ENGINEERING CHANGE NOTICE

0050718

1. ECN 653560

Proj. ECN S

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	R. P. Anantatmula, Data Assessment and Interpretation, R1-30, 373-0785	[] Yes [X] No	04/27/99
	6. Project Title/No./Work Order No. Tank 241-S-102	7. Bldg./Sys./Fac. No. 241-S-102	8. Approval Designator N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-SD-WM-ER-611, Rev. 0-B	10. Related ECN No(s). ECNs: 163505, 649907	11. Related PO No. N/A

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

13a. Description of Change

13b. Design Baseline Document? [] Yes [X] No

The document has been totally revised to include the results of recent sampling to address technical issues associated with the waste, and to update the best basis standard inventory.

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14a. Justification (mark one)

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

14b. Justification Details

Changes required to incorporate new sampling data.

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

See attached distribution.

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1. ECN (use no. from pg. 1): ECN-653560

16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

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

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

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

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

21. Approvals

	Signature	Date		Signature	Date
Design Authority			Design Agent		
Cog. Eng. R.P. Anantatmula	R.P. Anantatmula	4/29/99	PE		
Cog. Mgr. K.M. Hall	Kathleen M. Hall	5/6/99	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other J.W. Cammann	JW Cammann	4/29/99	Other		
R.J. Cash	RJ Cash	5/6/99	DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

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Tank Characterization Report for Single-Shell Tank 241-S-102, HNF-SD-WM-ER-611, Rev. 1		ECN No. ECN-653560

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
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Sandia National Laboratory P.O. Box 5800 MS-0744, Dept. 6404 Albuquerque, NM 87815					
D. Powers		X			
Nuclear Consulting Services Inc. P. O. Box 29151 Columbus, OH 43229-01051					
J. L. Kovach		X			
Chemical Reaction Sub-TAP P.O. Box 271 Lindsborg, KS 67456					
B. C. Hudson		X			
SAIC 555 Quince Orchard Rd., Suite 500 Gaithersburg, MD 20878-1437					
H. Sutter		X			
Los Alamos Laboratory CST-14 MS-J586 P. O. Box 1663 Los Alamos, NM 87545					
S. F. Agnew		X			
Tank Advisory Panel 102 Windham Road Oak Ridge, TN 37830					
D. O. Campbell		X			

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DOE/RL Reading Room	H2-53	X			
DE&S Hanford, Inc.					
G. D. Johnson	S7-73	X			
Fluor Daniel Hanford Corporation					
J. S. Hertzel	H8-67	X			
Lockheed Martin Hanford, Corp.					
R. P. Anantatmula	R1-30	X			
J. W. Cammann	R2-11	X			
J. G. Field	R2-12	X			
R. E. Larson	T4-07	X			
L. M. Sasaki	R2-12	X			
B. C. Simpson	R2-12	X			
R. R. Thompson	R2-12	X			
ERC (Environmental Resource Center)	R1-51	X			
T.C.S.R.C.	R1-10	5			
Lockheed Martin Services, Inc.					
B. G. Lauzon	R1-08	X			
Central Files	B1-07	X			
EDMC	H6-08	X			
Numatec Hanford Corporation					
J. S. Garfield	R3-73	X			
D. L. Herting	T6-07	X			
Pacific Northwest National Laboratory					
A. F. Noonan	K9-91	X			
Scientific Applications International Corporation					
M. D. LeClair	R3-75	X			

S

Tank Characterization Report for Single-Shell Tank 241-S-102

R. P. Anantatmula
Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract 8023764-9-K001

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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-102. This report supports the requirements of the Tri-Party Agreement Milestone M-44-15C.

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Lockheed Martin Hanford Corp.

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LIST OF TERMS

ANOVA	analysis of variance
Btu/hr	British thermal units per hour
Ci	curie
Ci/L	curies per liter
CI	confidence interval
cm	centimeter
c/s	counts per second
df	degrees of freedom
DL	drainable liquid
DQO	data quality objective
DSC	differential scanning calorimetry
DST	double-shell tank
DW	dry weight
ft	foot
ft^3/min.	cubic feet per minute
g	gram
g/cm^3	gram per cubic centimeter
GEA	gamma energy analysis
g/L	gram per liter
g/mL	gram per milliliter
HDW	Hanford defined waste
HHF	hydrostatic head fluid
HLW	high-level waste
HTCE	historical tank content estimate
IC	ion chromatography
ICP	inductively coupled plasma spectroscopy
IDLH	immediately dangerous to life or health
in.	inch
J/g	joule per gram
kg	kilogram
kgal	kilogallon
kL	kiloliter
kW	kilowatt
LFL	lower flammability limit
LL	lower limit
LLW	low-level waste
m	meter
m^2	square meter
mg/m^3	milligram per cubic meter
m^3/hr	cubic meter per hour
M	moles per liter

LIST OF TERMS (Continued)

mm	millimeter
MS	mass spectrometry
n/a	not applicable
n/r	not reported
PHMC	Project Hanford Management Contractor
p/m	parts per million
p/mv	parts per million by volume
QC	quality control
R1	high-level REDOX waste (1952-1957)
REML	restricted maximum likelihood method
RGS	retained gas sample
RPD	relative percent difference
SACS	Surveillance Analysis Computer System
SAP	sampling and analysis plan
SMM	supernatant mixing model
SMMS1	supernatant mixing model saltcake from the 242-S Evaporator
SMMS2	supernatant mixing model salt slurry from the 242-S Evaporator
SpG	specific gravity
SST	single-shell tank
TCD	tank characterization database
TCR	tank characterization report
TGA	thermogravimetric analysis
TIC	total inorganic carbon
TLM	tank layer model
TOC	total organic carbon
TSAP	Tank 241-S-102 Retained Gas Sampler System and Analysis Plan
TWRS	Tank Waste Remediation System
UL	upper limit
W	watt
WSTRS	Waste Status and Transaction Record Summary
wt%	weight percent
%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
µCi/g	microcurie per gram
µCi/mL	microcurie per milliliter
µeq/g	microequivalent per gram
µg	microgram
µg C/g	microgram of carbon per gram
µg/g	microgram per gram
µg/mL	micrograms per milliliter
µ mol/L	micromole per liter

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1.0 INTRODUCTION

A major function of the Tank Waste Remediation System (TWRS) is to characterize waste in support of waste management and disposal activities at the Hanford Site. Analytical data from sampling and analysis and other available information about a tank are compiled and maintained in a tank characterization report (TCR). This report and its appendices serve as the TCR for single-shell tank 241-S-102. The objectives of this report are 1) to use characterization data in response to technical issues associated with tank 241-S-102 waste, and 2) to provide a standard characterization of this waste in terms of a best-basis inventory estimate. Section 2.0 summarizes the response to technical issues, Section 3.0 shows the best-basis inventory estimate, and Section 4.0 makes recommendations about the safety status of the tank and additional sampling needs. The appendices contain supporting data and information. This report supports the requirements of the Hanford Federal Facility Agreement and Consent Order (Ecology et al. 1997), Milestone M-44-15c, change request M-44-97-03 to "issue characterization deliverables consistent with the Waste Information Requirements Document developed for FY 1999" (Adams et al. 1998).

1.1 SCOPE

The characterization information in this report originated from sample analyses and known historical sources. Samples were obtained and assessed to fulfill requirements for tank specific issues discussed in Section 2.0 of this report. Other information was used to support conclusions derived from these results. Appendix A contains historical information for tank 241-S-102 including surveillance information, records pertaining to waste transfers and tank operations, and expected tank contents derived from a process knowledge model. Appendix B summarizes recent sampling events (see Table 1-1), sample data obtained before 1989, and sampling results. Appendix C provides the statistical analysis and numerical manipulation of data used in issue resolution. Appendix D contains the evaluation to establish the best basis for the inventory estimate. Appendix E is a bibliography that resulted from an in-depth literature search of all known information sources applicable to tank 241-S-102 and its respective waste types.

Table 1-1. Summary of Recent Sampling. (2 sheets)

Sample/Date[1]	Phase	Location	Segmentation	Percent Recovery
Vapor sample (3/14/95 - 2/11/97)	Gas	Tank headspace, Riser 7	n/a	n/a
Push core 125 (1/9/96 - 3/8/96)	Solid/liquid	Riser 11	11 segments	2-100
Push core 130 (1/9/96 - 3/8/96)	Solid/liquid	Riser 14	11 segments	0-100

Table 1-1. Summary of Recent Sampling. (2 sheets)

Sample/Date[1]	Phase	Location	Segmentation	Percent Recovery
Push core 232 3/5/98 - 4/3/98)	Solid/liquid	Riser 16	11 segments	0-100
Grab (6/22/95)	Liquid	Riser 13	n/a	Two sample bottles
Grab (10/27/98)	Liquid	Riser 13	n/a	Three sample bottles

Note:

n/a = not applicable

[1]Dates are in the mm/dd/yy format.

1.2 TANK BACKGROUND

The 241-S Tank Farm was constructed during 1950 and 1951 in the 200 West Area of the Hanford Site.

According to Anderson (1990), the tank went into service in 1953. During the third quarter of 1953, tank 241-S-102 received REDOX high-level waste (HLW) from S Plant. From the fourth quarter of 1953 to the third quarter of 1955, REDOX HLW cascaded from tank 241-S-101 to tank 241-S-102. Waste additions to tank 241-S-102 from tank 241-S-101 did not occur again until the fourth quarter of 1973 and continued intermittently until the second quarter of 1979.

Because tank 241-S-102 was the 242-S Evaporator feed tank from 1973 to 1976, frequent transfers were made to tank 241-S-102 from other tanks during this period. After 1976, tank 241-S-102 received mostly evaporator bottoms and evaporator feed from tanks 241-SY-102, 241-T-101, 241-TX-102, 241-TX-104, and 241-TX-105. In 1979, additions of $HNO_3/KMnO_4$ were received from an unknown source. These receipts were probably associated with evaporator operations which use $HNO_3/KMnO_4$ in the partial neutralization process. Large intermittent transfers of water were added to the tank from 1972 through 1976. Approximately 2,078 kL (549 kgal) of waste was left in tank 241-S-102 after the final transfer from the tank in 1992.

Tank 241-S-102 was removed from service and labeled inactive in 1980. Tank 241-S-102 was partially interim-isolated in 1982 and is awaiting the completion of interim stabilization (Brevick et al. 1997). Salt well liquor waste was transferred from the tank to tank 241-AW-106 during the fourth quarter of 1992 as part of the interim-stabilization process.

Table 1-2 is an overall description of tank 241-S-102. The tank has a nominal storage capacity of 2,869 kL (758 kgal), and presently contains an estimated 2078 kL (549 kgal) of double-shell slurry feed (Hanlon 1999). The tank is on the flammable gas, safety issue Watch List (Public Law 101-510).

Tank 241-S-102 was removed from the Watch List for the organic complexant safety issue in December 1998 (Owendoff 1998).

Table 1-2. Description of Tank 241-S-102. (2 sheets)

TANK DESCRIPTION	
Type	Single-Shell
Constructed	1951
In service	1953
Diameter	22.9 m (75 ft)
Operating depth	7 m (23 ft)
Capacity	2869 kL (758 kgal)
Bottom shape	Dish
Ventilation	Passive
TANK STATUS (as of 12/31/98)	
Waste classification	Double-shell slurry feed
Total waste volume[1]	2078 kL (549 kgal)
Supernate volume	0 kL (0 kgal)
Saltcake volume	2063 kL (545 kgal)
Sludge volume	15.1 kL (4 kgal)
Drainable interstitial liquid volume	992 kL (262 kgal)
Waste surface level (12/31/98)	522 cm (205.5 inches)
Temperature (1/1/98 – 12/31/98)	22.7° - 63.2 °C (72.9° - 145.7 °F)
Integrity	Sound
Watch List status[2]	Flammable gas
Flammable gas facility group	2
SAMPLING DATE[3]	
Core samples	January – March 1996
Core samples	March – April 1998
Grab samples	June 1995/October 1998
Vapor samples	March 1995
	January 1996
	April 1996
	September 1996
	December 1996
	February 1997

Table 1-2. Description of Tank 241-S-102. (2 sheets)

SERVICE STATUS	
Declared inactive	1980
Interim stabilization (partial)	1992
Interim isolation (partial)	1982

Notes:

[1]Hanlon (1999)

[2]The organic complexant safety issue was closed in December 1998 (Owendoff 1998). The organic solvent safety issue is expected to be closed in 1999.

[3]Dates are in the mm/dd/yy format.

2.0 RESPONSE TO TECHNICAL ISSUES

The following technical issues have been identified for tank 241-S-102 (Brown et al. 1998).

- Flammable gas: Does a possibility exist for releasing flammable gases into the headspace of the tank or releasing chemical or radioactive materials into the environment?

- Historical model: Does the waste inventory generated by a model based on process knowledge and historical information (Agnew et al. 1997) represent the current tank waste inventory?

- Pretreatment: What fraction of the waste is soluble when treated by sludge washing and leaching?

- Compatibility: Will safety problems be created as a result of commingling wastes in interim storage? Do operations issues exist that should be addressed before waste is transferred?

Additional technical issues required by Brown et al. (1997) and addressed by sampling events include:

- Safety screening: Does the waste pose or contribute to any recognized potential safety problems?

- Organic complexant: Does the possibility exist for a point source ignition in the waste followed by a propagation of the reaction in the solid/liquid phase of the waste?

- Organic solvent: Does an organic solvent pool exist that may cause a fire or ignition of organic solvent in entrained waste solids?

- Vapor Space Phenomenology: Do the samples collected from a single tank headspace location represent headspace in general? To what extent does the headspace composition change with time? Does the exchange of vapor with the atmosphere and other tanks in a cascade series affect the homogeneity and composition of the tank headspace vapor?

Data from the analysis of push core samples, liquid grab samples, and tank vapor space measurements, along with available historical information, provided the means to respond to the technical issues. Sections 2.1 to 2.6 present the response. Data from the vapor samples obtained during the period March 14, 1995 to February 11, 1997 provided the means to address the vapor screening issue. See Appendix B for sample and analysis data for tank 241-S-102.

2.1 FLAMMABLE GAS DATA QUALITY OBJECTIVE

The flammable gas data quality objective (DQO) has been extended to apply to all tanks (Bauer and Jackson 1998). Analyses and evaluations will change according to program needs until this issue is resolved. Final resolution of the flammable gas safety issue is expected to be completed by September 30, 2001 (Johnson 1997).

As of February 1, 1999, the following flammable gas analyses and evaluations have been completed.

Push-mode sampling was done in March and April 1998 through riser 16. Retained gas samples (RGS) were taken and analyzed to address flammable gas issues (Bauer and Jackson 1998). No specific notification limits or "acceptance levels" have been determined to meet this DQO. The results of RGS testing are reported in Mahoney et al. (1998), and summarized in Appendix B of this document. RGS measurements showed that the insoluble retained gases in tank 241-S-102 had an average composition of 31 mol% nitrogen, 32 mol% hydrogen, 34 mol% nitrous oxide and 3 mol% ammonia, with minor quantities of other components including methane and other hydrocarbons. The measured ammonia levels were 35,000 $\pm$ 9,000 and 110,000 $\pm$ 77,000 μmol/L of waste (the latter being equivalent to 0.37 wt% ammonia in the liquid). Although the lower ammonia concentrations are considered to be more accurate because they were measured after longer equilibration times, the ammonia levels were unusually high. The RGS samples retained void fractions between 0.13 and 0.34, with two samples showing gas volume fractions greater than 0.25. The total amount of gas calculated from the RGS data is about twice that calculated from the waste level response to atmospheric pressure changes. Thus, it is possible that the region sampled by RGS is not representative of the average waste.

Tank 241-S-102 is one of the SSTs on the flammable gas watch list that shows waste level growth which may indicate gas retention. According to McCain and Bauer (1998), a steady state concentration of hydrogen of 617 p/m was estimated for tank 241-S-102 from vapor grab samples. Hukaby et al. (1997) estimated a ventilation rate of 0.063 m^3/min using sulfur hexafluoride tracer in the headspace of tank 241-S-102. McCain and Bauer (1998) estimated a steady-state hydrogen release rate of 0.053 m^3/day from the steady state hydrogen concentration and the ventilation rate. They also estimated a hydrogen accumulation rate of 0.013 m^3/day to yield a total hydrogen generation rate in tank 241-S-102 of 0.066 m^3/day. Although this hydrogen generation rate is significantly less than 1 m^3/day, it is important to note that there are several factors that affect this rate. Among these are ventilation rate, waste temperature, gas retention rate in the waste, retained gas composition, evaporation rate, and waste homogeneity.

2.2 HISTORICAL EVALUATION

The purpose of the historical evaluation is to determine whether the model inventories based on process knowledge and historical information (Agnew et al. 1997) agree with current tank inventories. If the historical model accurately predicts the waste characteristics as observed

through sample characterization, the possibility exists to reduce the amount of total sampling and analysis needed. Data requirements for this evaluation are documented in Historical Model Evaluation Data Requirements (Simpson and McCain 1997).

A "gateway" analysis is a quick check to ensure that data obtained from sampling support the remainder of the historical evaluation analysis. Failure of the gateway analysis indicates the model waste composition estimate is not comparable to the sample data and the tank is not a good tank on which to perform the historical DQO. If the gateway analysis fails, the remainder of the sampling and analysis for the historical DQO will not be applied to the tank. If the gateway analysis passes, then further assessments will be performed on the waste sample data as specified in the historical model evaluation DQO. Results of the historical model evaluation DQO will be used to quantify the errors associated with the historical tank content estimates (HTCE) (Simpson and McCain 1997).

The most recent version of the historical model evaluation DQO (Simpson and McCain 1997) identifies tank 241-S-102 as having a thick layer of SMMS1 saltcake waste; this version of the DQO was used to carry out the fingerprint test.

The gateway analysis (fingerprint test) was applied to all portions of solid waste extruded from tank 241-S-102. Assuming the choice made by the historical DQO model in the selection of gateway analytes and concentrations for SMMS1 is correct, and also assuming that SMMS1 saltcake is present in the top segments of the tank, the majority of the top segments from both cores appear to be representative of the SMMS1 saltcake. The results of the historical DQO data assessment are in Appendix C.

2.3 PRETREATMENT

Samples were archived for future pretreatment analyses and evaluation in accordance with *Stategy for Sampling Hanford Site Tanks for Development of Disposal Technology* (Kupfer et al. 1995).

2.4 COMPATIBILITY

Tank 241-S-102 was only partially interim stabilized in 1992. Salt well pumping of waste from tank 241-S-102 (waste stream SST-99-02) into tank 241-SY-102 is proposed for 1999. Approximately 480,000 gallons of waste, including dilution and flush water are anticipated to be received into the double-shell tank (DST) system. Before pumping the waste liquids from tank 241-S-102, a waste compatibility assessment was performed by Process Control. Other wastes are scheduled to be received into tank 241-SY-102. Receipt of these other waste streams has also been considered in this assessment. The waste compatibility assessment ensures that the waste in tank 241-S-102 is compatible with the waste in the receiving DST, tank 241-SY-102. The *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Mulkey and Miller 1997, Fowler 1995 and 1999) directs the waste compatibility assessment.

A waste compatibility assessment to transfer waste from tank 241-S-102 to tank 241-SY-102 (Fowler 1995 and 1999) recommended that tank 241-S-102 waste be transferred to tank 241-SY-102 provided requirements specified by the assessment were addressed. Seven requirements were specified in the waste compatibility assessment. The results of this assessment indicate that no additional waste categories, waste codes, or tank safety concerns will be created as a result of transferring 241-S-102 waste into the DST system.

2.5 SAFETY SCREENING

The data needed to screen the waste in tank 241-S-102 for potential safety problems are documented in *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995). These potential safety problems are exothermic conditions in the waste, flammable gases in the waste and/or tank headspace, and criticality conditions in the waste. Each condition is addressed separately below.

2.5.1 Exothermic Conditions (Energetics)

The first requirement outlined in the safety screening DQO (Dukelow et al. 1995) is to ensure there are not sufficient exothermic constituents (organic or ferrocyanide) in tank 241-S-102 to pose a safety hazard. The safety screening DQO required the waste sample profile be tested for energetics every 24 cm (9.5 in.) to determine whether the energetics exceeded the safety threshold limit. The threshold limit for energetics is 480 J/g on a dry weight basis.

During DSC analysis of 1996 core samples, all samples that had one or more exothermic reactions were recorded. On a dry weight basis, no sample exceeded the safety screening and organic complexant safety DQO decision criteria threshold of 480 J/g. The highest individual sample result for solids was 244.4 J/g, and the highest upper limit of the 95 percent confidence interval on the mean was 260.9 J/g. The highest individual sample result for the drainable liquids was 306.3 J/g, and the highest 95 percent confidence interval upper limit was 385.2 J/g (Fritts 1996).

2.5.2 Flammable Gas

As requested in the sampling and analysis plan (SAP) (Eggers 1996) and required by the safety screening DQO (Dukelow et al. 1995), the tank 241-S-102 headspace was sampled through riser 7 and analyzed before core sampling in 1996 for the presence of flammable gases, using a combustible gas meter. This was crucial considering that tank 241-S-102 is on the Flammable Gas Watch List. The results were 6 percent of the lower flammability limit (LFL), which is below the safety screening limit of 25 percent of the LFL. In addition, the concentration of oxygen gas, ammonia gas, and total organic carbon (TOC) vapors were determined. The ammonia concentrations were above the "immediately dangerous to life or health" (IDLH) notification limit of 300 p/m. Data for the vapor phase measurements made between March 14, 1995 and February 11, 1997 are presented in Appendix B.

2.5.3 Criticality

The safety screening DQO threshold for criticality, based on total alpha activity, is 1 g/L. Because total alpha activity is measured in μCi/g instead of g/L, the 1 g/L limit is converted into units of μCi/g by assuming that all alpha decay originates from ^{239}Pu. The safety threshold limit is 1 g ^{239}Pu per liter of waste. Assuming that all alpha is from ^{239}Pu, for the highest density of 1.92 g/mL (upper half of segment 11 from core 125), 1 g/L of ^{239}Pu translates to 32 μCi/g of alpha activity. The mean total alpha activity result was 0.167 μCi/g for the solids. The maximum upper limit to a 95 percent confidence interval on the mean was 1.94 μCi/g and the largest individual sample result was 1.81 μCi/g from the duplicate result of core 130, segment 8A, indicating that the potential for a criticality event is extremely low. Therefore, criticality is not a concern for this tank. Appendix C contains the method used to calculate confidence limits.

2.6 ORGANIC COMPLEXANT

The data required to support the organic complexant issue are documented in *Memorandum of Understanding for the Organic Complexant Safety Issue Data Requirements* (Schreiber 1997). Energetics by differencial scanning calorimetry (DSC) and sample moisture analyses were conducted to address the organic complexant issue.

The following results are given on a dry weight basis. No sample exceeded the safety screening and organic complexant safety DQO decision criteria threshold of 480 J/g for exotherms. The highest individual sample result was for liquids and was 306.3 J/g (Fritts 1996), and the upper limit of the 95 percent confidence interval on the mean for this sample was 385.2 J/g. The overall mean TOC result for the solids was 3,920 μg C/g, and the upper limit of the 95 percent confidence interval on the mean were 4,850 μg C/g and the corresponding data for the liquids were 4,150 and 5,410 μg C/g respectively. All results were below the organic complexant safety DQO decision criteria threshold of 45,000 μg C/g. In addition, recent analysis (Meacham et al. 1998) indicated that bulk runaway and propagation are not possible in the single shell tanks (SSTs). Therefore, the tank is classified as "safe" for this issue.

The organic complexant safety issue was closed December 1998 (Owendoff 1998).

2.7 ORGANIC SOLVENT SAFETY SCREENING

The data required to support the organic solvent screening issue are documented in the *Data Quality Objective to Support Resolution of the Organic Solvent Safety Issue* (Meacham et al. 1997). The DQO requires tank headspace samples be analyzed for total nonmethane organic compounds to determine whether the organic extractant pool in the tank is a hazard. The purpose of this assessment is to ensure that an organic solvent pool fire or ignition of organic solvent cannot occur.

Vapor samples taken between March 14, 1995 and February 11, 1997 showed that the concentration of total nonmethane organic hydrocarbons in tank 241-S-102 was 0.53 mg/m^3 with an estimated organic solvent pool size of 0.05 m^2 (Huckaby and Sklarew 1997), well below the limit of 1 m^2.

The organic solvent safety issue is expected to be closed in 1999.

2.8 VAPOR SPACE PHENOMENOLOGY

A tracer gas study was conducted in the headspace of tank 241-S-102 from September 24, 1996 to February 11, 1997 (Huckaby et al. 1997). Passive ventilation rates are needed for the resolution of several key safety issues. These safety issues are associated with the rates of flammable gas production and ventilation, the rates at which organic salt-nitrate salt mixtures dry out, and the estimation of organic solvent waste surface areas.

Sulfur hexafluoride was injected into the tank headspace, and the headspace was sampled several times during the study. The average ventilation rate based on sulfur hexafluoride was 3.8 m^3/hr (2.2 ft^3/min). The results for seven other tanks tested ranged from 1.9 to 42 m^3/hr (1.1 to 25 ft^3/min).

2.9 OTHER TECHNICAL ISSUES

2.9.1 Hazardous Vapor Screening

Vapor samples were taken to address the *Data Quality Objectives for Tank Hazardous Vapor Safety Screening* (Osborne and Buckley 1995). However, this is no longer an issue because headspace vapor (sniff) tests are required for the safety screening DQO (Dukelow et al. 1995), and the toxicity issue was closed for all tanks (Hewitt 1996).

2.9.2 Tank Waste Heat Load

A factor in assessing tank safety is the heat generation and temperature of the waste. Heat is generated in the tanks from radioactive decay. An estimate of the tank heat load based on the 1996 core sampling events was 2,740 W (9,340 Btu/hr). The heat load estimate based on the tank process history was 2,090 W (7,130 Btu/hr) (Agnew et al. 1997). The heat load estimate based on the tank headspace temperature was 2,440 W (8,331 Btu/hr) (Kummerer 1995). All three of these estimates are quite low, and are well below the limit of 11,700 W (40,000 Btu/hr) that separates high- and low-heat-load tanks (Smith 1986).

2.10 SUMMARY

The results of all analyses performed to address potential safety issues showed that primary analytes did not exceed safety decision threshold limits. Total alpha results were below the notification limit. On a dry-weight basis, no sample exceeded the safety screening and organic complexant safety DQO decision criteria threshold of 480 J/g. Ammonia is the only analyte that exceeded the IDLH notification limit of 300 p/m. However, the concentration of flammable gases in the tank headspace was measured at 6 percent of the LFL, well below the threshold of 25 percent of the LFL. Vapor analyses were also used to address the organic solvent issue. The organic solvent pool size was estimated to be 0.05 m^2, which is significantly less than the notification limit of 1 m^2. The average ventilation rate based on sulfur hexafluoride tracer injection into the headspace was 3.8 m^3/hr (2.2 ft^3/min) for tank 241-S-102.

The gateway analysis was applied to all portions of solid waste extruded from tank 241-S-102. Assuming the choice made by the historical DQO model in the selection of gateway analytes and concentrations for SMMS1 is correct, and also assuming that SMMS1 saltcake is present in the top segments of the tank, the majority of the top segments from both cores appear to be representative of the SMMS1 saltcake.

Samples were archived for future pretreatment analyses and evaluation in accordance with *Strategy for Sampling Hanford Site Tanks for Development of Disposal Technology* (Kupfer et al. 1995). All compatibility and safety requirements were in compliance. Transfer of waste to tank 241-SY-102 was recommended if requirements specified by Fowler (1999) are met.

The analyses results are summarized in Table 2-1.

Table 2-1. Summary of Technical Issues. (2 sheets)

Issue	Sub-issue	Result
Flammable gas	Mechanisms for generation, retention and release Waste models	RGS data indicated retained gases to contain 32 mol% hydrogen, 34 mol% nitrous oxide, 31 mol% nitrogen and 3 mol% ammonia. High ammonia concentration in the waste. Void fractions for RGS samples varied between 0.13 and 0.34 with two samples exceeding 0.25.
Historical (gateway analysis)	Total mass of gateway analytes	The majority of the bottom segments in core 125 and 130 failed fingerprint test for 85 percent of total mass of analytes. The majority of the top segments in both cores passed fingerprint test for 85 percent of total mass of analytes.

Table 2-1. Summary of Technical Issues. (2 sheets)

Issue	Sub-issue	Result
Historical (gateway analysis) (Cont'd)	Selected segment comparison with ≥10% of DQO values	All segments of core 130 passed for all analytes. For core 125, segment 4 did not pass for carbonate, segment 6A did not pass for Al, segment 10 (lower half) did not pass for nitrate and sulfate, and segment 11 (upper half) did not pass for sulfate.
Pretreatment	Analyses for treatment to separate low-level and high-level waste streams	Samples were archived for future analysis.
Compatibility	Waste compatibility assessment	All compatibility and safety requirements were in compliance. Transfer of waste to tank 241-SY-102 was recommended if requirements specified by Fowler (1999) are met.
Vapor Space Phenomenology	Ventilation rate	The average ventilation rate based on sulfur hexafluoride was 3.8 m^3/hr (2.2 ft^3/min).
Safety screening	Energetics	Exotherms were below the threshold limit of 480 J/g.
	Flammable gas	Vapor measurement reported 6 percent of lower flammability limit.
	Criticality	All analyses well below 32 μCi/g. The maximum 95 percent confidence interval upper limit was 1.94 μCi/g.
Organic complexant[1]	Safety categorization (safe)	Exotherms were below the threshold limit of 480 J/g.
Organic solvent[2]	Solvent pool size	Organic pool size estimate of 0.05 m^2 is well below the limit of 1 m^2.

Notes:

[1]This issue was closed in December 1998 (Owendoff 1998)

[2]The issue is expected to be closed in 1999.

3.0 BEST-BASIS STANDARD INVENTORY ESTIMATE

Key waste management activities include overseeing tank farm operations and identifying, monitoring, and resolving safety issues associated with these operations and with the tank wastes. Disposal activities involve designing equipment, processes, and facilities for retrieving wastes and processing them into a form that is suitable for long-term storage/disposal. Information about chemical, radiological, and/or physical properties is used to perform safety analyses, engineering evaluations, and risk assessment associated with these activities.

Chemical and radiological inventory information is generally derived using three approaches: 1) component inventories are estimated using the results of sample analyses, 2) component inventories are predicted using the Hanford defined waste (HDW) model, process knowledge, and historical information, or 3) a tank-specific process estimate is made based on process flowsheets, reactor fuel data, essential material usage, and other operating data.

An evaluation of available chemical information for tank 241-S-102 was performed, including the following:

- An inventory estimate generated by the HDW model (Agnew et al. 1997)
- A sample-based inventory estimate from two push cores from 1996
- Data from 1998 core 232 for ^{90}Sr and ^{137}Cs inventory estimates
- An engineering evaluation of R sludge inventory based on comparisons developed by evaluation of tanks 241-S-101, 241-S-104 and 241-S-107.

Based on this evaluation, a best-basis inventory was developed for tank 241-S-102 for which sampling information was available. The sample-based evaluation inventories from tanks 241-S-102, 241-S-101, 241-S-104, and 241-S-107 were used as a basis for the engineering evaluation. The two sample-based evaluations were combined to arrive at the engineering assessment, which is chosen as the best basis for the majority of non-radioactive analytes. The waste is assumed to contain three phases, viz., drained saltcake solids (saltcake solids), interstitial liquid and sludge. Because of their similarities, SMMS1 and SMMS2 were considered to be the same saltcake for this evaluation. Average analyte concentrations for solid subdivisions of the 1996 core sample data were used to predict the saltcake inventories. Average analyte concentrations for liquid subdivisions of the 1996 core sample data were used to predict the interstitial liquid inventories. Averages of the analyte concentrations from the R sludge containing tanks, viz., 241-S-101, 241-S-104, and 241-S-107 were used to predict the sludge inventories. Densities used in the calculations for saltcake and interstitial liquid were averaged from the 1996 core sample data for the solid and liquid subdivisions respectively. The sludge density used was the same as that used by the previous best-basis estimate. The densities used were 1.68, 1.39, and 1.77 g/mL for saltcake solids, interstitial liquid and sludge respectively. The total volume of saltcake solids plus interstitial liquid used for the estimate was 2,063 kL

(545 kgal), which is the same as the total saltcake volume of Agnew et al. (1997) and Hanlon (1999). The saltcake solids and interstitial liquid volumes were estimated separately from this total using the 1996 core sample extrusion data. The calculated volumes for the saltcake solids and interstitial liquid were 1,965 kL (519 kgal) and 98.4 kL (26 kgal) respectively. The sludge volume used in the inventory calculations was 15.1 kL (4 kgal), which is the same as that predicted by Agnew et al. (1997) and Hanlon (1999).

For those few analytes which have "less than" values for both engineering assessment and sample-based inventories, HDW model values were used as the best basis if the HDW model value is less than both these estimates. On the other hand, if the HDW model value is more than the "less than" values of the engineering assessment and sample-based inventories, the lesser of the two "less than" values is chosen as the best basis, with the comment "upper bound". If one of the waste components has a "less than" value for an analyte and is less than 10 percent of the value of the other component (s), the total inventory is reported as the sum of values for all the components for that analyte.

The total alpha value from the 1996 core sample data for solids and the total uranium value were used to estimate inventories of the alpha contributing radionuclides and nuclides based on uranium. The same isotopic ratios listed in the HDW model were used for the calculations.

Best-basis tank inventory values are derived for 46 key radionuclides (as defined in Section 3.1 of Kupfer et al. 1998), all decayed to a common report date of January 1, 1994. Often, waste sample analyses have only reported ^{90}Sr, ^{137}Cs, $^{239/240}Pu$, and total uranium (or total beta and total alpha) while other key radionuclides such as ^{60}Co, ^{99}Tc, ^{129}I, ^{154}Eu, ^{155}Eu, and ^{241}Am, etc., have been infrequently reported. For this reason it has been necessary to derive most of the 46 key radionuclides by computer models. These models estimate radionuclide activity in batches of reactor fuel, account for the split of radionuclides to various separations plant waste streams, and track their movement with tank waste transactions. (These computer models are described in Kupfer et al. 1998, Section 6.1 and in Watrous and Wootan 1997.) Model generated values for radionuclides in any of 177 tanks are reported in the Hanford Defined Waste Rev. 4 model results (Agnew et al. 1997). The best-basis value for any one analyte may be either a model result or a sample or engineering assessment-based result if available. For a discussion of typical error between model derived values and sample derived values, see Kupfer et al. (1998, Section 6.1.10).

Once the best-basis inventories were determined, the hydroxide inventory was calculated by performing a charge balance with the valences of other analytes. This charge balance approach is consistent with that used by Agnew et al. (1997).

The best-basis inventory estimates for tank 241-S-102 are presented in Tables 3-1 and 3-2. The inventory values reported in Tables 3-1 and 3-2 are subject to change. Refer to the Tank Characterization Database (TCD) for the most current inventory values.

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-S-102 (Effective January 31, 1999).

Analyte	Total Inventory (kg)	Basis (S, M, C, or E)[1]	Comment
Al	49,500	S/E	
Bi	246	M	
Ca	1,360	S/E	
Cl	13,000	S/E	
TIC as CO_3	89,800	S/E	
Cr	9,700	S/E	
F	16,500	S/E	Upper bound estimate
Fe	2,880	S/E	
Hg	0	E	Simpson (1998)
K	3,090	S/E	
La	4.41	M	
Mn	1,320	S/E	
Na	6.62E+05	S/E	
Ni	106	S/E	
NO_2	1.25E+05	S/E	
NO_3	1.12 E+06	S/E	
OH_{TOTAL}	75,000	C	
Pb	189	M	
PO_4	1.51E+05	S/E	
Si	1,600	S/E	
SO_4	30,300	S/E	
Sr	36.3	S/E	Upper bound estimate
TOC	13,600	S/E	
U_{TOTAL}	2,860	S/E	
Zr	20.2	M	

Notes:

[1]S = sample-based, M = Hanford defined waste model-based (Agnew et al. 1997), E = engineering assessment-based, and C = calculated by charge balance; includes oxides as hydroxides, not including CO_3, NO_3, NO_2, PO_4, SO_4, and SiO_3.

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-S-102 Decayed to January 1, 1994 (Effective January 31, 1999). (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment[2]
^{3}H	241	M	
^{14}C	34.2	M	
^{59}Ni	2.43	M	
^{60}Co	37.6	M	
^{63}Ni	237	M	
^{79}Se	3.41	M	
^{90}Sr	84,200	S/E	
^{90}Y	84,200	S/E	From ^{90}Sr
^{93}Zr	16.7	M	
^{93m}Nb	12.1	M	
^{99}Tc	244	M	
^{106}Ru	0.00664	M	
^{113m}Cd	87.4	M	
^{125}Sb	161	M	
^{126}Sn	5.15	M	
^{129}I	0.470	M	
^{134}Cs	2.48	M	
^{137}Cs	4.61E+05	S/E	
^{137m}Ba	4.36E+05	S/E	From ^{137}Cs
^{151}Sm	12,000	M	
^{152}Eu	3.95	M	
^{154}Eu	611	M	
^{155}Eu	232	M	
^{226}Ra	1.61E-04	M	
^{227}Ac	9.85E-04	M	
^{228}Ra	0.131	M	
^{229}Th	0.00307	M	
^{231}Pa	0.00420	M	
^{232}Th	0.00869	M	

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-S-102 Decayed to January 1, 1994 (Effective January 31, 1999). (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment[2]
^{232}U	0.879	S/E/M	Based on U_{TOTAL} and HDW isotopic distribution
^{233}U	3.37	S/E/M	Based on U_{TOTAL} and HDW isotopic distribution
^{234}U	1.05	S/E/M	Based on U_{TOTAL} and HDW isotopic distribution
^{235}U	0.0425	S/E/M	Based on U_{TOTAL} and HDW isotopic distribution
^{236}U	0.0325	S/E/M	Based on U_{TOTAL} and HDW isotopic distribution
^{237}Np	0.897	M	
^{238}Pu	6.53	S/E/M	Based on total alpha and HDW isotopic distribution
^{238}U	0.954	S/E/M	Based on U_{TOTAL} and HDW isotopic distribution
^{239}Pu	241	S/E/M	Based on total alpha and HDW isotopic distribution
^{240}Pu	40.0	S/E/M	Based on total alpha and HDW isotopic distribution
^{241}Am	256	S/E/M	Based on total alpha and HDW isotopic distribution
^{241}Pu	438	S/E/M	Based on total alpha and HDW isotopic distribution
^{242}Cm	0.655	S/E/M	Based on total alpha and HDW isotopic distribution
^{242}Pu	0.00238	S/E/M	Based on total alpha and HDW isotopic distribution
^{243}Am	0.00878	S/E/M	Based on total alpha and HDW isotopic distribution

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-S-102 Decayed to January 1, 1994 (Effective January 31, 1999). (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment[2]
^{243}Cm	0.0598	S/E/M	Based on total alpha and HDW isotopic distribution
^{244}Cm	0.594	S/E/M	Based on total alpha and HDW isotopic distribution

Notes:

[1]S = Sample-based, M = Hanford defined waste model-based (Agnew et al. 1997), and E = engineering assessment-based.

4.0 RECOMMENDATIONS

The results of all analyses performed to address potential safety issues showed that primary analytes did not exceed safety decision threshold limits. Total alpha results were below the notification limit. On a dry-weight basis, no sample exceeded the safety screening and organic complexant safety DQO decision criteria threshold of 480 J/g. Ammonia is the only analyte that exceeded the IDLH notification limit of 300 p/m. However, the concentration of flammable gases in the tank headspace was measured at 6 percent of the LFL, well below the threshold of 25 percent of the LFL. Vapor analyses were also used to address the organic solvent issue. The organic solvent pool size was estimated to be 0.05 m^2, which is significantly less than the notification limit of 1 m^2. The average ventilation rate based on sulfur hexafluoride tracer injection into the headspace was 3.8 m^3/hr (2.2 ft^3/min) for tank 241-S-102.

The gateway analysis was applied to all portions of solid waste extruded from tank 241-S-102. Assuming the choice made by the historical DQO model in the selection of gateway analytes and concentrations for SMMS1 is correct, and also assuming that SMMS1 saltcake is present in the top segments of the tank, the majority of the top segments from both cores appear to be representative of the SMMS1 saltcake. Therefore, a full suite of analyses is recommended from segment 7, core 125 and segment 6, core 130.

Although flammable gas in the tank headspace was well below 25 percent of the LFL, retained gas samples indicated a high ammonia concentration in the waste. The data also indicated void fractions between 0.13 and 0.34 with two samples exceeding 0.25. Samples were archived for future pretreatment analyses and evaluation in accordance with *Strategy for Sampling Hanford Site Tanks for Development of Disposal Technology* (Kupfer et al. 1995). All compatibility and safety requirements were in compliance. Transfer of waste to tank 241-SY-102 was recommended if requirements specified by Fowler (1999) are met.

Table 4-1 summarizes the Project Hanford Management Contractor (PHMC) TWRS Program review status and acceptance of the sampling and analysis results reported in this TCR. All issues required to be addressed by sampling and analysis are listed in column 1 of Table 4-1. Column 2 indicates by "yes" or "no" whether issue requirements were met by the sampling and analysis performed. Column 3 indicates concurrence and acceptance by the program in PHMC/TWRS that is responsible for the applicable issue. A "yes" in column 3 indicates that no additional sampling or analyses are needed. Conversely, "no" indicates additional sampling or analysis may be needed to satisfy issue requirements.

Table 4-1. Acceptance of Tank 241-S-102 Sampling and Analysis.

Issue	Sampling and Analysis Performed	TWRS/PHMC Program Acceptance
Flammable gas DQO (Bauer and Jackson 1998)	Yes	Yes
Historical evaluation DQO (Simpson and McCain 1997)	Yes	Yes
Pretreatment DQO (Kupfer et al. 1995)	Yes	Yes
Compatibility DQO (Mulkey and Miller 1997)	Yes	Yes
Vapor space phenomenology (DOE-RL 1996)	Yes	Yes
Organic complexant MOU[1] (Schreiber 1997)	Yes	Yes
Organic solvent DQO[2] (Meacham et al. 1997)	Yes	Yes
Safety screening DQO (Dukelow et al. 1995)	Yes	Yes

Notes:

[1]This issue was closed in December 1998 (Owendoff 1998).

[2]This issue is expected to be closed in 1999.

Table 4-2 summarizes the status of PHMC TWRS Program review and acceptance of the evaluations and other characterization information contained in this report. Column 1 lists the different evaluations performed in this report. Column 2 shows whether issue evaluations have been completed or are in progress. Column 3 indicates concurrence and acceptance with the evaluation by the program in PHMC/TWRS that is responsible for the applicable issue. A "yes" indicates that the evaluation is completed and meets all issue requirements.

Table 4-2. Acceptance of Evaluation of Characterization Data and Information for Tank 241-S-102.

Issue	Evaluation Performed	TWRS/PHMC Program Acceptance
Flammable gas DQO	Yes	Yes
Historical evaluation DQO	Yes	Yes
Pretreatment DQO	Yes	Yes
Compatibility DQO	Yes	Yes
Vapor space phenomenology	Yes	Yes
Organic complexant MOU[1]	Yes	Yes
Organic solvent DQO[2]	Yes	Yes
Safety screening DQO	Yes	Yes

Notes:

[1]This issue was closed in December 1998 (Owendoff 1998)

[2]This issue is expected to be closed in 1999

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APPENDIX A

HISTORICAL TANK INFORMATION

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APPENDIX A

HISTORICAL TANK INFORMATION

Appendix A describes tank 241-S-102 based on historical information. For this report, historical information includes information about the fill history, waste types, surveillance, or modeling data about the tank. This information is necessary for providing a balanced assessment of sampling and analytical results.

This appendix contains the following information:

- **Section A1.0**: Current tank status, including the current waste levels and the tank stabilization and isolation status
- **Section A2.0**: Information about the tank design
- **Section A3.0**: Process knowledge about the tank, the waste transfer history, and the estimated contents of the tank based on modeling data
- **Section A4.0**: Surveillance data for tank 241-S-102, including surface-level readings, temperatures, and a description of the waste surface based on photographs
- **Section A5.0**: References for Appendix A.

A1.0 CURRENT TANK STATUS

As of December 31, 1998, tank 241-S-102 contained an estimated 2078 kL (549 kgal) of double-shell slurry feed waste (Hanlon 1999). The waste volumes were estimated using an ENRAF[1] surface-level gauge in the manual mode. Table A1-1 shows the volumes of the waste phases found in the tank.

Currently, tank 241-S-102 is categorized as sound. The tank was partially interim-isolated in 1982 and partially interim stabilized in 1992. The tank is passively ventilated and is on the Flammable Gas Watch List (Public Law 101-510). The tank was removed from the Watch List for the organic complexant issue in December 1998 (Owendoff 1998).

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

Table A1-1. Tank Contents Status Summary.

Waste Type	kL (kgal)
Total waste	2078 (549)
Supernatant	0 (0)
Sludge	15 (4)
Saltcake	2063 (545)
Drainable interstitial liquid	992 (262)
Drainable liquid remaining	992 (262)
Pumpable liquid remaining	905 (239)

A2.0 TANK DESIGN AND BACKGROUND

The 241-S Tank Farm was constructed during 1950 and 1951 in the 200 West Area of the Hanford Site. The farm contains 12 100-series tanks. The tanks have a capacity of 2,869 kL (758 kgal), a diameter of 22.9 m (75.0 ft), and an operating depth of 7 m (23 ft) (Leach and Stahl 1993). Built according to second-generation design, the 241-S Tank Farm was designed for waste with a maximum fluid temperature of 104 °C (220 °F) (Brevick et al. 1997). A cascade overflow line, 7.5 cm (3 in.) in diameter, connects tank 241-S-102 as the second in a cascade series of three tanks that includes tank 241-S-101 and tank 241-S-103. Each tank in the cascade is set 1 ft lower in elevation than the preceding tank. The cascade overflow height is approximately 7.25 m (23.8 ft) above the tank bottom center line and 37.0 cm (1.2 ft) below the top of the steel liner.

The tank has a dished bottom with a 1.2-m (4-ft)-radius knuckle. Tank 241-S-102 was designed with a primary mild steel liner and a concrete dome with various risers. The tank is set on a reinforced-concrete foundation. The tank and foundation were waterproofed by a coating of tar covered by a three-ply, asphalt-impregnated, waterproofing fabric. The waterproofing was protected by welded wire-reinforced gunite. One coat of primer was sprayed on all exposed interior tank surfaces. The ceiling of the tank dome was covered with six applications of a vinyl resin coating (Rutherford 1949). Lead flashing was used to protect the joint where the steel liner meets the concrete dome. Asbestos gaskets were used to seal the risers in the tank dome. The tank was covered with approximately 1.8 m (6 ft) of overburden.

According to the drawings and engineering change notices, tank 241-S-102 has 12 risers. The risers range in diameter from 10 cm (4 in.) to 1.1 m (42 in.). Table A2-1 shows numbers, diameters, and descriptions of the risers and the nozzles. Figure A2-1 shows the riser configuration. Risers 11, 14, and 16 (10 cm [4 in.] in diameter), and 7 (30 cm [12 in.] in diameter) are available for use (Lipnicki 1997). Figure A2-2 shows a tank cross section of the approximate waste level and a schematic of the tank equipment.

Table A2-1. Tank 241-S-102 Risers.[1,2,3,4]

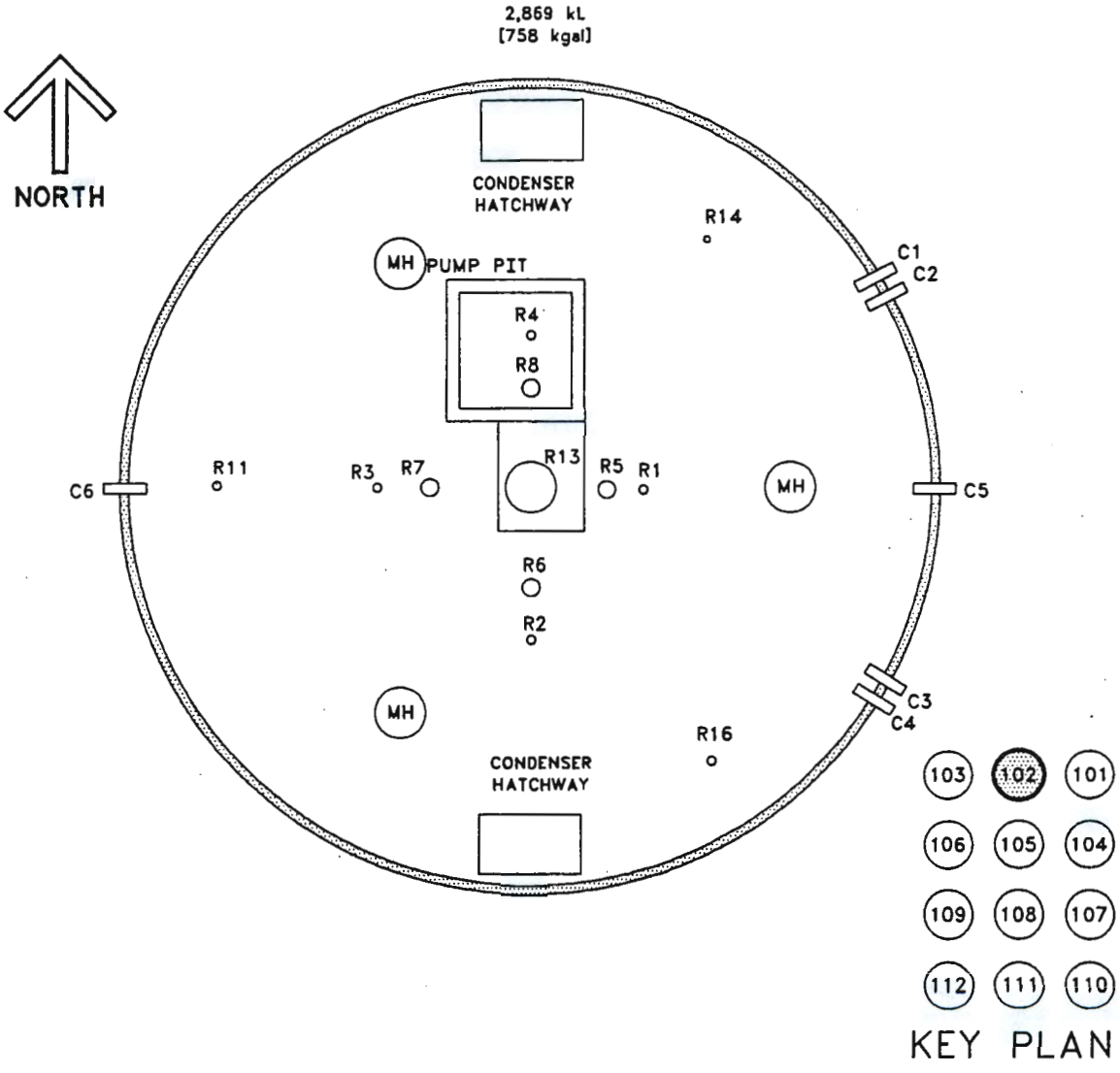
Number	Diameter (in.)	Description and Comments
R1	4	Standard Hydrogen Monitor System(SHMS)/Breather Filter
R2	4	Level Indicating Transmitter (ENRAF[5]), BM
R3	4	B-221 Temperature Probe
R4	4	Flange, Weather Covered (Unusable)
R5	12	B-346 Liquid Observation Well, BM
R6	12	HEPA filter exhauster inlet (Duct Removed & Riser Capped ECN-706501 8/29/95)
R7[6]	12	B-222 Observation Port (Install Multiport Adapter W/ Heated Vapor Probe In Highest 12/19/95)
R8	12	Pump Mount, Weather Covered
R11[6]	4	500 ft^3/min exhauster
R13	42	Salt Well Screen and Pump
R14[6]	4	Sludge Measurement Port
R16[6]	4	Sludge Measurement Port, BM
C1	3	Spare Nozzle, Capped
C2	3	Spare Nozzle, Capped
C3	3	Spare Nozzle, Capped
C4	3	Spare Nozzle, Capped
C5	3	Inlet
C6	3	Outlet
MH	---	Manhole

Notes:

HEPA = high efficiency particulate air filter

[1]Alstad (1993)
[2]Vitro (1980)
[3]Lipnicki (1997)
[4]Tran (1993)
[5]ENRAF is a trademark of ENRAF Corporation, Houston, Texas.
[6]Denotes risers tentatively available for sampling (Lipnicki 1997)

Figure A2-1. Riser Configuration for Tank 241-S-102.



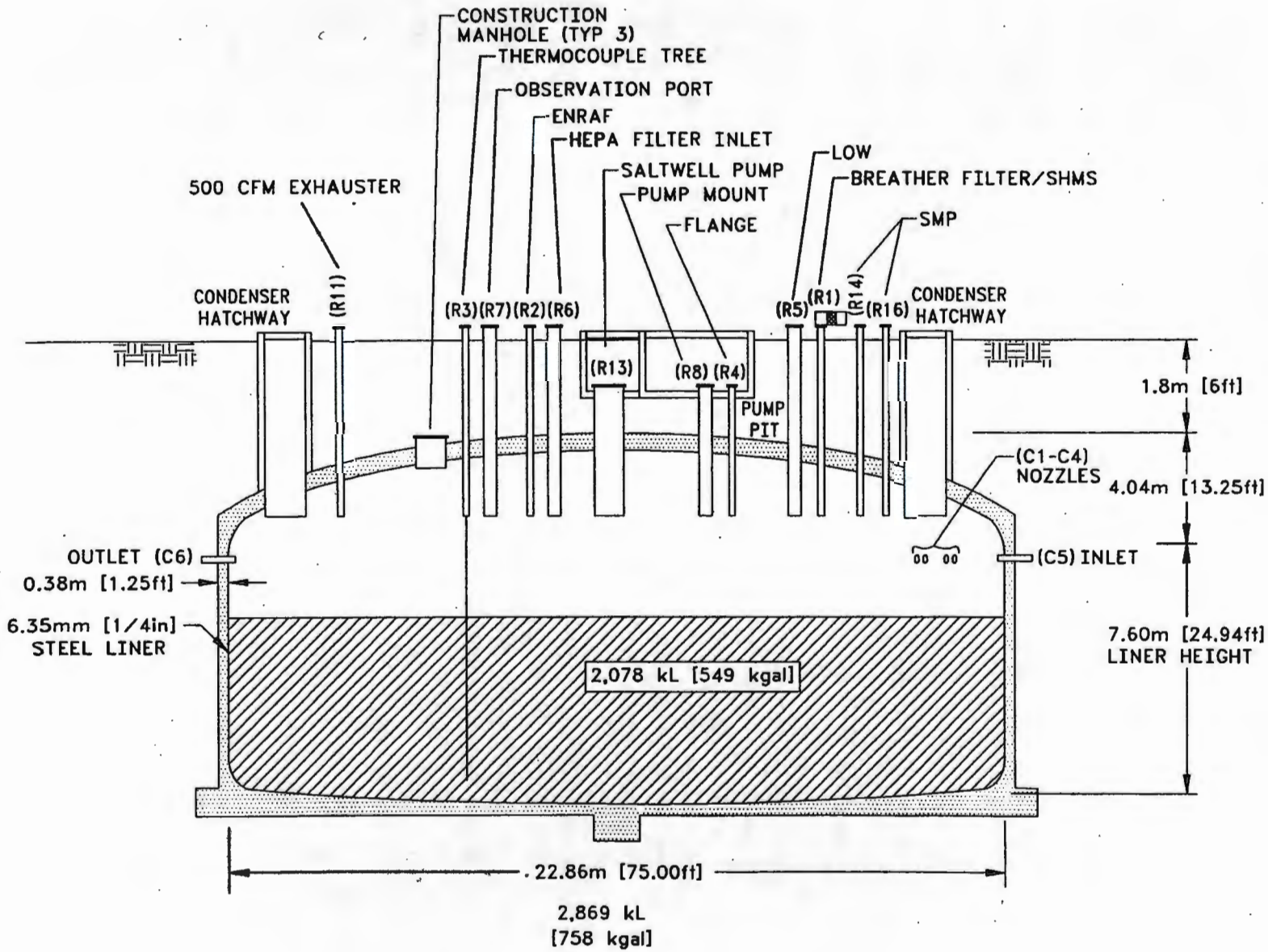


Figure A2-2. Tank 241-S-102 Cross Section and Schematic.

A3.0 PROCESS KNOWLEDGE

The sections below 1) provide information about the transfer history of tank 241-S-102, 2) describe the process wastes that made up the transfers, and 3) estimate the current tank contents based on transfer history.

A3.1 WASTE TRANSFER HISTORY

Table A3-1 summarizes the waste transfer history of tank 241-S-102 (Agnew et al. 1997b). During the third quarter of 1953, tank 241-S-102 received REDOX high level waste (HLW) from S Plant. From the fourth quarter of 1953 to the third quarter of 1955, REDOX HLW cascaded from tank 241-S-101 to tank 241-S-102. This was the last waste addition to tank 241-S-102 for the rest of the 1950s and the 1960s. Waste additions to tank 241-S-102 from tank 241-S-101 did not occur again until the fourth quarter of 1973 and continued intermittently until the second quarter of 1979.

Because tank 241-S-102 was the 242-S Evaporator feed tank from 1973 until 1976, frequent transfers were made to tank 241-S-102 from other tanks during this period. The following waste types are an example of what was transferred to tank 241-S-102: REDOX HLW, B Plant HLW, B Plant low-level waste (LLW), REDOX LLW, Plutonium-Uranium Extraction (PUREX) Facility LLW, cladding waste, laboratory waste, Battelle Northwest Laboratory waste, evaporator bottoms, and terminal liquor.

After 1976, tank 241-S-102 received mostly evaporator bottoms and evaporator feed from tanks 241-SY-102, 241-T-101, 241-TX-102, 241-TX-104, and 241-TX-105. In 1979, additions of $HNO_3/KMnO_4$ were received from an unspecified source. These receipts were probably associated with evaporator operations which use $HNO_3/KMnO_4$ in the partial neutralization process. Large, intermittent transfers of water were added to the tank from 1972 through 1976. Approximately 2,078 kL (549 kgal) of waste was left in tank 241-S-102 after the final transfer from it in 1992.

Tank 241-S-102 was removed from service and labeled inactive in 1980. Salt well liquor waste was transferred from tank 241-S-102 to tank 241-AW-106 during the fourth quarter of 1992 as part of the interim-stabilization process. Tank 241-S-102 was partially interim-isolated in 1982 and is awaiting the completion of interim stabilization. Currently, the waste contained in tank 241-S-102 is classified as double-shell slurry feed.

Table A3-1. Tank 241-S-102 Major Transfers.[1] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume[2]	
				kL	kgal
S Plant		R	1953	905	239
241-S-101		R	1953 to 1955	4,490	1,186
	241-S-103	R	1953 to 1955	2,362	624
241-SX-106		SU	1972 to 1976	49,574	13,096
	241-SX-106	SU	1972 to 1976	24,590	6,496
241-S-101		SU	1973 to 1979	11,576	3,058
Misc.		Water	1972 to 1976	49,774	13,149
	241-S-101	SU	1973 to 1976	8,351	2,206
241-S-103		SU	1973 to 1977	16,164	4,270
	241-S-103	SU	1973 to 1977	16,660	4,401
241-S-105		SU	1973 to 1974	6,276	1,658
	241-S-105	SU	1973 to 1974	5,451	1,440
241-S-106		SU	1973 to 1975	11,053	2,920
	241-S-106	SU	1973 to 1975	10,872	2,872
241-S-107		SU	1973 to 1976	19,317	5,103
	241-S-107	SU	1973 to 1977	8,195	2,165
241-S-108		SU	1974	7,457	1,970
	241-S-108	SU	1974	7,249	1,915
241-S-109		SU	1974	8,282	2,188
	241-S-109	SU	1974	8,078	2,134
241-S-110		SU	1974 to 1976	39,425	10,415
	241-S-110	SU	1974 to 1975	3,842	1,015
241-S-111		SU	1974 to 1976	10,221	2,700
	241-S-111	SU	1974 to 1976	9,638	2,546
241-S-112		SU	1974 to 1975	6,818	1,801
	241-S-112	SU	1974 to 1975	6,465	1,708
241-SX-102		SU	1974 to 1976	22,606	5,972
	241-SX-102	SU	1974 to 1977	12,552	3,316
241-SX-103		SU	1975 to 1977	10,902	2,880
	241-SX-103	SU	1975 to 1977	11,103	2,933
241-SX-104		SU	1975 to 1976	7,423	1,961
	241-SX-104	SU	1975 to 1977	6,852	1,810
241-SX-105		SU	1975 to 1976	8,101	2,140
	241-SX-105	SU	1975 to 1976	8,245	2,178
241-U-108		SU	1975 to 1977	7,453	1,969
	241-U-108	SU	1975 to 1977	3,199	845
241-U-111		SU	1975 to 1977	12,719	3,360
	241-U-111	SU	1975 to 1977	3,914	1,034

Table A3-1. Tank 241-S-102 Major Transfers.[1] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume[2]	
				kL	kgal
	241-U-111	SU	1975 to 1977	3,914	1,034
241-U-106		SU	1976 to 1977	2,869	758
	241-U-106	SU	1976 to 1977	2,267	599
241-U-105		SU	1976	2,517	665
	241-U-105	SU	1976 to 1977	2,037	538
241-U-103		SU	1976	3,797	1,003
	241-U-103	SU	1976 to 1977	2,252	595
241-TX-104		SU	1977	2,487	657
241-SY-102		SU	1977 to 1980	8,423	2,225
	241-SY-102	SU	1977-1980	6,859	1,812

Note:

R = REDOX HLW
SU = supernatant

[1]Agnew et al (1997b)
[2]Because only major transfers are listed, the sum of these transfers will not equal the current tank volume.

