ENGINEERING CHANGE NOTICE	Page 1 of 2	1. ECN № 621375 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 []	Jim G. Field, Data Assessment and Interpretation, R2-12, 376-3753	[] Yes [X] No	03/10/99
	6. Project Title/No./Work Order No. Tank 241-SX-103	7. Bldg./Sys./Fac. No. 241-SX-103	8. Approval Designator N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-SD-WM-ER-662, Rev. 0-A	10. Related ECN No(s). ECN-649891	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.

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.

RELEASE STAMP

DATE:
HANFORD
STA: 4
RELEASE
ID:
MAR 16 1999
2

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

A-7900-013-1

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) ECN-621375

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. J.G. Field	J G Field	3/10/99	PE		
Cog. Mgr. K.M. Hall	Kathleen M. Hall	3/11/99	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other J.W. Cammann	JW Cammann	3/11/99	Other		
R.J. Cash	R J Cash	3/12/99	DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

DISTRIBUTION SHEET

To	From	Page 1 of 2
Distribution	Data Assessment and Interpretation	Date 03/10/99
Project Title/Work Order		EDT No. N/A
Tank Characterization Report for Single-Shell Tank 241-SX-103, HNF-SD-WM-ER-662, Rev. 1		ECN No. ECN-621375

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
OFFSITE					
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			

DISTRIBUTION SHEET

To	From	Page 2 of 2
Distribution	Data Assessment and Interpretation	Date 03/10/99
Project Title/Work Order		EDT No. N/A
Tank Characterization Report for Single-Shell Tank 241-SX-103, HNF-SD-WM-ER-662, Rev. 1		ECN No. ECN-621375

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
<u>ONSITE</u>					
<u>Department of Energy - Richland Operations</u>					
W. S. Liou	S7-54	X			
DOE/RL Reading Room	H2-53	X			
<u>DE&S Hanford, Inc.</u>					
G. D. Johnson	S7-73	X			
<u>Fluor Daniel Hanford Corporation</u>					
J. S. Hertzel	H8-67	X			
<u>Lockheed Martin Hanford, Corp.</u>					
J. W. Cammann	R2-11	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			
<u>Lockheed Martin Services, Inc.</u>					
B. G. Lauzon	R1-08	X			
Central Files	B1-07	X			
EDMC	H6-08	X			
<u>Numatec Hanford Corporation</u>					
J. S. Garfield	R3-73	X			
D. L. Herting	T6-07	X			
<u>Pacific Northwest National Laboratory</u>					
A. F. Noonan	K9-91	X			
<u>Scientific Applications International Corporation</u>					
M. D. LeClair	R3-75	X			

S

Tank Characterization Report for Single-Shell Tank 241-SX-103

C. J. Lindquist
Los Alamos Technical Associates, Richland, WA 99352

S. J. Wilmarth
Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract 8023764-9-K001

EDT/ECN: ECN-621375 UC: 2070
Org Code: 74B10 CACN/COA: 102217/EI00
B&R Code: EW 3120074 Total Pages: 301

Key Words: Waste Characterization, Single-Shell Tank, SST, Tank 241-SX-103, Tank SX-103, SX-103, SX Farm, Tank Characterization Report, TCR, Waste Inventory, TPA Milestone M-44

Abstract: This document summarizes the information on the historical uses, present status, and the sampling and analysis results of waste stored in Tank 241-SX-103. This report supports the requirements of the Tri-Party Agreement Milestone M-44-15C.

3/16/99
Release Approval Date

DATE: HANFORD RELEASE ID:
STA. 4 2
MAR 16 1999
Release Stamp

Approved for Public Release

RECORD OF REVISION		(1) Document Number HNF-SD-WM-ER-662	Page 1

(2) Title
Preliminary Tank Characterization Report for Single-Shell Tank 241-SX-103: Best-Basis Inventory

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Initially released 08/28/97 on EDT 622681	M.J. Kupfer	K.M. Hodgson
0A RS	Incorporate per ECN-649891	M.J. Kupfer	K.M. Hodgson
		MJKupfer	K.M. Hodgson
		9-9-98	9-15-98
1 RS	Incorporate per ECN-621375.	J.G. Field	K.M. Hall
		JG Field	Kathleen M. Hall
		3-10-99	3/11/99

A-7320-005 (08/91) WEF168

Tank Characterization Report for Single-Shell Tank 241-SX-103

C. J. Lindquist
Los Alamos Technical Associates, Inc.

S. R. Wilmarth
Lockheed Martin Hanford Corp.

Date Published
March 1999

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

FLUOR DANIEL HANFORD, INC.
P.O. Box 1000
Richland, Washington

Hanford Management and Integration Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TERMS

AES	atomic emission spectroscopy
ANOVA	analysis of variance
Btu/hr	British thermal units per hour
CI	confidence interval
Ci	curie
Ci/L	curies per liter
cm	centimeter
df	degrees of freedom
DQO	data quality objective
DSC	differential scanning calorimetry
DW	dry weight
ft	feet
g	gram
g/cm^3	grams per cubic centimeter
g/L	grams per liter
g/mL	grams per milliliter
GEA	gamma energy analysis
HDW	Hanford defined waste
HHF	hrostatic head fluid
HTCE	historical tank content estimate
IC	ion chromatography
ICP	inductively coupled plasma spectroscopy
in.	inch
J/g	joules per gram
kg	kilogram
kgal	kilogallon
kL	kiloliter
kW	kilowatt
LFL	lower flammability limit
LL	lower limit
m	meter
M	moles per liter
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mL	milliliter
mm	millimeter
n/a	not applicable
N/A	not available
N/D	not determined
NR	not requested
PHMC	Project Hanford Management Contractor

LIST OF TERMS (Continued)

ppm	parts per million
ppmv	parts per million volume
QC	quality control
R1	REDOX high-level waste (1952 to 1957)
REDOX	Reduction Oxidation (facility)
REML	restricted maximum likelihood
RPD	relative percent difference
RSltck	REDOX saltcake
S1-SltCK	242-S Evaporator saltcake waste (1973-1976)
SAP	sampling and analysis plan
SHMS	standard hydrogen monitoring system
SMM	supernatant mixing model
SMMS1	supernatant mixing model S1 saltcake
TGA	thermogravimetric analysis
TIC	total inorganic carbon
TLM	tank layer model
TOC	total organic carbon
TWRS	Tank Waste Remediation System
UL	upper limit
W	watt
WSTRS	Waste Status and Transaction Record Summary
vol%	volume percent
wt%	weight percent
%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
μCi/g	microcuries per gram
μCi/mL	microcuries per milliliter
μeq/g	microequivalents per gram
μg C/g	micrograms of carbon per gram
μg/g	micrograms per gram
μg/mL	micrograms per milliliter

This page intentionally left blank.

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. This report and its appendices serve as the tank characterization report for single-shell tank 241-SX-103.

The objectives of this report are 1) to use characterization data in response to technical issues associated with tank 241-SX-103 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 *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 fiscal year 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-SX-103 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 for this tank. Appendix E is a bibliography that resulted from an in-depth literature search of all known information sources applicable to tank 241-SX-103 and its respective waste types. The reports listed in Appendix E are available in the Lockheed Martin Hanford Corp. Tank Characterization and Safety Resource Center.

Table 1-1. Summary of Recent Sampling.

Sample/Date[1]	Phase	Location	Segmentation	Recovery
Vapor sample (3/23/95)	Gas	Tank headspace, riser 2, 7.3 m (24 ft) below top of riser	n/a	n/a
Grab samples 3SX-97-1, 3SX-97-2, 3SX-97-3 (6/6/97)	Liquid/solid	Riser 9, 1,026 cm (404 in.), 1,280 cm (504 in.), and 1,402 cm (552 in.) below top of riser	None	n/a
Rotary core 235 (4/28/98 to 4/30/98)	Solid/liquid	Riser 11	12 segments, upper half and lower half	0 to 85%
Rotary core 239 (5/5/98 to 5/11/98)	Solid/liquid	Riser 7	12 segments, upper half and lower half	0 to 100%

Notes:

n/a = not applicable

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

1.2 TANK BACKGROUND

Single-shell tank 241-SX-103 is located in the 200 West Area SX Tank Farm on the Hanford Site. It was constructed in 1953-1954 and is the last tank in a three-tank cascade series. From 1954 to 1971, the tank received supernatant transfers from 241-SX tanks and various other tanks. In 1955, the tank received waste from the Reduction Oxidation (REDOX) facility. From 1958 to 1963, supernatant, condensate waste, and sparge transfers were sent to 241-SX tanks and various other tanks.

From 1975 to 1980, waste was transferred into and out of tank 241-SX-103 in support of 242-S Evaporator operations. The tank was labeled inactive in 1978 and removed from service in 1980. The tank was partially interim isolated in June 1985.

Table 1-2 summarizes the description of tank 241-SX-103. The tank has a maximum storage capacity of 3,785 kL (1,000 kgal) and, as of January 31, 1999, contained an estimated 2,400 kL (634 kgal) of noncomplexed waste based on surface level and zip cord measurements. The tank is actively ventilated and is on the Watch List (Public Law 101-510) for flammable gas. The organic complexant safety issue was closed on December 9, 1998, and all organic complexant tanks were removed from the organic complexant Watch List (Owendoff 1998).

Table 1-2. Description of Tank 241-SX-103.

TANK DESCRIPTION	
Type	Single-shell
Constructed	1953-1954
In service	1954
Diameter	22.9 m (75.0 ft)
Operating depth	9.14 m (30.0 ft)
Capacity	3,785 kL (1,000 kgal)
Bottom shape	Dish
Ventilation	Active
TANK STATUS	
Waste classification	Noncomplexed
Total waste volume[1]	2,400 kL (634 kgal)
Supernatant volume[1]	0 kL (0 kgal)
Saltcake volume[1]	1,964 kL (519 kgal)
Sludge volume[2]	435 kL (115 kgal)
Drainable interstitial liquid volume[3]	982 kL (259.5 kgal)
Waste surface level (01/31/99)	599 cm (236 in.)
Temperature (01/31/98 to 01/31/99)	28.4 °C (83.1 °F) to 73.3 °C (164 °F)
Integrity	Sound
Watch List[4]	Flammable gas
Flammable Gas Facility Group	2
SAMPLING DATES	
Vapor sample	March 1995
Grab sample	June 1997
Core sample	April and May 1998
SERVICE STATUS	
Declared inactive	1978
Partial interim isolation	June 1985
Interim stabilization/intrusion prevention	Not completed

Notes:

[1]Based on zip cord readings and surface level measusrements, not consistent with Hanlon (1998).
[2]Hanlon (1999)
[3]Assumes a saltcake drainable porosity of 50 percent.
[4]The organic complexant safety issue was closed on December 9, 1998 and all organic complexant tanks were removed from the organic complexant Watch List (Owendoff 1998).

This page intentionally left blank.

2.0 RESPONSE TO TECHNICAL ISSUES

The following technical issues have been identified for tank 241-SX-103 (Brown et al. 1998).

- **Flammable gas**: Does a possibility exist for release of flammable gases into the tank headspace or release of 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?

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

- **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?

Data from the analysis of rotary core samples, liquid grab samples and tank headspace measurements, along with available historical information, provided the means to respond to the technical issues. Sections 2.1 and 2.2 present the response. Data from the March 1995 vapor sample provided the means to address the vapor screening issue. See Appendix B for sample and analysis data for tank 241-SX-103.

2.1 FLAMMABLE GAS DATA QUALITY OBJECTIVE

The requirements to support the flammable gas issue are documented in the *Data Quality Objective to Support Resolution of the Flammable Gas Safety Issue* (Bauer and Jackson 1998). This data quality objective (DQO) has been extended to apply to all tanks. Analyses and evaluations will change according to program needs until this issue is resolved. Final resolution of the flammable gas issue is expected to be completed by September 30, 2001 (Johnson 1997).

Tank 241-SX-103 is equipped with a standard hydrogen monitoring system (SHMS) for the collection of vapor-phase data that support resolution of flammable gas issues. The SHMS vapor grab sample data are posted to the tank characterization database (LMHC 1998).

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 analyses will be performed on the waste samples 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 (Simpson and McCain 1997).

The gateway analysis was applied to each of the saltcake samples taken from tank 241-SX-103 in April and May 1998. The gateway analytes for tank 241-SX-103 are sodium, aluminum, chromium, water, nitrate, carbonate, and sulfate. These analytes were chosen because the tank waste is predicted to be composed predominantly of saltcake waste generated from the 242-S Evaporator from 1973 through 1976 (S1-SltCK). The gateway analysis required two tests be performed for each sample. The first test was to determine if the concentration of each of the gateway analytes was over 10 percent of the predicted concentration (as specified in the DQO). The second test was to determine if the gateway analytes contributed to more than 85 percent (by mass) of the total waste. The gateway analysis for tank 241-SX-103 is shown in Appendix C.

Except for two segments, the core 235 and core 239 segments passed both gateway analysis tests. The amount of sulfate in segment 235:10, lower half was <10 percent of the amount expected for supernatant mixing model (SMM) S1-saltcake (SMMS1) waste. The fingerprint analytes accounted for <85 percent of the waste mass for segments 239:11R, upper half and 239:11R, lower half. This indicates, that except for these segments the waste is consistent with the SMMS1 waste type. Segments 239:11R, upper and lower halves are located near the bottom of the tank and may be a combination of SMMS1 and some other waste type. Based on process history and results for surrounding segments, segment 235:10 lower half is expected to be SMMS1 waste.

The final test was to compare analytical results for composite samples and selected segments with Hanford defined waste (HDW) model estimates (Agnew et al. 1997) for SMM analyte concentrations in tank 241-SX-103. The concentration of all of the indicator analyte values for the composite samples were >10 percent of the historical model estimates for the SMM saltcake in this tank.

In general, the segments and composites analyzed agree with SMMS1 saltcake estimates and historical model predictions. The upper four to five segments of tank 241-SX-103 are mostly drainable liquids with few solids. Segments 5 to 9 are mostly solids, probably precipitated from the SMMS1 solution. Segments 10 and 11 appear to be saltcake, but do not exhibit the characteristics of SMMS1. Based on the aluminum concentrations, the bottom of the tank (segment 12) appears to be a dense sludge.

2.3 PRETREATMENT

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

2.4 SAFETY SCREENING

The data needed to screen the waste in tank 241-SX-103 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.

2.4.1 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) in tank 241-SX-103 to pose a safety hazard. The safety screening DQO required that 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. Results obtained using differential scanning calorimetry (DSC) indicated that no sample from tank 241-SX-103 had mean exothermic reactions (on a dry weight basis) exceeding the safety screening DQO limit. The maximum dry weight exotherm observed was 187 J/g. The maximum upper limit to a

95 percent confidence interval on the mean was 237 J/g from core 239, segment 7 drainable liquid. Therefore, energetic behavior is not a concern for this tank. Appendix C contains the method used to calculate confidence limits.

2.4.2 Flammable Gas

Headspace measurements were taken before obtaining the April/May 1998 rotary core samples. The March 1995 vapor samples showed a low flammable gas concentration (<23 ppmv). Data for the combustible gas tests (sniff tests) and the March 1995 vapor samples are presented in Appendix B.

2.4.3 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 and using the maximum solids density of 1.88 g/mL, this limit corresponds to 32.7 µCi/g of total alpha activity for solids. The maximum total alpha activity result was 0.816 µCi/g (core 235, segment 11, lower half). The maximum upper limit to a 95 percent confidence interval on the mean was 0.942 µCi/g (core 235, segment 11, lower half), 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.

2.5 ORGANIC COMPLEXANT

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

Several exotherms were observed but did not exceed the limit of 480 J/g (dry weight). The TOC results for the persulfate oxidation analysis ranged from 0.02 to 1.18 percent dry weight. Furnace oxidation TOC analysis was required for those samples for which the TOC by persulfate did not account for at least 75 percent of the exothermic energy. This condition did not occur in any samples. Analysis of variance (ANOVA) analyses showed that all TOC values were well below 4.5 percent, and the probability of a propagating event is not a concern for this tank (Meacham et al. 1998). Therefore, the tank is classified as "safe" for this issue. The organic complexant safety issue was closed on December 9, 1998, and all organic complexant tanks were removed from the organic complexant Watch List (Owendoff 1998).

2.6 ORGANIC SOLVENT SAFETY SCREENING

The data required to support the organic solvent safety screening issues 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 an organic extractant pool exists in the tank. The purpose of this assessment is to ensure that an organic solvent pool fire or ignition of organic solvents cannot occur.

Vapor samples taken in March 1995 showed the concentration of total nonmethane organic hydrocarbon in tank 241-SX-103 was 0.78 mg/m^3. An estimate of the organic solvent pool size has not been calculated (Huckaby and Sklarew 1997). However, the organic program has determined that even if an organic solvent pool does exist, the consequence of a fire or ignition of organic solvents is below risk evaluation guidelines for all tanks (Brown et al. 1998). Consequently, additional vapor analyses are not required for this tank. This issue is expected to be closed in 1999.

2.7 COMPATIBILITY

Tank 241-SX-103 has not yet been interim stabilized. Before pumping the supernatant and other drainable liquids from tank 241-SX-103, a waste compatibility assessment will be performed by tank farm operations. The *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Mulkey and Miller 1997, Fowler 1995) direct the waste compatibility assessment.

Sampling and analysis of grab samples were performed to the requirements of the waste compatibility DQO for tank 241-SX-103 as specified in the sampling and analysis plan (Sasaki 1997). The analytical results for tank 241-SX-103 and the waste compatibility requirements were included in the 1997 grab samples analytical results report (Steen 1997). The results showed that all compatibility requirements were met.

2.8 OTHER TECHNICAL ISSUES

2.8.1 Hazardous Vapor Screening

Vapor samples were taken in March 1995 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). Vapor sample results are discussed in Appendix B.

2.8.2 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. Based on the the results from the 1998 core and 1997 grab sampling events, the most significant decay heat contributors in the waste are ^{90}Sr and ^{137}Cs, with nondecayed inventories of 7.27E+05 and 7.92E+05 Ci, respectively. The heat load calculations based on these radionuclide inventories indicate that 6,590 W (29,300 Btu/hr) of heat are produced in the tank. The heat load estimate based on the tank process history was 6,520 W (22,300 Btu/hr) (Agnew et al. 1997). The heat load estimate based on the tank headspace temperature was 8,130 W (27,740 Btu/hr) (Kummerer 1995). All three estimates are well below the limit of 11,700 W (40,000 Btu/hr) that separates high- and low-heat-load tanks (Smith 1986).

2.9 SUMMARY

The results of all analyses performed to address potential safety issues showed that primary analytes did not exceed safety decision threshold limits. All requirements for the safety screening and organic complexant issue were met. With the exception of a few samples, the gateway analyses for the historical DQO were satisfied. The amount of sulfate in segment 235:10, lower half was <10 percent of the amount expected for SMMS1 waste. The fingerprint analytes accounted for <85 percent of the waste mass for segments 239:11R upper half and 239:11R lower half, indicating that except for these segments the waste is consistent with the SMMS1 waste type. The results from the 1997 grab samples indicate that all compatibility and safety requirements were met. Vapor samples taken in March 1995 showed the concentration of total nonmethane organic hydrocarbon in the tank was 0.78 mg/m^3 and the flammable gas concentration was <23 ppmv. 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	The concentration of hydrogen as measured during the March 1995 vapor samples was <23 ppmv, which is <0.058 percent of the LFL.
Historical (gateway analysis)	Total mass of gateway analytes	More than 85% by weight of the waste was accounted for by the gateway analytes for all samples except segments 239:11R upper and lower half.
	Selected segment comparison with ≥10% of DQO values	The amount of sulfate in segment 235:10 lower half was <10 percent of the amount expected for SMMS1 waste. All other segments passed for all analytes.

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

Issue	Sub-issue	Result
Historical (gateway analysis) (Cont'd)	Core composite comparison with HDW	The concentration of all of the indicator analyte values for the composite samples were >10 percent of the HDW model estimates for the SMMS1-saltcake in this tank.
Pretreatment	Analyses for treatment to separate low-level and high-level waste streams	Samples were archived for future analysis.
Safety screening	Energetics	All exotherms were ≤ 187 J/g, well below the upper limit of 480 J/g.
	Flammable gas	Vapor measurements were less than 0.058% of LFL
	Criticality	All analyses were less than 1 µCi/g, well below the total alpha limit of 32.7 µCi/g.
Organic complexants[1]	Safety categorization (safe)	Classified as safe, with low TOC, and no visible layers. No sample exceeded 4.5% TOC (dry-weight basis).
Organic solvents[2]	Solvent pool size	The concentration of total nonmethane hydrocarbon was 0.78 mg/m^3. An estimate of the organic solvent pool size has not been calculated.
Compatibility	Waste compatibility assessment	All compatibility and safety requirements were in compliance.

Notes:

LFL = lower flammability limit

[1]The organic complexant safety issue was closed on December 9, 1998, and all organic complexant tanks were removed from the organic complexant Watch List (Owendoff 1998).

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

This page intentionally left blank.

3.0 BEST-BASIS STANDARD INVENTORY ESTIMATE

Tank farm activities include overseeing tank farm operations and identifying, monitoring, and resolving safety issues associated with these operations and with the storage of tank wastes. Disposal activities involve designing equipment, processes, and facilities for retrieving wastes and processing them into a form 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 work associated with tank farm operation and disposal.

Chemical and radiological inventory information is generally derived using one of three approaches: 1) component inventories are estimated using the results of sample analyses, 2) component inventories are predicted using the HDW model based on 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 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 chemical information for tank 241-SX-103 was performed, and a best-basis inventory was established. This work follows the methodology that was established by the standard inventory task. The following information was used in the evaluation:

- Analytical data from the April/May 1998 rotary mode core samples (Steen 1998)
- Analytical data from the June 1997 grab samples (Steen 1997)
- Analytical data from other S and U farm tanks that contain similar 242-S Evaporator concentrated SMMS1 and REDOX high-level sludge (R1) waste types
- The inventory estimates generated by the HDW model (Agnew et al. 1997).

Based on this evaluation, a best-basis inventory was developed for tank 241-SX-103 using the 1998 core and 1997 grab sampling analytical data. Where analytical data were not available, the HDW model inventory estimates reported by Agnew et al. (1997) were used as the best basis for this tank.

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 have been infrequently reported. Therefore, 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 the 177 Hanford Site tanks are reported in the HDW 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.

The best-basis inventory estimate for tank 241-SX-103 is presented in Tables 3-1 and 3-2. The mercury inventory was specified in Simpson (1998). Once the best-basis inventories were determined, the hydroxide inventory was calculated by performing a charge balance with the valence of other analytes. This charge balance approach is consistent with that used by Agnew et al. (1997a).

The inventory values reported in Tables 3-1 and 3-2 are subject to change. Refer to the Tank Characterization Database for the most current inventory values.

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-103. (Effective January 31, 1999) (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
Al	2.08E+05	S	
Bi	0	S/E	Not expected in waste based on process history
Ca	776	S/E	Upper bounding limit
Cl	19,400	S	
TIC as CO_3	1.06E+05	S	
Cr	13,900	S	
F	939	S/E	Based on IC analysis
Fe	4,540	S/E	Iron not expected in liquid phase
Hg	0	E	Per change package #7 (Simpson 1998)
K	7,360	S	
La	0	S/E	Not expected in waste based on process history
Mn	2,540	S/E	Manganese not expected in liquid phase
Na	7.00E+05	S	
Ni	333	S/E	Nickel not expected in liquid phase
NO_2	2.92E+05	S	
NO_3	8.33E+05	S	
OH_{TOTAL}	5.01E+05	C	
Pb	279	S/E	Upper bounding limit
PO_4	15,000	S	Based on IC analysis
Si	1,830	S	

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-103. (Effective January 31, 1999) (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
SO_4	34,900	S	Based on IC analysis
Sr	116	S/E	Strontium not expected in liquid phase; upper bounding limit
TOC	13,600	S/E	
U_{TOTAL}	1,560	S/E	Uranium not expected in liquid phase
Zr	46.4	S/E	Zirconium not expected in liquid phase

Notes:

IC = ion chromatography
TIC = total inorganic carbon

[1]S = sample-based (see Appendix B), M = HDW 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_2, NO_3, PO_4, SO_4, and SiO_3.

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-103 Decayed to January 1, 1994. (Effective January 31, 1999) (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	672	M	
^{14}C	90.6	M	
^{59}Ni	8.76	M	
^{60}Co	101	M	
^{63}Ni	854	M	
^{79}Se	11.2	M	
^{90}Sr	8.86E+05	S	
^{90}Y	8.86E+05	S	Based on ^{90}Sr activity
^{93}Zr	54.7	M	
^{93m}Nb	40.8	M	
^{99}Tc	648	M	
^{106}Ru	0.0185	M	
^{113m}Cd	240	M	
^{125}Sb	432	M	
^{126}Sn	17.1	M	
^{129}I	1.25	M	

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-103 Decayed to January 1, 1994 (Effective January 31, 1999). (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{134}Cs	7.85	M	
^{137}Cs	8.26E+05	S	
^{137m}Ba	7.82E+05	S	Based on 0.946 of ^{137}Cs activity
^{151}Sm	39,700	M	
^{152}Eu	14.0	M	
^{154}Eu	1,670	M	
^{155}Eu	797	M	
^{226}Ra	5.86E-04	M	
^{227}Ac	0.00355	M	
^{228}Ra	0.395	M	
^{229}Th	0.00926	M	
^{231}Pa	0.0146	M	
^{232}Th	0.0259	M	
^{232}U	0.457	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{233}U	1.75	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{234}U	0.582	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{235}U	0.0235	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{236}U	0.0195	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{237}Np	2.37	M	
^{238}Pu	9.15	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{238}U	0.523	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{239}Pu	326	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{240}Pu	54.3	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{241}Am	369	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-103 Decayed to January 1, 1994 (Effective January 31, 1999). (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{241}Pu	588	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{242}Cm	0.770	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{242}Pu	0.00319	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{243}Am	0.0129	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{243}Cm	0.0706	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{244}Cm	0.685	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.

Notes:

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

This page intentionally left blank.

4.0 RECOMMENDATIONS

Rotary-mode core samples (April/May 1998), grab samples (June 1997), and vapor samples (March 1995) were taken to satisfy the applicable issues associated with tank 241-SX-103. Analytical results from the core sample were within the established limits of the safety screening and organic complexant DQOs. The organic complexant safety issue was closed on December 9, 1998, and all organic complexant tanks were removed from the organic complexant Watch List (Owendoff 1998). With the exception of a few segments, the gateway analysis for the historical evaluation DQO passed, indicating that the waste recovered is predominately SMMS1 saltcake. Segments 10 and 11 appear to be saltcake, but do not exhibit the characteristics of SMMS1. Based on the aluminum concentrations, the bottom layer of waste in the tank (segment 12) is expected to be a dense sludge.

The analytical results for tank 241-SX-103 and the waste compatibility requirements were included in the 1997 grab samples analytical results report (Steen 1997). These results showed that all compatibility requirements were met. Before pumping the supernatant and other drainable liquids from tank 241-SX-103, a waste compatibility assessment will be performed by tank farm operations.

Vapor samples showed that ammonia is the only toxic vapor of concern, and that the LFL in the tank headspace is less than one percent. The concentration of total nonmethane organic hydrocarbon in the tank is 0.78 mg/m^3. An estimate of the organic solvent pool size has not been calculated (Huckaby and Sklarew 1997). However, the organic program has determined that even if an organic solvent pool does exist, the consequence of a fire or ignition of organic solvents does not exceed the criteria established in the authorization basis (Brown et al. 1998). Consequently, additional vapor analyses are not required for this tank. The organic solvent safety issue is expected to be closed for all tanks in 1999.

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 tank characterization report. 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 responsible for the applicable issue. A "yes" in column 3 indicates that no additional sampling or analyses are needed. Conversely, a "no" indicates additional sampling or analysis may be needed to satisfy issue requirements.

Table 4-1. Acceptance of Tank 241-SX-103 Sampling and Analysis.

Issue	Sampling and Analysis Performed	TWRS/PHMC Program Acceptance
Flammable gas DQO	Yes	Yes
Historical evaluation DQO	Yes	Yes
Pretreatment DQO	Yes	Yes
Organic complexant memorandum of understanding[1]	Yes	Yes
Organic solvent DQO[2]	Yes	Yes
Safety screening DQO	Yes	Yes
Compatibility DQO	Yes	Yes

Notes:

[1]The organic complexant safety issue was closed on December 9, 1998, and all organic complexant tanks were removed from the organic complexant Watch List (Owendoff 1998).

[2]The organic solvent safety 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-SX-103. (2 sheets)

Issue	Evaluation Performed	TWRS/PHMC Program Acceptance
Flammable gas DQO	(in progress)[1]	N/D
Historical evaluation DQO	Yes	Yes
Pretreatment DQO	No	N/D
Organic complexant memorandum of understanding[2]	Yes	Yes

Table 4-2. Acceptance of Evaluation of Characterization Data and Information for Tank 241-SX-103. (2 sheets)

Issue	Evaluation Performed	TWRS/PHMC Program Acceptance
Organic solvent DQO[3]	Yes	Yes
Safety screening DQO	Yes	Yes
Compatibility DQO	Yes	Yes

Notes:

N/D = not determined

[1]Sampling and analysis for the flammable gas issue is not expected to be completed until September 30, 2001.

[2]The organic complexant safety issue was closed on December 9, 1998, and all organic complexant tanks were removed from the organic complexant Watch List (Owendoff 1998).

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

This page intentionally left blank.

5.0 REFERENCES

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.

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, Los Alamos National Laboratory, Los Alamos, New Mexico.

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.

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.

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.

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

Ecology, EPA, and DOE, 1997, *Hanford Federal Facility Agreement and Consent Order,* as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

Fowler, K. D., 1995, *Data Quality Objectives for Tank Farms Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

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.

Hewitt, E. R., 1996, *Tank Waste Remediation System Resolution of Potentially Hazardous Vapor Issues*, WHC-SD-TWR-RPT-001, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Hodgson, K. M., and M. D. LeClair, 1996, *Work Plan for Defining a Standard Inventory Estimate for Wastes Stored in Hanford Site Underground Tanks,* WHC-SD-WM-WP-311, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Huckaby, J. L., and D. S. Sklarew, 1997, *Screening for Organic Solvents in Hanford Waste Tanks Using Organic Vapor Concentrations,* PNNL-11698, Pacific Northwest National Laboratory, Richland, Washington.

Johnson, G. D., 1997, *Strategy for Resolution of the Flammable Gas Safety Issue*, HNF-SD-WM-ER-680, Rev. 0, DE&S Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland Washington.

Kummerer, M., 1995, *Heat Removal Characteristics of Waste Storage Tanks*, WHC-SD-WM-SARR-010, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Kupfer, M. J., W. W. Shulz, 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.

Kupfer, M. J., A. L. Boldt, B. A. Higley, K. M. Hodgson, L. W. Shelton, B. C. Simpson, R. A. Watrous, M. D. LeClair, G. L. Borsheim, R. T. Winward, R. M. Orme, N. G. Colton, S. L. Lambert, D. E. Place, and W. W. Schulz, 1998, *Standard Inventories of Chemicals and Radionuclides in Hanford Site Tank Wastes*, HNF-SD-WM-TI-740, Rev. 0B, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

LMHC, 1998, Tank Characterization Database, Internet at http://twins.pnl.gov:8001/TCD/main.html, Lockheed Martin Hanford Corp., Richland Washington.

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.

Meacham, J. E., W. L. Cowley, A. B. Webb, N. W. Kirch, J. A. Lechelt, D. A. Reynolds, L. A. Stauffer, D. B. Bechtold, D. M. Camaioni, F. Gao, R. T. Hallen, P. G. Heasler, J. L. Huckaby, R. D. Scheele, C. S. Simmons, J. J. Toth, and L. M. Stock, 1998, *Organic Complexant Topical Report*, HNF-3588, Rev. 2, DE&S Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

Mulkey, C. H., and M. S. Miller, 1997, *Data Quality Objectives for Tank Farms Waste Compatibility Program*, HNF-SD-WM-DQO-001, Rev. 2, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

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.

