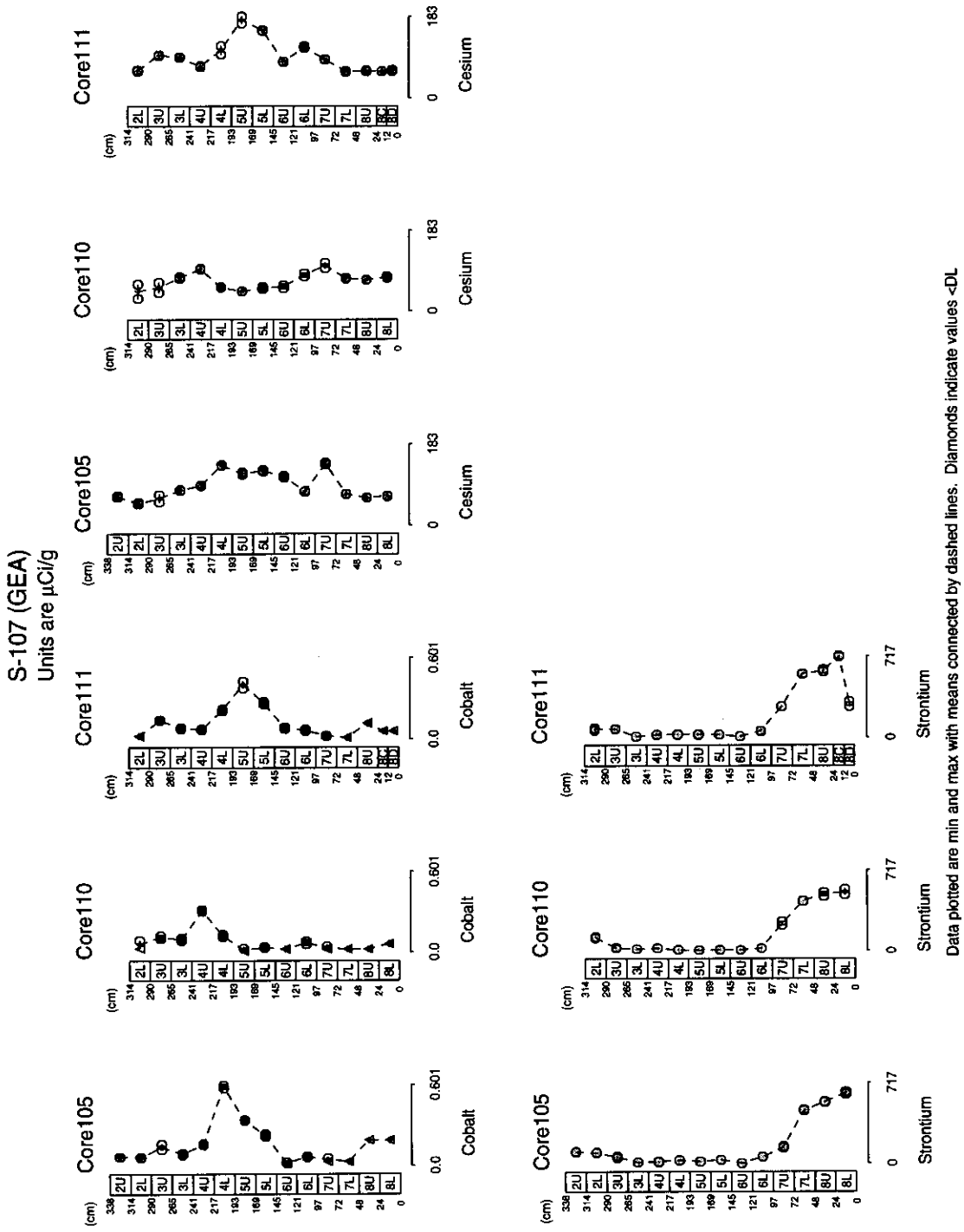


Figure 5.10 Profile Plots for each Analyte (µCi/g), Minimum and Maximum Values are Plotted for each Analyte with the Average Connected by a Dashed Line

6.0 REFERENCES

Agnew, S. F. 1996, *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev 3.* LA-UR-96-858, Rev. 2, Los Alamos National Laboratory, Los Alamos, New Mexico.

Agnew, S. F., 1995, *Hanford Defined Wastes: Chemical and Radionuclide Compositions.* LA-UR-94-2657, Rev. 2, Los Alamos National Laboratory, Los Alamos, New Mexico.

Hartley, S. A., G. Chen, K. M. Remund, C. A. LoPresti, A. M. Liebetrau, 1996, *A Comparison of Historical Tank Content Estimate (HTCE) Model and Sample-Based Estimates of Hanford Waste Tank Contents.* (in press at PNNL), PNNL, Richland, Washington.

Hartley, S. A., K. M. Remund, B. C. Simpson, R. D. Cromar, C. M. Anderson, 1995, *Statistical Supplement to the Tank Characterization Reference Guide*, WHC-SD-WM-TI-648, Westinghouse Hanford Company, Richland, Washington.

Heasler, P. G., K. M. Remund, J. M. Tingey, D. B. Baird, F. M. Ryan, 1994, *Tank Characterization Report for Single-Shell Tank B-201*, PNL-10100, Pacific Northwest Laboratory, Richland, Washington.

Jensen, L., and A. M. Liebetrau, 1988, *Statistical Techniques for Characterizing Single-Shell Tank Wastes.* WHC-SA-0348-FP, Westinghouse Hanford Company, Richland, Washington.

Paterson, H.D. and R. Thompson. 1971. "Recovery of Inter-Block Information when Block Sizes are Unequal." *Biometrika*, 58, 545-554.

This page intentionally left blank.