A3.2 HISTORICAL ESTIMATION OF TANK CONTENTS

The historical transfer data used for this estimate are from the following sources:

- Waste Status and Transaction Record Summary: (WSTRS), Rev. 4, (Agnew et al. 1997b) is a tank-by-tank quarterly summary spreadsheet of waste transactions.

- Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4 (Agnew et al. 1997a) contains the Hanford defined waste (HDW) list, the supernatant mixing model (SMM), the tank layer model (TLM), and the historical tank content estimate (HTCE).

- The HDW list is comprised of approximately 50 waste types defined by concentration for major analytes/compounds for sludge and supernatant layers.

- The TLM defines the solid layers in each tank using waste composition and waste transfer information. The SMM is a subroutine within the HDW model that calculates the volume and composition of certain supernatant blends and concentrates.

Using these records, the TLM defines the solid layers in each tank. The SMM uses information from the WSTRS, the TLM, and the HDW list to describe the supernatants and concentrates in

each tank. Together the WSTRS, TLM, SMM, and HDW list determine the inventory estimate for each tank. These model predictions are considered estimates that require further evaluation using analytical data.

Based on Agnew et al. (1997b), tank 241-S-102 contains three layers of waste. The bottom layer is 15 kL (4 kgal) of REDOX HLW (R1) generated between 1952 and 1957, the middle layer is 773 kL (204 kgal) of type 1 242-S Evaporator saltcake (SMMS1) waste and the top layer is 1,290 kL (341 kgal) of type 242-S Evaporator salt slurry (SMMS2) waste. Figure A3-1 is a graphical representation of the estimated waste type and volume for the tank layer. The historical tank content estimate model predicts that tank 241-S-102 contains very large amounts of sodium and nitrate. Hydroxide and nitrite are also expected to be present in significant quantities. Additionally, noticeable quantities of aluminum, carbonate, and sulfate will be found. The principal radionuclides are ^{90}Sr and ^{137}Cs. Table A3-2 shows the historical estimate of the expected waste constituents and their concentrations.

Figure A3-1. Tank Layer Model.

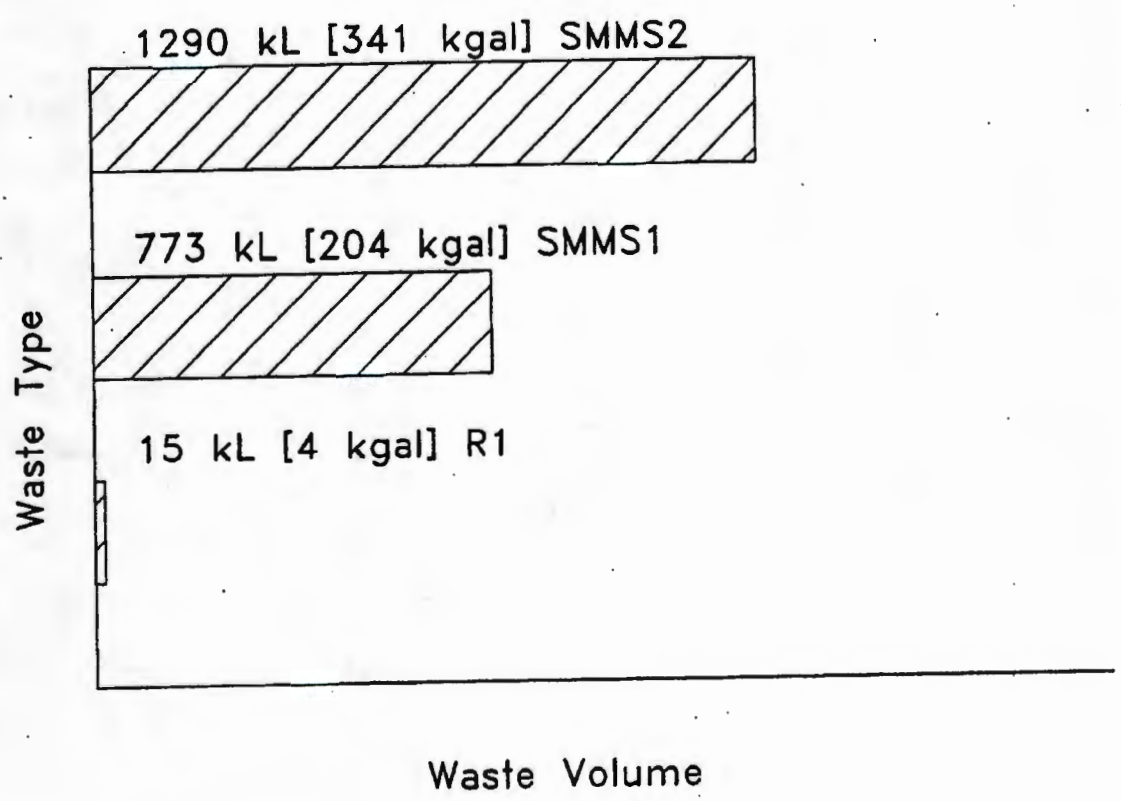


Table A3-2. Historical Tank Inventory Estimate.[1,2] (4 sheets)

Total Inventory Estimate					
Physical Properties				**-95 CI**	**+95 CI**
Total waste	2.66E+06 (kg)	(549 kgal)	---	---	---
Heat load	2.09 (kW)	7,130 (Btu/hr)	---	1.97	2.20
Bulk density[4]	1.28 (g/cc)	---	---	1.26	1.30
Water wt%[4]	61.1	---	---	59.2	63.4
TOC wt% C (wet)[4]	0.409	---	---	0.271	0.547
Constituents	**M**	**p/m**	**kg[5]**	**-95 CI**	**+95 CI**
Na^{+}	6.51	1.17E+05	3.11E+05	5.96	6.95
Al^{3+}	0.824	1.73E+04	4.62E+04	0.764	0.874
Fe^{3+}	1.22E-02	533	1.42E+03	1.13E-02	1.31E-02
Cr^{3+}	7.01E-02	2.84E+03	7.57E+03	6.21E-02	7.43E-02
Bi^{3+}	5.67E-04	92.4	246	5.15E-04	6.18E-04
La^{3+}	1.53E-05	1.65	4.41	1.11E-05	1.95E-05
Hg^{2+}	3.96E-06	0.620	1.65	3.69E-06	4.07E-06
Zr	1.07E-04	7.59	20.2	9.71E-05	1.16E-04
Pb^{2+}	4.39E-04	71.0	189	3.58E-04	5.21E-04
Ni^{2+}	3.25E-03	149	397	3.13E-03	3.32E-03
Sr^{2+}	0	0	0	0	0
Mn^{4+}	1.74E-03	74.5	198	1.31E-03	2.17E-03
Ca^{2+}	1.67E-02	522	1.39E+03	1.54E-02	1.80E-02
K^{+}	2.95E-02	901	2.40E+03	2.69E-02	3.23E-02
OH^{-}	4.82	6.40E+04	1.70E+05	4.45	5.10
NO^{3-}	2.31	1.12E+05	2.97E+05	2.14	2.36
NO^{2-}	1.14	4.09E+04	1.09E+05	0.956	1.33
CO_3^{2-}	0.191	8.94E+03	2.38E+04	0.173	0.206
PO_4^{3-}	3.88E-02	2.88E+03	7.66E+03	3.35E-02	4.07E-02
SO_4^{2-}	0.107	8.06E+03	2.15E+04	8.38E-02	0.131
Si	3.50E-02	767	2.04E+03	2.89E-02	4.11E-02
F^{-}	2.78E-02	412	1.10E+03	2.33E-02	3.17E-02
Cl^{-}	0.111	3.08E+03	8.19E+03	0.101	0.120
$C_6H_5O_7^{3-}$	1.24E-02	1.84E+03	4.89E+03	1.14E-02	1.34E-02

Table A3-2. Historical Tank Inventory Estimate.[1, 2] (4 sheets)

Total Inventory Estimate					
Constituents (Cont'd)	**M**	**p/m**	**Kg[5]**	**-95 CI**	**+95 CI**
$EDTA^{4-}$	6.27E-03	1.41E+03	3.75E+03	1.93E-03	1.07E-02
$Glycolate^{-}$	3.80E-02	2.23E+03	5.93E+03	2.48E-02	5.13E-02
$Acetate^{-}$	2.65E-03	122	325	2.17E-03	3.14E-03
$Oxalate^{2-}$	2.00E-05	1.37	3.66	1.77E-05	2.23E-05
DBP	8.38E-03	1.37E+03	3.66E+03	6.87E-03	9.86E-03
Butanol	8.38E-03	485	1.29E+03	6.87E-03	9.86E-03
NH_3	4.00E-02	530	1.41E+03	3.31E-02	5.15E-02
$Fe(CN)_6^{4-}$	0	0	0	0	0
Radiological Constituents	**(Ci/L)**	**(μCi/g)**	**(Ci[3])**	**-95 CI (Ci/L)**	**95 CI (Ci/L)**
^{3}H	1.16E-04	9.07E-02	241	6.15E-05	1.24E-04
^{14}C	1.65E-05	1.29E-02	34.2	5.03E-06	1.69E-05
^{59}Ni	1.17E-06	9.12E-04	2.43	6.30E-07	1.22E-06
^{63}Ni	1.14E-04	8.89E-02	237	6.07E-05	1.19E-04
^{60}Co	1.81E-05	1.41E-02	37.6	5.01E-06	1.87E-05
^{79}Se	1.64E-06	1.28E-03	3.41	9.08E-07	2.16E-06
^{90}Sr	6.09E-02	47.5	1.27E+05	5.73E-02	6.45E-02
^{90}Y	6.09E-02	47.5	1.27E+05	3.57E-02	6.45E-02
^{93}Zr	8.04E-06	6.28E-03	16.7	4.39E-06	1.06E-05
^{93m}Nb	5.85E-06	4.56E-03	12.1	3.29E-06	7.66E-06
^{99}Tc	1.17E-04	9.16E-02	244	7.47E-05	1.61E-04
^{106}Ru	3.20E-09	2.49E-06	6.64E-03	1.50E-09	3.92E-09
^{113m}Cd	4.21E-05	3.28E-02	87.4	2.02E-05	5.76E-05
^{125}Sb	7.76E-05	6.05E-02	161	2.09E-05	8.04E-05
^{126}Sn	2.48E-06	1.93E-03	5.15	1.38E-06	3.25E-06
^{129}I	2.26E-07	1.77E-04	0.470	1.44E-07	3.10E-07
^{134}Cs	1.19E-06	9.32E-04	2.48	8.66E-07	1.53E-06
^{137}Cs	0.127	99.1	2.64E+05	0.115	0.139
^{137m}Ba	0.120	93.8	2.50E+05	9.16E-02	0.131
^{151}Sm	5.77E-03	4.50	1.20E+04	3.21E-03	7.58E-03
^{152}Eu	1.90E-06	1.48E-03	3.95	9.95E-07	2.14E-06

Table A3-2. Historical Tank Inventory Estimate.[1, 2] (4 sheets)

Total Inventory Estimate					
Radiological Constituents (Cont'd)	**(Ci/L)**	**(μCi/g)**	**(Ci[3])**	**-95 CI (Ci/L)**	**95 CI (Ci/L)**
^{154}Eu	2.94E-04	0.229	611	1.11E-04	3.86E-04
^{155}Eu	1.11E-04	8.70E-02	232	5.76E-05	1.26E-04
^{226}Ra	7.76E-11	6.06E-08	1.61E-04	5.50E-11	9.37E-11
^{228}Ra	6.28E-08	4.90E-05	0.131	2.61E-08	1.08E-07
^{227}Ac	4.74E-10	3.70E-07	9.85E-04	3.42E-10	5.67E-10
^{231}Pa	2.02E-09	1.58E-06	4.20E-03	1.29E-09	2.54E-09
^{229}Th	1.48E-09	1.15E-06	3.07E-03	6.69E-10	2.46E-09
^{232}Th	4.18E-09	3.26E-06	8.69E-03	2.15E-09	6.21E-09
^{232}U	3.27E-07	2.55E-04	0.680	1.80E-07	5.07E-07
^{233}U	1.25E-06	9.79E-04	2.61	6.91E-07	1.94E-06
^{34}U	3.89E-07	3.04E-04	0.809	3.74E-07	4.01E-07
^{235}U	1.58E-08	1.23E-05	3.29E-02	1.52E-08	1.63E-08
^{236}U	1.21E-08	9.45E-06	2.52E-02	1.17E-08	1.25E-08
^{238}U	4.45E-07	3.48E-04	0.925	4.30E-07	4.57E-07
^{237}Np	4.31E-07	3.37E-04	0.897	2.92E-07	5.73E-07
^{238}Pu	7.06E-07	5.51E-04	1.47	5.42E-07	8.70E-07
^{239}Pu	2.61E-05	2.03E-02	54.2	2.19E-05	3.02E-05
^{240}Pu	4.32E-06	3.37E-03	8.98	3.54E-06	5.10E-06
^{241}Pu	4.73E-05	3.69E-02	98.4	3.62E-05	5.85E-05
^{242}Pu	2.57E-10	2.01E-07	5.34E-04	1.91E-10	3.24E-10
^{241}Am	2.76E-05	2.16E-02	57.4	1.99E-05	3.54E-05
^{243}Am	9.49E-10	7.41E-07	1.97E-03	7.05E-10	1.20E-09
^{242}Cm	7.08E-08	5.52E-05	0.147	3.37E-08	7.98E-08
^{243}Cm	6.47E-09	5.05E-06	1.34E-02	2.92E-09	7.28E-09
^{244}Cm	6.42E-08	5.01E-05	0.133	2.76E-08	8.44E-08

Table A3-2. Historical Tank Inventory Estimate.[1, 2] (4 sheets)

Total Inventory Estimate					
Totals	**M or g/L**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	3.40E-04	---	0.707	2.61E-04	4.19E-04
U	4.47E-03	830	2.21E+03	4.27E-03	4.61E-03

Notes:

CI = confidence interval

[1]Agnew et al. (1997a)

[2]These predictions have not been validated and should be used with caution.

[3]Unknowns in tank solids inventory are assigned by the TLM.

[4]This is the volume average for density, mass average water wt% and TOC wt% carbon.

[5]Differences exist among the inventories in this column and the inventories calculated from the two sets of concentrations.

A4.0 SURVEILLANCE DATA

Tank 241-S-102 surveillance consists of surface-level measurements (liquid and solid) and temperature monitoring inside the tank (waste and headspace). Surveillance data provide the basis for determining tank integrity. Liquid-level measurements can indicate whether the tank has a major leak. Solid surface-level measurements indicate physical changes in and consistencies of the solid layers of a tank. Dry wells located around the tank perimeter may show increased radioactivity because of leaks. The liquid observation well for tank 241-S-102 is located in riser 5.

A4.1 SURFACE-LEVEL READINGS

Tank 241-S-102 is categorized as a sound tank. The tank waste surface level is monitored with an automatic ENRAF system through riser 2. If the automated system fails, manual field measurements will be conducted quarterly. A surface level measurement of 522 cm (205.5 in.) was taken on December 31, 1998, from the manual ENRAF system obtained from the Surveillance Analysis Computer System (SACS) (LMHC 1999). A review of the SACS data for the Food Instrument Corporation and manual tape showed a steady surface level of 4.95 m (16.25 ft) since 1981, approximately 25.0 cm (10 in.) less than the ENRAF measurements.

Figure A4-1 is the historical surface level graph of the volume measurements for tank 241-S-102. Figure A4-2 is the surface level graph of the most recent measurements since January 1, 1996. Tank 241-S-102 has a liquid observation well. The tank has eight dry wells. Dry wells 40-02-03 (active prior to 1990, current readings >200 c/s) and 40-02-08 (active prior to 1990, current readings <200 c/s), have had readings greater than the 50 c/s background reading.

A4.2 INTERNAL TANK TEMPERATURES

Tank 241-S-102 has a single thermocouple tree with 6 thermocouples to monitor the waste temperature through riser 3. Elevations are available for all thermocouples. Tank 241-S-102 is on the Flammable Gas and Organics Watch Lists and has a weekly temperature reading requirement. Plots of the individual thermocouple readings can be found in the S Tank Farm supporting documents for the HTCE (Brevick et al. 1997). Figure A4-3 is a graph of the weekly high temperature.

From January 1, 1998 through December 31, 1998, the low temperature was 22.7 °C (72.9 °F), the high temperature was 63.2 °C (145.7 °F), and the mean temperature was 37.1 °C (98.7 °F).

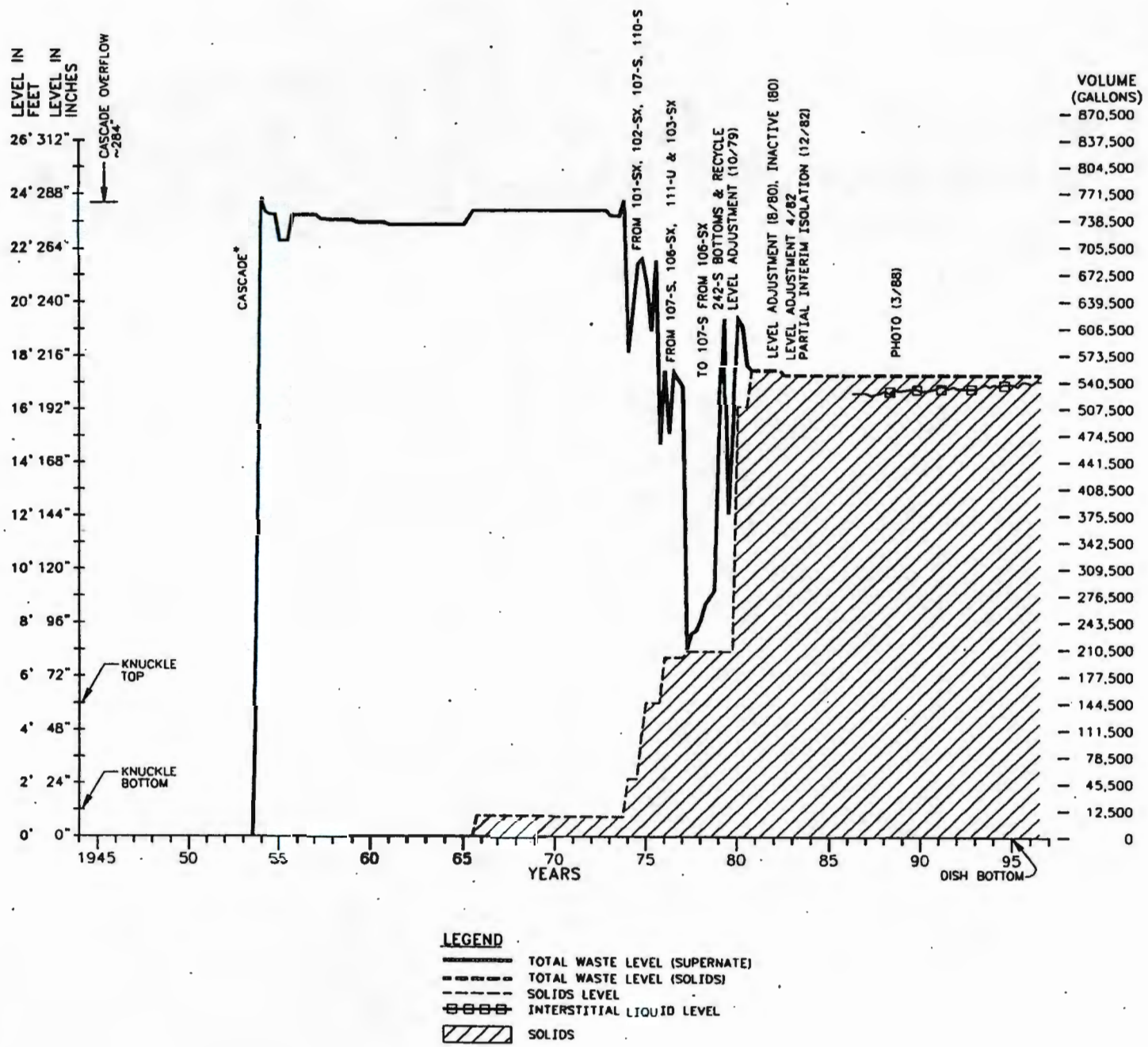


Figure A4-1. 241-S-102 Tank Surface Level.

Figure A4-2. 241-S-102 Tank Surface Level (after 1/1/96 only).

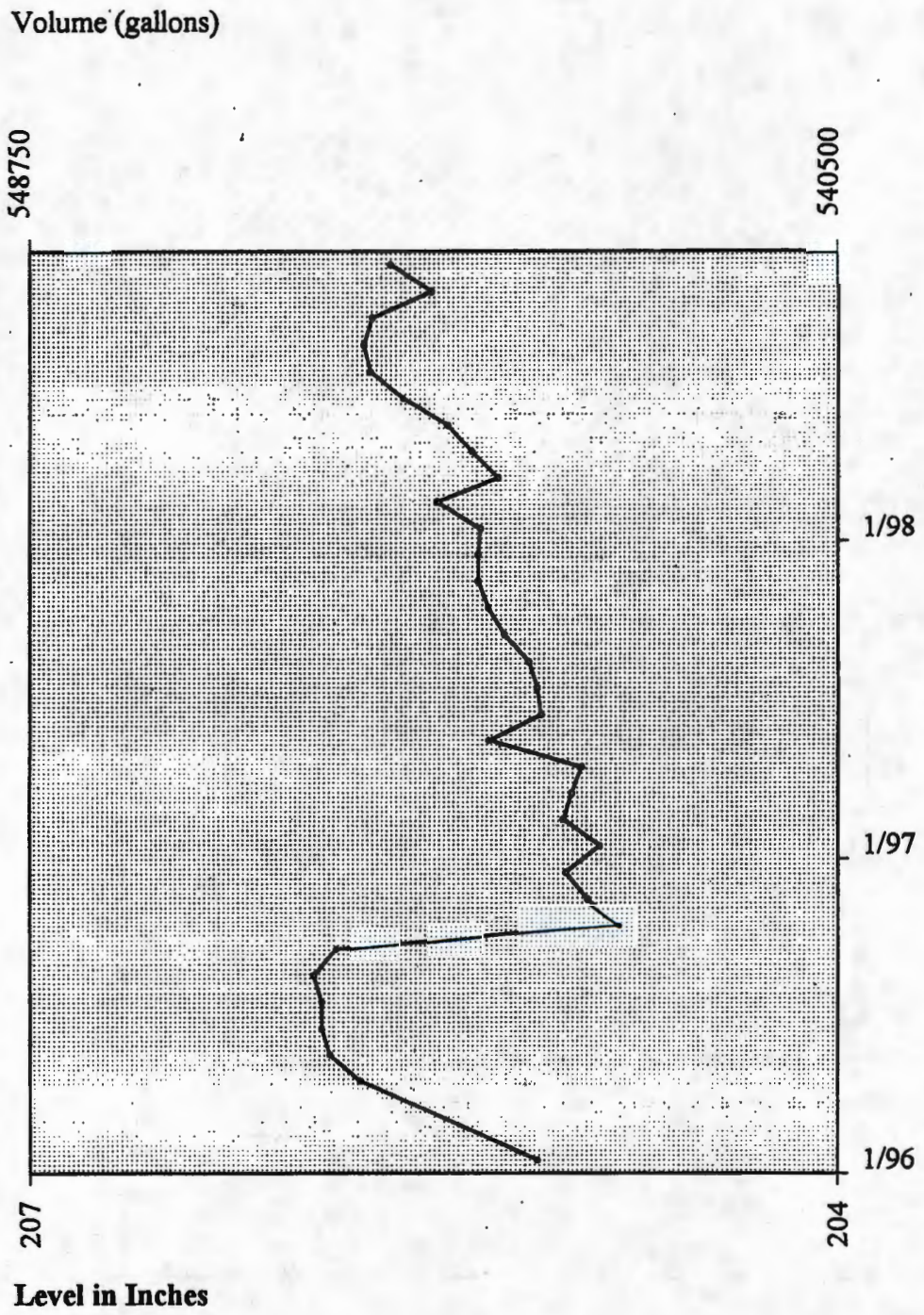
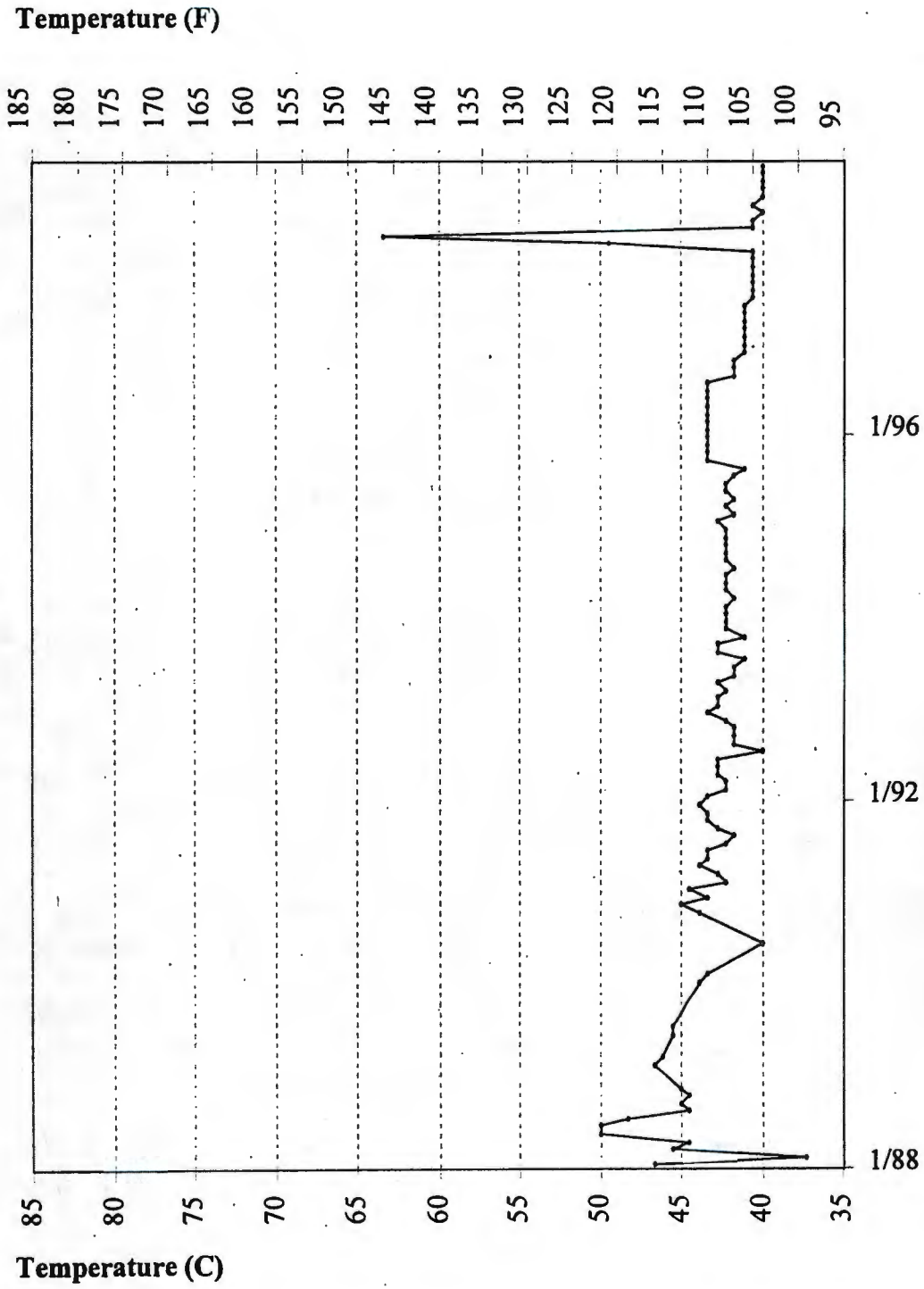


Figure A4-3. Tank 241-S-102 High Temperature Plot.[1]



[1]Note: The high spike in 1998 was a result of instrument error and can be ignored. It is identified in the database as suspect data.

A4.3 TANK 241-S-102 PHOTOGRAPHS

The March 1988 photographic montage of the tank 241-S-102 interior shows a waste surface of varied colors and textures. Most of the center of the tank appears to be filled with solids beginning to form a crust on a liquid surface. Crust has formed around the tank perimeter. Visible equipment in the photographs include a thermocouple tree, a manual tape, a Food Instrument Corporation gauge, spare nozzles, overflow nozzles, a salt well screen, two manholes, and several risers. The tank contained approximately 2,078 kL (549 kgal) of waste when the photographs were taken. The only activity in the tank since that time was the salt well pumping of 23 kL (6 kgal) to tank 241-AW-106. The photographic montage should represent the current appearance of the waste surface. Because 23 kL is only about 1.1 percent of the total waste volume, only soluble analytes are present in pumped liquids and a number of factors contribute to the uncertainty of the calculated waste volume, analyte inventories were based on a waste volume of 2,078 kL rather than on a volume of 2,055 kL.

A5.0 APPENDIX A REFERENCES

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APPENDIX B

SAMPLING OF TANK 241-S-102

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APPENDIX B

SAMPLING OF TANK 241-S-102

Appendix B provides sampling and analysis information for each known sampling event for tank 241-S-102 and assesses sample results. It includes the following.

- **Section B1.0**: Tank Sampling Overview
- **Section B2.0**: Sampling Events
- **Section B3.0**: Assessment of Characterization Results
- **Section B4.0**: References for Appendix B

B1.0 TANK SAMPLING OVERVIEW

This section describes the sampling and analysis events for tank 241-S-102. The sampling and analysis were performed in accordance with the sampling and analysis plan (SAP) prepared for each one of these events.

Two push-mode core samples were taken between January and March 1996 to satisfy the requirements of the safety screening DQO (Dukelow et al. 1995), the organic complexant safety DQO (Turner et al. 1995), and the historical model evaluation DQO (Simpson and McCain 1997). The sampling and analysis were performed in accordance with the SAP (Eggers 1996). Before core sampling began in 1996, the tank headspace vapors were measured for flammable gas concentration as required by the safety screening DQO. For further discussions of the sampling and analysis procedures, refer to the *Tank Characterization Reference Guide* (DeLorenzo et al. 1994).

Twelve push mode core segments were taken between March 5, 1998 and April 2, 1998. The segments were subsampled and analyzed in accordance with the *Tank 241-S-102 Retained Gas Sampler System Sampling and Analysis Plan* (TSAP) (McCain 1998), *Letter of Instruction (LOI) for Compatibility Analysis of Samples from Tank 241-S-102* (Thompson 1998) and the *DQOs for Tank Farms Waste Compatibility Program* (Mulkey and Miller 1997). Three grab samples were taken on October 27, 1998 from tank 241-S-102. The sampling and analyses were performed in accordance with the *Letter of Instruction for Analysis of Grab Samples from Tanks 241-S-102 and 241-S-106* (Sasaki 1998).

Two liquid grab samples were taken on June 22, 1995 to support the waste compatibility issue. Tank characterization plan (Homi 1994) was followed except that the samples were filtered before analysis. Extensive vapor sampling was done in accordance with the DQO for generic in-tank health and safety issue resolution (Osborne and Buckley 1995) between March 14, 1995 and February 11, 1997.

B2.0 SAMPLING EVENTS

This section describes sampling events. Tables B2-12 through B2-106 show analytical results. The analytical results used to characterize current tank contents were the 1996 core samples, the vapor samples from March 14, 1995 to February 11, 1997, the 1998 core samples, and the 1995 and 1998 grab samples. Historical sample results are discussed in Section B2.6 and presented in Section B2.10. Table B2-1 summarizes the sampling and analytical requirements from the safety screening and historical DQOs.

B2.1 1996 CORE SAMPLING EVENTS

A vertical profile is used to satisfy the safety screening DQO (Dukelow et al. 1995). Safety screening analyses include: total alpha activity to determine criticality, DSC to ascertain the fuel energy value, and thermogravimetric analysis (TGA) to obtain the total moisture content. In addition, combustible gas meter readings in the tank headspace were performed to measure tank headspace flammability. The safety screening DQO also requires bulk density measurements.

Tank 241-S-102 was also evaluated against the historical model requirements (Simpson and McCain 1997). The specified gateway analytes to evaluate the tank layer model (TLM) for this tank are chromium, sodium, aluminum, nitrate, carbonate, sulfate, and water. Historical model analyses include: DSC, TGA, inductively coupled plasma (ICP), and ion chromatography (IC). The full range of analytes is required for both ICP and IC analyses.

Table B2-1 summarizes the sampling and analytical requirements for applicable issues.

Description of Cores 125 and 130. Twenty-five segments were received from cores 125 and 130 by the 222-S Laboratory between January 17 and March 11, 1996. These segments were extruded between January 21 and March 18, 1996.

Analyses could not be conducted on the first segment (96-010) from core 125 because of insufficient sample recovery. At the time of extrusion, segment samples were divided into half segments or quarter segments of solid material and drainable liquid, depending on the types of materials removed from the sampler. Based on the appearance of the waste, an attempt was made to divide segments containing material resembling saltcake into half or quarter

subsegments, and segments resembling sludge into half segments. Solid material from extruded segments were assigned a location such as upper-half segment, lower-half segment, or quarter segment, depending on where the material came out on the extrusion tray and whether the material belonged to the same or a different facies. Drainable liquid was collected at the lower end of the extrusion tray in a separate jar. Solid materials were homogenized before being subsampled.

Drainable liquid samples were recovered from segments 7 and 11 (96-016 and 96-020) of core 125, and segments 5, 6A, and 10 (96-046, 96-047A, and 96-051) of core 130. Liner liquid also was recovered from segment 6A of core 130 and was treated and analyzed as a drainable liquid. It was not included in the tank mean estimates. Based on the amount recovered and the extrusion photographs, sample recoveries varied widely. Problems with sample recovery resulted in segments 6 and 8 of core 130 being sampled multiple times. No separable organic layer was observed in any segment. A field blank and a hydrostatic head fluid (HHF) blank were delivered to the 222-S Laboratory with core 125; both were analyzed as drainable liquids. In accordance with the historical model evaluation DQO, core composites of saltcake, sludge and saltcake/sludge were formed. The segment portions that formed a particular composite were based on the appearance of the sample during extrusion.

Table B2-2 summarizes the extrusion information including the subsampling scheme, the amount of sample recovered and a description of the sample visual characteristics.

Field Blank. A field blank was provided to the 222-S Laboratory with core 125. It underwent the same analyses as the drainable liquid as indicated in the tank sampling and analysis plan (Eggers 1996).

Hydrostatic Head Fluid. A sample of the HHF (lithium bromide solution) was provided with core 125 and was analyzed as drainable liquid by IC and ICP.

Table B2-1. Integrated Data Quality Objective Requirements for Tank 241-S-102.[1]

Sampling Event	Applicable DQOs	Sampling Requirements	Analytical Requirements
Push mode core sampling	Safety screening - Energetics - Moisture content - Total alpha - Flammable gas Dukelow et al. (1995) Flammable gas Bauer and Jackson (1998) Organic complexant Schreiber (1997) Historical Simpson and McCain (1997)	Core samples from a minimum of two risers separated radially to the maximum extent possible. Combustible gas measurement	Flammability, energetics, moisture, total alpha activity, density, anions, cations, radionuclides, TOC, separable organics, phyical properties, TIC, pH, Cr(VI)
Grab sampling	Compatibility Mulkey and Miller (1997)	Grab samples	Energetics, moisture, anions, cations, radionuclides, specific gravity, pH, separable organics, TOC, TIC, percent solids
Vapor sampling	Organic solvent Meacham et al. (1997)	Steel canisters, triple sorbent traps, sorbent trap systems	Flammable gas, organic vapors, permanent gases

Note:

[1]Brown et al. (1998)

B2.1.1 Sample Handling

The 1996 push mode core samples were shipped to the 222-S Laboratory for subsampling and analysis. Samples were assigned LABCORE numbers and were subjected to visual inspection for color, clarity, and solids content. The radiation dose rate on contact was also measured. Drainable liquid (and liner liquid, when present in sufficient amount) was collected and clarified

by centrifugation. Segments containing solids were divided into upper and lower half segments and were also divided longitudinally to provide material for the gas bubble retention and release studies. Sludge and saltcake composites were created from the two cores to generate a composite that would represent tank contents. Sample extrusion and subsampling for the two cores is presented in Table B2-2 (Fritts 1996).

Table B2-2. Tank 241-S-102 Subsampling Scheme and Sample Description.[1] (4 sheets)

Core:Riser	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
125:11	SEG 2 96-011	142.0	Upper half	Extruded 6 inches of solids. The solids were brown in color with white mixed through out. The texture was a saltcake. The solids were subsampled in 1 jar.
125:11	SEG 3 96-012	224.2	Upper half	Extruded 12 inches of solids which were gray in color and the texture resembled a saltcake. Subsampled in 1 jar.
125:11	SEG 4 96-013	176.4	Upper half	Extruded 15 inches of solids which were light gray to gray in color and the texture resembled a saltcake. Subsampled in 2 jars.
		139.7	Lower half	
125:11	SEG 5 96-014	135.7	Upper half	Extruded 14 inches of solids. The solids were light gray to medium gray in color and the texture resembled a saltcake. Subsampled in half segments.
		181.2	Lower half	
125:11	SEG 6 96-015	33.3	Upper portion	Extruded 13 inches of solids. The upper portion was light gray and 2 inches, the middle portion was medium gray and 10 inches and the bottom portion was light gray and 1 inch.
		202.2	Middle portion	
		49.5	Lower portion	
125:11	SEG 7 96-016	88.5	Drainable liquid	Collected 70 mL of drainable liquid which was medium gray in color and opaque. Extruded 14 inches of solids which were medium gray in color and the texture was a damp saltcake.
		164.6	Upper half	
		156.4	Lower half	

Table B2-2. Tank 241-S-102 Subsampling Scheme and Sample Description.[1] (4 sheets)

Core:Riser	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
125:11	SEG 8 96-017	193.3	Upper half	Extruded 11 inches of solids. The upper portion of solids were medium gray, the lower portion were brown and white in color and the texture was a damp saltcake. Subsampled in half segments.
		77.6	Lower half	
125:11	SEG 9 96-018	232.0	Upper half	Extruded 19 inches of solids which were black in color and the texture resembled a soft sludge. Subsampled in half segments.
		230.1	Lower half	
125:11	SEG 10 96-019	210.0	Upper half	Extruded 17 inches of solids which were black in color and the texture was a soft sludge. Subsampled in half segments.
		198.8	Lower half	
125:11	SEG 11 96-020	13.1	Drainable liquid	Collected 3 mLs of drainable liquid that was clear and light yellow in color. Extruded 10 inches of solids that were gray in color and were a saltcake. Subsampled in half segments.
		300.5	Upper half	
130:14	SEG 2 96-043	139.9	Upper half	Extruded 8 inches of solids that were medium gray in color and the texture resembled a saltcake. The solids were subsampled in 1 jar.
130:14	SEG 3 96-044	245.0	Upper half	Extruded 10 inches of solids. The solids were medium gray in color and the texture resembled a saltcake. The solids were subsampled in 1 jar.
130:14	SEG 4 96-045	184.8	Upper half	Extruded 10 inches of solids which ranged from gray to white in color and the texture was a very fine, crumbly saltcake. The solids were subsampled as a whole segment.

Table B2-2. Tank 241-S-102 Subsampling Scheme and Sample Description.[1] (4 sheets)

Core:Riser	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
130:14	SEG 5 96-046	43.6	Drainable liquid	Collected 30 mLs of drainable liquid that was yellowish/gray in color and opaque. Extruded 12 inches of solids that were gray in color and the texture was a mixture of solid sludge and wet saltcake.
		53.4	Upper portion	
		152.6	Middle portion	
		142.9	Lower portion	
130:14	SEG 6 96-047	101.6	Upper half	Extruded 6 inches of solids that were gray in color and the texture was a mixture of sludge and saltcake. The solids were subsampled in half segments.
		32.1	Lower half	
130:14	SEG 6A 96-047A	72.0	Drainable liquid	Collected 45 mLs of gray opaque drainable liquid. Extruded 4 inches of solids that were gray in color and the texture was a wet saltcake. Subsampled in 1jar.
		122.2	Upper half	
130:14	SEG 6B 96-047B	290.8	Upper half	Extruded 19 inches of solids that ranged from light gray to dark gray and the texture was a damp saltcake. The solids were subsampled in half segments.
		228.0	Lower half	
130:14	SEG 7 96-048	84.7	Upper half	Extruded 4 inches of solids which were blue gray in color and the texture was a damp saltcake. The solids were subsampled into 1 jar.
130:14	SEG 8 96-049	124.4	Upper half	Extruded 6 inches of solids that were dark gray in color and the texture was a damp saltcake. The solids were subsampled in 1 jar.
130:14	SEG 8A 96-049A	76.0	Upper portion	Extruded 11.5 inches of solids that were gray and black in color and the texture was a mixture of sludge and saltcake. The solids were subsampled in quarter segments.
		90.4	Middle portion	
		119.8	Lower portion	
130:14	SEG 9 96-050	250.4	Upper half	Extruded 19 inches of solids that were black in color and the texture resembled a sludge. The solids were subsampled in half segments.
		228.9	Lower half	

Table B2-2. Tank 241-S-102 Subsampling Scheme and Sample Description.[1] (4 sheets)

Core:Riser	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
130:14	SEG 10 96-051	43.4	Drainable liquid	Collected 43 mLs of drainable liquid that was black in color and opaque. Extruded 16 inches of solids that were black in color and the texture was a sludge.
		194.7	Upper half	
		203.4	Lower half	
130:14	SEG 11 96-052	30.2	Upper half	Extruded 9 inches of solids that were black in color and the texture was a mixture of sludge and saltcake. The solids were subsampled in half segments.
		148.4	Lower half	

Note:

[1]Fritts (1996)

B2.1.2 Sample Analysis

As noted in Table B2-1, the safety screening DQO required analyses for thermal properties by DSC, moisture by TGA, fissile content by total alpha analysis, and bulk density (specific gravity for the drainable liquid samples). The DSC, TGA, and bulk density/specific gravity analyses were conducted on direct samples. Total alpha activity was analyzed directly on the liquid samples after dilution in acid and with fusion-digestion on solid samples. In addition to the core samples, the flammability of the tank headspace was measured prior to core sampling (Fritts 1996).

Bromide analysis by IC and lithium analysis by ICP were required by the SAP to determine the amount of HHF contamination in the samples. Nitrate and several metals were also reported as a result of the IC and ICP analyses to satisfy the requirements of the historical model evaluation DQO.

Anticipating verification of the presence of SMMS1 saltcake by the fingerprint analytes, the historical model evaluation DQO required secondary analyses on all subsegments and core composites. These were in addition to the fingerprint analytes of aluminum, chromium, sodium, carbonate, nitrate, sulfate, and weight percent water, and the other primary analytes, DSC and ^{137}Cs.

All IC analyses, opportunistic and DQO-driven, were performed directly after dilution in water on liquid samples and prepared with water digestion on solid samples. The IC analyses were performed on all subsegments and composites. Additional analytes required by the historical model evaluation DQO included bismuth, calcium, iron, manganese, nickel, phosphorus, silicon, and uranium. For all ICP analyses, subsegment and core-composite samples were prepared

using an acid digestion. Samples of segments 7 and 9, from both cores and all composites, also were analyzed after preparation by a water digestion. The ICP liquid samples were analyzed directly after dilution in acid.

Cesium-137 and all opportunistic gamma energy analyses (GEA) were performed on fusion-digested samples for segments 7 and 9 from both cores and all composites. The TIC and TOC analyses were performed on direct samples and conducted on all subsegments and composites. Additional historical model evaluation secondary analytes that were conducted on segments 7 and 9, from both cores and all composites, included total beta and $^{89/90}Sr$ (both performed on fusion-digested samples), fusion-digested uranium analyzed by phosphorescence, total alpha activity, TOC, and bulk density (Fritts 1996).

The organic complexant safety DQO also required DSC, TOC, and weight percent water as primary analytes.

Laboratory quality control checks included laboratory control standards, matrix spikes, duplicate analyses, and blanks, as appropriate.

All reported analyses were performed in accordance with approved laboratory procedures. No deviations or modifications were noted by the laboratory.

Table B2-3 lists the approved analytical procedures used for reported analyses. Table B2-4 summarizes the sample portions, sample numbers, and analyses performed on each sample.

Table B2-3. Analytical Procedures.[1] (2 sheets)

Analysis	Method	Procedure Number
Energetics	Differential Scanning Calorimetery	LA-514-113 LA-514-114
Percent water	Thermogravimetric Analysis	LA-560-112 LA-514-114
Total alpha activity	Alpha proportional counter	LA-508-101
Flammable gas	Combustible gas analysis	WHC-IP-0030 IH 1.4 and IH-2.1[2]
TOC/TIC	Persulfate oxidation coulometry Furnace oxidation coulometry	LA-342-100 LA-344-105
Metals	Inductively coupled plasma atomic emission spectrometry	LA-505-161
Anions	Ion chromatography	LA-533-105
Radionuclides	Gamma energy analysis	LA-548-121
Uranium	Kinetic phosphorescence	LA-925-009
^{90}Sr	Beta proportional counting	LA-220-101

Table B2-3. Analytical Procedures.[1] (2 sheets)

Analysis	Method	Procedure Number
Total beta activity	Beta proportional counting	LA-220-101
Hydroxide	Titration	LA-661-102
PH	Direct	LA-212-102
Bulk density	Gravimetry	LO-160-103

Notes:

[1]Fritts (1996)
[2]WHC(1992)

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 125, riser 11			
1	Whole	n/a	Insufficient sample
2	Upper half	S96T000655	Bulk density
		S96T000755	DSC, TGA, TIC, TOC
		S96T000861	Alpha
		S96T000881	IC
		S96T000906	ICP (acid digest)
3	Upper half	S96T000657	Bulk density
		S96T000756	DSC, TGA, TIC, TOC
		S96T000862	Alpha
		S96T000885	IC
		S96T000907	ICP (acid digest)
4	Upper half	S96T000527	Bulk density
		S96T000757	DSC, TGA, TIC, TOC
		S96T000863	Alpha
		S96T000886	IC
		S96T000908	ICP (acid digest)

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 125, riser 11 (Cont'd)			
4 (Cont'd)	Lower half	S96T000528	Bulk density
		S96T000758	DSC, TGA, TIC, TOC
		S96T000864	Alpha
		S96T000887	IC
		S96T000909	ICP (acid digest)
5	Upper half	S96T000573	Bulk density
		S96T000759	DSC, TGA, TIC, TOC
		S96T000865	Alpha
		S96T000888	IC
		S96T000910	ICP (acid digest)
	Lower half	S96T000579	Bulk density
		S96T000760	DSC, TGA, TIC, TOC
		S96T000866	Alpha
		S96T000889	IC
		S96T000911	ICP (acid digest)
6	A	S96T000580	Bulk density
		S96T000761	DSC, TGA, TIC, TOC
		S96T000867	Alpha
		S96T000890	IC
		S96T000912	ICP (acid digest)
	B	S96T000581	Bulk density
		S96T000762	DSC, TGA, TIC, TOC
		S96T000868	Alpha
		S96T000891	IC
		S96T000913	ICP (acid digest)
	C	S96T000582	Bulk density
		S96T000763	DSC, TGA, TIC, TOC
		S96T000869	Alpha
		S96T000892	IC
		S96T000914	ICP (acid digest)
7	Upper half	S96T000584	Bulk density
		S96T000764	DSC, TGA, TIC, TOC
		S96T000870	Uranium, $^{89/90}$Sr, GEA, alpha, Beta

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 125, riser 11 (Cont'd)			
7 (Cont'd)	Upper half	S96T000893	IC
		S96T000915	ICP (acid digest)
		S96T003184	ICP (water digest)
	Lower half	S96T000585	Bulk density
		S96T000765	DSC, TGA, TIC, TOC
		S96T000871	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T000894	IC
		S96T000916	ICP (acid digest)
		S96T003188	ICP (water digest)
	Drainable liquid	S96T000773	DSC, TGA, TIC, TOC, SpG, ICP (acid dilution), IC, alpha
8	Upper half	S96T000586	Bulk density
		S96T000766	DSC, TGA, TIC, TOC
		S96T000872	Alpha
		S96T000895	IC
		S96T000917	ICP (cid digest)
	Lower half	S96T000587	Bulk density
		S96T000767	DSC, TGA, TIC, TOC
		S96T000873	KOH (fusion), alpha
		S96T000896	IC
		S96T000918	ICP (acid digest)
9	Upper half	S96T000588	Bulk density
		S96T000768	DSC, TGA, TIC, TOC
		S96T000874	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T000897	IC
		S96T000919	ICP (acid digest)
		S96T003189	ICP (water digest)
	Lower half	S96T000589	Bulk density
		S96T000769	DSC, TGA, TIC, TOC
		S96T000875	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T000898	IC
		S96T000920	ICP (acid digest)
		S96T003190	ICP (water digest)

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 125, riser 11 (Cont'd)			
10	Upper half	S96T000590	Bulk density
		S96T000770	DSC, TGA, TIC, TOC
		S96T000876	Alpha
		S96T000899	IC
		S96T000921	ICP (acid digest)
	Lower half	S96T000591	Bulk density
		S96T000771	DSC, TGA, TIC, TOC
		S96T000877	Alpha
		S96T000900	IC
		S96T000922	ICP (acid digest)
11	Upper half	S96T000592	Bulk density
		S96T000772	DSC, TGA, TIC, TOC
		S96T000878	Alpha
		S96T000901	IC
		S96T000923	ICP (acid digest)
	Drainable liquid	S96T000634	DSC, TGA, TIC, TOC, SpG, ICP (acid dilution), IC, alpha
Field blank	Whole	S96T000838	DSC, SpG, TGA, TIC, TOC, ICP (acid dilution), IC, alpha
HHF	Whole	S96T000326	ICP (cid dilution), IC
Composite (saltcake)	Whole	S96T000774	Bulk density
		S96T000777	DSC, TGA, TIC, TOC
		S96T000879	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T000902	IC
		S96T000904	ICP
		S96T000925	ICP (acid digest)
Composite (sludge)	Whole	S96T000776	Bulk density
		S96T000780	DSC, TGA, TIC, TOC
		S96T000880	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T000903	IC
		S96T000905	ICP
		S96T000926	ICP (acid digest)

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 130, riser 14			
1	Whole	N/A	Insufficient sample
2	Upper half	S96T001111	Bulk density
		S96T001141	DSC, TGA, TIC, TOC
		S96T001173	Alpha
		S96T001181	ICP (acid digest)
	Upper half	S96T001189	IC
3	Upper half	S96T001112	Bulk density
		S96T001145	DSC, TGA, TIC, TOC
		S96T001174	Alpha
		S96T001182	ICP (acid digest)
		S96T001190	IC
4	Upper half	S96T001113	Bulk density
		S96T001146	DSC, TGA, TIC, TOC
		S96T001175	Alpha
		S96T001183	ICP (acid digest)
		S96T001191	IC
5	A	S96T001114	Bulk density
		S96T001147	DSC, TGA, TIC, TOC
		S96T001176	Alpha
		S96T001184	ICP (acid digest)
		S96T001192	IC
	B	S96T001115	Bulk density
		S96T001148	DSC, TGA, TIC, TOC
		S96T001177	Alpha
		S96T001185	ICP (acid digest)
		S96T001193	IC
	C	S96T001116	Bulk density
		S96T001149	DSC, TGA, TIC, TOC
		S96T001178	Alpha
		S96T001186	ICP (acid digest)
		S96T001194	IC
	Drainable liquid	S96T001125	DSC, TGA, TIC, TOC, ICP (acid dilution), IC, alpha

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 130, riser 14 (Cont'd)			
6	Upper half	S96T001117	Bulk density
		S96T001150	TGA, DSC, TIC, TOC
		S96T001179	Alpha
		S96T001187	ICP (acid digest)
		S96T001195	IC
	Lower half	S96T001118	Bulk density
		S96T001151	TGA, DSC, TIC, TOC
		S96T001180	Alpha
		S96T001188	ICP (acid digest)
6A	Upper half	S96T001386	DSC, TGA, TIC, TOC
		S96T001387	Bulk density
		S96T001465	Alpha
		S96T001479	ICP (acid digest)
		S96T001496	IC
	Drainable liquid	S96T001382	DSC, TGA, TIC, TOC, SpG, ICP (acid dilution), IC, alpha
	Liner liquid	S96T001383	DSC, TGA, TIC, TOC, SpG, ICP (acid dilution), IC, alpha
6B	Upper half	S96T001393	Bulk density
		S96T001399	DSC, TGA, TIC, TOC
		S96T001466	Alpha
		S96T001480	ICP (acid digest)
		S96T001497	IC
	Lower half	S96T001394	Bulk density
		S96T001401	DSC, TGA, TIC, TOC
		S96T001467	Alpha
		S96T001481	ICP (acid digest)
		S96T001498	IC
7	Upper half	S96T001389	Bulk density
		S96T001390	DSC, TGA, TIC, TOC
		S96T001468	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T001482	ICP (acid digest)
		S96T001493	IC
		S96T003194	ICP (water digest)

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 130, riser 14 (Cont'd)			
8	Upper half	S96T001408	Bulk density
		S96T001409	DSC, TGA, TIC, TOC
		S96T001469	Alpha
		S96T001483	ICP (acid digest)
		S96T001499	IC
8A	A	S96T001416	Bulk density
		S96T001429	DSC, TGA, TIC, TOC
		S96T001470	Alpha
		S96T001484	ICP (acid digest)
		S96T001500	IC
	B	S96T001417	Bulk density
		S96T001424	DSC, TGA, TIC, TOC
		S96T00S96T001471	Alpha
		S96T001485	ICP (acid digest)
		S96T001501	IC
	C	S96T001418	Bulk density
		S96T001425	DSC, TGA, TIC, TOC
		S96T001472	Alpha
		S96T001486	ICP (acid digest)
		S96T001494	IC
9	Upper half	S96T001439	Bulk density
		S96T001441	DSC, TGA, TIC, TOC
		S96T001473	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T001487	ICP (acid digest)
		S96T001495	IC
		S96T003195	ICP (water digest)
	Lower half	S96T001440	Bulk density
		S96T001442	DSC, TGA, TIC, TOC
		S96T001474	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T001488	ICP (acid digest)
		S96T001502	IC
		S96T003193	ICP (water digest)

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 130, riser 14 (Cont'd)			
10	Upper half	S96T001419	Bulk density
		S96T001426	DSC, TGA, TIC, TOC
		S96T001475	Alpha
		S96T001489	ICP (acid digest)
		S96T001503	IC
	Lower half	S96T001420	Bulk density
		S96T001427	DSC, TGA, TIC, TOC
		S96T001476	Alpha
		S96T001490	ICP (acid digest)
		S96T001504	IC
	Drainable liquid	S96T001437	DSC, TGA, TIC, TOC, ICP (acid dilution), IC, alpha
11	Upper half	S96T001421	Bulk density
		S96T001434	DSC, TGA, TIC, TOC
		S96T001477	Alpha
		S96T001491	ICP (acid digest)
		S96T001505	IC
	Lower half	S96T001422	Bulk density
		S96T001435	DSC, TGA, TIC, TOC
		S96T001478	Alpha
		S96T001492	ICP (acid digest)
		S96T001506	IC
Composite (saltcake)	Whole	S96T001574	Bulk density
		S96T001577	DSC, TGA, TIC, TOC
		S96T001583	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T001586	ICP (acid digest)
		S96T001589	IC
		S96T001592	ICP (water digest)
Composite (saltcake/sludge)	Whole	S96T001576	Bulk density
		S96T001579	DSC, TGA, TIC, TOC
		S96T001585	Uranium, $^{89/90}$Sr, GEA, alpha, beta

Table B2-4. Sample Analyses Summary.[1] (9 sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 130, riser 14 (Cont'd)			
Composite (saltcake/sludge) (Cont'd)	Whole (Cont'd)	S96T001588	ICP (acid digest)
		S96T001591	IC
		S96T001594	ICP (water digest)
Composite (sludge)	Whole	S96T001575	Bulk density
		S96T001578	DSC, TGA, TIC, TOC
		S96T001584	Uranium, $^{89/90}$Sr, GEA, alpha, beta
		S96T001587	ICP (acid digest)
		S96T001590	IC
		S96T001593	ICP (water digest)

Notes:

n/a = not applicable

[1]Fritts (1996)

B2.1.3. Analytical Results

This section summarizes the sampling and analytical results associated with the 1996 core sampling and analysis of tank 241-S-102. Table B2-5 shows the total alpha activity, percent water, energetics, IC, and ICP analytical results associated with this tank. These results are documented in Fritts (1996).

Table B2-5. Analytical Tables.

Analysis	Table Number
Inductively coupled plasma/emission spectroscometry	B2-12 to B2-48
Ion chromatography	B2-49 to B2-56
Bulk density	B2-57
Energetics by differential scanning calorimetry	B2-58 to B2-60
Specific gravity	B2-63
Percent water by thermogravimetric analysis	B2-61
Total alpha	B2-64 to B2-65
Total inorganic carbon	B2-78
Total organic carbon	B2-79

The quality control (QC) parameters assessed in conjunction with tank 241-S-102 samples were standard recoveries, spike recoveries, duplicate analyses, relative percent differences (RPDs), and blanks. The QC criteria are specified in the SAP (Eggers 1996). Sample and duplicate pairs, in which any QC parameter was outside these limits, are footnoted in the sample mean column of the following data summary tables with an a, b, c, d, e, or f as follows.

- "a" indicates the standard recovery was below the QC limit.
- "b" indicates the standard recovery was above the QC limit.
- "c" indicates the spike recovery was below the QC limit.
- "d" indicates the spike recovery was above the QC limit.
- "e" indicates the RPD was above the QC limit.
- "f" indicates blank contamination.

In the analytical tables in this section, the "mean" is the average of the result and duplicate value. All values, including those below the detection level (denoted by "<") were averaged. If both sample and duplicate values were non-detected or if one value was detected while the other was not, the mean is expressed as a non-detected value. If both values were detected, the mean is expressed as a detected value.

B2.1.3.1 Total Alpha Activity. Analyses for total alpha activity were performed on the samples recovered from tank 241-S-102. The samples were prepared by fusion digestion. Two fusions were prepared for each sample (for duplicate results). Each fused dilution was analyzed and the results were averaged and reported as one value. Total alpha results for one of the five core composites resulted in an RPD of 34.4 percent. This was because of the low level of alpha activity. No reruns were requested.

For the solid samples, the highest individual sample result for total alpha activity was 1.31 μCi/g, the highest upper limit of the 95 percent confidence interval on the mean was 1.94 μCi/g, and the overall mean was 0.167 μCi/g. The only detected drainable liquid sample measured 0.0121 μCi/mL. All total alpha activity values were at least one order of magnitude below their safety screening thresholds.

B2.1.3.2 Thermogravimetric Analysis. Thermogravimetric analysis measures the mass of a sample as its temperature is increased at a constant rate. Nitrogen is passed over the sample during heating to remove any released gases. A decrease in the weight of a sample during TGA represents a loss of gaseous matter from the sample, through evaporation or through a reaction that forms gas phase products. The moisture content is estimated by assuming that all TGA sample weight loss up to a certain temperature (typically 150 to 200 °C [300 to 390 °F]) is caused by water evaporation. The temperature limit for moisture loss is chosen by the operator at an inflection point on the TGA plot. Other volatile matter fractions can often be differentiated by inflection points as well.

Most solid samples exhibited a large weight loss between ambient temperature and 250 °C. This weight loss was attributed to water evaporation. The overall weight percent water mean estimate for the tank was 22.7 percent. Several sample means were below the organic complexant DQO decision threshold of 17 weight percent water. Because the minimum exothermic energy necessary to support a propagating reaction is a change in enthalpy with a magnitude of at least 480 J/g (Turner et al. 1995) and because no sample result exhibited an exothermic reaction this large, the low weight percent water values were not a concern.