Owendoff, J. M., 1998, *Approval to Close the Organic Complexant Safety Issue and Remove 18 Organic Complexant Tanks from the Watchlist*, (memorandum, to J. D. Wagoner, December 9), U. S. Department of Energy, Washington D. C.

Public Law 101-510, 1990, "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of *National Defense Authorization Act for Fiscal Year 1991.*

Sasaki, L. M., 1997, *Compatibility Grab Sampling and Analysis Plan for Fiscal Year 1997*, WHC-SD-WM-TSAP-115, Rev. 0H, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

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.

Simpson, B. C., and D. J. McCain, 1997, *Historical Model Evaluation Data Requirements*, HNF-SD-WM-DQO-018, Rev. 2, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Simpson, B. C., 1998, *Best-Basis Inventory Change Package for Reconciliation of Mercury Values, Change Package 7*, (internal memorandum 7A120-98-005 to J. W. Cammann, February 26), Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Smith, D. A., 1986, *Single-Shell Tank Isolation Safety Analysis Report*, WHC-SD-WM-SAR-006, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

Steen, F. H., 1997, *Tank 241-SX-103, Grab Samples, 3SX-97-1, 3SX-97-2 and 3SX-97-3 Analytical Results for the Final Report*, HNF-SD-WM-DP-260, Rev. 0, Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

Steen, F. H., 1998, *Tank 241-SX-103, Cores 229 and 233, Analytical Results for the Final Report*, HNF-SD-WM-DP-311, Rev. 0, Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

Watrous, R. A., and D. W. Wootan, 1997, *Activity of Fuel Batches Processed Through Hanford Separations Plants, 1944 Through 1989,* HNF-SD-WM-TI-794, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

APPENDIX A

HISTORICAL TANK INFORMATION

This page intentionally left blank.

APPENDIX A

HISTORICAL TANK INFORMATION

Appendix A describes tank 241-SX-103 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-SX-103, including surface-level readings, temperatures, and a description of the waste surface based on photographs
- **Section A5.0**: Appendix A references.

A1.0 CURRENT TANK STATUS

As of January 31, 1999 tank 241-SX-103 contained an estimated 2,400 kL (634 kgal) of noncomplexed waste based on surface level measurements and zip cord readings. This differs from the Hanlon (1998) volume of 2,468 kL (652 kgal), accounting for 15 cm (6 in.) of evaporation since the Hanlon volume was last updated. The waste volumes were estimated using a Food Instrument Corporation surface level gauge and sludge level measurement device. Table A1-1 shows the volumes of the waste phases found in the tank.

Tank 241-SX-103 is out of service, as are all single-shell tanks. This tank is categorized as sound with partial interim isolation completed in 1985. The tank is actively ventilated and is on the Watch List (Public Law 101-510) for flammable gas. Tank 241-SX-103 and all organic complexant tanks were removed from the Watch List for the organic complexants issue on December 9, 1998 (Owendoff 1998).

Table A1-1. Tank Contents Status Summary.[1]

Waste Type	kL (kgal)
Total waste[1]	2,400 (634)
Supernatant[1]	0 (0)
Sludge[2]	435 (115)
Saltcake[1]	1,964 (519)
Drainable interstitial liquid[3]	984 (259.5)
Drainable liquid remaining[3]	984 (259.5)
Pumpable liquid remaining[3]	939 (248)

Note:

[1]Based on surface level measurements, differs from Hanlon (1999)

[2]Hanlon (1998)

[3]Assumes a saltcake drainable porosity of 50 percent and 11.2 kgal capillary hold up (Brown 1996).

A2.0 TANK DESIGN AND BACKGROUND

The SX Tank Farm was constructed between 1953 and 1954 in the 200 West Area of the Hanford Site. The SX Tank Farm contains fifteen 100-series tanks. These tanks have a maximum capacity of 3,785 kL (1,000 kgal) and a diameter of 23 m (75 ft). Built according to the third-generation design, the 241-SX Tank Farm was designed for self-boiling waste (for a one- to five-year boiling period) with a maximum fluid temperature of 121 °C (250 °F) (Leach and Stahl 1997). Because the tanks were designed specifically for boiling waste, airlift circulators were installed to control waste temperatures.

Tank 241-SX-103 entered service in 1954 and is third in a three-tank cascading series. These tanks are connected by a 7.6-cm (3-in.) cascade line. The cascade overflow height is approximately 9.47 m (373 in.) from the tank bottom and 30 cm (1 ft) below the top of the steel liner. These single-shell tanks in the 241-SX Tank Farm are constructed of 61-cm (2-ft)-thick, reinforced concrete with a 0.953-cm (0.375-in.) mild carbon steel liner on the bottom and sides with a 38-cm (1.25-ft)-thick, domed concrete top. These tanks have a dished bottom with an operating depth of 9.14 m (30 ft). The tanks are covered with approximately 2.21 m (7.25 ft) of overburden.

Tank 241-SX-103 has 13 risers according to the drawings and engineering change notices. The risers range in diameter from 100 mm (4 in.) to 1.1 m (42 in.). Table A2-1 shows numbers, diameters, and descriptions of the risers. A plan view that depicts the riser and nozzle configuration is shown as Figure A2-1. Figure A2-2 is a tank cross section showing the approximate waste level along with a schematic of the tank equipment.

Table A2-1. Tank 241-SX-103 Risers.[1]

Number	Diameter (in.)	Description and Comments
R1	4	Pit drain
R2	4	B-221 temperature probe
R3	4	Food Instrument Corporation gauge (benchmark Change Engineering Order 36904; December 11, 1986) (ENRAF[2] 854, Engineering Change Notice-620751; February 27, 1995)
R4	4	Pit drain
R5	12	Pump riser
R6	12	Vapor manifold (below grade)
R7	12	B-222 observation port (benchmark Change Engineering Order 36904; December 11, 1986)
R8	12	Pump riser
R9	12	Saltwell screen and pump
R11	4	Blind flange, sludge measurement port (benchmark Change Engineering Order 36904; December 11, 1986)
R13	42	Spare (below grade)
R14	4	B-436 liquid observation well
R16	4	Breather filter (standard hydrogen monitor system with air filter W-369-012; December 20, 1994)
N1	5	Spare, capped
N2	3.5	Inlet
N3	3.5	Auxiliary inlet
N4	4	Outlet

Notes:

[1]Alstad (1993), Lipnicki (1997), Tran (1993), and Vitro (1985)
[2]ENRAF is a trademark of ENRAF Corporation, Houston, Texas.

Figure A2-1. Riser Configuration for Tank 241-SX-103.

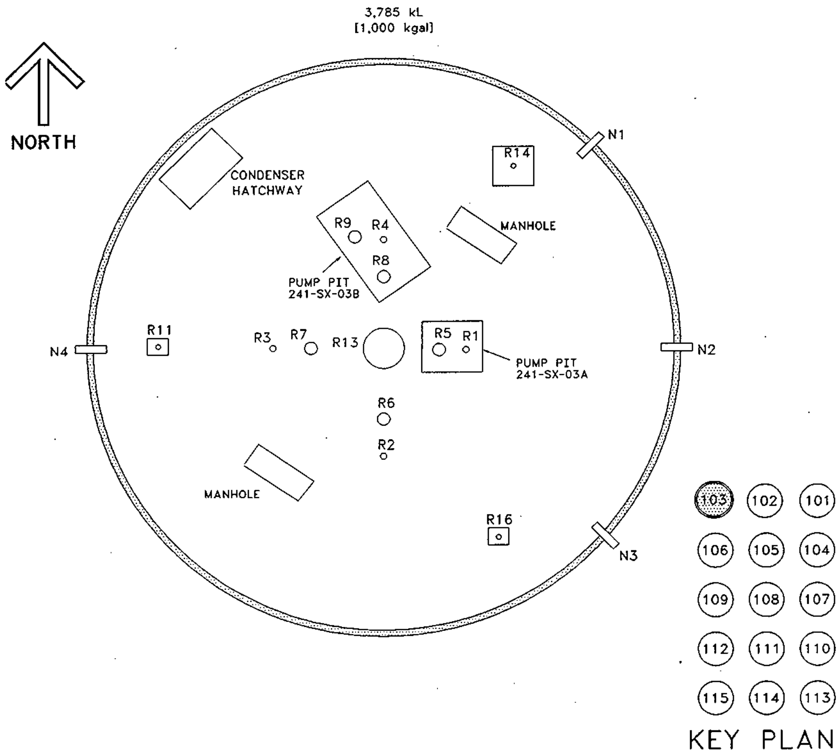
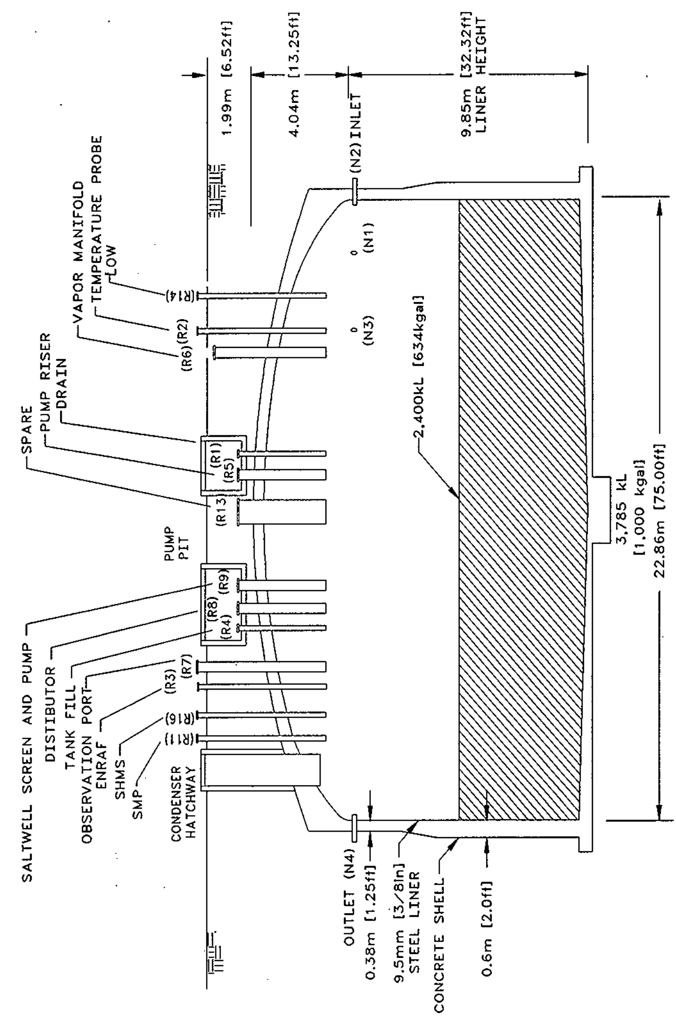


Figure A2-2. Tank 241-SX-103 Cross Section and Schematic.



A3.0 PROCESS KNOWLEDGE

The sections below 1) provide information about the transfer history of tank 241-SX-103, 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-SX-103 (Agnew et al. 1997b). Waste was initially added to tank 241-SX-103 in the fourth quarter of 1954 with the cascade of REDOX process high-level waste (R1) from tank 241-SX-102. In the first and third quarters of 1955, waste was received from the 202-S (REDOX) Plant. In the second quarter of 1958, supernatant was sent to tank 241-U-101. From the fourth quarter of 1958 to the third quarter of 1960, sparge transfers of water were sent to tank 241-SX-106. From the second quarter of 1961 to the second quarter of 1971, supernatant waste was sent to tanks 241-SX-102, 241-TX-101, 241-TX-118, 241-TY-101, and 241-BX-104. From the second quarter of 1961 to the second quarter of 1963, condensate waste was sent to tank 241-SX-106. From the third quarter of 1961 to the third quarter of 1971, the tank received supernatant waste from various 241-SX tanks, 241-TX-118, 241-BX-101, and 241-BX-103.

In support of the 242-S Evaporator campaign, supernatant waste was transferred to and received from tank 241-S-102 from the first quarter of 1975 to the first quarter of 1977. From the second quarter of 1977 to the third quarter of 1980, waste was transferred and received from tank 241-SY-102 in support of the 242-S Evaporator campaign. The tank was labeled inactive in 1978 and removed from service in 1980. The tank was partially interim isolated in June 1985.

Table A3-1. Tank 241-SX-103 Major Transfers.[1,2,3,4] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume	
				KL	kgal
241-SX-102	--	Supernatant	1954	2,456	649
202-S (REDOX)	--	Supernatant (R1)	1955	1,083	286
--	241-SX-106	Sparge water	1958-1960	636	168
--	241-U-101, 241-SX-102, 241-SX-106, 241-TX-101, 241-TX-118, 241-TY-101, 241-BX-104	Supernatant	1958-1971	19,890	5,255

Table A3-1. Tank 241-SX-103 Major Transfers.[1,2,3,4] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume KL	Estimated Waste Volume kgal
241-SX-113, 241-SX-108, 241-SX-114, 241-SX-110, 241-SX-111, 241-SX-105, 241-SX-107, 241-TX-118, 241-BX-101, 241-BX-103	--	Supernatant	1958-1971	19,920	5,263
--	--	Flush water	1963	242	64
--	--	Condensate water	1965-1966	57	15
--	241-S-102	Evaporator feed	1975-1977	10,901	2,880
241-S-102	--	Evaporator bottoms	1975-1977	11,329	2,993
--	241-SY-102	Evaporator feed	1977-1980	2,634	696
241-SY-102	--	Evaporator bottoms	1977-1980	1,158	306
241-S-107	--	Supernatant	1979	280	74
--	241-AW-102	Supernatant	1992	53	14

Notes:

[1]Waste volumes and types are best estimates based on the historical data.

[2]Agnew et al. (1997b)

[3]Because only major transfers are listed, the sum of these transfers will not equal the current tank waste volume.

[4]Waste evaporated from the tank is not included in this table.

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 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.

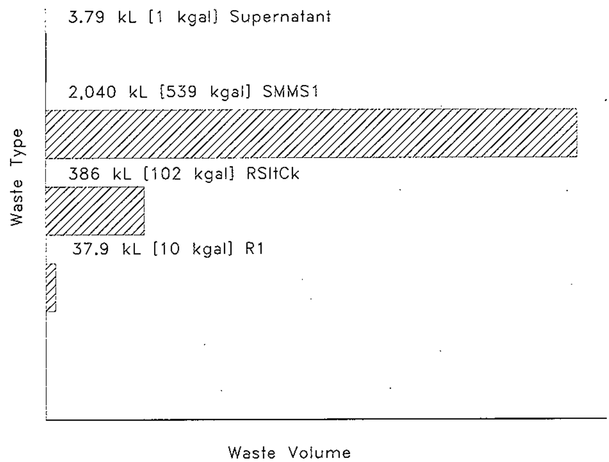
- The SMM is a subroutine within the HDW model that calculates the volume and composition of certain supernatant blends and concentrates.

Using these records, the TLM defines the solid layers in each tank. The SMM uses information from the Waste Status and Transaction Record Summary (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 the TLM and SMM, tank 241-SX-103 contains four layers. A top layer of 3.785 kL (1 kgal) of supernatant is predicted to be above a layer of 2,040 kL (539 kgal) of SMMS1, over a layer of 386 kL (102 kgal) of REDOX saltcake (RSltCk), over a bottom layer of 37.85 kL (10 kgal) of REDOX high-level sludge waste (R1). Figure A3-1 is a graphical representation of the estimated waste type and volume for the tank layer.

The SMMS1 layer should contain the following major constituents listed from highest concentration above one weight percent: nitrate, sodium, hydroxide, nitrite, aluminum, carbonate, and sulfate. Constituents above one weight percent in the REDOX saltcake layer are sodium, nitrate, nitrite, hydroxide, aluminum, and chromium. Constituents above one weight percent in the R1 layer are hydroxide, nitrate, aluminum, sodium, nitrite, and iron. Table A3-2 shows the historical estimate of the expected waste constituents and their concentrations.

Figure A3-1. Tank Layer Model[1].



Note:

[1]Differs from Hanlon (1999) and tank surveillance measurements.

Table A3-2. Historical Tank Inventory Estimate.[1,2] (3 sheets)

Total Inventory Estimate					
PHYSICAL PROPERTIES				**-95 CI**	**+95 CI**
Total waste	4.18E+06 kg (652 kgal)			--	--
Heat load	6.52 kW (2.23E+04 Btu/hr)			6.18	6.85
Bulk density[3]	1.69 g/cm^3			1.64	1.73
Water wt%[3]	28.5			26.2	31.8
TOC wt% C (wet)[3]	0.758			0.477	1.04
Constituents	***M***	**ppm**	**kg**[4]	**-95 CI (*M*)**	**+95 CI (*M*)**
Na^+	15.6	2.20E+05	8.86E+05	14.5	16.6
Al^{3+}	2.16	29,400	1.44E+05	1.84	2.63
Fe^{3+}	0.0289	427	3,990	0.027	0.0308
Cr^{3+}	0.261	4,910	33,500	0.206	0.273
Bi^{3+}	0.00143	214	739	0.00130	0.00156
La^{3+}	5.37E-05	5.34	18.4	3.89E-05	6.86E-05
Hg^{2+}	9.43E-06	1.33	4.67	8.74E-06	9.70E-06
Zr	2.68E-04	17.5	60.3	2.44E-04	2.92E-04
Pb^{2+}	0.00102	147	521	8.23E-04	0.00122
Ni^{2+}	0.00945	265	1,370	0.00915	0.00969
Sr^{2+}	0	0	0	0	0
Mn^{4+}	0.00365	143	495	0.00274	0.00457
Ca^{2+}	0.0486	953	4,810	0.0435	0.0538
K^+	0.0689	1,780	6,650	0.0633	0.0748
OH^-	12.5	1.11E+05	5.23E+05	10.9	14.6
NO_3^-	5.65	2.07E+05	8.65E+05	5.23	5.78
NO_2^-	2.57	70,000	2.92E+05	2.18	2.97
CO_3^{2-}	0.456	16,200	67,600	0.414	0.493
PO_4^{3-}	0.0932	5,230	21,800	0.0794	0.0980
SO_4^{2-}	0.250	14,200	59,400	0.200	0.301
Si	0.0962	1,600	6,670	0.0823	0.109
F^-	0.0705	792	3,310	0.0591	0.0806
Cl^-	0.255	5,340	22,300	0.232	0.274
$C_6H_5O_7^{3-}$	0.0272	3,030	12,700	0.0248	0.0295
$EDTA^{4-}$	0.0168	2,850	11,900	0.00501	0.0287
$HEDTA^{3-}$	0.0315	5,100	21,300	0.00801	0.0554
$Glycolate^-$	0.0941	4,170	17,400	0.0623	0.126
$Acetate^-$	0.00641	223	933	0.00526	0.00755
$Oxalate^{2-}$	7.03E-05	3.66	15.3	6.23E-05	7.84E-05
DBP	0.0185	2,300	9,590	0.0153	0.0216

Table A3-2. Historical Tank Inventory Estimate.[1, 2] (3 sheets)

Total Inventory Estimate					
Constituents (Cont'd)	M	Ppm	kg[4]	-95 CI (M)	+95 CI (M)
Butanol	0.0185	810	3,380	0.0153	0.0216
NH_3	0.0944	948	3,960	0.0797	0.119
$Fe(CN)_6^{4-}$	0	0	0	0	0
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci[5]**	**-95 CI (Ci/L)**	**+95 CI (Ci/L)**
^{3}H	2.72E-04	0.161	672	1.56E-04	2.93E-04
^{14}C	3.67E-05	0.0217	90.6	1.24E-05	3.78E-05
^{59}Ni	3.55E-06	0.00210	8.76	2.37E-06	3.66E-06
^{63}Ni	3.46E-04	0.204	854	2.31E-04	3.57E-04
^{60}Co	4.07E-05	0.0241	101	1.29E-05	4.23E-05
^{79}Se	4.56E-06	0.00269	11.2	3.00E-06	5.66E-06
^{90}Sr	0.172	102	4.24E+05	0.164	0.179
^{90}Y	0.172	102	4.24E+05	0.118	0.180
^{93}Zr	2.22E-05	0.0131	54.7	1.44E-05	2.77E-05
^{93m}Nb	1.65E-05	0.00976	40.8	1.11E-05	2.04E-05
^{99}Tc	2.63E-04	0.155	648	1.72E-04	3.54E-04
^{106}Ru	7.48E-09	4.42E-06	0.0185	3.88E-09	9.02E-09
^{113m}Cd	9.71E-05	0.0574	240	5.05E-05	1.30E-04
^{125}Sb	1.75E-04	0.103	432	5.45E-05	1.83E-04
^{126}Sn	6.91E-06	0.00409	17.1	4.58E-06	8.57E-06
^{129}I	5.06E-07	2.99E-04	1.25	3.30E-07	6.84E-07
^{134}Cs	3.18E-06	0.00188	7.85	2.29E-06	4.09E-06
^{137}Cs	0.317	187	7.81E+05	0.288	0.346
^{137m}Ba	0.299	177	7.39E+05	0.204	0.327
^{151}Sm	0.0161	9.51	39,700	0.0107	0.0200
^{152}Eu	5.66E-06	0.00335	14.0	3.74E-06	6.31E-06
^{154}Eu	6.76E-04	0.399	1,670	2.87E-04	8.72E-04
^{155}Eu	3.23E-04	0.191	797	2.08E-04	3.62E-04
^{226}Ra	2.37E-10	1.40E-07	5.86E-04	1.55E-10	2.95E-10
^{228}Ra	1.60E-07	9.46E-05	0.395	6.85E-08	2.72E-07
^{227}Ac	1.44E-09	8.51E-07	0.00355	9.60E-10	1.73E-09
^{231}Pa	5.94E-09	3.51E-06	0.0146	4.04E-09	7.04E-09
^{229}Th	3.75E-09	2.22E-06	0.00926	1.74E-09	6.21E-09
^{232}Th	1.05E-08	6.21E-06	0.0259	5.44E-09	1.56E-08
^{232}U	8.14E-07	4.81E-04	2.01	4.46E-07	1.26E-06
^{233}U	3.12E-06	0.00184	7.70	1.71E-06	4.84E-06

Table A3-2. Historical Tank Inventory Estimate.[1,2] (3 sheets)

Total Inventory Estimate					
Radiological Constituents (Cont'd)	**Ci/L**	**µCi/g**	**Ci[5]**	**-95 CI (Ci/L)**	**+95 CI (Ci/L)**
^{234}U	1.04E-06	6.12E-04	2.55	9.24E-07	1.16E-06
^{235}U	4.19E-08	2.47E-05	0.103	3.74E-08	4.69E-08
^{236}U	3.47E-08	2.05E-05	0.0856	3.03E-08	3.93E-08
^{238}U	1.16E-06	6.84E-04	2.86	1.06E-06	1.27E-06
^{237}Np	9.59E-07	5.67E-04	2.37	6.63E-07	1.26E-06
^{238}Pu	1.93E-06	0.00114	4.76	1.58E-06	2.28E-06
^{239}Pu	6.87E-05	0.0406	169	5.95E-05	7.79E-05
^{240}Pu	1.14E-05	0.00676	28.2	9.78E-06	1.31E-05
^{241}Pu	1.24E-04	0.0732	306	1.00E-04	1.48E-04
^{242}Pu	6.72E-10	3.97E-07	0.00166	5.31E-10	8.14E-10
^{241}Am	7.78E-05	0.0459	192	6.13E-05	9.43E-05
^{243}Am	2.71E-09	1.60E-06	0.00669	2.19E-09	3.28E-09
^{242}Cm	1.62E-07	9.59E-05	0.400	8.33E-08	1.87E-07
^{243}Cm	1.49E-08	8.79E-06	0.0367	7.35E-09	1.71E-08
^{244}Cm	1.44E-07	8.53E-05	0.356	6.68E-08	1.88E-07
Totals	**M**	**µg/g**	**kg**	**-95 CI (M or g/L)**	**+95 CI (M or g/L)**
Pu	9.39E-04 (g/L)	--	2.32	7.70E-04	0.00111
U	0.0117	1,640	6,870	0.0105	0.0131

Notes:

CI = confidence interval

[1]Agnew et al. (1997a)

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

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

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

[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-SX-103 surveillance consists of surface-level measurements (liquid and solid), temperature monitoring inside the tank (waste and headspace), dry well monitoring, and a standard hydrogen monitoring system (SHMS). Surveillance data provide the basis for determining tank integrity. Liquid level measurements and dry well 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. The SHMS primarily monitors hydrogen gas concentration in the tank headspace.

A4.1 SURFACE-LEVEL READINGS

Tank 241-SX-103 is categorized as a sound tank. Until February 1995, a Food Instrument Corporation gauge or manual tape was used to measure surface level. The Food Instrument Corporation gauge was replaced by an ENRAF™ gauge that is used to monitor the surface level through riser 3. Zip cord readings taken on 1/20/98 were 233.7 in. for riser 7 and 238.8 in. for riser 11. The manual ENRAF™ reading taken on 1/20/98 and on 1/31/98 was 234 in. The average of the zip cord readings and the manual ENRAF™ measurements is shown in Table 2-1 and was used for the best-basis inventory volume for tank 241-SX-103.
Figures A4-1 and A4-2 show the surface level history from 1954 to the present.

Discrepancies have been noted between the volume specified by Hanlon (1999) and the recent surface-level measurements. Since its installation, the ENRAF™ has been rebaselined five times to account for the changing surface level in tank 241-SX-103. The surface level baseline in tank 241-SX-103 has deviated between 622 cm (245 in.) and 592 cm (233 in.). These fluctuations in the waste surface baseline are most likely caused by evaporation and are consistent with observed losses for other SX tanks.

Additionally, tank 241-SX-103 has a liquid observation well located in riser 14, and six dry wells. None of the dry-wells has radiation readings greater than the 200 counts per second limit.

A4.2 INTERNAL TANK TEMPERATURES

Tank 241-SX-103 has a single thermocouple tree with six thermocouples to monitor the waste temperature through riser 2. Temperature readings are available from the Surveillance Analysis Computer System from July 1981 to October 1998 (LMHC 1998). Thermocouple elevations and current temperature data are recorded for thermocouples 1 through 6.

The average temperature between January 31, 1998, and January 31, 1999, was 63.2 °C (145.7 °F), the minimum temperature was 28.4 °C (83.1 °F), and the maximum temperature was 73.3 °C (164 °F). A graph of the weekly high temperatures can be found in Figure A4-3. Plots of the individual thermocouple readings can be found in *Supporting Document for the Historical*

Tank Content Estimate for SX-Tank Farm (Brevick et al. 1997).

A4.3 STANDARD HYDROGEN MONITORING SYSTEM

McCain and Bauer (1998) describes the SHMS type B that monitors the vapor phase in the tank 241-SX-103 headspace. The SHMS measures parts-per-million levels of hydrogen, methane, and nitrous oxide. The tank 241-SX-103 SHMS went into service in March 1995. Section B2.3.1 presents the surveillance results from the SHMS.

A4.4 TANK 241-SX-103 PHOTOGRAPHS

The December 1987 photographic montage of the interior of tank 241-SX-103 shows pools of yellowish-brown liquid over a light-colored saltcake surface of varying thickness and dark liquid underneath. An old level measurement tape and other debris can be seen in the center of the montage. A Food Instrument Corporation probe, temperature probe, saltwell screen, manhole, and some inlet nozzles are also visible in the photographs. The waste level has not changed significantly since the photographs were taken; therefore, the photographic montage should represent the current appearance of the waste in the tank (Brevick et al. 1997).

Figure A4-1. Tank 241-SX-103 Surface Level History.

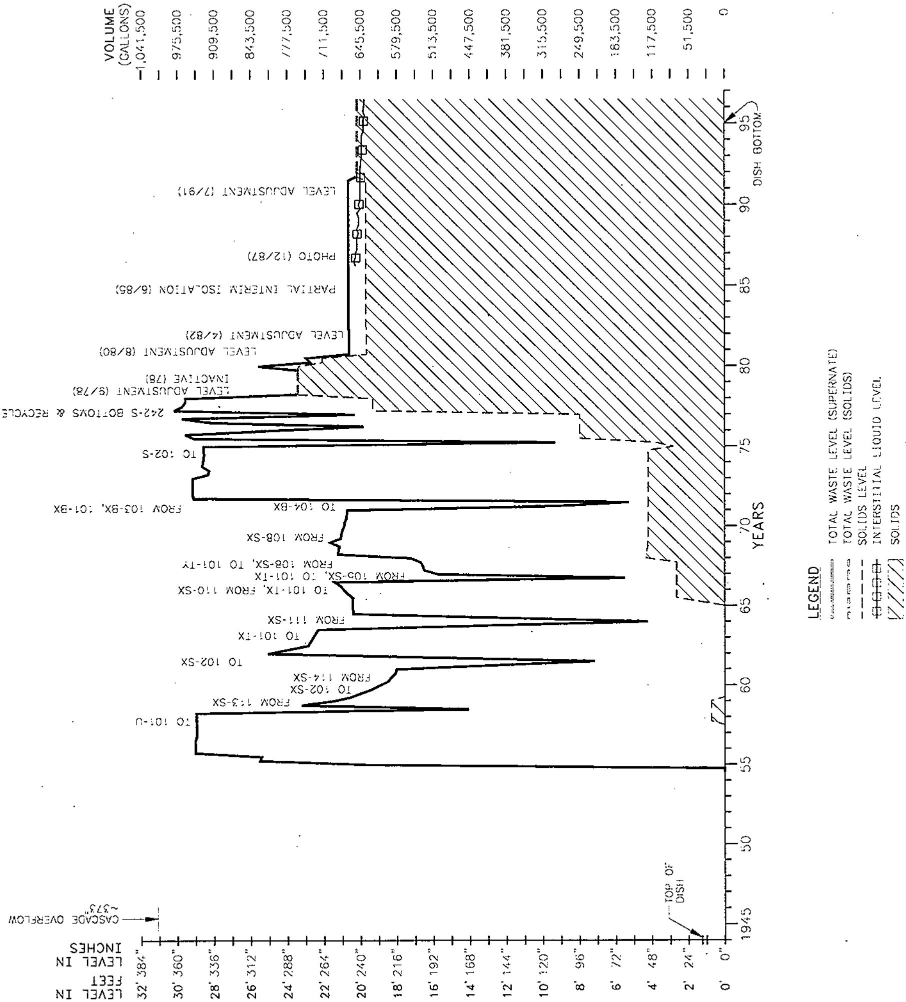


Figure A4-2. Tank 241-SX-103 Current Surface-Level Measurements.

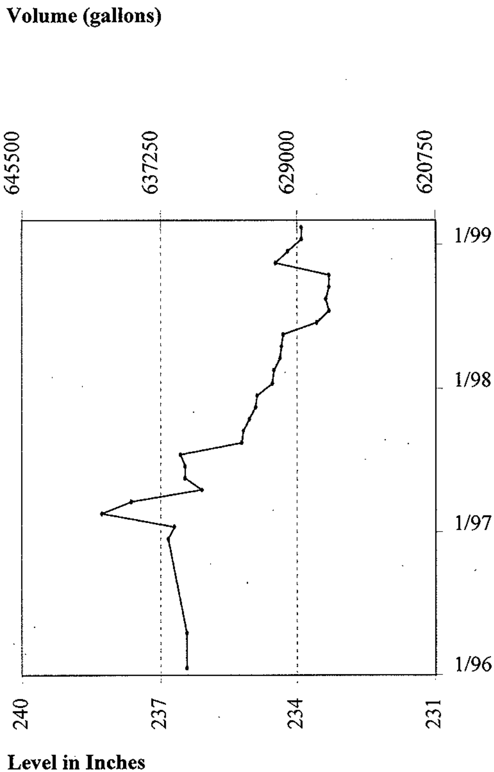
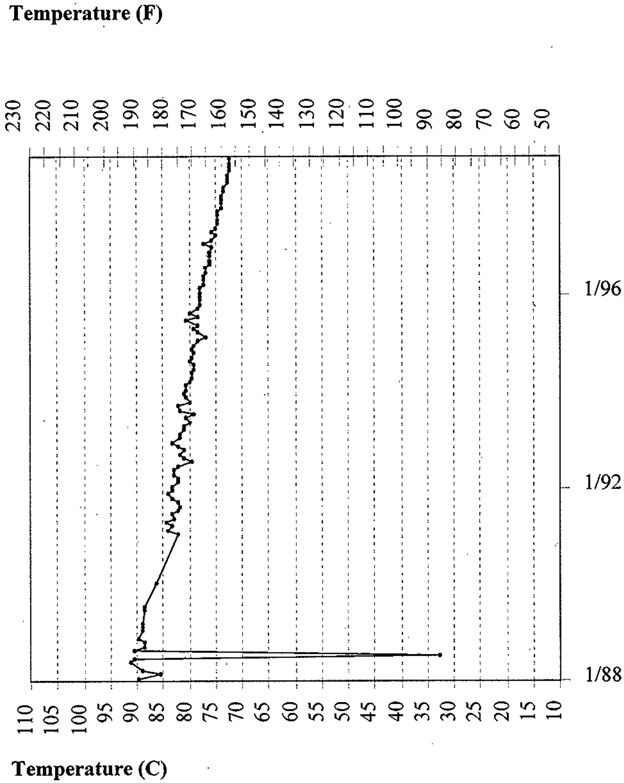


Figure A4-3. Tank 241-SX-103 High Temperature Plot.