B2.1.3.3 Differential Scanning Calorimetry. In a DSC analysis, heat absorbed or emitted by a substance is measured while the sample is heated at a constant rate. Nitrogen is passed over the sample material to remove any gases being released. The onset temperature for an endothermic or exothermic event is determined graphically.

On a dry-weight basis, no sample exceeded the safety screening and organic complexant safety DQO decision criteria threshold of 480 J/g. The highest individual sample result for solids was 244.4 J/g, and the highest upper limit of the 95 percent confidence interval on the mean was 260.9 J/g. The highest individual sample result for the drainable liquids was 306.3 J/g, and the highest 95 percent confidence interval upper limit was 385.2 J/g (Fritts 1996).

B2.1.3.4 Inductively Coupled Plasma. Samples were prepared by fusion or acid digest or water digest. Although a full suite of analytes were reported, only lithium was requested for the safety screening DQO. The SAP (Eggers 1996) required the laboratory to perform ICP analyses for lithium to determine whether any samples were contaminated by HHF. However, the historical model evaluation DQO required analyses of several additional analytes in an attempt to quantify the errors involved in predicting tank waste composition. The primary ICP analytes detected were aluminum and sodium; other analytes observed at concentrations above detection limits were chromium, iron, potassium, manganese, and silicon. The lithium concentration of all samples was <100 μg/g indicating that the contamination from the hydrostatic head fluid may not be significant.

B2.1.3.5 Ion Chromatography (Ions). Samples were prepared by water digest. Although a full suite of analytes were reported, only bromide was requested for the safety screening DQO. The SAP (Eggers 1996) required the laboratory to perform IC analyses for bromide to determine whether any samples were contaminated by HHF. However, the historical model evaluation DQO required analyses of several additional analytes in an attempt to quantify the errors involved in predicting tank waste composition. The primary IC analytes were nitrate, nitrite, and phosphate. Also detected were sulfate, oxalate, and chloride.

Bromide concentration of some samples was high indicating that the samples might have been contaminated by intrusion of HHF. Therefore, HHF conrtamination analysis of the subject samples was performed and is presented in Section C3.0.

B2.1.3.6 Specific Gravity and Bulk Density. Density/specific gravity measurements were performed on all subsegments. The subsegment-level results ranged from a high of 1.92 g/mL (from the upper half of segment 11, core 125), to a low of 1.274 g/mL (from the drainable liquid

sample of segment 10, core 130), and yielded an overall mean of 1.64 g/mL. The saltcake, sludge, and saltcake/sludge composites yielded estimates of 1.69 g/mL, 1.67 g/mL, and 1.75 g/mL, respectively.

B2.1.3.7 Total Organic Carbon. TOC analysis was performed on the direct subsamples. The chemist noted that an RPD of 23 percent for sample S96T001390 was the result of a low analyte level reaching the detector and sample inhomogeneity. The maximum sample size allowed by the procedure was used in this analysis and a re-analysis would not improve the results. A triplicate analysis was run for samples S96T000780 and S96T001441. These triplicate analyses were run as an informal check on the sample and duplicate and are not considered in this report. The raw data for the triplicate analysis is included with the TIC/TOC raw data.

Drainable liquid sample S96T000634 could not be accurately delivered by pipetting. The weight of sample analyzed (instead of the volume) was used to calculate the results. For this liquid sample, the result units are µg/g instead of µg/mL. The results for the field blank are higher than expected showing the possibility of contamination. However, the results are much lower than the TOC levels reported for the samples and does not impact sample data quality.

The overall mean TOC result was 4,490 µg C/g, and the highest 95 percent confidence interval upper limits were 24,100 µg C/g and 8,920 µg C/g for the solid and drainable liquid samples, respectively. All results were below the organic complexant safety DQO decision criteria threshold of 30,000 µg C/g.

B2.1.3.8 Total Inorganic Carbon. TIC analysis was performed on the direct subsamples. A high RPD for sample S96T001435 resulted in a triplicate analysis. A triplicate analysis was also run for samples S96T000780 and S96T001441. The raw data for the triplicate analysis is included with the TIC/TOC raw data in this report. Drainable liquid sample S96T000634 could not be accurately delivered by pipetting. The weight of sample analyzed (instead of the volume) was used to calculate the results. For this liquid sample, the result units are µg/g instead of µg/mL. The results for the field blank are higher than expected showing the possibility of contamination. However, the results are much lower than the TIC levels reported for the samples and does not impact sample data quality. An RPD of 43.1 percent is reported for the field blank, and the laboratory did not provide any explanation.

The overall mean using the weighted method based on the number of samples of each category, viz., segment samples, saltcake composite samples etc., was 5,200 µg C/g.

B2.2 VAPOR PHASE MEASUREMENT

As requested in the SAP (Eggers 1996) and required by the safety screening DQO (Dukelow et al. 1995), the tank 241-S-102 headspace was sampled and analyzed before core sampling in 1996 for the presence of flammable gases, using a combustible gas meter. This was crucial considering that tank 241-S-102 is on the Flammable Gas Watch List. The results were six percent of the LFL, well below the 25 percent decision threshold. In addition, the concentration

of oxygen gas, ammonia gas, and TOC vapors were determined. The ammonia concentrations were above the 500 p/m threshold considered by the National Institute of Safety and Health to be "immediately dangerous to life or health" (Fritts 1996). The results of the headspace measurements are provided in Table B2-6. Domespace measurements taken on September 10, 1998, before liquid grab sampling, are also listed in the table.

Table B2-6. Results of Headspace Measurements of Tank 241-S-102. [1]

Measurement	Riser 7 January 1996	Riser 7 September 1998
Flammable vapor concentration as a percent of the LEL	6%	0%
Volume percent oxygen gas	20.4%	20.8%
Concentration of ammonia gas	> 700 p/m	700 p/m
Concentration of TOC vapor	65.3 p/m	42 p/m

Note:

[1]Fritts (1996)

During the period March 14, 1995 to February 11, 1997, six vapor samples were taken from the headspace of tank 241-S-102. A team of personnel from the Pacific Northwest National Laboratory analyzed these samples. The results are reported in Pool et al. (1995, 1997a, 1997b), Evans et al. (1996, 1997) and Mitroshkov et al. (1997).

Pacific Northwest National Laboratory was contracted to provide sampling devices and to analyze inorganic and organic analytes collected from the tank headspace. Sampling devices included sorbent trains (for inorganic analyses), and SUMMA canisters (for organic analyses). Samples were taken from the tank headspace on March 1, 1995, January 26, 1996, April 4, 1996, September 19, 1996, December 19, 1996 and February 11, 1997. Immediately after the samples were collected, they were transported to Pacific Northwest National Laboratory for analysis.

A summary of results of inorganic and organic analyses is shown in Table B2-7.

Table B2-7. Results of Headspace Vapor Sample Measurements from March 14, 1995 to February 11, 1997.[1,2,3]

Category	Sample Medium	Analyte	Concentration	Units
Inorganic analytes	Sorbent traps	NH_3	412-798	P/mv
		NO_2	< 0.16	P/mv
		NO	< 0.16	P/mv
		H_2O	12.2-16.0	Mg/L
Permanent gases	Summa[4] canister	H_2	460-1,179	P/mv
		CH_4	< 50	P/mv
		CO_2	2-33	P/mv
		CO	< 17	P/mv
		N_2O	509-1,041	P/mv
TNMOC	SUMMA™ canister	TNMOC	15.5-27.5	Mg/m^3
Organics	SUMMA™ canister	Methanol	4.9-12.44	Mg/m^3
		Ethanol	9.55-19.42	Mg/m^3
		Acetone/1-Butanol	0.44-1.76	Mg/m^3
Organics	Sorbent traps	Methanol	3.01-27.41	Mg/m^3
		Ethanol	4.05-27.25	Mg/m^3
		Acetone/1-Butanol	0.41-3.35	Mg/m^3

Notes:

[1]Pool et al. 1995, 1997a, 1997b
[2]Evans et al., 1996, 1997
[3]Mitroshkov et al., 1997
[4]SUMMA is a trademark of Moletrics, Inc., Cleveland, Ohio.

B2.3 DESCRIPTION OF 1998 CORE SAMPLING EVENT

Twelve push mode core segments were collected from tank 241-S-102 through riser 16 between March 5, 1998 and April 2, 1998. Eleven segments were expected to be taken from core 232. However, because of poor sample recovery obtained during the sampling of segment 4, an additional segment was taken and identified as 4R. The segments were subsampled and analyzed in accordance with the *Tank 241-S-102 Retained Gas Sampler System Sampling and Analysis Plan* (TSAP) (McCain 1998), *Letter of Instruction (LOI) for Compatibility Analysis of Samples from Tank 241-S-102* (Thompson 1998) and the *Data Quality Objectives for Tank Farms Waste Compatibility Program (DQO)* (Mulkey and Miller 1997). A field blank was

provided to the 222-S Laboratory with core 232 and was submitted to the laboratory for IC and ICP analyses (Steen 1998). A sample of the HHF was provided with core 232 and was analyzed as drainable liquid by IC and ICP.

The TSAP (McCain 1998) required the core samples to be extruded and archived. The LOI (Thompson 1998) requested analyses associated with the Compatibility DQO be performed on these samples. Core 232 segment 1 contained sufficient liquid to perform these analyses. No analyses were performed on the remaining archived samples. The analytical results are reported in Steen (1998). Because the results are obtained for only one segment, they are included in Section B2.7 along with the analytical data for the 1996 core samples. The extrusion information is given below in Table B2-8. The analytical procedures and sample analysis summary for core 232 segment 1 liquid analyses are shown in Tables B2-9 and B2-10.

Table B2-8. Tank 241-S-102 Subsampling Scheme and Sample Description.[1] (2 sheets)

Core:Riser	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
232:16	SEG 1	350.6	Whole	Collected 250mLs of drainable liquid that was clear and yellow in color. No organic layer was observed.
232:16	SEG 2		Whole	RGS
232:16	SEG 3	219.0	Upper half	Extruded 12 inches of solids that were gray and white in color and resembled a wet salt. The liquid (<5 mL) was dark gray in color, opaque, and subsampled in with the upper half solids.
		186.4	Lower half	
232:16	SEG 4		Whole	RGS
232:16	SEG 4R		Whole	RGS
232:16	SEG 5	0.0	Whole	The sampler was empty.
232:16	SEG 6		Whole	RGS
232:16	SEG 7		Whole	RGS
232:16	SEG 8		Whole	RGS
232:16	SEG 9	257.0	Upper half	No drainable liquid. Extruded 17 inches of solids that were gray in color and the texture was a wet salt.
		223.4	Lower half	
232:16	SEG 10		Whole	RGS

Table B2-8. Tank 241-S-102 Subsampling Scheme and Sample Description.[1] (2 sheets)

Core:Riser	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
232:16	SEG 11	170.9	Upper half	No drainable liquid. Extruded 13 inches of solids that were black in color and the texture was a moist salt.
		164.1	Lower half	

Notes:

RGS = retained gas sample

[1]Steen (1998)

Table B2-9. Analytical Procedures.[1]

Analysis	Method	Procedure Number
Energetics	Differential Scanning Calorimetery	LA-514-114
Percent water	Thermogravimetric Analysis	LA-514-114
Specific gravity	Specific gravity	LA-510-112
$[H^+]$	PH	LA-212-106
OH^-	Titration	LA-211-102
TOC/TIC	Persulfate oxidation	LA-342-100
Metals	Inductively coupled plasma atomic emission spectrometry	LA-505-161
Anions	Ion chromatography	LA-533-105
Radionuclides	Gamma energy analysis	LA-548-121
Uranium isotopes	ICP/MS	LA-506-101
^{90}Sr	Beta proportional counting	LA-220-101
Ammonia	Ion selective electrode	LA-631-001
^{239}Pu, ^{241}Am	Alpha counting	LA-953-104

Note:

[1]Steen (1998)

Table B2-10. Sample Analyses Summary. [1]

Segment	Segment Portion	Sample Number	Analyses
CORE 232, RISER 16			
1	Drainable liquid	S98T002514	DSC, OH^-, pH, TGA, ICP/MS
		S98T002515	Sp.G., TIC, TOC, ICP, IC
		S98T002516	ISE, $^{89/90}Sr$, GEA
		S98T002679	$^{239/240}Pu$, ^{241}Am

Note:

[1]Steen (1998)

B2.4 DESCRIPTION OF 1998 GRAB SAMPLING EVENT

Three grab samples were taken from riser 13 of tank 241-S-102 on October 27, 1998 and received by the 222-S Laboratory on October 27, 1998. The samples were obtained from three different elevations in the tank. The elevations (as measured from tank bottom) were 204 inches, 108 inches, and 12 inches for samples 25-98-1, 25-98-2, and 25-98-3 respectively. Analyses were performed in accordance with the *LOI for Analysis of Grab Samples from Tanks 241-S-102 and 241-S-106* (Sasaki 1998). The analytical results are reported in Fuller (1998) and presented here in Section B2.8.

Table B2-11 provides the appearance information for the grab samples. As required by the LOI, specific gravity, TGA, bulk density and ammonia analyses were performed on the samples. The LOI specifies the ammonia analysis be performed by Ion Selective Electrode. However, because of instrumentation problems, the ammonia analysis was performed by Ion Chromatography (IC).

The IC ammonia method is sensitive to sodium and samples with a high sodium content must be diluted before analysis. The detection limit for sample S98T003209 was 480 μg/g because of a large dilution factor. The results were reported as less than the detection limit. The laboratory re-ran the analysis of sample S98T003209 (Hardy 1998) using a more concentrated sample. However, the results were still below the detection limit and the ammonia concentrations were reported as <41.33 μg/g.

Table B2-11. Appearance Information for 1998 Tank 241-S-102 Grab Samples.

Sample Number	Date Sampled	Date Received	% Settled Solids	Sample Description
2S-98-1	10/27/98	10/27/98	5.4 %	Light yellow, clear liquid; no organic layer was observed. Solids were white/crystalline.
2S-98-2	10/27/98	10/27/98	29.3 %	Light yellow, clear to opaque liquid. No organic layer was observed. Solids were white (slightly dirty) and crystalline.
2S-98-3	10/27/98	10/27/98	42.4 %	Light yellow, opaque liquid; no organic layer was observed. Solids were white to dark and crystalline.

B2.5 DESCRIPTION OF 1995 GRAB SAMPLING EVENT

Two liquid grab samples from tank 241-S-102 riser 13 were taken on June 22, 1995 and received by the 222-S Laboratories on June 22, 1995. Both samples were analyzed to support the waste compatibility safety issue . The tank characterization plan (Homi 1994) was followed except that the samples were filtered before analysis. Accuracy and precision criteria were met for all analyses. No notifications were required based on sample results.

Visual observation indicated that sample S-102-1 was cloudy with approximately 5 percent settled solids and sample S-102-2 was cloudy with approximately 26 percent settled solids. Both samples did not contain an organic layer. The analytical results are reported in Esch (1995) and summarized in Section B2.9.

B2.6 DESCRIPTION OF HISTORICAL SAMPLING EVENT

Most sampling events that occurred during the process history of tank 241-S-102 involved the retrieval of supernatant samples when the tank was used as a feed tank to the 242-S Evaporator. The most recent drainable liquid data may or may not represent current tank contents. No sampling date or methodology were available. The most recent historical solids sample does not represent current tank contents because the tank was still active during and after this sampling event.

Jansky (1980) reported results from a liquid sample analyzed approximately March 20, 1980. The dates of sample retrieval and analysis were not given. No description of the technique or procedure used to obtain the sample and no information concerning the sampled riser or sample depth were available. Analytical results are given in Table B2-106.

Delegard (1979) reports the following about a December 31, 1979 solids sample. The core sample exhibited two layers: one layer was smooth and soft; the other was coarse and grainy. The dates of the sample retrieval and sample analysis were not given. No description of the technique or procedure used to obtain the sample and no information about the sampled riser or sample depth were available. Approximately 95 weight percent of the sample was water-soluble. The remaining material was dissolved in hydrochloric acid. No information was available about sample handling during analysis. Table B2-105 shows the analytical results.

B2.7 1996 PUSH CORE DATA TABLES

Table B2-12. Tank 241-S-102 Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	6,810	7,280	7,050
S96T000907	Core 125:3	Upper half	4,470	4,530	4,500
S96T000908	Core 125:4	Upper half	6,160	6,500	6,330[QC:d]
S96T000909		Lower half	11,300	10,200	10,800
S96T000910	Core 125:5	Upper half	6,070	6,090	6,080
S96T000911		Lower half	10,300	10,100	10,200
S96T000912	Core 125:6	Subsegment A, top	2,220	2,180	2,200
S96T000913		Subsegment B	14,400	14,200	14,300[QC:d]
S96T000914		Subsegment C	8,560	9,100	8,830
S96T000915	Core 125:7	Upper half	15,600	14,700	15,200
S96T000916		Lower half	14,500	15,500	15,000
S96T000917	Core 125:8	Upper half	20,600	18,200	19,400
S96T000918		Lower half	11,100	11,600	11,400
S96T000919	Core 125:9	Upper half	12,300	12,900	12,600
S96T000920		Lower half	13,700	13,100	13,400
S96T000921	Core 125:10	Upper half	14,700	14,800	14,800[QC:c]
S96T000922		Lower half	13,000	13,400	13,200

Table B2-12. Tank 241-S-102 Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000923	Core 125:11	Upper half	31,900	24,800	28,400[QC:e]
S96T001181	Core 130:2	Upper half	11,500	8,950	10,200[QC:e]
S96T001182	Core 130:3	Upper half	4,410	4,140	4,280
S96T001183	Core 130:4	Upper half	7,340	7,630	7,490
S96T001184	Core 130:5	Subsegment A, top	11,400	10,700	11,100
S96T001185		Subsegment B	11,700	11,700	11,700[QC:c]
S96T001186		Subsegment C	15,800	16,100	16,000
S96T001187	Core 130:6	Upper half	15,200	14,300	14,800
S96T001188		Lower half	14,800	15,700	15,300
S96T001479	Core 130:6A	Upper half	11,000	11,000	11,000[QC:d]
S96T001480	Core 130:6B	Upper half	6,520	8,360	7,440[QC:d,e]
S96T001481		Lower half	6,690	7,320	7,010
S96T001482	Core 130:7	Upper half	13,900	12,500	13,200[QC:c]
S96T001483	Core 130:8	Upper half	16,500	13,700	15,100
S96T001484	Core 130:8A	Subsegment A, top	14,400	14,500	14,500
S96T001485		Subsegment B	19,400	23,900	21,700[QC:e]
S96T001486		Subsegment C	19,800	19,900	19,900
S96T001487	Core 130:9	Upper half	12,900	12,600	12,800
S96T001488		Lower half	10,500	10,900	10,700
S96T001489	Core 130:10	Upper half	13,000	14,400	13,700
S96T001490		Lower half	17,900	14,600	16,300[QC:e]
S96T001491	Core 130:11	Upper half	13,100	13,800	13,500
S96T001492		Lower half	26,500	57,100	41,800[QC:e]
S96T000925	Core 125	Solid composite	10,900	10,700	10,800[QC:d]
S96T000926		Solid composite	14,900	13,000	14,000[QC:c]
S96T001586	Core 130	Solid composite	11,800	10,500	11,200
S96T001587		Solid composite	14,800	17,000	15,900
S96T001588		Solid composite	26,300	26,300	26,300

Table B2-12. Tank 241-S-102 Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	13,000	11,100	12,100
S96T003188		Lower half	4,760	9,840	7,300[QC:d,e]
S96T003189	Core 125:9	Upper half	10,800	12,400	11,600
S96T003190		Lower half	11,500	12,400	12,000
S96T003194	Core 130:7	Upper half	12,800	13,000	12,900
S96T003195	Core 130:9	Upper half	657	7,470	4,060[QC:d,e]
S96T003196		Lower half	986	1,500	1,240[QC:d,e]
S96T000904	Core 125	Solid composite	11,200	11,600	11,400[QC:d]
S96T000905		Solid composite	14,200	14,200	14,200[QC:d]
S96T001592	Core 130	Solid composite	9,680	11,300	10,500
S96T001593		Solid composite	15,000	15,700	15,400
S96T001594		Solid composite	13,000	29,700	21,400[QC:c,e]
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	19,700	20,100	19,900[QC:d]
S96T000634	Core 125:11	Drainable liquid	61,700	60,700	61,200
S96T001125	Core 130:5	Drainable liquid	51,700	52,100	51,900[QC:d]
S96T001382	Core 130:6A	Drainable liquid	51,700	49,600	50,700
S96T001437	Core 130:10	Drainable liquid	25,800	25,600	25,700
S98T002515	Core 232:1	Drainable liquid	26,900	27,500	27,200[QC:d]

Table B2-13. Tank 241-S-102 Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000906	Core 125:2	Upper half	<24.6	<23.1	<23.9
S96T000907	Core 125:3	Upper half	<25.1	<23.6	<24.4
S96T000908	Core 125:4	Upper half	<24.7	<23.4	<24
S96T000909		Lower half	<26	<26.2	<26.1
S96T000910	Core 125:5	Upper half	<25.8	<27.8	<26.8
S96T000911		Lower half	<25.3	<29.3	<27.3
S96T000912	Core 125:6	Subsegment A, top	<56.7	<57.3	<57[QC:c]
S96T000913		Subsegment B	<59.2	<56	<57.6
S96T000914		Subsegment C	<56.8	<61.3	<59
S96T000915	Core 125:7	Upper half	<105	<104	<105
S96T000916		Lower half	<57.3	<53.4	<55.3
S96T000917	Core 125:8	Upper half	<57.1	<54.7	<55.9
S96T000918		Lower half	<24.4	<26.1	<25.3
S96T000919	Core 125:9	Upper half	<22.8	<21.3	<22.1
S96T000920		Lower half	<22.6	<22.7	<22.6
S96T000921	Core 125:10	Upper half	<22.5	<21.8	<22.1
S96T000922		Lower half	<22	<23.4	<22.7
S96T000923	Core 125:11	Upper half	<10.3	<9.85	<10.1
S96T001181	Core 130:2	Upper half	<58.4	<57.1	<57.8[QC:c]
S96T001182	Core 130:3	Upper half	<59	<56.5	<57.8
S96T001183	Core 130:4	Upper half	<56.8	<53	<54.9
S96T001184	Core 130:5	Subsegment A, top	<56.9	<54	<55.5
S96T001185		Subsegment B	64	<51.3	<57.6[QC:c,e]
S96T001186		Subsegment C	<59.1	<60.5	<59.8
S96T001187	Core 130:6	Upper half	<54.4	<64.8	<59.6
S96T001188		Lower half	<63.1	<57.1	<60.1
S96T001479	Core 130:6A	Upper half	<25	<25.2	<25.1

Table B2-13. Tank 241-S-102 Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001480	Core 130:6B	Upper half	<36	<35.3	<35.6[QC:c]
S96T001481		Lower half	<35.4	<36.6	<36
S96T001482	Core 130:7	Upper half	<34.6	<34.1	<34.4
S96T001483	Core 130:8	Upper half	<36.8	<37	<36.9
S96T001484	Core 130:8A	Subsegment A, top	<34.7	<34.3	<34.5
S96T001485		Subsegment B	<37.2	<35.9	<36.5
S96T001486		Subsegment C	<46.5	<48.2	<47.4
S96T001487	Core 130:9	Upper half	<46	<48.1	<47
S96T001488		Lower half	<48.3	<47.2	<47.8
S96T001489	Core 130:10	Upper half	<47.8	<45.9	<46.8
S96T001490		Lower half	<35	<36.7	<35.9
S96T001491	Core 130:11	Upper half	<46.3	<45.4	<45.8
S96T001492		Lower half	<22.2	<21.7	<21.9
S96T000925	Core 125	Solid composite	<22.9	<22.4	<22.6
S96T000926		Solid composite	<25	<24.7	<24.9
S96T001586	Core 130	Solid composite	<33.9	<35.4	<34.6
S96T001587		Solid composite	<31	<36.3	<33.6
S96T001588		Solid composite	<30.9	<25.5	<28.2
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<29.8	<33.3	<31.5
S96T003188		Lower half	<29.3	<29.4	<29.4
S96T003189	Core 125:9	Upper half	<34.4	<36.3	<35.3
S96T003190		Lower half	<35	<30.8	<32.9
S96T003194	Core 130:7	Upper half	<30.3	<31.2	<30.8
S96T003195	Core 130:9	Upper half	<31.9	<29.8	<30.9
S96T003196		Lower half	<34.4	<33	<33.7

Table B2-13. Tank 241-S-102 Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T000904	Core 125	Solid composite	<42.4	<42.7	<42.5
S96T000905		Solid composite	<52.2	<49.6	<50.9
S96T001592	Core 130	Solid composite	<32.7	<32.3	<32.5
S96T001593		Solid composite	<34.6	<38.1	<36.4
S96T001594		Solid composite	<34.5	<32.6	<33.5
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<72.1	<72.1	<72.1
S96T000634	Core 125:11	Drainable liquid	<72.1	<72.1	<72.1
S96T001125	Core 130:5	Drainable liquid	<36.1	<36.1	<36.1
S96T001382	Core 130:6A	Drainable liquid	<36.1	<36.1	<36.1
S96T001437	Core 130:10	Drainable liquid	<24.1	<24.1	<24.1
S98T002515	Core 232:1	Drainable liquid	<36.1	<36.1	<36.1

Table B2-14. Tank 241-S-102 Analytical Results: Arsenic (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<41	<38.5	<39.8
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1
S96T000913		Subsegment B	<98.6	<93.3	<95.9
S96T000914		Subsegment C	<94.7	<102	<98.3

Table B2-14. Tank 241-S-102 Analytical Results: Arsenic (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000915	Core 125:7	Upper half	<175	<173	<174
S96T000916		Lower half	<95.5	<89	<92.3
S96T000917	Core 125:8	Upper half	<95.2	<91.2	<93.2
S96T000918		Lower half	<40.7	<43.4	<42
S96T000919	Core 125:9	Upper half	<38	<35.5	<36.8
S96T000920		Lower half	<37.7	<37.9	<37.8
S96T000921	Core 125:10	Upper half	<37.5	<36.3	<36.9
S96T000922		Lower half	<36.6	<39.1	<37.9
S96T000923	Core 125:11	Upper half	<17.1	<16.4	<16.8
S96T001181	Core 130:2	Upper half	<97.3	<95.1	<96.2
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	<94.7	<88.4	<91.6
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	<87.1	<85.4	<86.3
S96T001186		Subsegment C	<98.6	<101	<99.8
S96T001187	Core 130:6	Upper half	<90.6	<108	<99.3
S96T001188		Lower half	<105	<95.2	<100
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	<61.9	<59.9	<60.9
S96T001486		Subsegment C	<77.5	<80.3	<78.9

Table B2-14. Tank 241-S-102 Analytical Results: Arsenic (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001487	Core 130:9	Upper half	<76.6	<80.2	<78.4
S96T001488		Lower half	<80.6	<78.6	<79.6
S96T001489	Core 130:10	Upper half	<79.7	<76.5	<78.1
S96T001490		Lower half	<58.4	<61.1	<59.8
S96T001491	Core 130:11	Upper half	<77.1	<75.7	<76.4
S96T001492		Lower half	<37	<36.1	<36.5
S96T000925	Core 125	Solid composite	<38.2	<37.3	<37.8
S96T000926		Solid composite	<41.7	<41.2	<41.5
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	<51.7	<60.5	<56.1
S96T001588		Solid composite	<51.5	<42.4	<47
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9

Table B2-14. Tank 241-S-102 Analytical Results: Arsenic (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-15. Tank 241-S-102 Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	<20.5	<19.3	<19.9
S96T000907	Core 125:3	Upper half	<20.9	<19.7	<20.3
S96T000908	Core 125:4	Upper half	<20.7	<19.5	<20.1
S96T000909		Lower half	<21.7	<22.5	<22.1
S96T000910	Core 125:5	Upper half	<21.5	<23.2	<22.4
S96T000911		Lower half	<21.1	<24.4	<22.8
S96T000912	Core 125:6	Subsegment A, top	<47.3	<47.8	<47.5
S96T000913		Subsegment B	<49.3	<46.7	<48
S96T000914		Subsegment C	<47.4	<51.1	<49.3
S96T000915	Core 125:7	Upper half	<87.3	<86.4	<86.8
S96T000916		Lower half	<47.7	<44.5	<46.1
S96T000917	Core 125:8	Upper half	<47.6	<45.6	<46.6
S96T000918		Lower half	<20.3	<21.7	<21
S96T000919	Core 125:9	Upper half	<19	<17.7	<18.4
S96T000920		Lower half	<18.9	<19	<18.9

Table B2-15. Tank 241-S-102 Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000921	Core 125:10	Upper half	<18.7	<18.1	<18.4
S96T000922		Lower half	22.4	22.3	22.4
S96T000923	Core 125:11	Upper half	10	10.9	10.4
S96T001181	Core 130:2	Upper half	<48.7	<47.5	<48.1
S96T001182	Core 130:3	Upper half	<49.1	<47	<48
S96T001183	Core 130:4	Upper half	<47.4	<44.2	<45.8
S96T001184	Core 130:5	Subsegment A, top	<47.4	<45	<46.2
S96T001185		Subsegment B	<43.6	<42.7	<43.2
S96T001186		Subsegment C	<49.3	<50.4	<49.8
S96T001187	Core 130:6	Upper half	<45.3	<54	<49.6
S96T001188		Lower half	<52.6	<47.6	<50.1
S96T001479	Core 130:6A	Upper half	<20.8	<21	<20.9
S96T001480	Core 130:6B	Upper half	<30	<29.4	<29.7
S96T001481		Lower half	<29.5	<30.5	<30
S96T001482	Core 130:7	Upper half	<28.8	<28.4	<28.6
S96T001483	Core 130:8	Upper half	<30.7	<30.8	<30.8
S96T001484	Core 130:8A	Subsegment A, top	<28.9	<28.6	<28.8
S96T001485		Subsegment B	<31	<30	<30.5
S96T001486		Subsegment C	<38.8	<40.1	<39.5
S96T001487	Core 130:9	Upper half	<38.3	<40.1	<39.2
S96T001488		Lower half	<40.3	<39.3	<39.8
S96T001489	Core 130:10	Upper half	<39.9	<38.3	<39.1
S96T001490		Lower half	<29.2	<30.5	<29.9
S96T001491	Core 130:11	Upper half	<38.6	<37.8	<38.2
S96T001492		Lower half	30.8	38.1	34.5[QC:e]

Table B2-15. Tank 241-S-102 Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000925	Core 125	Solid composite	<19.1	<18.7	<18.9
S96T000926		Solid composite	<20.8	<20.6	<20.7
S96T001586	Core 130	Solid composite	<28.2	<29.5	<28.9
S96T001587		Solid composite	<25.8	<30.3	<28.1
S96T001588		Solid composite	<25.7	<21.2	<23.4
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T003184	Core 125:7	Upper half	<24.9	<27.8	<26.4
S96T003188		Lower half	<24.4	<24.5	<24.4
S96T003189	Core 125:9	Upper half	<28.7	<30.3	<29.5
S96T003190		Lower half	<29.1	<25.7	<27.4
S96T003194	Core 130:7	Upper half	<25.3	<26	<25.6
S96T003195	Core 130:9	Upper half	<26.6	<24.8	<25.7
S96T003196		Lower half	<28.7	<27.5	<28.1
S96T000904	Core 125	Solid composite	<35.4	<35.6	<35.5
S96T000905		Solid composite	<43.5	<41.3	<42.4
S96T001592	Core 130	Solid composite	<27.2	<26.9	<27
S96T001593		Solid composite	<28.8	<31.8	<30.3
S96T001594		Solid composite	<28.8	<27.2	<28
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<60	<60	<60
S96T000634	Core 125:11	Drainable liquid	<60	<60	<60
S96T001125	Core 130:5	Drainable liquid	<30.1	<30.1	<30.1
S96T001382	Core 130:6A	Drainable liquid	<30.1	<30.1	<30.1
S96T001437	Core 130:10	Drainable liquid	<20.1	<20.1	<20.1
S98T002515	Core 232:1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-16. Tank 241-S-102 Analytical Results: Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<2.05	<1.93	<1.99
S96T000907	Core 125:3	Upper half	<2.09	<1.97	<2.03
S96T000908	Core 125:4	Upper half	<2.07	<1.95	<2.01
S96T000909		Lower half	<2.17	<2.25	<2.21
S96T000910	Core 125:5	Upper half	<2.15	<2.32	<2.23
S96T000911		Lower half	<2.11	<2.44	<2.27
S96T000912	Core 125:6	Subsegment A, top	<4.73	<4.78	<4.76
S96T000913		Subsegment B	<4.93	<4.67	<4.8
S96T000914		Subsegment C	<4.74	<5.11	<4.93
S96T000915	Core 125:7	Upper half	<8.73	<8.64	<8.69
S96T000916		Lower half	<4.77	<4.45	<4.61
S96T000917	Core 125:8	Upper half	<4.76	<4.56	<4.66
S96T000918		Lower half	<2.03	<2.17	<2.1
S96T000919	Core 125:9	Upper half	<1.9	<1.77	<1.84
S96T000920		Lower half	<1.89	<1.9	<1.9
S96T000921	Core 125:10	Upper half	<1.87	<1.81	<1.84
S96T000922		Lower half	<1.83	<1.95	<1.89
S96T000923	Core 125:11	Upper half	<0.855	<0.821	<0.838
S96T001181	Core 130:2	Upper half	<4.87	<4.75	<4.81
S96T001182	Core 130:3	Upper half	<4.91	<4.7	<4.8
S96T001183	Core 130:4	Upper half	<4.74	<4.42	<4.58
S96T001184	Core 130:5	Subsegment A, top	<4.74	<4.5	<4.62
S96T001185		Subsegment B	<4.36	<4.27	<4.31
S96T001186		Subsegment C	<4.93	<5.04	<4.98
S96T001187	Core 130:6	Upper half	<4.53	<5.4	<4.96
S96T001188		Lower half	<5.26	<4.76	<5.01
S96T001479	Core 130:6A	Upper half	<2.08	<2.1	<2.09

Table B2-16. Tank 241-S-102 Analytical Results: Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001480	Core 130:6B	Upper half	<3	<2.94	<2.97
S96T001481		Lower half	<2.95	<3.05	<3
S96T001482	Core 130:7	Upper half	<2.88	<2.84	<2.86
S96T001483	Core 130:8	Upper half	<3.07	<3.08	<3.08
S96T001484	Core 130:8A	Subsegment A, top	<2.89	<2.86	<2.88
S96T001485		Subsegment B	<3.1	<3	<3.05
S96T001486		Subsegment C	<3.88	<4.01	<3.94
S96T001487	Core 130:9	Upper half	<3.83	<4.01	<3.92
S96T001488		Lower half	<4.03	<3.93	<3.98
S96T001489	Core 130:10	Upper half	<3.99	<3.83	<3.91
S96T001490		Lower half	<2.92	<3.05	<2.98
S96T001491	Core 130:11	Upper half	<3.86	<3.78	<3.82
S96T001492		Lower half	<1.85	<1.81	<1.83
S96T000925	Core 125	Solid composite	<1.91	<1.87	<1.89
S96T000926		Solid composite	<2.08	<2.06	<2.07
S96T001586	Core 130	Solid composite	<2.82	<2.95	<2.88
S96T001587		Solid composite	<2.58	<3.03	<2.8
S96T001588		Solid composite	<2.57	<2.12	<2.34
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<2.49	<2.78	<2.63
S96T003188		Lower half	<2.44	<2.45	<2.45
S96T003189	Core 125:9	Upper half	<2.87	<3.03	<2.95
S96T003190		Lower half	<2.91	<2.57	<2.74
S96T003194	Core 130:7	Upper half	<2.53	<2.6	<2.56
S96T003195	Core 130:9	Upper half	<2.66	<2.48	<2.57
S96T003196		Lower half	<2.87	<2.75	<2.81

Table B2-16. Tank 241-S-102 Analytical Results: Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T000904	Core 125	Solid composite	<3.54	<3.56	<3.55
S96T000905		Solid composite	<4.35	<4.13	<4.24
S96T001592	Core 130	Solid composite	<2.72	<2.69	<2.71
S96T001593		Solid composite	<2.88	<3.18	<3.03
S96T001594		Solid composite	<2.88	<2.72	<2.8
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<6	<6	<6
S96T000634	Core 125:11	Drainable liquid	<6	<6	<6
S96T001125	Core 130:5	Drainable liquid	<3	<3	<3
S96T001382	Core 130:6A	Drainable liquid	<3	<3	<3
S96T001437	Core 130:10	Drainable liquid	<2	<2	<2
S98T002515	Core 232:1	Drainable liquid	<3	<3	<3

Table B2-17. Tank 241-S-102 Analytical Results: Bismuth (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<41	<38.5	<39.8
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5

Table B2-17. Tank 241-S-102 Analytical Results: Bismuth (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1
S96T000913		Subsegment B	<98.6	<93.3	<95.9
S96T000914		Subsegment C	<94.7	<102	<98.3
S96T000915	Core 125:7	Upper half	<175	<173	<174
S96T000916		Lower half	<95.5	<89	<92.3
S96T000917	Core 125:8	Upper half	<95.2	<91.2	<93.2
S96T000918		Lower half	<40.7	<43.4	<42
S96T000919	Core 125:9	Upper half	66.6	66.6	66.6
S96T000920		Lower half	<37.7	54.4	<46[QC:e]
S96T000921	Core 125:10	Upper half	70.4	78.5	74.5
S96T000922		Lower half	59.4	56.4	57.9
S96T000923	Core 125:11	Upper half	<17.1	<16.4	<16.8
S96T001181	Core 130:2	Upper half	<97.3	<95.1	<96.2
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	<94.7	<88.4	<91.6
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	<87.1	<85.4	<86.3
S96T001186		Subsegment C	<98.6	<101	<99.8
S96T001187	Core 130:6	Upper half	<90.6	<108	<99.3
S96T001188		Lower half	<105	<95.2	<100
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5

Table B2-17. Tank 241-S-102 Analytical Results: Bismuth (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	121	124	123
S96T001486		Subsegment C	108	117	113
S96T001487	Core 130:9	Upper half	85.4	<80.2	<82.8
S96T001488		Lower half	<80.6	118	<99.3[QC:e]
S96T001489	Core 130:10	Upper half	<79.7	<76.5	<78.1
S96T001490		Lower half	79	66.5	72.8
S96T001491	Core 130:11	Upper half	<77.1	<75.7	<76.4
S96T001492		Lower half	<37	<36.1	<36.5
S96T000925	Core 125	Solid composite	<38.2	<37.3	<37.8
S96T000926		Solid composite	46.8	66.8	56.8[QC:e]
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	73.9	92.9	83.4[QC:e]
S96T001588		Solid composite	<51.5	52	<51.8
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8

Table B2-17. Tank 241-S-102 Analytical Results: Bismuth (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-18. Tank 241-S-102 Analytical Results: Boron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<20.5	<19.3	<19.9
S96T000907	Core 125:3	Upper half	<20.9	<19.7	<20.3
S96T000908	Core 125:4	Upper half	<20.7	<19.5	<20.1
S96T000909		Lower half	34.9	24.6	29.8[QC:e]
S96T000910	Core 125:5	Upper half	35.9	<23.2	<29.5[QC:e]
S96T000911		Lower half	27.5	101	64.3[QC:e]
S96T000912	Core 125:6	Subsegment A, top	<47.3	<47.8	<47.5
S96T000913		Subsegment B	<49.3	<46.7	<48
S96T000914		Subsegment C	<47.4	<51.1	<49.3

Table B2-18. Tank 241-S-102 Analytical Results: Boron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000915	Core 125:7	Upper half	106	240	173[QC:e]
S96T000916		Lower half	<47.7	<44.5	<46.1
S96T000917	Core 125:8	Upper half	<47.6	<45.6	<46.6
S96T000918		Lower half	<20.3	104	<62.1[QC:e]
S96T000919	Core 125:9	Upper half	82.3	56.4	69.3[QC:e]
S96T000920		Lower half	96.5	98	97.3
S96T000921	Core 125:10	Upper half	102	77.1	89.5[QC:e]
S96T000922		Lower half	164	152	158
S96T000923	Core 125:11	Upper half	19.6	20.5	20.1
S96T001181	Core 130:2	Upper half	<48.7	134	<91.3[QC:e]
S96T001182	Core 130:3	Upper half	120	<47	<83.5[QC:e]
S96T001183	Core 130:4	Upper half	56.8	<44.2	<50.5[QC:e]
S96T001184	Core 130:5	Subsegment A, top	164	<45	<105[QC:e]
S96T001185		Subsegment B	133	<42.7	<87.8[QC:e]
S96T001186		Subsegment C	<49.3	75.4	<62.4[QC:e]
S96T001187	Core 130:6	Upper half	150	118	134[QC:e]
S96T001188		Lower half	162	148	155
S96T001479	Core 130:6A	Upper half	30.1	32.6	31.4
S96T001480	Core 130:6B	Upper half	<30	191	<111[QC:e]
S96T001481		Lower half	<29.5	<30.5	<30
S96T001482	Core 130:7	Upper half	40.1	<28.4	<34.3[QC:e]
S96T001483	Core 130:8	Upper half	88.3	35.9	62.1[QC:e]
S96T001484	Core 130:8A	Subsegment A, top	36.3	63.9	50.1[QC:e]
S96T001485		Subsegment B	46.1	35.9	41[QC:e]
S96T001486		Subsegment C	191	108	150[QC:e]

Table B2-18. Tank 241-S-102 Analytical Results: Boron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001487	Core 130:9	Upper half	134	127	131
S96T001488		Lower half	181	106	144[QC:e]
S96T001489	Core 130:10	Upper half	69.4	61.7	65.6
S96T001490		Lower half	59.7	68.9	64.3
S96T001491	Core 130:11	Upper half	133	94.8	114[QC:e]
S96T001492		Lower half	49.1	91	70[QC:e]
S96T000925	Core 125	Solid composite	26.5	25.7	26.1
S96T000926		Solid composite	98.2	115	107
S96T001586	Core 130	Solid composite	151	81.3	116[QC:e]
S96T001587		Solid composite	244	208	226
S96T001588		Solid composite	145	204	175[QC:e]
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	275	375	325[QC:e]
S96T003188		Lower half	310	228	269[QC:e]
S96T003189	Core 125:9	Upper half	600	655	628
S96T003190		Lower half	585	390	488[QC:e]
S96T003194	Core 130:7	Upper half	365	433	399
S96T003195	Core 130:9	Upper half	243	291	267
S96T003196		Lower half	359	328	344
S96T000904	Core 125	Solid composite	500	521	511
S96T000905		Solid composite	687	697	692
S96T001592	Core 130	Solid composite	534	497	516
S96T001593		Solid composite	303	240	272[QC:e]
S96T001594		Solid composite	430	445	438

Table B2-18. Tank 241-S-102 Analytical Results: Boron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<60	<60	<60
S96T000634	Core 125:11	Drainable liquid	97	93.9	95.5
S96T001125	Core 130:5	Drainable liquid	99.7	103	101
S96T001382	Core 130:6A	Drainable liquid	90.9	88.8	89.8
S96T001437	Core 130:10	Drainable liquid	51.7	49.5	50.6
S98T002515	Core 232:1	Drainable liquid	67.3	68.4	67.8

Table B2-19. Tank 241-S-102 Analytical Results: Cadmium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<2.05	<1.93	<1.99
S96T000907	Core 125:3	Upper half	<2.09	<1.97	<2.03
S96T000908	Core 125:4	Upper half	<2.07	<1.95	<2.01
S96T000909		Lower half	<2.17	2.45	<2.31
S96T000910	Core 125:5	Upper half	<2.15	<2.32	<2.23
S96T000911		Lower half	<2.11	<2.44	<2.27
S96T000912	Core 125:6	Subsegment A, top	<4.73	<4.78	<4.76
S96T000913		Subsegment B	<4.93	<4.67	<4.8
S96T000914		Subsegment C	<4.74	<5.11	<4.93
S96T000915	Core 125:7	Upper half	<8.73	<8.64	<8.69
S96T000916		Lower half	<4.77	<4.45	<4.61
S96T000917	Core 125:8	Upper half	<4.76	<4.56	<4.66
S96T000918		Lower half	3.95	3.88	3.92

Table B2-19. Tank 241-S-102 Analytical Results: Cadmium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000919	Core 125:9	Upper half	10.3	11.2	10.8
S96T000920		Lower half	6.19	6.08	6.13
S96T000921	Core 125:10	Upper half	25.5	23.5	24.5
S96T000922		Lower half	12.4	12.7	12.6
S96T000923	Core 125:11	Upper half	1.58	1.31	1.45
S96T001181	Core 130:2	Upper half	<4.87	<4.75	<4.81
S96T001182	Core 130:3	Upper half	<4.91	<4.7	<4.8
S96T001183	Core 130:4	Upper half	7.03	5.13	6.08[QC:e]
S96T001184	Core 130:5	Subsegment A, top	<4.74	<4.5	<4.62
S96T001185		Subsegment B	<4.36	<4.27	<4.31
S96T001186		Subsegment C	<4.93	<5.04	<4.98
S96T001187	Core 130:6	Upper half	<4.53	<5.4	<4.96
S96T001188		Lower half	<5.26	<4.76	<5.01
S96T001479	Core 130:6A	Upper half	<2.08	<2.1	<2.09
S96T001480	Core 130:6B	Upper half	<3	<2.94	<2.97
S96T001481		Lower half	<2.95	<3.05	<3
S96T001482	Core 130:7	Upper half	<2.88	<2.84	<2.86
S96T001483	Core 130:8	Upper half	<3.07	<3.08	<3.08
S96T001484	Core 130:8A	Subsegment A, top	<2.89	<2.86	<2.88
S96T001485		Subsegment B	19.9	23.1	21.5
S96T001486		Subsegment C	9.35	17.2	13.3[QC:e]
S96T001487	Core 130:9	Upper half	8.8	8.96	8.88
S96T001488		Lower half	6.3	6.72	6.51
S96T001489	Core 130:10	Upper half	7.95	8.45	8.2
S96T001490		Lower half	11.9	11.9	11.9

Table B2-19. Tank 241-S-102 Analytical Results: Cadmium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001491	Core 130:11	Upper half	13.5	14	13.8
S96T001492		Lower half	4.26	3.63	3.94
S96T000925	Core 125	Solid composite	<1.91	<1.87	<1.89
S96T000926		Solid composite	11.6	12	11.8
S96T001586	Core 130	Solid composite	<2.82	<2.95	<2.88
S96T001587		Solid composite	9.88	9.23	9.55
S96T001588		Solid composite	6.76	7.08	6.92
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<2.49	<2.78	<2.63
S96T003188		Lower half	<2.44	<2.45	<2.45
S96T003189	Core 125:9	Upper half	<2.87	<3.03	<2.95
S96T003190		Lower half	<2.91	<2.57	<2.74
S96T003194	Core 130:7	Upper half	<2.53	<2.6	<2.56
S96T003195	Core 130:9	Upper half	<2.66	<2.48	<2.57
S96T003196		Lower half	<2.87	<2.75	<2.81
S96T000904	Core 125	Solid composite	<3.54	<3.56	<3.55
S96T000905		Solid composite	<4.35	<4.13	<4.24
S96T001592	Core 130	Solid composite	<2.72	<2.69	<2.71
S96T001593		Solid composite	<2.88	<3.18	<3.03
S96T001594		Solid composite	<2.88	<2.72	<2.8
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<6	<6	<6
S96T000634	Core 125:11	Drainable liquid	<6	<6	<6
S96T001125	Core 130:5	Drainable liquid	<3	<3	<3

Table B2-19. Tank 241-S-102 Analytical Results: Cadmium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S96T001382	Core 130:6A	Drainable liquid	<3	<3	<3
S96T001437	Core 130:10	Drainable liquid	<2	<2	<2
S98T002515	Core 232:1	Drainable liquid	<3	<3	<3

Table B2-20. Tank 241-S-102 Analytical Results: Calcium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	266	266	266
S96T000907	Core 125:3	Upper half	163	131	147[QC:e]
S96T000908	Core 125:4	Upper half	143	186	165[QC:e]
S96T000909		Lower half	282	335	309
S96T000910	Core 125:5	Upper half	223	214	219
S96T000911		Lower half	274	220	247[QC:e]
S96T000912	Core 125:6	Subsegment A, top	229	175	202[QC:e]
S96T000913		Subsegment B	367	339	353
S96T000914		Subsegment C	136	143	140
S96T000915	Core 125:7	Upper half	236	307	272[QC:e]
S96T000916		Lower half	173	198	186
S96T000917	Core 125:8	Upper half	185	165	175
S96T000918		Lower half	189	148	169[QC:e]
S96T000919	Core 125:9	Upper half	239	233	236
S96T000920		Lower half	200	164	182
S96T000921	Core 125:10	Upper half	206	192	199
S96T000922		Lower half	379	309	344[QC:e]

Table B2-20. Tank 241-S-102 Analytical Results: Calcium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000923	Core 125:11	Upper half	517	2,090	1,300[QC:e]
S96T001181	Core 130:2	Upper half	253	292	273
S96T001182	Core 130:3	Upper half	236	169	203[QC:e]
S96T001183	Core 130:4	Upper half	331	272	302
S96T001184	Core 130:5	Subsegment A, top	185	147	166[QC:e]
S96T001185		Subsegment B	257	191	224[QC:e]
S96T001186		Subsegment C	275	290	283
S96T001187	Core 130:6	Upper half	251	268	260
S96T001188		Lower half	240	238	239
S96T001479	Core 130:6A	Upper half	151	147	149
S96T001480	Core 130:6B	Upper half	241	304	273[QC:e]
S96T001481		Lower half	1,250	216	733[QC:e]
S96T001482	Core 130:7	Upper half	276	252	264
S96T001483	Core 130:8	Upper half	601	233	417[QC:e]
S96T001484	Core 130:8A	Subsegment A, top	260	208	234[QC:e]
S96T001485		Subsegment B	312	346	329
S96T001486		Subsegment C	275	261	268
S96T001487	Core 130:9	Upper half	238	306	272[QC:e]
S96T001488		Lower half	228	214	221
S96T001489	Core 130:10	Upper half	230	241	236
S96T001490		Lower half	240	208	224
S96T001491	Core 130:11	Upper half	287	334	311
S96T001492		Lower half	5,240	5,480	5,360
S96T000925	Core 125	Solid composite	404	335	370
S96T000926		Solid composite	256	278	267

Table B2-20. Tank 241-S-102 Analytical Results: Calcium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001586	Core 130	Solid composite	322	296	309
S96T001587		Solid composite	144	187	166[QC:e]
S96T001588		Solid composite	1,120	338	729[QC:e]
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	71	90.2	80.6[QC:e]
S96T003188		Lower half	51.5	51	51.3
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	59.9	<51.4	<55.6
S96T003194	Core 130:7	Upper half	52.5	<52.1	<52.3
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	102	194	148[QC:e]
S96T000905		Solid composite	1,120	<82.7	<601[QC:c,e]
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	102	<79.8[QC:e]
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-21. Tank 241-S-102 Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<41	<38.5	<39.8
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1
S96T000913		Subsegment B	<98.6	<93.3	<95.9
S96T000914		Subsegment C	<94.7	<102	<98.3
S96T000915	Core 125:7	Upper half	<175	<173	<174
S96T000916		Lower half	<95.5	<89	<92.3
S96T000917	Core 125:8	Upper half	<95.2	<91.2	<93.2
S96T000918		Lower half	<40.7	<43.4	<42
S96T000919	Core 125:9	Upper half	<38	40.2	<39.1
S96T000920		Lower half	<37.7	<37.9	<37.8
S96T000921	Core 125:10	Upper half	<37.5	<36.3	<36.9
S96T000922		Lower half	43.5	45.1	44.3
S96T000923	Core 125:11	Upper half	<17.1	<16.4	<16.8
S96T001181	Core 130:2	Upper half	<97.3	<95.1	<96.2
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	<94.7	<88.4	<91.6
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	<87.1	<85.4	<86.3
S96T001186		Subsegment C	<98.6	<101	<99.8
S96T001187	Core 130:6	Upper half	<90.6	<108	<99.3
S96T001188		Lower half	<105	<95.2	<100

Table B2-21. Tank 241-S-102 Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	72.3	90	81.2[QC:e]
S96T001486		Subsegment C	<77.5	<80.3	<78.9
S96T001487	Core 130:9	Upper half	<76.6	<80.2	<78.4
S96T001488		Lower half	<80.6	<78.6	<79.6
S96T001489	Core 130:10	Upper half	<79.7	<76.5	<78.1
S96T001490		Lower half	<58.4	<61.1	<59.8
S96T001491	Core 130:11	Upper half	<77.1	<75.7	<76.4
S96T001492		Lower half	<37	<36.1	<36.5
S96T000925	Core 125	Solid composite	<38.2	<37.3	<37.8
S96T000926		Solid composite	<41.7	<41.2	<41.5
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	<51.7	<60.5	<56.1
S96T001588		Solid composite	<51.5	<42.4	<47
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4

Table B2-21. Tank 241-S-102 Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9
Liquids			**µg/Ml**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-22. Tank 241-S-102 Analytical Results: Chromium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	1,860	1,920	1,890[QC:c]
S96T000907	Core 125:3	Upper half	1,430	1,470	1,450
S96T000908	Core 125:4	Upper half	975	953	964
S96T000909		Lower half	2,870	2,870	2,870
S96T000910	Core 125:5	Upper half	1,510	1,310	1,410
S96T000911		Lower half	2,030	1,950	1,990

Table B2-22. Tank 241-S-102 Analytical Results: Chromium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000912	Core 125:6	Subsegment A, top	890	899	895
S96T000913		Subsegment B	4,580	4,180	4,380
S96T000914		Subsegment C	1,030	1,100	1,070
S96T000915	Core 125:7	Upper half	3,430	3,290	3,360
S96T000916		Lower half	2,420	2,870	2,650
S96T000917	Core 125:8	Upper half	3,370	3,100	3,240
S96T000918		Lower half	3,070	2,750	2,910
S96T000919	Core 125:9	Upper half	5,560	6,060	5,810
S96T000920		Lower half	3,030	2,910	2,970
S96T000921	Core 125:10	Upper half	6,930	6,610	6,770[QC:c]
S96T000922		Lower half	5,850	5,860	5,860
S96T000923	Core 125:11	Upper half	819	748	784
S96T001181	Core 130:2	Upper half	1,570	1,800	1,690
S96T001182	Core 130:3	Upper half	1,520	1,460	1,490
S96T001183	Core 130:4	Upper half	1,530	1,640	1,590
S96T001184	Core 130:5	Subsegment A, top	456	453	455
S96T001185		Subsegment B	1,280	1,170	1,230[QC:c]
S96T001186		Subsegment C	1,880	1,940	1,910
S96T001187	Core 130:6	Upper half	3,260	3,190	3,230
S96T001188		Lower half	1,030	1,050	1,040
S96T001479	Core 130:6A	Upper half	1,410	1,420	1,420
S96T001480	Core 130:6B	Upper half	1,010	1,240	1,130[QC:c]
S96T001481		Lower half	1,340	1,650	1,500[QC:c]
S96T001482	Core 130:7	Upper half	2,660	2,440	2,550
S96T001483	Core 130:8	Upper half	2,890	2,480	2,690

Table B2-22. Tank 241-S-102 Analytical Results: Chromium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	2,040	2,010	2,030
S96T001485		Subsegment B	11,800	13,800	12,800
S96T001486		Subsegment C	3,720	3,660	3,690[QC:c]
S96T001487	Core 130:9	Upper half	3,620	3,560	3,590
S96T001488		Lower half	2,440	2,510	2,480
S96T001489	Core 130:10	Upper half	3,130	3,650	3,390
S96T001490		Lower half	5,480	5,280	5,380
S96T001491	Core 130:11	Upper half	8,250	9,270	8,760
S96T001492		Lower half	2,760	3,140	2,950
S96T000925	Core 125	Solid composite	2,040	1,900	1,970
S96T000926		Solid composite	4,950	4,880	4,920
S96T001586	Core 130	Solid composite	1,850	1,960	1,910
S96T001587		Solid composite	4,040	3,590	3,820
S96T001588		Solid composite	4,330	4,330	4,330
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	382	402	392
S96T003188		Lower half	260	255	258
S96T003189	Core 125:9	Upper half	149	152	151
S96T003190		Lower half	157	140	149
S96T003194	Core 130:7	Upper half	143	149	146
S96T003195	Core 130:9	Upper half	470	473	472
S96T003196		Lower half	431	499	465
S96T000904	Core 125	Solid composite	153	160	157
S96T000905		Solid composite	479	299	389[QC:e]
S96T001592	Core 130	Solid composite	168	193	181
S96T001593		Solid composite	134	150	142
S96T001594		Solid composite	93	137	115[QC:e]

Table B2-22. Tank 241-S-102 Analytical Results: Chromium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	196	198	197
S96T000634	Core 125:11	Drainable liquid	43.2	39.6	41.4
S96T001125	Core 130:5	Drainable liquid	85.8	84.9	85.3
S96T001382	Core 130:6A	Drainable liquid	211	200	206
S96T001437	Core 130:10	Drainable liquid	9.66	9.53	9.59
S98T002515	Core 232:1	Drainable liquid	457	470	464

Table B2-23. Tank 241-S-102 Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<8.2	<7.7	<7.95
S96T000907	Core 125:3	Upper half	<8.36	<7.88	<8.12
S96T000908	Core 125:4	Upper half	<8.22	<7.8	<8.01
S96T000909		Lower half	<8.67	<8.98	<8.82
S96T000910	Core 125:5	Upper half	<8.6	<9.27	<8.93
S96T000911		Lower half	<8.44	<9.78	<9.11
S96T000912	Core 125:6	Subsegment A, top	<18.9	<19.1	<19
S96T000913		Subsegment B	<19.7	<18.7	<19.2
S96T000914		Subsegment C	<18.9	<20.4	<19.6
S96T000915	Core 125:7	Upper half	<34.9	<34.6	<34.8
S96T000916		Lower half	<19.1	<17.8	<18.5
S96T000917	Core 125:8	Upper half	<19	<18.2	<18.6
S96T000918		Lower half	<8.13	<8.69	<8.41
S96T000919	Core 125:9	Upper half	<7.6	<7.09	<7.34
S96T000920		Lower half	<7.55	<7.58	<7.56

Table B2-23. Tank 241-S-102 Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000921	Core 125:10	Upper half	<7.5	<7.25	<7.38
S96T000922		Lower half	<7.33	<7.81	<7.57
S96T000923	Core 125:11	Upper half	<3.42	<3.28	<3.35
S96T001181	Core 130:2	Upper half	<19.5	<19	<19.3
S96T001182	Core 130:3	Upper half	<19.7	<18.8	<19.3
S96T001183	Core 130:4	Upper half	<18.9	<17.7	<18.3
S96T001184	Core 130:5	Subsegment A, top	<19	<18	<18.5
S96T001185		Subsegment B	<17.4	<17.1	<17.3
S96T001186		Subsegment C	<19.7	<20.2	<19.9
S96T001187	Core 130:6	Upper half	<18.1	<21.6	<19.9
S96T001188		Lower half	<21	<19	<20
S96T001479	Core 130:6A	Upper half	<8.34	<8.39	<8.37
S96T001480	Core 130:6B	Upper half	<12	<11.8	<11.9
S96T001481		Lower half	<11.8	<12.2	<12
S96T001482	Core 130:7	Upper half	<11.5	<11.4	<11.4
S96T001483	Core 130:8	Upper half	<12.3	<12.3	<12.3
S96T001484	Core 130:8A	Subsegment A, top	<11.6	<11.4	<11.5
S96T001485		Subsegment B	<12.4	<12	<12.2
S96T001486		Subsegment C	<15.5	<16.1	<15.8
S96T001487	Core 130:9	Upper half	<15.3	<16	<15.7
S96T001488		Lower half	<16.1	<15.7	<15.9
S96T001489	Core 130:10	Upper half	<15.9	<15.3	<15.6
S96T001490		Lower half	<11.7	<12.2	<11.9
S96T001491	Core 130:11	Upper half	<15.4	<15.1	<15.3
S96T001492		Lower half	<7.4	<7.22	<7.31

Table B2-23. Tank 241-S-102 Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000925	Core 125	Solid composite	<7.64	<7.47	<7.55
S96T000926		Solid composite	<8.33	<8.23	<8.28
S96T001586	Core 130	Solid composite	<11.3	<11.8	<11.6
S96T001587		Solid composite	<10.3	<12.1	<11.2
S96T001588		Solid composite	<10.3	<8.49	<9.39
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<9.94	<11.1	<10.5
S96T003188		Lower half	<9.76	<9.81	<9.79
S96T003189	Core 125:9	Upper half	<11.5	<12.1	<11.8
S96T003190		Lower half	<11.7	<10.3	<11
S96T003194	Core 130:7	Upper half	<10.1	<10.4	<10.3
S96T003195	Core 130:9	Upper half	<10.6	<9.92	<10.3
S96T003196		Lower half	<11.5	<11	<11.3
S96T000904	Core 125	Solid composite	<14.1	<14.2	<14.1
S96T000905		Solid composite	<17.4	<16.5	<16.9
S96T001592	Core 130	Solid composite	<10.9	<10.8	<10.9
S96T001593		Solid composite	<11.5	<12.7	<12.1
S96T001594		Solid composite	<11.5	<10.9	<11.2
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<24	<24	<24
S96T000634	Core 125:11	Drainable liquid	<24	<24	<24
S96T001125	Core 130:5	Drainable liquid	<12	<12	<12
S96T001382	Core 130:6A	Drainable liquid	<12	<12	<12
S96T001437	Core 130:10	Drainable liquid	<8.02	<8.02	<8.02
S98T002515	Core 232:1	Drainable liquid	<12	<12	<12

Table B2-24. Tank 241-S-102 Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<4.1	<3.85	<3.97
S96T000907	Core 125:3	Upper half	<4.18	<3.94	<4.06
S96T000908	Core 125:4	Upper half	<4.11	<3.9	<4
S96T000909		Lower half	<4.34	<4.49	<4.42
S96T000910	Core 125:5	Upper half	<4.3	<4.63	<4.46
S96T000911		Lower half	<4.22	<4.88	<4.55
S96T000912	Core 125:6	Subsegment A, top	<9.46	<9.56	<9.51
S96T000913		Subsegment B	<9.86	<9.33	<9.59
S96T000914		Subsegment C	<9.47	<10.2	<9.84
S96T000915	Core 125:7	Upper half	<17.5	<17.3	<17.4
S96T000916		Lower half	<9.55	<8.9	<9.23
S96T000917	Core 125:8	Upper half	15.9	15.5	15.7
S96T000918		Lower half	13.1	15.2	14.1
S96T000919	Core 125:9	Upper half	<3.8	<3.55	<3.67
S96T000920		Lower half	<3.77	4.8	<4.29[QC:e]
S96T000921	Core 125:10	Upper half	6.88	4.74	5.81[QC:e]
S96T000922		Lower half	<3.66	<3.91	<3.79
S96T000923	Core 125:11	Upper half	4.32	4.64	4.48
S96T001181	Core 130:2	Upper half	<9.73	<9.51	<9.62
S96T001182	Core 130:3	Upper half	<9.83	<9.41	<9.62
S96T001183	Core 130:4	Upper half	<9.47	<8.84	<9.16
S96T001184	Core 130:5	Subsegment A, top	<9.49	<8.99	<9.24
S96T001185		Subsegment B	<8.71	<8.54	<8.63
S96T001186		Subsegment C	<9.86	<10.1	<9.98
S96T001187	Core 130:6	Upper half	15.3	14.4	14.9
S96T001188		Lower half	<10.5	<9.52	<10

Table B2-24. Tank 241-S-102 Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001479	Core 130:6A	Upper half	12.7	12.9	12.8
S96T001480	Core 130:6B	Upper half	<6	<5.88	<5.94
S96T001481		Lower half	<5.89	<6.11	<6
S96T001482	Core 130:7	Upper half	<5.76	<5.68	<5.72
S96T001483	Core 130:8	Upper half	7.47	<6.16	<6.81
S96T001484	Core 130:8A	Subsegment A, top	13.2	12.8	13
S96T001485		Subsegment B	<6.19	<5.99	<6.09
S96T001486		Subsegment C	11.2	10.8	11
S96T001487	Core 130:9	Upper half	<7.66	8.22	<7.94
S96T001488		Lower half	<8.06	<7.86	<7.96
S96T001489	Core 130:10	Upper half	<7.97	<7.65	<7.81
S96T001490		Lower half	8.61	<6.11	<7.36[QC:e]
S96T001491	Core 130:11	Upper half	<7.71	<7.57	<7.64
S96T001492		Lower half	9.1	7.01	8.05[QC:e]
S96T000925	Core 125	Solid composite	5.08	4.05	4.56[QC:e]
S96T000926		Solid composite	5.29	<4.12	<4.71[QC:e]
S96T001586	Core 130	Solid composite	6.73	6.64	6.69
S96T001587		Solid composite	7.86	7.05	7.46
S96T001588		Solid composite	9.45	8.69	9.07
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<4.97	<5.56	<5.26
S96T003188		Lower half	<4.88	<4.91	<4.89
S96T003189	Core 125:9	Upper half	9.67	12	10.8[QC:e]
S96T003190		Lower half	<5.83	<5.14	<5.48
S96T003194	Core 130:7	Upper half	<5.06	<5.21	<5.13

Table B2-24. Tank 241-S-102 Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T003195	Core 130:9	Upper half	<5.32	<4.96	<5.14
S96T003196		Lower half	<5.74	<5.5	<5.62
S96T000904	Core 125	Solid composite	<7.07	<7.12	<7.1
S96T000905		Solid composite	<8.7	<8.27	<8.48
S96T001592	Core 130	Solid composite	<5.45	<5.38	<5.42
S96T001593		Solid composite	<5.76	<6.35	<6.05
S96T001594		Solid composite	<5.75	<5.43	<5.59
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<12	<12	<12
S96T000634	Core 125:11	Drainable liquid	<12	<12	<12
S96T001125	Core 130:5	Drainable liquid	<6.01	<6.01	<6.01
S96T001382	Core 130:6A	Drainable liquid	53	51.8	52.4
S96T001437	Core 130:10	Drainable liquid	<4.01	<4.01	<4.01
S98T002515	Core 232:1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-25. Tank 241-S-102 Analytical Results: Iron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	3,920	8,060	5,990[QC:e]
S96T000907	Core 125:3	Upper half	45.2	48	46.6
S96T000908	Core 125:4	Upper half	26	25.6	25.8
S96T000909		Lower half	50	62.2	56.1[QC:e]
S96T000910	Core 125:5	Upper half	27.9	23.9	25.9
S96T000911		Lower half	60.9	38.9	49.9[QC:e]

Table B2-25. Tank 241-S-102 Analytical Results: Iron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000912	Core 125:6	Subsegment A, top	64.3	<47.8	<56[QC:e]
S96T000913		Subsegment B	100	123	112[QC:e]
S96T000914		Subsegment C	<47.4	<51.1	<49.3
S96T000915	Core 125:7	Upper half	95.5	<86.4	<91
S96T000916		Lower half	49.3	58.8	54
S96T000917	Core 125:8	Upper half	199	141	170[QC:e]
S96T000918		Lower half	814	549	682[QC:e]
S96T000919	Core 125:9	Upper half	2,220	2,400	2,310
S96T000920		Lower half	669	648	659
S96T000921	Core 125:10	Upper half	2,750	2,570	2,660
S96T000922		Lower half	1,990	2,010	2,000
S96T000923	Core 125:11	Upper half	3,190	754	1,970[QC:e]
S96T001181	Core 130:2	Upper half	99.1	238	169[QC:d,e]
S96T001182	Core 130:3	Upper half	55.3	<47	<51.1
S96T001183	Core 130:4	Upper half	<47.4	<44.2	<45.8
S96T001184	Core 130:5	Subsegment A, top	<47.4	<45	<46.2
S96T001185		Subsegment B	<43.6	<42.7	<43.2
S96T001186		Subsegment C	<49.3	50.5	<49.9
S96T001187	Core 130:6	Upper half	146	158	152
S96T001188		Lower half	53.6	<47.6	<50.6
S96T001479	Core 130:6A	Upper half	74.7	45.5	60.1[QC:e]
S96T001480	Core 130:6B	Upper half	716	58.2	387[QC:c,e]
S96T001481		Lower half	53.8	60.9	57.3
S96T001482	Core 130:7	Upper half	44.9	35.5	40.2[QC:e]
S96T001483	Core 130:8	Upper half	101	61.6	81.3[QC:e]

Table B2-25. Tank 241-S-102 Analytical Results: Iron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	467	464	466
S96T001485		Subsegment B	4,720	5,990	5,360[QC:e]
S96T001486		Subsegment C	902	888	895
S96T001487	Core 130:9	Upper half	855	834	845
S96T001488		Lower half	534	574	554
S96T001489	Core 130:10	Upper half	875	960	918
S96T001490		Lower half	2,520	2,480	2,500
S96T001491	Core 130:11	Upper half	2,390	2,820	2,610
S96T001492		Lower half	1,290	1,800	1,550[QC:e]
S96T000925	Core 125	Solid composite	4,650	322	2,490[QC:e]
S96T000926		Solid composite	1,700	1,770	1,740
S96T001586	Core 130	Solid composite	144	80.3	112[QC:e]
S96T001587		Solid composite	1,320	1,220	1,270
S96T001588		Solid composite	1,350	1,120	1,240
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<24.9	<27.8	<26.4
S96T003188		Lower half	<24.4	<24.5	<24.4
S96T003189	Core 125:9	Upper half	<28.7	<30.3	<29.5
S96T003190		Lower half	<29.1	<25.7	<27.4
S96T003194	Core 130:7	Upper half	<25.3	<26	<25.6
S96T003195	Core 130:9	Upper half	<26.6	<24.8	<25.7
S96T003196		Lower half	<28.7	<27.5	<28.1
S96T000904	Core 125	Solid composite	<35.4	<35.6	<35.5
S96T000905		Solid composite	146	75.9	111[QC:e]

Table B2-25. Tank 241-S-102 Analytical Results: Iron (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T001592	Core 130	Solid composite	<27.2	<26.9	<27
S96T001593		Solid composite	<28.8	<31.8	<30.3
S96T001594		Solid composite	<28.8	<27.2	<28
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<60	<60	<60
S96T000634	Core 125:11	Drainable liquid	<60	<60	<60
S96T001125	Core 130:5	Drainable liquid	<30.1	<30.1	<30.1
S96T001382	Core 130:6A	Drainable liquid	<30.1	<30.1	<30.1
S96T001437	Core 130:10	Drainable liquid	<20.1	<20.1	<20.1
S98T002515	Core 232:1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-26. Tank 241-S-102 Analytical Results: Lanthanum (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<20.5	<19.3	<19.9
S96T000907	Core 125:3	Upper half	<20.9	<19.7	<20.3
S96T000908	Core 125:4	Upper half	<20.7	<19.5	<20.1
S96T000909		Lower half	<21.7	<22.5	<22.1
S96T000910	Core 125:5	Upper half	<21.5	<23.2	<22.4
S96T000911		Lower half	<21.1	<24.4	<22.8
S96T000912	Core 125:6	Subsegment A, top	<47.3	<47.8	<47.5
S96T000913		Subsegment B	<49.3	<46.7	<48
S96T000914		Subsegment C	<47.4	<51.1	<49.3

Table B2-26. Tank 241-S-102 Analytical Results: Lanthanum (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000915	Core 125:7	Upper half	<87.3	<86.4	<86.8
S96T000916		Lower half	<47.7	<44.5	<46.1
S96T000917	Core 125:8	Upper half	<47.6	<45.6	<46.6
S96T000918		Lower half	<20.3	<21.7	<21
S96T000919	Core 125:9	Upper half	23.4	24.6	24
S96T000920		Lower half	<18.9	<19	<18.9
S96T000921	Core 125:10	Upper half	18.8	<18.1	<18.5
S96T000922		Lower half	27.5	27.4	27.4
S96T000923	Core 125:11	Upper half	<8.55	<8.21	<8.38
S96T001181	Core 130:2	Upper half	<48.7	<47.5	<48.1
S96T001182	Core 130:3	Upper half	<49.1	<47	<48
S96T001183	Core 130:4	Upper half	<47.4	<44.2	<45.8
S96T001184	Core 130:5	Subsegment A, top	<47.4	<45	<46.2
S96T001185		Subsegment B	<43.6	<42.7	<43.2
S96T001186		Subsegment C	<49.3	<50.4	<49.8
S96T001187	Core 130:6	Upper half	<45.3	<54	<49.6
S96T001188		Lower half	<52.6	<47.6	<50.1
S96T001479	Core 130:6A	Upper half	<20.8	<21	<20.9
S96T001480	Core 130:6B	Upper half	<30	<29.4	<29.7
S96T001481		Lower half	<29.5	<30.5	<30
S96T001482	Core 130:7	Upper half	<28.8	<28.4	<28.6
S96T001483	Core 130:8	Upper half	<30.7	<30.8	<30.8
S96T001484	Core 130:8A	Subsegment A, top	<28.9	<28.6	<28.8
S96T001485		Subsegment B	47.3	59.3	53.3[QC:e]
S96T001486		Subsegment C	<38.8	<40.1	<39.5

Table B2-26. Tank 241-S-102 Analytical Results: Lanthanum (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001487	Core 130:9	Upper half	<38.3	<40.1	<39.2
S96T001488		Lower half	<40.3	<39.3	<39.8
S96T001489	Core 130:10	Upper half	<39.9	<38.3	<39.1
S96T001490		Lower half	<29.2	<30.5	<29.9
S96T001491	Core 130:11	Upper half	<38.6	40.2	<39.4
S96T001492		Lower half	<18.5	<18.1	<18.3
S96T000925	Core 125	Solid composite	<19.1	<18.7	<18.9
S96T000926		Solid composite	<20.8	<20.6	<20.7
S96T001586	Core 130	Solid composite	<28.2	<29.5	<28.9
S96T001587		Solid composite	<25.8	<30.3	<28.1
S96T001588		Solid composite	<25.7	<21.2	<23.4
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<24.9	<27.8	<26.4
S96T003188		Lower half	<24.4	<24.5	<24.4
S96T003189	Core 125:9	Upper half	<28.7	<30.3	<29.5
S96T003190		Lower half	<29.1	<25.7	<27.4
S96T003194	Core 130:7	Upper half	<25.3	<26	<25.6
S96T003195	Core 130:9	Upper half	<26.6	<24.8	<25.7
S96T003196		Lower half	<28.7	<27.5	<28.1
S96T000904	Core 125	Solid composite	<35.4	<35.6	<35.5
S96T000905		Solid composite	<43.5	<41.3	<42.4
S96T001592	Core 130	Solid composite	<27.2	<26.9	<27
S96T001593		Solid composite	<28.8	<31.8	<30.3
S96T001594		Solid composite	<28.8	<27.2	<28

Table B2-26. Tank 241-S-102 Analytical Results: Lanthanum (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<60	<60	<60
S96T000634	Core 125:11	Drainable liquid	<60	<60	<60
S96T001125	Core 130:5	Drainable liquid	<30.1	<30.1	<30.1
S96T001382	Core 130:6A	Drainable liquid	<30.1	<30.1	<30.1
S96T001437	Core 130:10	Drainable liquid	<20.1	<20.1	<20.1
S98T002515	Core 232:1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-27. Tank 241-S-102 Analytical Results: Lead (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	45.7	49	47.4
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1
S96T000913		Subsegment B	<98.6	<93.3	<95.9
S96T000914		Subsegment C	<94.7	<102	<98.3
S96T000915	Core 125:7	Upper half	<175	<173	<174
S96T000916		Lower half	<95.5	<89	<92.3
S96T000917	Core 125:8	Upper half	<95.2	<91.2	<93.2
S96T000918		Lower half	79.9	56.7	68.3[QC:e]

Table B2-27. Tank 241-S-102 Analytical Results: Lead (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000919	Core 125:9	Upper half	165	192	179
S96T000920		Lower half	54.2	58.3	56.3
S96T000921	Core 125:10	Upper half	167	137	152
S96T000922		Lower half	120	128	124
S96T000923	Core 125:11	Upper half	34.7	30	32.4
S96T001181	Core 130:2	Upper half	<97.3	<95.1	<96.2
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	<94.7	<88.4	<91.6
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	<87.1	<85.4	<86.3
S96T001186		Subsegment C	<98.6	<101	<99.8
S96T001187	Core 130:6	Upper half	<90.6	<108	<99.3
S96T001188		Lower half	<105	<95.2	<100
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	359	428	394
S96T001486		Subsegment C	<77.5	89.3	<83.4
S96T001487	Core 130:9	Upper half	80.3	88.4	84.3
S96T001488		Lower half	<80.6	<78.6	<79.6
S96T001489	Core 130:10	Upper half	<79.7	83.6	<81.7
S96T001490		Lower half	160	151	156

Table B2-27. Tank 241-S-102 Analytical Results: Lead (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001491	Core 130:11	Upper half	124	124	124
S96T001492		Lower half	49.8	43.7	46.8
S96T000925	Core 125	Solid composite	42.4	<37.3	<39.8
S96T000926		Solid composite	125	119	122
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	89.4	85.6	87.5
S96T001588		Solid composite	100	96.8	98.4
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1

Table B2-27. Tank 241-S-102 Analytical Results: Lead (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-28. Tank 241-S-102 Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	<4.1	<3.85	<3.97
S96T000907	Core 125:3	Upper half	<4.18	<3.94	<4.06
S96T000908	Core 125:4	Upper half	<4.11	<3.9	<4
S96T000909		Lower half	<4.34	<4.49	<4.42
S96T000910	Core 125:5	Upper half	<4.3	<4.63	<4.46
S96T000911		Lower half	<4.22	<4.88	<4.55
S96T000912	Core 125:6	Subsegment A, top	73.8	71.4	72.6
S96T000913		Subsegment B	<9.86	<9.33	<9.59
S96T000914		Subsegment C	53.7	56.3	55
S96T000915	Core 125:7	Upper half	61	60.4	60.7
S96T000916		Lower half	34.1	36.2	35.2
S96T000917	Core 125:8	Upper half	<9.52	<9.12	<9.32
S96T000918		Lower half	<4.07	<4.34	<4.21
S96T000919	Core 125:9	Upper half	<3.8	<3.55	<3.67
S96T000920		Lower half	<3.77	<3.79	<3.78
S96T000921	Core 125:10	Upper half	<3.75	<3.63	<3.69
S96T000922		Lower half	<3.66	<3.91	<3.79

Table B2-28. Tank 241-S-102 Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000923	Core 125:11	Upper half	<1.71	<1.64	<1.67
S96T001181	Core 130:2	Upper half	<9.73	<9.51	<9.62
S96T001182	Core 130:3	Upper half	<9.83	<9.41	<9.62
S96T001183	Core 130:4	Upper half	<9.47	<8.84	<9.16
S96T001184	Core 130:5	Subsegment A, top	<9.49	<8.99	<9.24
S96T001185		Subsegment B	<8.71	<8.54	<8.63
S96T001186		Subsegment C	<9.86	<10.1	<9.98
S96T001187	Core 130:6	Upper half	17.7	16.8	17.3
S96T001188		Lower half	<10.5	<9.52	<10
S96T001479	Core 130:6A	Upper half	16.6	16.5	16.6
S96T001480	Core 130:6B	Upper half	<6	<5.88	<5.94
S96T001481		Lower half	<5.89	<6.11	<6
S96T001482	Core 130:7	Upper half	<5.76	<5.68	<5.72
S96T001483	Core 130:8	Upper half	<6.14	<6.16	<6.15
S96T001484	Core 130:8A	Subsegment A, top	<5.78	<5.72	<5.75
S96T001485		Subsegment B	<6.19	<5.99	<6.09
S96T001486		Subsegment C	<7.75	<8.03	<7.89
S96T001487	Core 130:9	Upper half	<7.66	<8.02	<7.84
S96T001488		Lower half	<8.06	<7.86	<7.96
S96T001489	Core 130:10	Upper half	<7.97	8.31	<8.14
S96T001490		Lower half	13.8	13.7	13.8
S96T001491	Core 130:11	Upper half	<7.71	7.69	<7.7
S96T001492		Lower half	<3.7	<3.61	<3.66
S96T000925	Core 125	Solid composite	5.81	5.63	5.72
S96T000926		Solid composite	<4.17	<4.12	<4.14

Table B2-28. Tank 241-S-102 Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001586	Core 130	Solid composite	<5.65	<5.91	<5.78
S96T001587		Solid composite	6.81	<6.05	<6.43
S96T001588		Solid composite	<5.15	<4.24	<4.7
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<4.97	<5.56	<5.26
S96T003188		Lower half	<4.88	<4.91	<4.89
S96T003189	Core 125:9	Upper half	<5.73	<6.05	<5.89
S96T003190		Lower half	<5.83	<5.14	<5.48
S96T003194	Core 130:7	Upper half	<5.06	<5.21	<5.13
S96T003195	Core 130:9	Upper half	<5.32	<4.96	<5.14
S96T003196		Lower half	<5.74	<5.5	<5.62
S96T000904	Core 125	Solid composite	<7.07	<7.12	<7.1
S96T000905		Solid composite	<8.7	<8.27	<8.48
S96T001592	Core 130	Solid composite	<5.45	<5.38	<5.42
S96T001593		Solid composite	<5.76	<6.35	<6.05
S96T001594		Solid composite	<5.75	<5.43	<5.59
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<12	<12	<12
S96T000634	Core 125:11	Drainable liquid	<12	<12	<12
S96T001125	Core 130:5	Drainable liquid	<6.01	<6.01	<6.01
S96T001382	Core 130:6A	Drainable liquid	<6.01	<6.01	<6.01
S96T001437	Core 130:10	Drainable liquid	<4.01	<4.01	<4.01
S98T002515	Core 232:1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-29. Tank 241-S-102 Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<41	<38.5	<39.8
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1
S96T000913		Subsegment B	<98.6	<93.3	<95.9
S96T000914		Subsegment C	<94.7	<102	<98.3
S96T000915	Core 125:7	Upper half	<175	<173	<174
S96T000916		Lower half	<95.5	<89	<92.3
S96T000917	Core 125:8	Upper half	<95.2	<91.2	<93.2
S96T000918		Lower half	<40.7	<43.4	<42
S96T000919	Core 125:9	Upper half	42.4	41.8	42.1
S96T000920		Lower half	<37.7	<37.9	<37.8
S96T000921	Core 125:10	Upper half	86.1	78	82
S96T000922		Lower half	83.6	81.6	82.6
S96T000923	Core 125:11	Upper half	78.6	81.5	80
S96T001181	Core 130:2	Upper half	<97.3	<95.1	<96.2
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	<94.7	<88.4	<91.6
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	<87.1	<85.4	<86.3
S96T001186		Subsegment C	<98.6	<101	<99.8
S96T001187	Core 130:6	Upper half	<90.6	<108	<99.3
S96T001188		Lower half	<105	<95.2	<100

Table B2-29. Tank 241-S-102 Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	75.6	82.3	78.9
S96T001486		Subsegment C	<77.5	<80.3	<78.9
S96T001487	Core 130:9	Upper half	<76.6	<80.2	<78.4
S96T001488		Lower half	<80.6	<78.6	<79.6
S96T001489	Core 130:10	Upper half	<79.7	<76.5	<78.1
S96T001490		Lower half	<58.4	<61.1	<59.8
S96T001491	Core 130:11	Upper half	94.6	114	104
S96T001492		Lower half	<37	63.3	<50.1[QC:e]
S96T000925	Core 125	Solid composite	<38.2	<37.3	<37.8
S96T000926		Solid composite	48.1	55.6	51.9
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	<51.7	<60.5	<56.1
S96T001588		Solid composite	163	<42.4	<103[QC:e]
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4

Table B2-29. Tank 241-S-102 Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-30. Tank 241-S-102 Analytical Results: Manganese (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	96	140	118[QC:e]
S96T000907	Core 125:3	Upper half	20.6	24.3	22.5
S96T000908	Core 125:4	Upper half	7.16	7.59	7.38
S96T000909		Lower half	44.5	50.9	47.7
S96T000910	Core 125:5	Upper half	19	16.4	17.7
S96T000911		Lower half	27.1	24.9	26

Table B2-30. Tank 241-S-102 Analytical Results: Manganese (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000912	Core 125:6	Subsegment A, top	11.6	10.9	11.3
S96T000913		Subsegment B	48.2	44.6	46.4
S96T000914		Subsegment C	<9.47	<10.2	<9.84
S96T000915	Core 125:7	Upper half	<17.5	<17.3	<17.4
S96T000916		Lower half	12.3	13.2	12.8
S96T000917	Core 125:8	Upper half	47.8	36.4	42.1[QC:e]
S96T000918		Lower half	200	134	167[QC:e]
S96T000919	Core 125:9	Upper half	765	833	799
S96T000920		Lower half	355	334	345
S96T000921	Core 125:10	Upper half	2,110	1,940	2,030
S96T000922		Lower half	2,650	2,640	2,650
S96T000923	Core 125:11	Upper half	63.6	50.6	57.1[QC:e]
S96T001181	Core 130:2	Upper half	48.5	53.2	50.9
S96T001182	Core 130:3	Upper half	38	34.9	36.5
S96T001183	Core 130:4	Upper half	24.6	25.6	25.1
S96T001184	Core 130:5	Subsegment A, top	<9.49	<8.99	<9.24
S96T001185		Subsegment B	15	13.3	14.2
S96T001186		Subsegment C	13.3	13.9	13.6
S96T001187	Core 130:6	Upper half	95.4	90.8	93.1
S96T001188		Lower half	10.8	11.9	11.4
S96T001479	Core 130:6A	Upper half	16.6	16.4	16.5
S96T001480	Core 130:6B	Upper half	22.7	25	23.9
S96T001481		Lower half	29.3	31.3	30.3
S96T001482	Core 130:7	Upper half	10.7	9.52	10.1
S96T001483	Core 130:8	Upper half	20	16.8	18.4

Table B2-30. Tank 241-S-102 Analytical Results: Manganese (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	117	114	116
S96T001485		Subsegment B	1,740	2,080	1,910
S96T001486		Subsegment C	481	480	481
S96T001487	Core 130:9	Upper half	438	423	431
S96T001488		Lower half	275	289	282
S96T001489	Core 130:10	Upper half	448	476	462
S96T001490		Lower half	1,500	1,460	1,480
S96T001491	Core 130:11	Upper half	3,850	4,370	4,110
S96T001492		Lower half	135	151	143
S96T000925	Core 125	Solid composite	76.3	32.6	54.5[QC:e]
S96T000926		Solid composite	1,180	1,270	1,230
S96T001586	Core 130	Solid composite	33.6	32.9	33.3
S96T001587		Solid composite	751	670	711
S96T001588		Solid composite	435	450	443
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<4.97	<5.56	<5.26
S96T003188		Lower half	<4.88	<4.91	<4.89
S96T003189	Core 125:9	Upper half	<5.73	<6.05	<5.89
S96T003190		Lower half	<5.83	<5.14	<5.48
S96T003194	Core 130:7	Upper half	<5.06	<5.21	<5.13
S96T003195	Core 130:9	Upper half	<5.32	<4.96	<5.14
S96T003196		Lower half	<5.74	<5.5	<5.62
S96T000904	Core 125	Solid composite	<7.07	<7.12	<7.1
S96T000905		Solid composite	75.8	34.3	55[QC:e]
S96T001592	Core 130	Solid composite	<5.45	<5.38	<5.42
S96T001593		Solid composite	<5.76	<6.35	<6.05
S96T001594		Solid composite	<5.75	<5.43	<5.59

Table B2-30. Tank 241-S-102 Analytical Results: Manganese (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<12	<12	<12
S96T000634	Core 125:11	Drainable liquid	<12	<12	<12
S96T001125	Core 130:5	Drainable liquid	<6.01	<6.01	<6.01
S96T001382	Core 130:6A	Drainable liquid	<6.01	<6.01	<6.01
S96T001437	Core 130:10	Drainable liquid	<4.01	<4.01	<4.01
S98T002515	Core 232:1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-31. Tank 241-S-102 Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<20.5	<19.3	<19.9
S96T000907	Core 125:3	Upper half	<20.9	<19.7	<20.3
S96T000908	Core 125:4	Upper half	<20.7	<19.5	<20.1
S96T000909		Lower half	29.1	26.5	27.8
S96T000910	Core 125:5	Upper half	<21.5	<23.2	<22.4
S96T000911		Lower half	25.5	27.2	26.4
S96T000912	Core 125:6	Subsegment A, top	<47.3	<47.8	<47.5
S96T000913		Subsegment B	<49.3	<46.7	<48
S96T000914		Subsegment C	<47.4	<51.1	<49.3
S96T000915	Core 125:7	Upper half	<87.3	<86.4	<86.8
S96T000916		Lower half	<47.7	<44.5	<46.1
S96T000917	Core 125:8	Upper half	49.9	<45.6	<47.8
S96T000918		Lower half	26.2	27.1	26.6
S96T000919	Core 125:9	Upper half	26.1	27.8	27
S96T000920		Lower half	32.3	29.3	30.8

Table B2-31. Tank 241-S-102 Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000921	Core 125:10	Upper half	32.9	32.5	32.7
S96T000922		Lower half	27.9	30	28.9
S96T000923	Core 125:11	Upper half	23.2	25	24.1
S96T001181	Core 130:2	Upper half	<48.7	<47.5	<48.1
S96T001182	Core 130:3	Upper half	<49.1	<47	<48
S96T001183	Core 130:4	Upper half	<47.4	<44.2	<45.8
S96T001184	Core 130:5	Subsegment A, top	<47.4	<45	<46.2
S96T001185		Subsegment B	<43.6	<42.7	<43.2
S96T001186		Subsegment C	<49.3	<50.4	<49.8
S96T001187	Core 130:6	Upper half	<45.3	<54	<49.6
S96T001188		Lower half	<52.6	<47.6	<50.1
S96T001479	Core 130:6A	Upper half	27.1	28.2	27.6
S96T001480	Core 130:6B	Upper half	<30	<29.4	<29.7
S96T001481		Lower half	<29.5	<30.5	<30
S96T001482	Core 130:7	Upper half	35.2	33.4	34.3
S96T001483	Core 130:8	Upper half	41.3	35.1	38.2
S96T001484	Core 130:8A	Subsegment A, top	37.6	38	37.8
S96T001485		Subsegment B	<31	30.1	<30.6
S96T001486		Subsegment C	<38.8	<40.1	<39.5
S96T001487	Core 130:9	Upper half	<38.3	<40.1	<39.2
S96T001488		Lower half	<40.3	<39.3	<39.8
S96T001489	Core 130:10	Upper half	<39.9	<38.3	<39.1
S96T001490		Lower half	58	32.4	45.2[QC:e]
S96T001491	Core 130:11	Upper half	<38.6	<37.8	<38.2
S96T001492		Lower half	35	31.2	33.1

Table B2-31. Tank 241-S-102 Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000925	Core 125	Solid composite	24.3	24.6	24.5
S96T000926		Solid composite	32.8	28	30.4
S96T001586	Core 130	Solid composite	<28.2	<29.5	<28.9
S96T001587		Solid composite	33.7	39.4	36.5
S96T001588		Solid composite	39.8	38.4	39.1
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	50.1	56.1	53.1
S96T003188		Lower half	36.3	31	33.6
S96T003189	Core 125:9	Upper half	28.8	33.3	31
S96T003190		Lower half	33.8	35.5	34.6
S96T003194	Core 130:7	Upper half	34.8	35.9	35.3
S96T003195	Core 130:9	Upper half	28.2	29.1	28.6
S96T003196		Lower half	<28.7	28.3	<28.5
S96T000904	Core 125	Solid composite	<35.4	<35.6	<35.5
S96T000905		Solid composite	<43.5	<41.3	<42.4
S96T001592	Core 130	Solid composite	<27.2	32.7	<30
S96T001593		Solid composite	36.3	34.7	35.5
S96T001594		Solid composite	35.1	48.1	41.6[QC:e]
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	65.2	66.5	65.8
S96T000634	Core 125:11	Drainable liquid	152	149	151
S96T001125	Core 130:5	Drainable liquid	145	144	145
S96T001382	Core 130:6A	Drainable liquid	138	133	136
S96T001437	Core 130:10	Drainable liquid	67.4	66.4	66.9
S98T002515	Core 232:1	Drainable liquid	91.4	94.1	92.8

Table B2-32. Tank 241-S-102 Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	<41	<38.5	<39.8
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1
S96T000913		Subsegment B	<98.6	<93.3	<95.9
S96T000914		Subsegment C	<94.7	<102	<98.3
S96T000915	Core 125:7	Upper half	<175	<173	<174
S96T000916		Lower half	<95.5	<89	<92.3
S96T000917	Core 125:8	Upper half	<95.2	<91.2	<93.2
S96T000918		Lower half	<40.7	<43.4	<42
S96T000919	Core 125:9	Upper half	56	59.4	57.7
S96T000920		Lower half	<37.7	<37.9	<37.8
S96T000921	Core 125:10	Upper half	43.1	40.1	41.6
S96T000922		Lower half	62.7	62.8	62.8
S96T000923	Core 125:11	Upper half	<17.1	<16.4	<16.8
S96T001181	Core 130:2	Upper half	<97.3	<95.1	<96.2
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	<94.7	<88.4	<91.6
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	<87.1	<85.4	<86.3
S96T001186		Subsegment C	<98.6	<101	<99.8
S96T001187	Core 130:6	Upper half	<90.6	<108	<99.3
S96T001188		Lower half	<105	<95.2	<100

Table B2-32. Tank 241-S-102 Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	127	155	141
S96T001486		Subsegment C	<77.5	<80.3	<78.9
S96T001487	Core 130:9	Upper half	<76.6	<80.2	<78.4
S96T001488		Lower half	<80.6	<78.6	<79.6
S96T001489	Core 130:10	Upper half	<79.7	<76.5	<78.1
S96T001490		Lower half	<58.4	<61.1	<59.8
S96T001491	Core 130:11	Upper half	86.5	97.6	92
S96T001492		Lower half	<37	<36.1	<36.5
S96T000925	Core 125	Solid composite	<38.2	<37.3	<37.8
S96T000926		Solid composite	<41.7	41.9	<41.8
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	<51.7	<60.5	<56.1
S96T001588		Solid composite	<51.5	<42.4	<47
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4

Table B2-32. Tank 241-S-102 Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-33. Tank 241-S-102 Analytical Results: Nickel (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	14.8	15.3	15.1
S96T000907	Core 125:3	Upper half	8.71	9.58	9.14
S96T000908	Core 125:4	Upper half	<8.22	<7.8	<8.01
S96T000909		Lower half	20.6	25.1	22.9
S96T000910	Core 125:5	Upper half	15.8	12.7	14.3[QC:e]
S96T000911		Lower half	18.9	18.8	18.9

Table B2-33. Tank 241-S-102 Analytical Results: Nickel (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000912	Core 125:6	Subsegment A, top	<18.9	<19.1	<19
S96T000913		Subsegment B	41.8	39.3	40.5
S96T000914		Subsegment C	<18.9	<20.4	<19.6
S96T000915	Core 125:7	Upper half	<34.9	<34.6	<34.8
S96T000916		Lower half	22.5	23.1	22.8
S96T000917	Core 125:8	Upper half	31.6	26.7	29.1
S96T000918		Lower half	22.4	16.9	19.6[QC:e]
S96T000919	Core 125:9	Upper half	59.9	63.3	61.6
S96T000920		Lower half	34.9	34.4	34.6
S96T000921	Core 125:10	Upper half	88.6	84.6	86.6
S96T000922		Lower half	53.8	51.2	52.5
S96T000923	Core 125:11	Upper half	7.88	7.22	7.55
S96T001181	Core 130:2	Upper half	<19.5	23.1	<21.3
S96T001182	Core 130:3	Upper half	22.5	<18.8	<20.6
S96T001183	Core 130:4	Upper half	23.4	20.3	21.9
S96T001184	Core 130:5	Subsegment A, top	<19	<18	<18.5
S96T001185		Subsegment B	24.4	19	21.7[QC:e]
S96T001186		Subsegment C	21.7	25.9	23.8
S96T001187	Core 130:6	Upper half	36.9	42.2	39.5
S96T001188		Lower half	<21	<19	<20
S96T001479	Core 130:6A	Upper half	10.3	13.1	11.7[QC:e]
S96T001480	Core 130:6B	Upper half	<12	<11.8	<11.9
S96T001481		Lower half	<11.8	<12.2	<12
S96T001482	Core 130:7	Upper half	16.6	15.4	16
S96T001483	Core 130:8	Upper half	23.2	18.7	20.9[QC:e]

Table B2-33. Tank 241-S-102 Analytical Results: Nickel (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	15	15.3	15.2
S96T001485		Subsegment B	142	165	154
S96T001486		Subsegment C	53.8	56	54.9
S96T001487	Core 130:9	Upper half	41.6	42.9	42.3
S96T001488		Lower half	29.7	34.5	32.1
S96T001489	Core 130:10	Upper half	36.6	40.7	38.7
S96T001490		Lower half	57	50.6	53.8
S96T001491	Core 130:11	Upper half	62.6	71.6	67.1
S96T001492		Lower half	13.9	16.7	15.3
S96T000925	Core 125	Solid composite	14.9	13.3	14.1
S96T000926		Solid composite	55.8	57.6	56.7
S96T001586	Core 130	Solid composite	20.1	21	20.6
S96T001587		Solid composite	47.1	40.8	44
S96T001588		Solid composite	55.5	52.2	53.9
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<9.94	<11.1	<10.5
S96T003188		Lower half	<9.76	<9.81	<9.79
S96T003189	Core 125:9	Upper half	<11.5	<12.1	<11.8
S96T003190		Lower half	<11.7	<10.3	<11
S96T003194	Core 130:7	Upper half	<10.1	<10.4	<10.3
S96T003195	Core 130:9	Upper half	<10.6	<9.92	<10.3
S96T003196		Lower half	<11.5	<11	<11.3
S96T000904	Core 125	Solid composite	<14.1	<14.2	<14.1
S96T000905		Solid composite	<17.4	<16.5	<16.9

Table B2-33. Tank 241-S-102 Analytical Results: Nickel (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T001592	Core 130	Solid composite	<10.9	<10.8	<10.9
S96T001593		Solid composite	<11.5	<12.7	<12.1
S96T001594		Solid composite	<11.5	<10.9	<11.2
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<24	<24	<24
S96T000634	Core 125:11	Drainable liquid	<24	<24	<24
S96T001125	Core 130:5	Drainable liquid	16.2	<12	<14.1[QC:c]
S96T001382	Core 130:6A	Drainable liquid	<12	<12	<12
S96T001437	Core 130:10	Drainable liquid	<8.02	<8.02	<8.02
S98T002515	Core 232:1	Drainable liquid	<12	<12	<12

Table B2-34. Tank 241-S-102 Analytical Results: Phosphorus (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	4,150	4,180	4,170[QC:c]
S96T000907	Core 125:3	Upper half	2,480	2,390	2,440
S96T000908	Core 125:4	Upper half	1,570	1,320	1,450[QC:c]
S96T000909		Lower half	4,430	3,670	4,050
S96T000910	Core 125:5	Upper half	1,520	1,040	1,280[QC:c]
S96T000911		Lower half	2,940	2,940	2,940
S96T000912	Core 125:6	Subsegment A, top	2,610	2,660	2,640
S96T000913		Subsegment B	4,230	3,910	4,070[QC:c]
S96T000914		Subsegment C	306	325	316

Table B2-34. Tank 241-S-102 Analytical Results: Phosphorus (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000915	Core 125:7	Upper half	2,770	3,050	2,910
S96T000916		Lower half	2,360	3,310	2,840[QC:e]
S96T000917	Core 125:8	Upper half	13,700	8,770	11,200[QC:e]
S96T000918		Lower half	53,600	54,000	53,800[QC:d]
S96T000919	Core 125:9	Upper half	29,500	30,500	30,000
S96T000920		Lower half	30,400	30,100	30,300
S96T000921	Core 125:10	Upper half	37,100	33,900	35,500
S96T000922		Lower half	39,100	37,100	38,100
S96T000923	Core 125:11	Upper half	2,950	3,260	3,110
S96T001181	Core 130:2	Upper half	3,290	3,480	3,390
S96T001182	Core 130:3	Upper half	380	351	366
S96T001183	Core 130:4	Upper half	2,300	2,660	2,480
S96T001184	Core 130:5	Subsegment A, top	1,100	1,030	1,070
S96T001185		Subsegment B	2,820	2,380	2,600
S96T001186		Subsegment C	8,170	8,130	8,150
S96T001187	Core 130:6	Upper half	1,680	1,870	1,780
S96T001188		Lower half	816	829	823
S96T001479	Core 130:6A	Upper half	1,150	1,310	1,230
S96T001480	Core 130:6B	Upper half	1,710	1,970	1,840
S96T001481		Lower half	1,600	2,910	2,260[QC:e]
S96T001482	Core 130:7	Upper half	3,470	3,350	3,410
S96T001483	Core 130:8	Upper half	3,960	3,630	3,800
S96T001484	Core 130:8A	Subsegment A, top	18,400	21,300	19,900
S96T001485		Subsegment B	24,600	28,500	26,600
S96T001486		Subsegment C	45,800	44,200	45,000

Table B2-34. Tank 241-S-102 Analytical Results: Phosphorus (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001487	Core 130:9	Upper half	46,100	43,900	45,000
S96T001488		Lower half	41,300	42,600	42,000
S96T001489	Core 130:10	Upper half	36,900	35,900	36,400
S96T001490		Lower half	29,700	29,800	29,800
S96T001491	Core 130:11	Upper half	43,200	42,200	42,700
S96T001492		Lower half	9,330	10,400	9,870
S96T000925	Core 125	Solid composite	3,020	2,680	2,850
S96T000926		Solid composite	30,200	35,700	33,000[QC:d]
S96T001586	Core 130	Solid composite	2,200	2,210	2,210
S96T001587		Solid composite	41,900	35,600	38,800
S96T001588		Solid composite	17,700	19,500	18,600
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	3,170	3,920	3,550[QC:e]
S96T003188		Lower half	1,510	2,220	1,870[QC:d,e]
S96T003189	Core 125:9	Upper half	1,450	1,330	1,390
S96T003190		Lower half	3,770	3,540	3,660
S96T003194	Core 130:7	Upper half	3,590	3,770	3,680
S96T003195	Core 130:9	Upper half	46,300	50,200	48,300[QC:d]
S96T003196		Lower half	51,800	52,000	51,900[QC:d]
S96T000904	Core 125	Solid composite	3,170	3,250	3,210
S96T000905		Solid composite	44,100	42,200	43,200[QC:d]
S96T001592	Core 130	Solid composite	3,190	2,840	3,020
S96T001593		Solid composite	43,600	46,200	44,900
S96T001594		Solid composite	23,300	25,800	24,600

Table B2-34. Tank 241-S-102 Analytical Results: Phosphorus (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	1,680	1,860	1,770
S96T000634	Core 125:11	Drainable liquid	1,360	1,360	1,360
S96T001125	Core 130:5	Drainable liquid	1,170	1,170	1,170
S96T001382	Core 130:6A	Drainable liquid	1,110	1,060	1,090
S96T001437	Core 130:10	Drainable liquid	1,390	1,380	1,390
S98T002515	Core 232:1	Drainable liquid	896	922	909

Table B2-35. Tank 241-S-102 Analytical Results: Potassium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	581	690	636
S96T000907	Core 125:3	Upper half	478	526	502
S96T000908	Core 125:4	Upper half	571	675	623
S96T000909		Lower half	828	896	862
S96T000910	Core 125:5	Upper half	580	546	563
S96T000911		Lower half	831	870	851
S96T000912	Core 125:6	Subsegment A, top	<473	<478	<476[QC:d]
S96T000913		Subsegment B	1,020	1,100	1,060[QC:d]
S96T000914		Subsegment C	658	759	709
S96T000915	Core 125:7	Upper half	1,160	1,080	1,120
S96T000916		Lower half	1,120	1,240	1,180
S96T000917	Core 125:8	Upper half	1,460	1,410	1,440
S96T000918		Lower half	744	767	756

Table B2-35. Tank 241-S-102 Analytical Results: Potassium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000919	Core 125:9	Upper half	866	798	832
S96T000920		Lower half	857	869	863
S96T000921	Core 125:10	Upper half	947	923	935
S96T000922		Lower half	810	832	821
S96T000923	Core 125:11	Upper half	698	699	699
S96T001181	Core 130:2	Upper half	558	533	546
S96T001182	Core 130:3	Upper half	633	544	589
S96T001183	Core 130:4	Upper half	832	708	770
S96T001184	Core 130:5	Subsegment A, top	1,010	1,070	1,040
S96T001185		Subsegment B	835	897	866
S96T001186		Subsegment C	1,120	1,150	1,140
S96T001187	Core 130:6	Upper half	1,010	1,010	1,010
S96T001188		Lower half	1,110	1,120	1,120
S96T001479	Core 130:6A	Upper half	894	970	932[QC:c]
S96T001480	Core 130:6B	Upper half	603	605	604
S96T001481		Lower half	515	616	566
S96T001482	Core 130:7	Upper half	1,040	1,010	1,030
S96T001483	Core 130:8	Upper half	1,260	959	1,110[QC:e]
S96T001484	Core 130:8A	Subsegment A, top	1,170	1,100	1,140
S96T001485		Subsegment B	544	741	643[QC:e]
S96T001486		Subsegment C	593	625	609
S96T001487	Core 130:9	Upper half	815	810	813
S96T001488		Lower half	707	727	717
S96T001489	Core 130:10	Upper half	830	769	800
S96T001490		Lower half	1,100	871	986[QC:e]

Table B2-35. Tank 241-S-102 Analytical Results: Potassium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001491	Core 130:11	Upper half	716	809	763
S96T001492		Lower half	976	843	910
S96T000925	Core 125	Solid composite	784	815	800
S96T000926		Solid composite	945	880	913
S96T001586	Core 130	Solid composite	870	761	816
S96T001587		Solid composite	1,020	1,120	1,070
S96T001588		Solid composite	1,150	1,200	1,180
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	1,690	1,620	1,660[QC:c]
S96T003188		Lower half	1,260	1,430	1,350
S96T003189	Core 125:9	Upper half	994	1,250	1,120[QC:e]
S96T003190		Lower half	1,200	1,050	1,130
S96T003194	Core 130:7	Upper half	1,090	1,140	1,120
S96T003195	Core 130:9	Upper half	806	736	771
S96T003196		Lower half	747	792	770
S96T000904	Core 125	Solid composite	1,180	1,170	1,180
S96T000905		Solid composite	1,510	1,520	1,520[QC:c]
S96T001592	Core 130	Solid composite	1,010	1,210	1,110
S96T001593		Solid composite	1,040	1,020	1,030
S96T001594		Solid composite	1,030	1,490	1,260[QC:e]
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	2,110	2,000	2,060
S96T000634	Core 125:11	Drainable liquid	4,290	4,350	4,320[QC:c]
S96T001125	Core 130:5	Drainable liquid	3,920	3,920	3,920
S96T001382	Core 130:6A	Drainable liquid	3,980	3,970	3,980[QC:c]
S96T001437	Core 130:10	Drainable liquid	2,040	1,900	1,970
S98T002515	Core 232:1	Drainable liquid	2,660	2,740	2,700

Table B2-36. Tank 241-S-102 Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<41	<38.5	<39.8
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1
S96T000913		Subsegment B	<98.6	<93.3	<95.9
S96T000914		Subsegment C	<94.7	<102	<98.3
S96T000915	Core 125:7	Upper half	<175	<173	<174
S96T000916		Lower half	<95.5	<89	<92.3
S96T000917	Core 125:8	Upper half	<95.2	<91.2	<93.2
S96T000918		Lower half	<40.7	<43.4	<42
S96T000919	Core 125:9	Upper half	<38	<35.5	<36.8
S96T000920		Lower half	<37.7	<37.9	<37.8
S96T000921	Core 125:10	Upper half	<37.5	<36.3	<36.9
S96T000922		Lower half	<36.6	<39.1	<37.9
S96T000923	Core 125:11	Upper half	<17.1	<16.4	<16.8
S96T001181	Core 130:2	Upper half	<97.3	<95.1	<96.2
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	<94.7	<88.4	<91.6
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	<87.1	<85.4	<86.3
S96T001186		Subsegment C	<98.6	<101	<99.8
S96T001187	Core 130:6	Upper half	<90.6	<108	<99.3
S96T001188		Lower half	<105	<95.2	<100
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8

Table B2-36. Tank 241-S-102 Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	<61.9	<59.9	<60.9
S96T001486		Subsegment C	<77.5	<80.3	<78.9
S96T001487	Core 130:9	Upper half	<76.6	<80.2	<78.4
S96T001488		Lower half	<80.6	<78.6	<79.6
S96T001489	Core 130:10	Upper half	<79.7	<76.5	<78.1
S96T001490		Lower half	<58.4	<61.1	<59.8
S96T001491	Core 130:11	Upper half	<77.1	<75.7	<76.4
S96T001492		Lower half	<37	<36.1	<36.5
S96T000925	Core 125	Solid composite	<38.2	<37.3	<37.8
S96T000926		Solid composite	<41.7	<41.2	<41.5
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	<51.7	<60.5	<56.1
S96T001588		Solid composite	<51.5	<42.4	<47
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2

Table B2-36. Tank 241-S-102 Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-37. Tank 241-S-102 Analytical Results: Selenium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	<41	<38.5	<39.8
S96T000907	Core 125:3	Upper half	<41.8	<39.4	<40.6
S96T000908	Core 125:4	Upper half	<41.1	<39	<40
S96T000909		Lower half	<43.4	<44.9	<44.1
S96T000910	Core 125:5	Upper half	<43	<46.3	<44.6
S96T000911		Lower half	<42.2	<48.8	<45.5
S96T000912	Core 125:6	Subsegment A, top	<94.6	<95.6	<95.1

Table B2-37. Tank 241-S-102 Analytical Results: Selenium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000913		Subsegment B	337	275	306[QC:e]
S96T000914		Subsegment C	<94.7	<102	<98.3
S96T000915	Core 125:7	Upper half	302	309	306
S96T000916		Lower half	155	151	153
S96T000917	Core 125:8	Upper half	262	184	223[QC:e]
S96T000918		Lower half	<40.7	<43.4	<42
S96T000919	Core 125:9	Upper half	<38	<35.5	<36.8
S96T000920		Lower half	<37.7	<37.9	<37.8
S96T000921	Core 125:10	Upper half	<37.5	<36.3	<36.9
S96T000922		Lower half	<36.6	<39.1	<37.9
S96T000923	Core 125:11	Upper half	<17.1	<16.4	<16.8
S96T001181	Core 130:2	Upper half	<97.3	170	<134[QC:e]
S96T001182	Core 130:3	Upper half	<98.3	<94.1	<96.2
S96T001183	Core 130:4	Upper half	131	<88.4	<110[QC:e]
S96T001184	Core 130:5	Subsegment A, top	<94.9	<89.9	<92.4
S96T001185		Subsegment B	91.3	<85.4	<88.3
S96T001186		Subsegment C	152	142	147
S96T001187	Core 130:6	Upper half	211	261	236[QC:e]
S96T001188		Lower half	117	120	119
S96T001479	Core 130:6A	Upper half	<41.7	<41.9	<41.8
S96T001480	Core 130:6B	Upper half	<60	<58.8	<59.4
S96T001481		Lower half	<58.9	<61.1	<60
S96T001482	Core 130:7	Upper half	<57.6	<56.8	<57.2
S96T001483	Core 130:8	Upper half	<61.4	<61.6	<61.5

Table B2-37. Tank 241-S-102 Analytical Results: Selenium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	<57.8	<57.2	<57.5
S96T001485		Subsegment B	<61.9	<59.9	<60.9
S96T001486		Subsegment C	<77.5	<80.3	<78.9
S96T001487	Core 130:9	Upper half	<76.6	<80.2	<78.4
S96T001488		Lower half	<80.6	<78.6	<79.6
S96T001489	Core 130:10	Upper half	<79.7	<76.5	<78.1
S96T001490		Lower half	<58.4	<61.1	<59.8
S96T001491	Core 130:11	Upper half	<77.1	<75.7	<76.4
S96T001492		Lower half	<37	<36.1	<36.5
S96T000925	Core 125	Solid composite	<38.2	<37.3	<37.8
S96T000926		Solid composite	<41.7	<41.2	<41.5
S96T001586	Core 130	Solid composite	<56.5	<59.1	<57.8
S96T001587		Solid composite	<51.7	<60.5	<56.1
S96T001588		Solid composite	<51.5	<42.4	<47
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<49.7	<55.6	<52.7
S96T003188		Lower half	<48.8	<49.1	<49
S96T003189	Core 125:9	Upper half	<57.3	<60.5	<58.9
S96T003190		Lower half	<58.3	<51.4	<54.8
S96T003194	Core 130:7	Upper half	<50.6	<52.1	<51.4
S96T003195	Core 130:9	Upper half	<53.2	<49.6	<51.4
S96T003196		Lower half	<57.4	<55	<56.2
S96T000904	Core 125	Solid composite	<70.7	<71.2	<71
S96T000905		Solid composite	<87	<82.7	<84.8

Table B2-37. Tank 241-S-102 Analytical Results: Selenium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T001592	Core 130	Solid composite	<54.5	<53.8	<54.1
S96T001593		Solid composite	<57.6	<63.5	<60.5
S96T001594		Solid composite	<57.5	<54.3	<55.9
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<120	<120	<120
S96T000634	Core 125:11	Drainable liquid	<120	<120	<120
S96T001125	Core 130:5	Drainable liquid	<60.1	<60.1	<60.1
S96T001382	Core 130:6A	Drainable liquid	<60.1	<60.1	<60.1
S96T001437	Core 130:10	Drainable liquid	<40.1	<40.1	<40.1
S98T002515	Core 232:1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-38. Tank 241-S-102 Analytical Results: Silicon (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	352	400	376[QC:c]
S96T000907	Core 125:3	Upper half	261	242	252
S96T000908	Core 125:4	Upper half	76.1	68.6	72.3
S96T000909		Lower half	342	332	337
S96T000910	Core 125:5	Upper half	120	66.7	93.3[QC:e]
S96T000911		Lower half	186	260	223[QC:e]
S96T000912	Core 125:6	Subsegment A, top	<47.3	<47.8	<47.5
S96T000913		Subsegment B	239	197	218
S96T000914		Subsegment C	127	126	127

Table B2-38. Tank 241-S-102 Analytical Results: Silicon (ICP).. (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000915	Core 125:7	Upper half	210	261	236[QC:e]
S96T000916		Lower half	134	171	153[QC:e]
S96T000917	Core 125:8	Upper half	89.1	105	97
S96T000918		Lower half	186	286	236[QC:e]
S96T000919	Core 125:9	Upper half	700	360	530[QC:e]
S96T000920		Lower half	663	447	555[QC:e]
S96T000921	Core 125:10	Upper half	756	561	659[QC:e]
S96T000922		Lower half	1,290	1,180	1,240
S96T000923	Core 125:11	Upper half	554	665	610
S96T001181	Core 130:2	Upper half	89.1	232	161[QC:e]
S96T001182	Core 130:3	Upper half	240	220	230
S96T001183	Core 130:4	Upper half	245	300	273[QC:e]
S96T001184	Core 130:5	Subsegment A, top	254	108	181[QC:e]
S96T001185		Subsegment B	200	95.7	148[QC:c,e]
S96T001186		Subsegment C	279	294	287
S96T001187	Core 130:6	Upper half	432	425	429
S96T001188		Lower half	372	348	360
S96T001479	Core 130:6A	Upper half	67.3	231	149[QC:e]
S96T001480	Core 130:6B	Upper half	122	246	184[QC:c,e]
S96T001481		Lower half	128	142	135
S96T001482	Core 130:7	Upper half	293	284	289
S96T001483	Core 130:8	Upper half	127	86.7	107[QC:e]
S96T001484	Core 130:8A	Subsegment A, top	113	136	125
S96T001485		Subsegment B	276	460	368[QC:e]
S96T001486		Subsegment C	1,370	923	1,150[QC:e]

Table B2-38. Tank 241-S-102 Analytical Results: Silicon (ICP).. (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001487	Core 130:9	Upper half	1,280	1,160	1,220
S96T001488		Lower half	888	1,050	969
S96T001489	Core 130:10	Upper half	451	348	400[QC:e]
S96T001490		Lower half	<29.2	65.4	<47.3[QC:e]
S96T001491	Core 130:11	Upper half	888	984	936
S96T001492		Lower half	3,940	5,090	4,520[QC:e]
S96T000925	Core 125	Solid composite	399	328	364[QC:c]
S96T000926		Solid composite	590	280	435[QC:c,e]
S96T001586	Core 130	Solid composite	208	192	200[QC:b]
S96T001587		Solid composite	1,340	977	1,160[QC:b,e]
S96T001588		Solid composite	703	919	811[QC:b,e]
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	324	311	318
S96T003188		Lower half	350	316	333
S96T003189	Core 125:9	Upper half	385	434	410[QC:d]
S96T003190		Lower half	463	383	423[QC:d]
S96T003194	Core 130:7	Upper half	398	424	411
S96T003195	Core 130:9	Upper half	1,100	1,010	1,060[QC:d]
S96T003196		Lower half	670	702	686
S96T000904	Core 125	Solid composite	640	650	645[QC:d]
S96T000905		Solid composite	2,150	2,050	2,100[QC:d]
S96T001592	Core 130	Solid composite	342	364	353
S96T001593		Solid composite	644	530	587
S96T001594		Solid composite	466	1,050	758[QC:e]

Table B2-38. Tank 241-S-102 Analytical Results: Silicon (ICP).. (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	544	503	524[QC:d]
S96T000634	Core 125:11	Drainable liquid	742	726	734
S96T001125	Core 130:5	Drainable liquid	148	146	147
S96T001382	Core 130:6A	Drainable liquid	264	186	225[QC:c,e]
S96T001437	Core 130:10	Drainable liquid	112	110	111
S98T002515	Core 232:1	Drainable liquid	128	129	129

Table B2-39. Tank 241-S-102 Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	14.6	14.4	14.5
S96T000907	Core 125:3	Upper half	16	15.3	15.7
S96T000908	Core 125:4	Upper half	14.6	15.3	14.9
S96T000909		Lower half	14.7	15	14.8
S96T000910	Core 125:5	Upper half	15.1	15.8	15.4
S96T000911		Lower half	15.4	15.1	15.3
S96T000912	Core 125:6	Subsegment A, top	<9.46	<9.56	<9.51
S96T000913		Subsegment B	32.4	69.3	50.8[QC:e]
S96T000914		Subsegment C	25.5	22.1	23.8
S96T000915	Core 125:7	Upper half	21.4	29.1	25.3[QC:e]
S96T000916		Lower half	15.4	18.7	17.1
S96T000917	Core 125:8	Upper half	11.8	10.7	11.3
S96T000918		Lower half	15.4	15.4	15.4

Table B2-39. Tank 241-S-102 Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000919	Core 125:9	Upper half	19.7	19.5	19.6
S96T000920		Lower half	15.7	15.4	15.6
S96T000921	Core 125:10	Upper half	21.6	20	20.8
S96T000922		Lower half	18.7	18.5	18.6
S96T000923	Core 125:11	Upper half	4.93	5.4	5.17
S96T001181	Core 130:2	Upper half	<9.73	<9.51	<9.62
S96T001182	Core 130:3	Upper half	<9.83	<9.41	<9.62
S96T001183	Core 130:4	Upper half	<9.47	<8.84	<9.16
S96T001184	Core 130:5	Subsegment A, top	22.7	14	18.4[QC:e]
S96T001185		Subsegment B	<8.71	<8.54	<8.63
S96T001186		Subsegment C	<9.86	<10.1	<9.98
S96T001187	Core 130:6	Upper half	<9.06	<10.8	<9.93
S96T001188		Lower half	<10.5	<9.52	<10
S96T001479	Core 130:6A	Upper half	12.6	13.6	13.1
S96T001480	Core 130:6B	Upper half	16.5	15	15.8
S96T001481		Lower half	15.6	16.2	15.9
S96T001482	Core 130:7	Upper half	13.5	12.1	12.8
S96T001483	Core 130:8	Upper half	15.6	14.8	15.2
S96T001484	Core 130:8A	Subsegment A, top	14.1	14.2	14.1
S96T001485		Subsegment B	18.4	26.1	22.3[QC:e]
S96T001486		Subsegment C	17.7	17.9	17.8[QC:c]
S96T001487	Core 130:9	Upper half	18.1	18.1	18.1
S96T001488		Lower half	14.5	15.8	15.2
S96T001489	Core 130:10	Upper half	15.2	15.4	15.3
S96T001490		Lower half	20.1	16.3	18.2[QC:e]

Table B2-39. Tank 241-S-102 Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001491	Core 130:11	Upper half	21.1	21.3	21.2
S96T001492		Lower half	17.5	16.1	16.8
S96T000925	Core 125	Solid composite	13.3	13.7	13.5[QC:c]
S96T000926		Solid composite	18.5	18.7	18.6[QC:c]
S96T001586	Core 130	Solid composite	16.4	15.8	16.1[QC:a,c]
S96T001587		Solid composite	18.3	18	18.1[QC:a]
S96T001588		Solid composite	18.5	18.7	18.6[QC:a]
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	18.6	18.2	18.4
S96T003188		Lower half	17.7	17.1	17.4
S96T003189	Core 125:9	Upper half	17	16.8	16.9
S96T003190		Lower half	17.2	16.1	16.6
S96T003194	Core 130:7	Upper half	16.2	16.8	16.5
S96T003195	Core 130:9	Upper half	15.9	16.1	16
S96T003196		Lower half	16.9	16.6	16.8
S96T000904	Core 125	Solid composite	16.4	16	16.2
S96T000905		Solid composite	19.7	18.3	19
S96T001592	Core 130	Solid composite	18.3	17.9	18.1
S96T001593		Solid composite	16.3	16.3	16.3
S96T001594		Solid composite	15.6	16.5	16.1
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	16.5	17.8	17.1[QC:c]
S96T000634	Core 125:11	Drainable liquid	19.5	17.1	18.3[QC:c]
S96T001125	Core 130:5	Drainable liquid	18.8	18.7	18.8
S96T001382	Core 130:6A	Drainable liquid	18	17.5	17.8
S96T001437	Core 130:10	Drainable liquid	10.7	10.4	10.6
S98T002515	Core 232:1	Drainable liquid	15.6	15.4	15.5