A5.0 APPENDIX A REFERENCES

Agnew, S. F., J. Boyer, R. A. Corbin, T. B. Duran, J. R. Fitzpatrick, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1997a, *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4*, LA-UR-96-3860, Los Alamos National Laboratory, Los Alamos, New Mexico.

Agnew, S. F., R. A. Corbin, T. B. Duran, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1997b, *Waste Status and Transaction Record Summary (WSTRS) Rev. 4*, LA-UR-97-311, Los Alamos National Laboratory, Los Alamos, New Mexico.

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

Brevick, C. H., J. L. Stroup and J. W. Funk, 1997, *Supporting Document for the Historical Tank Content Estimate for the SX-Tank Farm*, HNF-SD-WM-ER-324, Rev. 1B, Fluor Daniel Northwest for Fluor Daniel Hanford, Inc., Richland, Washington.

Brown, R. G., 1996, *Multi Function Waste Tank Facility Path Forward Engineering Analysis Technical Task 3.5, SST Liquid Contents*, WHC-SD-W236A-ES-012, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

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.

Leach, C. E., and S. M. Stahl, 1997, *Hanford Site Tank Farm Facilities Interim Safety Basis*, WHC-SD-WM-ISB-001, Rev. 0M, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Lipnicki, J., 1997, *Waste Tank Risers Available for Sampling*, HNF-SD-WM-TI-710, Rev. 4, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

LMHC, 1998, Tank Characterization Database, Internet at http://twins.pnl.gov:8001/TCD/main.html, Lockheed Martin Hanford Corp., Richland, Washington.

McCain, D. J., and R. E. Bauer, 1998, *Results of Vapor Space Monitoring of Flammable Gas Watch List Tanks*, HNF-SD-WM-TI-797, Rev. 3A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Public Law 101-510, 1990, "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of the *National Defense Authorization Act for Fiscal Year 1991*.

Tran, T. T., 1993, *Thermocouple Status Single-Shell & Double-Shell Waste Tanks*, WHC-SD-WM-TI-553, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Vitro, 1985, *Piping Waste Tank Isolation 241-SX-103*, Drawing H-2-73220, Rev. 3, Vitro Engineering Corporation, Richland, Washington.

This page intentionally left blank.

APPENDIX B

SAMPLING OF TANK 241-SX-103

This page intentionally left blank.

APPENDIX B

SAMPLING OF TANK 241-SX-103

Appendix B provides sampling and analysis information for each known sampling event for tank 241-SX-103 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

Appendix B describes the sampling and analysis events for tank 241-SX-103. Rotary mode core samples were taken in April and May 1998 to satisfy the requirements of the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), *Memorandum of Understanding for the Organic Complexant Safety Issue Data Requirements* (Schreiber 1997), *Data Quality Objective to Support Resolution of the Organic Solvent Safety Issue* (Meacham et al. 1997), *Data Quality Objective to Support Resolution of the Flammable Gas Safety Issue* (Bauer and Jackson 1998), *Historical Model Evaluation Data Requirements* (Simpson and McCain 1997), and the *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology* (Kupfer et al. 1995). The sampling and analysis were performed in accordance with the *Tank 241-SX-103 Rotary Mode Core Sampling and Analysis Plan* (Conner 1998). Grab samples were taken in June 1997 to satisfy the requirements of the *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Fowler 1995 and Mulkey and Miller 1997). The sampling and analysis were performed in accordance with the *Compatibility Grab Sampling and Analysis Plan* (Sasaki 1997). Further discussions of the sampling and analysis procedures can be found in the *Tank Characterization Reference Guide* (DeLorenzo et al. 1994). These analyses are discussed in Sections B2.1 and B2.2.

Tank headspace vapors were characterized from samples collected in March 1995 in accordance with the *Tank 241-SX-103 Tank Characterization Plan* (Homi 1995). These analyses are discussed in Section B2.3.

B2.0 SAMPLING EVENTS

This section describes sampling events for tank 241-SX-103. The analytical results used to characterize current tank contents were derived from the 1995 vapor sample, the 1997 grab sample, and the 1998 rotary mode core sample. The sampling and analytical requirements from the safety screening, flammable gas, organic complexant, organic solvent, historical, and compatibility DQOs are also summarized.

B2.1 1998 CORE SAMPLING EVENT

A vertical profile of the waste is used to satisfy the requirements of 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-SX-103 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 sodium, aluminum, iron, chromium, water, nitrate, carbonate, sulfate, ^{137}Cs, ^{90}Sr, and uranium. The historical model analyses include DSC, TGA, ICP, and IC. The full range of analytes is required for both ICP and IC analyses.

Core 235 consisted of 12 core segments removed from tank 241-SX-103, riser 11, between April 28 and April 30, 1998. Segments were received by the 222-S Laboratory between April 29 and May 21, 1998. Because of high downforces encountered while sampling, additional samples were taken and identified as 6A, 9A, and 12A.

Core 239 consisted of 12 core segments removed from tank 241-SX-103, riser 7, between May 5 and May 11, 1998. Segments were received by the 222-S Laboratory between May 14 and May 21, 1998. Because of high downforces encountered while sampling, additional samples were taken and identified as 1A, 9R1, and 10R1. Because of the sampler was empty When segment 11 was taken, segment 11 was resampled and identified as 11R1.

A field blank was provided to the 222-S Laboratory with core 239. It underwent the same analysis as the drainable liquid as instructed by Conner (1998).

Table B2-1 summarizes the sampling and analytical requirements from the safety screening, flammable gas, organic complexant, organic solvent, historical, and compatibility DQOs.

Table B2-1. Integrated Data Quality Objective Requirements for Tank 241-SX-103.[1]

Sampling Event	Applicable DQOs	Sampling Requirements	Analytical Requirements
Rotary 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) Pretreatment (Kupfer et al. (1995) 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, physical properties, TIC, pH, Cr(VI)
Grab sampling	Compatibility Mulkey and Miller (1997) Fowler (1995)	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]Conner (1998)

B2.1.1 April/May 1998 Core Sample Handling

The core samples were shipped to the 222-S Laboratory for subsampling and analysis. Samples were assigned LABCORE numbers and 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. Additionally, solid core composites were made from each core. Homogenizing equal mass aliquots of solids from segments 6, 6A, 7, 8, 9A, 11, and 12A generated the core 235 composite. The core 239 composite was generated similarly from segments 1, 5, 6, 7, 8, 9, 9R1, 11R1, 12, and 12A. Sample extrusion and subsampling for the two cores is presented in Table B2-2. No organic layer was observed for any of the samples.

Table B2-2. Tank 241-SX-103 Core Subsampling Scheme and Sample Description.[1] (4 sheets)

Sample Identification	Core: Segment	Weight (g)	Sample Portion	Sample Description
Core 235, Riser 11				
235-01	235:1	0.0		Sampler empty.
235-02	235:2	<5.0	Drainable liquid	Sampler empty. Did not retain liquid.
235-03	235:3	<5.0	Drainable liquid	<5 mL of drainable liquid was included with the solids.
		12.0	Lower half	<2.5 cm (1 in.) of dark grey solids with the texture of a wet salt was extruded.
235-04	235:4	74.3	Drainable liquid	45 mL of drainable liquid, gray and opaque, was collected. Solids present were included with the drainable liquid.
235-05	235:5	94.9	Drainable liquid	60 mL of gray, opaque drainable liquid. <5 g of solids was included with the liquid.
		<5.0	Lower half	
235-06	235:6	<5.0	Drainable liquid	<5 mL of drainable liquid was included with the solids.
		19.1	Lower half	10 cm (4 in.) of gray solids with the texture of a wet salt was extruded.
235-06A	235:6A	104.2	Lower half	No drainable liquid. 10 cm (4 in.) of gray solids with the texture of a moist salt was extruded.
235-07	235:7	159.1	Lower half	No drainable liquid. 13 cm (5 in.) of gray solids with the texture of a moist salt was extruded.
235-08	235:8	264.1	Lower half	No drainable liquid. 23 cm (9 in.) of gray solids with the texture of a wet salt was extruded.
235-09	235:9	118.6	Lower half	No drainable liquid. 8 cm (3 in.) of dark gray solids with the texture of a salt slurry was extruded.
235-09A	235:9A	47.4	Lower half	No drainable liquid. 6.4 cm (2.5 in.) of dark gray solids with the texture of a dry salt was extruded.

Table B2-2. Tank 241-SX-103 Core Subsampling Scheme and Sample Description.[1] (4 sheets)

Sample Identification	Core: Segment	Weight (g)	Sample Portion	Sample Description
Core 235, Riser 11 (Cont'd)				
235-10	235:10	23.3	Lower half	No drainable liquid. 2.5 cm (1 in.) of black and white solids with the texture of a dry salt was extruded.
235-11	235:11	151.5	Lower half	No drainable liquid. 15 cm (6 in.) of dark brown-gray solids with the texture of a wet sludge was extruded.
235-12	235:12	0.0		Sampler empty
235-12A	235:12A	43.8	Lower half	No drainable liquid. 5 cm (2 in.) of dark grey solids with the texture of a moist salt was extruded.
Core 239, Riser 7				
239-01	239:1	<5.0	Drainable liquid	<5 mL of drainable liquid was included with the solids.
		235.7	Lower half	23 cm (9 in.) of gray solids with the texture of a salt slurry was extruded.
239-01A	239:1A	351.5	Drainable liquid	250 mL of drainable liquid, yellow and semi clear, was collected.
		19.9	Lower half	3.8 cm (1.5 in.) of white-clear solids with the texture of a salt slurry was extruded.
239-02	239:2	336.1	Drainable liquid	230 mL of drainable liquid, gray and opaque, was collected. Solids present were included with the liquid.
239-03	239:3	129.8	Drainable liquid	90 mL of drainable liquid, gray and opaque, was collected. Solids present were included with the liquid.
239-04	239:4	61.8	Drainable liquid	40 mL of drainable liquid, gray and opaque, was collected. Solids present were included with the liquid.

Table B2-2. Tank 241-SX-103 Core Subsampling Scheme and Sample Description.[1] (4 sheets)

Sample Identification	Core: Segment	Weight (g)	Sample Portion	Sample Description
Core 239, Riser 7 (Cont'd)				
239-05	239:5	62.4	Drainable liquid	45 mL of drainable liquid, gray and opaque, was collected. 20 cm (8 in.) of solids was extruded. The upper 10 cm (4 in.) were light gray with the texture of a salt slurry. The lower 10 cm (4 in.) were light gray with the texture of a wet salt.
		122.1	Upper half	
		116.3	Lower half	
239-06	239:6	272.5	Drainable liquid	210 mL of drainable liquid, gray and opaque, was collected. <5 cm (2 in.) of gray solids with the texture of a salt slurry was extruded.
		124.8	Lower half	
239-07	239:7	267.7	Drainable liquid	190 mL of drainable liquid, gray and opaque, was collected. 10 cm (4 in.) of gray solids with the texture of a salt slurry was extruded.
		125.0	Lower half	
239-08	239:8	169.6	Drainable liquid	120 mL of drainable liquid, dark gray and opaque, was collected. 13 cm (5 in.) of dark grey solids with the texture of a wet salt was extruded.
		203.4	Lower half	
239-09	239:9	200.3	Lower half	No drainable liquid. 15 cm (6 in.) of black and brown solids with the texture of a wet salt was extruded.
239-09R1	239:9R1	140.4	Drainable liquid	90 mL of drainable liquid, gray and opaque, was collected. 13 cm (5 in.)of gray solids with the texture of a salt slurry was extruded.
		198.8	Lower half	
239-10R1	239:10R1	99.5	Drainable liquid	80 mL of drainable liquid, black and opaque, was collected. 2.5 cm (1 in.) of black solids with the texture of a moist salt was extruded.
		13.9	Liner faces	

Table B2-2. Tank 241-SX-103 Core Subsampling Scheme and Sample Description.[1] (4 sheets)

Sample Identification	Core: Segment	Weight (g)	Sample Portion	Sample Description
239-11R	239:11R1	263.2	Upper half	No drainable liquid. 46 cm (18 in.) of black solids with the texture of a salt slurry was extruded.
		198.7	Lower half	
239-12	239:12	107.9	Lower half	No drainable liquid. 10 cm (4 in.) of dark grey solids with the texture of a dry salt was extruded.
239-12A	239:12A	56.0	Lower half	No drainable liquid. 5 cm (2 in.) of white solids with the texture of a dry salt was extruded.

Note:

[1]Steen (1998)

B2.1.2 April/May 1998 Core Sample Analysis

Samples from core 235 and core 239 were analyzed based on safety screening, organic, flammable gas and historical issues. Analyses included total alpha activity, energetics, water content, flammable gas, TOC, TIC, bulk density, IC, ICP, and gamma energy analysis (GEA).

All reported analyses were performed according to approved laboratory procedures (see Table B2-3). Table B2-4 is a summary of the sample portions, sample numbers, and analyses performed on each core sample.

Table B2-3. Analytical Procedures for 1998 Core and 1997 Grab Samples.[1] (2 sheets)

Analysis	Method	Procedure Number
Metals by ICP/AES	Inductively coupled plasma spectroscopy	LA-505-161 LA-505-151
Uranium	Kinetic phosphorescence	LA-925-009
Anions by IC	Ion chromatography	LA-533-105
Hydroxide	Titration	LA-211-102
Ammonia	Ion selective electrode	LA-631-001

Table B2-3. Analytical Procedures for 1998 Core and 1997 Grab Samples.[1] (2 sheets)

Analysis	Method	Procedure Number
TIC/TOC	Persulfate oxidation/coulometry	LA-342-100
TOC	Furnace oxidation/coulometry	LA-344-105
Radionuclides by GEA	Gamma energy analysis	LA-548-121
Strontium-90	Beta proportional counting	LA-220-101
Plutonium-239	Alpha proportional counting	LA-953-104
Americium-241	Alpha proportional counting	LA-953-104
Total alpha activity	Alpha proportional counting	LA-508-101
Total beta activity	Beta proportional counting	LA-220-101
Energetics by DSC	Differential scanning calorimetry	LA-514-114
Percent water by TGA	Thermogravimetric analysis	LA-514-114
Bulk density	Gravimetry	LO-160-103
Specific gravity	Gravimetry	LA-510-112
PH	Direct	LA-212-106
Flammable gas	Combustible gas analysis	IH 1.4 and IH 2.1[2]

Notes:

AES = atomic emission spectroscopy

[1]Steen (1997), Steen (1998).
[2]WHC (1992)

Table B2-4. Tank 241-SX-103 April/May 1998 Core Sample Analysis Summary. (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
11	Core 235	Core composite	S98T001798	Bulk density
			S98T001800	DSC/TGA, TIC/TOC
			S98T001802	Alpha, beta, ^{90}Sr, GEA, U, ICP
			S98T001803	IC
			S98T001804	ICP
11	Core 235, segment 3	Lower half	S98T001501	DSC/TGA, TIC/TOC
			S98T001502	ICP, alpha, GEA, ^{90}Sr, U
			S98T001503	ICP
			S98T001504	IC
11	Core 235, segment 4	Drainable liquid	S98T001543	DSC/TGA, alpha
			S98T001544	ICP, IC, specific gravity, NH_3
11	Core 235, segment 5	Drainable liquid	S98T001485	DSC/TGA, alpha
			S98T001486	ICP, IC, specific gravity, NH_3,
11	Core 235, segment 6	Lower half	S98T001494	Bulk density
			S98T001495	DSC/TGA, TIC/TOC
			S98T001497	ICP, alpha, GEA, ^{90}Sr, U
			S98T001498	ICP
			S98T001499	IC
11	Core 235, segment 6A	Lower half	S98T001546	Bulk density
			S98T001547	DSC/TGA, TIC/TOC
			S98T001548	ICP, alpha, GEA, ^{90}Sr, U
			S98T001551	ICP
			S98T001554	IC
11	Core 235, segment 7	Lower half	S98T001488	Bulk density
			S98T001489	DSC/TGA, TIC/TOC
			S98T001491	ICP, alpha, GEA, ^{90}Sr, U
			S98T001492	ICP
			S98T001493	IC

Table B2-4. Tank 241-SX-103 April/May 1998 Core Sample Analysis Summary. (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
11	Core 235, segment 8	Lower half	S98T001549	ICP, alpha, GEA, ^{90}Sr, U
			S98T001552	ICP
			S98T001555	IC
			S98T001557	Bulk density
			S98T001558	DSC/TGA, TIC/TOC
11	Core 235, segment 9	Lower half	S98T002488	Bulk density
			S98T002489	DSC/TGA, TIC/TOC
			S98T002491	ICP, alpha, GEA, ^{90}Sr, U
			S98T002492	ICP
			S98T002493	IC
11	Core 235, segment 9A	Lower half	S98T001505	Bulk density
			S98T001506	DSC/TGA, TIC/TOC
			S98T001508	ICP, alpha, GEA, ^{90}Sr, U
			S98T001509	ICP
			S98T001510	IC
11	Core 235, segment 10	Lower half	S98T001696	Bulk density
			S98T001697	DSC/TGA, TIC/TOC
			S98T001698	ICP, alpha, GEA, ^{90}Sr, U
			S98T001699	ICP
			S98T001700	IC
11	Core 235, segment 11	Lower half	S98T001550	ICP, alpha, GEA, ^{90}Sr, U
			S98T001553	ICP
			S98T001556	IC
			S98T001560	Bulk Density
			S98T001561	DSC/TGA, TIC/TOC
11	Core 235, segment 12	Lower half	S98T001636	Bulk density
			S98T001637	DSC/TGA, TIC/TOC
			S98T001638	ICP, alpha, GEA, ^{90}Sr, U
			S98T001639	ICP
			S98T001640	IC

Table B2-4. Tank 241-SX-103 April/May 1998 Core Sample Analysis Summary. (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
7	Core 239	Core composite	S98T001799	Bulk density
			S98T001806	DSC/TGA, TIC/TOC
			S98T001808	Alpha, beta, ^{90}Sr, GEA, U, ICP
			S98T001809	IC
			S98T001810	ICP
7	Core 239, segment 1	Lower half	S98T001581	Bulk density
			S98T001582	DSC/TGA, TIC/TOC
			S98T001584	ICP, alpha, GEA, ^{90}Sr, U
			S98T001585	ICP
			S98T001586	IC
7	Core 239, segment 1A	Drainable liquid	S98T001667	DSC/TGA, alpha
			S98T001668	ICP, IC, specific gravity, NH_3
		Lower half	S98T001641	Bulk density
			S98T001642	DSC/TGA, TIC/TOC
			S98T001643	ICP, alpha, GEA, ^{90}Sr, U
			S98T001644	ICP
			S98T001645	IC
			S98T002048	Alpha, ^{90}Sr
7	Core 239, segment 2	Drainable liquid	S98T001565	DSC/TGA, alpha
			S98T001566	ICP, IC, specific gravity, NH_3
7	Core 239, segment 3	Drainable liquid	S98T001653	DSC/TGA, alpha
			S98T001654	ICP, IC, specific gravity, NH_3
7	Core 239, segment 4	Drainable liquid	S98T001578	DSC/TGA, alpha
			S98T001579	ICP, IC, specific gravity, NH_3
7	Core 239, segment 5	Drainable liquid	S98T001714	DSC/TGA, alpha
			S98T001715	ICP, IC, specific gravity, NH_3
		Upper half	S98T001728	DSC/TGA, TIC/TOC
			S98T001730	ICP, GEA, U
			S98T001731	ICP
			S98T001732	IC

Table B2-4. Tank 241-SX-103 April/May 1998 Core Sample Analysis Summary. (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
7	Core 239, segment 5	Lower half	S98T001707	Bulk density
			S98T001708	DSC/TGA, TIC/TOC
			S98T001710	ICP, alpha, GEA, ^{90}Sr, U
			S98T001711	ICP
			S98T001712	IC
7	Core 239, segment 6	Drainable liquid	S98T001594	DSC/TGA, alpha
			S98T001595	ICP, IC, specific gravity, NH_3
		Lower half	S98T001587	Bulk density
			S98T001588	DSC/TGA, TIC/TOC
			S98T001590	ICP, alpha, GEA, ^{90}Sr, U
			S98T001591	ICP
			S98T001592	IC
7	Core 239, segment 7	Drainable liquid	S98T001718	DSC/TGA, alpha
			S98T001719	ICP, IC, specific gravity, NH_3
		Lower half	S98T001721	Bulk density
			S98T001722	DSC/TGA, TIC/TOC
			S98T001724	ICP, alpha, GEA, ^{90}Sr, U
			S98T001725	ICP
			S98T001726	IC
7	Core 239, segment 8	Drainable liquid	S98T001657	DSC/TGA, alpha
			S98T001658	ICP, IC, specific gravity, NH_3
		Lower half	S98T001660	Bulk density
			S98T001661	DSC/TGA, TIC/TOC
			S98T001663	ICP, alpha, GEA, ^{90}Sr, U
			S98T001664	ICP
			S98T001665	IC
7	Core 239, segment 9	Lower half	S98T001701	Bulk density
			S98T001702	DSC/TGA, TIC/TOC
			S98T001704	ICP, alpha, GEA, ^{90}Sr, U
			S98T001705	ICP
			S98T001706	IC

Table B2-4. Tank 241-SX-103 April/May 1998 Core Sample Analysis Summary. (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
7	Core 239, segment 9R1	Drainable liquid	S98T001604	DSC/TGA, alpha
			S98T001605	ICP, IC, specific gravity, NH_3
		Lower half	S98T001597	Bulk density
			S98T001598	DSC/TGA, TIC/TOC
			S98T001600	ICP, alpha, GEA, ^{90}Sr, U
			S98T001601	ICP
			S98T001895	IC
7	Core 239, segment 10R1	Drainable liquid	S98T001569	DSC/TGA, alpha
			S98T001571	ICP, IC, specific gravity, NH_3
		Partial	S98T001572	Bulk density
			S98T001573	DSC/TGA, TIC/TOC
			S98T001574	ICP, alpha, GEA, ^{90}Sr, U
			S98T001575	ICP
			S98T001576	IC
7	Core 239, segment 11	Upper half	S98T001608	DSC/TGA, TIC/TOC
			S98T001610	ICP, GEA, U
			S98T001611	ICP
			S98T001894	IC
		Lower half	S98T001613	Bulk density
			S98T001614	DSC/TGA, TIC/TOC
			S98T001616	ICP, alpha, GEA, ^{90}Sr, U
			S98T001617	ICP
			S98T001618	IC
7	Core 239, segment 12	Lower half	S98T001646	Bulk density
			S98T001647	DSC/TGA, TIC/TOC
			S98T001649	ICP, alpha, GEA, ^{90}Sr, U
			S98T001650	ICP
			S98T001651	IC

Table B2-4. Tank 241-SX-103 April/May 1998 Core Sample Analysis Summary. (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
7	Core 239, segment 12A	Lower half	S98T001619	Bulk density
			S98T001620	DSC/TGA, TIC/TOC
			S98T001622	ICP, alpha, GEA, ^{90}Sr, U
			S98T001623	ICP
			S98T001624	IC

B2.1.3 April/May 1998 Core Analytical Results

This section summarizes the sampling and analytical results associated with the April through May 1998 sampling and analysis of tank 241-SX-103. Table B2-5 indicates which summary result tables are associated with the total alpha activity, percent water, energetics, IC, ICP, and TOC analytical results. These results are documented in Steen (1998).

Table B2-5. April/May 1998 Core Sample Analytical Tables.

Analysis	Table Number
Inductively coupled plasma/emission spectroscopy	B2-11 through B2-47
Total uranium	B2-48
Ion chromatography	B2-49 through B2-56
NH_3 by ion selective electrode	B2-57
Total inorganic carbon	B2-58
Total organic carbon by persulfate	B2-59
Gamma energy analysis	B2-60 and B2-61
$^{89/90}$Sr	B2-62
Total alpha	B2-63
Total beta	B2-64
Energetics by differential scanning calorimetry	B2-65 and B2-66
Percent water by thermogravimetric analysis	B2-67
Bulk density	B2-68
Specific gravity	B2-69

The quality control (QC) parameters assessed in conjunction with tank 241-SX-103 samples were standard recoveries, spike recoveries, duplicate analyses (relative percent differences [RPDs]), and blanks. The quality control criteria are specified in the sampling and analysis plan (SAP) (Conner 1998). The limits for blanks are set forth in guidelines followed by the laboratory, and all data results in this report have met those guidelines. Sample and duplicate pairs, in which any quality control 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, f, g, or h 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.
- "g" indicates that this is a tentatively identified compound.
- "h" indicates that the serial dilution exceeds the acceptance limit.

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 nondetected, or if one value was detected while the other was not, the mean is expressed as a nondetected value. If both values were detected, the mean is expressed as a detected value.

B2.1.3.1 Inductively Coupled Plasma. Analyses by ICP were performed in duplicate on all samples. The analyses were performed directly on the drainable liquid samples following an acid dilution. The solid samples were analyzed following a potassium hydroxide fusion digestion in a nickel crucible. In addition, the solid core composite samples were prepared for analysis by acid digestion. Analyses were also performed on an acid digested portion of the subsamples and the results are included as opportunistic information. Although a full suite of analytes was reported, only aluminum, chromium, and sodium were specifically requested by the historical DQO. Lithium was requested by the safety screening DQO to correct percent water measurements.

The primary ICP analytes detected were sodium, aluminum, chromium, and sulfur. With the exception of a few segments, the majority of the lithium values were below detection levels. Core 235, segment 11 had a mean result of 144 μg/g.

B2.1.3.2 Total Uranium. The analyses for uranium were performed in duplicate on the solid samples following a fusion digestion. The highest mean result returned was 1,540 μg/g.

B2.1.3.3 Ion Chromatography (Ions). The analyses for IC were performed in duplicate on all samples. The analyses were performed directly on the drainable liquid samples. The solid samples were analyzed following a water digestion. Although a full suite of analytes was reported, only nitrate and sulfate were specifically requested by the historical DQO. Bromide was requested by the safety screening DQO to correct percent water measurements.

The primary IC analytes detected were nitrate, nitrite, and sulfate. With the exception of a few segments, the majority of the bromide values were below detection levels. Core 235, segment 11 had a mean result of 2,110 μg/g.

B2.1.3.4 Ammonia. The analyses for ammonia were performed in duplicate directly on the drainable liquid samples. The highest mean result returned was 99.2 μg/mL.

B2.1.3.5 Total Inorganic Carbon. The analyses for TIC by persulfate oxidation/coulometry were performed in duplicate directly on all samples. The solid mean results ranged from 245 μg C/g to 19,400 μg C/g.

B2.1.3.6 Total Organic Carbon. The analyses for TOC by persulfate oxidation/coulometry were performed in duplicate directly on all samples. The solid mean results ranged from 209 μg C/g to 8,210 μg C/g.

B2.1.3.7 Gamma Energy Analysis. The analyses by GEA for the radionuclide constituents were performed in duplicate on the solid samples following a fusion digestion. Although a full suite of analytes was reported, only ^{137}Cs were specifically requested by the historical DQO.

B2.1.3.8 Strontium-89/90. The analyses for $^{89/90}$Sr were performed in duplicate on the solid samples following a fusion digestion.

B2.1.3.9 Total Alpha Activity. Analyses for total alpha activity were performed in duplicate directly on the drainable liquids. The solid samples were analyzed in duplicate following a fusion digestion. All liquid total alpha results were below the total alpha activity action limit of 61.5 μCi/mL. All solid total alpha results were below the total alpha activity action limit of 32.7 μCi/g. The highest mean results returned were 0.0178 μCi/mL for the liquid samples and 0.816 μCi/g for the solid samples.

B2.1.3.10 Total Beta Activity. Analyses for total beta activity were performed in duplicate on the solid core composite samples following a fusion digestion.

B2.1.3.11 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. The analyses for exothermic energy by DSC were performed in duplicate directly on the samples.

All DSC results were below the action limit of 480 J/g dry weight. The highest solid mean result returned was 84.1 J/g dry weight (core 239, segment 1, lower half). The highest liquid mean result returned was 187 J/g dry weight (core 239, segment 7).

B2.1.3.12 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. Any 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 operator at an inflection point on the TGA plot chooses the temperature limit for moisture loss. Other volatile matter fractions can often be differentiated by inflection points as well.

The analyses for moisture content by TGA were performed in duplicate directly on all samples. Typically, TGA results are determined by summing the weight loss steps that occurred below 250 °C (482 °F); weight loss steps above this are not used to determine the result. However, for tank 241-SX-103, approximately 47 percent of the thermograms showed weight loss beyond 250 °C (482 °F). The percent water for tank 241-SX-103 samples ranged from 1.55 to 47.7 percent for the solid samples and 40.0 to 48.3 percent for the liquid samples

B2.1.3.13 Bulk Density and Specific Gravity. Bulk density was performed directly on the solid samples. The results of the bulk density measurements ranged from 1.24 g/mL to 1.88 g/mL (mean bulk density was 1.72 g/mL).

Specific gravity was performed in duplicate directly on the drainable liquid samples. The results of the specific gravity measurements ranged from 1.45 to 1.51 (mean specific gravity was 1.48).

B2.2 1997 GRAB SAMPLING EVENT

On June 6, 1997, three grab samples were collected from riser 9 of tank 241-SX-103. All samples were received at the 222-S Laboratory on June 6, 1997 (Steen 1997). Analyses were performed on samples 3SX-97-1, 3SX-97-2, and 3SX-97-3 in accordance with the compatibility SAP for 1997 (Sasaki 1997).

B2.2.1 June 1997 Grab Sample Handling

Table B2-6 lists the sampling dates, the dates the samples were received by the 222-S Laboratory, the actual sampling depths, percent solids settled, and sample appearance.

Table B2-6. Tank 241-SX-103 June 1997 Grab Sample Description.[1] (2 sheets)

Sample Identification	Date Sampled	Date Received	Sample Depth cm (in.)	Vol% Settled Solids	Sample Description
3SX-97-1	6/6/97	6/6/97	1,026 (404)	<1.0	Clear yellow liquid; no organic layer.
3SX-97-2	6/6/97	6/6/97	1,280 (504)	25.0	Clear yellow liquid; no organic layer; solids consisted of gray/white salt crystals.

Table B2-6. Tank 241-SX-103 June 1997 Grab Sample Description.[1] (2 sheets)

Sample Identification	Date Sampled	Date Received	Sample Depth cm (in.)	Vol% Settled Solids	Sample Description
3SX-97-3	6/6/97	6/6/97	1,402 (552)	55.0	Clear yellow liquid; no organic layer; solids consisted of white salt crystals.

Note:

[1]Steen (1997)

B2.2.2 June 1997 Grab Sample Analysis

All analyses required by the waste compatibility DQO were performed on the grab samples. In addition to the analyses requested in the compatibility SAP (Sasaki 1997), many ICP analytes, IC anions, and GEA radionuclides were obtained on an opportunistic basis. These analytes were reported in accordance with Kristofzski (1995) because doing so required little additional effort. The analyses required by the waste compatibility DQO included safety parameters such as thermal properties by DSC, content of fissile material from $^{239/240}$Pu, specific gravity, and the concentrations of several anions to assess corrosivity.

All analyses were performed at the 222-S Laboratory, and were conducted in accordance with approved laboratory procedures (see Table B2-3). Table B2-7 is a summary of the sample portions, sample numbers, and analyses performed on each core sample.

Table B2-7. Tank 241-SX-103 June 1997 Grab Sample Analysis Summary. (2 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
9	3SX-97-1	Supernatant	S97T001400	DSC/TGA, TIC/TOC, specific gravity, pH, OH, IC, ICP
			S97T001401	^{239}Pu, ^{241}Am, GEA, ^{90}Sr
			S97T001884	NH_3, TOC
			S97T002000	NH_3

Table B2-7. Tank 241-SX-103 June 1997 Grab Sample Analysis Summary. (2 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
9	3SX-97-2	Supernatant	S97T001333	Volume percent solids, bulk density
		Centrifuged liquid	S97T001402	DSC/TGA, bulk density, pH, OH, IC, ICP, TIC/TOC
			S97T001403	^{239}Pu, ^{241}Am, GEA, ^{90}Sr, NH_3, TOC
			S97T002001	NH_3
		Centrifuged solids	S97T001409	DSC/TGA, TIC/TOC, bulk density, pH
			S97T001560	^{241}Am, GEA, ICP, ^{239}Pu, ^{90}Sr, U
			S97T001562	IC, OH
9	3SX-97-3	Supernatant	S97T001334	Volume percent solids, bulk density
		Centrifuged liquid	S97T001404	DSC/TGA, bulk density, pH, OH, IC, ICP, TIC/TOC
			S97T001417	^{239}Pu, ^{241}Am, GEA, ^{90}Sr
4			S97T001885	NH_3, TOC
			S97T002002	NH_3
		Centrifuged solids	S97T001411	DSC/TGA, TIC/TOC, bulk density pH
			S97T001561	^{241}Am, GEA, ICP, ^{239}Pu, ^{90}Sr, U
			S97T001563	IC, OH

Note:

[1]Steen (1997)

B2.2.3 June 1997 Grab Analytical Results

This section summarizes the sampling and analytical results associated with the June 1997 grab sampling and analysis of tank 241-SX-103.

The three centrifuged liquid samples were analyzed on the direct samples; the ICP analytes were first subjected to an acid dilution. The centrifuged solid samples were analyzed directly for bulk density, DSC, TGA, TIC, TOC, and pH. The IC anions and hydroxide were analyzed following a water digestion, and the ICP analytes, uranium, and radionuclides were analyzed following a fusion digestion.

Table B2-8 indicates which summary result tables are associated with the percent water, energetics, bulk density, pH, OH, IC, ICP, TOC, and radionuclide analytical results from the grab sampling event. These results are documented in Steen (1997).

Table B2-8. June 1997 Grab Sample Analytical Tables.

Analysis	Table Number
Inductively coupled plasma/emission spectroscopy	B2-70 through B2-106
Total uranium	B2-107
Ion chromatography	B2-108 through B2-115
Hydroxide	B2-116
NH_3 by ion selective electrode	B2-117
Total inorganic carbon	B2-118
Total organic carbon by persulfate	B2-119
Total organic carbon by furnace oxidation	B2-120
Gamma energy analysis	B2-121 through B2-125
^{241}Am	B2-126
$^{239/240}Pu$	B2-127
$^{89/90}Sr$	B2-128
Energetics by differential scanning calorimetry	B2-129 and B2-130
Percent water by thermogravimetric analysis	B2-131
Bulk density	B2-132
Specific gravity	B2-133
PH	B2-134

B2.3 VAPOR PHASE MEASUREMENT

Vapor sampling and combustible gas testing were completed on March 23, 1995, to support the hazardous vapor safety screening DQO (Osborne and Buckley 1995). Results are shown in Tables B2-9 and B2-10.

In addition to the 1995 samples, headspace combustible gas measurements were obtained before the 1997 grab sampling and the 1998 rotary mode core sampling of tank 242-SX-103. These measurements were taken to determine the LFL for the tank headspace at the time of sampling and to ensure safe operating conditions during sampling. Results of vapor phase measurements taken in the headspace of the tank are summarized in Table B2-9.

Table B2-9. Results of Headspace Measurements of Tank 241-SX-103.

Measurement	Result		
	March 23, 1995	**June 6, 1997**	**April 21, 1998**
LFL	<0.058%	0%	0%
Ammonia	55 ppmv	20 ppmv	10 ppmv
Oxygen	20.6%	N/A	20.9 %
TOC	4.6 ppmv	1.9 ppmv	0 ppmv

Note:

N/A = not available

Table B2-10. Results of March 23, 1995 Headspace Vapor Sample Analysis.[1]

Category	Sample Medium	Analyte	Concentration	Units
Inorganic analytes	Sorbent traps	NH_3	77.0 ± 3.0	ppmv
		NO_2	≤0.01	ppmv
		NO	≤0.03	ppmv
		H_2O	14.2 ± 0.3	mg/L
Permanent gases	SUMMA[2] canister	H_2	<23.0	ppmv
		CH_4	<23.0	ppmv
		CO_2	193.0 ± 2.0	ppmv
		CO	<23.0	ppmv
		N_2O	<23.0	ppmv
TNMHC	SUMMA™ canister	TNMHC[3]	0.78	mg/m^3
Organics	SUMMA™ canister	1-Butanol	0.47 ± 0.06	mg/m^3
		Methanol	0.18 ± 0.04	mg/m^3
		Trichlorofluoromethane	0.07 ± 0.01	mg/m^3
		Pyridine	0.07 ± 0.06	mg/m^3
	Sorbent traps	Acetonitrile	0.0079 ± 0.0019	ppmv

Notes:

TNMHC = total nonmethane hydro-carbon

[1]Ligotke et al. (1995)
[2]SUMMA is a trademark of Molectrics, Inc., Cleveland, Ohio.
[3]By summation of detected organic species from SUMMA™ sample.

B2.3.1 Standard Hydrogen Monitoring System Results

Gas monitoring of the tank headspace is accomplished through the use of the SHMS and vapor grab samples. Continuous hydrogen measurements are taken through the Whittaker electrochemical cell, which is hydrogen specific. The maximum hydrogen concentration measured by the SHMS was 640 ppmv on December 12, 1995 (McCain and Bauer 1998). Vapor grab samples are taken periodically to confirm the SHMS hydrogen readings and to obtain additional information about other gases in the tank. The other gases measured are nitrous oxide, which is an oxidizer, and methane, which is flammable. The average hydrogen concentration between June 2, 1995 and August 18, 1998 was 30.6 ppmv, the minimum was 6 ppmv, and the maximum was 66 ppmv. The average methane concentration was 2.15 ppmv, and the average nitrous oxide concentration was 9.42 ppmv.

B2.4 DESCRIPTION OF HISTORICAL SAMPLING EVENT

Several samples were obtained from tank 241-SX-103 between October 1974 and October 1977 in support of process engineering operations. Supernatant was removed from tank 241-SX-103 from 1975 to 1980 in support of the 242-S Evaporator, and the tank received evaporator bottoms. As a result, these pre-1980 samples do not represent current tank contents and are not included in this report. Reference to these historical sampling events can be found in Appendix E.

B2.5 1998 ROTARY CORE DATA TABLES

Table B2-11. Tank 241-SX-103 Core Sample Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**μg/g**	**μg/g**	**μg/g**
S98T001503	235:3	Lower half	21,600	20,500	21,100
S98T001498	235:6	Lower half	9,690	10,600	10,100[QC:d]
S98T001551	235:6A	Lower half	6,680	6,670	6,680
S98T001492	235:7	Lower half	9,460	9,750	9,610
S98T001552	235:8	Lower half	18,300	16,100	17,200
S98T002492	235:9	Lower half	18,900	13,700	16,300[QC:e]
S98T001509	235:9A	Lower half	5,200	5,060	5,130
S98T001699	235:10	Lower half	4,680	4,800	4,740
S98T001553	235:11	Lower half	64,100	63,500	63,800
S98T001639	235:12A	Lower half	1.43E+05	1.40E+05	1.42E+05
S98T001585	239:1	Lower half	26,500	26,900	26,700[QC:c]
S98T001644	239:1A	Lower half	26,000	25,700	25,900
S98T001731	239:5	Upper half	13,200	11,900	12,600
S98T001711		Lower half	10,700	11,000	10,900
S98T001591	239:6	Lower half	22,700	22,500	22,600
S98T001725	239:7	Lower half	11,100	10,400	10,800[QC:c]
S98T001664	239:8	Lower half	14,300	11,900	13,100

Table B2-11. Tank 241-SX-103 Core Sample 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**
S98T001705	239:9	Lower half	16,200	11,800	14,000[QC:e]
S98T001601	239:9R1	Lower half	23,000	25,500	24,300
S98T001575	239:10R1	Partial	11,200	10,300	10,800[QC:d]
S98T001611	239:11R	Upper half	27,200	25,200	26,200
S98T001617		Lower half	32,500	30,600	31,600[QC:e]
S98T001650	239:12	Lower half	61,100	99,400	80,300[QC:e]
S98T001623	239:12A	Lower half	1,430	3,570	2,500[QC:e]
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	16,300	14,300	15,300
S98T001497	235:6	Lower half	9,970	10,600	10,300
S98T001548	235:6A	Lower half	6,720	6,500	6,610
S98T001491	235:7	Lower half	10,100	9,520	9,810
S98T001549	235:8	Lower half	16,600	17,500	17,100
S98T002491	235:9	Lower half	14,900	14,000	14,500
S98T001508	235:9A	Lower half	5,090	5,090	5,090
S98T001698	235:10	Lower half	5,130	5,150	5,140
S98T001550	235:11	Lower half	95,200	1.01E+05	98,100
S98T001638	235:12A	Lower half	2.58E+05	2.16E+05	2.37E+05
S98T001584	239:1	Lower half	25,600	24,500	25,100
S98T001643	239:1A	Lower half	18,300	21,400	19,900
S98T001730	239:5	Upper half	18,700	17,000	17,900
S98T001710		Lower half	12,500	12,600	12,600
S98T001590	239:6	Lower half	23,200	24,200	23,700
S98T001724	239:7	Lower half	15,700	18,700	17,200
S98T001663	239:8	Lower half	15,700	16,300	16,000
S98T001704	239:9	Lower half	16,100	13,200	14,700
S98T001600	239:9R1	Lower half	22,300	22,100	22,200
S98T001574	239:10R1	Partial	12,200	12,400	12,300
S98T001610	239:11R	Upper half	35,100	34,700	34,900
S98T001616		Lower half	49,500	48,800	49,200
S98T001649	239:12	Lower half	2.05E+05	2.31E+05	2.18E+05
S98T001622	239:12A	Lower half	2,420	2,650	2,540
S98T001802	Core 235	Solid composite	39,300	40,600	40,000
S98T001808	Core 239	Solid composite	73,100	81,400	77,300

Table B2-11. Tank 241-SX-103 Core Sample Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
S98T001804	Core 235	Solid composite	10,600	9,970	10,300
S98T001810	Core 239	Solid composite	15,700	12,600	14,200[QC:e]
Liquids			**μg/mL**	**μg/mL**	**μg/mL**
S98T001544	235:4	Drainable liquid	40,700	42,200	41,500
S98T001486	235:5	Drainable liquid	42,900	42,600	42,800[QC:c]
S98T001668	239:1A	Drainable liquid	45,500	45,800	45,700[QC:d]
S98T001566	239:2	Drainable liquid	41,100	47,200	44,200[QC:d]
S98T001654	239:3	Drainable liquid	44,700	44,500	44,600
S98T001579	239:4	Drainable liquid	44,800	44,400	44,600[QC:c]
S98T001715	239:5	Drainable liquid	44,200	44,400	44,300
S98T001595	239:6	Drainable liquid	44,500	44,800	44,700
S98T001719	239:7	Drainable liquid	43,900	44,800	44,400[QC:d]
S98T001658	239:8	Drainable liquid	44,300	44,800	44,600[QC:d]
S98T001605	239:9R1	Drainable liquid	45,300	44,500	44,900[QC:c]
S98T001571	239:10R1	Drainable liquid	47,400	46,300	46,900[QC:c]

Table B2-12. Tank 241-SX-103 Core Sample Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**μg/g**	**μg/g**	**μg/g**
S98T001503	235:3	Lower half	<46.5	<47.1	<46.8
S98T001498	235:6	Lower half	<47.6	<46.9	<47.3
S98T001551	235:6A	Lower half	<34.6	<34.3	<34.5
S98T001492	235:7	Lower half	<46.8	<47.4	<47.1
S98T001552	235:8	Lower half	<36	<35.3	<35.6
S98T002492	235:9	Lower half	<34.5	<34.6	<34.5
S98T001509	235:9A	Lower half	<47.8	<47.9	<47.8
S98T001699	235:10	Lower half	<46.2	<47.3	<46.8
S98T001553	235:11	Lower half	<24	<23.6	<23.8
S98T001639	235:12A	Lower half	<23.2	<23.3	<23.3
S98T001585	239:1	Lower half	<35.8	<35.8	<35.8

Table B2-12. Tank 241-SX-103 Core Sample 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**
S98T001644	239:1A	Lower half	<24.3	<23.9	<24.1
S98T001731	239:5	Upper half	<46.8	<47	<46.9
S98T001711		Lower half	<46.6	<46.9	<46.8
S98T001591	239:6	Lower half	<35.6	<36.1	<35.9
S98T001725	239:7	Lower half	<46.2	<47	<46.6
S98T001664	239:8	Lower half	<34.5	<35.1	<34.8
S98T001705	239:9	Lower half	<35.5	<34.9	<35.2
S98T001601	239:9R1	Lower half	<35.6	<35.2	<35.4
S98T001575	239:10R1	Partial	<35.5	<35.7	<35.6
S98T001611	239:11R	Upper half	<36.5	<35.3	<35.9
S98T001617		Lower half	<35.8	<36.4	<36.1
S98T001650	239:12	Lower half	<23.5	<23.9	<23.7
S98T001623	239:12A	Lower half	<35.9	<35.1	<35.5
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,180	<1,190	<1,190
S98T001497	235:6	Lower half	<1,180	<1,200	<1,190
S98T001548	235:6A	Lower half	<1,190	<1,210	<1,200
S98T001491	235:7	Lower half	<1,220	<1,210	<1,220
S98T001549	235:8	Lower half	<1,220	<1,190	<1,210
S98T002491	235:9	Lower half	<1,240	<1,250	<1,250
S98T001508	235:9A	Lower half	<1,220	<1,220	<1,220
S98T001698	235:10	Lower half	<1,230	<1,210	<1,220
S98T001550	235:11	Lower half	<1,210	<1,220	<1,220
S98T001638	235:12A	Lower half	<1,220	<1,210	<1,220
S98T001584	239:1	Lower half	<1,220	<1,210	<1,220
S98T001643	239:1A	Lower half	<1,190	<1,220	<1,210
S98T001730	239:5	Upper half	<1,240	<1,220	<1,230
S98T001710		Lower half	<1,220	<1,220	<1,220

Table B2-12. Tank 241-SX-103 Core Sample Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<1,240	<1,220	<1,230
S98T001724	239:7	Lower half	<1,230	<1,250	<1,240
S98T001663	239:8	Lower half	<1,220	<1,220	<1,220
S98T001704	239:9	Lower half	<1,220	<1,240	<1,230
S98T001600	239:9R1	Lower half	<1,220	<1,240	<1,230
S98T001574	239:10R1	Partial	<1,160	<1,200	<1,180
S98T001610	239:11R	Upper half	<1,230	<1,230	<1,230
S98T001616		Lower half	<1,230	<1,250	<1,240
S98T001649	239:12	Lower half	<1,250	<1,230	<1,240
S98T001622	239:12A	Lower half	<1,240	<1,250	<1,250
S98T001802	Core 235	Solid composite	<1,220	<1,140	<1,180
S98T001808	Core 239	Solid composite	<1,110	<1,030	<1,070
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<36.7	<36.6	<36.7
S98T001810	Core 239	Solid composite	<36.5	<36.7	<36.6
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<36.1	<36.1	<36.1
S98T001486	235:5	Drainable liquid	<36.1	<36.1	<36.1
S98T001668	239:1A	Drainable liquid	<36.1	<36.1	<36.1[QC:c]
S98T001566	239:2	Drainable liquid	<36.1	<36.1	<36.1
S98T001654	239:3	Drainable liquid	<36.1	<36.1	<36.1
S98T001579	239:4	Drainable liquid	<36.1	<36.1	<36.1
S98T001715	239:5	Drainable liquid	<36.1	<36.1	<36.1
S98T001595	239:6	Drainable liquid	<36.1	<36.1	<36.1
S98T001719	239:7	Drainable liquid	<36.1	<36.1	<36.1[QC:c]
S98T001658	239:8	Drainable liquid	<36.1	<36.1	<36.1
S98T001605	239:9R1	Drainable liquid	<36.1	<36.1	<36.1
S98T001571	239:10R1	Drainable liquid	<36.1	<36.1	<36.1

Table B2-13. Tank 241-SX-103 Core Sample Analytical Results: Arsenic (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	<78	<79	<78.5
S98T001552	235:8	Lower half	<60	<58.8	<59.4
S98T002492	235:9	Lower half	<57.4	<57.7	<57.5
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9
S98T001553	235:11	Lower half	<40	<39.3	<39.6
S98T001639	235:12A	Lower half	<38.6	<38.8	<38.7
S98T001585	239:1	Lower half	<59.7	<59.6	<59.7
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9
S98T001591	239:6	Lower half	<59.3	<60.1	<59.7
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7
S98T001601	239:9R1	Lower half	<59.4	<58.6	<59
S98T001575	239:10R1	Partial	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	<60.9	<58.8	<59.8
S98T001617		Lower half	<59.6	<60.7	<60.2
S98T001650	239:12	Lower half	<39.1	<39.9	<39.5
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980

Table B2-13. Tank 241-SX-103 Core Sample Analytical Results: Arsenic (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	PARTIAL	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61

Table B2-13. Tank 241-SX-103 Core Sample Analytical Results: Arsenic (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1[QC:c]
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1[QC:d]
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1[QC:c]
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1[QC:d]
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1[QC:c]

Table B2-14. Tank 241-SX-103 Core Sample Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<38.7	<39.2	<39
S98T001498	235:6	Lower half	<39.7	<39	<39.4
S98T001551	235:6A	Lower half	<28.9	<28.6	<28.8
S98T001492	235:7	Lower half	<39	<39.5	<39.3
S98T001552	235:8	Lower half	<30	<29.4	<29.7
S98T002492	235:9	Lower half	<28.7	<28.9	<28.8
S98T001509	235:9A	Lower half	<39.9	<40	<40
S98T001699	235:10	Lower half	<38.5	<39.4	<39
S98T001553	235:11	Lower half	49	52.6	50.8
S98T001639	235:12A	Lower half	<19.3	<19.4	<19.4
S98T001585	239:1	Lower half	<29.9	<29.8	<29.9

Table B2-14. Tank 241-SX-103 Core Sample 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**
S98T001644	239:1A	Lower half	<20.2	<19.9	<20
S98T001731	239:5	Upper half	<39	<39.1	<39
S98T001711		Lower half	<38.8	<39.1	<39
S98T001591	239:6	Lower half	<29.6	<30.1	<29.9
S98T001725	239:7	Lower half	<38.5	<39.2	<38.9
S98T001664	239:8	Lower half	<28.7	<29.2	<28.9
S98T001705	239:9	Lower half	<29.6	<29	<29.3
S98T001601	239:9R1	Lower half	<29.7	<29.3	<29.5
S98T001575	239:10R1	Partial	<29.6	<29.7	<29.6
S98T001611	239:11R	Upper half	<30.5	<29.4	<29.9
S98T001617		Lower half	33.3	34.3	33.8
S98T001650	239:12	Lower half	24.3	36.4	30.4[QC:e]
S98T001623	239:12A	Lower half	<29.9	<29.3	<29.6
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<983	<988	<986
S98T001497	235:6	Lower half	<979	<996	<988
S98T001548	235:6A	Lower half	<990	<1,010	<1,000
S98T001491	235:7	Lower half	<1,010	<1,010	<1,010
S98T001549	235:8	Lower half	<1,010	<993	<1,000
S98T002491	235:9	Lower half	<1,040	<1,040	<1,040
S98T001508	235:9A	Lower half	<1,020	<1,010	<1,020
S98T001698	235:10	Lower half	<1,020	<1,010	<1,020
S98T001550	235:11	Lower half	<1,000	<1,020	<1,010
S98T001638	235:12A	Lower half	<1,020	<1,010	<1,020
S98T001584	239:1	Lower half	<1,010	<1,010	<1,010
S98T001643	239:1A	Lower half	<995	<1,010	<1,000
S98T001730	239:5	Upper half	<1,030	<1,010	<1,020
S98T001710		Lower half	<1,020	<1,010	<1,020

Table B2-14. Tank 241-SX-103 Core Sample Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
S98T001590	239:6	Lower half	<1,040	<1,020	<1,030
S98T001724	239:7	Lower half	<1,020	<1,040	<1,030
S98T001663	239: 8	Lower half	<1,010	<1,020	<1,020
S98T001704	239:9	Lower half	<1,020	<1,030	<1,030
S98T001600	239:9R1	Lower half	<1,020	<1,030	<1,030
S98T001574	239:10R1	Partial	<968	<996	<982
S98T001610	239:11R	Upper half	<1,030	<1,030	<1,030
S98T001616		Lower half	<1,030	<1,040	<1,040
S98T001649	239:12	Lower half	<1,040	<1,020	<1,030
S98T001622	239:12A	Lower half	<1,040	<1,040	<1,040
S98T001802	Core 235	Solid Composite	<1,020	<949	<985
S98T001808	Core 239	Solid Composite	<928	<854	<891
Solids: water digest			µg/g	µg/g	µg/g
S98T001804	Core 235	Solid composite	<30.6	<30.5	<30.6
S98T001810	Core 239	Solid composite	<30.4	<30.6	<30.5
Liquids			µg/mL	µg/mL	µg/mL
S98T001544	235:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001486	235:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001668	239:1A	Drainable liquid	<30.1	<30.1	<30.1
S98T001566	239:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001654	239:3	Drainable liquid	<30.1	<30.1	<30.1
S98T001579	239:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001715	239:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001595	239:6	Drainable liquid	<30.1	<30.1	<30.1
S98T001719	239:7	Drainable liquid	<30.1	<30.1	<30.1
S98T001658	239:8	Drainable liquid	<30.1	<30.1	<30.1
S98T001605	239:9R1	Drainable liquid	<30.1	<30.1	<30.1
S98T001571	239:10R1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-15. Tank 241-SX-103 Core Sample Analytical Results: Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	<3.87	<3.92	<3.9
S98T001498	235:6	Lower half	<3.97	<3.9	<3.94
S98T001551	235:6A	Lower half	<2.89	<2.86	<2.88
S98T001492	235:7	Lower half	<3.9	<3.95	<3.92
S98T001552	235:8	Lower half	<3	<2.94	<2.97
S98T002492	235:9	Lower half	<2.87	<2.89	<2.88
S98T001509	235:9A	Lower half	<3.99	<4	<4
S98T001699	235:10	Lower half	<3.85	<3.94	<3.9
S98T001553	235:11	Lower half	<2	<1.96	<1.98
S98T001639	235:12A	Lower half	<1.93	<1.94	<1.94
S98T001585	239:1	Lower half	<2.99	<2.98	<2.99
S98T001644	239:1A	Lower half	<2.02	<1.99	<2
S98T001731	239:5	Upper half	<3.9	<3.91	<3.91
S98T001711		Lower half	<3.88	<3.91	<3.9
S98T001591	239:6	Lower half	<2.96	<3.01	<2.98
S98T001725	239:7	Lower half	<3.85	<3.92	<3.88
S98T001664	239:8	Lower half	<2.87	<2.92	<2.9
S98T001705	239:9	Lower half	<2.96	<2.9	<2.93
S98T001601	239:9R1	Lower half	<2.97	<2.93	<2.95
S98T001575	239:10R1	Partial	<2.96	<2.97	<2.96
S98T001611	239:11R	Upper half	<3.05	<2.94	<3
S98T001617		Lower half	<2.98	<3.03	<3
S98T001650	239:12	Lower half	<1.96	<1.99	<1.98
S98T001623	239:12A	Lower half	<2.99	<2.93	<2.96
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<98.3	<98.8	<98.5
S98T001497	235:6	Lower half	<97.9	<99.6	<98.8
S98T001548	235:6A	Lower half	<99	<101	<100

Table B2-15. Tank 241-SX-103 Core Sample Analytical Results: Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001491	235:7	Lower half	<101	<101	<101
S98T001549	235:8	Lower half	<101	<99.3	<100
S98T002491	235:9	Lower half	<104	<104	<104
S98T001508	235:9A	Lower half	<102	<101	<102
S98T001698	235:10	Lower half	<102	<101	<102
S98T001550	235:11	Lower half	<100	<102	<101
S98T001638	235:12A	Lower half	<102	<101	<102
S98T001584	239:1	Lower half	<101	<101	<101
S98T001643	239:1A	Lower half	<99.5	<101	<100
S98T001730	239:5	Upper half	<103	<101	<102
S98T001710		Lower half	<102	<101	<102
S98T001590	239:6	Lower half	<104	<102	<103
S98T001724	239:7	Lower half	<102	<104	<103
S98T001663	239:8	Lower half	<101	<102	<102
S98T001704	239:9	Lower half	<102	<103	<103
S98T001600	239:9R1	Lower half	<102	<103	<103
S98T001574	239:10R1	Partial	<96.8	<99.6	<98.2
S98T001610	239:11R	Upper half	<103	<103	<103
S98T001616		Lower half	<103	<104	<104
S98T001649	239:12	Lower half	<104	<102	<103
S98T001622	239:12A	Lower half	<104	<104	<104
S98T001802	Core 235	Solid composite	<102	<94.9	<98.5
S98T001808	Core 239	Solid composite	<92.8	<85.4	<89.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<3.06	<3.05	<3.05
S98T001810	Core 239	Solid composite	<3.04	<3.06	<3.05

Table B2-15. Tank 241-SX-103 Core Sample Analytical Results: Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<3	<3	<3
S98T001486	235:5	Drainable liquid	<3	<3	<3
S98T001668	239:1A	Drainable liquid	<3	<3	<3
S98T001566	239:2	Drainable liquid	<3	<3	<3
S98T001654	239:3	Drainable liquid	<3	<3	<3
S98T001579	239:4	Drainable liquid	<3	<3	<3
S98T001715	239:5	Drainable liquid	<3	<3	<3
S98T001595	239:6	Drainable liquid	<3	<3	<3
S98T001719	239:7	Drainable liquid	<3	<3	<3
S98T001658	239:8	Drainable liquid	<3	<3	<3
S98T001605	239:9R1	Drainable liquid	<3	<3	<3
S98T001571	239:10R1	Drainable liquid	<3	<3	<3

Table B2-16. Tank 241-SX-103 Core Sample Analytical Results: Bismuth (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	<78	<79	<78.5
S98T001552	235:8	Lower half	<60	<58.8	<59.4
S98T002492	235:9	Lower half	<57.4	<57.7	<57.5
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9
S98T001553	235:11	Lower half	<40	<39.3	<39.6
S98T001639	235:12A	Lower half	<38.6	<38.8	<38.7

Table B2-16. Tank 241-SX-103 Core Sample Analytical Results: Bismuth (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**μg/g**	**μg/g**	**μg/g**
S98T001585	239:1	Lower half	<59.7	<59.6	<59.7
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9
S98T001591	239:6	Lower half	<59.3	<60.1	<59.7
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7
S98T001601	239:9R1	Lower half	<59.4	<58.6	<59
S98T001575	239:10R1	Partial	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	102	116	109
S98T001617		Lower half	113	86	99.5[QC:e]
S98T001650	239:12	Lower half	<39.1	<39.9	<39.5
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			**μg/g**	**μg/g**	**μg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010

Table B2-16. Tank 241-SX-103 Core Sample Analytical Results: Bismuth (ICP).
(4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	Partial	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1

Table B2-16. Tank 241-SX-103 Core Sample Analytical Results: Bismuth (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-17. Tank 241-SX-103 Core Sample Analytical Results: Boron (ICP) (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	70.3	112	91.2[QC:e]
S98T001498	235:6	Lower half	136	112	124
S98T001551	235:6A	Lower half	114	180	147[QC:e]
S98T001492	235:7	Lower half	117	215	166[QC:e]
S98T001552	235:8	Lower half	136	110	123[QC:e]
S98T002492	235:9	Lower half	113	115	114
S98T001509	235:9A	Lower half	167	103	135[QC:e]
S98T001699	235:10	Lower half	84.7	139	112[QC:e]
S98T001553	235:11	Lower half	64	74.4	69.2
S98T001639	235:12A	Lower half	65.9	85.6	75.8[QC:e]
S98T001585	239:1	Lower half	216	147	182[QC:e]
S98T001644	239:1A	Lower half	150	159	155
S98T001731	239:5	Upper half	91.2	88.8	90
S98T001711		Lower half	94.4	122	108[QC:e]
S98T001591	239:6	Lower half	200	171	186
S98T001725	239:7	Lower half	93.8	75	84.4[QC:e]
S98T001664	239:8	Lower half	138	94.6	116[QC:e]
S98T001705	239:9	Lower half	152	132	142

Table B2-17. Tank 241-SX-103 Core Sample Analytical Results: Boron (ICP) (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001601	239:9R1	Lower half	95.3	146	121[QC:e]
S98T001575	239:10R1	Partial	109	100	105
S98T001611	239:11R	Upper half	136	116	126
S98T001617		Lower half	97	77	87[QC:e]
S98T001650	239:12	Lower half	66.1	115	90.5[QC:e]
S98T001623	239:12A	Lower half	146	86.9	116[QC:e]
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<983	<988	<986
S98T001497	235:6	Lower half	<979	<996	<988
S98T001548	235:6A	Lower half	<990	<1,010	<1,000
S98T001491	235:7	Lower half	<1,010	<1,010	<1,010
S98T001549	235:8	Lower half	<1,010	<993	<1,000
S98T002491	235:9	Lower half	<1,040	<1,040	<1,040
S98T001508	235:9A	Lower half	<1,020	<1,010	<1,020
S98T001698	235:10	Lower half	<1,020	<1,010	<1,020
S98T001550	235:11	Lower half	<1,000	<1,020	<1,010
S98T001638	235:12A	Lower half	<1,020	<1,010	<1,020
S98T001584	239:1	Lower half	<1,010	<1,010	<1,010
S98T001643	239:1A	Lower half	<995	<1,010	<1,000
S98T001730	239:5	Upper half	<1,030	<1,010	<1,020
S98T001710		Lower half	<1,020	<1,010	<1,020
S98T001590	239:6	Lower half	<1,040	<1,020	<1,030
S98T001724	239:7	Lower half	<1,020	<1,040	<1,030
S98T001663	239:8	Lower half	<1,010	<1,020	<1,020
S98T001704	239:9	Lower half	<1,020	<1,030	<1,030
S98T001600	239:9R1	Lower half	<1,020	<1,030	<1,030
S98T001574	239:10R1	Partial	<968	<996	<982

Table B2-17. Tank 241-SX-103 Core Sample Analytical Results: Boron (ICP) (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001610	239:11R	Upper half	<1030	<1,030	<1,030
S98T001616		Lower half	<1030	<1,040	<1,040
S98T001649	239:12	Lower half	<1040	<1,020	<1,030
S98T001622	239:12A	Lower half	<1040	<1,040	<1,040
S98T001802	Core 235	Solid composite	<1020	<949	<985
S98T001808	Core 239	Solid composite	<928	<854	<891
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	852	763	808
S98T001810	Core 239	Solid composite	885	874	880
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	90.2	92.1	91.2
S98T001486	235:5	Drainable liquid	96.3	94.1	95.2
S98T001668	239:1A	Drainable liquid	97.5	98.3	97.9[QC:c]
S98T001566	239:2	Drainable liquid	87.4	104	95.7
S98T001654	239:3	Drainable liquid	98.5	102	100
S98T001579	239:4	Drainable liquid	96.7	96.5	96.6
S98T001715	239:5	Drainable liquid	95.9	97.5	96.7
S98T001595	239:6	Drainable liquid	88.8	94.5	91.7
S98T001719	239:7	Drainable liquid	94.8	95.6	95.2[QC:c]
S98T001658	239:8	Drainable liquid	102	105	104
S98T001605	239:9R1	Drainable liquid	96.7	92.2	94.5
S98T001571	239:10R1	Drainable liquid	98.5	97.1	97.8