Table B2-40. Tank 241-S-102 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	2.11E+05	2.12E+05	2.12E+05
S96T000907	Core 125:3	Upper half	2.16E+05	2.12E+05	2.14E+05
S96T000908	Core 125:4	Upper half	2.08E+05	2.18E+05	2.13E+05[QC:d]
S96T000909		Lower half	2.08E+05	2.13E+05	2.11E+05
S96T000910	Core 125:5	Upper half	2.13E+05	2.20E+05	2.17E+05
S96T000911		Lower half	2.06E+05	2.04E+05	2.05E+05
S96T000912	Core 125:6	Subsegment A, top	2.20E+05	2.16E+05	2.18E+05[QC:d]
S96T000913		Subsegment B	2.04E+05	2.02E+05	2.03E+05[QC:d]
S96T000914		Subsegment C	1.98E+05	2.09E+05	2.04E+05
S96T000915	Core 125:7	Upper half	1.87E+05	1.94E+05	1.91E+05
S96T000916		Lower half	2.03E+05	1.95E+05	1.99E+05
S96T000917	Core 125:8	Upper half	1.97E+05	2.07E+05	2.02E+05
S96T000918		Lower half	1.93E+05	1.92E+05	1.93E+05[QC:d]
S96T000919	Core 125:9	Upper half	1.86E+05	1.79E+05	1.83E+05
S96T000920		Lower half	1.84E+05	1.83E+05	1.84E+05
S96T000921	Core 125:10	Upper half	1.88E+05	1.81E+05	1.85E+05
S96T000922		Lower half	1.75E+05	1.73E+05	1.74E+05
S96T000923	Core 125:11	Upper half	58,200	59,500	58,900
S96T001181	Core 130:2	Upper half	1.96E+05	2.09E+05	2.03E+05[QC:d]
S96T001182	Core 130:3	Upper half	2.28E+05	2.18E+05	2.23E+05
S96T001183	Core 130:4	Upper half	2.14E+05	2.15E+05	2.15E+05
S96T001184	Core 130:5	Subsegment A, top	1.99E+05	1.96E+05	1.98E+05
S96T001185		Subsegment B	2.02E+05	1.98E+05	2.00E+05
S96T001186		Subsegment C	1.84E+05	1.86E+05	1.85E+05
S96T001187	Core 130:6	Upper half	1.91E+05	1.89E+05	1.90E+05
S96T001188		Lower half	1.82E+05	1.84E+05	1.83E+05
S96T001479	Core 130:6A	Upper half	1.85E+05	1.96E+05	1.91E+05[QC:d]

Table B2-40. Tank 241-S-102 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001480	Core 130:6B	Upper half	2.44E+05	2.23E+05	2.34E+05
S96T001481		Lower half	2.33E+05	2.35E+05	2.34E+05
S96T001482	Core 130:7	Upper half	2.07E+05	1.83E+05	1.95E+05[QC:d]
S96T001483	Core 130:8	Upper half	2.24E+05	2.30E+05	2.27E+05
S96T001484	Core 130:8A	Subsegment A, top	1.96E+05	2.01E+05	1.99E+05
S96T001485		Subsegment B	1.34E+05	1.65E+05	1.50E+05[QC:e]
S96T001486		Subsegment C	1.91E+05	1.91E+05	1.91E+05
S96T001487	Core 130:9	Upper half	2.09E+05	2.00E+05	2.05E+05
S96T001488		Lower half	1.79E+05	1.85E+05	1.82E+05
S96T001489	Core 130:10	Upper half	1.81E+05	1.82E+05	1.82E+05
S96T001490		Lower half	1.84E+05	1.61E+05	1.73E+05
S96T001491	Core 130:11	Upper half	1.94E+05	1.93E+05	1.94E+05
S96T001492		Lower half	1.08E+05	1.04E+05	1.06E+05
S96T000925	Core 125	Solid composite	1.86E+05	1.83E+05	1.85E+05[QC:d]
S96T000926		Solid composite	1.83E+05	1.80E+05	1.82E+05[QC:d]
S96T001586	Core 130	Solid composite	2.28E+05	2.25E+05	2.27E+05[QC:d]
S96T001587		Solid composite	1.99E+05	1.95E+05	1.97E+05
S96T001588		Solid composite	1.89E+05	1.95E+05	1.92E+05
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	2.56E+05	2.54E+05	2.55E+05[QC:c]
S96T003188		Lower half	2.51E+05	2.48E+05	2.50E+05
S96T003189	Core 125:9	Upper half	2.52E+05	2.45E+05	2.49E+05
S96T003190		Lower half	2.48E+05	2.27E+05	2.38E+05
S96T003194	Core 130:7	Upper half	2.37E+05	2.43E+05	2.40E+05[QC:d]
S96T003195	Core 130:9	Upper half	2.24E+05	2.26E+05	2.25E+05[QC:d]
S96T003196		Lower half	2.32E+05	2.33E+05	2.33E+05[QC:d]

Table B2-40. Tank 241-S-102 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000904	Core 125	Solid composite	2.21E+05	2.18E+05	2.20E+05[QC:d]
S96T000905		Solid composite	2.16E+05	2.08E+05	2.12E+05[QC:d]
S96T001592	Core 130	Solid composite	2.50E+05	2.46E+05	2.48E+05
S96T001593		Solid composite	2.09E+05	2.14E+05	2.12E+05
S96T001594		Solid composite	2.10E+05	2.07E+05	2.09E+05
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	2.42E+05	2.47E+05	2.45E+05[QC:d]
S96T000634	Core 125:11	Drainable liquid	2.70E+05	2.65E+05	2.68E+05
S96T001125	Core 130:5	Drainable liquid	2.60E+05	2.63E+05	2.62E+05[QC:d]
S96T001382	Core 130:6A	Drainable liquid	2.59E+05	2.51E+05	2.55E+05
S96T001437	Core 130:10	Drainable liquid	1.50E+05	1.48E+05	1.49E+05
S98T002515	Core 232:1	Drainable liquid	2.12E+05	2.16E+05	2.14E+05[QC:d]

Table B2-41. Tank 241-S-102 Analytical Results: Strontium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	<4.1	<3.85	<3.97
S96T000907	Core 125:3	Upper half	<4.18	<3.94	<4.06
S96T000908	Core 125:4	Upper half	<4.11	<3.9	<4
S96T000909		Lower half	<4.34	<4.49	<4.42
S96T000910	Core 125:5	Upper half	<4.3	<4.63	<4.46
S96T000911		Lower half	<4.22	<4.88	<4.55

Table B2-41. Tank 241-S-102 Analytical Results: Strontium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000912	Core 125:6	Subsegment A, top	<9.46	<9.56	<9.51
S96T000913		Subsegment B	<9.86	<9.33	<9.59
S96T000914		Subsegment C	<9.47	<10.2	<9.84
S96T000915	Core 125:7	Upper half	<17.5	<17.3	<17.4
S96T000916		Lower half	<9.55	<8.9	<9.23
S96T000917	Core 125:8	Upper half	<9.52	<9.12	<9.32
S96T000918		Lower half	<4.07	<4.34	<4.21
S96T000919	Core 125:9	Upper half	<3.8	<3.55	<3.67
S96T000920		Lower half	<3.77	<3.79	<3.78
S96T000921	Core 125:10	Upper half	6.4	6	6.2
S96T000922		Lower half	4.76	4.71	4.73
S96T000923	Core 125:11	Upper half	2.87	5.91	4.39[QC:e]
S96T001181	Core 130:2	Upper half	<9.73	<9.51	<9.62
S96T001182	Core 130:3	Upper half	<9.83	<9.41	<9.62
S96T001183	Core 130:4	Upper half	<9.47	<8.84	<9.16
S96T001184	Core 130:5	Subsegment A, top	<9.49	<8.99	<9.24
S96T001185		Subsegment B	<8.71	<8.54	<8.63
S96T001186		Subsegment C	<9.86	<10.1	<9.98
S96T001187	Core 130:6	Upper half	<9.06	<10.8	<9.93
S96T001188		Lower half	<10.5	<9.52	<10
S96T001479	Core 130:6A	Upper half	<4.17	<4.19	<4.18
S96T001480	Core 130:6B	Upper half	<6	<5.88	<5.94
S96T001481		Lower half	<5.89	<6.11	<6
S96T001482	Core 130:7	Upper half	<5.76	<5.68	<5.72
S96T001483	Core 130:8	Upper half	<6.14	<6.16	<6.15

Table B2-41. Tank 241-S-102 Analytical Results: Strontium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	<5.78	<5.72	<5.75
S96T001485		Subsegment B	8.69	10.5	9.59
S96T001486		Subsegment C	<7.75	<8.03	<7.89
S96T001487	Core 130:9	Upper half	<7.66	<8.02	<7.84
S96T001488		Lower half	<8.06	<7.86	<7.96
S96T001489	Core 130:10	Upper half	<7.97	<7.65	<7.81
S96T001490		Lower half	<5.84	<6.11	<5.97
S96T001491	Core 130:11	Upper half	<7.71	<7.57	<7.64
S96T001492		Lower half	12	14.6	13.3
S96T000925	Core 125	Solid composite	<3.82	<3.73	<3.77
S96T000926		Solid composite	<4.17	<4.12	<4.14
S96T001586	Core 130	Solid composite	<5.65	<5.91	<5.78
S96T001587		Solid composite	<5.17	<6.05	<5.61
S96T001588		Solid composite	6.33	<4.24	<5.29[QC:e]
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<4.97	<5.56	<5.26
S96T003188		Lower half	<4.88	<4.91	<4.89
S96T003189	Core 125:9	Upper half	<5.73	<6.05	<5.89
S96T003190		Lower half	<5.83	<5.14	<5.48
S96T003194	Core 130:7	Upper half	<5.06	<5.21	<5.13
S96T003195	Core 130:9	Upper half	<5.32	<4.96	<5.14
S96T003196		Lower half	<5.74	<5.5	<5.62
S96T000904	Core 125	Solid composite	<7.07	<7.12	<7.1
S96T000905		Solid composite	<8.7	<8.27	<8.48

Table B2-41. Tank 241-S-102 Analytical Results: Strontium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001592	Core 130	Solid composite	<5.45	<5.38	<5.42
S96T001593		Solid composite	<5.76	<6.35	<6.05
S96T001594		Solid composite	<5.75	<5.43	<5.59
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<12	<12	<12
S96T000634	Core 125:11	Drainable liquid	<12	<12	<12
S96T001125	Core 130:5	Drainable liquid	<6.01	<6.01	<6.01
S96T001382	Core 130:6A	Drainable liquid	<6.01	<6.01	<6.01
S96T001437	Core 130:10	Drainable liquid	<4.01	<4.01	<4.01
S98T002515	Core 232:1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-42. Tank 241-S-102 Analytical Results: Sulfur (ICP). (4 sheets).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	1,780	1,820	1,800[QC:c]
S96T000907	Core 125:3	Upper half	471	555	513
S96T000908	Core 125:4	Upper half	704	794	749
S96T000909		Lower half	2,150	2,310	2,230
S96T000910	Core 125:5	Upper half	1,420	1,260	1,340
S96T000911		Lower half	1,560	1,490	1,530
S96T000912	Core 125:6	Subsegment A, top	742	732	737
S96T000913		Subsegment B	3,190	3,040	3,120
S96T000914		Subsegment C	525	572	549

Table B2-42. Tank 241-S-102 Analytical Results: Sulfur (ICP). (4 sheets).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000915	Core 125:7	Upper half	2,870	2,690	2,780
S96T000916		Lower half	1,760	1,840	1,800
S96T000917	Core 125:8	Upper half	1,010	771	891[QC:e]
S96T000918		Lower half	166	176	171
S96T000919	Core 125:9	Upper half	4,670	5,020	4,850
S96T000920		Lower half	4,600	4,580	4,590
S96T000921	Core 125:10	Upper half	2,140	2,610	2,380
S96T000922		Lower half	169	182	176
S96T000923	Core 125:11	Upper half	125	126	126
S96T001181	Core 130:2	Upper half	1,420	1,740	1,580[QC:e]
S96T001182	Core 130:3	Upper half	938	863	901
S96T001183	Core 130:4	Upper half	1,290	1,310	1,300
S96T001184	Core 130:5	Subsegment A, top	396	364	380
S96T001185		Subsegment B	1,160	1,090	1,130
S96T001186		Subsegment C	2,380	2,530	2,460
S96T001187	Core 130:6	Upper half	1,150	1,070	1,110
S96T001188		Lower half	1,100	1,130	1,120
S96T001479	Core 130:6A	Upper half	1,270	1,270	1,270[QC:d]
S96T001480	Core 130:6B	Upper half	550	676	613[QC:e]
S96T001481		Lower half	754	757	756
S96T001482	Core 130:7	Upper half	2,950	2,630	2,790
S96T001483	Core 130:8	Upper half	1,650	1,380	1,520
S96T001484	Core 130:8A	Subsegment A, top	716	689	703
S96T001485		Subsegment B	1,120	1,300	1,210
S96T001486		Subsegment C	4,030	4,100	4,070[QC:c]

Table B2-42. Tank 241-S-102 Analytical Results: Sulfur (ICP). (4 sheets).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001487	Core 130:9	Upper half	4,720	4,740	4,730
S96T001488		Lower half	3,510	3,580	3,550
S96T001489	Core 130:10	Upper half	3,690	3,860	3,780
S96T001490		Lower half	2,480	2,410	2,450
S96T001491	Core 130:11	Upper half	581	854	718[QC:e]
S96T001492		Lower half	198	192	195
S96T000925	Core 125	Solid composite	1,410	1,460	1,440
S96T000926		Solid composite	4,250	3,140	3,700[QC:e]
S96T001586	Core 130	Solid composite	1,490	1,600	1,550
S96T001587		Solid composite	3,860	3,420	3,640
S96T001588		Solid composite	1,640	1,740	1,690
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	4,170	4,080	4,130
S96T003188		Lower half	2,520	2,400	2,460
S96T003189	Core 125:9	Upper half	1,600	1,530	1,570
S96T003190		Lower half	3,370	3,090	3,230
S96T003194	Core 130:7	Upper half	3,070	3,180	3,130
S96T003195	Core 130:9	Upper half	5,790	5,680	5,740
S96T003196		Lower half	4,690	4,560	4,630
S96T000904	Core 125	Solid composite	1,650	1,720	1,690
S96T000905		Solid composite	3,910	3,630	3,770[QC:d]
S96T001592	Core 130	Solid composite	2,130	1,930	2,030
S96T001593		Solid composite	4,430	4,350	4,390
S96T001594		Solid composite	2,000	1,850	1,930

Table B2-42. Tank 241-S-102 Analytical Results: Sulfur (ICP). (4 sheets).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	1,830	1,890	1,860
S96T000634	Core 125:11	Drainable liquid	717	719	718
S96T001125	Core 130:5	Drainable liquid	877	896	887
S96T001382	Core 130:6A	Drainable liquid	827	702	765
S96T001437	Core 130:10	Drainable liquid	2,490	2,500	2,500[QC:d]
S98T002515	Core 232:1	Drainable liquid	1,730	1,770	1,750

Table B2-43. Tank 241-S-102 Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<82	<77	<79.5
S96T000907	Core 125:3	Upper half	<83.6	<78.8	<81.2
S96T000908	Core 125:4	Upper half	<82.2	<78	<80.1
S96T000909		Lower half	<86.7	<89.8	<88.3
S96T000910	Core 125:5	Upper half	<86	<92.7	<89.3
S96T000911		Lower half	<84.4	<97.7	<91.1
S96T000912	Core 125:6	Subsegment A, top	<189	<191	<190
S96T000913		Subsegment B	<197	<187	<192
S96T000914		Subsegment C	<189	<204	<197
S96T000915	Core 125:7	Upper half	<349	<346	<348
S96T000916		Lower half	<191	<178	<185
S96T000917	Core 125:8	Upper half	<190	<182	<186
S96T000918		Lower half	<81.3	<86.9	<84.1

Table B2-43. Tank 241-S-102 Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000919	Core 125:9	Upper half	<76	<70.9	<73.5
S96T000920		Lower half	<75.5	<75.8	<75.7
S96T000921	Core 125:10	Upper half	<75	<72.5	<73.8
S96T000922		Lower half	<73.3	<78.1	<75.7
S96T000923	Core 125:11	Upper half	<34.2	<32.8	<33.5
S96T001181	Core 130:2	Upper half	<195	<190	<193
S96T001182	Core 130:3	Upper half	<197	<188	<193
S96T001183	Core 130:4	Upper half	<189	<177	<183
S96T001184	Core 130:5	Subsegment A, top	<190	<180	<185
S96T001185		Subsegment B	<174	<171	<173
S96T001186		Subsegment C	<197	<202	<200
S96T001187	Core 130:6	Upper half	<181	<216	<199
S96T001188		Lower half	<210	<190	<200
S96T001479	Core 130:6A	Upper half	<83.4	<83.9	<83.7
S96T001480	Core 130:6B	Upper half	<120	<118	<119
S96T001481		Lower half	<118	<122	<120
S96T001482	Core 130:7	Upper half	<115	<114	<115
S96T001483	Core 130:8	Upper half	<123	<123	<123
S96T001484	Core 130:8A	Subsegment A, top	<116	<114	<115
S96T001485		Subsegment B	<124	<120	<122
S96T001486		Subsegment C	<155	<161	<158
S96T001487	Core 130:9	Upper half	<153	<160	<157
S96T001488		Lower half	<161	<157	<159
S96T001489	Core 130:10	Upper half	<159	<153	<156
S96T001490		Lower half	<117	<122	<120

Table B2-43. Tank 241-S-102 Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001491	Core 130:11	Upper half	<154	<151	<153
S96T001492		Lower half	<74	<72.2	<73.1
S96T000925	Core 125	Solid composite	<76.4	<74.7	<75.6
S96T000926		Solid composite	<83.3	<82.3	<82.8
S96T001586	Core 130	Solid composite	<113	<118	<116
S96T001587		Solid composite	<103	<121	<112
S96T001588		Solid composite	<103	<84.9	<94
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T003184	Core 125:7	Upper half	<99.4	<111	<105
S96T003188		Lower half	<97.6	<98.1	<97.8
S96T003189	Core 125:9	Upper half	<115	<121	<118
S96T003190		Lower half	<117	<103	<110
S96T003194	Core 130:7	Upper half	<101	<104	<103
S96T003195	Core 130:9	Upper half	<106	<99.2	<103
S96T003196		Lower half	<115	<110	<113
S96T000904	Core 125	Solid composite	<141	<142	<142
S96T000905		Solid composite	<174	<165	<170
S96T001592	Core 130	Solid composite	<109	<108	<109
S96T001593		Solid composite	<115	<127	<121
S96T001594		Solid composite	<115	<109	<112
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<240	<240	<240
S96T000634	Core 125:11	Drainable liquid	<240	<240	<240
S96T001125	Core 130:5	Drainable liquid	<120	<120	<120
S96T001382	Core 130:6A	Drainable liquid	<120	<120	<120
S96T001437	Core 130:10	Drainable liquid	<80.2	<80.2	<80.2
S98T002515	Core 232:1	Drainable liquid	<120	<120	<120

Table B2-44. Tank 241-S-102 Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<4.1	<3.85	<3.97[QC:a]
S96T000907	Core 125:3	Upper half	<4.18	<3.94	<4.06[QC:a]
S96T000908	Core 125:4	Upper half	<4.11	<3.9	<4[QC:a]
S96T000909		Lower half	<4.34	<4.49	<4.42[QC:a]
S96T000910	Core 125:5	Upper half	<4.3	<4.63	<4.46[QC:a]
S96T000911		Lower half	<4.22	<4.88	<4.55[QC:a]
S96T000912	Core 125:6	Subsegment A, top	<9.46	<9.56	<9.51[QC:c]
S96T000913		Subsegment B	<9.86	<9.33	<9.59
S96T000914		Subsegment C	<9.47	<10.2	<9.84
S96T000915	Core 125:7	Upper half	<17.5	<17.3	<17.4
S96T000916		Lower half	<9.55	<8.9	<9.23
S96T000917	Core 125:8	Upper half	<9.52	<9.12	<9.32
S96T000918		Lower half	<4.07	<4.34	<4.21[QC:a]
S96T000919	Core 125:9	Upper half	4.59	4.36	4.47[QC:a]
S96T000920		Lower half	<3.77	<3.79	<3.78[QC:a]
S96T000921	Core 125:10	Upper half	4.44	4.03	4.24[QC:a]
S96T000922		Lower half	4.66	4.61	4.63[QC:a]
S96T000923	Core 125:11	Upper half	25.7	78.5	52.1[QC:a,c]
S96T001181	Core 130:2	Upper half	<9.73	<9.51	<9.62[QC:c]
S96T001182	Core 130:3	Upper half	<9.83	<9.41	<9.62
S96T001183	Core 130:4	Upper half	<9.47	<8.84	<9.16
S96T001184	Core 130:5	Subsegment A, top	<9.49	<8.99	<9.24
S96T001185		Subsegment B	<8.71	<8.54	<8.63[QC:a,c]
S96T001186		Subsegment C	<9.86	<10.1	<9.98[QC:a]
S96T001187	Core 130:6	Upper half	<9.06	<10.8	<9.93[QC:a]
S96T001188		Lower half	<10.5	<9.52	<10[QC:a]
S96T001479	Core 130:6A	Upper half	<4.17	<4.19	<4.18

Table B2-44. Tank 241-S-102 Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001480	Core 130:6B	Upper half	<6	<5.88	<5.94[QC:c]
S96T001481		Lower half	<5.89	<6.11	<6
S96T001482	Core 130:7	Upper half	<5.76	<5.68	<5.72
S96T001483	Core 130:8	Upper half	<6.14	<6.16	<6.15
S96T001484	Core 130:8A	Subsegment A, top	<5.78	<5.72	<5.75
S96T001485		Subsegment B	7.88	10.4	9.14[QC:e]
S96T001486		Subsegment C	<7.75	<8.03	<7.89[QC:a]
S96T001487	Core 130:9	Upper half	<7.66	<8.02	<7.84[QC:a]
S96T001488		Lower half	<8.06	<7.86	<7.96[QC:a]
S96T001489	Core 130:10	Upper half	<7.97	<7.65	<7.81[QC:a]
S96T001490		Lower half	<5.84	<6.11	<5.97[QC:a]
S96T001491	Core 130:11	Upper half	<7.71	<7.57	<7.64[QC:a]
S96T001492		Lower half	36.8	216	126[QC:a,e]
S96T000925	Core 125	Solid composite	5.8	<3.73	<4.76[QC:a,c,e]
S96T000926		Solid composite	<4.17	<4.12	<4.14[QC:a,c]
S96T001586	Core 130	Solid composite	<5.65	<5.91	<5.78
S96T001587		Solid composite	<5.17	<6.05	<5.61
S96T001588		Solid composite	20.2	6.74	13.5[QC:e]
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T003184	Core 125:7	Upper half	<4.97	<5.56	<5.26
S96T003188		Lower half	<4.88	<4.91	<4.89
S96T003189	Core 125:9	Upper half	<5.73	<6.05	<5.89
S96T003190		Lower half	<5.83	<5.14	<5.48
S96T003194	Core 130:7	Upper half	<5.06	<5.21	<5.13
S96T003195	Core 130:9	Upper half	<5.32	<4.96	<5.14
S96T003196		Lower half	<5.74	<5.5	<5.62

Table B2-44. Tank 241-S-102 Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T000904	Core 125	Solid composite	<7.07	<7.12	<7.1
S96T000905		Solid composite	<8.7	<8.27	<8.48
S96T001592	Core 130	Solid composite	<5.45	<5.38	<5.42
S96T001593		Solid composite	<5.76	<6.35	<6.05
S96T001594		Solid composite	<5.75	<5.43	<5.59
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	<12	<12	<12
S96T000634	Core 125:11	Drainable liquid	<12	<12	<12
S96T001125	Core 130:5	Drainable liquid	<6.01	<6.01	<6.01
S96T001382	Core 130:6A	Drainable liquid	<6.01	<6.01	<6.01
S96T001437	Core 130:10	Drainable liquid	<4.01	<4.01	<4.01
S98T002515	Core 232:1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-45. Tank 241-S-102 Analytical Results: Total Uranium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<205	<193	<199
S96T000907	Core 125:3	Upper half	<209	<197	<203
S96T000908	Core 125:4	Upper half	<207	<195	<201
S96T000909		Lower half	<217	<225	<221
S96T000910	Core 125:5	Upper half	<215	<232	<224
S96T000911		Lower half	<211	<244	<228

Table B2-45. Tank 241-S-102 Analytical Results: Total Uranium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000912	Core 125:6	Subsegment A, top	<473	<478	<476
S96T000913		Subsegment B	<493	<467	<480
S96T000914		Subsegment C	<474	<511	<493
S96T000915	Core 125:7	Upper half	<873	<864	<869
S96T000916		Lower half	<477	<445	<461
S96T000917	Core 125:8	Upper half	<476	<456	<466
S96T000918		Lower half	<203	<217	<210
S96T000919	Core 125:9	Upper half	1,730	1,820	1,780
S96T000920		Lower half	730	684	707
S96T000921	Core 125:10	Upper half	845	833	839
S96T000922		Lower half	1,120	1,120	1,120
S96T000923	Core 125:11	Upper half	2,130	2,420	2,280
S96T001181	Core 130:2	Upper half	<487	<475	<481
S96T001182	Core 130:3	Upper half	<491	<470	<481
S96T001183	Core 130:4	Upper half	<474	<442	<458
S96T001184	Core 130:5	Subsegment A, top	<474	<450	<462
S96T001185		Subsegment B	<436	<427	<432
S96T001186		Subsegment C	<493	<504	<499
S96T001187	Core 130:6	Upper half	<453	<540	<497
S96T001188		Lower half	<526	<476	<501
S96T001479	Core 130:6A	Upper half	<208	<210	<209
S96T001480	Core 130:6B	Upper half	<300	<294	<297
S96T001481		Lower half	<295	<305	<300
S96T001482	Core 130:7	Upper half	<288	<284	<286
S96T001483	Core 130:8	Upper half	<307	<308	<308

Table B2-45. Tank 241-S-102 Analytical Results: Total Uranium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	<289	<286	<288
S96T001485		Subsegment B	3,850	4,600	4,230
S96T001486		Subsegment C	1,600	1,580	1,590
S96T001487	Core 130:9	Upper half	1,490	1,380	1,440
S96T001488		Lower half	576	605	591
S96T001489	Core 130:10	Upper half	618	680	649
S96T001490		Lower half	1,830	931	1,380[QC:e]
S96T001491	Core 130:11	Upper half	681	758	720
S96T001492		Lower half	32,700	31,500	32,100
S96T000925	Core 125	Solid composite	285	307	296
S96T000926		Solid composite	1,110	1,090	1,100
S96T001586	Core 130	Solid composite	<282	<295	<289
S96T001587		Solid composite	1,040	1,240	1,140
S96T001588		Solid composite	4,340	4,740	4,540
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	<249	<278	<264
S96T003188		Lower half	<244	<245	<245
S96T003189	Core 125:9	Upper half	<287	<303	<295
S96T003190		Lower half	<291	<257	<274
S96T003194	Core 130:7	Upper half	<253	<260	<257
S96T003195	Core 130:9	Upper half	<266	<248	<257
S96T003196		Lower half	<287	<275	<281
S96T000904	Core 125	Solid composite	<354	<356	<355
S96T000905		Solid composite	<435	<413	<424

Table B2-45. Tank 241-S-102 Analytical Results: Total Uranium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001592	Core 130	Solid composite	<272	<269	<271
S96T001593		Solid composite	<288	<318	<303
S96T001594		Solid composite	<288	<272	<280
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<600	<600	<600
S96T000634	Core 125:11	Drainable liquid	<600	<600	<600
S96T001125	Core 130:5	Drainable liquid	<300	<300	<300
S96T001382	Core 130:6A	Drainable liquid	<300	<300	<300
S96T001437	Core 130:10	Drainable liquid	<200	<200	<200
S98T002515	Core 232:1	Drainable liquid	<300	<300	<300
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S96T000870	Core 125:7	Upper half	24	20.7	22.4
S96T000871		Lower half	22.3	19.9	21.1
S96T000874	Core 125:9	Upper half	2,500	2,810	2,660
S96T000875		Lower half	1,210	1,230	1,220
S96T001468	Core 130:7	Upper half	14.7	13.9	14.3[QC:d,f]
S96T001473	Core 130:9	Upper half	1,100	1,190	1,150[QC:c]
S96T001474		Lower half	957	1,000	979
S96T000879	Core 125	Solid composite	350	301	326
S96T000880		Solid composite	1,470	1,460	1,470
S96T001583	Core 130	Solid composite	49.9	48.1	49[QC:f]
S96T001584		Solid composite	1,440	1,530	1,490
S96T001585		Solid composite	6,220	6,590	6,410

Table B2-46. Tank 241-S-102 Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<20.5	<19.3	<19.9
S96T000907	Core 125:3	Upper half	<20.9	<19.7	<20.3
S96T000908	Core 125:4	Upper half	<20.7	<19.5	<20.1
S96T000909		Lower half	<21.7	<22.5	<22.1
S96T000910	Core 125:5	Upper half	<21.5	<23.2	<22.4
S96T000911		Lower half	<21.1	<24.4	<22.8
S96T000912	Core 125:6	Subsegment A, top	<47.3	<47.8	<47.5
S96T000913		Subsegment B	<49.3	<46.7	<48
S96T000914		Subsegment C	<47.4	<51.1	<49.3
S96T000915	Core 125:7	Upper half	<87.3	<86.4	<86.8
S96T000916		Lower half	<47.7	<44.5	<46.1
S96T000917	Core 125:8	Upper half	<47.6	<45.6	<46.6
S96T000918		Lower half	<20.3	<21.7	<21
S96T000919	Core 125:9	Upper half	25	28.2	26.6
S96T000920		Lower half	30.2	29	29.6
S96T000921	Core 125:10	Upper half	43.9	39.7	41.8
S96T000922		Lower half	50.4	48.4	49.4
S96T000923	Core 125:11	Upper half	<8.55	<8.21	<8.38
S96T001181	Core 130:2	Upper half	<48.7	<47.5	<48.1
S96T001182	Core 130:3	Upper half	<49.1	<47	<48
S96T001183	Core 130:4	Upper half	<47.4	<44.2	<45.8
S96T001184	Core 130:5	Subsegment A, top	<47.4	<45	<46.2
S96T001185		Subsegment B	<43.6	<42.7	<43.2
S96T001186		Subsegment C	<49.3	<50.4	<49.8
S96T001187	Core 130:6	Upper half	<45.3	<54	<49.6
S96T001188		Lower half	<52.6	<47.6	<50.1

Table B2-46. Tank 241-S-102 Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001479	Core 130:6A	Upper half	<20.8	<21	<20.9
S96T001480	Core 130:6B	Upper half	<30	<29.4	<29.7
S96T001481		Lower half	<29.5	<30.5	<30
S96T001482	Core 130:7	Upper half	<28.8	<28.4	<28.6
S96T001483	Core 130:8	Upper half	<30.7	<30.8	<30.8
S96T001484	Core 130:8A	Subsegment A, top	<28.9	<28.6	<28.8
S96T001485		Subsegment B	<31	<30	<30.5
S96T001486		Subsegment C	<38.8	<40.1	<39.5
S96T001487	Core 130:9	Upper half	<38.3	<40.1	<39.2
S96T001488		Lower half	<40.3	<39.3	<39.8
S96T001489	Core 130:10	Upper half	<39.9	<38.3	<39.1
S96T001490		Lower half	48.3	38.2	43.3[QC:e]
S96T001491	Core 130:11	Upper half	45.6	43.9	44.8
S96T001492		Lower half	<18.5	<18.1	<18.3
S96T000925	Core 125	Solid composite	<19.1	<18.7	<18.9
S96T000926		Solid composite	30.3	37.5	33.9[QC:e]
S96T001586	Core 130	Solid composite	<28.2	<29.5	<28.9
S96T001587		Solid composite	42.7	36.4	39.5
S96T001588		Solid composite	<25.7	<21.2	<23.4
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T003184	Core 125:7	Upper half	<24.9	<27.8	<26.4
S96T003188		Lower half	<24.4	<24.5	<24.4
S96T003189	Core 125:9	Upper half	<28.7	<30.3	<29.5
S96T003190		Lower half	<29.1	<25.7	<27.4
S96T003194	Core 130:7	Upper half	<25.3	<26	<25.6

Table B2-46. Tank 241-S-102 Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T003195	Core 130:9	Upper half	41.7	41.5	41.6
S96T003196		Lower half	46.5	46.8	46.6
S96T000904	Core 125	Solid composite	<35.4	<35.6	<35.5
S96T000905		Solid composite	<43.5	42.4	<43
S96T001592	Core 130	Solid composite	<27.2	<26.9	<27
S96T001593		Solid composite	43	45.2	44.1
S96T001594		Solid composite	<28.8	<27.2	<28
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<60	<60	<60
S96T000634	Core 125:11	Drainable liquid	<60	<60	<60
S96T001125	Core 130:5	Drainable liquid	<30.1	<30.1	<30.1
S96T001382	Core 130:6A	Drainable liquid	<30.1	<30.1	<30.1
S96T001437	Core 130:10	Drainable liquid	<20.1	<20.1	<20.1
S98T002515	Core 232:1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-47. Tank 241-S-102 Analytical Results: Zinc (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S96T000906	Core 125:2	Upper half	16.2	17.5	16.9
S96T000907	Core 125:3	Upper half	13.6	14.2	13.9
S96T000908	Core 125:4	Upper half	12	13.5	12.8
S96T000909		Lower half	14.2	15.7	14.9
S96T000910	Core 125:5	Upper half	13.7	13.5	13.6
S96T000911		Lower half	15	17.2	16.1

Table B2-47. Tank 241-S-102 Analytical Results: Zinc (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T000912	Core 125:6	Subsegment A, top	<9.46	<9.56	<9.51
S96T000913		Subsegment B	14	10.2	12.1[QC:e]
S96T000914		Subsegment C	<9.47	<10.2	<9.84
S96T000915	Core 125:7	Upper half	<17.5	<17.3	<17.4
S96T000916		Lower half	13.4	13.3	13.4
S96T000917	Core 125:8	Upper half	16.8	11.5	14.2[QC:e]
S96T000918		Lower half	24.4	19	21.7[QC:e]
S96T000919	Core 125:9	Upper half	45.1	51.5	48.3
S96T000920		Lower half	25.7	24	24.9
S96T000921	Core 125:10	Upper half	30.1	28.4	29.3
S96T000922		Lower half	20.7	34.3	27.5[QC:e]
S96T000923	Core 125:11	Upper half	20	19.8	19.9
S96T001181	Core 130:2	Upper half	10.9	<9.51	<10.2
S96T001182	Core 130:3	Upper half	19.6	9.54	14.6[QC:e]
S96T001183	Core 130:4	Upper half	12.3	10.7	11.5
S96T001184	Core 130:5	Subsegment A, top	50.4	55.9	53.1
S96T001185		Subsegment B	30.8	28.3	29.6
S96T001186		Subsegment C	47.2	51.8	49.5
S96T001187	Core 130:6	Upper half	16.5	13.2	14.8[QC:e]
S96T001188		Lower half	<10.5	15.9	<13.2[QC:e]
S96T001479	Core 130:6A	Upper half	18.4	15.9	17.1
S96T001480	Core 130:6B	Upper half	24.2	26.4	25.3
S96T001481		Lower half	62.4	34.6	48.5[QC:e]
S96T001482	Core 130:7	Upper half	25.1	22.5	23.8
S96T001483	Core 130:8	Upper half	28.2	23.5	25.9

Table B2-47. Tank 241-S-102 Analytical Results: Zinc (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T001484	Core 130:8A	Subsegment A, top	18.6	18.8	18.7
S96T001485		Subsegment B	89.8	107	98.4
S96T001486		Subsegment C	34.7	33.5	34.1
S96T001487	Core 130:9	Upper half	30.5	30.7	30.6
S96T001488		Lower half	22.8	24.8	23.8
S96T001489	Core 130:10	Upper half	31.4	30.3	30.9
S96T001490		Lower half	37.1	31.8	34.5
S96T001491	Core 130:11	Upper half	19.6	20.2	19.9
S96T001492		Lower half	13.8	19	16.4[QC:e]
S96T000925	Core 125	Solid composite	24.6	24	24.3
S96T000926		Solid composite	41.5	41.9	41.7
S96T001586	Core 130	Solid composite	38.7	27.2	33[QC:e]
S96T001587		Solid composite	33.2	34.5	33.9
S96T001588		Solid composite	51.6	51.1	51.4
Solids: water digest			µg/g	µg/g	µg/g
S96T003184	Core 125:7	Upper half	12.2	11.4	11.8
S96T003188		Lower half	11.9	11.5	11.7
S96T003189	Core 125:9	Upper half	13.6	12.9	13.3
S96T003190		Lower half	26.6	13.1	19.9[QC:e]
S96T003194	Core 130:7	Upper half	14.3	19.9	17.1[QC:e]
S96T003195	Core 130:9	Upper half	11.8	10.7	11.3
S96T003196		Lower half	10	11.5	10.8
S96T000904	Core 125	Solid composite	10.2	11.9	11.1
S96T000905		Solid composite	42.2	10.3	26.3[QC:e]
S96T001592	Core 130	Solid composite	12.8	13.2	13
S96T001593		Solid composite	9.38	9.61	9.5
S96T001594		Solid composite	11.2	14.3	12.8[QC:e]

Table B2-47. Tank 241-S-102 Analytical Results: Zinc (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T000773	Core 125:7	Drainable liquid	15.1	13.4	14.3
S96T000634	Core 125:11	Drainable liquid	124	121	123
S96T001125	Core 130:5	Drainable liquid	236	233	235
S96T001382	Core 130:6A	Drainable liquid	23	24.7	23.9
S96T001437	Core 130:10	Drainable liquid	21.9	22	21.9
S98T002515	Core 232:1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-48. Tank 241-S-102 Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T000906	Core 125:2	Upper half	<4.1	<3.85	<3.97[QC:a]
S96T000907	Core 125:3	Upper half	<4.18	<3.94	<4.06[QC:a]
S96T000908	Core 125:4	Upper half	<4.11	<3.9	<4[QC:a]
S96T000909		Lower half	<4.34	<4.49	<4.42[QC:a]
S96T000910	Core 125:5	Upper half	<4.3	<4.63	<4.46[QC:a]
S96T000911		Lower half	<4.22	<4.88	<4.55[QC:a]
S96T000912	Core 125:6	Subsegment A, top	<9.46	<9.56	<9.51[QC:c]
S96T000913		Subsegment B	<9.86	<9.33	<9.59
S96T000914		Subsegment C	<9.47	<10.2	<9.84
S96T000915	Core 125:7	Upper half	<17.5	<17.3	<17.4
S96T000916		Lower half	<9.55	<8.9	<9.23
S96T000917	Core 125:8	Upper half	<9.52	<9.12	<9.32
S96T000918		Lower half	5.2	<4.34	<4.77[QC:a,c]

Table B2-48. Tank 241-S-102 Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T000919	Core 125:9	Upper half	50.9	56.1	53.5[QC:a]
S96T000920		Lower half	19.3	17.6	18.5[QC:a]
S96T000921	Core 125:10	Upper half	141	92.8	117[QC:a,c,e]
S96T000922		Lower half	55.7	56.1	55.9[QC:a]
S96T000923	Core 125:11	Upper half	3.56	4.59	4.08[QC:a,e]
S96T001181	Core 130:2	Upper half	<9.73	<9.51	<9.62[QC:a,c]
S96T001182	Core 130:3	Upper half	<9.83	<9.41	<9.62[QC:a,c]
S96T001183	Core 130:4	Upper half	<9.47	<8.84	<9.16[QC:a]
S96T001184	Core 130:5	Subsegment A, top	<9.49	<8.99	<9.24[QC:a]
S96T001185		Subsegment B	<8.71	<8.54	<8.63[QC:a,c]
S96T001186		Subsegment C	<9.86	<10.1	<9.98[QC:a]
S96T001187	Core 130:6	Upper half	<9.06	<10.8	<9.93[QC:a]
S96T001188		Lower half	<10.5	<9.52	<10[QC:a]
S96T001479	Core 130:6A	Upper half	<4.17	<4.19	<4.18
S96T001480	Core 130:6B	Upper half	<6	<5.88	<5.94[QC:c]
S96T001481		Lower half	<5.89	<6.11	<6
S96T001482	Core 130:7	Upper half	<5.76	<5.68	<5.72
S96T001483	Core 130:8	Upper half	<6.14	<6.16	<6.15
S96T001484	Core 130:8A	Subsegment A, top	12.2	14.9	13.6
S96T001485		Subsegment B	22.3	132	77.2[QC:e]
S96T001486		Subsegment C	25.8	25.3	25.6[QC:c]
S96T001487	Core 130:9	Upper half	24.1	22.3	23.2[QC:c]
S96T001488		Lower half	13.2	14.6	13.9
S96T001489	Core 130:10	Upper half	21.2	23.6	22.4
S96T001490		Lower half	58.8	45.1	52[QC:e]

Table B2-48. Tank 241-S-102 Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001491	Core 130:11	Upper half	40.1	46.3	43.2
S96T001492		Lower half	64.4	60	62.2
S96T000925	Core 125	Solid composite	<3.82	<3.73	<3.77[QC:a,c]
S96T000926		Solid composite	77.8	82.7	80.3[QC:a,c]
S96T001586	Core 130	Solid composite	<5.65	<5.91	<5.78
S96T001587		Solid composite	44.4	40.6	42.5
S96T001588		Solid composite	30.1	31.8	31
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T003184	Core 125:7	Upper half	<4.97	<5.56	<5.26
S96T003188		Lower half	<4.88	<4.91	<4.89
S96T003189	Core 125:9	Upper half	<5.73	<6.05	<5.89
S96T003190		Lower half	<5.83	<5.14	<5.48
S96T003194	Core 130:7	Upper half	<5.06	<5.21	<5.13
S96T003195	Core 130:9	Upper half	<5.32	<4.96	<5.14
S96T003196		Lower half	<5.74	<5.5	<5.62
S96T000904	Core 125	Solid composite	<7.07	<7.12	<7.1
S96T000905		Solid composite	<8.7	<8.27	<8.48
S96T001592	Core 130	Solid composite	<5.45	<5.38	<5.42
S96T001593		Solid composite	<5.76	<6.35	<6.05
S96T001594		Solid composite	<5.75	<5.43	<5.59
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<12	<12	<12
S96T000634	Core 125:11	Drainable liquid	<12	<12	<12
S96T001125	Core 130:5	Drainable liquid	<6.01	<6.01	<6.01
S96T001382	Core 130:6A	Drainable liquid	<6.01	<6.01	<6.01
S96T001437	Core 130:10	Drainable liquid	<4.01	<4.01	<4.01
S98T002515	Core 232:1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-49. Tank 241-S-102 Analytical Results: Bromide (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	<2,680	<2,610	<2,640
S96T000885	Core 125:3	Upper half	<2,470	<2,810	<2,640
S96T000886	Core 125:4	Upper half	<1,640	<1,660	<1,650
S96T000887		Lower half	<1,410	<1,270	<1,340
S96T000888	Core 125:5	Upper half	<1,920	<1,880	<1,900
S96T000889		Lower half	<1,460	<1,640	<1,550
S96T000890	Core 125:6	Subsegment A top	3,110	3,500	3,300
S96T000891		Subsegment B	<1,540	<1,760	<1,650
S96T000892		Subsegment C	<1,840	<1,770	<1,800
S96T000893	Core 125:7	Upper half	2,810	2,820	2,820
S96T000894		Lower half	2,550	2,650	2,600
S96T000895	Core 125:8	Upper half	<1,020	<971	<997
S96T000896		Lower half	<539	<580	<559
S96T000897	Core 125:9	Upper half	<516	<515	<516
S96T000898		Lower half	<2,650	<2,820	<2,730
S96T000899	Core 125:10	Upper half	<2,510	<2,410	<2,460
S96T000900		Lower half	<474	<461	<467
S96T000901	Core 125:11	Upper half	<236	<236	<236
S96T001189	Core 130:2	Upper half	<2,290	<2,290	<2,290
S96T001190	Core 130:3	Upper half	<3,070	<2,680	<2,880
S96T001191	Core 130:4	Upper half	<2,690	<2,640	<2,660
S96T001192	Core 130:5	Subsegment A top	<2,210	<2,330	<2,270
S96T001193		Subsegment B	<2,420	<2,650	<2,540
S96T001194		Subsegment C	<2,140	<2,630	<2,390
S96T001195	Core 130:6	Upper half	<2,560	<2,350	<2,450
S96T001196		Lower half	<2,310	<2,660	<2,490

Table B2-49. Tank 241-S-102 Analytical Results: Bromide (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	<2,680	<2,620	<2,650
S96T001497	Core 130:6B	Upper half	<2,400	<2,340	<2,370
S96T001498		Lower half	<961	<993	<977
S96T001493	Core 130:7	Upper half	<948	<940	<944
S96T001499	Core 130:8	Upper half	<1,040	<936	<988
S96T001500	Core 130:8A	Subsegment A top	<976	<957	<966
S96T001501		Subsegment B	<2,480	<2,470	<2,480
S96T001494		Subsegment C	<2,290	<2,300	<2,300
S96T001495	Core 130:9	Upper half	<2,370	<2,390	<2,380
S96T001502		Lower half	<2,460	<2,410	<2,430
S96T001503	Core 130:10	Upper half	556	563	560
S96T001504		Lower half	639	622	630
S96T001505	Core 130:11	Upper half	<1,010	<1,030	<1,020
S96T001506		Lower half	<955	<915	<935
S96T000902	Core 125	Solid composite	1,750	1,750	1,750
S96T000903		Solid composite	<294	<279	<286
S96T001589	Core 130	Solid composite	<914	<903	<908
S96T001590		Solid composite	<966	<1,070	<1,020
S96T001591		Solid composite	<494	<467	<481
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	8,850	8,950	8,900
S96T000634	Core 125:11	Drainable liquid	<1,290	<1,290	<1,290
S96T001125	Core 130:5	Drainable liquid	<522	<522	<522
S96T001382	Core 130:6A	Drainable liquid	<1,290	<1,290	<1,290
S96T001437	Core 130:10	Drainable liquid	1,580	1,630	1,600
S98T002515	Core 232:1	Drainable liquid	<644	<644	<644

Table B2-50. Tank 241-S-102 Analytical Results: Chloride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	1,940	1,980	1,960
S96T000885	Core 125:3	Upper half	1,670	2,210	1,940[QC:e]
S96T000886	Core 125:4	Upper half	2,000	1,980	1,990
S96T000887		Lower half	3,310	2,780	3,050
S96T000888	Core 125:5	Upper half	1,940	1,870	1,900
S96T000889		Lower half	3,290	8,360	5,820[QC:e]
S96T000890	Core 125:6	Subsegment A top	627	2,290	1,460[QC:e]
S96T000891		Subsegment B	3,460	3,920	3,690
S96T000892		Subsegment C	2,680	2,530	2,610
S96T000893	Core 125:7	Upper half	5,020	4,990	5,010
S96T000894		Lower half	4,300	9,820	7,060[QC:e]
S96T000895	Core 125:8	Upper half	5,780	5,610	5,690
S96T000896		Lower half	3,260	2,960	3,110
S96T000897	Core 125:9	Upper half	3,210	3,240	3,220
S96T000898		Lower half	3,980	6,050	5,020[QC:e]
S96T000899	Core 125:10	Upper half	3,640	5,180	4,410[QC:e]
S96T000900		Lower half	2,760	1,240	2,000[QC:e]
S96T000901	Core 125:11	Upper half	3,100	3,260	3,180
S96T001189	Core 130:2	Upper half	1,710	3,320	2,510[QC:e]
S96T001190	Core 130:3	Upper half	1,700	4,330	3,020[QC:e]
S96T001191	Core 130:4	Upper half	2,950	2,560	2,750
S96T001192	Core 130:5	Subsegment A top	3,340	3,640	3,490
S96T001193		Subsegment B	4,440	4,910	4,680
S96T001194		Subsegment C	3,160	4,190	3,680[QC:e]
S96T001195	Core 130:6	Upper half	4,380	5,080	4,730
S96T001196		Lower half	4,850	8,640	6,750[QC:e]

Table B2-50. Tank 241-S-102 Analytical Results: Chloride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	4,270	4,790	4,530
S96T001497	Core 130:6B	Upper half	2,360	2,950	2,660[QC:e]
S96T001498		Lower half	1,650	1,610	1,630
S96T001493	Core 130:7	Upper half	2,550	4,110	3,330[QC:e]
S96T001499	Core 130:8	Upper half	3,320	3,870	3,600
S96T001500	Core 130:8A	Subsegment A top	6,840	3,670	5,260[QC:e]
S96T001501		Subsegment B	3,210	3,010	3,110
S96T001494		Subsegment C	2,560	2,670	2,620
S96T001495	Core 130:9	Upper half	2,940	9,010	5,970[QC:e]
S96T001502		Lower half	3,000	3,720	3,360[QC:e]
S96T001503	Core 130:10	Upper half	3,120	3,550	3,340
S96T001504		Lower half	3,940	4,070	4,000
S96T001505	Core 130:11	Upper half	3,320	3,300	3,310
S96T001506		Lower half	3,630	3,330	3,480
S96T000902	Core 125	Solid composite	3,000	3,210	3,100
S96T000903		Solid composite	3,390	3,780	3,580
S96T001589	Core 130	Solid composite	2,430	2,730	2,580
S96T001590		Solid composite	3,060	2,910	2,980
S96T001591		Solid composite	3,030	4,070	3,550[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	5,880	5,910	5,890
S96T000634	Core 125:11	Drainable liquid	13,500	13,200	13,300
S96T001125	Core 130:5	Drainable liquid	13,200	12,800	13,000
S96T001382	Core 130:6A	Drainable liquid	12,900	12,900	12,900
S96T001437	Core 130:10	Drainable liquid	6,720	6,540	6,630
S98T002515	Core 232:1	Drainable liquid	9,080	9,100	9,090

Table B2-51. Tank 241-S-102 Analytical Results: Fluoride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	<276	<269	<273
S96T000885	Core 125:3	Upper half	<255	<290	<272
S96T000886	Core 125:4	Upper half	<169	<172	<171
S96T000887		Lower half	<146	<131	<138
S96T000888	Core 125:5	Upper half	<198	<194	<196
S96T000889		Lower half	365	<169	<267[QC:e]
S96T000890	Core 125:6	Subsegment A top	<155	<179	<167
S96T000891		Subsegment B	<159	<182	<171
S96T000892		Subsegment C	<190	<182	<186
S96T000893	Core 125:7	Upper half	445	<103	<274[QC:e]
S96T000894		Lower half	447	509	478
S96T000895	Core 125:8	Upper half	1,580	1,450	1,520
S96T000896		Lower half	12,800	64,200	38,500[QC:e]
S96T000897	Core 125:9	Upper half	12,200	12,300	12,300
S96T000898		Lower half	13,400	18,900	16,100[QC:e]
S96T000899	Core 125:10	Upper half	15,200	14,900	15,100
S96T000900		Lower half	11,900	6,160	9,050[QC:e]
S96T000901	Core 125:11	Upper half	1,030	1,380	1,210[QC:e]
S96T001189	Core 130:2	Upper half	<236	<237	<236
S96T001190	Core 130:3	Upper half	<317	<277	<297
S96T001191	Core 130:4	Upper half	<277	<272	<275
S96T001192	Core 130:5	Subsegment A top	<228	<240	<234
S96T001193		Subsegment B	<250	<273	<261
S96T001194		Subsegment C	<221	<272	<247
S96T001195	Core 130:6	Upper half	<264	<242	<253
S96T001196		Lower half	<238	<274	<256

Table B2-51. Tank 241-S-102 Analytical Results: Fluoride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	<277	<270	<273
S96T001497	Core 130:6B	Upper half	<247	<241	<244
S96T001498		Lower half	<99.1	<102	<101
S96T001493	Core 130:7	Upper half	<97.8	<97	<97.4
S96T001499	Core 130:8	Upper half	729	760	744
S96T001500	Core 130:8A	Subsegment A top	3,720	1,540	2,630[QC:e]
S96T001501		Subsegment B	11,000	10,000	10,500
S96T001494		Subsegment C	16,900	16,100	16,500
S96T001495	Core 130:9	Upper half	14,000	16,300	15,200
S96T001502		Lower half	15,600	17,000	16,300
S96T001503	Core 130:10	Upper half	12,300	11,000	11,700[QC:c]
S96T001504		Lower half	10,100	10,500	10,300
S96T001505	Core 130:11	Upper half	13,400	13,000	13,200
S96T001506		Lower half	3,260	3,350	3,310
S96T000902	Core 125	Solid composite	321	353	337
S96T000903		Solid composite	13,600	12,800	13,200
S96T001589	Core 130	Solid composite	307	292	299
S96T001590		Solid composite	13,200	13,400	13,300
S96T001591		Solid composite	6,410	5,090	5,750[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	416	<133	<275[QC:e]
S96T000634	Core 125:11	Drainable liquid	<133	<133	<133
S96T001125	Core 130:5	Drainable liquid	614	617	615[QC:c]
S96T001382	Core 130:6A	Drainable liquid	703	643	673
S96T001437	Core 130:10	Drainable liquid	<53.8	<53.8	<53.8
S98T002515	Core 232:1	Drainable liquid	<61.8	<61.8	<61.8

Table B2-52. Tank 241-S-102 Analytical Results: Nitrate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	4.89E+05	5.53E+05	5.21E+05
S96T000885	Core 125:3	Upper half	6.44E+05	6.35E+05	6.40E+05
S96T000886	Core 125:4	Upper half	6.04E+05	6.04E+05	6.04E+05[QC:c]
S96T000887		Lower half	4.49E+05	3.67E+05	4.08E+05[QC:e]
S96T000888	Core 125:5	Upper half	6.24E+05	6.38E+05	6.31E+05
S96T000889		Lower half	4.87E+05	4.90E+05	4.89E+05
S96T000890	Core 125:6	Subsegment A top	4.22E+05	3.76E+05	3.99E+05
S96T000891		Subsegment B	2.68E+05	3.23E+05	2.96E+05
S96T000892		Subsegment C	5.94E+05	5.88E+05	5.91E+05
S96T000893	Core 125:7	Upper half	2.68E+05	2.70E+05	2.69E+05
S96T000894		Lower half	3.46E+05	3.54E+05	3.50E+05
S96T000895	Core 125:8	Upper half	1.39E+05	1.59E+05	1.49E+05
S96T000896		Lower half	57,500	34,400	45,900[QC:e]
S96T000897	Core 125:9	Upper half	53,800	57,100	55,400
S96T000898		Lower half	62,100	81,300	71,700[QC:e]
S96T000899	Core 125:10	Upper half	54,600	54,800	54,700
S96T000900		Lower half	34,300	16,300	25,300[QC:e]
S96T000901	Core 125:11	Upper half	40,000	42,200	41,100
S96T001189	Core 130:2	Upper half	5.08E+05	4.28E+05	4.68E+05[QC:c]
S96T001190	Core 130:3	Upper half	6.57E+05	5.80E+05	6.19E+05
S96T001191	Core 130:4	Upper half	5.82E+05	5.74E+05	5.78E+05
S96T001192	Core 130:5	Subsegment A top	5.07E+05	5.33E+05	5.20E+05
S96T001193		Subsegment B	2.64E+05	2.86E+05	2.75E+05
S96T001194		Subsegment C	4.12E+05	5.09E+05	4.61E+05[QC:e]
S96T001195	Core 130:6	Upper half	3.95E+05	4.33E+05	4.14E+05
S96T001196		Lower half	4.15E+05	4.29E+05	4.22E+05

Table B2-52. Tank 241-S-102 Analytical Results: Nitrate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	<4.92E+05	<6.02E+05	<5.47E+05
S96T001497	Core 130:6B	Upper half	<6.01E+05	<6.03E+05	<6.02E+05
S96T001498		Lower half	5.48E+05	5.33E+05	5.41E+05
S96T001493	Core 130:7	Upper half	2.48E+05	3.87E+05	3.17E+05[QC:d, e]
S96T001499	Core 130:8	Upper half	3.62E+05	3.98E+05	3.80E+05
S96T001500	Core 130:8A	Subsegment A top	3.01E+05	1.55E+05	2.28E+05[QC:e]
S96T001501		Subsegment B	61,400	54,700	58,100
S96T001494		Subsegment C	46,700	46,700	46,700
S96T001495	Core 130:9	Upper half	48,900	51,700	50,300
S96T001502		Lower half	45,800	48,300	47,100
S96T001503	Core 130:10	Upper half	48,800	57,100	53,000
S96T001504		Lower half	56,400	62,300	59,400
S96T001505	Core 130:11	Upper half	45,500	45,600	45,500
S96T001506		Lower half	50,400	46,500	48,400
S96T000902	Core 125	Solid composite	4.31E+05	4.35E+05	4.33E+05
S96T000903		Solid composite	58,800	56,100	57,500
S96T001589	Core 130	Solid composite	4.77E+05	4.82E+05	4.80E+05
S96T001590		Solid composite	50,400	48,900	49,600
S96T001591		Solid composite	2.25E+05	1.99E+05	2.12E+05
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	2.84E+05	2.85E+05	2.84E+05
S96T000634	Core 125:11	Drainable liquid	1.25E+05	1.22E+05	1.24E+05
S96T001125	Core 130:5	Drainable liquid	1.43E+05	1.42E+05	1.42E+05
S96T001382	Core 130:6A	Drainable liquid	1.41E+05	1.42E+05	1.42E+05
S96T001437	Core 130:10	Drainable liquid	1.05E+05	1.06E+05	1.05E+05[QC:d]
S98T002515	Core 232:1	Drainable liquid	1.99E+05	2.03E+05	2.01E+05

Table B2-53. Tank 241-S-102 Analytical Results: Nitrite (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	22,400	22,900	22,600
S96T000885	Core 125:3	Upper half	20,200	20,400	20,300
S96T000886	Core 125:4	Upper half	22,600	22,200	22,400
S96T000887		Lower half	34,300	29,700	32,000
S96T000888	Core 125:5	Upper half	22,500	22,100	22,300
S96T000889		Lower half	34,000	32,900	33,400
S96T000890	Core 125:6	Subsegment A top	8,790	8,290	8,540
S96T000891		Subsegment B	36,000	40,600	38,300
S96T000892		Subsegment C	26,900	25,200	26,000
S96T000893	Core 125:7	Upper half	49,600	50,600	50,100
S96T000894		Lower half	44,100	43,400	43,800
S96T000895	Core 125:8	Upper half	56,900	56,200	56,500
S96T000896		Lower half	36,200	26,200	31,200[QC:e]
S96T000897	Core 125:9	Upper half	35,300	35,900	35,600
S96T000898		Lower half	42,300	55,100	48,700[QC:e]
S96T000899	Core 125:10	Upper half	39,900	38,900	39,400
S96T000900		Lower half	27,700	12,900	20,300[QC:e]
S96T000901	Core 125:11	Upper half	33,800	33,500	33,700
S96T001189	Core 130:2	Upper half	18,900	20,800	19,800
S96T001190	Core 130:3	Upper half	18,600	16,100	17,300
S96T001191	Core 130:4	Upper half	28,500	27,700	28,100
S96T001192	Core 130:5	Subsegment A top	36,600	42,300	39,500
S96T001193		Subsegment B	47,600	51,500	49,600
S96T001194		Subsegment C	35,500	44,300	39,900[QC:e]
S96T001195	Core 130:6	Upper half	48,100	45,700	46,900
S96T001196		Lower half	51,800	47,800	49,800