Table B2-18. Tank 241-SX-103 Core Sample Analytical Results: Cadmium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	7.7	9.37	8.54
S98T001498	235:6	Lower half	5.71	6.86	6.29
S98T001551	235:6A	Lower half	< 2.89	< 2.86	< 2.88
S98T001492	235:7	Lower half	4.19	4.2	4.2
S98T001552	235:8	Lower half	14.7	12.9	13.8
S98T002492	235:9	Lower half	5.44	3.91	4.68QC:e
S98T001509	235:9A	Lower half	<3.99	<4	<4
S98T001699	235:10	Lower half	<3.85	<3.94	<3.9
S98T001553	235:11	Lower half	9.98	10.8	10.4
S98T001639	235:12A	Lower half	<1.93	< 1.94	<1.94
S98T001585	239:1	Lower half	7.37	6.1	6.73
S98T001644	239:1A	Lower half	<2.02	<1.99	<2
S98T001731	239:5	Upper half	4.39	<3.91	<4.15
S98T001711		Lower half	6.11	<3.91	<5.01QC:e
S98T001591	239:6	Lower half	<2.96	<3.01	<2.98
S98T001725	239:7	Lower half	<3.85	<3.92	<3.88
S98T001664	239:8	Lower half	9.33	7.28	8.3QC:e
S98T001705	239:9	Lower half	9.2	6.54	7.87QC:e
S98T001601	239: 9R1	Lower half	7.32	4.6	5.96QC:e
S98T001575	239:10R1	Partial	5.98	5.29	5.63
S98T001611	239:11R	Upper half	21.6	22.3	22
S98T001617		Lower half	18	19.5	18.8
S98T001650	239:12	Lower half	4.54	5.78	5.16QC:e
S98T001623	239:12A	Lower half	<2.99	<2.93	<2.96
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<98.3	<98.8	<98.5
S98T001497	235:6	Lower half	<97.9	<99.6	<98.8

Table B2-18. Tank 241-SX-103 Core Sample Analytical Results: Cadmium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<99	<101	<100
S98T001491	235:7	Lower half	<101	<101	<101
S98T001549	235:8	Lower half	<101	<99.3	<100
S98T002491	235:9	Lower half	<104	<104	<104
S98T001508	235:9A	Lower half	<102	<101	<102
S98T001698	235:10	Lower half	<102	<101	<102
S98T001550	235:11	Lower half	<100	<102	<101
S98T001638	235:12A	Lower half	<102	<101	<102
S98T001584	239:1	Lower half	<101	<101	<101
S98T001643	239:1A	Lower half	<99.5	<101	<100
S98T001730	239:5	Upper half	<103	<101	<102
S98T001710		Lower half	<102	<101	<102
S98T001590	239:6	Lower half	<104	<102	<103
S98T001724	239:7	Lower half	<102	<104	<103
S98T001663	239:8	Lower half	<101	<102	<102
S98T001704	239:9	Lower half	<102	<103	<103
S98T001600	239:9R1	Lower half	<102	<103	<103
S98T001574	239:10R1	Partial	<96.8	<99.6	<98.2
S98T001610	239:11R	Upper half	<103	<103	<103
S98T001616		Lower half	<103	<104	<104
S98T001649	239:12	Lower half	<104	<102	<103
S98T001622	239:12A	Lower half	<104	<104	<104
S98T001802	Core 235	Solid composite	<102	<94.9	<98.5
S98T001808	Core 239	Solid composite	<92.8	<85.4	<89.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<3.06	<3.05	<3.05
S98T001810	Core 239	Solid composite	<3.04	<3.06	<3.05

Table B2-18. Tank 241-SX-103 Core Sample Analytical Results: Cadmium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<3	<3	<3
S98T001486	235:5	Drainable liquid	<3	<3	<3
S98T001668	239:1A	Drainable liquid	<3	<3	<3
S98T001566	239:2	Drainable liquid	<3	<3	<3
S98T001654	239:3	Drainable liquid	<3	<3	<3
S98T001579	239:4	Drainable liquid	<3	<3	<3
S98T001715	239:5	Drainable liquid	<3	<3	<3
S98T001595	239:6	Drainable liquid	<3	<3	<3
S98T001719	239:7	Drainable liquid	<3	<3	<3
S98T001658	239:8	Drainable liquid	<3	<3	<3
S98T001605	239:9R1	Drainable liquid	<3	<3	<3
S98T001571	239:10R1	Drainable liquid	<3	<3	<3

Table B2-19. Tank 241-SX-103 Core Sample Analytical Results: Calcium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	218	276	247[QC:b,e]
S98T001498	235:6	Lower half	185	214	200[QC:b]
S98T001551	235:6A	Lower half	183	125	154[QC:e]
S98T001492	235:7	Lower half	155	169	162[QC:b]
S98T001552	235:8	Lower half	391	285	338[QC:e]
S98T002492	235:9	Lower half	117	106	112
S98T001509	235:9A	Lower half	138	103	121[QC:b,e]
S98T001699	235:10	Lower half	< 77	< 78.8	< 77.9
S98T001553	235:11	Lower half	511	540	526

Table B2-19. Tank 241-SX-103 Core Sample Analytical Results: Calcium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001639	235:12A	Lower half	339	354	347
S98T001585	239:1	Lower half	300	197	249[QC:e]
S98T001644	239:1A	Lower half	< 40.4	< 39.8	< 40.1
S98T001731	239:5	Upper half	135	139	137
S98T001711		Lower half	169	112	141[QC:e]
S98T001591	239:6	Lower half	172	236	204[QC:e]
S98T001725	239:7	Lower half	116	126	121
S98T001664	239:8	Lower half	155	127	141
S98T001705	239:9	Lower half	145	109	127[QC:e]
S98T001601	239:9R1	Lower half	203	230	217
S98T001575	239:10R1	Partial	179	238	209[QC:e]
S98T001611	239:11R	Upper half	507	373	440[QC:e]
S98T001617		Lower half	610	537	574
S98T001650	239:12	Lower half	357	277	317[QC:e]
S98T001623	239:12A	Lower half	74.3	97	85.7[QC:e]
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	3,590	<2,010	<2,800[QC:e]
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030

Table B2-19. Tank 241-SX-103 Core Sample Analytical Results: Calcium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	PARTIAL	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	72.4	<61.1	<66.8
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1

Table B2-19. Tank 241-SX-103 Core Sample Analytical Results: Calcium (ICP). (4 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-20. Tank 241-SX-103 Core Sample Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	<78	<79	<78.5
S98T001552	235:8	Lower half	<60	<58.8	<59.4
S98T002492	235:9	Lower half	<57.4	<57.7	<57.5
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9
S98T001553	235:11	Lower half	59.9	65.2	62.5
S98T001639	235:12A	Lower half	<38.6	<38.8	<38.7
S98T001585	239:1	Lower half	<59.7	<59.6	<59.7
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9
S98T001591	239:6	Lower half	<59.3	<60.1	<59.7

Table B2-20. Tank 241-SX-103 Core Sample 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**
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7
S98T001601	239:9R1	Lower half	<59.4	<58.6	<59
S98T001575	239:10R1	Partial	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	90.6	83.8	87.2
S98T001617		Lower half	85.3	90.5	87.9
S98T001650	239:12	Lower half	<39.1	<39.9	<39.5
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030

Table B2-20. Tank 241-SX-103 Core Sample Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001704	239:9	Lower half	<2,040	<2,070	< 2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	Partial	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-21. Tank 241-SX-103 Core Sample Analytical Results: Chromium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	5,430	6,040	5,740
S98T001498	235:6	Lower half	4,300	4,390	4,350
S98T001551	235:6A	Lower half	1,730	1,710	1,720
S98T001492	235:7	Lower half	3,460	3,590	3,530
S98T001552	235:8	Lower half	1,2400	1,1000	1,1700
S98T002492	235:9	Lower half	4,730	3,400	4,070[QC:e]
S98T001509	235:9A	Lower half	3,160	3,050	3,110
S98T001699	235:10	Lower half	1,680	2,020	1,850
S98T001553	235:11	Lower half	3,950	4,230	4,090
S98T001639	235:12A	Lower half	3,630	3,550	3,590
S98T001585	239:1	Lower half	4,930	4,120	4,530[QC:c,h]
S98T001644	239:1A	Lower half	158	150	154
S98T001731	239:5	Upper half	4,040	4,120	4,080
S98T001711		Lower half	4,440	3,580	4,010[QC:e]
S98T001591	239:6	Lower half	1,850	1,990	1,920
S98T001725	239:7	Lower half	2,120	2,260	2,190
S98T001664	239:8	Lower half	6,610	5,150	5,880[QC:e]
S98T001705	239:9	Lower half	6,130	4,810	5,470[QC:e]
S98T001601	239: 9R1	Lower half	4,940	3,230	4,090[QC:e]
S98T001575	239:10R1	Partial	4,170	4,000	4,090[QC:d]
S98T001611	239:11R	Upper half	12,500	1,2800	12,700
S98T001617		Lower half	10,200	10,900	10,600
S98T001650	239:12	Lower half	4,730	7,070	5,900[QC:e]
S98T001623	239:12A	Lower half	304	532	418[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	7,390	6,120	6,760
S98T001497	235:6	Lower half	4,240	4,610	4,430

Table B2-21. Tank 241-SX-103 Core Sample Analytical Results: Chromium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	1,740	1,700	1,720
S98T001491	235:7	Lower half	3,630	3,430	3,530
S98T001549	235:8	Lower half	11,800	12,100	12,000
S98T002491	235:9	Lower half	3,810	3,840	3,830
S98T001508	235:9A	Lower half	3,250	3,310	3,280
S98T001698	235:10	Lower half	1,740	1,820	1,780
S98T001550	235:11	Lower half	4,610	4,790	4,700
S98T001638	235:12A	Lower half	4,660	4,000	4,330
S98T001584	239:1	Lower half	4,410	4,260	4,340
S98T001643	239:1A	Lower half	< 199	< 203	< 201
S98T001730	239:5	Upper half	5,110	5,260	5,190
S98T001710		Lower half	3,970	4,080	4,030
S98T001590	239:6	Lower half	1,820	1,900	1,860
S98T001724	239:7	Lower half	2,590	2,970	2,780
S98T001663	239:8	Lower half	6,320	6,520	6,420
S98T001704	239:9	Lower half	7,480	6,280	6,880
S98T001600	239:9R1	Lower half	4,960	5,150	5,060
S98T001574	239:10R1	Partial	4,130	4,910	4,520
S98T001610	239:11R	Upper half	13,400	13,300	13,400
S98T001616		Lower half	11,000	10,800	10,900
S98T001649	239:12	Lower half	6,330	7,040	6,690
S98T001622	239:12A	Lower half	472	400	436
S98T001802	Core 235	Solid composite	5,160	4,760	4,960
S98T001808	Core 239	Solid composite	5,260	5,300	5,280
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	562	522	542
S98T001810	Core 239	Solid composite	473	386	430[QC:e]

Table B2-21. Tank 241-SX-103 Core Sample Analytical Results: Chromium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	94.1	89	91.5
S98T001486	235:5	Drainable liquid	59.3	56.7	58
S98T001668	239:1A	Drainable liquid	167	168	168
S98T001566	239:2	Drainable liquid	146	187	167[QC:e]
S98T001654	239:3	Drainable liquid	145	143	144
S98T001579	239:4	Drainable liquid	129	112	121
S98T001715	239:5	Drainable liquid	50.3	52	51.1
S98T001595	239:6	Drainable liquid	31.6	30.8	31.2
S98T001719	239:7	Drainable liquid	33.2	24.3	28.8[QC:e]
S98T001658	239:8	Drainable liquid	53	55.5	54.3
S98T001605	239:9R1	Drainable liquid	407	397	402
S98T001571	239:10R1	Drainable liquid	1,080	1,050	1,070

Table B2-22. Tank 241-SX-103 Core Sample Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<15.5	<15.7	<15.6
S98T001498	235:6	Lower half	<15.9	<15.6	<15.8
S98T001551	235:6A	Lower half	<11.5	<11.4	<11.4
S98T001492	235:7	Lower half	<15.6	<15.8	<15.7
S98T001552	235:8	Lower half	<12	<11.8	<11.9
S98T002492	235:9	Lower half	<11.5	<11.5	<11.5
S98T001509	235:9A	Lower half	<15.9	<16	<15.9
S98T001699	235:10	Lower half	<15.4	<15.8	<15.6
S98T001553	235:11	Lower half	<7.99	<7.85	<7.92
S98T001639	235:12A	Lower half	<7.72	<7.77	<7.74
S98T001585	239:1	Lower half	<11.9	<11.9	<11.9

Table B2-22. Tank 241-SX-103 Core Sample 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
S98T001644	239:1A	Lower half	<8.08	<7.95	<8.02
S98T001731	239:5	Upper half	<15.6	<15.7	<15.6
S98T001711		Lower half	<15.5	<15.6	<15.6
S98T001591	239:6	Lower half	<11.9	<12	<11.9
S98T001725	239:7	Lower half	<15.4	<15.7	<15.6
S98T001664	239:8	Lower half	<11.5	<11.7	<11.6
S98T001705	239:9	Lower half	<11.8	<11.6	<11.7
S98T001601	239:9R1	Lower half	<11.9	<11.7	<11.8
S98T001575	239:10R1	Partial	<11.8	<11.9	<11.9
S98T001611	239:11R	Upper half	<12.2	<11.8	<12
S98T001617		Lower half	<11.9	<12.1	<12
S98T001650	239:12	Lower half	<7.82	<7.97	<7.89
S98T001623	239:12A	Lower half	<12	<11.7	<11.8
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<393	<395	<394
S98T001497	235:6	Lower half	<392	<399	<396
S98T001548	235:6A	Lower half	<396	<405	<401
S98T001491	235:7	Lower half	<405	<403	<404
S98T001549	235:8	Lower half	<406	<397	<402
S98T002491	235:9	Lower half	<415	<415	<415
S98T001508	235:9A	Lower half	<408	<406	<407
S98T001698	235:10	Lower half	<409	<402	<406
S98T001550	235:11	Lower half	<402	<407	<405
S98T001638	235:12A	Lower half	<407	<404	<406
S98T001584	239:1	Lower half	<405	<404	<405
S98T001643	239:1A	Lower half	<398	<405	<402
S98T001730	239:5	Upper half	<414	<405	<410
S98T001710		Lower half	<408	<405	<407

Table B2-22. Tank 241-SX-103 Core Sample Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<414	<408	<411
S98T001724	239:7	Lower half	<410	<416	<413
S98T001663	239:8	Lower half	<406	<406	<406
S98T001704	239:9	Lower half	<408	<414	<411
S98T001600	239:9R1	Lower half	<407	<412	<410
S98T001574	239:10R1	Partial	<387	<398	<393
S98T001610	239:11R	Upper half	<410	<410	<410
S98T001616		Lower half	<412	<418	<415
S98T001649	239:12	Lower half	<416	<409	<413
S98T001622	239:12A	Lower half	<415	<418	<417
S98T001802	Core 235	Solid composite	<408	<380	<394
S98T001808	Core 239	Solid composite	<371	<342	<357
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<12.2	<12.2	<12.2
S98T001810	Core 239	Solid composite	<12.2	<12.2	<12.2
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<12	<12	<12
S98T001486	235:5	Drainable liquid	<12	<12	<12
S98T001668	239:1A	Drainable liquid	<12	<12	<12[QC:c]
S98T001566	239:2	Drainable liquid	<12	<12	<12
S98T001654	239:3	Drainable liquid	<12	<12	<12
S98T001579	239:4	Drainable liquid	<12	<12	<12
S98T001715	239:5	Drainable liquid	<12	<12	<12
S98T001595	239:6	Drainable liquid	<12	<12	<12
S98T001719	239:7	Drainable liquid	<12	<12	<12[QC:c]
S98T001658	239:8	Drainable liquid	<12	<12	<12
S98T001605	239:9R1	Drainable liquid	<12	<12	<12
S98T001571	239:10R1	Drainable liquid	<12	<12	<12

Table B2-23. Tank 241-SX-103 Core Sample Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<7.75	<7.84	<7.8
S98T001498	235:6	Lower half	<7.93	<7.81	<7.87
S98T001551	235:6A	Lower half	<5.77	<5.72	<5.74
S98T001492	235:7	Lower half	<7.8	<7.9	<7.85
S98T001552	235:8	Lower half	<6	<5.88	<5.94
S98T002492	235:9	Lower half	<5.74	<5.77	<5.75
S98T001509	235:9A	Lower half	<7.97	<7.99	<7.98
S98T001699	235:10	Lower half	<7.7	<7.88	<7.79[QC:a]
S98T001553	235:11	Lower half	5.1	5.28	5.19
S98T001639	235:12A	Lower half	30.4	30.9	30.6
S98T001585	239:1	Lower half	<5.97	<5.96	<5.96
S98T001644	239:1A	Lower half	<4.04	<.98	<4.01
S98T001731	239:5	Upper half	<7.8	<.83	<7.81
S98T001711		Lower half	<7.76	<7.82	<7.79
S98T001591	239:6	Lower half	<5.93	<6.01	<5.97
S98T001725	239:7	Lower half	11.1	13.2	12.1
S98T001664	239:8	Lower half	<5.74	<5.85	<5.8[QC:a]
S98T001705	239:9	Lower half	<5.92	<5.81	<5.87[QC:a]
S98T001601	239:9R1	Lower half	<5.94	<5.86	<5.9
S98T001575	239:10R1	Partial	23.5	22	22.8
S98T001611	239:11R	Upper half	<6.09	<5.88	<5.98
S98T001617		Lower half	<5.96	<6.07	<6.02
S98T001650	239:12	Lower half	18.2	23.8	21[QC:e]
S98T001623	239:12A	Lower half	<5.99	<5.86	<5.93
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<197	<198	<198
S98T001497	235:6	Lower half	<196	<199	<198

Table B2-23. Tank 241-SX-103 Core Sample Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<198	<202	<200
S98T001491	235:7	Lower half	<203	<201	<202
S98T001549	235:8	Lower half	<203	<199	<201
S98T002491	235:9	Lower half	<207	<208	<208
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	<204	<201	<203
S98T001550	235:11	Lower half	<201	<203	<202
S98T001638	235:12A	Lower half	<203	<202	<203
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	<207	<203	<205
S98T001710		Lower half	<204	<203	<204
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207
S98T001663	239:8	Lower half	<203	<203	<203
S98T001704	239:9	Lower half	<204	<207	<206
S98T001600	239:9R1	Lower half	<204	<206	<205
S98T001574	239:10R1	Partial	<194	<199	<197
S98T001610	239:11R	Upper half	<205	<205	<205
S98T001616		Lower half	<206	<209	<208
S98T001649	239:12	Lower half	<208	<204	<206
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	<204	<190	<197
S98T001808	Core 239	Solid composite	<186	<171	<179
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<6.12	<6.11	<6.12
S98T001810	Core 239	Solid composite	<6.09	<6.12	<6.11

Table B2-23. Tank 241-SX-103 Core Sample Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S98T001544	235:4	Drainable liquid	6.81	7.25	7.03
S98T001486	235:5	Drainable liquid	23.6	23.1	23.4
S98T001668	239:1A	Drainable liquid	<6.01	<6.01	<6.01[QC:c]
S98T001566	239:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001654	239:3	Drainable liquid	<6.01	<6.01	<6.01
S98T001579	239:4	Drainable liquid	12.3	11.8	12.1
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	<6.01	6.02	<6.01
S98T001719	239:7	Drainable liquid	33.7	34.7	34.2[QC:c]
S98T001658	239:8	Drainable liquid	<6.01	<6.01	<6.01
S98T001605	239:9R1	Drainable liquid	<6.01	<6.01	<6.01
S98T001571	239:10R1	Drainable liquid	26.5	26	26.3

Table B2-24. Tank 241-SX-103 Core Sample Analytical Results: Iron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	1,630	3,410	2,520[QC:e]
S98T001498	235:6	Lower half	1,350	1,040	1,200[QC:c,e]
S98T001551	235:6A	Lower half	137	144	141
S98T001492	235:7	Lower half	398	370	384
S98T001552	235:8	Lower half	1,620	1,460	1,540
S98T002492	235:9	Lower half	941	748	845[QC:e]
S98T001509	235:9A	Lower half	318	297	308
S98T001699	235:10	Lower half	426	579	503[QC:e]
S98T001553	235:11	Lower half	3,500	3,790	3,650
S98T001639	235:12A	Lower half	585	694	640
S98T001585	239:1	Lower half	359	286	323[QC:e]

Table B2-24. Tank 241-SX-103 Core Sample Analytical Results: Iron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S98T001644	239:1A	Lower half	22.2	<19.9	<21
S98T001731	239:5	Upper half	379	388	384
S98T001711		Lower half	429	353	391
S98T001591	239:6	Lower half	149	196	173[QC:e]
S98T001725	239:7	Lower half	194	203	199
S98T001664	239:8	Lower half	510	386	448[QC:e]
S98T001705	239:9	Lower half	676	527	602[QC:e]
S98T001601	239:9R1	Lower half	554	358	456[QC:e]
S98T001575	239:10R1	Partial	607	605	606[QC:d]
S98T001611	239:11R	Upper half	5,300	5,470	5,390
S98T001617		Lower half	5,570	5,950	5,760
S98T001650	239:12	Lower half	854	1,220	1,040[QC:e]
S98T001623	239:12A	Lower half	62.9	85.2	74[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	3,210	1,600	2,410[QC:e]
S98T001497	235:6	Lower half	2,360	1,130	1,750[QC:e]
S98T001548	235:6A	Lower half	<990	<1,010	<1,000
S98T001491	235:7	Lower half	<1,010	<1,010	<1,010
S98T001549	235:8	Lower half	1,420	1,430	1,430
S98T002491	235:9	Lower half	<1,040	<1,040	<1,040
S98T001508	235:9A	Lower half	<1,020	<1,010	<1,020
S98T001698	235:10	Lower half	<1,020	<1,010	<1,020
S98T001550	235:11	Lower half	3,990	4,120	4,060
S98T001638	235:12A	Lower half	1,050	<1,010	<1,030
S98T001584	239:1	Lower half	<1,010	<1,010	<1,010
S98T001643	239:1A	Lower half	<995	<1,010	<1,000
S98T001730	239:5	Upper half	<1,030	<1,010	<1,020
S98T001710		Lower half	<1,020	<1,010	<1,020

Table B2-24. Tank 241-SX-103 Core Sample Analytical Results: Iron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<1,040	<1,020	<1,030
S98T001724	239:7	Lower half	<1,020	<1,040	<1,030
S98T001663	239:8	Lower half	<1,010	<1,020	<1,020
S98T001704	239:9	Lower half	<1,020	<1,030	<1,030
S98T001600	239:9R1	Lower half	<1,020	<1,030	<1,030
S98T001574	239:10R1	PARTIAL	<968	< 996	<982
S98T001610	239:11R	Upper half	5,470	5,500	5,490
S98T001616		Lower half	5,960	5,960	5,960
S98T001649	239:12	Lower half	1,860	1,810	1,840
S98T001622	239:12A	Lower half	<1,040	<1,040	<1,040
S98T001802	Core 235	Solid composite	1,120	1,480	1,300[QC:e]
S98T001808	Core 239	Solid composite	1,000	987	994
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<30.6	<30.5	<30.6
S98T001810	Core 239	Solid composite	<30.4	<30.6	<30.5
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001486	235:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001668	239:1A	Drainable liquid	<30.1	<30.1	<30.1
S98T001566	239:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001654	239:3	Drainable liquid	<30.1	<30.1	<30.1
S98T001579	239:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001715	239:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001595	239:6	Drainable liquid	<30.1	<30.1	<30.1
S98T001719	239:7	Drainable liquid	<30.1	<30.1	<30.1
S98T001658	239:8	Drainable liquid	<30.1	<30.1	<30.1
S98T001605	239:9R1	Drainable liquid	<30.1	<30.1	<30.1
S98T001571	239:10R1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-25. Tank 241-SX-103 Core Sample Analytical Results: Lanthanum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<38.7	<39.2	<39
S98T001498	235:6	Lower half	<39.7	<39	<39.4
S98T001551	235:6A	Lower half	<28.9	<28.6	<28.8
S98T001492	235:7	Lower half	<39	<39.5	<39.3
S98T001552	235:8	Lower half	<30	<29.4	<29.7
S98T002492	235:9	Lower half	<28.7	<28.9	<28.8
S98T001509	235:9A	Lower half	<39.9	<40	<40
S98T001699	235:10	Lower half	<38.5	<39.4	<39
S98T001553	235:11	Lower half	29.1	31.9	30.5
S98T001639	235:12A	Lower half	<19.3	<19.4	<19.4
S98T001585	239:1	Lower half	<29.9	<29.8	<29.9
S98T001644	239:1A	Lower half	<20.2	<19.9	<20
S98T001731	239:5	Upper half	<39	<39.1	<39
S98T001711		Lower half	< 38.8	< 39.1	< 39
S98T001591	239:6	Lower half	<29.6	<30.1	<29.9
S98T001725	239:7	Lower half	<38.5	<39.2	<38.9
S98T001664	239:8	Lower half	<28.7	<29.2	<28.9
S98T001705	239:9	Lower half	<29.6	<29	<29.3
S98T001601	239:9R1	Lower half	<29.7	<29.3	<29.5
S98T001575	239:10R1	Partial	<29.6	<29.7	<29.6
S98T001611	239:11R	Upper half	49.1	48.3	48.7
S98T001617		Lower half	47.6	50.9	49.3
S98T001650	239:12	Lower half	<19.6	<19.9	<19.8
S98T001623	239:12A	Lower half	<29.9	<29.3	<29.6
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<983	<988	<986
S98T001497	235:6	Lower half	<979	<996	<988

Table B2-25. Tank 241-SX-103 Core Sample Analytical Results: Lanthanum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<990	<1,010	<1,000
S98T001491	235:7	Lower half	<1,010	<1,010	<1,010
S98T001549	235:8	Lower half	<1,010	<993	<1,000
S98T002491	235:9	Lower half	<1,040	<1,040	<1,040
S98T001508	235:9A	Lower half	<1,020	<1,010	<1,020
S98T001698	235:10	Lower half	<1,020	<1,010	<1,020
S98T001550	235:11	Lower half	<1,000	<1,020	<1,010
S98T001638	235:12A	Lower half	<1,020	<1,010	<1,020
S98T001584	239:1	Lower half	<1,010	<1,010	<1,010
S98T001643	239:1A	Lower half	<995	<1,010	<1,000
S98T001730	239:5	Upper half	<1,030	<1,010	<1,020
S98T001710		Lower half	<1,020	<1,010	<1,020
S98T001590	239:6	Lower half	<1,040	<1,020	<1,030
S98T001724	239:7	Lower half	<1,020	<1,040	<1,030
S98T001663	239:8	Lower half	<1,010	<1,020	<1,020
S98T001704	239:9	Lower half	<1,020	<1,030	<1,030
S98T001600	239:9R1	Lower half	<1,020	<1,030	<1,030
S98T001574	239:10R1	Partial	<968	<996	<982
S98T001610	239:11R	Upper half	<1,030	<1,030	<1,030
S98T001616		Lower half	<1,030	<1,040	<1,040
S98T001649	239:12	Lower half	<1,040	<1,020	<1,030
S98T001622	239:12A	Lower half	<1,040	<1,040	<1,040
S98T001802	Core 235	Solid composite	<1,020	<949	<985
S98T001808	Core 239	Solid composite	<928	<854	<891
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<30.6	<30.5	<30.6
S98T001810	Core 239	Solid composite	<30.4	<30.6	<30.5

Table B2-25. Tank 241-SX-103 Core Sample Analytical Results: Lanthanum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001486	235:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001668	239:1A	Drainable liquid	<30.1	<30.1	<30.1
S98T001566	239:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001654	239:3	Drainable liquid	<30.1	<30.1	<30.1
S98T001579	239:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001715	239:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001595	239:6	Drainable liquid	<30.1	<30.1	<30.1
S98T001719	239:7	Drainable liquid	<30.1	<30.1	<30.1
S98T001658	239:8	Drainable liquid	<30.1	<30.1	<30.1
S98T001605	239:9R1	Drainable liquid	<30.1	<30.1	<30.1
S98T001571	239:10R1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-26. Tank 241-SX-103 Core Sample Analytical Results: Lead (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	79.7	<79	<79.3
S98T001552	235:8	Lower half	142	123	133
S98T002492	235:9	Lower half	90.5	64.7	77.6[QC:e]
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9[QC:a]
S98T001553	235:11	Lower half	90.7	99	94.8
S98T001639	235:12A	Lower half	<38.6	<38.8	<38.7
S98T001585	239:1	Lower half	148	86.4	117[QC:e]

Table B2-26. Tank 241-SX-103 Core Sample Analytical Results: Lead (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9
S98T001591	239:6	Lower half	62.4	79.7	71[QC:e]
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58[QC:a]
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7[QC:a]
S98T001601	239: 9R1	Lower half	87.4	138	113[QC:e]
S98T001575	239:10R1	Partial	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	191	209	200
S98T001617		Lower half	182	204	193
S98T001650	239:12	Lower half	<39.1	<39.9	<39.5
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040

Table B2-26. Tank 241-SX-103 Core Sample Analytical Results: Lead (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	Partial	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-27. Tank 241-SX-103 Core Sample Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	<7.75	<7.84	<7.8
S98T001498	235:6	Lower half	<7.93	<7.81	<7.87
S98T001551	235:6A	Lower half	<5.77	<5.72	<5.74
S98T001492	235:7	Lower half	<7.8	<7.9	<7.85
S98T001552	235:8	Lower half	<6	<5.88	<5.94
S98T002492	235:9	Lower half	<5.74	<5.77	<5.75
S98T001509	235:9A	Lower half	<7.97	<7.99	<7.98
S98T001699	235:10	Lower half	<7.7	<7.88	<7.79
S98T001553	235:11	Lower half	137	150	144
S98T001639	235:12A	Lower half	14.9	21.5	18.2[QC:e]
S98T001585	239:1	Lower half	12.6	11.7	12.1
S98T001644	239:1A	Lower half	<4.04	<3.98	<4.01
S98T001731	239:5	Upper half	<7.8	<7.83	<7.81
S98T001711		Lower half	<7.76	<7.82	<7.79
S98T001591	239:6	Lower half	<5.93	<6.01	<5.97
S98T001725	239:7	Lower half	<7.7	<7.83	<7.77
S98T001664	239:8	Lower half	<5.74	<5.85	<5.8
S98T001705	239:9	Lower half	<5.92	<5.81	<5.87
S98T001601	239:9R1	Lower half	<5.94	<5.86	<5.9
S98T001575	239:10R1	Partial	<5.91	<5.94	<5.93
S98T001611	239:11R	Upper half	<6.09	6.17	<6.13
S98T001617		Lower half	7.23	7.81	7.52
S98T001650	239:12	Lower half	7.71	10.7	9.21[QC:e]
S98T001623	239:12A	Lower half	<5.99	<5.86	<5.93
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<197	<198	<198
S98T001497	235:6	Lower half	<196	<199	<198