Table B2-53. Tank 241-S-102 Analytical Results: Nitrite (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	42,300	49,900	46,100
S96T001497	Core 130:6B	Upper half	24,300	23,000	23,700
S96T001498		Lower half	20,500	19,300	19,900
S96T001493	Core 130:7	Upper half	28,300	40,400	34,300[QC:e]
S96T001499	Core 130:8	Upper half	34,800	40,700	37,800
S96T001500	Core 130:8A	Subsegment A top	85,800	45,200	65,500[QC:e]
S96T001501		Subsegment B	36,800	33,200	35,000
S96T001494		Subsegment C	27,700	27,700	27,700
S96T001495	Core 130:9	Upper half	30,900	31,500	31,200
S96T001502		Lower half	30,200	30,900	30,500
S96T001503	Core 130:10	Upper half	34,700	40,300	37,500
S96T001504		Lower half	43,200	46,700	45,000
S96T001505	Core 130:11	Upper half	33,900	33,800	33,900
S96T001506		Lower half	37,300	34,000	35,700
S96T000902	Core 125	Solid composite	31,400	32,700	32,000
S96T000903		Solid composite	38,600	38,600	38,600
S96T001589	Core 130	Solid composite	28,200	30,200	29,200
S96T001590		Solid composite	34,600	33,100	33,900
S96T001591		Solid composite	34,300	48,600	41,500[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	59,500	60,400	59,900
S96T000634	Core 125:11	Drainable liquid	1.42E+05	1.40E+05	1.41E+05
S96T001125	Core 130:5	Drainable liquid	1.46E+05	1.48E+05	1.47E+05
S96T001382	Core 130:6A	Drainable liquid	1.45E+05	1.44E+05	1.45E+05
S96T001437	Core 130:10	Drainable liquid	75,600	75,300	75,500
S98T002515	Core 232:1	Drainable liquid	1.01E+05	1.00E+05	1.00E+05

Table B2-54. Tank 241-S-102 Analytical Results: Phosphate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	18,800	17,400	18,100
S96T000885	Core 125:3	Upper half	15,200	15,600	15,400
S96T000886	Core 125:4	Upper half	9,420	8,960	9,190
S96T000887		Lower half	11,900	11,300	11,600
S96T000888	Core 125:5	Upper half	10,800	9,940	10,400
S96T000889		Lower half	14,400	13,600	14,000
S96T000890	Core 125:6	Subsegment A top	9,270	8,640	8,950
S96T000891		Subsegment B	13,100	15,500	14,300
S96T000892		Subsegment C	<1,730	<1,670	<1,700
S96T000893	Core 125:7	Upper half	13,700	12,100	12,900
S96T000894		Lower half	10,900	9,690	10,300
S96T000895	Core 125:8	Upper half	50,500	48,000	49,200
S96T000896		Lower half	1.16E+05	1.85E+05	1.51E+05[QC:e]
S96T000897	Core 125:9	Upper half	1.12E+05	1.17E+05	1.14E+05
S96T000898		Lower half	1.21E+05	1.66E+05	1.43E+05[QC:e]
S96T000899	Core 125:10	Upper half	1.37E+05	1.35E+05	1.36E+05
S96T000900		Lower half	1.13E+05	56,000	84,400[QC:e]
S96T000901	Core 125:11	Upper half	12,500	16,300	14,400[QC:e]
S96T001189	Core 130:2	Upper half	19,200	21,700	20,500
S96T001190	Core 130:3	Upper half	<2,900	<2,530	<2,710
S96T001191	Core 130:4	Upper half	15,500	13,300	14,400
S96T001192	Core 130:5	Subsegment A top	8,640	9,510	9,080
S96T001193		Subsegment B	30,400	33,000	31,700
S96T001194		Subsegment C	13,400	16,200	14,800
S96T001195	Core 130:6	Upper half	12,300	11,100	11,700
S96T001196		Lower half	8,720	9,960	9,340

Table B2-54. Tank 241-S-102 Analytical Results: Phosphate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	10,900	11,500	11,200
S96T001497	Core 130:6B	Upper half	10,700	10,800	10,800
S96T001498		Lower half	6,980	7,530	7,250
S96T001493	Core 130:7	Upper half	9,300	12,100	10,700[QC:e]
S96T001499	Core 130:8	Upper half	12,500	13,300	12,900
S96T001500	Core 130:8A	Subsegment A top	1.00E+05	58,700	79,400[QC:e]
S96T001501		Subsegment B	1.02E+05	91,900	96,700
S96T001494		Subsegment C	1.59E+05	1.49E+05	1.54E+05
S96T001495	Core 130:9	Upper half	1.36E+05	1.54E+05	1.45E+05
S96T001502		Lower half	1.52E+05	1.65E+05	1.59E+05
S96T001503	Core 130:10	Upper half	1.40E+05	1.26E+05	1.33E+05[QC:e]
S96T001504		Lower half	1.16E+05	1.19E+05	1.18E+05
S96T001505	Core 130:11	Upper half	1.27E+05	1.22E+05	1.25E+05
S96T001506		Lower half	29,800	31,100	30,500
S96T000902	Core 125	Solid composite	10,800	11,200	11,000
S96T000903		Solid composite	1.43E+05	1.38E+05	1.41E+05
S96T001589	Core 130	Solid composite	9,620	8,040	8,830
S96T001590		Solid composite	1.30E+05	1.31E+05	1.30E+05
S96T001591		Solid composite	70,400	55,500	63,000[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	5,470	5,720	5,600
S96T000634	Core 125:11	Drainable liquid	5,470	4,980	5,230
S96T001125	Core 130:5	Drainable liquid	4,290	4,270	4,280
S96T001382	Core 130:6A	Drainable liquid	6,340	6,070	6,210
S96T001437	Core 130:10	Drainable liquid	3,190	3,510	3,350
S98T002515	Core 232:1	Drainable liquid	3,130	3,150	3,140

Table B2-55. Tank 241-S-102 Analytical Results: Sulfate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	10,300	10,000	10,200
S96T000885	Core 125:3	Upper half	6,390	7,020	6,710
S96T000886	Core 125:4	Upper half	5,940	5,510	5,730
S96T000887		Lower half	9,150	8,620	8,890
S96T000888	Core 125:5	Upper half	6,730	6,500	6,620
S96T000889		Lower half	7,420	8,580	8,000
S96T000890	Core 125:6	Subsegment A top	4,460	4,800	4,630
S96T000891		Subsegment B	10,800	12,600	11,700
S96T000892		Subsegment C	5,310	5,260	5,290
S96T000893	Core 125:7	Upper half	11,400	12,100	11,700
S96T000894		Lower half	8,150	7,950	8,050
S96T000895	Core 125:8	Upper half	5,550	5,040	5,300
S96T000896		Lower half	18,500	1,460	9,970[QC:e]
S96T000897	Core 125:9	Upper half	17,700	18,500	18,100
S96T000898		Lower half	21,100	27,600	24,300[QC:e]
S96T000899	Core 125:10	Upper half	12,200	11,800	12,000
S96T000900		Lower half	1,330	1,040	1,190[QC:e]
S96T000901	Core 125:11	Upper half	680	725	702
S96T001189	Core 130:2	Upper half	9,060	10,700	9,880
S96T001190	Core 130:3	Upper half	9,850	11,800	10,800
S96T001191	Core 130:4	Upper half	10,400	9,830	10,100
S96T001192	Core 130:5	Subsegment A top	5,160	5,990	5,570
S96T001193		Subsegment B	11,600	12,900	12,200
S96T001194		Subsegment C	7,040	8,820	7,930[QC:e]
S96T001195	Core 130:6	Upper half	11,100	7,640	9,350[QC:e]
S96T001196		Lower half	7,860	9,510	8,690

Table B2-55. Tank 241-S-102 Analytical Results: Sulfate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	9,620	9,970	9,800
S96T001497	Core 130:6B	Upper half	6,180	6,080	6,130
S96T001498		Lower half	4,160	3,870	4,020
S96T001493	Core 130:7	Upper half	7,890	10,400	9,150[QC:e]
S96T001499	Core 130:8	Upper half	5,620	5,720	5,670
S96T001500	Core 130:8A	Subsegment A top	5,560	3,800	4,680[QC:e]
S96T001501		Subsegment B	6,120	6,290	6,200
S96T001494		Subsegment C	16,800	15,200	16,000
S96T001495	Core 130:9	Upper half	15,200	19,000	17,100[QC:e]
S96T001502		Lower half	14,100	15,200	14,700
S96T001503	Core 130:10	Upper half	13,600	12,800	13,200
S96T001504		Lower half	9,070	9,320	9,200
S96T001505	Core 130:11	Upper half	10,200	12,300	11,200
S96T001506		Lower half	2,240	2,100	2,170
S96T000902	Core 125	Solid composite	6,110	6,180	6,140
S96T000903		Solid composite	11,800	11,200	11,500
S96T001589	Core 130	Solid composite	6,130	5,400	5,770
S96T001590		Solid composite	12,800	12,200	12,500
S96T001591		Solid composite	5,720	5,110	5,420
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	6,660	6,660	6,660
S96T000634	Core 125:11	Drainable liquid	3,530	3,440	3,490
S96T001125	Core 130:5	Drainable liquid	2,630	2,670	2,650
S96T001382	Core 130:6A	Drainable liquid	4,060	3,940	4,000
S96T001437	Core 130:10	Drainable liquid	6,350	6,320	6,340
S98T002515	Core 232:1	Drainable liquid	4,650	4,670	4,660

Table B2-56. Tank 241-S-102 Analytical Results: Oxalate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T000881	Core 125:2	Upper half	3,200	3,120	3,160
S96T000885	Core 125:3	Upper half	2,240	<2,340	<2,290
S96T000886	Core 125:4	Upper half	2,490	2,280	2,380
S96T000887		Lower half	4,130	3,650	3,890
S96T000888	Core 125:5	Upper half	3,160	2,910	3,040
S96T000889		Lower half	2,990	2,970	2,980
S96T000890	Core 125:6	Subsegment A top	1,660	1,460	1,560
S96T000891		Subsegment B	3,950	4,980	4,460[QC:e]
S96T000892		Subsegment C	2,230	2,340	2,280
S96T000893	Core 125:7	Upper half	5,590	5,500	5,540
S96T000894		Lower half	4,800	4,530	4,670
S96T000895	Core 125:8	Upper half	12,400	12,700	12,600
S96T000896		Lower half	16,900	19,300	18,100
S96T000897	Core 125:9	Upper half	16,500	16,900	16,700
S96T000898		Lower half	12,500	15,400	14,000[QC:e]
S96T000899	Core 125:10	Upper half	12,400	12,800	12,600
S96T000900		Lower half	14,200	7,430	10,800[QC:e]
S96T000901	Core 125:11	Upper half	2,980	4,250	3,620[QC:e]
S96T001189	Core 130:2	Upper half	4,940	5,330	5,130
S96T001190	Core 130:3	Upper half	2,980	3,600	3,290
S96T001191	Core 130:4	Upper half	4,440	3,520	3,980[QC:e]
S96T001192	Core 130:5	Subsegment A top	2,020	2,350	2,190
S96T001193		Subsegment B	4,250	5,110	4,680
S96T001194		Subsegment C	2,600	3,280	2,940[QC:e]
S96T001195	Core 130:6	Upper half	5,850	2,700	4,280[QC:e]
S96T001196		Lower half	2,710	2,560	2,640

Table B2-56. Tank 241-S-102 Analytical Results: Oxalate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001496	Core 130:6A	Upper half	3,330	3,350	3,340
S96T001497	Core 130:6B	Upper half	3,160	2,320	2,740[QC:e]
S96T001498		Lower half	2,000	1,790	1,890
S96T001493	Core 130:7	Upper half	2,760	3,470	3,110[QC:e]
S96T001499	Core 130:8	Upper half	3,950	4,270	4,110
S96T001500	Core 130:8A	Subsegment A top	40,500	21,600	31,000[QC:e]
S96T001501		Subsegment B	29,300	29,500	29,400
S96T001494		Subsegment C	16,300	15,500	15,900
S96T001495	Core 130:9	Upper half	12,300	14,300	13,300
S96T001502		Lower half	10,000	10,600	10,300
S96T001503	Core 130:10	Upper half	12,500	11,200	11,900
S96T001504		Lower half	10,900	12,100	11,500
S96T001505	Core 130:11	Upper half	31,500	32,000	31,800
S96T001506		Lower half	20,200	22,600	21,400
S96T000902	Core 125	Solid composite	3,320	3,160	3,240
S96T000903		Solid composite	14,900	14,300	14,600
S96T001589	Core 130	Solid composite	3,050	2,800	2,920
S96T001590		Solid composite	11,200	10,300	10,800
S96T001591		Solid composite	13,300	10,500	11,900[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	<1,070	<1,070	<1,070
S96T000634	Core 125:11	Drainable liquid	<1,070	<1,070	<1,070
S96T001125	Core 130:5	Drainable liquid	<435	<435	<435
S96T001382	Core 130:6A	Drainable liquid	<1,070	<1,070	<1,070
S96T001437	Core 130:10	Drainable liquid	741	892	816
S98T002515	Core 232:1	Drainable liquid	<541	582	<561

Table B2-57. Tank 241-S-102 Analytical Results: Bulk Density. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			**g/mL**	**g/mL**	**g/mL**
S96T000655	Core 125:2	Upper half	1.87	n/a	1.87
S96T000657	Core 125:3	Upper half	1.47	n/a	1.47
S96T000527	Core 125:4	Upper half	1.44	n/a	1.44
S96T000528		Lower half	1.71	n/a	1.71
S96T000573	Core 125:5	Upper half	1.45	n/a	1.45
S96T000579		Lower half	1.45	n/a	1.45
S96T000581	Core 125:6	Subsegment B	1.68	n/a	1.68
S96T000582		Subsegment C	1.68	n/a	1.68
S96T000584	Core 125:7	Upper half	1.59	n/a	1.59
S96T000585		Lower half	1.62	n/a	1.62
S96T000586	Core 125:8	Upper half	1.71	n/a	1.71
S96T000587		Lower half	1.77	n/a	1.77
S96T000588	Core 125:9	Upper half	1.68	n/a	1.68
S96T000589		Lower half	1.7	n/a	1.7
S96T000590	Core 125:10	Upper half	1.66	n/a	1.66
S96T000591		Lower half	1.68	n/a	1.68
S96T000592	Core 125:11	Upper half	1.92	n/a	1.92
S96T001111	Core 130:2	Upper half	1.45	n/a	1.45
S96T001112	Core 130:3	Upper half	1.55	n/a	1.55
S96T001113	Core 130:4	Upper half	1.55	n/a	1.55
S96T001114	Core 130:5	Subsegment A top	1.79	n/a	1.79
S96T001115		Subsegment B	1.88	n/a	1.88
S96T001116		Subsegment C	1.72	n/a	1.72
S96T001117	Core 130:6	Upper half	1.75	n/a	1.75
S96T001118		Lower half	1.88	n/a	1.88
S96T001387	Core 130:6A	Upper half	1.77	n/a	1.77

Table B2-57. Tank 241-S-102 Analytical Results: Bulk Density. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			**g/mL**	**g/mL**	**g/mL**
S96T001393	Core 130:6B	Upper half	1.74	n/a	1.74
S96T001394		Lower half	1.67	n/a	1.67
S96T001389	Core 130:7	Upper half	1.73	n/a	1.73
S96T001408	Core 130:8	Upper half	1.78	n/a	1.78
S96T001416	Core 130:8A	Subsegment A top	1.7	n/a	1.7
S96T001417		Subsegment B	1.7	n/a	1.7
S96T001418		Subsegment C	1.64	n/a	1.64
S96T001439	Core 130:9	Upper half	1.63	n/a	1.63
S96T001440		Lower half	1.6	n/a	1.6
S96T001419	Core 130:10	Upper half	1.6	n/a	1.6
S96T001420		Lower half	1.63	n/a	1.63
S96T001422	Core 130:11	Lower half	1.88	n/a	1.88
S96T000774	Core 125	Solid composite	1.69	n/a	1.69
S96T000776		Solid composite	1.69	n/a	1.69
S96T001574	Core 130	Solid composite	1.68	n/a	1.68
S96T001575		Solid composite	1.64	n/a	1.64
S96T001576		Solid composite	1.75	n/a	1.75

Table B2-58. Tank 241-S-102 Analytical Results: Exotherm (DSC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids			**J/g**	**J/g**	**J/g**	**J/g**
S96T000759	Core 125:5	Upper half	44.2	39.9		42
S96T000760		Lower half	45.3	43.1		44.2

Table B2-58. Tank 241-S-102 Analytical Results: Exotherm (DSC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids (Cont'd)			**J/g**	**J/g**	**J/g**	**J/g**
S96T000762	Core 125:6	Subsegment B	55.3	50.9		53.1
S96T000763		Subsegment C	34.1	35.5		34.8
S96T000767	Core 125:8	Lower half	105	116		111
S96T000768	Core 125:9	Upper half	29	29.5		29.3
S96T000769		Lower half	37	21.1		29.1[QC:e]
S96T000770	Core 125:10	Upper half	142	139		140
S96T000771		Lower half	122	126		124
S96T001141	Core 130:2	Upper half	1.3	3	2.3	2.2[QC:e]
S96T001146	Core 130:4	Upper half	31.2	25.7		28.4
S96T001147	Core 130:5	Subsegment A top	19.3	21.9		20.6
S96T001429	Core 130:8A	Subsegment A top	55.1	56.6		55.9
S96T001430		Subsegment B	38.8	30.7		34.8
S96T001431		Subsegment C	11.8	12.8		12.3
S96T001442	Core 130:9	Lower half	14.8	16.3		15.6
S96T001432	Core 130:10	Upper half	62.7	69.3		66
S96T001433		Lower half	67.1	84.3		75.7
S96T001434	Core 130:11	Upper half	24.7	37		30.9[QC:e]
S96T000777	Core 125	Solid composite	20.3	18.8		19.6
Liquids			**J/g**	**J/g**	**J/g**	**J/g**
S96T000634	Core 125:11	Drainable liquid	67.8	77.7		72.8
S96T001382	Core 130:6A	Drainable liquid	116	107		111

Table B2-59. Tank 241-S-102 Analytical Results: Exotherms – calculated dry weight (DSC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			**J/g DW**	**J/g DW**	**J/g DW**
S96T000759	Core 125:5	Upper half	48.2	43.5	45.9
S96T000760		Lower half	54.6	52	53.3
S96T000762	Core 125:6	Subsegment B	73.2	67.4	70.3
S96T000763		Subsegment C	38.6	40.2	39.4
S96T000767	Core 125:8	Lower half	177		177
S96T000768	Core 125:9	Upper half	48.1	48.9	48.5
S96T000769		Lower half	63.9	36.5	50.2[QC:e]
S96T000770	Core 125:10	Upper half	244	238	241
S96T000771		Lower half	212	219	216
S96T001141	Core 130:2	Upper half	1.51	3.49	2.5[QC:e]
S96T001146	Core 130:4	Upper half	35.7	32.6	34.1
S96T001147	Core 130:5	Subsegment A top	23.4	26.5	24.9
S96T001429	Core 130:8A	Subsegment A top	82.9	85.2	84
S96T001430		Subsegment B	62.8	49.7	56.3
S96T001431		Subsegment C	19.8	21.5	20.6
S96T001442	Core 130:9	Lower half	25.8	28.4	27.1
S96T001432	Core 130:10	Upper half	109	120	115
S96T001433		Lower half	121	152	136
S96T001434	Core 130:11	Upper half	41.4	62	51.7[QC:e]
S96T000777	Core 125	Solid composite	25.4	23.5	24.4
Liquids			**J/g DW**	**J/g DW**	**J/g DW**
S96T000634	Core 125:11	Drainable liquid	116	133	125
S96T001125	Core 130:5	Drainable liquid	306	277	291
S96T001382	Core 130:6A	Drainable liquid	222	205	214
S98T002514	Core 232:1	Drainable liquid	91.2	90	90.6

Table B2-60. Tank 241-S-102 Analytical Results: Exotherm – Transition 1 (DSC/TGA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**J/g**	**J/g**	**J/g**
S96T001125	Core 130:5	Drainable liquid	162	146	154
S98T002514	Core 232:1	Drainable liquid	44.7	44.1	44.4

Table B2-61. Tank 241-S-102 Analytical Results: Percent Water (TGA). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids			**%**	**%**	**%**	**%**
S96T000755	Core 125:2	Upper half	14.7	14.9		14.8
S96T000756	Core 125:3	Upper half	8.02	8.11		8.06
S96T000757	Core 125:4	Upper half	10.3	9.99		10.2
S96T000758		Lower half	17.5	16.4		17
S96T000759	Core 125:5	Upper half	8.5	8.11		8.3
S96T000760		Lower half	16.4	17.8		17.1
S96T000761	Core 125:6	Subsegment A top	7.13	3.18		5.16[QC:e]
S96T000762		Subsegment B	24	25		24.5
S96T000763		Subsegment C	14.2	8.26		11.2[QC:e]
S96T000763		Subsegment C	12.2	12.2		12.2
S96T000764	Core 125:7	Upper half	33.2	34.6		33.9
S96T000765		Lower half	31.2	29.1		30.1
S96T000766	Core 125:8	Upper half	36.2	35.1		35.6
S96T000767		Lower half	39.6	41.3		40.5
S96T000768	Core 125:9	Upper half	39.1	40.3		39.7
S96T000769		Lower half	42	42.2		42.1

Table B2-61. Tank 241-S-102 Analytical Results: Percent Water (TGA). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids (Cont'd)			%	%	%	%
S96T000770	Core 125:10	Upper half	41.5	42.2		41.8
S96T000771		Lower half	42.5	42.5		42.5
S96T000772	Core 125:11	Upper half	17.7	17.8		17.7
S96T001141	Core 130:2	Upper half	13.4	14.7		14
S96T001145	Core 130:3	Upper half	5.4	6.19		5.8
S96T001146	Core 130:4	Upper half	12.7	12.6		12.6
S96T001147	Core 130:5	Subsegment A top	17.6	17.2		17.4
S96T001148		Subsegment B	20	19.7		19.9
S96T001149		Subsegment C	29.1	28.9		29
S96T001150	Core 130:6	Upper half	24.8	24.4		24.6
S96T001151		Lower half	30.4	23.8		27.1
S96T001386	Core 130:6A	Upper half	13.2	19.4	18.9	17.2[QC:e]
S96T001399	Core 130:6B	Upper half	13.3	14.7		14
S96T001401		Lower half	13.1	12.8		12.9
S96T001401 RR1		Lower half	12.4	12.7	12.6	12.5
S96T001390	Core 130:7	Upper half	22.8	2.24	21.7	15.6[QC:e]
S96T001409	Core 130:8	Upper half	20.8	24.2		22.5
S96T001429	Core 130:8A	Subsegment A top	34.3	32.7		33.5
S96T001430		Subsegment B	37.6	38.9		38.2
S96T001431		Subsegment C	38.9	41.9		40.4
S96T001441	Core 130:9	Upper half	41.2	41.5		41.3
S96T001442		Lower half	42.1	43		42.6
S96T001432	Core 130:10	Upper half	42.4	42.4		42.4
S96T001433		Lower half	44.6	44.3		44.4

Table B2-61. Tank 241-S-102 Analytical Results: Percent Water (TGA). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids (Cont'd)			%	%	%	%
S96T001434	Core 130:11	Upper half	40.3	40.4		40.3
S96T001435		Lower half	22.7	21.8		22.2
S96T000777	Core 125	Solid Composite	21	19.1		20
S96T000780		Solid Composite	41.2	33.3	41.6	38.7
S96T001577	Core 130	Solid Composite	13.3	14.8		14.1
S96T001578		Solid Composite	41.4	41.9		41.6
S96T001579		Solid Composite	41.1	35.1		38.1
Liquids			%	%	%	%
S96T000773	Core 125:7	Drainable Liquid	53.2	52.8		53
S96T000634	Core 125:11	Drainable Liquid	45.6	29.5		37.5[QC:e]
S96T000634 RR1		Drainable Liquid	45	46.3		45.6
S96T001125	Core 130:5	Drainable Liquid	47	47.2		47.1
S96T001382	Core 130:6A	Drainable Liquid	47.7	48.1		47.9
S96T001437	Core 130:10	Drainable Liquid	65.8	65.6		65.7
S98T002514	Core 232:1	Drainable Liquid	51.5	50.5		51

Table B2-62. Tank 241-S-102 Analytical Results: pH Measurement (pH).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			Unitless	unitless	unitless
S98T002514	Core 232:1	Drainable liquid	13.8	13.8	13.8

Table B2-63. Tank 241-S-102 Analytical Results: Specific Gravity (SpG).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**Unitless**	**unitless**	**unitless**
S96T000773	Core 125:7	Drainable liquid	1.39	1.39	1.39
S96T000634	Core 125:11	Drainable liquid	1.37	1.46	1.42
S96T001125	Core 130:5	Drainable liquid	1.45	1.49	1.47
S96T001382	Core 130:6A	Drainable liquid	1.38	1.45	1.42
S96T001383		Drainable liquid	1.35	1.35	1.35
S96T001437	Core 130:10	Drainable liquid	1.27	1.28	1.27
S98T002515	Core 232:1	Drainable liquid	1.38	1.42	1.4

Table B2-64. Tank 241-S-102 Analytical Results: Total Alpha.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S96T000773	Core 125:7	Drainable liquid	<0.00841	<0.0115	<0.00996
S96T000634	Core 125:11	Drainable liquid	<0.0146	0.0121	<0.0134
S96T001125	Core 130:5	Drainable liquid	<0.0142	<0.00943	<0.0118
S96T001382	Core 130:6A	Drainable liquid	<0.0169	<0.0154	<0.0161
S96T001437	Core 130:10	Drainable liquid	<0.00728	<0.0119	<0.00959

Table B2-65. Tank 241-S-102 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000861	Core 125:2	Upper half	0.0312	0.0343	0.0328
S96T000862	Core 125:3	Upper half	0.0083	0.00927	0.00879
S96T000863	Core 125:4	Upper half	0.00805	0.00662	0.00734
S96T000864		Lower half	0.0261	0.0229	0.0245

Table B2-65. Tank 241-S-102 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000865	Core 125:5	Upper half	0.0107	0.00642	0.00856[QC:e]
S96T000866		Lower half	0.0122	0.00845	0.0103[QC:e]
S96T000867	Core 125:6	Subsegment A top	0.00731	0.0072	0.00725
S96T000868		Subsegment B	0.0449	0.0373	0.0411[QC:c]
S96T000869		Subsegment C	0.00781	0.00655	0.00718[QC:c,f]
S96T000870	Core 125:7	Upper half	0.0299	0.032	0.031[QC:f]
S96T000871		Lower half	0.0229	0.028	0.0255[QC:e,f]
S96T000872	Core 125:8	Upper half	0.085	0.0652	0.0751[QC:e]
S96T000873		Lower half	0.286	0.255	0.27
S96T000874	Core 125:9	Upper half	0.767	0.633	0.7
S96T000875		Lower half	0.209	0.172	0.191
S96T000876	Core 125:10	Upper half	0.447	0.483	0.465
S96T000877		Lower half	0.493	0.577	0.535
S96T000878	Core 125:11	Upper half	<0.0445	0.0385	<0.0415
S96T001173	Core 130:2	Upper half	0.0406	0.0396	0.0401
S96T001174	Core 130:3	Upper half	0.0162	0.0153	0.0158
S96T001175	Core 130:4	Upper half	0.0145	0.0123	0.0134
S96T001176	Core 130:5	Subsegment A top	0.00402	0.00445	0.00424
S96T001177		Subsegment B	0.00937	0.00915	0.00926
S96T001178		Subsegment C	0.0198	0.0211	0.0205
S96T001179	Core 130:6	Upper half	0.0777	0.0758	0.0768
S96T001180		Lower half	0.00871	0.0115	0.0101[QC:e]
S96T001465	Core 130:6A	Upper half	0.0217	0.00869	0.0152[QC:e,f]
S96T001466	Core 130:6B	Upper half	0.0199	0.013	0.0165[QC:e,f]
S96T001467		Lower half	0.0155	0.0177	0.0166[QC:f]
S96T001468	Core 130:7	Upper half	0.0238	0.0198	0.0218
S96T001469	Core 130:8	Upper half	0.0224	0.0337	0.0281[QC:e]

Table B2-65. Tank 241-S-102 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T001470	Core 130:8A	Subsegment A top	0.164	0.176	0.17
S96T001471		Subsegment B	1.76	1.81	1.79
S96T001472		Subsegment C	0.196	0.174	0.185
S96T001473	Core 130:9	Upper half	0.188	0.161	0.175
S96T001474		Lower half	0.135	0.129	0.132
S96T001475	Core 130:10	Upper half	0.247	0.226	0.237
S96T001476		Lower half	0.587	0.616	0.601
S96T001477	Core 130:11	Upper half	0.727	0.641	0.684
S96T001478		Lower half	0.123	0.133	0.128
S96T000879	Core 125	Solid composite	0.0324	0.0229	0.0277[QC:e]
S96T000880		Solid composite	0.526	0.529	0.528
S96T001583	Core 130	Solid composite	0.0218	0.0215	0.0217
S96T001584		Solid composite	0.277	0.249	0.263
S96T001585		Solid composite	0.26	0.236	0.248

Table B2-66. Tank 241-S-102 Analytical Results: Total Beta. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000870	Core 125:7	Upper half	151	152	152
S96T000871		Lower half	138	139	139
S96T000874	Core 125:9	Upper half	226	221	224
S96T000875		Lower half	162	163	163
S96T001468	Core 130:7	Upper half	139	131	135

Table B2-66. Tank 241-S-102 Analytical Results: Total Beta. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T001473	Core 130:9	Upper half	159	160	160
S96T001474		Lower half	140	137	139
S96T000879	Core 125	Solid composite	110	117	114
S96T000880		Solid composite	227	229	228
S96T001583	Core 130	Solid composite	96	92.5	94.3
S96T001584		Solid composite	189	190	190
S96T001585		Solid composite	214	218	216

Table B2-67. Tank 241-S-102 Analytical Results: Americium-241.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T002679	Core 232:1	Drainable liquid	2.81E-04	2.81E-04	2.81E-04

Table B2-68. Tank 241-S-102 Analytical Results: Americium-241 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000870	Core 125:7	Upper half	<0.846	<0.806	<0.826
S96T000871		Lower half	<0.775	<0.797	<0.786
S96T000874	Core 125:9	Upper half	0.536	0.527	0.532
S96T000875		Lower half	<0.142	0.175	<0.158[QC:e]
S96T001468	Core 130:7	Upper half	<0.746	<0.684	<0.715
S96T001473	Core 130:9	Upper half	<0.637	<0.624	<0.63
S96T001474		Lower half	<0.612	<0.606	<0.609

Table B2-68. Tank 241-S-102 Analytical Results: Americium-241 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000879	Core 125	Solid composite	<0.634	<0.656	<0.645
S96T000880		Solid composite	<0.675	<0.689	<0.682
S96T001583	Core 130	Solid composite	<0.583	<0.571	<0.577
S96T001584		Solid composite	<0.935	<0.948	<0.942
S96T001585		Solid composite	<1.12	<1.16	<1.14

Table B2-69. Tank 241-S-102 Analytical Results: Cesium-137 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000870	Core 125:7	Upper half	146	143	145
S96T000871		Lower half	141	148	144
S96T000874	Core 125:9	Upper half	118	112	115
S96T000875		Lower half	129	123	126
S96T001468	Core 130:7	Upper half	129	126	128
S96T001473	Core 130:9	Upper half	100	100	100
S96T001474		Lower half	101	99.8	100
S96T000879	Core 125	Solid composite	99.5	108	104
S96T000880		Solid composite	112	114	113
S96T001583	Core 130	Solid composite	85.9	81.1	83.5
S96T001584		Solid composite	108	108	108
S96T001585		Solid composite	131	140	135
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T002516	Core 232:1	Drainable liquid	308	307	308

Table B2-70. Tank 241-S-102 Analytical Results: Cobalt-60 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000870	Core 125:7	Upper half	<0.0202	<0.0192	<0.0197
S96T000871		Lower half	<0.018	<0.0209	<0.0194
S96T000874	Core 125:9	Upper half	<0.0264	<0.0314	<0.0289
S96T000875		Lower half	<0.0279	<0.0245	<0.0262
S96T001468	Core 130:7	Upper half	<0.0189	<0.0161	<0.0175
S96T001473	Core 130:9	Upper half	<0.0212	<0.0202	<0.0207
S96T001474		Lower half	<0.0172	<0.0179	<0.0175
S96T000879	Core 125	Solid composite	<0.0197	<0.0159	<0.0178
S96T000880		Solid composite	<0.0202	<0.0248	<0.0225
S96T001583	Core 130	Solid composite	<0.0147	<0.017	<0.0159
S96T001584		Solid composite	<0.0418	<0.0445	<0.0432
S96T001585		Solid composite	<0.0488	<0.0385	<0.0437
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T002516	Core 232:1	Drainable liquid	<0.0038	<0.00397	<0.00389

Table B2-71. Tank 241-S-102 Analytical Results: Europium-154 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000870	Core 125:7	Upper half	<0.0945	<0.0774	<0.086
S96T000871		Lower half	<0.0766	<0.0698	<0.0732
S96T000874	Core 125:9	Upper half	0.687	0.613	0.65
S96T000875		Lower half	<0.113	<0.132	<0.122
S96T001468	Core 130:7	Upper half	<0.0714	<0.0663	<0.0689
S96T001473	Core 130:9	Upper half	0.173	0.204	0.188
S96T001474		Lower half	<0.0815	0.164	<0.123[QC:e]
S96T000879	Core 125	Solid composite	<0.0646	<0.0588	<0.0617
S96T000880		Solid composite	0.399	0.421	0.41
S96T001583	Core 130	Solid composite	<0.0659	<0.054	<0.06
S96T001584		Solid composite	0.295	0.221	0.258[QC:e]
S96T001585		Solid composite	<0.231	0.293	<0.262[QC:e]

Table B2-72. Tank 241-S-102 Analytical Results: Europium-155 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000870	Core 125:7	Upper half	<0.407	<0.386	<0.397
S96T000871		Lower half	<0.379	<0.383	<0.381
S96T000874	Core 125:9	Upper half	0.505	0.468	0.487
S96T000875		Lower half	<0.193	<0.195	<0.194
S96T001468	Core 130:7	Upper half	<0.356	<0.331	<0.344
S96T001473	Core 130:9	Upper half	<0.246	<0.241	<0.244
S96T001474		Lower half	<0.237	<0.234	<0.235
S96T000879	Core 125	Solid composite	<0.242	<0.25	<0.246
S96T000880		Solid composite	<0.218	<0.272	<0.245

Table B2-72. Tank 241-S-102 Analytical Results: Europium-155 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T001583	Core 130	Solid composite	<0.278	<0.265	<0.271
S96T001584		Solid composite	<0.456	<0.456	<0.456
S96T001585		Solid composite	<0.536	<0.548	<0.542

Table B2-73. Tank 241-S-102 Analytical Results: Uranium-238 (ICP/MS).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T002514	Core 232:1	Drainable liquid	1.39	1.49	1.44

Table B2-74. Tank 241-S-102 Analytical Results: Plutonium-239/240.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T002679	Core 232:1	Drainable liquid	<3.13E-05	3.44E-05	<3.29E-05

Table B2-75. Tank 241-S-102 Analytical Results: Strontium-89/90. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T000870	Core 125:7	Upper half	5.83	6.05	5.94
S96T000871		Lower half	3.81	3.77	3.79
S96T000874	Core 125:9	Upper half	58.1	59.2	58.7
S96T000875		Lower half	26.2	27.5	26.9
S96T001468	Core 130:7	Upper half	6.36	6.22	6.29

Table B2-75. Tank 241-S-102 Analytical Results: Strontium-89/90. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S96T001473	Core 130:9	Upper half	36.8	35.9	36.3
S96T001474		Lower half	25.1	24.4	24.8
S96T000879	Core 125	Solid composite	5.76	5.39	5.57
S96T000880		Solid composite	53.4	54.1	53.8
S96T001583	Core 130	Solid composite	4.31	4.36	4.34
S96T001584		Solid composite	38.2	39.5	38.9
S96T001585		Solid composite	40.1	39.3	39.7
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T002516	Core 232:1	Drainable liquid	0.292	0.296	0.294

Table B2-76. Tank 241-S-102 Analytical Results: Ammonia (Ion Sel. Electrode).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T002516	Core 232:1	Drainable liquid	34.7	24.4	29.6

Table B2-77. Tank 241-S-102 Analytical Results: Hydroxide (OH Direct).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T002514	Core 232:1	Drainable liquid	37,900	37,200	37,600

Table B2-78. Tank 241-S-102 Analytical Results: Total Inorganic Carbon (TIC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids			µg/g	µg/g	µg/g	µg/g
S96T000755	Core 125:2	Upper half	4,310	4,360		4,340
S96T000756	Core 125:3	Upper half	2,500	2,080		2,290
S96T000757	Core 125:4	Upper half	1,860	179		1,020[QC:e]
S96T000758		Lower half	5,890	5,980		5,940
S96T000759	Core 125:5	Upper half	4,470	4,340		4,410
S96T000760		Lower half	3,800	4,050		3,930
S96T000761	Core 125:6	Subsegment A top	3,220	3,140		3,180
S96T000762		Subsegment B	8,180	8,500		8,340
S96T000763		Subsegment C	1,840	2,030		1,940
S96T000764	Core 125:7	Upper half	13,100	13,700		13,400
S96T000765		Lower half	10,100	10,100		10,100
S96T000766	Core 125:8	Upper half	15,300	15,800		15,600
S96T000767		Lower half	3,090	2,970		3,030
S96T000768	Core 125:9	Upper half	8,310	8,670		8,490
S96T000769		Lower half	8,980	8,900		8,940
S96T000770	Core 125:10	Upper half	4,510	4,610		4,560
S96T000771		Lower half	1,170	1,130		1,150
S96T000772	Core 125:11	Upper half	791	848		820
S96T001141	Core 130:2	Upper half	7,260	7,730		7,500
S96T001145	Core 130:3	Upper half	4,310	4,350		4,330
S96T001146	Core 130:4	Upper half	3,420	3,700		3,560
S96T001147	Core 130:5	Subsegment A top	1,510	1,730		1,620
S96T001148		Subsegment B	3,310	3,840		3,580
S96T001149		Subsegment C	8,650	8,740		8,700
S96T001150	Core 130:6	Upper half	3,510	3,360		3,440
S96T001151		Lower half	3,700	4,170		3,940
S96T001386	Core 130:6A	Upper half	4,610	4,370		4,490

Table B2-78. Tank 241-S-102 Analytical Results: Total Inorganic Carbon (TIC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids (Cont'd)			**µg/g**	**µg/g**	**µg/g**	**µg/g**
S96T001399	Core 130:6B	Upper half	2,730	2,820		2,780
S96T001401		Lower half	2,790	3,150		2,970
S96T001390	Core 130:7	Upper half	7,460	7,450		7,460
S96T001409	Core 130:8	Upper half	7,830	7,930		7,880
S96T001429	Core 130:8A	Subsegment A top	13,000	13,300		13,200[QC:d]
S96T001430		Subsegment B	4,550	3,930		4,240
S96T001431		Subsegment C	2,800	2,590		2,700
S96T001441	Core 130:9	Upper half	5,110	5,000		5,060
S96T001442		Lower half	5,630	5,580		5,610
S96T001432	Core 130:10	Upper half	6,670	6,060		6,370
S96T001433		Lower half	5,130	5,220		5,180
S96T001434	Core 130:11	Upper half	4,310	4,210		4,260
S96T001435		Lower half	895	1,250	969	1,040[QC:e]
S96T000777	Core 125	Solid composite	5,150	5,660		5,410
S96T000780		Solid composite	5,360	5,090		5,230
S96T001577	Core 130	Solid composite	5,690	5,240		5,470
S96T001578		Solid composite	5,240	5,160		5,200
S96T001579		Solid composite	3,130	3,770		3,450
Liquids			**µg/g**	**µg/g**	**µg/g**	**µg/g**
S96T000634	Core 125:11	Drainable liquid	3,090	3,280		3,190
Liquids			**µg/mL**	**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	5,350	5,690		5,520
S96T001125	Core 130:5	Drainable liquid	3,080	2,940		3,010
S96T001382	Core 130:6A	Drainable liquid	2,890	2,910		2,900
S96T001437	Core 130:10	Drainable liquid	4,540	4,680		4,610
S98T002515	Core 232:1	Drainable liquid	4,210	4,230		4,220

Table B2-79. Tank 241-S-102 Analytical Results: Total Organic Carbon (TOC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T000755	Core 125:2	Upper half	1,280	1,290	1,290
S96T000756	Core 125:3	Upper half	968	1,110	1,040
S96T000757	Core 125:4	Upper half	1,240	1,300	1,270
S96T000758		Lower half	2,360	2,310	2,340
S96T000759	Core 125:5	Upper half	1,490	1,610	1,550
S96T000760		Lower half	2,130	2,070	2,100
S96T000761	Core 125:6	Subsegment A top	789	782	786
S96T000762		Subsegment B	3,110	3,330	3,220
S96T000763		Subsegment C	1,470	1,480	1,480
S96T000764	Core 125:7	Upper half	3,670	3,730	3,700
S96T000765		Lower half	3,230	3,200	3,220
S96T000766	Core 125:8	Upper half	6,560	6,820	6,690
S96T000767		Lower half	7,620	8,270	7,950[QC:d]
S96T000768	Core 125:9	Upper half	6,690	7,050	6,870
S96T000769		Lower half	4,980	4,910	4,950
S96T000770	Core 125:10	Upper half	4,920	4,890	4,910
S96T000771		Lower half	7,420	6,310	6,870
S96T000772	Core 125:11	Upper half	2,070	2,170	2,120
S96T001141	Core 130:2	Upper half	1,450	1,460	1,460
S96T001145	Core 130:3	Upper half	1,140	1,120	1,130
S96T001146	Core 130:4	Upper half	1,720	1,770	1,750
S96T001147	Core 130:5	Subsegment A top	1,670	1,730	1,700
S96T001148		Subsegment B	2,360	2,220	2,290
S96T001149		Subsegment C	3,230	3,290	3,260
S96T001150	Core 130:6	Upper half	2,640	2,550	2,600[QC:c]
S96T001151		Lower half	2,760	3,100	2,930

Table B2-79. Tank 241-S-102 Analytical Results: Total Organic Carbon (TOC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T001386	Core 130:6A	Upper half	2,420	2,270	2,350
S96T001399	Core 130:6B	Upper half	1,390	1,330	1,360
S96T001401		Lower half	1,330	1,360	1,350
S96T001390	Core 130:7	Upper half	2,230	2,810	2,520[QC:e]
S96T001409	Core 130:8	Upper half	3,140	2,860	3,000
S96T001429	Core 130:8A	Subsegment A top	9,170	8,830	9,000
S96T001430		Subsegment B	12,700	13,300	13,000
S96T001431		Subsegment C	6,370	6,560	6,470
S96T001441	Core 130:9	Upper half	5,650	5,820	5,740
S96T001442		Lower half	4,460	4,300	4,380
S96T001432	Core 130:10	Upper half	4,530	4,640	4,590
S96T001433		Lower half	4,680	4,460	4,570
S96T001434	Core 130:11	Upper half	11,000	11,200	11,100
S96T001435		Lower half	8,130	7,770	7,950[QC:c]
S96T000777	Core 125	Solid composite	1,950	2,040	2,000
S96T000780		Solid composite	5,950	5,570	5,760
S96T001577	Core 130	Solid composite	1,920	1,950	1,940
S96T001578		Solid composite	4,780	5,000	4,890
S96T001579		Solid composite	5,390	5,320	5,360
Liquids			**µg/g**	**µg/g**	**µg/g**
S96T000634	Core 125:11	Drainable liquid	3,110	3,080	3,100
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T000773	Core 125:7	Drainable liquid	2,480	2,900	2,690
S96T001125	Core 130:5	Drainable liquid	5,460	4,890	5,180
S96T001382	Core 130:6A	Drainable liquid	5,600	5,390	5,500
S96T001437	Core 130:10	Drainable liquid	3,600	3,400	3,500
S98T002515	Core 232:1	Drainable liquid	3,020	3,000	3,010

B2.8 1998 GRAB SAMPLING EVENT

Table B2-80. 1998 Grab Sample Data for Tank 241-S-102 (Bulk Density).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			**g/mL**	**g/mL**	**g/mL**
S98T003195	Riser 13	Whole	1.49	n/a	1.49
S98T003199		Whole	1.72	n/a	1.72
S98T003203		Whole	1.68	n/a	1.68

Table B2-81. 1998 Grab Sample Data for Tank 241-S-102 (% Water by TGA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			**%**	**%**	**%**
S98T003196	Riser 13	Whole	50.5	50.6	50.5
S98T003200		Whole	47.6	47.2	47.4
S98T003204		Whole	45.4	45.3	45.4
Liquids			**%**	**%**	**%**
S98T003198	Riser 13	Grab Sample	51.3	51.4	51.3
S98T003202		Grab Sample	47.5	47.9	47.7
S98T003206		Grab Sample	48.3	48.7	48.5

Table B2-82. 1998 Grab Sample Data for Tank 241-S-102 (Specific Gravity).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**Unitless**	**Unitless**	**Unitless**
S98T003198	Riser 13	Grab Sample	1.35	1.35	1.35
S98T003202		Grab Sample	1.48	1.55	1.52
S98T003206		Grab Sample	1.42	1.46	1.44

Table B2-83. 1998 Grab Sample Data for Tank 241-S-102 (Ammonium Ion-IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			**µg/g**	**µg/g**	**µg/g**
S98T003209	Riser 13	Whole	<4.81E+02	<4.70E+02	n/a
S98T003210		Whole	1.13E+02	1.31E+02	1.22E+02
S98T003211		Whole	1.69E+02	1.49E+02	1.59E+02
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T003198	Riser 13	Grab sample	<2.22E+01	<2.22E+01	n/a
S98T003202		Grab sample	<2.22E+01	<2.24E+01	n/a
S98T003206		Grab sample	<2.22E+01	<2.22E+01	n/a

B2.9 1995 GRAB SAMPLING EVENT

Table B2-84. 1995 Grab Sample Data for Tank 241-S-102: Aluminum (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids: acid digest			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	4.08E+04	3.58E+04	3.83E+04
S98T001186		Whole	3.82E+04	3.61E+04	3.71E+04

Table B2-85. 1995 Grab Sample Data for Tank 241-S-102: Iron (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids: acid digest			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	<30.05	<30.05	n/a
S98T001186		Whole	<30.05	<30.05	n/a

Table B2-86. 1995 Grab Sample Data for Tank 241-S-102: Sodium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids: acid digest			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	2.67E+05	2.36E+05	2.52E+05
S98T001186		Whole	2.44E+05	2.29E+05	2.37E+05

Table B2-87. 1995 Grab Sample Data for Tank 241-S-102: Nitrate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	2.10E+05	2.08E+05	2.09E+05
S98T001186		Whole	1.74E+05	1.71E+05	1.73E+05

Table B2-88. 1995 Grab Sample Data for Tank 241-S-102: Nitrite (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	1.10E+05	1.09E+05	1.10E+05
S98T001186		Whole	9.07E+04	8.95E+04	9.01E+04

Table B2-89. 1995 Grab Sample Data for Tank 241-S-102: Chloride (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	9.59E+03	9.39E+03	9.49E+03
S98T001186		Whole	8.02E+03	7.82E+03	7.92E+03

Table B2-90. 1995 Grab Sample Data for Tank 241-S-102: Fluoride (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	<132	<132	n/a
S98T001186		Whole	<319	<319	n/a

Table B2-91. 1995 Grab Sample Data for Tank 241-S-102: Phosphate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	3.21E+03	3.09E+03	3.15E+03
S98T001186		Whole	3.92E+03	3.59E+03	3.76E+03

Table B2-92. 1995 Grab Sample Data for Tank 241-S-102: Sulfate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:				**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	4.11E+03	4.09E+03	4.10E+03
S98T001186		Whole	4.36E+03	4.13E+03	4.24E+03

Table B2-93. 1995 Grab Sample Data for Tank 241-S-102: OH (Titration).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	5.09E+04	4.24E+04	4.66E+04
S98T001186		Whole	4.14E+04	3.59E+04	3.86E+04

Table B2-94. 1995 Grab Sample Data for Tank 241-S-102: Americum-241.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µCi/mL**	**µCi/mL**	**µCi/mL**
S95T001185	Riser 13	Whole	3.84E-04	3.88E-04	3.86E-04
S98T001187		Whole	3.71E-04	3.77E-04	3.74E-04

Table B2-95. 1995 Grab Sample Data for Tank 241-S-102: Cesium-137 by GEA.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µCi/mL**	**µCi/mL**	**µCi/mL**
S95T001185	Riser 13	Whole	317	314	315.5
S98T001187		Whole	350	350	350

Table B2-96. 1995 Gram Sample Data for Tank 241-S-102: Strontium 89/90 High Level.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µCi/mL**	**µCi/mL**	**µCi/mL**
S95T001185	Riser 13	Whole	3.36E-01	3.33E-01	3.35E-01
S98T001187		Whole	3.01E-01	3.06E-01	3.03E-01

Table B2-97. 1995 Grab Sample Data for Tank 241-S-102: Plutonium-239/240.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µCi/mL**	**µCi/mL**	**µCi/mL**
S95T001185	Riser 13	Whole	<5.23E-05	<5.18E-05	n/a
S98T001187		Whole	<6.92E-05	<5.30E-05	n/a

Table B2-98. 1995 Grab Sample Data for Tank 241-S-102: % Water by TGA.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**%**	**%**	**%**
S95T001184	Riser 13	Whole	51.98	52.25	52.11
S98T001186		Whole	51.84	53.10	52.47

Table B2-99. 1995 Grab Sample Data for Tank 241-S-102: DSC.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**J/g**	**J/g**	**J/g**
S95T001184	Riser 13	Whole	45	41.30	43.15
S98T001186		Whole	54.3	55.1	54.7

Table B2-100. 1995 Grab Sample Data for Tank 241-S-102: pH (Direct).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**pH**	**pH**	**pH**
S95T001184	Riser 13	Whole	13.72	13.72	13.72
S98T001186		Whole	13.70	13.73	13.71

Table B2-101. 1995 Grab Sample Data for Tank 241-S-102: Total Inorganic Carbon.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	3.91E+03	3.97E+03	3.94E+03
S98T001186		Whole	4.11E+03	4.13E+03	4.12E+03

Table B2-102. 1995 Grab Sample Data for Tank 241-S-102: Total Organic Carbon.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**µg/mL**	**µg/mL**	**µg/mL**
S95T001184	Riser 13	Whole	3.71E+03	3.76E+03	3.74E+03
S98T001186		Whole	3.83E+03	3.64E+03	3.74E+03

Table B2-103. 1995 Grab Sample Data for Tank 241-S-102: Specific Gravity.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**Unitless**	**Unitless**	**Unitless**
S95T001184	Riser 13	Whole	1.32	1.34	1.33
S98T001186		Whole	1.33	1.28	1.31

Table B2-104. 1995 Grab Sample Data for Tank 241-S-102: Volume % Solids.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids:			**%**	**%**	**%**
S95T001182	Riser 13	Whole	5.3	n/a	n/a
S98T001183		Whole	26.3	n/a	n/a

B2.10 HISTORICAL DATA TABLES

Table B2-105. 1979 Solids Sample from Tank 241-S-102.[1]

Composition of Tank 241-S-102 Evaporator Product Solids		
Component	**Lab Value**	**Lab Unit**
$NaAlO_2$	4.1	Weight percent
NaOH	2.2	Weight percent
$NaNO_2$	5.5	Weight percent
$NaNO_3$	51.4	Weight percent
$Na_2CO_3 \cdot H_2O$	2.4	Weight percent
$Na_3PO_4 \cdot 12H_2O$	13.4	Weight percent
Insoluble	4.6	Weight percent

Note:

[1]Delegard (1979)

Table B2-106. 1980 Liquid Sample from Tank 241-S-102.[1]

Composition of Tank 241-S-102 Waste Liquor Samples		
Component	**Molarity**	**Weight Percent**
$NaAlO_2$	1.77	10.35
NaOH	4.04	11.53
$NaNO_3$	2.19	13.28
$NaNO_2$	2.64	12.99
$Na_3PO_4 \cdot 12H_2O$	0.0502	1.36
Na_2SO_4	0.0042	0.04
$Na_2CO_3 \cdot H_2O$	0.137	1.21
H_2O	48.25	48.25
Pu (g/L)	8.23×10^{-6}	
U (g/L)	3.23×10^{-4}	
Specific Gravity	1.4018	

Note:

[1]Jansky (1980)

B3.0 ASSESSMENT OF CHARACTERIZATION RESULTS

This section discusses the overall quality and consistency of the current sampling results for tank 241-S-102 and provides the results of an analytical-based inventory calculation.

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

B3.1 FIELD OBSERVATIONS

The safety screening DQO (Dukelow et al. 1995), organic complexant safety DQO (Turner et al. 1995), and historical model evaluation DQO (Simpson and McCain 1997) required all vertical waste profiles be from two widely spaced risers. This requirement was fulfilled by cores 125 and 130 taken in 1996, thereby enabling a spatial examination of analyte concentrations. The waste recovered in segments with less than full recovery was assumed to be representative of the whole segment.

Eleven segments were expected to be taken from core 232 in 1998. However, because of the poor sample recovery obtained during the sampling of segment 4, an additional segment was taken and identifed as 4R. The TSAP (McCain 1998) states the core samples should be transported to the laboratory within three calendar days from the time each segment is removed from the tank, this requirement was not met for some of the segments from core 232.

The three 1998 liquid grab samples collected from different depths in the tank had solids precipitated upon cooling to ambient temperature in the laboratory. The amount of solids increased with increasing depth of the samples.

B3.2 QUALITY CONTROL ASSESSMENT

The usual QC assessment includes an evaluation of the appropriate standard recoveries, spike recoveries, duplicate analyses, and blanks that are performed in conjunction with the chemical analyses. Sample and duplicate pairs with one or more QC results outside the specified criteria were identified by footnotes in the data summary tables.

The standard and spike recovery results provide an estimate of analysis accuracy. If a standard or spike recovery is above or below the given criterion, the analytical results may be biased high or low, respectively. The precision is estimated by the RPD, which is defined as the absolute value of the difference between the primary and duplicate samples, divided by their mean, times 100. A number of spike recoveries and RPDs were outside the target level for total alpha activity. This may have been caused by a high dissolved solids content on the sample mount and

subsequent self-shielding. Reruns were deemed unnecessary as the sample results were far below the action limit. Some high RPDs for the IC analytes may be attributable to sample homogeneity problems (Fritts 1996). Many ICP analytes also had one or more QC parameters outside the specified limits. No sample exceeded the criterion for preparation blanks; thus, contamination was not a problem.

In summary, the vast majority of QC results were within the boundaries specified in the SAPs. The discrepancies mentioned here and footnoted in the data summary tables should not impact data validity or use.

B3.3 DATA CONSISTENCY CHECKS

Comparing different analytical methods is helpful in assessing the consistency and quality of the data. The quantity of data available from the 1996 core sampling event enabled the comparison of ICP phosphorus and sulfate data to the IC phosphate and sulfate data, and the comparison of the total beta activity to the activities of the individual beta emitters. In addition, mass and charge balances were calculated to help assess the overall data consistency. No data consistency checks were made for the 1998 core sampling event because the sample preparation in retained gas analysis made the samples unsuitable. Comparison of different analytical methods could not be performed for the 1998 grab samples because the samples were analyzed for amonium ion only.

B3.3.1 Comparison of Results from Different Analytical Methods

The following data consistency checks compare the results from two analytical methods. A close agreement between the two methods strengthens the credibility of both results, whereas poor agreement brings the reliability of the data into question. The analytical mean results were taken from Section B2.0 tables, and the segment-level acid-digestion (ICP) data.

The ICP phosphorus analytical mean for the solid subdivision of the 1996 core sample data was 14,800 µg/g, which represents total phosphorus and converts to 45,400 µg/g of phosphate. The IC phosphate result, representing soluble phosphorous, was <45,500 µg/g. Therefore, no meaningful comparison of phosphate and phosphorus can be made. The ICP sulfur analytical mean (Core 232 Liquid Samples) of 1,750 µg/g represents total sulfur and converts to 5,243 µg/g of sulfate. The IC sulfate result, representing soluble sulfur, was 4,660 µg/g, giving a ratio between the two sulfate values of 1.13. Therefore, the two analytical methods are in agreement.

A comparison also was made using the analytical mean for the total beta measurement and the activities of $^{89/90}Sr$ and ^{137}Cs (see Table B3-1) for the solid subdivision data. The sum of the beta emitters was calculated as follows:

$$\text{Sum of beta emitters} = (2 * {}^{89/90}Sr + {}^{137}Cs)$$

Because $^{89/90}Sr$ is in equilibrium with its daughter product ^{90}Y, the $^{89/90}Sr$ activity must be multiplied by 2 to account for all beta emitters (see Table B3-1). The activities of the two methods compared well, yielding a ratio of 1.06.

Table B3-1. Comparison of Total Beta Activity with the Sum of Strontium-89/90 and Cesium-137 Activities.

Analyte	Overall Mean (µCi/g)	Beta Activities (µCi/g)
$^{89/90}Sr$	22	44
^{137}Cs	123	123
Sum of beta emitters		167
Total beta activity		158
Ratio		1.06

B3.3.2 Mass and Charge Balance

The principal objective in performing mass and charge balances is to determine whether the measurements are consistent. In calculating the balances, only the analytes listed in Section B2.0 for the solids subdivision, which were detected at a concentration of 1,000 µg/g or greater, were considered.

SOLIDS

With the exception of sodium, all cations in Table B3-2 were assumed to be in their most common hydroxide or oxide form, and the concentrations of the assumed species were calculated stoichiometrically. Based on the large endotherm that the samples exhibited near 300 °C, aluminum was assumed to exist as gibbsite, $Al(OH)_3$. Because precipitates are neutral species, all positive charge was attributed to the sodium cation. The anionic analytes in Table B3-3 were assumed to be present as sodium salts and were expected to balance the positive charge exhibited by the cations. Phosphorus was assumed to be present entirely as the soluble phosphate ion. The concentrations of cations in Table B3-2, the anions in Table B3-3, and the percent water were used to calculate the mass balance.

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

$$\text{Mass balance} = \%\ \text{Water} + 0.0001 \times \{\text{Total Analyte Concentration}\}$$

$$= \%\ \text{Water} + 0.0001 \times \{[Al(OH)_3] + [Cr(OH)_3] + [Na^+] + [CO_3^{2-}] + [Cl^-] + [NO_3^-] + [NO_2^-] + [(COO)_2^{2-}] + [PO_4^{3-}] + [SO_4^{2-}]\}$$

The total analyte concentration calculated from the above equation is 697,000 μg/g. The mean weight percent water obtained from TGA is 26.7 percent or 267,000 μg/g. The mass balance resulting from adding the percent water to the total analyte concentration is 96.4 percent (see Table B3-4).

The following equations demonstrate the derivation of total cations and total anions. The charge balance is the ratio of these two values.

Total cations = $[Na^+]/23.0 = 8{,}390$ μeq/g

Total anions = $[CO_3^{2-}]/30.0 + [Cl^-]/35.5 + [NO_3^-]/62.0 + [NO_2^-]/46.0 + [(COO)_2^{2-}]/44.0 + [PO_4^{3-}]/31.7 + [SO_4^{2-}]/48.1 = 8{,}930$ μeq/g.

The charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 0.94.

In summary, the above calculations yield reasonable mass and charge balance values close to 100 percent for the mass balance and close to 1.0 for the charge balance, indicating that the analytical results are generally consistent.

Table B3-2. Cation Mass and Charge Data for Solids.

Analyte	Concentration μg/g	Assumed Species	Concentration of Assumed Species μg/g	Charge μeq/g
Aluminum	12,900	$Al(OH)_3$	37,300	0
Chromium	2,920	$Cr(OH)_3$	5,780	0
Sodium	1.93E+05	Na^+	1.93E+05	8,390
Total			2.36E+05	8,390

Table B3-3. Anion Mass and Charge Data for Solids.

Analyte	Concentration	Assumed Species	Concentration of Assumed Species	Charge
	µg/g		µg/g	µeq/g
TIC	5,280	CO_3^{2-}	26,400	880
Chloride	3,560	Cl^-	3,560	100
Nitrate	3.35E+05	NO_3^-	3.35E+05	5,400
Nitrite	34,200	NO_2^-	34,200	743
Oxalate	7,710	$(COO)_2^{2-}$	7,710	175
Phosphate	45,500	PO_4^{3-}	45,500	1,440
Sulfate	9,040	SO_4^{2-}	9,040	188
Total			4.61E+05	8,930

Table B3-4. Mass Balance Totals.

Totals	Concentrations	Charge
	µg/g	µeq/g
Cation Total (from Table B3-2)	2.36E+05	+8,390
Anion Total (from Table B3-3)	4.61E+05	-8,930
Water (%)	26.7	n/a
Totals	96.4%	0.94 (ratio)

LIQUIDS

Aluminum is assumed to be present as aluminate (AlO_2^-) in the drainable liquid. Sodium and potassium are present as ions. The concentrations of the assumed species were calculated stoichiometrically. Because precipitates are neutral species, all positive charge was attributed to the sodium cation. The anions listed in Table B3-6 were assumed to be present mostly as sodium salts and were expected to balance the positive charge exhibited by the cations. Phosphate, as determined by IC, is assumed to be completely water soluble and appears only in the anion mass and charge calculations. The concentrations of cationic species in Table B3-5, the anionic species in Table B3-6, and the percent water were ultimately used to calculate the mass balance. The mass balance was calculated from the formula below. The factor 0.0001 is the conversion factor from µg/g to weight percent. An average specific gravity of 1.39 was used to convert from µg/mL to µg/g.

Mass balance = % Water + 0.0001 x {Total Analyte Concentration}

= % Water + 0.0001 x $\{AlO_2^- + Na^+ + K^+ + Cl^- + NO_2^- + NO_3^- + PO_4^{-3} + C_2H_3O_2^- + SO_4^{-2} + CO_3^{-2}\}$

The total analyte concentrations calculated from the above equation is 4.76E+05 µg/g. The mean weight percent water (obtained from the gravimetric analyses reported in Table B3-12) is 51 percent or 5.1E+05 µg/g. The mass balance resulting from adding the percent water to the total analyte concentration is 98.6 percent (see Table B3-7).

The following equations demonstrate the derivation of total cations and total anions; the charge balance is the ratio of these two values.

Total cations (µeq/g) = $[Na^+]/23.0 + [K^+]/39.1 = 7{,}320$ µeq/g

Total anions (µeq/g) = $[Cl-]/35.5 + [NO_2^-]/46.0 + [NO_3^-]/62.0 + [PO_4^{-3}]/31.7 + [C_2H_3O_2^-]/59.0 + [SO_4^{-2}]/48.1 + [CO_3^{-2}]/30 = 5{,}950$ µeq/g

The solids charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 1.23. The net positive charge is probably balanced by unmeasured hydroxide.

Table B3-5. Cation Mass and Charge Data for Liquids.

Analyte	Concentration (µg/g)	AssumedSpecies	Concentration of Assumed Species (µg/g)	Charge (µeq/g)
Na	1.67E+05	Na^+	1.67E+05	7,260
K	2,290	K^+	2,290	58.6
Totals			1.69E+05	7,320

Table B3-6. Anion Mass and Charge Data for Liquids. (2 sheets)

Analyte	Concentration (µg/g)	Charge (µeq/g)
AlO_2^-	68,385	1,160
Cl^-	7,340	207
NO_2^-	80,600	1,750
NO_3^-	1.14E+05	1,840
CO_3^-	19,000	633
SO_4^{-2}	3,320	69

Table B3-6. Anion Mass and Charge Data for Liquids. (2 sheets)

Analyte	Concentration (µg/g)	Charge (µeq/g)
PO_4^{-3}	3,510	111
$C_2H_3O_2^-$	10,200	173
Totals	3.06E+05	5,940

Table B3-7. Mass and Charge Balance Totals Liquids.

Totals	Concentrations (µg/g)	Charge (µeq/g)
Total from Table B3-5 (cations)	1.69E+05	+7,320
Total from Table B3-6 (anions)	3.06E+05	-5,940
Water percent (%)	51	n/a
Totals	98.6%	1.23 (ratio)

B3.4 MEAN CONCENTRATIONS AND CONFIDENCE INTERVALS

Statistical average and confidence interval estimates reported in this section include data from samples contaminated with the hydrostatic head fluid. Subsequently, the majority of the data from the contaminated samples was removed from the TCD. However, no attempts were made to adjust the estimates in this section because the difference in the total inventory estimates of the analytes with and without the contaminated samples is a maximum of 1 percent.

Means and Confidence Intervals

Solid Data

Analysis of variance (ANOVA) models were fit to the composite, segment, and grab data, respectively. The composite and segment data was obtained in January and March of 1996, and the grab data was from the October 1998 sampling event. For the 1996 data, two types of composite samples were made. The composites were from the sludge and saltcake portion of the core material. For the composite, segment, and grab data, mean values and 95 percent confidence intervals on the mean, were determined from the ANOVA.

The first ANOVA was fit to the data from saltcake core composite samples. Two saltcake composites were made. The first was formed using material from core 125, riser 11, and the second was from core 130, riser 14. Two variance components were used in the calculations.

They represent concentration differences between core composite samples from different risers, and between analytical replicates.

The model is:

$$Y_{ij} = \mu + R_i + A_{ij},$$

$$i=1,2,\ldots,a;\ j=1,2,\ldots,n_i;$$

where

Y_{ij}	=	concentration from the jth analytical result from the composite sample from the ith riser
μ	=	the mean
R_i	=	the effect of the ith riser
A_{ij}	=	the analytical error
a	=	the number of segments
n_i	=	the number of analytical results from the composite sample from i^{th} riser

The variable R_i is a random effect. This variable, along with A_{ij}, are assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(R)$, and $\sigma^2(A)$ respectively. The degrees of freedom (*df*) associated with the standard deviation of the mean is the number of risers with data minus one.

Restricted maximum likelihood method (REML) was used to estimate the mean concentration and standard deviation of the mean for all analytes that had 50 percent or more of their reported values greater than the detection limit. For analytes with a majority of results below the detection limit, a simple average is all that is reported. In these cases the value of the detection limit was used for non-detected results.

The lower and upper limits, LL(95%) and UL(95%), of a two-sided 95 percent confidence interval on the mean were calculated using:

$$LL(95\%) = \hat{\mu} - t_{(df,\ 0.025)} \times \hat{\sigma}\ (\hat{\mu}),$$
$$UL(95\%) = \hat{\mu} + t_{(df,\ 0.025)} \times \hat{\sigma}\ (\hat{\mu}).$$

In this equation, $\hat{\mu}$ is the estimate of the mean concentration, $\hat{\sigma}(\hat{\mu})$ is the estimate of the standard deviation of the mean, and $t_{(df,\ 0.025)}$ is the quantile from Student's t distribution with *df* degrees of freedom. The degrees of freedom for this model are the number of risers with data minus one. The mean values and 95 percent confidence intervals for the saltcake core composite results are given in Table B3-8. In cases where the lower limit of the confidence interval was negative, it is reported as zero.

Table B3-8. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Saltcake Core Composite Samples (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP:A	1.10E+04	1	7.33E+03	1.46E+04	µg/g
Aluminum	ICP:W	1.09E+04	1	5.16E+03	1.67E+04	µg/g
Americium-241*	GEA:F	<6.11E-01	n/a	n/a	n/a	µCi/g
Antimony*	ICP:A	<2.86E+01	n/a	n/a	n/a	µg/g
Antimony*	ICP:W	<3.75E+01	n/a	n/a	n/a	µg/g
Arsenic*	ICP:A	<4.78E+01	n/a	n/a	n/a	µg/g
Arsenic*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Barium*	ICP:A	<2.39E+01	n/a	n/a	n/a	µg/g
Barium*	ICP:W	<3.13E+01	n/a	n/a	n/a	µg/g
Beryllium*	ICP:A	<2.39E+00	n/a	n/a	n/a	µg/g
Beryllium*	ICP:W	<3.13E+00	n/a	n/a	n/a	µg/g
Bismuth*	ICP:A	<4.78E+01	n/a	n/a	n/a	µg/g
Bismuth*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Boron	ICP:A	7.11E+01	1	0.00E+00	6.43E+02	µg/g
Boron	ICP:W	5.13E+02	1	4.01E+02	6.25E+02	µg/g
Bromide*	IC:W	1.33E+03	1	0.00E+00	6.68E+03	µg/g
Cadmium*	ICP:A	<2.39E+00	n/a	n/a	n/a	µg/g
Cadmium*	ICP:W	<3.13E+00	n/a	n/a	n/a	µg/g
Calcium	ICP:A	3.39E+02	1	0.00E+00	7.24E+02	µg/g
Calcium*	ICP:W	1.01E+02	1	0.00E+00	6.97E+02	µg/g
Cerium*	ICP:A	<4.78E+01	n/a	n/a	n/a	µg/g
Cerium*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Cesium-137	GEA:F	9.36E+01	1	0.00E+00	2.22E+02	µCi/g
Chloride	IC:W	2.84E+03	1	0.00E+00	6.17E+03	µg/g
Chromium	ICP:A	1.94E+03	1	1.42E+03	2.46E+03	µg/g

Table B3-8. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Saltcake Core Composite Samples (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Chromium	ICP:W	1.69E+02	1	1.60E+01	3.21E+02	µg/g
Cobalt*	ICP:A	<9.55E+00	n/a	n/a	n/a	µg/g
Cobalt*	ICP:W	<1.25E+01	n/a	n/a	n/a	µg/g
Cobalt-60*	GEA:F	<1.68E-02	n/a	n/a	n/a	µCi/g
Copper	ICP:A	5.63E+00	1	0.00E+00	1.91E+01	µg/g
Copper*	ICP:W	<6.25E+00	n/a	n/a	n/a	µg/g
Europium-154*	GEA:F	<6.08E-02	n/a	n/a	n/a	µCi/g
Europium-155*	GEA:F	<2.59E-01	n/a	n/a	n/a	µCi/g
Fluoride	IC:W	3.18E+02	1	7.86E+01	5.58E+02	µg/g
Gross alpha	Alpha:F	2.46E-02	1	0.00E+00	6.28E-02	µCi/g
Gross beta	Alpha:F	1.04E+02	1	0.00E+00	2.26E+02	µCi/g
Iron	ICP:A	1.30E+03	1	0.00E+00	1.64E+04	µg/g
Iron*	ICP:W	<3.13E+01	n/a	n/a	n/a	µg/g
Lanthanum*	ICP:A	<2.39E+01	n/a	n/a	n/a	µg/g
Lanthanum*	ICP:W	<3.13E+01	n/a	n/a	n/a	µg/g
Lead*	ICP:A	<4.88E+01	n/a	n/a	n/a	µg/g
Lead*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Lithium*	ICP:A	5.75E+00	1	4.90E+00	6.60E+00	µg/g
Lithium*	ICP:W	<6.25E+00	n/a	n/a	n/a	µg/g
Magnesium*	ICP:A	<4.78E+01	n/a	n/a	n/a	µg/g
Magnesium*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Manganese	ICP:A	4.39E+01	1	0.00E+00	1.81E+02	µg/g
Manganese*	ICP:W	<6.25E+00	n/a	n/a	n/a	µg/g
Molybdenum*	ICP:A	2.66E+01	1	0.00E+00	5.46E+01	µg/g
Molybdenum*	ICP:W	<3.27E+01	n/a	n/a	n/a	µg/g
Neodymium*	ICP:A	<4.78E+01	n/a	n/a	n/a	µg/g
Neodymium*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Nickel	ICP:A	1.73E+01	1	0.00E+00	5.83E+01	µg/g
Nickel*	ICP:W	<1.25E+01	n/a	n/a	n/a	µg/g
Nitrate	IC:W	4.56E+05	1	1.59E+05	7.53E+05	µg/g
Nitrite	IC:W	3.06E+04	1	1.27E+04	4.85E+04	µg/g

Table B3-8. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Saltcake Core Composite Samples (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Oxalate	IC:W	3.08E+03	1	1.07E+03	5.09E+03	µg/g
Phosphate	IC:W	9.92E+03	1	0.00E+00	2.38E+04	µg/g
Phosphorus	ICP:A	2.53E+03	1	0.00E+00	6.63E+03	µg/g
Phosphorus	ICP:W	3.11E+03	1	1.87E+03	4.35E+03	µg/g
Potassium	ICP:A	8.08E+02	1	5.08E+02	1.11E+03	µg/g
Potassium	ICP:W	1.14E+03	1	5.71E+02	1.71E+03	µg/g
Samarium*	ICP:A	<4.78E+01	n/a	n/a	n/a	µg/g
Samarium*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Selenium*	ICP:A	<4.78E+01	n/a	n/a	n/a	µg/g
Selenium*	ICP:W	<6.25E+01	n/a	n/a	n/a	µg/g
Silicon	ICP:A	2.82E+02	1	0.00E+00	1.32E+03	µg/g
Silicon	ICP:W	4.99E+02	1	0.00E+00	2.35E+03	µg/g
Silver	ICP:A	1.48E+01	1	0.00E+00	3.13E+01	µg/g
Silver	ICP:W	1.71E+01	1	5.08E+00	2.92E+01	µg/g
Sodium	ICP:A	2.06E+05	1	0.00E+00	4.72E+05	µg/g
Sodium	ICP:W	2.34E+05	1	5.27E+04	4.15E+05	µg/g
Strontium*	ICP:A	<4.78E+00	n/a	n/a	n/a	µg/g
Strontium*	ICP:W	<6.25E+00	n/a	n/a	n/a	µg/g
Strontium-89/90	Sr:F	4.96E+00	1	0.00E+00	1.28E+01	µCi/g
Sulfate	IC:W	5.96E+03	1	3.55E+03	8.36E+03	µg/g
Sulfur	ICP:A	1.49E+03	1	7.91E+02	2.19E+03	µg/g
Sulfur	ICP:W	1.86E+03	1	0.00E+00	4.05E+03	µg/g
Thallium*	ICP:A	<9.55E+01	n/a	n/a	n/a	µg/g
Thallium*	ICP:W	<1.25E+02	n/a	n/a	n/a	µg/g
Titanium*	ICP:A	<5.27E+00	n/a	n/a	n/a	µg/g
Titanium*	ICP:W	<6.25E+00	n/a	n/a	n/a	µg/g
Total inorganic carbon	TIC/TOC	5.44E+03	1	3.66E+03	7.21E+03	µg/g
Total organic carbon	TIC/TOC	1.97E+03	1	1.58E+03	2.35E+03	µg/g
Uranium*	ICP:A	2.92E+02	1	2.20E+02	3.64E+02	µg/g
Uranium*	ICP:W	<3.13E+02	n/a	n/a	n/a	µg/g

Table B3-8. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Saltcake Core Composite Samples (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Uranium	U:F	1.87E+02	1	0.00E+00	1.94E+03	µg/g
Vanadium*	ICP:A	<2.39E+01	n/a	n/a	n/a	µg/g
Vanadium*	ICP:W	<3.13E+01	n/a	n/a	n/a	µg/g
Zinc	ICP:A	2.86E+01	1	0.00E+00	8.36E+01	µg/g
Zinc	ICP:W	1.20E+01	1	0.00E+00	2.44E+01	µg/g
Zirconium*	ICP:A	<4.78E+00	n/a	n/a	n/a	µg/g
Zirconium*	ICP:W	<6.25E+00	n/a	n/a	n/a	µg/g

Note:

* a "less than" value was used in the calculations

The same ANOVA model that was fit to the saltcake composite data was fit to the sludge composite data. The mean values and 95 percent confidence intervals for the sludge composite results are given in Table B3-9. The degrees of freedom for this model are the number of risers with data minus one.

Table B3-9. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Sludge Core Composite Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP:A	1.49E+04	1	2.54E+03	2.73E+04	µg/g
Aluminum	ICP:W	1.48E+04	1	7.47E+03	2.21E+04	µg/g
Americium-241*	GEA:F	<8.12E-01	n/a	n/a	n/a	µCi/g
Antimony*	ICP:A	<2.93E+01	n/a	n/a	n/a	µg/g
Antimony*	ICP:W	<4.36E+01	n/a	n/a	n/a	µg/g
Arsenic*	ICP:A	<4.88E+01	n/a	n/a	n/a	µg/g
Arsenic*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Barium*	ICP:A	<2.44E+01	n/a	n/a	n/a	µg/g
Barium*	ICP:W	<3.64E+01	n/a	n/a	n/a	µg/g
Beryllium*	ICP:A	<2.44E+00	n/a	n/a	n/a	µg/g
Beryllium*	ICP:W	<3.63E+00	n/a	n/a	n/a	µg/g
Bismuth	ICP:A	7.01E+01	1	0.00E+00	2.39E+02	µg/g

Table B3-9. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Sludge Core Composite Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Bismuth*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Boron	ICP:A	1.66E+02	1	0.00E+00	9.25E+02	µg/g
Boron	ICP:W	4.82E+02	1	0.00E+00	3.15E+03	µg/g
Bromide*	IC:W	<6.52E+02	n/a	n/a	n/a	µg/g
Cadmium	ICP:A	1.07E+01	1	0.00E+00	2.49E+01	µg/g
Cadmium*	ICP:W	<3.63E+00	n/a	n/a	n/a	µg/g
Calcium	ICP:A	2.16E+02	1	0.00E+00	8.61E+02	µg/g
Calcium*	ICP:W	<3.31E+02	n/a	n/a	n/a	µg/g
Cerium*	ICP:A	<4.88E+01	n/a	n/a	n/a	µg/g
Cerium*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Cesium-137	GEA:F	1.11E+02	1	8.04E+01	1.41E+02	µCi/g
Chloride	IC:W	3.28E+03	1	0.00E+00	7.09E+03	µg/g
Chromium	ICP:A	4.37E+03	1	0.00E+00	1.14E+04	µg/g
Chromium	ICP:W	2.66E+02	1	0.00E+00	1.83E+03	µg/g
Cobalt*	ICP:A	<9.74E+00	n/a	n/a	n/a	µg/g
Cobalt*	ICP:W	<1.45E+01	n/a	n/a	n/a	µg/g
Cobalt-60*	GEA:F	<3.28E-02	n/a	n/a	n/a	µCi/g
Copper*	ICP:A	6.08E+00	1	0.00E+00	2.36E+01	µg/g
Copper*	ICP:W	<7.27E+00	n/a	n/a	n/a	µg/g
Europium-154	GEA:F	3.34E-01	1	0.00E+00	1.30E+00	µCi/g
Europium-155*	GEA:F	<3.51E-01	n/a	n/a	n/a	µCi/g
Fluoride	IC:W	1.33E+04	1	1.11E+04	1.54E+04	µg/g
Gross alpha	Alpha:F	3.95E-01	1	0.00E+00	2.08E+00	µCi/g
Gross beta	Alpha:F	2.09E+02	1	0.00E+00	4.53E+02	µCi/g
Iron	ICP:A	1.50E+03	1	0.00E+00	4.46E+03	µg/g
Iron*	ICP:W	7.06E+01	1	0.00E+00	5.83E+02	µg/g
Lanthanum*	ICP:A	<2.44E+01	n/a	n/a	n/a	µg/g
Lanthanum*	ICP:W	<3.64E+01	n/a	n/a	n/a	µg/g
Lead	ICP:A	1.05E+02	1	0.00E+00	3.24E+02	µg/g

Table B3-9. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Sludge Core Composite Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Lead*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Lithium*	ICP:A	<5.29E+00	n/a	n/a	n/a	µg/g
Lithium*	ICP:W	<7.27E+00	n/a	n/a	n/a	µg/g
Magnesium*	ICP:A	5.40E+01	1	2.02E+01	8.78E+01	µg/g
Magnesium*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Manganese	ICP:A	9.68E+02	1	0.00E+00	4.24E+03	µg/g
Manganese*	ICP:W	3.06E+01	1	0.00E+00	3.42E+02	µg/g
Molybdenum	ICP:A	3.35E+01	1	0.00E+00	7.25E+01	µg/g
Molybdenum*	ICP:W	3.90E+01	1	0.00E+00	8.28E+01	µg/g
Neodymium*	ICP:A	<4.90E+01	n/a	n/a	n/a	µg/g
Neodymium*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Nickel	ICP:A	5.03E+01	1	0.00E+00	1.31E+02	µg/g
Nickel*	ICP:W	<1.45E+01	n/a	n/a	n/a	µg/g
Nitrate	IC:W	5.36E+04	1	3.78E+03	1.03E+05	µg/g
Nitrite	IC:W	3.62E+04	1	6.14E+03	6.63E+04	µg/g
Oxalate	IC:W	1.27E+04	1	0.00E+00	3.70E+04	µg/g
Phosphate	IC:W	1.35E+05	1	7.16E+04	1.99E+05	µg/g
Phosphorus	ICP:A	3.59E+04	1	0.00E+00	7.27E+04	µg/g
Phosphorus	ICP:W	4.40E+04	1	3.29E+04	5.51E+04	µg/g
Potassium	ICP:A	9.91E+02	1	0.00E+00	1.99E+03	µg/g
Potassium	ICP:W	1.27E+03	1	0.00E+00	4.35E+03	µg/g
Samarium*	ICP:A	<4.88E+01	n/a	n/a	n/a	µg/g
Samarium*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Selenium*	ICP:A	<4.88E+01	n/a	n/a	n/a	µg/g
Selenium*	ICP:W	<7.27E+01	n/a	n/a	n/a	µg/g
Silicon	ICP:A	7.97E+02	1	0.00E+00	5.39E+03	µg/g
Silicon	ICP:W	1.34E+03	1	0.00E+00	1.10E+04	µg/g
Silver	ICP:A	1.84E+01	1	1.55E+01	2.12E+01	µg/g
Silver	ICP:W	1.76E+01	1	4.97E-01	3.48E+01	µg/g

Table B3-9. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Sludge Core Composite Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Sodium	ICP:A	1.89E+05	1	9.08E+04	2.88E+05	µg/g
Sodium	ICP:W	2.12E+05	1	1.87E+05	2.36E+05	µg/g
Strontium*	ICP:A	<4.88E+00	n/a	n/a	n/a	µg/g
Strontium*	ICP:W	<7.27E+00	n/a	n/a	n/a	µg/g
Strontium-89/90	Sr:F	4.63E+01	1	0.00E+00	1.41E+02	µCi/g
Sulfate	IC:W	1.20E+04	1	5.66E+03	1.84E+04	µg/g
Sulfur	ICP:A	3.67E+03	1	5.64E+02	6.77E+03	µg/g
Sulfur	ICP:W	4.08E+03	1	1.41E+02	8.02E+03	µg/g
Thallium*	ICP:A	<9.74E+01	n/a	n/a	n/a	µg/g
Thallium*	ICP:W	<1.45E+02	n/a	n/a	n/a	µg/g
Titanium*	ICP:A	<4.88E+00	n/a	n/a	n/a	µg/g
Titanium*	ICP:W	<7.27E+00	n/a	n/a	n/a	µg/g
Total inorganic carbon	TIC/TOC	5.21E+03	1	4.48E+03	5.95E+03	µg/g
Total organic carbon	TIC/TOC	5.33E+03	1	0.00E+00	1.09E+04	µg/g
Uranium	ICP:A	1.12E+03	1	5.78E+02	1.66E+03	µg/g
Uranium*	ICP:W	<3.64E+02	n/a	n/a	n/a	µg/g
Uranium	U:F	1.48E+03	1	1.23E+03	1.72E+03	µg/g
Vanadium	ICP:A	3.67E+01	1	8.30E-01	7.26E+01	µg/g
Vanadium*	ICP:W	4.35E+01	1	3.59E+01	5.12E+01	µg/g
Zinc	ICP:A	3.78E+01	1	0.00E+00	8.76E+01	µg/g
Zinc	ICP:W	1.79E+01	1	0.00E+00	1.24E+02	µg/g
Zirconium	ICP:A	6.14E+01	1	0.00E+00	3.01E+02	µg/g
Zirconium*	ICP:W	<7.27E+00	n/a	n/a	n/a	µg/g

Note:

* a "less than" value was used in the calculations

A second type of ANOVA model was fit to the data from the solid samples from the core segment data. The core segment data was from core 125, riser 11, and from core 130, riser 14. Four variance components were used in the calculations. They represent concentration differences between risers, segments, laboratory samples, and analytical replicates.

The model is:

$$Y_{ijkm} = \mu + R_i + S_{ij} + L_{ijk} + A_{ijkm},$$

$$i=1,2,\ldots,a;\ j=1,2,\ldots,b_i;\ k=1,2,\ldots,c_{ij};m=1,2,\ldots,n_{ijk}$$

where

Y_{ijkm}	=	concentration from the mth analytical result of the kth sample of the jth segment of the ith riser
μ	=	the mean
R_I	=	the effect of the ith riser
S_{ij}	=	the effect of the jth segment from the ith riser
L_{ijk}	=	the effect of the kth sample from the jth segment of the ith riser
A_{ijkm}	=	the analytical error
a	=	the number of risers
b_i	=	the number of segments from the ith riser
c_{ij}	=	the number of samples from the jth segment of the ith riser
n_{ijk}	=	the number of analytical results from the ijk^{th} sample

The variables R_i, S_{ij}, and L_{ijk} are random effects. These variables, as well as A_{ijkm}, are assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(R)$, $\sigma^2(S)$, $\sigma^2(L)$ and $\sigma^2(A)$, respectively. The *df* associated with the standard deviation of the mean is the number of risers with data minus one. The mean values and 95 percent confidence intervals for the solid subdivision samples are given in Table B3-10.

Table B3-10. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Solid Subdivision Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP:A	1.29E+04	1	0.00E+00	2.83E+04	µg/g
Aluminum	ICP:W	9.15E+03	1	0.00E+00	3.85E+04	µg/g
Americium-241[1]	GEA:F	<6.08E-01	n/a	n/a	n/a	µCi/g
Antimony[1]	ICP:A	<4.15E+01	n/a	n/a	n/a	µg/g
Antimony[1]	ICP:W	<3.21E+01	n/a	n/a	n/a	µg/g
Arsenic[1]	ICP:A	<6.90E+01	n/a	n/a	n/a	µg/g
Arsenic[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Barium[1]	ICP:A	<3.50E+01	n/a	n/a	n/a	µg/g
Barium[1]	ICP:W	<2.67E+01	n/a	n/a	n/a	µg/g
Beryllium[1]	ICP:A	<3.45E+00	n/a	n/a	n/a	µg/g
Beryllium[1]	ICP:W	<2.67E+00	n/a	n/a	n/a	µg/g
Bismuth[1]	ICP:A	<7.47E+01	n/a	n/a	n/a	µg/g
Bismuth[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Boron[1]	ICP:A	7.19E+01	1	0.00E+00	2.24E+02	µg/g
Boron	ICP:W	3.89E+02	1	0.00E+00	1.18E+03	µg/g
Bromide[1]	IC:W	<1.84E+03	n/a	n/a	n/a	µg/g
Bulk Density	Bulk Denisty	1.68E+06	37	1.64E+06	1.72E+06	µg/mL
Cadmium[1]	ICP:A	<6.22E+00	n/a	n/a	n/a	µg/g
Cadmium[1]	ICP:W	<2.67E+00	n/a	n/a	n/a	µg/g
Calcium	ICP:A	4.09E+02	1	0.00E+00	2.09E+03	µg/g
Calcium[1]	ICP:W	<5.80E+01	n/a	n/a	n/a	µg/g
Cerium[1]	ICP:A	<6.97E+01	n/a	n/a	n/a	µg/g
Cerium[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Cesium-137	GEA:F	1.23E+02	1	3.64E+00	2.43E+02	µCi/g
Chloride	IC:W	3.61E+03	1	6.44E+02	6.58E+03	µg/g
Chromium	ICP:A	2.92E+03	1	0.00E+00	7.98E+03	µg/g
Chromium	ICP:W	2.74E+02	1	0.00E+00	1.26E+03	µg/g
Cobalt[1]	ICP:A	<1.38E+01	n/a	n/a	n/a	µg/g
Cobalt[1]	ICP:W	<1.07E+01	n/a	n/a	n/a	µg/g

Table B3-10. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Solid Subdivision Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Cobalt-60[1]	GEA:F	<2.14E-02	n/a	n/a	n/a	µCi/g
Copper[1]	ICP:A	<8.20E+00	n/a	n/a	n/a	µg/g
Copper[1]	ICP:W	<6.05E+00	n/a	n/a	n/a	µg/g
Europium-154[1]	GEA:F	<1.87E-01	n/a	n/a	n/a	µCi/g
Europium-155[1]	GEA:F	<3.26E-01	n/a	n/a	n/a	µCi/g
Fluoride[1]	IC:W	<4.98E+03	n/a	n/a	n/a	µg/g
Gross alpha[1]	Alpha:F	1.67E-01	1	0.00E+00	8.53E-01	µCi/g
Gross beta	Alpha:F	1.58E+02	1	0.00E+00	3.24E+02	µCi/g
Iron[1]	ICP:A	8.59E+02	1	0.00E+00	4.15E+03	µg/g
Iron[1]	ICP:W	<2.67E+01	n/a	n/a	n/a	µg/g
Lanthanum[1]	ICP:A	<3.55E+01	n/a	n/a	n/a	µg/g
Lanthanum[1]	ICP:W	<2.67E+01	n/a	n/a	n/a	µg/g
Lead[1]	ICP:A	<9.18E+01	n/a	n/a	n/a	µg/g
Lead[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Lithium[1]	ICP:A	<1.20E+01	n/a	n/a	n/a	µg/g
Lithium[1]	ICP:W	<5.35E+00	n/a	n/a	n/a	µg/g
Magnesium[1]	ICP:A	<7.44E+01	n/a	n/a	n/a	µg/g
Magnesium[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Manganese[1]	ICP:A	3.88E+02	1	0.00E+00	2.31E+03	µg/g
Manganese[1]	ICP:W	<5.35E+00	n/a	n/a	n/a	µg/g
Molybdenum[1]	ICP:A	<3.79E+01	n/a	n/a	n/a	µg/g
Molybdenum[1]	ICP:W	3.50E+01	1	0.00E+00	7.92E+01	µg/g
Neodymium[1]	ICP:A	<7.26E+01	n/a	n/a	n/a	µg/g
Neodymium[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Nickel[1]	ICP:A	3.07E+01	1	0.00E+00	8.68E+01	µg/g
Nickel[1]	ICP:W	<1.07E+01	n/a	n/a	n/a	µg/g
Nitrate[1]	IC:W	3.35E+05	1	0.00E+00	9.23E+05	µg/g
Nitrite	IC:W	3.42E+04	1	8.35E+03	6.00E+04	µg/g
Oxalate[1]	IC:W	7.71E+03	1	0.00E+00	2.74E+04	µg/g

Table B3-10. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Solid Subdivision Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Percent Water	DSC/TGA	1.78E+01	1	0.00E+00	8.37E+01	%
Percent Water	TGA	2.67E+01	1	0.00E+00	7.12E+01	%
Phosphate[1]	IC:W	4.55E+04	1	0.00E+00	1.82E+05	µg/g
Phosphorus	ICP:A	1.27E+04	1	0.00E+00	5.34E+04	µg/g
Phosphorus	ICP:W	1.48E+04	1	0.00E+00	1.69E+05	µg/g
Potassium[1]	ICP:A	8.38E+02	1	3.67E+02	1.31E+03	µg/g
Potassium	ICP:W	1.12E+03	1	0.00E+00	3.53E+03	µg/g
Samarium[1]	ICP:A	<6.90E+01	n/a	n/a	n/a	µg/g
Samarium[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Selenium[1]	ICP:A	<8.88E+01	n/a	n/a	n/a	µg/g
Selenium[1]	ICP:W	<5.35E+01	n/a	n/a	n/a	µg/g
Silicon[1]	ICP:A	4.62E+02	1	0.00E+00	2.11E+03	µg/g
Silicon	ICP:W	5.13E+02	1	0.00E+00	2.37E+03	µg/g
Silver[1]	ICP:A	1.61E+01	1	0.00E+00	3.86E+01	µg/g
Silver	ICP:W	1.69E+01	1	1.11E+01	2.27E+01	µg/g
Sodium	ICP:A	1.93E+05	1	1.08E+05	2.78E+05	µg/g
Sodium	ICP:W	2.41E+05	1	1.51E+05	3.30E+05	µg/g
Strontium[1]	ICP:A	<7.38E+00	n/a	n/a	n/a	µg/g
Strontium[1]	ICP:W	<5.35E+00	n/a	n/a	n/a	µg/g
Strontium-89/90	Sr:F	2.20E+01	1	0.00E+00	1.42E+02	µCi/g
Sulfate	IC:W	9.04E+03	1	0.00E+00	1.97E+04	µg/g
Sulfur	ICP:A	1.68E+03	1	0.00E+00	4.83E+03	µg/g
Sulfur	ICP:W	3.56E+03	1	0.00E+00	1.31E+04	µg/g
Thallium[1]	ICP:A	<1.38E+02	n/a	n/a	n/a	µg/g
Thallium[1]	ICP:W	<1.07E+02	n/a	n/a	n/a	µg/g
Titanium[1]	ICP:A	<1.14E+01	n/a	n/a	n/a	µg/g
Titanium[1]	ICP:W	<5.35E+00	n/a	n/a	n/a	µg/g
Total inorganic carbon	TIC/TOC	5.28E+03	1	0.00E+00	1.23E+04	µg/g
Total organic	TIC/TOC	3.92E+03	1	2.99E+03	4.85E+03	µg/g

Table B3-10. Ninety Five Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Solid Subdivision Samples. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
carbon						
Uranium[1]	ICP:A	<1.49E+03	n/a	n/a	n/a	µg/g
Uranium[1]	ICP:W	<2.67E+02	n/a	n/a	n/a	µg/g
Uranium	U:F	7.92E+02	1	0.00E+00	6.73E+03	µg/g
Vanadium[1]	ICP:A	<3.68E+01	n/a	n/a	n/a	µg/g
Vanadium[1]	ICP:W	<3.17E+01	n/a	n/a	n/a	µg/g
Zinc[1]	ICP:A	2.36E+01	1	0.00E+00	8.33E+01	µg/g
Zinc	ICP:W	1.39E+01	1	0.00E+00	3.38E+01	µg/g
Zirconium[1]	ICP:A	<1.95E+01	n/a	n/a	n/a	µg/g
Zirconium[1]	ICP:W	<5.35E+00	n/a	n/a	n/a	µg/g

Note:

[1]a "less than" value was used in the calculations

A third ANOVA model was fit to the data from the solid material of the October 1998 grab samples. One variance component was used in the calculations. It represents concentration differences between analytical replicates.

The model is:

$$Y_i = \mu + A_i,$$

$$i=1,2,\ldots,n;$$

where

Y_i = concentration from the ith analytical result

μ = the mean

A_i = the analytical error

n = the number of analytical results.

The variable A_i is assumed to be normally distributed with mean zero and variance $\sigma^2(A)$. The estimate of μ is the sample mean, the estimate of $\sigma^2(A)$ is the sample variance. The *df* associated with the standard deviation of the mean is the number of observations minus one. Table B3-11 gives the estimate of the mean, degrees of freedom, and 95 percent confidence interval on the mean for each constituent that had 50 percent or more of their reported values greater than the detection limit.

Table B3-11. Ninety Five Percent Percent Two-Sided Confidence Interval For The Mean Concentration Based On 1998 Data from Solid Grab Samples.

Analyte	Method	Mean	df	LL	UL	Units
Ammonium Ion by IC*	IC:W	2.52E+02	5	6.96E+01	4.35E+02	µg/g
Bulk density	Bulk Density	1.63E+06	2	1.32E+06	1.94E+06	µg/mL
Percent Water	DSC/TGA	4.78E+01	5	4.53E+01	5.02E+01	%

Note:

* a "less than" value was used in the calculation

Means and Confidence Intervals

Liquid Data

Two ANOVA models were fit to the data from the liquid portion of the core and grab sample. Mean values, and 95 percent confidence intervals on the mean, were determined from the ANOVA.

The first ANOVA was fit to the liquid data from segment 1 of core 232. Segment one of this core had sufficient liquid to perform an analysis for the Compatibility DQO. Because the liquid samples were not altered prior to analysis, concentration estimates for the liquid portion of the data are given in this section. The solid portion of core 232 was analyzed for the *Tank 241-S-102 Retained Gas Sampler System and Analysis Plan* (TSAP) (McCain 1998). These data were not used to estimate the concentrations of constituents in the tank waste because the sample preparation in retained gas analysis made the samples unsuitable. The ANOVA model for the liquid data used one variance component. The variance component represents concentration differences between analytical replicates.

The model is:

$$Y_i = \mu + A_i,$$

$$i=1,2,\ldots,n;$$

where

Y_i = concentration from the ith analytical result

μ = the mean

A_i = the analytical error

n = the number of analytical results.

The variables A_i is assumed to be normally distributed with mean zero and variance $\sigma^2(A)$. The estimate of μ is the sample mean, the estimate of $\sigma^2(A)$ is the sample variance, and the *df* associated with the standard deviation of the mean is the number of observations minus one. Table B3-12 gives the estimate of the mean, degrees of freedom, and 95 percent confidence interval on the mean for each constituent that had 50 percent or more of their reported values greater than the detection limit. The data were from the tank samples. For this ANOVA the degrees of freedom are the number of observations minus one.

Table B3-12. Ninety Five Percent Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Liquid Samples from Core 232. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP	2.72E+04	1	2.34E+04	3.10E+04	µg/mL
Americium-241	Am-241	2.81E-04	1	2.81E-04	2.81E-04	µCi/mL
Ammonia	Ion Sel. Electrode (NH3)	2.96E+01	1	0.00E+00	9.50E+01	µg/mL
Antimony*	ICP	<3.61E+01	n/a	n/a	n/a	µg/mL
Arsenic*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Barium*	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Beryllium*	ICP	<3.00E+00	n/a	n/a	n/a	µg/mL
Bismuth*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Boron	ICP	6.78E+01	1	6.09E+01	7.48E+01	µg/mL

Table B3-12. Ninety Five Percent Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Liquid Samples from Core 232. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Bromide*	IC	<6.44E+02	n/a	n/a	n/a	µg/mL
Cadmium*	ICP	<3.00E+00	n/a	n/a	n/a	µg/mL
Calcium*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Cerium*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Cesium-137	GEA	3.08E+02	1	3.01E+02	3.14E+02	µCi/mL
Chloride	IC	9.09E+03	1	8.98E+03	9.20E+03	µg/mL
Chromium	ICP	4.64E+02	1	3.81E+02	5.46E+02	µg/mL
Cobalt*	ICP	<1.20E+01	n/a	n/a	n/a	µg/mL
Cobalt-60*	GEA	<3.89E-03	n/a	n/a	n/a	µCi/mL
Copper*	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Fluoride*	IC	<6.18E+01	n/a	n/a	n/a	µg/mL
Hydroxide	OH Direct	3.76E+04	1	3.31E+04	4.20E+04	µg/mL
Iron*	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Lanthanum*	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Lead*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Lithium*	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Magnesium*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Manganese*	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Molybdenum	ICP	9.28E+01	1	7.56E+01	1.10E+02	µg/mL
Neodymium*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Nickel*	ICP	<1.20E+01	n/a	n/a	n/a	µg/mL
Nitrate	IC	2.01E+05	1	1.72E+05	2.29E+05	µg/mL
Nitrite	IC	1.00E+05	1	9.65E+04	1.04E+05	µg/mL
Oxalate*	IC	5.61E+02	1	3.00E+02	8.23E+02	µg/mL
Percent Water	DSC/TGA	5.10E+01	1	4.46E+01	5.74E+01	%
PH Measurement	PH	1.38E+01	1	1.33E+01	1.43E+01	Unitless
Phosphate	IC	3.14E+03	1	3.01E+03	3.27E+03	µg/mL
Phosphorus	ICP	9.09E+02	1	7.44E+02	1.07E+03	µg/mL
Plutonium-239/40*	PU239/240	3.29E-05	1	1.32E-05	5.25E-05	µCi/mL

Table B3-12. Ninety Five Percent Percent Two-Sided Confidence Interval for the Mean Concentration Based on Data from Liquid Samples from Core 232. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Potassium	ICP	2.70E+03	1	2.19E+03	3.21E+03	µg/mL
Samarium*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Selenium*	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Silicon	ICP	1.29E+02	1	1.22E+02	1.35E+02	µg/mL
Silver	ICP	1.55E+01	1	1.42E+01	1.68E+01	µg/mL
Sodium	ICP	2.14E+05	1	1.89E+05	2.39E+05	µg/mL
Specific gravity	SpG	1.40E+00	1	1.14E+00	1.66E+00	Unitless
Strontium*	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Strontium-89/90	Sr	2.94E-01	1	2.69E-01	3.19E-01	µCi/mL
Sulfate	IC	4.66E+03	1	4.53E+03	4.79E+03	µg/mL
Sulfur	ICP	1.75E+03	1	1.50E+03	2.00E+03	µg/mL
Thallium*	ICP	<1.20E+02	n/a	n/a	n/a	µg/mL
Titanium*	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Total inorganic carbon	TIC/TOC	4.22E+03	1	4.09E+03	4.35E+03	µg/mL
Total organic carbon	TIC/TOC	3.01E+03	1	2.88E+03	3.14E+03	µg/mL
U-233 by ICP/MS*	ICP/MS	<7.39E-01	n/a	n/a	n/a	µg/mL
U-234 by ICP/MS*	ICP/MS	<6.51E-01	n/a	n/a	n/a	µg/mL
U-235 by ICP/MS*	ICP/MS	<8.37E-01	n/a	n/a	n/a	µg/mL
U-236 by ICP/MS*	ICP/MS	<6.29E-01	n/a	n/a	n/a	µg/mL
Uranium*	ICP	<3.00E+02	n/a	n/a	n/a	µg/mL
Uranium-238	ICP/MS	1.44E+00	1	7.98E-01	2.08E+00	µg/mL
Vanadium*	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Zinc*	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Zirconium*	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL

Note:

MS = mass spectrometry

* a "less than" value was used in the calculation

The same ANOVA that was fit to the liquid portion of the core 232 sample was fit to the 1998 grab sample data. Table B3-13 gives the estimate of the mean, degrees of freedom, and 95 percent confidence interval on the mean for each constituent that had 50 percent or more of their reported values greater than the detection limit.

Table B3-13. Ninety Five Percent Percent Two-Sided Confidence Interval for the Mean Concentration based on the 1998 Grab Sample Data.

Analyte	Method	Mean	df	LL	UL	Units
Ammonium Ion by IC*	IC	<2.22E+01	n/a	n/a	n/a	µg/mL
Percent Water	DSC/TGA	4.92E+01	5	4.73E+01	5.10E+01	%
Specific gravity	SpG	1.44E+00	5	1.35E+00	1.52E+00	Unitless

Note:

* a "less than" value was used in the calculation

An ANOVA with four variance components was fit to the data from the liquid portion of the core segment samples. This ANOVA model is identical to the model fit to the solid portion of these samples. Table B3-14 gives the estimate of the mean, degrees of freedom, and 95 percent confidence interval on the mean for each constituent that had 50 percent or more of their reported values greater than the detection limit.

Some analytes had results that were below the detection limit. In these cases the value of the detection limit was used for non-detected results. For analytes with a majority of results below the detection limit, a simple average is all that is reported.

Table B3-14. Ninety Five Percent Percent Two-Sided Confidence Interval for the Mean Concentration Based on the Data from Liquid Subdivision Samples.. (3 sheets)

Analyte	Method	Mean	*df*	LL	UL	Units
Aluminum	ICP	4.35E+04	1	0.00E+00	1.51E+05	µg/mL
Antimony*	ICP	<4.61E+01	n/a	n/a	n/a	µg/mL
Arsenic*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Barium*	ICP	<3.84E+01	n/a	n/a	n/a	µg/mL
Beryllium*	ICP	<3.83E+00	n/a	n/a	n/a	µg/mL
Bismuth*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Boron*	ICP	7.84E+01	1	0.00E+00	2.03E+02	µg/mL

Table B3-14. Ninety Five Percent Percent Two-Sided Confidence Interval for the Mean Concentration Based on the Data from Liquid Subdivision Samples:. (3 sheets)

Analyte	Method	Mean	*df*	LL	UL	Units
Bromide*	IC	<2.74E+03	n/a	n/a	n/a	µg/mL
Cadmium*	ICP	<3.83E+00	n/a	n/a	n/a	µg/mL
Calcium*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Cerium*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Chloride	IC	1.02E+04	1	0.00E+00	3.01E+04	µg/mL
Chromium	ICP	9.67E+01	1	0.00E+00	5.35E+02	µg/mL
Cobalt*	ICP	<1.53E+01	n/a	n/a	n/a	µg/mL
Copper*	ICP	<3.23E+01	n/a	n/a	n/a	µg/mL
Fluoride*	IC	<3.14E+02	n/a	n/a	n/a	µg/mL
Gross alpha*	Alpha Rad	<1.26E-02	n/a	n/a	n/a	µCi/mL
Iron*	ICP	<3.84E+01	n/a	n/a	n/a	µg/mL
Lanthanum*	ICP	<3.84E+01	n/a	n/a	n/a	µg/mL
Lead*	ICP	<7.68E+01	n/a	n/a	n/a	µg/mL
Lithium*	ICP	<7.67E+00	n/a	n/a	n/a	µg/mL
Magnesium*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Manganese*	ICP	<7.67E+00	n/a	n/a	n/a	µg/mL
Molybdenum	ICP	1.11E+02	1	0.00E+00	3.45E+02	µg/mL
Neodymium*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Nickel*	ICP	<1.57E+01	n/a	n/a	n/a	µg/mL
Nitrate	IC	1.59E+05	1	0.00E+00	6.62E+05	µg/mL
Nitrite	IC	1.12E+05	1	0.00E+00	3.10E+05	µg/mL
Oxalate*	IC	<9.22E+02	n/a	n/a	n/a	µg/mL
Phosphate	IC	4.88E+03	1	0.00E+00	1.06E+04	µg/mL
Phosphorus	ICP	1.33E+03	1	0.00E+00	4.05E+03	µg/mL
Potassium	ICP	3.19E+03	1	0.00E+00	9.34E+03	µg/mL
Samarium*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Selenium*	ICP	<7.67E+01	n/a	n/a	n/a	µg/mL
Silicon	ICP	3.95E+02	1	0.00E+00	3.34E+03	µg/mL
Silver	ICP	1.63E+01	1	0.00E+00	3.44E+01	µg/mL

Table B3-14. Ninety Five Percent Percent Two-Sided Confidence Interval for the Mean Concentration Based on the Data from Liquid Subdivision Samples.: (3 sheets)

Analyte	**Method**	**Mean**	*df*	**LL**	**UL**	**Units**
Sodium	ICP	2.32E+05	1	1.15E+03	4.64E+05	µg/mL
Specific gravity	SpG	1.39E+00	1	1.34E+00	1.43E+00	unitless
Strontium*	ICP	<7.67E+00	n/a	n/a	n/a	µg/mL
Sulfate	IC	4.61E+03	1	0.00E+00	1.48E+04	µg/mL
Sulfur	ICP	1.34E+03	1	0.00E+00	5.89E+03	µg/mL
Thallium*	ICP	<1.53E+02	n/a	n/a	n/a	µg/mL
Titanium*	ICP	<7.67E+00	n/a	n/a	n/a	µg/mL
Total inorganic carbon	TIC/TOC	3.80E+03	1	0.00E+00	1.06E+04	µg/g
Total organic carbon	TIC/TOC	4.15E+03	1	2.89E+03	5.41E+03	µg/g
Uranium*	ICP	<3.83E+02	n/a	n/a	n/a	µg/mL
Vanadium*	ICP	<3.84E+01	n/a	n/a	n/a	µg/mL
Zinc	ICP	8.61E+01	1	0.00E+00	6.15E+02	µg/mL
Zirconium*	ICP	<7.67E+00	n/a	n/a	n/a	µg/mL

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

Appendix C documents the results of the analyses and statistical and numerical manipulations required by the DQOs applicable to tank 241-S-102. The analyses required for tank 241-S-102 are reported as follows:

- **Section C1.0**: Statistical analysis and numerical manipulations supporting the safety screening DQO (Dukelow et al. 1995)
- **Section C2.0**: Gateway analysis for the historical model DQO (Simpson and McCain 1997)
- **Section 3.0**: Analysis for hydrostatic head fluid contamination
- **Section C4.0**: Appendix C references.

C1.0 STATISTICS FOR THE SAFETY SCREENING DATA QUALITY OBJECTIVE

The safety screening DQO (Dukelow et al. 1995) defines decision limits in terms of one-sided 95 percent confidence intervals. The safety screening DQO limits are 32 μCi/g for gross alpha and 480 Joules/g for DSC.

Confidence intervals were calculated for the mean values from each laboratory sample. The data used in the computations was from the data package of the 1996 core sampling events (Fritts 1996). Table C1-1 has the Gross Alpha results. The DSC results are in Table C1-2.

The upper limit (UL) of a one-sided 95 percent confidence interval on the mean is

$$\text{UL: } \hat{\mu} + t_{(df,0.05)}\, \hat{\sigma}(\hat{\mu})$$

In this equation, $\hat{\mu}$ is the arithmetic mean of the data, $\hat{\sigma}(\hat{\mu})$ is the estimate of the standard deviation of the mean, and $t_{(df,0.05)}$ is the quantile from Student's t distribution with *df* degrees of freedom. The degrees of freedom equals the number of samples minus one.

For sample numbers with at least one value above the detection limit, the upper limit of a 95 percent confidence interval is given in Table C1-1. Each confidence interval can be used to make the following statement. If the upper limit is less than 32 μCi/g (44.5 μCi/mL for drainable liquid), then one would reject the null hypothesis that the alpha is greater than or equal to 32 μCi/g (44.5 μCi/mL for drainable liquid) at the 0.05 level of significance.

Ninety of the 102 gross alpha results were above the detection limit. The maximum gross alpha result was 1.81 µCi/g, from the duplicate result of core 130, segment 8A. The UL closest to the threshold was 1.94E+00 µCi/g, for core 130, segment 8A, second quarter. This is well below the limit of 32 µCi/g. For the single drainable liquid sample (core 125, segment 11) the UL was 2.12E-02, which is below the limit 44.5 µCi/mL. Therefore, there is no criticality hazard associated with this tank.

Table C1-1. 95 Percent Upper Confidence Limits for Gross Alpha. (2 sheets)

Lab Sample ID	Description	µ	*df*	UL	Units
S96T000634*	Core 125, segment 11	1.34E-02	1	2.12E-02	µCi/mL
S96T000861F	Core 125, segment 2, upper half	3.28E-02	1	4.25E-02	µCi/g
S96T000862F	Core 125, segment 3, upper half	8.79E-03	1	1.18E-02	µCi/g
S96T000863F	Core 125, segment 4, upper half	7.33E-03	1	1.18E-02	µCi/g
S96T000864F	Core 125, segment 4, lower half	2.45E-02	1	3.46E-02	µCi/g
S96T000865F	Core 125, segment 5, upper half	8.56E-03	1	2.21E-02	µCi/g
S96T000866F	Core 125, segment 5, lower half	1.03E-02	1	2.22E-02	µCi/g
S96T000867F	Core 125, segment 6, top quarter	7.25E-03	1	7.60E-03	µCi/g
S96T000868F	Core 125, segment 6, second quarter	4.11E-02	1	6.51E-02	µCi/g
S96T000869F	Core 125, segment 6, third quarter	7.18E-03	1	1.12E-02	µCi/g
S96T000870F	Core 125, segment 7, upper half	3.10E-02	1	3.76E-02	µCi/g
S96T000871F	Core 125, segment 7, lower half	2.54E-02	1	4.16E-02	µCi/g
S96T000872F	Core 125, segment 8, upper half	7.51E-02	1	1.38E-01	µCi/g
S96T000873F	Core 125, segment 8, lower half	2.70E-01	1	3.68E-01	µCi/g
S96T000874F	Core 125, segment 9, upper half	7.00E-01	1	1.12E+00	µCi/g
S96T000875F	Core 125, segment 9, lower half	1.90E-01	1	3.07E-01	µCi/g
S96T000876F	Core 125, segment 10, upper half	4.65E-01	1	5.79E-01	µCi/g
S96T000877F	Core 125, segment 10, lower half	5.35E-01	1	8.00E-01	µCi/g
S96T000878F*	Core 125, segment 11, upper half	4.15E-02	1	6.04E-02	µCi/g
S96T000879F	Core 125, core composite	2.76E-02	1	5.76E-02	µCi/g
S96T000880F	Core 125, core composite	5.28E-01	1	5.37E-01	µCi/g
S96T001173F	Core 130, segment 2, upper half	4.01E-02	1	4.33E-02	µCi/g
S96T001174F	Core 130, segment 3, upper half	1.58E-02	1	1.86E-02	µCi/g
S96T001175F	Core 130, segment 4, upper half	1.34E-02	1	2.03E-02	µCi/g
S96T001176F	Core 130, segment 5, top quarter	4.24E-03	1	5.59E-03	µCi/g
S96T001177F	Core 130, segment 5, second quarter	9.26E-03	1	9.95E-03	µCi/g
S96T001178F	Core 130, segment 5, third quarter	2.05E-02	1	2.46E-02	µCi/g

Table C1-1. 95 Percent Upper Confidence Limits for Gross Alpha. (2 sheets)

Lab Sample ID	Description	μ	*df*	UL	Units
S96T001179F	Core 130, segment 6, upper half	7.68E-02	1	8.27E-02	μCi/g
S96T001180F	Core 130, segment 6, lower half	1.01E-02	1	1.89E-02	μCi/g
S96T001465F	Core 130, segment 6A, upper half	1.52E-02	1	5.63E-02	μCi/g
S96T001466F	Core 130, segment 6B, upper half	1.64E-02	1	3.82E-02	μCi/g
S96T001467F	Core 130, segment 6B, lower half	1.66E-02	1	2.35E-02	μCi/g
S96T001468F	Core 130, segment 7, upper half	2.18E-02	1	3.44E-02	μCi/g
S96T001469F	Core 130, segment 8, upper half	2.80E-02	1	6.37E-02	μCi/g
S96T001470F	Core 130, segment 8A top quarter	1.70E-01	1	2.08E-01	μCi/g
S96T001471F	Core 130, segment 8A, second quarter	1.78E+00	1	1.94E+00	μCi/g
S96T001472F	Core 130, segment 8A third quarter	1.85E-01	1	2.54E-01	μCi/g
S96T001473F	Core 130, segment 9, upper half	1.74E-01	1	2.60E-01	μCi/g
S96T001474F	Core 130, segment 9, lower half	1.32E-01	1	1.51E-01	μCi/g
S96T001475F	Core 130, segment 10, upper half	2.36E-01	1	3.03E-01	μCi/g
S96T001476F	Core 130, segment 10, lower half	6.01E-01	1	6.93E-01	μCi/g
S96T001477F	Core 130, segment 11, upper half	6.84E-01	1	9.55E-01	μCi/g
S96T001478F	Core 130, segment 11, lower half	1.28E-01	1	1.60E-01	μCi/g
S96T001583F	Core 130, core composite	2.16E-02	1	2.26E-02	μCi/g
S96T001584F	Core 130, core composite	2.63E-01	1	3.51E-01	μCi/g
S96T001585F	Core 130, core composite	2.48E-01	1	3.24E-01	μCi/g

Note:

* a "less than" value was used in the calculations

Fifty-six of the 111 DSC results had no exothermic reaction. The maximum value was 306 Joules per gram dry weight, from core 130, segment 5. For those samples with at least one exothermic value, a 95 percent upper confidence limit is given in Table C1-2. All of the results are expressed on a dry weight (DW) basis. Each confidence interval can be used to make the following statement. If the upper limit is less than 480 Joules/g, then one would reject the null hypothesis that DSC is greater than or equal to 480 Joules/g at the 0.05 level of significance. The maximum upper limit to a 95 percent CI on the mean for DSC was 3.85E+02. This is below

the threshold limit of 480 J/g. Therefore, propagating exothermic reactions are not a credible hazard in this tank.

Table C1-2. 95 Percent Upper Confidence Limits for DSC. (2 sheets)

Lab Sample ID	Description	$\hat{\mu}$	*df*	UL	Units
S95T001184	Grab sample	9.01E+01	1	1.15E+02	J/g DW
S95T001186	Grab sample	1.15E+02	1	1.20E+02	J/g DW
S96T000634	Core 125, segment 11	1.25E+02	1	1.78E+02	J/g DW
S96T000759	Core 125, segment 5, upper half	4.59E+01	1	6.07E+01	J/g DW
S96T000760	Core 125, segment 5, lower half	5.33E+01	1	6.17E+01	J/g DW
S96T000762	Core 125, segment 6, second quarter	7.03E+01	1	8.87E+01	J/g DW
S96T000763	Core 125, segment 6, third quarter	3.94E+01	1	4.44E+01	J/g DW
S96T000767	Core 125, segment 8, lower half	1.86E+02	1	2.44E+02	J/g DW
S96T000768	Core 125, segment 9, upper half	4.85E+01	1	5.11E+01	J/g DW
S96T000769	Core 125, segment 9, lower half	5.02E+01	1	1.37E+02	J/g DW
S96T000770	Core 125, segment 10, upper half	2.41E+02	1	2.61E+02	J/g DW
S96T000771	Core 125, segment 10, lower half	2.16E+02	1	2.37E+02	J/g DW
S96T000777	Core 125, core composite	2.44E+01	1	3.04E+01	J/g DW
S96T001125	Core 130, segment 5	2.91E+02	1	3.85E+02	J/g DW
S96T001141	Core 130, segment 2, upper half	2.56E+00	2	4.24E+00	J/g DW
S96T001146	Core 130, segment 4, upper half	3.26E+01	1	5.24E+01	J/g DW
S96T001147	Core 130, segment 5, top quarter	2.49E+01	1	3.49E+01	J/g DW
S96T001382	Core 130, segment 6A	2.14E+02	1	2.68E+02	J/g DW
S96T001383	Core 130, segment 6A	2.08E+02	1	3.27E+02	J/g DW
S96T001429	Core 130, segment 8A, top quarter	8.40E+01	1	9.11E+01	J/g DW
S96T001430	Core 130, segment 8A, second quarter	5.63E+01	1	9.77E+01	J/g DW
S96T001431	Core 130, Segment 8A, third quarter	2.06E+01	1	2.59E+01	J/g DW

Table C1-2. 95 Percent Upper Confidence Limits for DSC. (2 sheets)

Lab Sample ID	Description	$\hat{\mu}$	*df*	UL	Units
S96T001432	Core 130, segment 10, upper half	1.15E+02	1	1.51E+02	J/g DW
S96T001433	Core 130, segment 10, lower half	1.36E+02	1	2.34E+02	J/g DW
S96T001434	Core 130, segment 11, upper half	5.17E+01	1	1.17E+02	J/g DW
S96T001442	Core 130, segment 9, lower half	2.71E+01	1	3.53E+01	J/g DW
S98T002514	Core 232, segment 1,	9.06E+01	1	9.44E+01	J/g DW

Note:

DW = dry weight

C2.0 GATEWAY ANALYSIS FOR HISTORICAL MODEL DATA QUALITY OBJECTIVE

C2.1 HISTORICAL MODEL EVALUATION

The primary objective of the historical model evaluation DQO is to acquire adequate information through selective tank sampling to quantify the errors associated with predicting tank waste composition based on waste transaction history and waste type compositions (Simpson and McCain 1997). The DQO identifies key waste components and their characteristic concentrations for certain waste types. It assumes waste types can be identified as distinct layers in the tanks.

The first step in the evaluation is to compare the analytical results with DQO-defined concentration levels for a selected number of analytes. This ensures that the predicted waste type may be in the tank at the predicted location. If the analytical results are $\geq$10 percent of the DQO levels (ratio of 0.1 or more), the waste type and layer identification are considered acceptable for further investigation, and additional analyses are requested on selected segments and composite samples (Simpson and McCain 1997).

The most recent version of the historical DQO (Simpson and McCain 1997) identifies tank 241-S-102 as having only a thick layer of SMMS1 saltcake waste. Although tank 241-S-102 was not listed as a priority tank in Simpson and McCain (1997), it is the most acceptable alternative for tank 241-U-109. Except for a heel of R1 sludge, Agnew et al. (1997) predicts that the solids in tank 241-S-102 are comprised of SMMS1 and SMMS2 saltcakes. Only the solid segments were considered for the present gateway analysis. Table C2-1 compares the expected and measured concentrations for the SMMS1 saltcake in core 125 and core 130 solids samples.

Table C2-1. Tank 241-S-102 Historical Model Evaluation for SMMS1. (2 sheets).