Table B2-27. Tank 241-SX-103 Core Sample Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
S98T001548	235:6A	Lower half	<198	<202	<200
S98T001491	235:7	Lower half	<203	<201	<202
S98T001549	235:8	Lower half	<203	<199	<201
S98T002491	235:9	Lower half	<207	<208	<208
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	<204	<201	<203
S98T001550	235:11	Lower half	<201	<203	<202
S98T001638	235:12A	Lower half	<203	<202	<203
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	<207	<203	<205
S98T001710		Lower half	<204	<203	<204
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207
S98T001663	239:8	Lower half	<203	<203	<203
S98T001704	239:9	Lower half	<204	<207	<206
S98T001600	239:9R1	Lower half	<204	<206	<205
S98T001574	239:10R1	Partial	<194	<199	<197
S98T001610	239:11R	Upper half	<205	<205	<205
S98T001616		Lower half	<206	<209	<208
S98T001649	239:12	Lower half	<208	<204	<206
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	<204	<190	<197
S98T001808	Core 239	Solid composite	<186	<171	<179
Solids: water digest			µg/g	µg/g	µg/g
S98T001804	Core 235	Solid composite	10.9	9.13	10
S98T001810	Core 239	Solid composite	<6.09	<6.12	<6.11

Table B2-27. Tank 241-SX-103 Core Sample Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001486	235:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001668	239:1A	Drainable liquid	<6.01	<6.01	<6.01
S98T001566	239:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001654	239:3	Drainable liquid	<6.01	<6.01	<6.01
S98T001579	239:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	<6.01	<6.01	<6.01
S98T001719	239:7	Drainable liquid	<6.01	<6.01	<6.01
S98T001658	239:8	Drainable liquid	<6.01	<6.01	<6.01
S98T001605	239:9R1	Drainable liquid	<6.01	<6.01	<6.01
S98T001571	239:10R1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-28. Tank 241-SX-103 Core Sample Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	<78	<79	<78.5
S98T001552	235:8	Lower half	<60	<58.8	<59.4
S98T002492	235:9	Lower half	<57.4	<57.7	<57.5
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9
S98T001553	235:11	Lower half	72.1	69	70.5
S98T001639	235:12A	Lower half	<38.6	<38.8	<38.7
S98T001585	239:1	Lower half	<59.7	<59.6	<59.7

Table B2-28. Tank 241-SX-103 Core Sample 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**
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9
S98T001591	239:6	Lower half	<59.3	<60.1	<59.7
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7
S98T001601	239:9R1	Lower half	<59.4	<58.6	<59
S98T001575	239:10R1	Partial	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	87.4	67.8	77.6[QC:e]
S98T001617		Lower half	94.5	111	103
S98T001650	239:12	Lower half	<39.1	46.9	<43
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040

Table B2-28. Tank 241-SX-103 Core Sample Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fushion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	Partial	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-29. Tank 241-SX-103 Core Sample Analytical Results: Manganese (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	172	204	188
S98T001498	235:6	Lower half	212	213	213
S98T001551	235:6A	Lower half	49.3	49.6	49.5
S98T001492	235:7	Lower half	175	177	176
S98T001552	235:8	Lower half	856	773	815
S98T002492	235:9	Lower half	399	283	341[QC:e]
S98T001509	235:9A	Lower half	163	153	158
S98T001699	235:10	Lower half	207	322	265[QC:e]
S98T001553	235:11	Lower half	1520	1650	1590
S98T001639	235:12A	Lower half	470	594	532[QC:e]
S98T001585	239:1	Lower half	157	130	144
S98T001644	239:1A	Lower half	<4.04	<3.98	<4.01
S98T001731	239:5	Upper half	166	167	167
S98T001711		Lower half	227	187	207
S98T001591	239:6	Lower half	73.5	78.4	76
S98T001725	239:7	Lower half	91.6	101	96.3
S98T001664	239: 8	Lower half	262	198	230[QC:e]
S98T001705	239: 9	Lower half	380	298	339[QC:e]
S98T001601	239: 9R1	Lower half	308	199	254[QC:e]
S98T001575	239:10R1	Partial	305	303	304
S98T001611	239:11R	Upper half	3,260	3,390	3,330
S98T001617		Lower half	3,430	3,690	3,560
S98T001650	239:12	Lower half	1,980	2,550	2,270[QC:e]
S98T001623	239:12A	Lower half	12.6	32.8	22.7[QC:e]
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	265	242	254
S98T001497	235:6	Lower half	251	252	252

Table B2-29. Tank 241-SX-103 Core Sample Analytical Results: Manganese (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
S98T001548	235:6A	Lower half	<198	<202	<200
S98T001491	235:7	Lower half	<203	205	<204
S98T001549	235:8	Lower half	824	805	815
S98T002491	235:9	Lower half	352	342	347
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	233	242	238
S98T001550	235:11	Lower half	1,800	1,830	1,820
S98T001638	235:12A	Lower half	822	929	876
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	239	250	245
S98T001710		Lower half	226	213	220
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207
S98T001663	239:8	Lower half	280	283	282
S98T001704	239:9	Lower half	491	423	457
S98T001600	239:9R1	Lower half	335	343	339
S98T001574	239:10R1	Partial	343	367	355
S98T001610	239:11R	Upper half	3,550	3,570	3,560
S98T001616		Lower half	3,770	3,720	3,750
S98T001649	239:12	Lower half	2,380	2,350	2,370
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	590	538	564
S98T001808	Core 239	Solid composite	882	698	790[QC:e]
Solids: water digest			µg/g	µg/g	µg/g
S98T001804	Core 235	Solid composite	<6.12	<6.11	<6.12
S98T001810	Core 239	Solid composite	<6.09	<6.12	<6.11

Table B2-29. Tank 241-SX-103 Core Sample Analytical Results: Manganese (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001486	235:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001668	239:1A	Drainable liquid	<6.01	<6.01	<6.01
S98T001566	239:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001654	239:3	Drainable liquid	<6.01	<6.01	<6.01
S98T001579	239:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	<6.01	<6.01	<6.01
S98T001719	239:7	Drainable liquid	<6.01	<6.01	<6.01
S98T001658	239:8	Drainable liquid	<6.01	<6.01	<6.01
S98T001605	239:9R1	Drainable liquid	<6.01	<6.01	<6.01
S98T001571	239:10R1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-30. Tank 241-SX-103 Core Sample Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<38.7	40.7	<39.7
S98T001498	235:6	Lower half	<39.7	<39	<39.4
S98T001551	235:6A	Lower half	<28.9	<28.6	<28.8
S98T001492	235:7	Lower half	<39	<39.5	<39.3
S98T001552	235:8	Lower half	62.4	54.9	58.6
S98T002492	235:9	Lower half	65.1	47.1	56.1[QC:e]
S98T001509	235:9A	Lower half	<39.9	<40	<40
S98T001699	235:10	Lower half	<38.5	<39.4	<39
S98T001553	235:11	Lower half	33.6	35.8	34.7
S98T001639	235:12A	Lower half	<19.3	<19.4	<19.4
S98T001585	239:1	Lower half	64.9	72.4	68.7

Table B2-30. Tank 241-SX-103 Core Sample Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001644	239:1A	Lower half	84	83.3	83.7
S98T001731	239:5	Upper half	<39	<39.1	<39
S98T001711		Lower half	<38.8	<39.1	<39
S98T001591	239:6	Lower half	71.7	69.7	70.7
S98T001725	239:7	Lower half	<38.5	<39.2	<38.9
S98T001664	239:8	Lower half	44.1	37.5	40.8
S98T001705	239:9	Lower half	50.5	37.5	44[QC:e]
S98T001601	239:9R1	Lower half	69.7	81.9	75.8
S98T001575	239:10R1	Partial	32.7	<29.7	<31.2
S98T001611	239:11R	Upper half	61.8	57.1	59.5
S98T001617		Lower half	55.8	53.7	54.8
S98T001650	239:12	Lower half	29.4	30.5	29.9
S98T001623	239:12A	Lower half	<29.9	<29.3	<29.6
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<983	<988	<986
S98T001497	235:6	Lower half	<979	<996	<988
S98T001548	235:6A	Lower half	<990	<1,010	<1,000
S98T001491	235:7	Lower half	<1,010	<1,010	<1,010
S98T001549	235:8	Lower half	<1,010	<993	<1,000
S98T002491	235:9	Lower half	<1,040	<1,040	<1,040
S98T001508	235:9A	Lower half	<1,020	<1,010	<1,020
S98T001698	235:10	Lower half	<1,020	<1,010	<1,020
S98T001550	235:11	Lower half	<1,000	<1,020	<1,010
S98T001638	235:12A	Lower half	<1,020	<1,010	<1,020
S98T001584	239:1	Lower half	<1,010	<1,010	<1,010
S98T001643	239:1A	Lower half	<995	<1,010	<1,000
S98T001730	239:5	Upper half	<1,030	<1,010	<1,020
S98T001710		Lower half	<1,020	<1,010	<1,020

Table B2-30. Tank 241-SX-103 Core Sample Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<1,040	<1,020	<1,030
S98T001724	239:7	Lower half	<1,020	<1,040	<1,030
S98T001663	239:8	Lower half	<1,010	<1,020	<1,020
S98T001704	239:9	Lower half	<1,020	<1,030	<1,030
S98T001600	239:9R1	Lower half	<1,020	<1,030	<1,030
S98T001574	239:10R1	PARTIAL	<968	<996	<982
S98T001610	239:11R	Upper half	<1,030	<1,030	<1,030
S98T001616		Lower half	<1,030	<1,040	<1,040
S98T001649	239:12	Lower half	<1,040	<1,020	<1,030
S98T001622	239:12A	Lower half	<1,040	<1,040	<1,040
S98T001802	Core 235	Solid composite	<1,020	<949	<985
S98T001808	Core 239	Solid composite	<928	<854	<891
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	36.3	34.4	35.3
S98T001810	Core 239	Solid composite	52	40.7	46.4[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	129	131	130
S98T001486	235:5	Drainable liquid	136	135	136
S98T001668	239:1A	Drainable liquid	141	143	142[QC:c]
S98T001566	239:2	Drainable liquid	126	146	136
S98T001654	239:3	Drainable liquid	138	138	138
S98T001579	239:4	Drainable liquid	138	136	137
S98T001715	239:5	Drainable liquid	136	137	137
S98T001595	239:6	Drainable liquid	136	137	137
S98T001719	239:7	Drainable liquid	134	138	136[QC:c]
S98T001658	239:8	Drainable liquid	139	139	139
S98T001605	239:9R1	Drainable liquid	140	140	140
S98T001571	239:10R1	Drainable liquid	145	144	145

Table B2-31. Tank 241-SX-103 Core Sample Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	<78	<79	<78.5
S98T001552	235:8	Lower half	<60	<58.8	<59.4
S98T002492	235:9	Lower half	<57.4	<57.7	<57.5
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9
S98T001553	235:11	Lower half	81.7	90.6	86.2
S98T001639	235:12A	Lower half	<38.6	<38.8	<38.7
S98T001585	239:1	Lower half	<59.7	<59.6	<59.7
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9
S98T001591	239:6	Lower half	<59.3	<60.1	<59.7
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7
S98T001601	239:9R1	Lower half	<59.4	<58.6	<59
S98T001575	239:10R1	Partial	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	105	109	107
S98T001617		Lower half	112	122	117
S98T001650	239:12	Lower half	43.8	57.8	50.8[QC:e]
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980

Table B2-31. Tank 241-SX-103 Core Sample Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	Partial	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61

Table B2-31. Tank 241-SX-103 Core Sample Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-32. Tank 241-SX-103 Core Sample Analytical Results: Nickel (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	75.6	84.6	80.1
S98T001498	235:6	Lower half	62.8	65.6	64.2
S98T001551	235:6A	Lower half	24.2	27.3	25.8
S98T001492	235:7	Lower half	55.4	58.7	57
S98T001552	235:8	Lower half	194	175	185
S98T002492	235:9	Lower half	74.8	47.9	61.3[QC:e]
S98T001509	235:9A	Lower half	41.7	41.7	41.7
S98T001699	235:10	Lower half	18	29.1	23.6[QC:e]
S98T001553	235:11	Lower half	358	384	371
S98T001639	235:12A	Lower half	51.9	51.4	51.6
S98T001585	239:1	Lower half	69.1	53.9	61.5[QC:e]

Table B2-32. Tank 241-SX-103 Core Sample Analytical Results: Nickel (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001644	239:1A	Lower half	<8.08	<7.95	<8.02
S98T001731	239:5	Upper half	47.7	51.5	49.6
S98T001711		Lower half	58.8	46	52.4[QC:e]
S98T001591	239:6	Lower half	25.7	29.7	27.7
S98T001725	239:7	Lower half	21.1	33	27.1[QC:e]
S98T001664	239:8	Lower half	90.1	71.6	80.8[QC:e]
S98T001705	239:9	Lower half	91.6	70.1	80.8[QC:e]
S98T001601	239:9R1	Lower half	67.9	43.1	55.5[QC:e]
S98T001575	239:10R1	Partial	58.8	54.5	56.6
S98T001611	239:11R	Upper half	224	237	231
S98T001617		Lower half	269	279	274
S98T001650	239:12	Lower half	102	152	127[QC:e]
S98T001623	239:12A	Lower half	<12	<11.7	<11.8
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T002491	235:9	Lower half	888	2,140	1,510[QC:e]
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<12.2	<12.2	<12.2
S98T001810	Core 239	Solid composite	<12.2	<12.2	<12.2
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<12	<12	<12
S98T001486	235:5	Drainable liquid	<12	<12	<12
S98T001668	239:1A	Drainable liquid	<12	<12	<12
S98T001566	239:2	Drainable liquid	<12	<12	<12
S98T001654	239:3	Drainable liquid	<12	<12	<12
S98T001579	239:4	Drainable liquid	<12	<12	<12
S98T001715	239:5	Drainable liquid	<12	<12	<12
S98T001595	239:6	Drainable liquid	<12	<12	<12
S98T001719	239:7	Drainable liquid	<12	<12	<12

Table B2-32. Tank 241-SX-103 Core Sample Analytical Results: Nickel (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T001658	239:8	Drainable liquid	<12	<12	<12
S98T001605	239:9R1	Drainable liquid	<12	<12	<12
S98T001571	239:10R1	Drainable liquid	<12	<12	<12

Table B2-33. Tank 241-SX-103 Core Sample Analytical Results: Phosphorus (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	975	3,560	2,270[QC:e]
S98T001498	235:6	Lower half	4970	684	2,830[QC:c,e]
S98T001551	235:6A	Lower half	472	427	450
S98T001492	235:7	Lower half	1,100	656	878[QC:e]
S98T001552	235:8	Lower half	1,200	2,560	1,880[QC:e]
S98T002492	235:9	Lower half	1,650	1,100	1,380[QC:e]
S98T001509	235:9A	Lower half	385	361	373
S98T001699	235:10	Lower half	291	453	372[QC:e]
S98T001553	235:11	Lower half	1,250	1270	1,260
S98T001639	235:12A	Lower half	773	814	794
S98T001585	239:1	Lower half	1,900	1,310	1,610[QC:c,e]
S98T001644	239:1A	Lower half	3370	3,230	3,300
S98T001731	239:5	Upper half	1,190	1,180	1,190
S98T001711		Lower half	551	475	513
S98T001591	239:6	Lower half	2,260	1,880	2,070
S98T001725	239:7	Lower half	1,570	1,740	1,660
S98T001664	239:8	Lower half	1,120	777	949[QC:e]
S98T001705	239:9	Lower half	987	715	851[QC:e]
S98T001601	239:9R1	Lower half	1,680	1,320	1,500[QC:e]

Table B2-33. Tank 241-SX-103 Core Sample Analytical Results: Phosphorus (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001575	239:10R1	Partial	1,240	953	1,100[QC:d,e]
S98T001611	239:11R	Upper half	1,820	2,070	1,950
S98T001617		Lower half	1,850	1,800	1,830[QC:c]
S98T001650	239:12	Lower half	1,630	1,540	1,590
S98T001623	239:12A	Lower half	<120	<117	<119
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<3,930	<3,950	<3,940
S98T001497	235:6	Lower half	<3,920	<3,990	<3,960
S98T001548	235:6A	Lower half	<3,960	<4,050	<4,010
S98T001491	235:7	Lower half	<4,050	<4,030	<4,040
S98T001549	235:8	Lower half	<4,060	<3,970	<4,020
S98T002491	235:9	Lower half	<4,150	<4,150	<4,150
S98T001508	235:9A	Lower half	<4,080	<4,060	<4,070
S98T001698	235:10	Lower half	<4,090	<4,020	<4,060
S98T001550	235:11	Lower half	<4,020	<4,070	<4,050
S98T001638	235:12A	Lower half	<4,070	<4,040	<4,060
S98T001584	239:1	Lower half	<4,050	<4,040	<4,050
S98T001643	239:1A	Lower half	4,870	5,110	4,990
S98T001730	239:5	Upper half	<4,140	<4,050	<4,100
S98T001710		Lower half	<4,080	<4,050	<4,070
S98T001590	239:6	Lower half	<4,140	<4,080	<4,110
S98T001724	239:7	Lower half	<4,100	<4,160	<4,130
S98T001663	239:8	Lower half	<4,060	<4,060	<4,060
S98T001704	239:9	Lower half	<4,080	<4,140	<4,110
S98T001600	239:9R1	Lower half	<4,070	<4,120	<4,100
S98T001574	239:10R1	Partial	<3,870	<3,980	<3,930
S98T001610	239:11R	Upper half	<4,100	<4,100	<4,100
S98T001616		Lower half	<4,120	<4,180	<4,150

Table B2-33. Tank 241-SX-103 Core Sample Analytical Results: Phosphorus (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001649	239:12	Lower half	<4,160	<4,090	<4,130
S98T001622	239:12A	Lower half	<4,150	<4,180	<4,170
S98T001802	Core 235	Solid composite	<4,080	<3,800	<3,940
S98T001808	Core 239	Solid composite	<3,710	<3,420	<3,570
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	844	811	828
S98T001810	Core 239	Solid composite	1,260	1,090	1,180
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	1,010	1,040	1,030
S98T001486	235:5	Drainable liquid	1,080	1,100	1,090
S98T001668	239:1A	Drainable liquid	964	983	974[QC:c]
S98T001566	239:2	Drainable liquid	914	1,050	982
S98T001654	239:3	Drainable liquid	1,050	1,020	1,040
S98T001579	239:4	Drainable liquid	1,100	1,080	1,090
S98T001715	239:5	Drainable liquid	1,010	1,040	1,030
S98T001595	239:6	Drainable liquid	991	981	986
S98T001719	239:7	Drainable liquid	915	916	916[QC:c]
S98T001658	239:8	Drainable liquid	1,050	1,080	1,070
S98T001605	239:9R1	Drainable liquid	1,100	1,080	1,090
S98T001571	239:10R1	Drainable liquid	1,220	1,190	1,210

Table B2-34. Tank 241-SX-103 Core Sample Analytical Results: Potassium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	1,360	1,540	1,450
S98T001498	235:6	Lower half	1,070	1,220	1,150
S98T001551	235:6A	Lower half	768	731	750

Table B2-34. Tank 241-SX-103 Core Sample 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**
S98T001492	235:7	Lower half	1,230	1,130	1,180
S98T001552	235:8	Lower half	1,910	1,680	1,800
S98T002492	235:9	Lower half	2,090	1,460	1,780[QC:e]
S98T001509	235:9A	Lower half	805	785	795
S98T001699	235:10	Lower half	761	722	742
S98T001553	235:11	Lower half	1,110	1,160	1,140
S98T001639	235:12A	Lower half	364	432	398
S98T001585	239:1	Lower half	1,950	2,000	1,980[QC:c]
S98T001644	239:1A	Lower half	2,470	2,490	2,480
S98T001731	239:5	Upper half	1,170	1,060	1,120
S98T001711		Lower half	1,010	967	989
S98T001591	239:6	Lower half	2,080	1,960	2,020
S98T001725	239:7	Lower half	907	1,220	1,060[QC:c,e]
S98T001664	239:8	Lower half	1,470	1,280	1,380
S98T001705	239:9	Lower half	1,660	1,240	1,450[QC:e]
S98T001601	239:9R1	Lower half	2,010	2,200	2,110
S98T001575	239:10R1	Partial	1,140	980	1,060
S98T001611	239:11R	Upper half	2,060	1,970	2,020
S98T001617		Lower half	1,760	1,720	1,740
S98T001650	239:12	Lower half	715	882	799[QC:e]
S98T001623	239:12A	Lower half	< 299	392	< 346[QC:e]
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	1,090	1,180	1,140
S98T001810	Core 239	Solid composite	1,600	1,300	1,450[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	3,980	4,090	4,040
S98T001486	235:5	Drainable liquid	4,210	4,180	4,200
S98T001668	239:1A	Drainable liquid	4,200	4,290	4,250

Table B2-34. Tank 241-SX-103 Core Sample Analytical Results: Potassium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T001566	239:2	Drainable liquid	4,070	4,750	4,410[QC:d]
S98T001654	239:3	Drainable liquid	4,300	4,170	4,240
S98T001579	239:4	Drainable liquid	4,470	4,390	4,430
S98T001715	239:5	Drainable liquid	4,020	4,050	4,040
S98T001595	239:6	Drainable liquid	4,430	4,500	4,470
S98T001719	239:7	Drainable liquid	3,990	4,150	4,070
S98T001658	239:8	Drainable liquid	4,150	4,180	4,170
S98T001605	239:9R1	Drainable liquid	4,560	4,480	4,520[QC:c]
S98T001571	239:10R1	Drainable liquid	4,600	4,600	4,600[QC:c]

Table B2-35. Tank 241-SX-103 Core Sample Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	<78	<79	<78.5
S98T001552	235:8	Lower half	<60	<58.8	<59.4
S98T002492	235:9	Lower half	<57.4	<57.7	<57.5
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9
S98T001553	235:11	Lower half	<40	<39.3	<39.6
S98T001639	235:12A	Lower half	<38.6	<38.8	<38.7
S98T001585	239:1	Lower half	<59.7	<59.6	<59.7
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9

Table B2-35. Tank 241-SX-103 Core Sample Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001591	239:6	Lower half	<59.3	<60.1	<59.7
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7
S98T001601	239:9R1	Lower half	<59.4	<58.6	<59
S98T001575	239:10R1	PARTIAL	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	<60.9	<58.8	<59.8
S98T001617		Lower half	<59.6	<60.7	<60.2
S98T001650	239:12	Lower half	<39.1	<39.9	<39.5
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030

Table B2-35. Tank 241-SX-103 Core Sample Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	Partial	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	< 2,060	< 2,090	< 2,080
S98T001649	239:12	Lower half	< 2,080	< 2,040	< 2,060
S98T001622	239:12A	Lower half	< 2,070	< 2,090	< 2,080
S98T001802	Core 235	Solid composite	< 2,040	< 1,900	< 1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-36. Tank 241-SX-103 Core Sample Analytical Results: Selenium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<77.5	<78.4	<78
S98T001498	235:6	Lower half	<79.3	<78.1	<78.7
S98T001551	235:6A	Lower half	<57.7	<57.2	<57.5
S98T001492	235:7	Lower half	<78	<79	<78.5
S98T001552	235:8	Lower half	<60	<58.8	<59.4
S98T002492	235:9	Lower half	<57.4	<57.7	<57.5
S98T001509	235:9A	Lower half	<79.7	<79.9	<79.8
S98T001699	235:10	Lower half	<77	<78.8	<77.9
S98T001553	235:11	Lower half	56.2	47.4	51.8
S98T001639	235:12A	Lower half	122	121	122
S98T001585	239:1	Lower half	61.5	60.2	60.9
S98T001644	239:1A	Lower half	<40.4	<39.8	<40.1
S98T001731	239:5	Upper half	<78	<78.3	<78.2
S98T001711		Lower half	<77.6	<78.2	<77.9
S98T001591	239:6	Lower half	<59.3	<60.1	<59.7
S98T001725	239:7	Lower half	<77	<78.3	<77.7
S98T001664	239:8	Lower half	<57.4	<58.5	<58
S98T001705	239:9	Lower half	<59.2	<58.1	<58.7
S98T001601	239:9R1	Lower half	<59.4	<58.6	<59
S98T001575	239:10R1	Partial	<59.1	<59.4	<59.3
S98T001611	239:11R	Upper half	<60.9	<58.8	<59.8
S98T001617		Lower half	<59.6	<60.7	<60.2
S98T001650	239:12	Lower half	62	85	73.5[QC:e]
S98T001623	239:12A	Lower half	<59.9	<58.6	<59.3
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<1,970	<1,980	<1,980
S98T001497	235:6	Lower half	<1,960	<1,990	<1,980

Table B2-36. Tank 241-SX-103 Core Sample Analytical Results: Selenium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<1,980	<2,020	<2,000
S98T001491	235:7	Lower half	<2,030	<2,010	<2,020
S98T001549	235:8	Lower half	<2,030	<1,990	<2,010
S98T002491	235:9	Lower half	<2,070	<2,080	<2,080
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2,030
S98T001584	239:1	Lower half	<2,030	<2,020	<2,030
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	<2,070	<2,030	<2,050
S98T001710		Lower half	<2,040	<2,030	<2,040
S98T001590	239:6	Lower half	<2,070	<2,040	<2,060
S98T001724	239:7	Lower half	<2,050	<2,080	<2,070
S98T001663	239:8	Lower half	<2,030	<2,030	<2,030
S98T001704	239:9	Lower half	<2,040	<2,070	<2,060
S98T001600	239:9R1	Lower half	<2,040	<2,060	<2,050
S98T001574	239:10R1	Partial	<1,940	<1,990	<1,970
S98T001610	239:11R	Upper half	<2,050	<2,050	<2,050
S98T001616		Lower half	<2,060	<2,090	<2,080
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	<2,040	<1,900	<1,970
S98T001808	Core 239	Solid composite	<1,860	<1,710	<1,790
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<61.2	<61.1	<61.2
S98T001810	Core 239	Solid composite	<60.9	<61.2	<61

Table B2-36. Tank 241-SX-103 Core Sample Analytical Results: Selenium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S98T001544	235:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001486	235:5	Drainable liquid	<60.1	61.2	<60.7
S98T001668	239:1A	Drainable liquid	<60.1	<60.1	<60.1
S98T001566	239:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001654	239:3	Drainable liquid	<60.1	<60.1	<60.1
S98T001579	239:4	Drainable liquid	<60.1	<60.1	<60.1
S98T001715	239:5	Drainable liquid	<60.1	<60.1	<60.1
S98T001595	239:6	Drainable liquid	<60.1	<60.1	<60.1
S98T001719	239:7	Drainable liquid	<60.1	<60.1	<60.1
S98T001658	239:8	Drainable liquid	<60.1	<60.1	<60.1
S98T001605	239:9R1	Drainable liquid	<60.1	<60.1	<60.1
S98T001571	239:10R1	Drainable liquid	<60.1	<60.1	<60.1

Table B2-37. Tank 241-SX-103 Core Sample Analytical Results: Silicon (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	233	185	209[QC:e]
S98T001498	235:6	Lower half	190	158	174
S98T001551	235:6A	Lower half	193	227	210[QC:b]
S98T001492	235:7	Lower half	197	308	253[QC:e]
S98T001552	235:8	Lower half	177	150	164[QC:b]
S98T002492	235:9	Lower half	346	320	333[QC:b]
S98T001509	235:9A	Lower half	263	202	233[QC:c,e]
S98T001699	235:10	Lower half	569	545	557[QC:c]
S98T001553	235:11	Lower half	550	664	607[QC:b]
S98T001639	235:12A	Lower half	235	266	251[QC:b]
S98T001585	239:1	Lower half	205	232	219

Table B2-37. Tank 241-SX-103 Core Sample Analytical Results: Silicon (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001644	239:1A	Lower half	358	347	353[QC:b]
S98T001731	239:5	Upper half	124	125	125[QC:b]
S98T001711		Lower half	371	296	334[QC:b,e]
S98T001591	239:6	Lower half	287	240	264
S98T001725	239:7	Lower half	135	131	133[QC:b]
S98T001664	239:8	Lower half	151	163	157
S98T001705	239:9	Lower half	180	210	195
S98T001601	239:9R1	Lower half	182	200	191
S98T001575	239:10R1	Partial	200	188	194[QC:b]
S98T001611	239:11R	Upper half	506	685	596[QC:a,e]
S98T001617		Lower half	910	1,550	1,230[QC:a,c,e]
S98T001650	239:12	Lower half	500	527	514[QC:b]
S98T001623	239:12A	Lower half	246	339	293[QC:a,e]
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<983	<988	<986
S98T001497	235:6	Lower half	<979	<996	<988
S98T001548	235:6A	Lower half	<990	<1,010	<1,000
S98T001491	235:7	Lower half	<1,010	1,080	<1,050
S98T001549	235:8	Lower half	1,220	<993	<1,110[QC:e]
S98T002491	235:9	Lower half	<1,040	<1,040	<1,040
S98T001508	235:9A	Lower half	<1,020	<1,010	<1,020
S98T001698	235:10	Lower half	1,310	<1,010	<1,160[QC:e]
S98T001550	235:11	Lower half	1,600	1,630	1,620
S98T001638	235:12A	Lower half	1,280	1,020	1,150[QC:e]
S98T001584	239:1	Lower half	<1,010	<1,010	<1,010
S98T001643	239:1A	Lower half	<995	<1,010	<1,000
S98T001730	239:5	Upper half	2,280	<1,010	<1,650[QC:e]
S98T001710		Lower half	<1,020	<1,010	<1,020

Table B2-37. Tank 241-SX-103 Core Sample Analytical Results: Silicon (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**μg/g**	**μg/g**	**μg/g**
S98T001590	239:6	Lower half	<1,040	<1,020	<1,030
S98T001724	239:7	Lower half	<1,020	<1,040	<1,030
S98T001663	239:8	Lower half	<1,010	<1,020	<1,020
S98T001704	239:9	Lower half	<1,020	<1,030	<1,030
S98T001600	239:9R1	Lower half	<1,020	<1,030	<1,030
S98T001574	239:10R1	Partial	< 968	< 996	< 982
S98T001610	239:11R	Upper half	1,430	1,440	1,440
S98T001616		Lower half	2,230	2,220	2,230
S98T001649	239:12	Lower half	<1,040	1,170	<1,110
S98T001622	239:12A	Lower half	<1,040	1,130	<1,090
S98T001802	Core 235	Solid composite	<1,020	<949	<985
S98T001808	Core 239	Solid composite	999	<854	<927
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
S98T001804	Core 235	Solid composite	434	594	514[QC:e]
S98T001810	Core 239	Solid composite	413	415	414
Liquids			**μg/mL**	**μg/mL**	**μg/mL**
S98T001544	235:4	Drainable liquid	115	120	118
S98T001486	235:5	Drainable liquid	181	180	181
S98T001668	239:1A	Drainable liquid	166	165	166[QC:d]
S98T001566	239:2	Drainable liquid	68.2	80.1	74.2
S98T001654	239:3	Drainable liquid	258	248	253
S98T001579	239:4	Drainable liquid	181	172	177
S98T001715	239:5	Drainable liquid	159	163	161
S98T001595	239:6	Drainable liquid	61.9	61.1	61.5
S98T001719	239:7	Drainable liquid	152	147	150[QC:d]
S98T001658	239:8	Drainable liquid	173	165	169
S98T001605	239:9R1	Drainable liquid	90.2	78.2	84.2
S98T001571	239:10R1	Drainable liquid	236	219	228

Table B2-38. Tank 241-SX-103 Core Sample Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	16.2	17	16.6
S98T001498	235:6	Lower half	16.9	17.6	17.3
S98T001551	235:6A	Lower half	15.6	16	15.8
S98T001492	235:7	Lower half	17.2	17.3	17.3
S98T001552	235:8	Lower half	18.8	18	18.4
S98T002492	235:9	Lower half	21.4	15.3	18.4[QC:e]
S98T001509	235:9A	Lower half	18.3	18.4	18.4
S98T001699	235:10	Lower half	18.6	18.7	18.6[QC:c]
S98T001553	235:11	Lower half	11.8	13.9	12.9
S98T001639	235:12A	Lower half	13.2	18.2	15.7[QC:a,e]
S98T001585	239:1	Lower half	13.9	13.1	13.5
S98T001644	239:1A	Lower half	11.9	11.6	11.8[QC:a]
S98T001731	239:5	Upper half	15	14.6	14.8
S98T001711		Lower half	17.3	14.7	16
S98T001591	239:6	Lower half	13	13.2	13.1
S98T001725	239:7	Lower half	14.4	15.9	15.2
S98T001664	239:8	Lower half	16.9	18.4	17.6
S98T001705	239:9	Lower half	17.3	16.5	16.9
S98T001601	239:9R1	Lower half	14.5	12.1	13.3
S98T001575	239:10R1	Partial	17.7	16.8	17.3
S98T001611	239:11R	Upper half	22.1	20.5	21.3
S98T001617		Lower half	20.1	20.4	20.3
S98T001650	239:12	Lower half	12.1	11.5	11.8[QC:a]
S98T001623	239:12A	Lower half	18	17.7	17.9
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<197	<198	<198
S98T001497	235:6	Lower half	<196	<199	<198