Core: Segment	Fingerprint Analytes (% by Weight)								Analytes >10% of Expected?
	Na	Al	NO_3	SO_4	Cr	CO_3	H_2O	Total	
125:2 upper half	21.2	0.7	52.1	1.02	0.19	2.17	14.8	92.2	Yes
125:3 upper half	21.4	0.45	64	0.67	0.15	1.15	8.07	95.9	Yes
125:4 upper half	21.3	0.63	60.4	0.57	0.096	0.09	10.2	93.3	No
125:4 lower half	21.1	1.08	40.8	0.89	0.29	2.97	16.96	84.1	Yes
125:5 upper half	21.7	0.61	63.1	0.66	0.14	2.2	8.31	96.7	Yes
125:5 lower half	20.5	1.02	48.9	0.8	0.2	1.96	17.1	90.5	Yes
125:6 A	21.8	0.22	39.9	0.46	0.089	1.59	5.2	69.3	No
125:6 B	20.3	1.43	29.6	1.17	0.44	4.17	24.5	81.6	Yes
125:6 C	20.4	0.88	59.1	0.53	0.11	0.97	12.2	94.2	Yes
125:7 upper half	19.1	1.52	26.9	1.17	0.34	6.7	33.9	89.6	Yes
125:7 lower half	19.9	1.5	35	0.81	0.26	5.05	30.1	92.6	Yes
125:8 upper half	20.2	1.94	14.9	0.53	0.32	7.7	35.6	81.2	Yes
125:8 lower half	19.3	1.14	4.59	1	0.29	1.5	40.5	68.3[1]	Yes
125:9 upper half	18.3	1.26	5.54	1.81	0.58	4.2	39.7	71.4[1]	Yes
125:9 lower half	18.4	1.34	7.17	2.43	0.3	4.3	42.1	76.0[1]	Yes
125:10 upper half	18.5	1.48	5.47	1.2	0.68	2.3	41.8	71.4[1]	Yes
125:10 lower half	17.4	1.32	2.53	0.12	0.59	0.58	42.5	65.0[1]	No[1]
125:11 upper half	5.9	2.84	4.11	0.07	0.08	0.41	17.7	31.1[1]	No[1]
130:2 upper half	20.3	1.02	46.8	0.99	0.17	3.75	14.04	87.1	Yes
130:3 upper half	22.3	0.43	61.9	1.08	0.15	2.17	5.8	93.8	Yes
130:4 upper half	21.5	0.75	57.8	1.01	0.16	1.78	12.6	95.6	Yes
130:5 A	19.8	1.11	52	0.56	0.045	0.81	17.4	91.7	Yes
130:5 B	20	1.17	27.5	1.22	0.12	1.79	19.9	71.7[1]	Yes
130:5 C	18.5	1.6	46.1	0.79	0.19	4.35	29	100.5	Yes
130:6 upper half	19	1.48	41.4	0.94	0.32	1.72	24.6	89.5	Yes
130:6 lower half	18.3	1.53	42.2	0.87	0.1	1.97	27.1	92.1	Yes
130:6A upper half	19.1	1.1	54.7	0.98	0.14	2.25	16.3	94.6	Yes
130:6B upper half	23.4	0.74	60.2	0.61	0.11	1.39	14	100.5	Yes

Table C2-1. Tank 241-S-102 Historical Model Evaluation for SMMS1. (2 sheets).

Core: Segment	Fingerprint Analytes (% by Weight)								Analytes >10% of Expected?
	Na	Al	NO_3	SO_4	Cr	CO_3	H_2O	Total	
130:6B lower half	23.4	0.7	54.1	0.4	0.15	1.49	12.9	93.1	Yes
130:7 upper half	19.5	1.32	31.8	0.91	0.26	3.73	12.5	70.0[1]	Yes
130:8 upper half	22.7	1.51	38	0.57	0.27	3.94	22.5	89.5	Yes
130:9 upper half	20.5	1.28	5.03	1.71	0.36	2.53	41.3	72.7[1]	Yes
130:9 lower half	18.2	1.07	4.71	1.47	0.25	2.8	42.6	71.1[1]	Yes
130:10 upper half	18.2	1.37	5.3	1.32	0.34	3.18	42.4	72.1[1]	Yes
130:10 lower half	17.3	1.63	5.94	0.92	0.54	2.59	44.5	73.4[1]	Yes
130:11 upper half	19.4	1.35	4.55	1.12	0.88	2.13	40.3	69.7[1]	Yes
130:11 lower half	10.6	4.18	4.84	0.22	0.3	0.54	22.2	42.9[1]	Yes
Expected for SMMS1[2]	19.54	3.10	27.43	1.30	0.30	1.70	32.1	85.5	---

Note:

[1]Less than 85 percent of total mass or analyte is less than 10% of expectation. Segment fails the gateway analysis.

[2]Simpson and McCain (1997)

Although Hanlon (1999) and Agnew et al., (1997) indicate that the SMMS1 saltcake occupies approximately the bottom four segments of the waste (volume = 772 kL [204 kgal]), the gateway analysis has been performed for all the segments of cores 125 and 130. It can be seen from the table that the majority of the bottom segments of both cores, where SMMS1 saltcake is expected to reside in the tank, failed the gateway analysis. Surprisingly, the majority of the top segments of cores 125 and 130 passed the gateway analysis for SMMS1 saltcake. This could mean several things. To begin with, it is possible that the analytes and the concentrations selected for the waste type SMMS1 may be somewhat in error. It is also possible that certain amount of mixing of the waste types, viz., SMMS1, SMMS2 and R1 sludge, had taken place leading to analyte concentrations in the upper segments closely resembling that of SMMS1 saltcake, and those in the lower segments to deviate from the SMMS1 saltcake concentrations. In addition, there is a remote possibility that there is more than the 15.1 kL (4 kgal) of sludge in tank 241-S-102 causing the analyte concentrations in the bottom segments to deviate from those of SMMS1 saltcake.

Support for mixing of waste types and/or the possible presence of a larger quantity of sludge than predicted is also obtained from the extrusion data for core 130 in Table B2-2 of Appendix B of this report. The laboratory reported that the solids extracted from the extruded waste from segments 9, 10, and 11 resembled the sludge. It should also be noted that though the

244-S evaporator campaigns that led to the production of SMMS1 and SMMS2 saltcakes were carried out at two distinctly different time periods, the concentrations of the two waste types may be quite similar. In fact, this assumption was made to calculate the best basis inventories in Appendix D of this report.

Assuming the choice made by the historical DQO model in the selection of gateway analytes and concentrations for SMMS1 is correct, and also assuming that SMMS1 saltcake is present in the top segments of the tank, the majority of the top segments from both cores appear to be representative of the SMMS1 saltcake. Therefore, a full suite of analyses is recommended from segment 7, core 125 and segment 6, core 130.

C3.0 ANALYSIS FOR HYDROSTATIC HEAD FLUID CONTAMINATION

Water was used as an HHF in the acquisition of cores 125 and 130. Lithium bromide was added to the HHF to act as a tracer. Composite and segment analyses for lithium and bromide were performed in accordance with the sampling and analysis plan (Eggers 1996) to detect contamination of the waste samples with HHF.

C3.1 LITHIUM

None of the sample results for lithium exceeded 100 μg/g. However, some of the sample results for bromide showed high values because of probable intrusion of HHF into these samples. Therefore, Table C3-1 lists the lithium values of samples from the same segments as the samples for which high bromide values were recorded (see Table C3-2).

Table C3-1. Tank 241- S-102 Lithium Results.

Sample Number	Core:Segment Portion	Average Lithium
Solids		**(μg/g)**
S96T000912	125:6 A	72.6
S96T000915	125:7 upper half	60.7
S96T000916	125:7 lower half	35.2
Drainable liquid		**(μg/mL)**
S96T000773	125:7 drainable liquid	< 8.63

C3.2 BROMIDE

The bromide analytical data for samples from the segments listed in Table C3-1 are shown in Table C3-2. The results in Table C3-2 indicate the greatest HHF intrusion occurred in the drainable liquid sample of core 125, segment 7. Hydrostatic head fluid in this segment appears to have intruded into the upper and lower half solid samples. In addition, HHF intrusion is also evident in the solid sample of core 125, segment 6A. The amount of HHF contamination in both solid and liquid samples was determined using the approach outlined in Winkelman (1996). Corrected water content for each of these samples is shown in Table C3-3. The results indicate that HHF intrusion was significant (>10% of total water content) for all these samples.

Table C3-2. Tank 241-S-102 Bromide Results.

Sample Number	Core:Segment Portion	Average Bromide
Solids		**(µg/g)**
S96T000890	125:6 A	3,305
S96T000893	125:7 upper half	2,817
S96T000894	125:7 lower half	2,599
Drainable liquid		**(µg/mL)**
S96T000773	125:7 drainable liquid	8,896

Table C3-3. Correction to Thermogravimetric Analysis Results as a Result of Hydrostatic Head Fluid Contamination.

Core: Segment Portion	TGA Result (%)	Corrected TGA Result (%) (Based on Bromide)
Solids		
125:6 A	5.2	0
125:7 upper half	33.9	25.3
125:7 lower half	30.1	21.8
Drainable liquid		
125:7 drainable liquid	53	36.5

C4.0 APPENDIX C REFERENCES

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-S-102

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-S-102

An effort is underway to provide waste inventory estimates that will serve as standard characterization source terms for the various waste management activities (Hodgson and LeClair 1996). As part of this effort, an evaluation of available information for single-shell tank 241-S-102 was performed, and a best-basis inventory was established. This work, detailed in the following sections, follows the methodology that was established by the standard inventory task.

D1.0 CHEMICAL INFORMATION SOURCES

Available waste (chemical) information for tank 241-S-102 include the following:

- Data from two push mode cores, taken in 1996. See Appendix B of this Tank Characterization Report.
- Data from the three liquid grab samples taken in 1998. See Appendix B of this Tank Characterization Report.
- Data from push mode core sample taken in 1998. See Appendix B of this Tank Characterization Report.
- Data from the two liquid grab samples taken in 1995. See Appendix B of this Tank Characterization Report.
- The inventory estimate for this tank (Agnew et al. 1997) generated from the HDW, which is referred to as the Los Alamos National Laboratory (LANL) model and as the HTCE. The HDW term will be used in this appendix.
- Data from TCRs for other tanks with the same Supernatant Mixing Model 242-S Evaporator saltcake (1973-1976) (SMMS1) waste type (tank 241-S-101 [Kruger-et al. 1996], tank 241-U-106 [Brown et al. 1997], and tank 241-U-109 [Baldwin and Stephens 1996]).
- Data from TCRs for other tanks with the same Supernatant Mixing Model 242-S Evaporator saltcake (1977-1980) (SMMS2) waste type (tank 241-S-101 [Kruger et al. 1996], tank 241-U-102 [Hu et al. 1997], tank 241-U-107 [Jo et al. 1996], and tank 241-U-109 [Baldwin and Stephens 1996]).

- Data from TCRs for tanks with the same reduction and oxidation (REDOX) (R) sludge waste type (tank 241-S-101 [Kruger et al. 1996], tank 241-S-104 [DiCenso et al. 1994], and tank 241-S-107 [Simpson et al. 1996]).

In spite of all the above information sources, only the 1996 core sample data, data from tanks 241-S-101, 241-S-104, and 241-S-107 containing R sludge waste, and the HDW model were used for the best-basis inventory estimates in this report. The liquid grab sample data of 1998 could not be used because only ammonia analysis was done to provide data to estimate flammable gas concentrations in the vapor space of double-contained receiver tank during and after salt well pumping activities. The liquid grab sample data of 1995 were obtained to support the waste compatibility safety issue. Although these data included IC, ICP, TIC and TOC data, the more recent 1996 core sample data on drainable liquids were used instead for the present best-basis inventory estimates. The 1998 core sampling data were not used because valid data were only available for alternate segments. However, these data were used to calculate ^{90}Sr and ^{137}Cs inventories.

D2.0 COMPARISON OF COMPONENT INVENTORY VALUES

The previous best-basis inventories and the HDW model inventories are listed in Tables D2-1 and D2-2. Table D2-1 lists nonradioactive components on a kilogram (kg) basis, and Table D2-2 lists the radioactive components on a curie basis. The tank volume used to generate the previous best-basis inventories is 2,078 kL (549 kgal) total waste. Hanlon (1999) reports 2,078 kL (549 kgal) total waste, with a sludge layer of 15.1 kL (4 kgal), 2,063 kL (545 kgal) of saltcake (containing interstitial liquid), and no supernatant. Agnew et al. (1997) in the HDW model reports 2,078 kL (549 kgal) of total waste, 1,291 kL (341 kgal) of SMMS2 saltcake, 772 kL (204 kgal) of SMMS1 saltcake, 15.1 kL (4 kgal) of sludge. The mean density used for the previous best-basis calculations was 1.64 g/mL and the HDW model density for the total solid waste is estimated to be 1.28 g/mL. The chemical species in this appendix are reported without charge designation per the best-basis inventory convention.

Table D2-1. Previous Best-Basis Inventory and Hanford Defined Waste-Based Inventory Estimates for Nonradioactive Components in Tank 241-S-102. (2 sheets)

Analyte	Previous Best-Basis Inventory (kg)	HDW Inventory (kg)[1]	Analyte	Previous Best-Basis Inventory (kg)	HDW Inventory (kg)[1]
Al	46,400	46,200	Ni	93.4	397
Bi	237	246	NO_2	1.14E+05	1.09E+05
Ca	1,740	1,390	NO_3	1.03E+06	2.97E+05
Cl	12,000	8,190	OH	96,500	1.70E+05
Cr	9,100	7,570	Pb	282	189
F	9,030	1,100	PO_4	1.50E+05	7,660
Fe	3,130	1,420	Si	1,820	2,040

Table D2-1. Previous Best-Basis Inventory and Hanford Defined Waste-Based Inventory Estimates for Nonradioactive Components in Tank 241-S-102. (2 sheets)

Analyte	Previous Best-Basis Inventory (kg)	HDW Inventory (kg)[1]	Analyte	Previous Best-Basis Inventory (kg)	HDW Inventory (kg)[1]
Hg	0	1.65	SO_4	30,500	21,500
K	2,900	2,400	Sr	7.43	0
La	4.41	4.41	TIC as CO_3	89,000	23,800
Mn	1,040	198	TOC	11,800	10,900
Na	6.48E+05	3.11E+05	U_{TOTAL}	3,290	2,210
			Zr	62.1	20.2

Notes:
[1]Agnew et al. (1997).

Table D2-2. Previous Best-Basis Inventory and Hanford Defined Waste-Based Inventory Estimates for Radioactive Components in Tank 241-S-102.

Analyte	Previous Best-Basis Inventory (Ci)	HDW[1] Inventory Estimate (Ci)
^{90}Sr	3.10E+05	1.27E+05
^{137}Cs	4.43E+05	2.64E+05

Notes:
[1]Agnew et al. (1997), radionuclides decayed to January 1, 1994.

D3.0 COMPONENT INVENTORY EVALUATION

The following evaluation of tank contents is performed to identify potential errors and/or missing information that would influence the previous sample-based and HDW model component inventories. See Section 2.3 of this TCR for a detailed waste history of tank 241-S-102.

D3.1 EXPECTED TYPE OF WASTE BASED ON THIS EVALUATION.

Agnew et al. (1997): R, SMMS1, SMMS2
Hill et al. (1995): R, EB, DSSF

R	=	High-level REDOX waste
SMMS1	=	Supernatant Mixing Model S, (early period), a mixture of supernatant coming from the 242-S Evaporator that are a blend of other waste types that upon cooling precipitated as a saltcake
SMMS2	=	Supernatant Mixing Model S (later period), a mixture of supernatant coming from the 242-S Evaporator that are a blend of other waste types that upon cooling precipitated as a saltcake
EB	=	Evaporator bottoms (same as saltcake)
DSSF	=	Double-shell slurry feed (more selectively concentrated EB)

Agnew et al. (1997) provides estimated volumes for these waste types as does Hanlon (1999) (see Section D2.0). Agnew et al. (1997) projects a 15.1 kL (4 kgal) R sludge layer, which matches the amount of sludge predicted by Hanlon (1999). Agnew et al. (1997) predicts 1,291 kL (341 kgal) of SMMS2 saltcake and 772 kL (204 kgal) of SMMS1 saltcake, which matches the total saltcake of Hanlon (1999) of 2,063 kL (545 kgal). Hill et al. (1995) predicts DSSF either was sent on to double-shell tanks, or what was left became part of the SMMS saltcakes. The Hanlon (1999) volumes for total saltcake and sludge were used for the engineering assessment.

D3.2 INVENTORY EVALUATION

The following evaluation provides an engineering assessment of tank 241-S-102 contents. For this evaluation, the following assumptions and observations are made:

- Tank waste is assumed to be composed of three phases, viz., interstitial liquid, drained saltcake solids (saltcake solids) and sludge. The saltcake (including interstitial liquid) and sludge volumes have been assumed to be the same as those of Agnew et al. (1997) and Hanlon (1999). The volumes of saltcake solids and interstitial liquid have been estimated from the 1996 core sample extrusion data in Table B2-2.

- Only the SMMS1 and SMMS2 saltcake waste streams and the R sludge waste streams contributed to solids formation. Because of their similarities, SMMS1 and SMMS2 were considered to be the same saltcake for this evaluation.

- The analyte inventories for interstitial liquid have been estimated from analyte concentrations of drainable liquid (liquid subdivision data) from the 1996 core

sampling data. However, it should be noted that these inventories may not be fully representative of the inventories of the interstitial liquid in the tank because of solids precipitation as the sample cools from the time it is extracted (from the tank) till it is analyzed in the laboratory. Saltcake inventories have been estimated from the solid subdivision data of the 1996 core sampling effort. Sludge inventories have been estimated from concentrations of R sludge waste in tanks 241-S-101, 241-S-104, and 241-S-107.

- No radiolysis of NO_3 to NO_2 and no additions of NO_2 to the waste for corrosion purposes are factored into this evaluation.

- Although the overall total volume remains the same (549 kgal), recent salt well pumping volume estimates show 444 kgal of saltcake and 105 kgal of sludge. Conversely, other sources of tank volume information (e.g., best-basis inventory, Hanlon [1999], Agnew et al. [1997]) estimate 545 kgal of saltcake and 4 kgal of sludge. The salt well pumping volumes appear to be based on visual observation of color changes in the extruded core. Segment level evaluation of the analytes actually support the 4 kgal estimate for the sludge rather than the 105 kgal estimate. However, clustering data from Pacific National Northwest Laboratories suggest more than 4 kgal of sludge, but it is difficult to quantify because of the location of the core sample. Therefore, a sludge volume of 4 kgal was used for the current best-basis inventory estimates.

D3.3 BASIS FOR CALCULATIONS USED IN THIS ENGINEERING EVALUATION

Table D3-1 shows the engineering evaluation approaches used on tank 241-S-102.

Table D3-1. Engineering Evaluation Approaches Used On Tank 241-S-102. (2 sheets)

Type of waste	How calculated	Check method
Supernatant Volume = none predicted	None to calculate	None needed
Saltcake solids Total volume = 1,964.6 kL (519 kgal) Density = 1.68 g/mL (See Table B3-10)	Used sample-based average concentrations and density for the solid subdivisions from the 1996 core sample data. Volume estimated separate from the interstitial liquid using 1996 core sample extrusion data.	See Table D3-2

Table D3-1. Engineering Evaluation Approaches Used On Tank 241-S-102. (2 sheets)

Type of waste	How calculated	Check method
Interstitial liquid Total volume = 98.4 kL (26 kgal) Density = 1.39 g/mL (See Table B3-14)	Used sample-based average concentrations and density for the liquid subdivisions from the 1996 core sample data. Volume estimated separate from the saltcake solids using 1996 core sample extrusion data.	It should be noted that these inventories may not be fully representative of the inventories of the interstitial liquid in the tank because of solids precipitation as the sample cools from the time it is extracted (from the tank) until it is analyzed in the laboratory. See Table D3-2.
Sludge Total volume = 15.1 kL (4 kgal) Density = 1.77 g/mL	Used average concentrations from R sludge tank samples (R1 template) and density (1.77 g/mL)	Sample concentrations from other TCR based tanks with R sludge were used to predict the sludge inventories. Waste records and sample-based data for tank 241-S-102 indicate that the sludge in this tank should be similar to those used to predict the inventories. See Table D3-3.

Notes:

R = High-level REDOX waste
REDOX = Reduction and oxidation

D3.3.1 Basis for Saltcake Solids and Interstitial Liquid Calculations Used in this Engineering Evaluation

Because of their similarities, SMMS1 and SMMS2 were considered to be the same saltcake for this evaluation. Average analyte concentrations for solid subdivisions of the 1996 core sample data were used to predict the saltcake inventories. Average analyte concentrations for liquid subdivisions of the 1996 core sample data were used to predict the interstitial liquid inventories. Densities used in the calculations were averaged from the 1996 core sample data for the solid and liquid subdivisions. Saltcake solids volume was estimated separately from the interstitial liquid using 1996 core sample extrusion data. The calculations are as follows:

There were 5 subsegments of drainable liquid (DL) from cores 125 and 130. The total weight of these segments was 260.6 grams. The densities for these 5 subsegments were averaged to obtain an average DL density of 1.39 g/mL (See Table B3-14). This gave a volume of 187.48 mL for the DL. The corresponding parameters for saltcake solids are a total weight of 6292.1 grams, an average density of 1.68 g/mL (See Table B3-10) and a volume of 3745.3 mL.

Assuming the total volume of saltcake solids + DL = 545 kgal, the saltcake solids and interstitial liquid volumes were calculated as follows:

Volume of saltcake solids = (3745.3/[187.48+3745.183]) x 545 = 519 kgal.
Volume of DL = 545 – 519 = 26 kgal.

See Appendix B for analyte concentration data for the saltcake solids and interstititial liquid. These data are the same as those for the solid and liquid subdivision data from cores 125 and 130 taken in 1996. Table D3-2 gives analyte concentrations and inventories for saltcake solids and interstitial liquid. These inventories are summed with those for the sludge in Table D3-4 to obtain the total engineering assessment-based inventories. Calculations for saltcake solids are: (average concentration of analyte in μg/g) x (waste volume in kgal) x 3.785412 kL/kgal x 1 E+06 mL/kL x (density in g/mL) x kg/(1 E+09) μg = total kg for this waste type in the tank. Calculations for interstitial liquid are: (average concentration of analyte in μg/mL) x (waste volume in kgal) x 3.785412 kL/kgal x 1 E+06 mL/kL x kg/(1 E+09) μg = total kg for this waste type in the tank.

Table D3-2. Tank 241-S-102 Saltcake Solids and Interstitial Liquid - Concentrations and Inventories. (2 sheets)

Analyte	Saltcake Solids Concentration (μg/g)[1]	Saltcake Solids Inventory (kg)[2]	Interstitial Liquid Concentration (μg/mL)[3]	Interstitial Liquid Inventory (kg)[4]
Al	12,900	42,600	43,500	4,280
Bi	<74.7	<247	<76.7	<7.55
Ca	409	1,350	<76.7	<7.55
Cl	3,610	11,900	10,200	1,000
TIC as CO_3	26,400	87,100	26,400	2,600
Cr	2,920	9,640	96.7	9.52
F	<4,980	<16,400	<314	<30.9
Fe	859	2,840	<38.4	<3.78
K	838	2,770	3,190	314
La	<35.5	<117	<38.4	<3.78
Mn	388	1,280	<7.67	<0.755
Na	1.93E+05	6.37E+05	232,000	22,800
Ni	30.7	101	<15.7	<1.54
NO_2	34,200	1.13E+05	1.12E+05	11,000
NO_3	3.35E+05	1.11E+06	1.59E+05	15,600
Pb	<91.8	<303	<76.8	<7.56
PO_4	45,500	1.50E+05	4880	480
Si	462	1,520	395	38.9
SO_4	9,040	29,800	4,610	454
Sr	<7.38	<24.4	<7.67	<0.755
TOC	3,920	12,900	4,150	568

Table D3-2. Tank 241-S-102 Saltcake Solids and Interstitial Liquid - Concentrations and Inventories. (2 sheets)

Analyte	Saltcake Solids Concentration (µg/g)[1]	Saltcake Solids Inventory (kg)[2]	Interstitial Liquid Concentration (µg/mL)[3]	Interstitial Liquid Inventory (kg)[4]
U_{Total}	792	2,610	<383	<37.7
Zr	<19.5	<64.4	<7.67	<0.755
^{137}Cs	123 (µCi/g)	406,000 (Ci)	308[5] (µCi/mL)	30,300 (Ci)
^{90}Sr (µCi/g)	22 (µCi/g)	72,600 (Ci)	0.294[5] (µCi/mL)	28.9 (Ci)
Total alpha	0.167 (µCi/g)	551 (Ci)	<1.26E-02 (µCi/mL)	<1.24 (Ci)

Notes:

[1]Table B3-10

[2]Based on a density of 1.68 g/mL and a volume of 1,964.6 Kl

[3]Table B3-14

[4]Based on a density of 1.39 g/mL and a volume of 98.4 kL

[5]1998 Core 232 data from Table B3-12

D3.3.2 Basis for Sludge Calculations Used In This Engineering Evaluation

Waste records and sample-based data for tank 241-S-102 indicate that it is one of the tanks which contain R sludge. Sample concentrations from other tanks with R sludge (tanks 241-S-101 [Kruger et al. 1996], 241-S-104 [DiCenso et al. 1994], 241-S-107 [Simpson et al. 1996]) were used to predict the sludge inventories. Because this sludge data set is a standard for many tanks, it is also being used for tank 241-S-102 sludge evaluation. It is recognized that this may bias the comparison towards the sample-based data for this tank. See Table D3-3 for calculations and Table D3-4 for the total engineering assessment inventories.

Calculations for Table D3-3 are: (average concentration for the analyte in µg/g) x (waste volume in kgal) x 3.785412 kL/kgal x 1 E+06 mL/kL x (density in g/mL) x kg/(1 E+09) µg = total kg for this waste type in the tank.

Table D3-3. Tank 241-S-102 Inventory Based on Other R Sludge Tanks. (2 sheets)

Analyte	Tanks (segments) (µg/g)			Average Concentration[4] (µg/g)	R Sludge Inventory (kg)
	241-S-104[1] Total Sludge Concentration	241-S-107[2]	241-S-101[3] 7U-8L		241-S-102
Al	117,000	56,400	127,000	100,000	2,680
Bi	<45.7	n/r	<38.8	<42.3	<1.13
Ca	247	234	322	268	7.16
Cr	2,350	1,180	2,230	1,920	51.3
Fe	1,720	1,160	1,960	1,610	43.1
Pb	29.6	33	37	33.2	0.887
Mn	1,150	83	2,750	1,330	35.5
Hg	<0.126	n/r	n/r	<0.126	<3.37E-03
Ni	56	206	90.7	118	3.15
K	300	457	539	432	11.5
Si	1,330	1,060	1,360	1,250	33.4
Na	121,000	60,400	112,000	97,800	2,610
Sr	424	378	456	419	11.2
U	6,690	8,685	7,684	7,690	206
Zr	33.6	131	36	66.9	1.79
La	<2.07	n/r	<19.5	<10.8	<0.288
Cl	3,200	1,860	2,050	2,370	63.3
F	145	150	<65.7	<120	<3.21
NO_3	191,000	57,600	119,000	123,000	3,270
NO_2	25,900	34,300	31,100	30,400	813
PO_4	<2,190	1,630	1,360	<1,730	<46.2
SO_4	2,270	1,300	897	1,490	39.8
TOC	1,730	n/r	n/r	1,730	46.2
TIC is CO_3	4,140	n/r	n/r	4,140	111

Table D3-3. Tank 241-S-102 Inventory Based on Other R Sludge Tanks. (2 sheets)

Analyte	Tanks (segments) (µg/g)			Average Concentration[4] (µg/g)	R Sludge Inventory (kg)
	241-S-104[1] Total Sludge Concentration	241-S-107[2]	241-S-101[3] 7U-8L		241-S-102
Radionuclides[5] (µCi/g)					(Ci)
^{90}Sr	301	276	n/r	289	7,720
^{137}Cs	60.5	74	98	77.5	2,070
Density (g/mL)	1.64	1.90	1.77	1.77	n/a

Notes:

n/r = not reported
n/a = not applicable

[1] DiCenso et al. (1994)

[2] Statistically determined median R sludge concentrations for tank 241-S-107 contained in the attachment to Simpson et al. (1996)

[3] Kruger et al. (1996)

[4] Average of analyte concentrations for tanks 241-S-101, 241-S-104, and 241-S-107

[5] Radionuclides decayed to January 1, 1994.

The total kg of an analyte for each waste type are added in Table D3-4 to produce the total engineering assessment-based inventory for this tank. The total column is rounded to three significant figures.

Table D3-4. Tank 241-S-102 Engineering Assessment Total Inventory Calculations. (2 sheets)

Element	241-S-102 Saltcake Solids (kg)	241-S-102 Interstitial Liquid (kg)	241-S-102 Sludge (kg)	Total Tank (kg)
Al	42,600	4,280	2,680	49,500
Bi	<247	<7.55	<1.13	<256
Ca	1,350	<7.55	7.15	1,360
Cl	11,900	1,000	63.3	13,000

Table D3-4. Tank 241-S-102 Engineering Assessment Total Inventory Calculations. (2 sheets)

Element	241-S-102 Saltcake Solids (kg)	241-S-102 Interstitial Liquid (kg)	241-S-102 Sludge (kg)	Total Tank (kg)
TIC as CO_3	87,100	2,600	111	89,800
Cr	9,640	9.52	51.3	9,700
F	<16,400	<30.9	<3.21	<16,500
Fe	2,840	<3.78	43.1	<2,880
Hg	n/r	n/r	<3.37E-03	0.00
K	2,770	314	11.5	3,090
La	<117	<3.78	<0.288	<121
Mn	1,280	<0.755	35.5	1,320
Na	6.37E+05	22,800	2,610	6.62E+05
Ni	101	<1.54	3.15	106
NO_2	1.13E+05	11,000	813	1.25E+05
NO_3	1.11E+06	15,600	3,270	1.12E+06
Pb	<303	<7.56	0.887	<311
PO_4	1.50E+05	480	<46.2	1.51E+05
Si	1,520	38.9	33.4	1,600
SO_4	29,800	454	39.8	30,300
Sr	<24.4	<0.755	11.2	<36.3
TOC	12,900	568	46.2	13,600
U_{Total}	2,610	<37.7	206	2,860
Zr	<64.4	<0.755	1.79	<67.0
Radionuclides[1] (Ci)				
^{137}Cs	4.27E+05 (decayed)	31,900 (decayed)	2,070	4.61E+05
^{90}Sr	76,400 (decayed)	30.5 (decayed)	7,710	84,200

Notes:

n/r = not reported

[1]Radionuclides decayed to January 1, 1994.

D4.0 DEFINE THE BEST BASIS AND ESTABLISH COMPONENT INVENTORIES

Key waste management activities include overseeing tank farm operations and identifying, monitoring, and resolving safety issues associated with these operations and with the tank wastes. Disposal activities involve designing equipment, processes, and facilities for retrieving wastes and processing them into a form that is suitable for long-term storage/disposal. Information about chemical, radiological, and/or physical properties is used to perform safety analyses, engineering evaluations, and risk assessment associated with these activities.

Chemical and radiological inventory information is generally derived using three approaches: 1) component inventories are estimated using the results of sample analyses, 2) component inventories are predicted using the HDW model, process knowledge, and historical information, or 3) a tank-specific process estimate is made based on process flowsheets, reactor fuel data, essential material usage, and other operating data.

An evaluation of available chemical information for tank 241-S-102 was performed, including the following:

- An inventory estimate generated by the HDW model (Agnew et al. 1997)
- A sample-based inventory estimate from two push cores from 1996
- Data from the 1998 core 232 data for ^{90}Sr and ^{137}Cs inventory estimates
- An engineering evaluation of R sludge inventory based on comparisons developed by evaluation of tanks 241-S-101, 241-S-104, and 241-S-107.

Based on this evaluation, a best-basis inventory was developed for tank 241-S-102 for which sampling information was available. The sample-based evaluation inventories from tank 241 S 102, and 241-S-101, 241-S-104, and 241-S-107 was used as a basis for the engineering evaluation. The two sample-based evaluations were combined to arrive at the engineering assessment, which is chosen as the best basis for the majority of non-radioactive analytes.

The waste is assumed to contain three phases, viz., drained saltcake solids (saltcake solids), interstitial liquid and sludge. Because on their similarities, SMMS1 and SMMS2 were considered to be the same saltcake for this evaluation. Average analyte concentrations for solid subdivisions of the 1996 core sample data were used to predict the saltcake solids inventories. Average analyte concentrations for liquid subdivisions of the 1996 core sample data were used to predict the interstitial liquid inventories. Averages of the analyte concentrations from the R sludge containing tanks, viz., 241-S-101, 241-S-104, and 241-S-107 were used to predict the sludge inventories. Densities used in the calculations for saltcake solids and interstitial liquid were averaged from the 1996 core sample data for the solid and liquid subdivisions respectively. The sludge density used was the same as that used by the previous best-basis estimate. The densities used were 1.68, 1.39, and 1.77 g/mL for saltcake solids, interstitial liquid, and sludge respectively. The total volume of saltcake solids plus interstitial liquid used for the estimate was 2,063 kL (545 kgal), which is the same as the total saltcake volume of Agnew et al. (1997) and

Hanlon (1999). The saltcake solids and interstitial liquid volumes were estimated separately from this total using the 1996 core sample extrusion data. The calculated volumes for the saltcake solids and interstitial liquid were 1,965 kL (519 kgal) and 98.4 kL (26 kgal) respectively. The sludge volume used in the inventory calculations was 15.1 kL (4 kgal), which is the same as that predicted by Agnew et al. (1997) and Hanlon (1999).

For those few analytes which have "less than" values for both engineering assessment and sample-based inventories, HDW model values were used as the best basis if the HDW model value is less than both these estimates. On the other hand, if the HDW model value is more than the "less than" values of the engineering assessment and sample-based inventories, the lesser of the two "less than" values is chosen as the best basis, with the comment "upper bound". If one of the waste components has a "less than" value for an analyte and is less than 10 percent of the value of the other component (s), the total inventory is reported as the sum of values for all the components for that analyte.

The total alpha value from the 1996 core sample data for solids and the total uranium value were used to estimate inventories of the alpha contributing radionuclides and nuclides based on uranium. The same isotopic ratios listed in the HDW model were used for the calculations.

Best-basis tank inventory values are derived for 46 key radionuclides (as defined in Section 3.1 of Kupfer et al. 1998), all decayed to a common report date of January 1, 1994. Often, waste sample analyses have only reported ^{90}Sr, ^{137}Cs, $^{239/240}Pu$, and total uranium (or total beta and total alpha) while other key radionuclides such as ^{60}Co, ^{99}Tc, ^{129}I, ^{154}Eu, ^{155}Eu, and ^{241}Am, etc., have been infrequently reported. For this reason it has been necessary to derive most of the 46 key radionuclides by computer models. These models estimate radionuclide activity in batches of reactor fuel, account for the split of radionuclides to various separations plant waste streams, and track their movement with tank waste transactions. (These computer models are described in Kupfer et al. 1998, Section 6.1 and in Watrous and Wootan 1997.) Model generated values for radionuclides in any of 177 tanks are reported in the Hanford Defined Waste Rev. 4 model results (Agnew et al. 1997). The best-basis value for any one analyte may be either a model result or a sample or engineering assessment-based result, if available. For a discussion of typical error between model derived values and sample derived values, see Kupfer et al. 1998, Section 6.1.10.

Once the best-basis inventories were determined, the hydroxide inventory was calculated by performing a charge balance with the valences of other analytes. This charge balance approach is consistent with that used by Agnew et al. (1997).

The best-basis inventory estimates for tank 241-S-102 are presented in Tables D4-1 and D4-2. The inventory values reported in Tables D4-1 and D4-2 are subject to change. Refer to the Tank Characterization Database (TCD) for the most current inventory values.

Table D4-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-S-102 (Effective January 31, 1999).

Analyte	Total inventory (kg)	Basis (S, M, C, or E)[1]	Comment
Al	49,500	S/E	
Bi	246	M	
Ca	1,360	S/E	
Cl	13,000	S/E	
TIC as CO_3	89,800	S/E	
Cr	9,700	S/E	
F	16,500	S/E	Upper bound estimate
Fe	2,880	S/E	
Hg	0	E	Simpson (1998)
K	3,090	S/E	
La	4.41	M	
Mn	1,320	S/E	
Na	6.62E+05	S/E	
Ni	106	S/E	
NO_2	1.25E+05	S/E	
NO_3	1.12 E+06	S/E	
OH_{Total}	75,000	C	
Pb	189	M	
PO_4	1.51E+05	S/E	
Si	1,600	S/E	
SO_4	30,300	S/E	
Sr	36.3	S/E	Upper bound estimate
TOC	13,600	S/E	
U_{TOTAL}	2,860	S/E	
Zr	20.2	M	

Note:

[1]S = Sample-based, M = Hanford defined waste model-based (Agnew et al. 1997), E = engineering assessment-based, and C = calculated by charge balance; includes oxides as hydroxides, not including CO_3, NO_3, NO_2, PO_4, SO_4, and SiO_3.

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-S-102 Decayed to January 1, 1994. (Effective January 31, 1999). (2 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	241	M	
^{14}C	34.2	M	
^{59}Ni	2.43	M	
^{60}Co	37.6	M	
^{63}Ni	237	M	
^{79}Se	3.41	M	
^{90}Sr	84,200	S/E	
^{90}Y	84,200	S/E	From ^{90}Sr
^{93}Zr	16.7	M	
^{93m}Nb	12.1	M	
^{99}Tc	244	M	
^{106}Ru	0.00664	M	
^{113m}Cd	87.4	M	
^{125}Sb	161	M	
^{126}Sn	5.15	M	
^{129}I	0.470	M	
^{134}Cs	2.48	M	
^{137}Cs	4.61E+05	S/E	
^{137m}Ba	4.36E+05	S/E	From ^{137}Cs
^{151}Sm	12,000	M	
^{152}Eu	3.95	M	
^{154}Eu	611	M	
^{155}Eu	232	M	
^{226}Ra	1.61E-04	M	
^{227}Ac	9.85E-04	M	
^{228}Ra	0.131	M	
^{229}Th	0.00307	M	
^{231}Pa	0.00420	M	
^{232}Th	0.00869	M	
^{232}U	0.879	S/E/M	Based on U_{Total} and HDW isotopic distribution.
^{233}U	3.37	S/E/M	Based on U_{Total} and HDW isotopic distribution.

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-S-102 Decayed to January 1, 1994. (Effective January 31, 1999). (2 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{234}U	1.05	S/E/M	Based on U_{Total} and HDW isotopic distribution.
^{235}U	0.0425	S/E/M	Based on U_{Total} and HDW isotopic distribution.
^{236}U	0.0325	S/E/M	Based on U_{Total} and HDW isotopic distribution.
^{237}Np	0.897	M	
^{238}Pu	6.53	S/E/M	Based on total alpha and HDW isotopic distribution.
^{238}U	0.954	S/E/M	Based on U_{Total} and HDW isotopic distribution.
^{239}Pu	241	S/E/M	Based on total alpha and HDW isotopic distribution.
^{240}Pu	40.0	S/E/M	Based on total alpha and HDW isotopic distribution.
^{241}Am	256	S/E/M	Based on total alpha and HDW isotopic distribution.
^{241}Pu	438	S/E/M	Based on total alpha and HDW isotopic distribution.
^{242}Cm	0.655	S/E/M	Based on total alpha and HDW isotopic distribution.
^{242}Pu	O.00238	S/E/M	Based on total alpha and HDW isotopic distribution.
^{243}Am	0.00878	S/E/M	Based on total alpha and HDW isotopic distribution.
^{243}Cm	0.0598	S/E/M	Based on total alpha and HDW isotopic distribution.
^{244}Cm	0.594	S/E/M	Based on total alpha and HDW isotopic distribution.

Notes:

[1]S = Sample-based, M = Hanford defined waste model-based (Agnew et al. 1997), and E = engineering assessment-based

D5.0 APPENDIX D REFERENCES

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Kruger, A. A., B. J. Morris, and L. J. Fergestrom, 1996, *Tank Characterization Report for Single-Shell Tank 241-S-101*, WHC-SD-WM-ER-613, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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APPENDIX E

BIBLIOGRAPHY FOR SINGLE-SHELL TANK 241-S-102

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APPENDIX E

BIBLIOGRAPHY FOR SINGLE-SHELL TANK 241-S-102

Appendix E is a bibliography that supports the characterization of tank 241-S-102. This bibliography represents an in-depth literature search of all known information sources that provide sampling, analysis, surveillance, modeling information, and processing occurrences associated with tank 241-S-102 and its respective waste types.

The references in this bibliography are separated into three categories containing references broken down into subgroups. These categories and their subgroups are listed below.

I. NON-ANALYTICAL DATA

- Ia. Models/Waste Type Inventories/Campaign Information
- Ib. Fill History/Waste Transfer Records
- Ic. Surveillance/Tank Configuration
- Id. Sample Planning/Tank Prioritization
- Ie. Data Quality Objectives/Customers of Characterization Data

II. ANALYTICAL DATA - SAMPLING OF TANK WASTE AND WASTE TYPES

- IIa. Sampling of Tank 241-S-102
- IIb. Sampling of Tanks with Similar Waste Types

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

- IIIa. Inventories Using Both Campaign and Analytical Information
- IIIb. Compendium of Existing Physical and Chemical Documented Data Sources

This bibliography is broken down into the appropriate sections of material with an annotation at the end of each reference describing the information source. Most information listed below is available in the Lockheed Martin Hanford Corporation Tank Characterization and Safety Resource Center.

I. NON-ANALYTICAL DATA

Ia. Models/Waste Type Inventories/Campaign Information

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

- Contains single-shell tank fill history and primary campaign and waste information to 1981.

Jungfleisch, F. M., and B. C. Simpson, 1993, *Preliminary Estimation of the Waste Inventories in Hanford Tanks Through 1980*, WHC-SD-WM-TI-057 Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

- A model based on process knowledge and radioactive decay estimations using ORIGEN for different compositions of process waste streams assembled for total, solution, and solids compositions per tank. Assumptions about waste/waste types and solubility parameters and constraints are also given.

Ib. Fill History/Waste Transfer Records

Agnew, S. F., R. A. Corbin, T. B. Duran, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1997, *Waste Status and Transaction Record Summary (WSTRS) Rev. 4*, LA-UR-97-311, Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains spreadsheets showing all available data on tank additions and transfers.

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

- Contains single-shell tank fill history and primary campaign and waste information to 1981.

Ic. Surveillance/Tank Configuration

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

- Shows tank riser locations in relation to a tank aerial view and a description of risers and their contents.

Lipnicki, J., 1997, *Waste Tank Risers Available for Sampling*, HNF-SD-RE-TI-710, Rev. 4, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Assesses riser locations for each tank; however, not all tanks are included or completed. An estimate of available risers for sampling are also included.

Tran, T. T., 1993, *Thermocouple Status Single-Shell & Double-Shell Waste Tanks*, WHC-SD-WM-TI-553, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains riser and thermocouple information for Hanford Site waste tanks.

Id. Sample Planning/Tank Prioritization

Adams, M. R., T. M. Brown, J. W. Hunt, and L. J. Fergestrom, 1998, *Fiscal Year 1999 Waste Information Requirements Document*, HNF-2884, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains Tri-Party Agreement (Ecology et al. 1996) requirement-driven TWRS Characterization Program information.

Brown, T. M., J. W. Hunt, and L. J. Fergestrom, 1997, *Tank Characterization Technical Sampling Basis*, HNF-SD-WM-TA-164, Rev. 3, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Summarizes the 1997 technical basis for characterizing tank waste and assigns a priority number to each tank.

Brown, T. M., J. W. Hunt, and L. J. Fergestrom, 1998, *Tank Characterization Technical Sampling Basis*, HNF-SD-WM-TA-164, Rev. 4, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Summarizes the 1998 technical basis for characterizing tank waste and assigns a priority number to each tank.

Buckley, L. L., 1997, *Vapor Sampling and Analysis Plan/Test Plan for Temporal Studies of Tanks BX-104, BY-108, C-107 and S-102*, WHC-SD-WM-TP-522, Rev. 0D, Westinghouse Hanford Company, Richland, Washington.

- Sampling and analysis plan for the study of seasonal and long term headspace composition changes in three high level tanks.

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

- Describes tank sampling and analysis requirements for tank farms.

DOE-RL, 1996, *Recommendation 93-5 Implementation Plan,* DOE/RL-94-0001, Rev. 1, U.S. Department of Energy, Richland, Washington.

- Describes tank issues and defines characterization requirements.

Eggers, R. F., 1996, *Tank 241-S-102 Push Mode Core Sampling and Analysis Plan*, WHC-SD-WM-TSAP-074, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains sampling and analysis requirements for tank 241-S-102 core samples based on applicable DQOs.

Grimes, G. W., 1977, *Hanford Long-Term Defense High-Level Waste Management Program Waste Sampling and Characterization Plan*, RHO-CD-137, Rockwell Hanford Operations, Richland, Washington.

- Early characterization planning document.

Homi, C. S., 1995, *Vapor Sampling and Analysis Plan*, WHC-SD-WM-TP-335, Rev. 0G, Westinghouse Hanford Company, Richland, Washington.

- Vapor sampling and analysis plan for 200 Area Tanks.

McCain, D. J., 1998, *Tank 241-S-102 Retained Gas Sampler System Sampling and Analysis Plan*, HNF-1907, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains sampling and analysis requirements for RGS core samples.

Sasaki, L. M., 1998, *Letter of Instruction for Analysis of Grab Samples from Tank 241-S-102 and 241-S-106*, (letter 74B20-98-002 to D. B. Hardy, October 22), Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains instructions for analyzing grab samples.

Stanton, G. A., 1998, *Baseline Sampling Schedule*, Change 98-03, (internal memorandum 79520-98-003 to distribution, October 23), Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Provides a tank waste sampling schedule through fiscal year 2004 and lists samples taken since 1994.

Thompson, R. R., 1998, *Letter of Instruction for Compatibility Analysis of Samples from Tank 241-S-102*, (letter 7A120-98-039 to C. M. Seidel, August 12), Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains instruction for conducting compatibility analyses.

Ie. Data Quality Objectives (DQO) and Customers of Characterization Data

Bauer, R. E., and L. P. Jackson, 1998, *Data Quality Objective to Support Resolution of the Flammable Gas Safety Issue*, HNF-SD-WM-DQO-004, Rev. 3A, DE&S Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains flammable gas requirements for single-shell tanks.

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.

- Determines whether tanks are under safe operating conditions.

Kupfer, M. J., W. W. Schultz, G. L. Borsheim, S. J. Eberlein, B. C. Simpson, 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.

- Provides basis for selecting tanks for disposal needs.

McDuffie, N. G., 1995, *Flammable Gas Tank Safety Program: Data Requirements for Core Sample Analysis Developed through the Data Quality Objectives Process*, WHC-SD-WM-DQO-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Contains flammable gas requirements for double-shell tanks.

Meacham, J. E., D. L. Banning, M. R. Allen, and L. D. Muhlestein, 1997, *Data Quality Objective to Support Resolution of the Organic Solvent Safety Issue*, HNF-SD-WM-DQO-026, Rev. 0, DE&S Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains requirements for the organic solvent DQO.

Mulkey, C. H., and M. S. Miller, 1997, *Data Quality Objectives for Tank Farms Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 2, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Documents safety-related compatibility requirements for tank transfers.

Osborne, J. W., and L. L. Buckley, 1995, *Data Quality Objectives for Tank Hazardous Vapor Safety Screening*, WHC-SD-WM-DQO-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Contains requirements for addressing hazardous vapor issues.

Schreiber, R. D., 1997, *Memorandum of Understanding for the Organic Complexant Safety Issue Data Requirements*, HNF-SD-WM-RD-060, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains requirements, methodology and logic for analyses to support organic complexant issue resolution.

Simpson, B. C., and D. J. McCain, 1997, *Historical Model Evaluation Data Requirements*, WHC-SD-WM-DQO-018, Rev. 2, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Provides data needs for evaluating the Los Alamos National Laboratory model for estimating tank waste compositions.

Slankas, T. J., M. J. Kupfer, and W. W. Schulz, 1995, *Data Needs and Attendant Data Quality Objectives for Tank Waste Pretreatment and Disposal*, WHC-SD-WM-DQO-022, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Documents the needs of the pretreatment function in TWRS.

Turner, D. A., H. Babad, L. L. Buckley, and J. E. Meacham, 1995, *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue*, WHC-SD-WM-DQO-006, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Categorizes organic tanks as "safe," "conditionally safe," or "unsafe" based on fuel and moisture concentrations and supports resolution of the safety issue.

II. ANALYTICAL DATA - SAMPLING OF TANK WASTE AND WASTE TYPES

IIa. Sampling of Tank 241-S-102

Note: In addition to the references listed in this section, the Tank Characterization and Resource Safety Center file for tank 241-S-102 contains data for over 100 grab samples taken between 1971 and 1979.

Caprio, G. S., 1997, *Vapor and Gas Sampling of Single-Shell Tank 241-S-102 Using the Vapor Sampling System*, WHC-SD-WM-RPT-142, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains sampling data results for the March 1995 vapor sample.

Caprio, G. S., 1997, *Vapor and Gas Sampling of Single-Shell Tank 241-S-102 Using the In Situ Vapor Sampling System*, HNF-SD-WM-RPT-214, Rev. 0, SGN Eurisys Services Corp. for Fluor Daniel Hanford, Inc, Richland, Wasington.

- Contains sampling data results for the January 1996 vapor sample.

Caprio, G. S., 1997, *Vapor and Gas Sampling of Single-Shell Tank 241-S-102 Using the In Situ Vapor Sampling System*, HNF-SD-WM-RPT-291, Rev. 0, SGN Eurisys Services Corp. for Fluor Daniel Hanford, Inc, Richland, Wasington.

- Contains sampling data results for the February 1997 vapor sample.

Delegard, C. H., 1979, *Analysis of Tank 102-S Evaporator Solids* (Rockwell internal letter 65124-79-026 to G. A. Olsen, December 31), Rockwell Hanford Operations, Richland, Washington.

- Contains 1979 grab sample results for tank 241-S-102.

Esch, R. A., 1995, *Waste Compatibility Results for 241-S-102 Grab Samples*, (letter 75970-95-059 to M. J. Sutey et al., August 8), Westinghouse Hanford Company, Richland, Washington.

- Contains compatibility sampling and analysis results for tank 241-S-102 grab samples.

Evans, J. C., B. L. Thomas, K. H. Pool, K. B. Olsen, J. S. Fruchter, and K. L. Silvers, 1996, *Headspace Vapor Characterization of Hanford Waste Tank 241-S-102: Results from Samples Collected on 01/26/96*, PNNL-11153, Pacific Northwest National Laboratory, Richland, Washington.

- Contains headspace vapor results for 1996 samples.

Evans, J. C., K. H. Pool, B. L. Thomas, D. S. Sklarew, A. V. Mitroshkov, J. A. Edwards, J. L. Julya, B. M. Thornton, J. S. Fruchter, and K. L. Silvers, 1997, *Tank 241-S-102 Temporal Study Headspace Gas and Vapor Characterization Results from Samples Collected on September 19, 1996*, PNNL-11502, Pacific Northwest National Laboratory, Richland, Washington.

- Contains headspace vapor results and discussion for 1996 samples.

Fritts, L. L., 1996, *Final Report for Tank 241-S-102, Push Mode Cores 125 and 130*, WHC-SD-WM-DP-179, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains analytical results for tank 241-S-102 core samples.

Fuller, R. K., 1998, *Analyses Results for the Final Report for Tank 241-S-102 Grab Samples*, (letter WMH-9860058 to K. M. Hall, November 24), Waste Management Federal Services of Hanford Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains ammonia results for 1998 grab samples.

Hardy, D. B., 1998, *Ammonia Re-Run Results from Tank 241-S-102, Sample 2S-98-01*, (letter WMH-9860418 to K. M. Hall, December 16), Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains ammonia re-run results for 1998 grab samples

Huckaby, J. L., L. Jensen, J. C. Hayes, L. D. Pennington, L. L. Buckley, and S. R. Wilmarth, 1997, *Seasonal Changes in the Composition of Passively Ventilated Waste Tank Headspaces*, PNNL-11667, Pacific Northwest National Laboratory, Richland, Washington.

- Contains sample results and statistical analyses for tank 241-S-102 vapor samples.

Huckaby, J. L., J. A. Edwards, J. C. Evans, J. S. Fruchter, J. L. Julya,, K. B. Olsen, K. H. Pool, B. L. Thomas, K. L. Silvers, L Jensen, L. L. Buckley, S. R. Wilmarth, and L. D. Pennington, 1996, *Comparison of Vapor Sampling System (VSS) and In Situ Vapor Sampling (ISVS) Methods on Tanks C-107, BY-108, and S-102*, PNNL-11186, Pacific Northwest National Laboratory, Richland, Washington.

- Compares tank vapor results for two sampling methods..

Huckaby, J. L., and D. R. Bratzel, 1995, *Tank 241-S-102 Headspace Gas and Vapor Characterization Results for Samples Collected in March 1995*, WHC-SD-WM-ER-496, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains results for March 1995 vapor samples.

Huckaby, J. L., 1995, *Tank 241-S-102 Vapor Sampling and Analysis Tank Characterization Report*, WHC-SD-WM-ER-446, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains results for March 1995 vapor samples.

Gauglitz, P. A., S. D. Rassat, P. R. Bredt, J. H.,Konynenbelt, S. M. Tingey, and D. P. Mendoza, 1996, *Mechanisms of Gas Bubble Retention and Release: Results for Hanford Waste Tanks 241-S-102 and 241-SY-103 and Single-Shell Tank Stimulants*, PNNL-11298, Pacific Northwest National Laboratory, Richland, Washington.

- Contains results of bubble retention tests to quantify and study flammable gas retention and releases for tank 241-S-102.

Mahoney, L. A., Z. I. Antoniak, and J. M. Bates, 1998, *Preliminary Retained Gas Sampler Measurement Results for Hanford Waste Tank 241-S-102*, TWS98.50, Pacific Northwest National Laboratory, Richland, Washington.

- Contains RGS results for core samples.

Mitroshkov, A. V., J. C. Evans, J. C. Hayes, K. H. Pool, K. B. Olsen, J. A. Edwards, J. L. Julya, B. M. Thornton, J. S. Fruchter, and K. L. Silvers, 1997, *Tank 241-S-102 Fifth Temporal Study: Headspace Gas and Vapor Characterization Results from Samples Collected on February 11, 1997*, PNNL-11613, Pacific Northwest National Laboratory, Richland, Washington.

- Contains headspace vapor results for 1997 samples.

Jansky, M. T., 1980, *Hot Boildown of Tank 102-S Liquor* (Rockwell internal letter 65453-080-118 to H.J. Eding, March 28), Rockwell Hanford Operations, Richland, Washington.

- Contains historical sample results.

Pool, K. H., B. D. McVeety, T. W. Clauss, K. B. Olsen, J. S. Fruchter, R. B. Lucke, G. S. Klinger, M. W. Ligotke, O. P. Bredt, and S. C. Goheen, 1995, *Vapor Space Characterization of Waste Tank 241-S-102: Results from Samples Collected on 3/14/95*, PNL-10587, Pacific Northwest National Laboratory, Richland, Washington.

- Contains 1995 vapor sample results.

Pool, K. H., J. C. Evans, B. L. Thomas, K. B. Olsen, J. S. Fruchter, and K. L. Silvers, 1997, *Headspace Vapor Characterization of Hanford Waste Tank 241-S-102: Second Comparison Study Results from Samples Collected on 04/04/96*, PNNL-11270, Pacific Northwest National Laboratory, Richland, Washington.

- Compares 1995 and 1996 vapor sample results.

Pool, K. H., J. C. Evans, K. B. Olsen, J. C. Hayes, A. V. Mitroshkov, J. A. Edwards, J. L. Julya, B. M. Thornton, J. S. Fruchter, and K. L. Silvers, 1997, *Tank 241-S-102 Fourth Temporal Study: Headspace Gas and Vapor Characterization Results from Samples Collected on December 19, 1996*, PNNL-11601, Pacific Northwest National Laboratory, Richland, Washington.

- Contains 1996 vapor sample results.

Steen, F. H.,1998, *Analyses Results for the Final Report for Tank 241-S-102 Grab Samples*, (internal memorandum WMH-9860058 to K. M. Hall, November 24), Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains final finger trap grab sample analytical results.

Steen, F. H., 1998, *Tank 241-S-102, Core 232 Analytical Results for the Final Report*, HNF-1649, Rev. 0, Waste Management Federal Services of Hanford Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains final core sample analytical results.

IIb. Sampling Tanks with Similar Waste Types

- The following tank characterization reports contain sample information used to establish the best-basis inventory for tank 241-S-102.

Baldwin, J. H., and R. H. Stephens, 1996, *Tank Characterization Report for Single-Shell Tank 241-U-109*, WHC-SD-WM-ER-609, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Brown, T. M., R. D. Cromar, J. L. Stroup, and R. T. Winward, 1997, *Tank Characterization Report for Single-Shell Tank 241-U-106*, HNF-SD-WM-ER-636, Rev. 0, Lockheed Martin Hanford Corporation, Richland Washington.

DiCenso, A. T., L. C. Amato, J. D. Franklin, G. L. Nuttall, K. W. Johnson, P. Sathyanarayana, 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.

Hu, T. A., L. C. Amato, R. T. Winward, and R. D. Cromar, 1997, *Tank Characterization Report for Single-Shell Tank 241-U-102*, HNF-SD-WM-ER-618, Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington.

Jo, J., B. J. Morris, and T. T. Tran, 1996, *Tank Characterization Report for Single-Shell Tank 241-U-107*, WHC-SD-WM-ER-614, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Kruger, A. A., B. J. Morris, and L. J. Fergestrom, 1996, *Tank Characterization Report for Single-Shell Tank 241-S-101*, WHC-SD-WM-ER-613, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Simpson, B. C., J. G. Field, D. W. Engel, and D. S. Daly, 1996, *Tank Characterization Report for Single-Shell Tank 241-S-107*, WHC-SD-WM-ER-589, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

IIIa. Inventories from Campaign and Analytical Information

Agnew, S. F., J. Boyer, R. A. Corbin, T. B. Duran, J. R. Fitzpatrick, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1997, *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4*, LA-UR-96-3860, Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains waste type summaries and primary chemical compound/analyte and radionuclide estimates for sludge, supernatant, and solids.

Allen, G. K., 1976, *Estimated Inventory of Chemicals Added to Underground Waste Tanks*, 1944 - 1975, ARH-CD-601B, Atlantic Richfield Hanford Company, Richland, Washington.

- Document contains major components for waste types, and some assumptions. Purchase records are used to estimate chemical inventories.

Allen, G. K., 1975, *Hanford Liquid Waste Inventory As Of September 30, 1974*, ARH-CD-229, Atlantic Richfield Hanford Company, Richland, Washington.

- Document contains major components for waste types, and some assumptions

Brevick, C. H., J. L. Stroup, and J. W. Funk, 1997, *Historical Tank Content Estimate for the Southwest Quadrant of the Hanford 200 West Area*, WHC-SD-WM-ER-352, Rev. 1, Fluor Daniel Northwest, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Document contains summary information from the supporting document as well as in-tank photo collages and the solid composite inventory estimates Rev. 0 and Rev. 0A.

Schmittroth, F. A., 1995, *Inventories for Low-Level Tank Waste*, WHC-SD-WM-RPT-164, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Document contains tank inventory information.

IIIb. Compendium of Data from Other Physical and Chemical Sources

Brevick, C. H., J. L. Stroup, and J. W. Funk, 1997, *Supporting Document for the Historical Tank Content Estimate for S Tank Farm*, HNF-SD-WM-ER-323, Rev. 1, Fluor Daniel Northwest, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Document contains historical data and solid inventory estimates. The appendices contain the following information: Appendix C - Level History AutoCAD sketch; Appendix D - Temperature Graphs; Appendix - Surface Level Graph; Appendix F, pg. F-1 - Cascade/ Drywell Chart; Appendix G - Riser Configuration Drawing and Table; Appendix I - In-Tank Photos; and Appendix K - Tank Layer Model Bar Chart and Spreadsheet.

Brevick, C. H., L. A. Gaddis, and E. D. Johnson, 1995, *Tank Waste Source Term Inventory Validation*, Vol. I & II., WHC-SD-WM-ER-400, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Document contains a quick reference to sampling information in spreadsheet or graphical form for 23 chemicals and 11 radionuclides for all the tanks.

Hanlon, B. M., 1999, *Waste Tank Summary Report for Month Ending December 31, 1998*, HNF-EP-0182-129, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains a monthly summary of the following: fill volumes, Watch List tanks, occurrences, integrity information, equipment readings, equipment status, tank location, and other miscellaneous tank information.

Hill, J. G., G. S. Anderson, and B. C. Simpson, 1995, *The Sort on Radioactive Waste Type Model: A Method to Sort Single-Shell Tanks into Characteristic Groups*, PNL-9814, Rev. 2, Pacific Northwest National Laboratory, Richland, Washington.

- Contains a method that sorts single-shell tanks into characteristic groups.

Husa, E. I., 1993, *Hanford Site Waste Storage Tank Information Notebook*, WHC-EP-0625, Westinghouse Hanford Company, Richland, Washington.

- Contains in-tank photographs and summaries on the tank description, leak detection system, and tank status.

Husa, E. I., 1995, *Hanford Waste Tank Preliminary Dryness Evaluation*, WHC-SD-WM-TI-703, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Assesses relative dryness between tanks.

LMHC, 1999, *Tank Characterization Data Base*, Internet at http://twins.pnl.gov:8001/htbin/TCD/main.html

- Contains analytical data for each of the 177 Hanford Site waste tanks.

Shelton, L. W., 1996, *Chemical and Radionuclide Inventory for Single- and Double-Shell Tanks*, (internal memorandum 74A20-96-30 to D. J. Washenfelder, February 28), Westinghouse Hanford Company, Richland, Washington.

- Contains a tank inventory estimate based on analytical information.

Van Vleet, R. J., 1993, *Radionuclide and Chemical Inventories*, WHC-SD-WM-TI-565, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains tank inventory information.

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