Table B2-38. Tank 241-SX-103 Core Sample Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<198	<202	<200
S98T001491	235:7	Lower half	<203	<201	<202
S98T001549	235:8	Lower half	<203	<199	<201
S98T002491	235:9	Lower half	<207	<208	<208
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	<204	<201	<203
S98T001550	235:11	Lower half	<201	<203	<202
S98T001638	235:12A	Lower half	<203	<202	<203
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	<207	<203	<205
S98T001710		Lower half	<204	<203	<204
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207
S98T001663	239:8	Lower half	<203	<203	<203
S98T001704	239:9	Lower half	<204	<207	<206
S98T001600	239:9R1	Lower half	<204	<206	<205
S98T001574	239:10R1	Partial	<194	<199	<197
S98T001610	239:11R	Upper half	<205	<205	<205
S98T001616		Lower half	<206	<209	<208
S98T001649	239:12	Lower half	<208	<204	<206
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	<204	<190	<197
S98T001808	Core 239	Solid composite	<186	<171	<179
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	14.8	15.6	15.2
S98T001810	Core 239	Solid composite	14.3	15	14.7

Table B2-38. Tank 241-SX-103 Core Sample Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	18	17.6	17.8
S98T001486	235:5	Drainable liquid	18.6	17.9	18.3
S98T001668	239:1A	Drainable liquid	<6.01	<6.01	<6.01
S98T001566	239:2	Drainable liquid	16.1	18.7	17.4
S98T001654	239:3	Drainable liquid	17.1	17	17.1
S98T001579	239:4	Drainable liquid	17.9	18	17.9
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	17.8	18.1	18
S98T001719	239:7	Drainable liquid	<6.01	<6.01	<6.01
S98T001658	239:8	Drainable liquid	17.2	16.3	16.8
S98T001605	239:9R1	Drainable liquid	17.9	17.6	17.8
S98T001571	239:10R1	Drainable liquid	19.2	19.4	19.3

Table B2-39. Tank 241-SX-103 Core Sample Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	2.38E+05	2.27E+05	2.33E+05[QC:b]
S98T001498	235:6	Lower half	2.41E+05	2.33E+05	2.37E+05[QC:b,d]
S98T001551	235:6A	Lower half	2.23E+05	2.26E+05	2.25E+05[QC:b,d]
S98T001492	235:7	Lower half	2.38E+05	2.43E+05	2.41E+05[QC:b]
S98T001552	235:8	Lower half	2.13E+05	2.17E+05	2.15E+05[QC:b]
S98T002492	235:9	Lower half	2.82E+05	2.14E+05	2.48E+05[QC:b,e]
S98T001509	235:9A	Lower half	2.48E+05	2.48E+05	2.48E+05[QC:b,d]
S98T001699	235:10	Lower half	2.49E+05	2.45E+05	2.47E+05[QC:c]
S98T001553	235:11	Lower half	1.12E+05	1.11E+05	1.12E+05[QC:b]
S98T001639	235:12A	Lower half	86400	1.14E+05	1.00E+05[QC:e]
S98T001585	239:1	Lower half	1.85E+05	1.77E+05	1.81E+05[QC:c,g]

Table B2-39. Tank 241-SX-103 Core Sample 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**
S98T001644	239:1A	Lower half	1.61E+05	1.65E+05	1.63E+05
S98T001731	239:5	Upper half	2.21E+05	2.25E+05	2.23E+05[QC:b]
S98T001711		Lower half	2.30E+05	2.23E+05	2.27E+05[QC:b]
S98T001591	239:6	Lower half	1.85E+05	1.76E+05	1.81E+05
S98T001725	239:7	Lower half	2.26E+05	2.22E+05	2.24E+05[QC:b,c]
S98T001664	239:8	Lower half	2.26E+05	2.31E+05	2.29E+05
S98T001705	239:9	Lower half	2.14E+05	2.20E+05	2.17E+05
S98T001601	239:9R1	Lower half	1.87E+05	1.69E+05	1.78E+05
S98T001575	239:10R1	Partial	2.34E+05	2.37E+05	2.36E+05[QC:b,c]
S98T001611	239:11R	Upper half	1.89E+05	1.84E+05	1.87E+05[QC:b]
S98T001617		Lower half	1.77E+05	1.74E+05	1.76E+05[QC:b,c]
S98T001650	239:12	Lower half	1.03E+05	89,100	96,100
S98T001623	239:12A	Lower half	2.52E+05	2.41E+05	2.47E+05[QC:b]
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	2.15E+05	2.27E+05	2.21E+05
S98T001497	235:6	Lower half	2.30E+05	2.27E+05	2.29E+05
S98T001548	235:6A	Lower half	2.40E+05	2.42E+05	2.41E+05
S98T001491	235:7	Lower half	2.26E+05	2.28E+05	2.27E+05
S98T001549	235:8	Lower half	2.33E+05	2.29E+05	2.31E+05
S98T002491	235:9	Lower half	2.23E+05	2.22E+05	2.23E+05
S98T001508	235:9A	Lower half	2.48E+05	2.46E+05	2.47E+05
S98T001698	235:10	Lower half	2.49E+05	2.51E+05	2.50E+05
S98T001550	235:11	Lower half	1.29E+05	1.22E+05	1.26E+05
S98T001638	235:12A	Lower half	82,200	1.09E+05	95,600[QC:e]
S98T001584	239:1	Lower half	1.97E+05	2.00E+05	1.99E+05
S98T001643	239:1A	Lower half	1.95E+05	1.89E+05	1.92E+05
S98T001730	239:5	Upper half	2.20E+05	2.18E+05	2.19E+05
S98T001710		Lower half	2.32E+05	2.32E+05	2.32E+05

Table B2-39. Tank 241-SX-103 Core Sample Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	1.85E+05	1.80E+05	1.83E+05
S98T001724	239:7	Lower half	2.22E+05	2.12E+05	2.17E+05
S98T001663	239:8	Lower half	2.31E+05	2.24E+05	2.28E+05
S98T001704	239:9	Lower half	2.20E+05	2.23E+05	2.22E+05
S98T001600	239:9R1	Lower half	2.01E+05	2.03E+05	2.02E+05
S98T001574	239:10R1	PARTIAL	2.53E+05	2.48E+05	2.51E+05[QC:d]
S98T001610	239:11R	Upper half	1.96E+05	1.93E+05	1.95E+05
S98T001616		Lower half	1.86E+05	1.90E+05	1.88E+05
S98T001649	239:12	Lower half	1.07E+05	91,300	99,200
S98T001622	239:12A	Lower half	2.52E+05	2.49E+05	2.51E+05
S98T001802	Core 235	Solid composite	2.10E+05	2.09E+05	2.10E+05
S98T001808	Core 239	Solid composite	1.89E+05	1.82E+05	1.86E+05
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	2.14E+05	2.20E+05	2.17E+05[QC:c]
S98T001810	Core 239	Solid composite	2.04E+05	2.15E+05	2.10E+05[QC:c]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	2.42E+05	2.49E+05	2.46E+05
S98T001486	235:5	Drainable liquid	2.51E+05	2.50E+05	2.51E+05[QC:c]
S98T001668	239:1A	Drainable liquid	2.29E+05	2.31E+05	2.30E+05[QC:d]
S98T001566	239:2	Drainable liquid	2.25E+05	2.58E+05	2.42E+05[QC:d]
S98T001654	239:3	Drainable liquid	2.33E+05	2.31E+05	2.32E+05
S98T001579	239:4	Drainable liquid	2.46E+05	2.46E+05	2.46E+05[QC:c]
S98T001715	239:5	Drainable liquid	2.27E+05	2.26E+05	2.27E+05
S98T001595	239:6	Drainable liquid	2.45E+05	2.46E+05	2.46E+05
S98T001719	239:7	Drainable liquid	2.25E+05	2.30E+05	2.28E+05[QC:d]
S98T001658	239:8	Drainable liquid	2.31E+05	2.31E+05	2.31E+05[QC:d]
S98T001605	239:9R1	Drainable liquid	2.48E+05	2.44E+05	2.46E+05[QC:c]
S98T001571	239:10R1	Drainable liquid	2.62E+05	2.58E+05	2.60E+05[QC:c]

Table B2-40. Tank 241-SX-103 Core Sample Analytical Results: Strontium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<7.75	<7.84	<7.8
S98T001498	235:6	Lower half	<7.93	<7.81	<7.87
S98T001551	235:6A	Lower half	<5.77	<5.72	<5.74
S98T001492	235:7	Lower half	<7.8	<7.9	<7.85
S98T001552	235:8	Lower half	<6	<5.88	<5.94
S98T002492	235:9	Lower half	<5.74	<5.77	<5.75
S98T001509	235: 9A	Lower half	<7.97	<7.99	<7.98
S98T001699	235:10	Lower half	<7.7	<7.88	<7.79
S98T001553	235:11	Lower half	143	156	150
S98T001639	235:12A	Lower half	66.4	73.5	70
S98T001585	239:1	Lower half	<5.97	<5.96	<5.96
S98T001644	239:1A	Lower half	<4.04	<3.98	<4.01
S98T001731	239:5	Upper half	<7.8	<7.83	<7.81
S98T001711		Lower half	<7.76	<7.82	<7.79
S98T001591	239:6	Lower half	<5.93	<6.01	<5.97
S98T001725	239:7	Lower half	<7.7	<7.83	<7.77
S98T001664	239:8	Lower half	<5.74	<5.85	<5.8
S98T001705	239:9	Lower half	<5.92	<5.81	<5.87
S98T001601	239:9R1	Lower half	<5.94	<5.86	<5.9
S98T001575	239:10R1	Partial	<5.91	<5.94	<5.93
S98T001611	239:11R	Upper half	42.3	43.8	43
S98T001617		Lower half	79.5	80	79.8
S98T001650	239:12	Lower half	72	102	87[QC:e]
S98T001623	239:12A	Lower half	<5.99	<5.86	<5.93
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<197	<198	<198
S98T001497	235:6	Lower half	<196	<199	<198
S98T001548	235:6A	Lower half	<198	<202	<200

Table B2-40. Tank 241-SX-103 Core Sample Analytical Results: Strontium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001491	235:7	Lower half	<203	<201	<202
S98T001549	235:8	Lower half	<203	<199	<201
S98T002491	235:9	Lower half	<207	<208	<208
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	<204	<201	<203
S98T001550	235:11	Lower half	<201	<203	<202
S98T001638	235:12A	Lower half	<203	<202	<203
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	<207	<203	<205
S98T001710		Lower half	<204	<203	<204
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207
S98T001663	239:8	Lower half	<203	<203	<203
S98T001704	239:9	Lower half	<204	<207	<206
S98T001600	239:9R1	Lower half	<204	<206	<205
S98T001574	239:10R1	Partial	<194	<199	<197
S98T001610	239:11R	Upper half	<205	<205	<205
S98T001616		Lower half	<206	<209	<208
S98T001649	239:12	Lower half	<208	<204	<206
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	<204	<190	<197
S98T001808	Core 239	Solid composite	<186	<171	<179
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<6.12	<6.11	<6.12
S98T001810	Core 239	Solid composite	<6.09	<6.12	<6.11
S98T001544	235:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001486	235:5	Drainable liquid	<6.01	<6.01	<6.01

Table B2-40. Tank 241-SX-103 Core Sample Analytical Results: Strontium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S98T001668	239:1A	Drainable liquid	<6.01	<6.01	<6.01
S98T001566	239:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001654	239:3	Drainable liquid	<6.01	<6.01	<6.01
S98T001579	239:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	<6.01	<6.01	<6.01
S98T001719	239:7	Drainable liquid	<6.01	<6.01	<6.01
S98T001658	239:8	Drainable liquid	<6.01	<6.01	<6.01
S98T001605	239:9R1	Drainable liquid	<6.01	<6.01	<6.01
S98T001571	239:10R1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-41. Tank 241-SX-103 Core Sample Analytical Results: Sulfur (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	15,600	14,600	15,100
S98T001498	235:6	Lower half	7,100	7,450	7,280
S98T001551	235:6A	Lower half	2,370	2,340	2,360
S98T001492	235:7	Lower half	3,340	3,260	3,300
S98T001552	235:8	Lower half	10,800	11,000	10,900
S98T002492	235:9	Lower half	5,090	3,700	4,400[QC:e]
S98T001509	235:9A	Lower half	1,650	1,620	1,640
S98T001699	235:10	Lower half	474	668	571[QC:e]
S98T001553	235:11	Lower half	403	373	388
S98T001639	235:12A	Lower half	266	395	331[QC:e]
S98T001585	239:1	Lower half	6,620	5,720	6,170[QC:c,g]
S98T001644	239:1A	Lower half	830	823	827
S98T001731	239:5	Upper half	6,860	7,150	7,010

Table B2-41. Tank 241-SX-103 Core Sample Analytical Results: Sulfur (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S98T001711		Lower half	7,640	6,360	7,000
S98T001591	239:6	Lower half	3,550	3,250	3,400
S98T001725	239:7	Lower half	4,140	4,510	4,330
S98T001664	239:8	Lower half	11,400	8,490	9,950[QC:e]
S98T001705	239:9	Lower half	7,100	5,430	6,270[QC:e]
S98T001601	239:9R1	Lower half	7,010	4,670	5,840[QC:e]
S98T001575	239:10R1	Partial	7,260	6,610	6,940[QC:d]
S98T001611	239:11R	Upper half	4,580	4,720	4,650
S98T001617		Lower half	3,800	4,000	3,900
S98T001650	239:12	Lower half	187	201	194
S98T001623	239:12A	Lower half	< 59.9	146	< 103[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	18,000	14,200	16,100[QC:e]
S98T001497	235:6	Lower half	8,110	8,290	8,200
S98T001548	235:6A	Lower half	2,210	2,520	2,370
S98T001491	235:7	Lower half	3,320	3,290	3,310
S98T001549	235:8	Lower half	1,1200	10,900	11,100
S98T002491	235:9	Lower half	4,460	4,280	4,370
S98T001508	235:9A	Lower half	<2,040	<2,030	<2,040
S98T001698	235:10	Lower half	<2,040	<2,010	<2,030
S98T001550	235:11	Lower half	<2,010	<2,030	<2,020
S98T001638	235:12A	Lower half	<2,030	<2,020	<2030
S98T001584	239:1	Lower half	5,520	5,490	5,510
S98T001643	239:1A	Lower half	<1,990	<2,030	<2,010
S98T001730	239:5	Upper half	8,150	8,800	8,480
S98T001710		Lower half	6,390	6,500	6,450
S98T001590	239:6	Lower half	3,530	3,190	3,360
S98T001724	239:7	Lower half	4,690	5,590	5,140

Table B2-41. Tank 241-SX-103 Core Sample Analytical Results: Sulfur (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001663	239:8	Lower half	10,400	10,700	10,600
S98T001704	239:9	Lower half	7,980	6,690	7,340
S98T001600	239:9R1	Lower half	7,020	7,550	7,290
S98T001574	239:10R1	Partial	7,320	9,480	8,400[QC:e]
S98T001610	239:11R	Upper half	4,420	4,630	4,530
S98T001616		Lower half	3,880	4,070	3,980
S98T001649	239:12	Lower half	<2,080	<2,040	<2,060
S98T001622	239:12A	Lower half	<2,070	<2,090	<2,080
S98T001802	Core 235	Solid composite	4,280	3,800	4,040
S98T001808	Core 239	Solid composite	4,150	4,270	4,210
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	4,460	4,200	4,330
S98T001810	Core 239	Solid composite	5,430	4,360	4,900[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	1,480	1,540	1,510
S98T001486	235:5	Drainable liquid	1,360	1,330	1,350
S98T001668	239:1A	Drainable liquid	1,400	1,410	1,410[QC:c]
S98T001566	239:2	Drainable liquid	1,270	1,460	1,370[QC:d]
S98T001654	239:3	Drainable liquid	1,500	1,480	1,490
S98T001579	239:4	Drainable liquid	1,580	1,550	1,570
S98T001715	239:5	Drainable liquid	1,640	1,680	1,660
S98T001595	239:6	Drainable liquid	1,410	1,410	1,410
S98T001719	239:7	Drainable liquid	1,290	1,300	1,300[QC:c]
S98T001658	239:8	Drainable liquid	1,190	1,200	1,200
S98T001605	239:9R1	Drainable liquid	1,430	1,380	1,410
S98T001571	239:10R1	Drainable liquid	1,370	1,320	1,350

Table B2-42. Tank 241-SX-103 Core Sample Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<155	<157	<156
S98T001498	235:6	Lower half	<159	<156	<158
S98T001551	235:6A	Lower half	<115	<114	<115
S98T001492	235:7	Lower half	<156	<158	<157
S98T001552	235:8	Lower half	<120	<118	<119
S98T002492	235:9	Lower half	<115	<115	<115
S98T001509	235:9A	Lower half	<159	<160	<160
S98T001699	235:10	Lower half	<154	<158	<156[QC:a]
S98T001553	235:11	Lower half	<79.9	<78.5	<79.2
S98T001639	235:12A	Lower half	<77.2	<77.7	<77.5
S98T001585	239:1	Lower half	<119	<119	<119
S98T001644	239:1A	Lower half	<80.8	<79.5	<80.2
S98T001731	239:5	Upper half	<156	<157	<157
S98T001711		Lower half	<155	<156	<156
S98T001591	239:6	Lower half	<119	<120	<120
S98T001725	239:7	Lower half	<154	<157	<156
S98T001664	239:8	Lower half	<115	<117	<116[QC:a]
S98T001705	239: 9	Lower half	<118	<116	<117[QC:a]
S98T001601	239: 9R1	Lower half	<119	<117	<118
S98T001575	239:10R1	Partial	<118	<119	<119
S98T001611	239:11R	Upper half	<122	<118	<120
S98T001617		Lower half	<119	<121	<120
S98T001650	239:12	Lower half	<78.2	<79.7	<79
S98T001623	239:12A	Lower half	<120	<117	<119
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<3,930	<3,950	<3,940
S98T001497	235:6	Lower half	<3,920	<3,990	<3,960
S98T001548	235:6A	Lower half	<3,960	<4,050	<4,010

Table B2-42. Tank 241-SX-103 Core Sample Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001491	235:7	Lower half	<4,050	<4,030	<4,040
S98T001549	235:8	Lower half	<4,060	<3,970	<4,020
S98T002491	235:9	Lower half	<4,150	<4,150	<4,150
S98T001508	235:9A	Lower half	<4,080	<4,060	<4,070
S98T001698	235:10	Lower half	<4,090	<4,020	<4,060
S98T001550	235:11	Lower half	<4,020	<4,070	<4,050
S98T001638	235:12A	Lower half	<4,070	<4,040	<4,060
S98T001584	239:1	Lower half	<4,050	<4,040	<4,050
S98T001643	239:1A	Lower half	<3,980	<4,050	<4,020
S98T001730	239:5	Upper half	<4,140	<4,050	<4,100
S98T001710		Lower half	<4,080	<4,050	<4,070
S98T001590	239:6	Lower half	<4,140	<4,080	<4,110
S98T001724	239:7	Lower half	<4,100	<4,160	<4,130
S98T001663	239:8	Lower half	<4,060	<4,060	<4,060
S98T001704	239:9	Lower half	<4,080	<4,140	<4,110
S98T001600	239:9R1	Lower half	<4,070	<4,120	<4,100
S98T001574	239:10R1	Partial	<3,870	<3,980	<3,930
S98T001610	239:11R	Upper half	<4,100	<4,100	<4,100
S98T001616		Lower half	<4,120	<4,180	<4,150
S98T001649	239:12	Lower half	<4,160	<4,090	<4,130
S98T001622	239:12A	Lower half	<4,150	<4,180	<4,170
S98T001802	Core 235	Solid composite	<4,080	<3,800	<3,940
S98T001808	Core 239	Solid composite	<3,710	<3,420	<3,570
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	< 122	< 122	< 122
S98T001810	Core 239	Solid composite	< 122	< 122	< 122

Table B2-42. Tank 241-SX-103 Core Sample Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<120	<120	<120
S98T001486	235:5	Drainable liquid	<120	<120	<120
S98T001668	239:1A	Drainable liquid	<120	<120	<120
S98T001566	239:2	Drainable liquid	<120	<120	<120
S98T001654	239:3	Drainable liquid	<120	<120	<120
S98T001579	239:4	Drainable liquid	<120	<120	<120
S98T001715	239:5	Drainable liquid	<120	<120	<120
S98T001595	239:6	Drainable liquid	<120	<120	<120
S98T001719	239:7	Drainable liquid	<120	<120	<120
S98T001658	239:8	Drainable liquid	<120	<120	<120
S98T001605	239:9R1	Drainable liquid	<120	<120	<120
S98T001571	239:10R1	Drainable liquid	<120	<120	<120

Table B2-43. Tank 241-SX-103 Core Sample Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<7.75	<7.84	<7.8
S98T001498	235:6	Lower half	<7.93	<7.81	<7.87
S98T001551	235:6A	Lower half	<5.77	<5.72	<5.74
S98T001492	235:7	Lower half	<7.8	<7.9	<7.85
S98T001552	235:8	Lower half	<6	<5.88	<5.94
S98T002492	235:9	Lower half	<5.74	<5.77	<5.75
S98T001509	235:9A	Lower half	<7.97	<7.99	<7.98
S98T001699	235:10	Lower half	<7.7	<7.88	<7.79
S98T001553	235:11	Lower half	7.42	8.08	7.75
S98T001639	235:12A	Lower half	<3.86	<3.88	<3.87
S98T001585	239:1	Lower half	<5.97	<5.96	<5.96

Table B2-43. Tank 241-SX-103 Core Sample Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001644	239:1A	Lower half	<4.04	<3.98	<4.01
S98T001731	239:5	Upper half	<7.8	<7.83	<7.81
S98T001711		Lower half	<7.76	<7.82	<7.79
S98T001591	239:6	Lower half	<5.93	<6.01	<5.97
S98T001725	239:7	Lower half	<7.7	<7.83	<7.77
S98T001664	239:8	Lower half	<5.74	<5.85	<5.8
S98T001705	239:9	Lower half	<5.92	<5.81	<5.87
S98T001601	239:9R1	Lower half	<5.94	<5.86	<5.9
S98T001575	239:10R1	Partial	< 5.91	< 5.94	< 5.93
S98T001611	239:11R	Upper half	17.8	18	17.9
S98T001617		Lower half	29.4	31.8	30.6
S98T001650	239:12	Lower half	5.38	6.79	6.08[QC:e]
S98T001623	239:12A	Lower half	<5.99	<5.86	<5.93
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<197	<198	<198
S98T001497	235:6	Lower half	<196	<199	<198
S98T001548	235:6A	Lower half	<198	<202	<200
S98T001491	235:7	Lower half	<203	<201	<202
S98T001549	235:8	Lower half	<203	<199	<201
S98T002491	235:9	Lower half	<207	<208	<208
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	<204	<201	<203
S98T001550	235:11	Lower half	<201	<203	<202
S98T001638	235:12A	Lower half	<203	<202	<203
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	<207	<203	<205
S98T001710		Lower half	<204	<203	<204

Table B2-43. Tank 241-SX-103 Core Sample Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207
S98T001663	239:8	Lower half	<203	<203	<203
S98T001704	239:9	Lower half	<204	<207	<206
S98T001600	239:9R1	Lower half	<204	<206	<205
S98T001574	239:10R1	Partial	<194	<199	<197
S98T001610	239:11R	Upper half	<205	<205	<205
S98T001616		Lower half	<206	<209	<208
S98T001649	239:12	Lower half	<208	<204	<206
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	<204	<190	<197
S98T001808	Core 239	Solid composite	<186	<171	<179
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<6.12	<6.11	<6.12
S98T001810	Core 239	Solid composite	<6.09	<6.12	<6.11
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001486	235:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001668	239:1A	Drainable liquid	<6.01	<6.01	<6.01
S98T001566	239:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001654	239:3	Drainable liquid	<6.01	<6.01	<6.01
S98T001579	239:4	Drainable liquid	<6.01	<6.01	<6.01
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	<6.01	<6.01	<6.01
S98T001719	239:7	Drainable liquid	<6.01	<6.01	<6.01
S98T001658	239:8	Drainable liquid	<6.01	<6.01	<6.01
S98T001605	239:9R1	Drainable liquid	<6.01	<6.01	<6.01
S98T001571	239:10R1	Drainable liquid	< 6.01	<6.01	<6.01

Table B2-44. Tank 241-SX-103 Core Sample Analytical Results: Total Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<387	<392	<390
S98T001498	235:6	Lower half	<397	<390	<394
S98T001551	235:6A	Lower half	<289	<286	<288
S98T001492	235:7	Lower half	<390	<395	<393
S98T001552	235:8	Lower half	1,300	1,160	1,230
S98T002492	235:9	Lower half	418	290	354[QC:e]
S98T001509	235:9A	Lower half	<399	<400	<400
S98T001699	235:10	Lower half	<385	<394	<390
S98T001553	235:11	Lower half	1,390	1,550	1,470
S98T001639	235:12A	Lower half	322	347	335
S98T001585	239:1	Lower half	335	<298	<317
S98T001644	239:1A	Lower half	<202	<199	<201
S98T001731	239:5	Upper half	<390	<391	<391
S98T001711		Lower half	<388	<391	<390
S98T001591	239:6	Lower half	<296	<301	<299
S98T001725	239:7	Lower half	<385	<392	<389
S98T001664	239:8	Lower half	420	332	376[QC:e]
S98T001705	239:9	Lower half	337	<290	<314
S98T001601	239:9R1	Lower half	301	<293	<297
S98T001575	239:10R1	Partial	<296	<297	<297
S98T001611	239:11R	Upper half	879	912	896
S98T001617		Lower half	1,140	1,210	1,180
S98T001650	239:12	Lower half	1,220	1,490	1,360
S98T001623	239:12A	Lower half	<299	<293	<296
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<9,830	<9,880	<9,860
S98T001497	235:6	Lower half	<9,790	<9,960	<9,880

Table B2-44. Tank 241-SX-103 Core Sample Analytical Results: Total Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001548	235:6A	Lower half	<9,900	<10,100	<10,000
S98T001491	235:7	Lower half	<10,100	<10,100	<10,100
S98T001549	235:8	Lower half	<10,100	<9,930	<10,000
S98T002491	235:9	Lower half	<10,400	<10,400	<10,400
S98T001508	235:9A	Lower half	<10,200	<10,100	<10,200
S98T001698	235:10	Lower half	<10,200	<10,100	<10,200
S98T001550	235:11	Lower half	<10,000	<10,200	<10,100
S98T001638	235:12A	Lower half	<10,200	<10,100	<10,200
S98T001584	239:1	Lower half	<10,100	<10,100	<10,100
S98T001643	239:1A	Lower half	<9,950	<10,100	<10,000
S98T001730	239:5	Upper half	<10,300	<10,100	<10,200
S98T001710		Lower half	<10,200	<0,100	<10,200
S98T001590	239:6	Lower half	<10,400	<10,200	<10,300
S98T001724	239:7	Lower half	<10,200	<10,400	<10,300
S98T001663	239:8	Lower half	<10,100	<10,200	<10,200
S98T001704	239:9	Lower half	<10,200	<10,300	<10,300
S98T001600	239:9R1	Lower half	<10,200	<10,300	<10,300
S98T001574	239:10R1	Partial	<9,680	<9,960	<9,820
S98T001610	239:11R	Upper half	<10,300	<10,300	<10,300
S98T001616		Lower half	<10,300	<10,400	<10,400
S98T001649	239:12	Lower half	<10,400	<10,200	<10,300
S98T001622	239:12A	Lower half	<10,400	<10,400	<10,400
S98T001802	Core 235	Solid composite	<10,200	<9,490	<9,850
S98T001808	Core 239	Solid composite	<9,280	<8,540	<8,910
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<306	<305	<306
S98T001810	Core 239	Solid composite	<304	<306	<305

Table B2-44. Tank 241-SX-103 Core Sample Analytical Results: Total Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<300	<300	<300
S98T001486	235:5	Drainable liquid	<300	<300	<300
S98T001668	239:1A	Drainable liquid	<300	<300	<300[QC:c]
S98T001566	239:2	Drainable liquid	<300	<300	<300
S98T001654	239:3	Drainable liquid	<300	<300	<300
S98T001579	239:4	Drainable liquid	<300	<300	<300
S98T001715	239:5	Drainable liquid	<300	<300	<300
S98T001595	239:6	Drainable liquid	<300	<300	<300
S98T001719	239:7	Drainable liquid	<300	<300	<300[QC:c]
S98T001658	239:8	Drainable liquid	<300	<300	<300
S98T001605	239:9R1	Drainable liquid	<300	<300	<300
S98T001571	239:10R1	Drainable liquid	<300	<300	<300

Table B2-45. Tank 241-SX-103 Core Sample Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	<38.7	<39.2	<39
S98T001498	235:6	Lower half	<39.7	<39	<39.4
S98T001551	235:6A	Lower half	<28.9	<28.6	<28.8
S98T001492	235:7	Lower half	<39	<39.5	<39.3
S98T001552	235:8	Lower half	<30	<29.4	<29.7
S98T002492	235:9	Lower half	<28.7	<28.9	<28.8
S98T001509	235:9A	Lower half	<39.9	<40	<40
S98T001699	235:10	Lower half	<38.5	<39.4	<39
S98T001553	235:11	Lower half	<20	<19.6	<19.8
S98T001639	235:12A	Lower half	<19.3	<19.4	<19.4
S98T001585	239:1	Lower half	<29.9	<29.8	<29.9

Table B2-45. Tank 241-SX-103 Core Sample 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**
S98T001644	239:1A	Lower half	<20.2	<19.9	<20
S98T001731	239:5	Upper half	<39	<39.1	<39
S98T001711		Lower half	<38.8	<39.1	<39
S98T001591	239:6	Lower half	<29.6	<30.1	<29.9
S98T001725	239:7	Lower half	<38.5	<39.2	<38.9
S98T001664	239:8	Lower half	<28.7	<29.2	<28.9
S98T001705	239:9	Lower half	<29.6	<29	<29.3
S98T001601	239:9R1	Lower half	<29.7	<29.3	<29.5
S98T001575	239:10R1	Partial	<29.6	<29.7	<29.6
S98T001611	239:11R	Upper half	<30.5	<29.4	<29.9
S98T001617		Lower half	<29.8	<30.3	<30.1
S98T001650	239:12	Lower half	<19.6	<19.9	<19.8
S98T001623	239:12A	Lower half	<29.9	<29.3	<29.6
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<983	<988	<986
S98T001497	235:6	Lower half	<979	<996	<988
S98T001548	235:6A	Lower half	<990	<1,010	<1,000
S98T001491	235:7	Lower half	<1,010	<1,010	<1,010
S98T001549	235:8	Lower half	<1,010	<993	<1,000
S98T002491	235:9	Lower half	<1,040	<1,040	<1,040
S98T001508	235:9A	Lower half	<1,020	<1,010	<1,020
S98T001698	235:10	Lower half	<1,020	<1,010	<1,020
S98T001550	235:11	Lower half	<1,000	<1,020	<1,010
S98T001638	235:12A	Lower half	<1,020	<1,010	<1,020
S98T001584	239:1	Lower half	<1,010	<1,010	<1,010
S98T001643	239:1A	Lower half	<995	<1,010	<1,000
S98T001730	239:5	Upper half	<1,030	<1,010	<1,020
S98T001710		Lower half	<1,020	<1,010	<1,020

Table B2-45. Tank 241-SX-103 Core Sample Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001590	239:6	Lower half	<1,040	<1,020	<1,030
S98T001724	239:7	Lower half	<1,020	<1,040	<1,030
S98T001663	239:8	Lower half	<1,010	<1,020	<1,020
S98T001704	239:9	Lower half	<1,020	<1,030	<1,030
S98T001600	239:9R1	Lower half	<1,020	<1,030	<1,030
S98T001574	239:10R1	PARTIAL	<968	<996	<982
S98T001610	239:11R	Upper half	<1,030	<1,030	<1,030
S98T001616		Lower half	<1,030	<1,040	<1,040
S98T001649	239:12	Lower half	<1,040	<1,020	<1,030
S98T001622	239:12A	Lower half	<1,040	<1,040	<1,040
S98T001802	Core 235	Solid composite	<1,020	<949	<985
S98T001808	Core 239	Solid composite	<928	<854	<891
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<30.6	<30.5	<30.6
S98T001810	Core 239	Solid composite	<30.4	<30.6	<30.5
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001486	235:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001668	239:1A	Drainable liquid	<30.1	<30.1	<30.1[QC:c]
S98T001566	239:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001654	239:3	Drainable liquid	<30.1	<30.1	<30.1
S98T001579	239:4	Drainable liquid	<30.1	<30.1	<30.1
S98T001715	239:5	Drainable liquid	<30.1	<30.1	<30.1
S98T001595	239:6	Drainable liquid	<30.1	<30.1	<30.1
S98T001719	239:7	Drainable liquid	<30.1	<30.1	<30.1[QC:c]
S98T001658	239:8	Drainable liquid	<30.1	<30.1	<30.1
S98T001605	239:9R1	Drainable liquid	<30.1	<30.1	<30.1
S98T001571	239:10R1	Drainable liquid	<30.1	<30.1	<30.1

Table B2-46. Tank 241-SX-103 Core Sample Analytical Results: Zinc (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S98T001503	235:3	Lower half	77.4	64.1	70.8
S98T001498	235:6	Lower half	18.6	21	19.8
S98T001551	235:6A	Lower half	8.86	7.23	8.04[QC:e]
S98T001492	235:7	Lower half	15	18.7	16.9[QC:e]
S98T001552	235:8	Lower half	44.3	36.6	40.5
S98T002492	235:9	Lower half	18.4	12.9	15.6[QC:e]
S98T001509	235:9A	Lower half	10.8	9.28	10
S98T001699	235:10	Lower half	8.74	10.2	9.47[QC:a]
S98T001553	235:11	Lower half	16.5	19.9	18.2
S98T001639	235:12A	Lower half	<3.86	<3.88	<3.87
S98T001585	239:1	Lower half	16.8	13.7	15.3[QC:e]
S98T001644	239:1A	Lower half	<4.04	<3.98	<4.01
S98T001731	239:5	Upper half	12.2	11.6	11.9
S98T001711		Lower half	14.1	9.86	12[QC:e]
S98T001591	239:6	Lower half	8.47	58.9	33.7[QC:e]
S98T001725	239:7	Lower half	21.6	22.1	21.9
S98T001664	239:8	Lower half	15.9	12.4	14.2[QC:a,e]
S98T001705	239:9	Lower half	17.8	14.4	16.1[QC:a,e]
S98T001601	239:9R1	Lower half	14.3	11.5	12.9[QC:e]
S98T001575	239:10R1	Partial	53.8	50.7	52.3
S98T001611	239:11R	Upper half	40.1	37.6	38.9
S98T001617		Lower half	34.2	34.6	34.4
S98T001650	239:12	Lower half	<3.91	<3.99	<3.95
S98T001623	239:12A	Lower half	<5.99	<5.86	<5.93
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	<197	<198	<198
S98T001497	235:6	Lower half	<196	<199	<198
S98T001548	235:6A	Lower half	<198	<202	<200
S98T001491	235:7	Lower half	<203	<201	<202

Table B2-46. Tank 241-SX-103 Core Sample Analytical Results: Zinc (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**μg/g**	**μg/g**	**μg/g**
S98T001549	235:8	Lower half	<203	<199	<201
S98T002491	235:9	Lower half	<207	<208	<208
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	<204	<201	<203
S98T001550	235:11	Lower half	<201	<203	<202
S98T001638	235:12A	Lower half	<203	<202	<203
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	<207	<203	<205
S98T001710		Lower half	<204	<203	<204
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207
S98T001663	239:8	Lower half	<203	<203	<203
S98T001704	239:9	Lower half	<204	<207	<206
S98T001600	239:9R1	Lower half	<204	<206	<205
S98T001574	239:10R1	Partial	<194	<199	<197
S98T001610	239:11R	Upper half	<205	<205	<205
S98T001616		Lower half	<206	<209	<208
S98T001649	239:12	Lower half	<208	<204	<206
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	<204	<190	<197
S98T001808	Core 239	Solid composite	<186	<171	<179
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
S98T001804	Core 235	Solid composite	<6.12	<6.11	<6.12
S98T001810	Core 239	Solid composite	<6.09	<6.12	<6.11
Liquids			**μg/mL**	**μg/mL**	**μg/mL**
S98T001544	235:4	Drainable liquid	7.69	7.83	7.76
S98T001486	235:5	Drainable liquid	38.2	37.8	38

Table B2-46. Tank 241-SX-103 Core Sample Analytical Results: Zinc (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T001668	239:1A	Drainable liquid	<6.01	<6.01	<6.01[QC:c]
S98T001566	239:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001654	239:3	Drainable liquid	<6.01	<6.01	<6.01
S98T001579	239:4	Drainable liquid	13.5	12.4	12.9
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	<6.01	<6.01	<6.01
S98T001719	239:7	Drainable liquid	48.4	48.9	48.6[QC:c]
S98T001658	239:8	Drainable liquid	<6.01	<6.01	<6.01
S98T001605	239:9R1	Drainable liquid	<6.01	<6.01	<6.01
S98T001571	239:10R1	Drainable liquid	142	138	140

Table B2-47. Tank 241-SX-103 Core Sample Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T001503	235:3	Lower half	8.57	9.23	8.9
S98T001498	235:6	Lower half	<7.93	<7.81	<7.87
S98T001551	235:6A	Lower half	<5.77	<5.72	<5.74
S98T001492	235:7	Lower half	<7.8	<7.9	<7.85
S98T001552	235:8	Lower half	27	24.6	25.8
S98T002492	235:9	Lower half	10.7	7.63	9.16[QC:e]
S98T001509	235:9A	Lower half	<7.97	<7.99	<7.98
S98T001699	235:10	Lower half	<7.7	<7.88	<7.79
S98T001553	235:11	Lower half	12.9	7.02	9.96[QC:e]
S98T001639	235:12A	Lower half	16.1	16.4	16.3
S98T001585	239:1	Lower half	9.24	8.25	8.75
S98T001644	239:1A	Lower half	<4.04	<3.98	<4.01
S98T001731	239:5	Upper half	<7.8	<7.83	<7.81

Table B2-47. Tank 241-SX-103 Core Sample 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**
S98T001711		Lower half	<7.76	<7.82	<7.79
S98T001591	239:6	Lower half	<5.93	<6.01	<5.97
S98T001725	239:7	Lower half	<7.7	<7.83	<7.77
S98T001664	239:8	Lower half	10.5	7.94	9.22[QC:e]
S98T001705	239:9	Lower half	10.6	9.22	9.91
S98T001601	239:9R1	Lower half	9.78	7.13	8.46[QC:e]
S98T001575	239:10R1	Partial	10.7	9.75	10.2
S98T001611	239:11R	Upper half	79.5	82.7	81.1
S98T001617		Lower half	99	26.6	62.8[QC:c,e]
S98T001650	239:12	Lower half	47.6	60	53.8[QC:e]
S98T001623	239:12A	Lower half	<5.99	<5.86	<5.93
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T001502	235:3	Lower half	<197	<198	<198
S98T001497	235:6	Lower half	<196	<199	<198
S98T001548	235:6A	Lower half	<198	<202	<200
S98T001491	235:7	Lower half	<203	<201	<202
S98T001549	235:8	Lower half	<203	<199	<201
S98T002491	235:9	Lower half	<207	<208	<208
S98T001508	235:9A	Lower half	<204	<203	<204
S98T001698	235:10	Lower half	<204	<201	<203
S98T001550	235:11	Lower half	<201	<203	<202
S98T001638	235:12A	Lower half	<203	<202	<203
S98T001584	239:1	Lower half	<203	<202	<203
S98T001643	239:1A	Lower half	<199	<203	<201
S98T001730	239:5	Upper half	<207	<203	<205
S98T001710		Lower half	<204	<203	<204
S98T001590	239:6	Lower half	<207	<204	<206
S98T001724	239:7	Lower half	<205	<208	<207

Table B2-47. Tank 241-SX-103 Core Sample Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T001663	239:8	Lower half	<203	<203	<203
S98T001704	239:9	Lower half	<204	<207	<206
S98T001600	239:9R1	Lower half	<204	<206	<205
S98T001574	239:10R1	Partial	<194	<199	<197
S98T001610	239:11R	Upper half	<205	<205	<205
S98T001616		Lower half	<206	<209	<208
S98T001649	239:12	Lower half	<208	<204	<206
S98T001622	239:12A	Lower half	<207	<209	<208
S98T001802	Core 235	Solid composite	<204	<190	<197
S98T001808	Core 239	Solid composite	<186	<171	<179
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001804	Core 235	Solid composite	<6.12	<6.11	<6.12
S98T001810	Core 239	Solid composite	<6.09	<6.12	<6.11
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235: 4	Drainable liquid	<6.01	<6.01	<6.01
S98T001486	235: 5	Drainable liquid	<6.01	<6.01	<6.01
S98T001668	239: 1A	Drainable liquid	<6.01	25.8	<15.9[QC:c,e]
S98T001566	239: 2	Drainable liquid	<6.01	<6.01	<6.01
S98T001654	239: 3	Drainable liquid	<6.01	<6.01	<6.01
S98T001579	239: 4	Drainable liquid	<6.01	<6.01	<6.01
S98T001715	239:5	Drainable liquid	<6.01	<6.01	<6.01
S98T001595	239:6	Drainable liquid	<6.01	<6.01	<6.01
S98T001719	239:7	Drainable liquid	<6.01	<6.01	<6.01[QC:c]
S98T001658	239:8	Drainable liquid	<6.01	<6.01	<6.01
S98T001605	239:9R1	Drainable liquid	<6.01	<6.01	<6.01
S98T001571	239:10R1	Drainable liquid	<6.01	<6.01	<6.01

Table B2-48. Tank 241-SX-103 Core Sample Analytical Results: Total Uranium (U).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			µg/g	µg/g	µg/g
S98T001502	235:3	Lower half	494	525	510
S98T001497	235:6	Lower half	313	349	331
S98T001548	235:6A	Lower half	111	108	110
S98T001491	235:7	Lower half	298	281	290
S98T001549	235:8	Lower half	1,570	1,500	1,540
S98T002491	235:9	Lower half	388	375	382[QC:f]
S98T001508	235:9A	Lower half	103	109	106
S98T001698	235:10	Lower half	81.1	83.7	82.4
S98T001550	235:11	Lower half	868	893	881
S98T001638	235:12A	Lower half	605	571	588
S98T001584	239:1	Lower half	234	236	235
S98T001643	239:1A	Lower half	6.41	7.12	6.77[QC:f]
S98T001730	239:5	Upper half	372	380	376
S98T001710		Lower half	316	361	339[QC:f]
S98T001590	239:6	Lower half	160	181	171
S98T001724	239:7	Lower half	149	169	159[QC:f]
S98T001663	239:8	Lower half	329	344	337
S98T001704	239:9	Lower half	302	262	282
S98T001600	239:9R1	Lower half	199	237	218
S98T001574	239:10R1	Partial	226	243	235[QC:c]
S98T001610	239:11R	Upper half	1,060	1,080	1,070
S98T001616		Lower half	1,470	1,510	1,490
S98T001649	239:12	Lower half	1,300	1,440	1,370
S98T001622	239:12A	Lower half	18.1	19	18.6[QC:f]
S98T001802	Core 235	Solid composite	637	602	620
S98T001808	Core 239	Solid composite	548	492	520

Table B2-49. Tank 241-SX-103 Core Sample Analytical Results: Bromide (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S98T001504	235:3	Lower half	<1,110	<1,170	<1,140
S98T001499	235:6	Lower half	<1,540	<1,520	<1,530
S98T001554	235:6A	Lower half	<1,190	<1,170	<1,180
S98T001493	235:7	Lower half	<1,450	<1,480	<1,460
S98T001555	235:8	Lower half	<1,200	<1,210	<1,210
S98T002493	235:9	Lower half	<1,240	<1,270	<1,260
S98T001510	235:9A	Lower half	<1,080	<922	<1,000
S98T001700	235:10	Lower half	<1,010	<1,020	<1,010
S98T001556	235:11	Lower half	2,070	2,150	2,110
S98T001640	235:12A	Lower half	1,400	1,380	1,390
S98T001586	239:1	Lower half	554	561	557
S98T001645	239:1A	Lower half	<1,270	<1,270	<1,270
S98T001732	239:5	Upper half	<1,020	<1,010	<1,010
S98T001712		Lower half	<1,020	<1,020	<1,020
S98T001592	239:6	Lower half	<510	<522	<516
S98T001726	239:7	Lower half	<2,490	<2,510	<2,500
S98T001665	239:8	Lower half	<1,030	<1,030	<1,030
S98T001706	239:9	Lower half	<1,030	<1,020	<1,020
S98T001895	239:9R1	Lower half	<1,260	<1,260	<1,260
S98T001576	239:10R1	Partial	<1,350	<1,380	<1,360
S98T001894	239:11R	Upper half	<1,270	<1,250	<1,260
S98T001618		Lower half	<514	<522	<518
S98T001651	239:12	Lower half	<1,270	<1,280	<1,270
S98T001624	239:12A	Lower half	<2,490	<2,520	<2,500
S98T001803	Core 235	Solid composite	1,390	1,380	1,390
S98T001809	Core 239	Solid composite	<1,260	<1,270	<1,260

Table B2-49. Tank 241-SX-103 Core Sample Analytical Results: Bromide (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<1,280	<1,280	<1,280
S98T001486	235:5	Drainable liquid	<1,280	<1,280	<1,280
S98T001668	239:1A	Drainable liquid	<644	<644	<644
S98T001566	239:2	Drainable liquid	<1,280	<1,280	<1,280
S98T001654	239:3	Drainable liquid	<644	<644	<644
S98T001579	239:4	Drainable liquid	<1,280	<1,280	<1,280
S98T001715	239:5	Drainable liquid	<644	<644	<644
S98T001595	239:6	Drainable liquid	<1,280	<1,280	<1,280
S98T001719	239:7	Drainable liquid	<1,280	<1,280	<1,280
S98T001658	239:8	Drainable liquid	<644	<644	<644
S98T001605	239:9R1	Drainable liquid	<1,280	<1,280	<1,280
S98T001571	239:10R1	Drainable liquid	<1,280	<1,280	<1,280

Table B2-50. Tank 241-SX-103 Core Sample Analytical Results: Chloride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001504	235:3	Lower half	4,390	3,500	3,950[QC:e]
S98T001499	235:6	Lower half	2,440	2,360	2,400
S98T001554	235:6A	Lower half	1,370	1,810	1,590[QC:e]
S98T001493	235:7	Lower half	2,360	2,280	2,320
S98T001555	235:8	Lower half	3,760	4,210	3,980
S98T002493	235:9	Lower half	3,130	3,380	3,260
S98T001510	235:9A	Lower half	1,420	1,590	1,510
S98T001700	235:10	Lower half	1,160	1,200	1,180
S98T001556	235:11	Lower half	3,290	3,380	3,340
S98T001640	235:12A	Lower half	1,400	1,380	1,390
S98T001586	239:1	Lower half	5,550	5,410	5,480

Table B2-50. Tank 241-SX-103 Core Sample 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**
S98T001645	239:1A	Lower half	3,370	2,750	3,060[QC:e]
S98T001732	239:5	Upper half	3,820	4,160	3,990
S98T001712		Lower half	6,150	2,920	4,530[QC:e]
S98T001592	239:6	Lower half	6,670	6,300	6,480
S98T001726	239:7	Lower half	3,250	2,870	3,060
S98T001665	239:8	Lower half	3,920	3,500	3,710
S98T001706	239:9	Lower half	2,980	3,210	3,100
S98T001895	239:9R1	Lower half	4,500	4,810	4,650
S98T001576	239:10R1	Partial	2,700	2,900	2,800
S98T001894	239:11R	Upper half	5,130	5,160	5,150
S98T001618		Lower half	4,670	3,050	3,860[QC:e]
S98T001651	239:12	Lower half	2,630	2,690	2,660
S98T001624	239:12A	Lower half	561	625	593
S98T001803	Core 235	Solid composite	2,800	2,710	2,750
S98T001809	Core 239	Solid composite	4,230	3,400	3,820[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	9,620	9,610	9,620
S98T001486	235:5	Drainable liquid	10,100	9,920	9,990
S98T001668	239:1A	Drainable liquid	11,000	11,500	11,200
S98T001566	239:2	Drainable liquid	12,000	12,000	12,000
S98T001654	239:3	Drainable liquid	11,900	12,100	12,000
S98T001579	239:4	Drainable liquid	10,700	10,800	10,700
S98T001715	239:5	Drainable liquid	7,560	7,500	7,530
S98T001595	239:6	Drainable liquid	11,600	11,500	11,600
S98T001719	239:7	Drainable liquid	10,400	10,700	10,600
S98T001658	239:8	Drainable liquid	11,900	11,900	11,900
S98T001605	239:9R1	Drainable liquid	11,100	10,700	10,900
S98T001571	239:10R1	Drainable liquid	12,000	12,200	12,100

Table B2-51. Tank 241-SX-103 Core Sample Analytical Results: Fluoride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S98T001504	235:3	Lower half	606	518	562
S98T001499	235:6	Lower half	533	395	464[QC:e]
S98T001554	235:6A	Lower half	<114	292	<203[QC:e]
S98T001493	235:7	Lower half	307	482	395[QC:e]
S98T001555	235:8	Lower half	479	611	545[QC:e]
S98T002493	235:9	Lower half	235	220	228
S98T001510	235:9A	Lower half	<205	<175	<190
S98T001700	235:10	Lower half	<96.8	<98.3	<97.6
S98T001556	235:11	Lower half	368	446	407
S98T001640	235:12A	Lower half	211	208	210
S98T001586	239:1	Lower half	407	381	394[QC:c]
S98T001645	239:1A	Lower half	<122	<122	<122
S98T001732	239:5	Upper half	401	386	394
S98T001712		Lower half	<97.7	<98.4	<98
S98T001592	239:6	Lower half	<49	<50.1	<49.5
S98T001726	239:7	Lower half	576	347	461[QC:e]
S98T001665	239:8	Lower half	323	347	335
S98T001706	239:9	Lower half	275	294	285
S98T001895	239:9R1	Lower half	546	553	549
S98T001576	239:10R1	Partial	331	266	298[QC:e]
S98T001894	239:11R	Upper half	429	329	379[QC:e]
S98T001618		Lower half	151	128	139
S98T001651	239:12	Lower half	342	321	332
S98T001624	239:12A	Lower half	<239	<242	<240
S98T001803	Core 235	Solid composite	367	395	381
S98T001809	Core 239	Solid composite	350	333	341

Table B2-51. Tank 241-SX-103 Core Sample Analytical Results: Fluoride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**μg/mL**	**μg/mL**	**μg/mL**
S98T001544	235:4	Drainable liquid	<122	<122	<122
S98T001486	235:5	Drainable liquid	<122	<122	<122
S98T001668	239:1A	Drainable liquid	<61.8	<61.8	<61.8[QC:c]
S98T001566	239:2	Drainable liquid	<122	<122	<122
S98T001654	239:3	Drainable liquid	<61.8	<61.8	<61.8
S98T001579	239:4	Drainable liquid	<122	<122	<122
S98T001715	239:5	Drainable liquid	<61.8	<61.8	<61.8
S98T001595	239:6	Drainable liquid	<122	<122	<122
S98T001719	239:7	Drainable liquid	<122	<122	<122[QC:c]
S98T001658	239:8	Drainable liquid	<61.8	<61.8	<61.8
S98T001605	239:9R1	Drainable liquid	<122	<122	<122
S98T001571	239:10R1	Drainable liquid	<122	<122	<122

Table B2-52. Tank 241-SX-103 Core Sample Analytical Results: Nitrate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
S98T001504	235:3	Lower half	1.81E+05	1.48E+05	1.64E+05
S98T001499	235:6	Lower half	4.13E+05	3.82E+05	3.98E+05
S98T001554	235:6A	Lower half	4.36E+05	5.55E+05	4.95E+05[QC:d,e]
S98T001493	235:7	Lower half	4.94E+05	4.85E+05	4.90E+05
S98T001555	235:8	Lower half	2.15E+05	1.66E+05	1.91E+05[QC:e]
S98T002493	235:9	Lower half	4.21E+05	4.19E+05	4.20E+05
S98T001510	235:9A	Lower half	6.08E+05	6.06E+05	6.07E+05
S98T001700	235:10	Lower half	6.49E+05	6.46E+05	6.48E+05
S98T001556	235:11	Lower half	1.60E+05	1.37E+05	1.49E+05
S98T001640	235:12A	Lower half	1.96E+05	2.38E+05	2.17E+05
S98T001586	239:1	Lower half	1.53E+05	1.53E+05	1.53E+05

Table B2-52. Tank 241-SX-103 Core Sample 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**
S98T001645	239:1A	Lower half	4.78E+05	5.52E+05	5.15E+05
S98T001732	239:5	Upper half	3.36E+05	3.09E+05	3.22E+05
S98T001712		Lower half	1.71E+05	4.45E+05	3.08E+05[QC:e]
S98T001592	239:6	Lower half	1.43E+05	1.73E+05	1.58E+05
S98T001726	239:7	Lower half	4.58E+05	4.83E+05	4.70E+05
S98T001665	239:8	Lower half	3.02E+05	3.19E+05	3.10E+05
S98T001706	239:9	Lower half	4.09E+05	3.99E+05	4.04E+05
S98T001895	239:9R1	Lower half	2.59E+05	2.72E+05	2.65E+05
S98T001576	239:10R1	Partial	3.13E+05	2.75E+05	2.94E+05
S98T001894	239:11R	Upper half	1.98E+05	1.98E+05	1.98E+05
S98T001618		Lower half	1.65E+05	1.09E+05	1.37E+05[QC:e]
S98T001651	239:12	Lower half	1.43E+05	91900	1.17E+05[QC:e]
S98T001624	239:12A	Lower half	7.24E+05	7.14E+05	7.19E+05
S98T001803	Core 235	Solid composite	4.02E+05	3.99E+05	4.01E+05
S98T001809	Core 239	Solid composite	3.00E+05	4.01E+05	3.50E+05[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	1.64E+05	1.67E+05	1.66E+05
S98T001486	235:5	Drainable liquid	1.70E+05	1.69E+05	1.70E+05
S98T001668	239:1A	Drainable liquid	1.52E+05	1.55E+05	1.53E+05
S98T001566	239:2	Drainable liquid	1.70E+05	1.72E+05	1.71E+05
S98T001654	239:3	Drainable liquid	1.69E+05	1.69E+05	1.69E+05
S98T001579	239:4	Drainable liquid	1.56E+05	1.58E+05	1.57E+05
S98T001715	239:5	Drainable liquid	1.03E+05	1.03E+05	1.03E+05
S98T001595	239:6	Drainable liquid	1.63E+05	1.61E+05	1.62E+05
S98T001719	239:7	Drainable liquid	1.36E+05	1.51E+05	1.44E+05
S98T001658	239:8	Drainable liquid	1.67E+05	1.68E+05	1.68E+05
S98T001605	239:9R1	Drainable liquid	1.53E+05	1.46E+05	1.50E+05
S98T001571	239:10R1	Drainable liquid	1.70E+05	1.71E+05	1.71E+05

Table B2-53. Tank 241-SX-103 Core Sample Analytical Results: Nitrite (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S98T001504	235:3	Lower half	54,800	48,500	51,600
S98T001499	235:6	Lower half	38,200	36,700	37,500
S98T001554	235:6A	Lower half	20,600	27,200	23,900[QC:e]
S98T001493	235:7	Lower half	36,500	35,400	35,900
S98T001555	235:8	Lower half	61,900	69,600	65,800
S98T002493	235:9	Lower half	51,000	56,600	53,800
S98T001510	235:9A	Lower half	19,200	19,400	19,300
S98T001700	235:10	Lower half	19,300	20,400	19,800
S98T001556	235:11	Lower half	62,800	64,300	63,500
S98T001640	235:12A	Lower half	19,800	19,600	19,700
S98T001586	239:1	Lower half	92,400	89,200	90,800
S98T001645	239:1A	Lower half	44,900	36,500	40,700[QC:e]
S98T001732	239:5	Upper half	54,300	59,900	57,100
S98T001712		Lower half	94,000	43,900	68,900[QC:e]
S98T001592	239:6	Lower half	99,100	95,800	97,400
S98T001726	239:7	Lower half	45,800	42,300	44,100
S98T001665	239:8	Lower half	58,400	52,100	55,300
S98T001706	239:9	Lower half	44,500	45,000	44,800
S98T001895	239:9R1	Lower half	60,900	65,300	63,100
S98T001576	239:10R1	Partial	38,900	43,200	41,000
S98T001894	239:11R	Upper half	75,800	77,200	76,500
S98T001618		Lower half	77,500	51,500	64,500[QC:e]
S98T001651	239:12	Lower half	40,000	38,700	39,300
S98T001624	239:12A	Lower half	8,790	9,280	9,040
S98T001803	Core 235	Solid composite	44,500	42,100	43,300
S98T001809	Core 239	Solid composite	64,100	51,200	57,600[QC:e]
S98T001544	235:4	Drainable liquid	1.48E+05	1.48E+05	1.48E+05
S98T001486	235:5	Drainable liquid	1.56E+05	1.54E+05	1.55E+05

Table B2-53. Tank 241-SX-103 Core Sample Analytical Results: Nitrite (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**μg/mL**	**μg/mL**	**μg/mL**
S98T001668	239:1A	Drainable liquid	1.62E+05	1.64E+05	1.63E+05
S98T001566	239:2	Drainable liquid	1.72E+05	1.69E+05	1.70E+05
S98T001654	239:3	Drainable liquid	1.64E+05	1.67E+05	1.66E+05
S98T001579	239:4	Drainable liquid	1.51E+05	1.52E+05	1.51E+05
S98T001715	239:5	Drainable liquid	1.13E+05	1.10E+05	1.11E+05
S98T001595	239:6	Drainable liquid	1.66E+05	1.64E+05	1.65E+05
S98T001719	239:7	Drainable liquid	1.55E+05	1.64E+05	1.60E+05
S98T001658	239:8	Drainable liquid	1.66E+05	1.67E+05	1.66E+05
S98T001605	239:9R1	Drainable liquid	1.57E+05	1.57E+05	1.57E+05
S98T001571	239:10R1	Drainable liquid	1.75E+05	1.79E+05	1.77E+05

Table B2-54. Tank 241-SX-103 Core Sample Analytical Results: Phosphate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
S98T001504	235:3	Lower half	3,380	2,500	2,940[QC:e]
S98T001499	235:6	Lower half	6,200	3,780	4,990[QC:e]
S98T001554	235:6A	Lower half	1,960	2,280	2,120
S98T001493	235:7	Lower half	2,730	5,100	3,920[QC:e]
S98T001555	235:8	Lower half	3,410	4,660	4,030[QC:e]
S98T002493	235:9	Lower half	3,590	4,040	3,810
S98T001510	235:9A	Lower half	2,810	2,840	2,830
S98T001700	235:10	Lower half	1,860	2,660	2,260[QC:e]
S98T001556	235:11	Lower half	4,290	8,260	6,270[QC:e]
S98T001640	235:12A	Lower half	3,100	3,350	3,220
S98T001586	239:1	Lower half	4,910	4,460	4,690
S98T001645	239:1A	Lower half	13,500	11,900	12,700
S98T001732	239:5	Upper half	3,380	3,210	3,300

Table B2-54. Tank 241-SX-103 Core Sample 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
S98T001712		Lower half	3,070	2,230	2,650[QC:e]
S98T001592	239:6	Lower half	3,690	5,250	4,470[QC:e]
S98T001726	239:7	Lower half	6,540	5,900	6,220
S98T001665	239:8	Lower half	3,850	3,480	3,670
S98T001706	239:9	Lower half	3,400	3,160	3,280
S98T001895	239:9R1	Lower half	9,640	6,790	8,220[QC:e]
S98T001576	239:10R1	Partial	3,800	3,790	3,790
S98T001894	239:11R	Upper half	7,650	7,500	7,580
S98T001618		Lower half	7,200	3,600	5,400[QC:e]
S98T001651	239:12	Lower half	6,540	7,890	7,210
S98T001624	239:12A	Lower half	<2,390	<2,420	<2,400
S98T001803	Core 235	Solid composite	3,280	3,020	3,150
S98T001809	Core 239	Solid composite	4,590	4,110	4,350
Liquids			µg/mL	µg/mL	µg/mL
S98T001544	235:4	Drainable liquid	3,790	3,450	3,620
S98T001486	235:5	Drainable liquid	3,720	3,610	3,660
S98T001668	239:1A	Drainable liquid	3,030	2,830	2,930
S98T001566	239:2	Drainable liquid	3,840	3,700	3,770
S98T001654	239:3	Drainable liquid	3,280	3,500	3,390
S98T001579	239:4	Drainable liquid	3,070	2,820	2,950
S98T001715	239:5	Drainable liquid	2,180	2,250	2,220
S98T001595	239:6	Drainable liquid	3,240	3,580	3,410
S98T001719	239:7	Drainable liquid	3,240	3,370	3,310
S98T001658	239:8	Drainable liquid	3,200	3,210	3,210
S98T001605	239:9R1	Drainable liquid	5,070	3,010	4,040[QC:e]
S98T001571	239:10R1	Drainable liquid	3,380	3,220	3,300

Table B2-55. Tank 241-SX-103 Core Sample Analytical Results: Sulfate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			μg/g	μg/g	μg/g
S98T001504	235:3	Lower half	43,900	35,700	39,800[QC:e]
S98T001499	235:6	Lower half	19,900	17,200	18,600
S98T001554	235:6A	Lower half	4,470	6,170	5,320[QC:e]
S98T001493	235:7	Lower half	9,060	7,890	8,480
S98T001555	235:8	Lower half	31,500	34,300	32,900
S98T002493	235:9	Lower half	10,900	12,600	11,700
S98T001510	235:9A	Lower half	6,430	5,690	6,060
S98T001700	235:10	Lower half	1,140	<1,130	<1,130
S98T001556	235:11	Lower half	772	909	840
S98T001640	235:12A	Lower half	2,200	2,030	2,110
S98T001586	239:1	Lower half	15,800	15,600	15,700
S98T001645	239:1A	Lower half	1,760	1,690	1,730
S98T001732	239:5	Upper half	52,000	25,900	38,900[QC:e]
S98T001712		Lower half	16,300	18,400	17,300
S98T001592	239:6	Lower half	4,710	6,460	5,580[QC:e]
S98T001726	239:7	Lower half	10,200	9,320	9,750
S98T001665	239:8	Lower half	30,600	31,900	31,200
S98T001706	239:9	Lower half	19,600	19,500	19,500
S98T001895	239:9R1	Lower half	27,100	27,400	27,200
S98T001576	239:10R1	Partial	20,900	24,800	22,900
S98T001894	239:11R	Upper half	15,400	17,000	16,200
S98T001618		Lower half	11,000	6,610	8,790[QC:e]
S98T001651	239:12	Lower half	2,000	1,710	1,850
S98T001624	239:12A	Lower half	<2,740	<2,790	<2,770
S98T001803	Core 235	Solid composite	11,400	10,800	11,100
S98T001809	Core 239	Solid composite	14,200	11,200	12,700[QC:e]

Table B2-55. Tank 241-SX-103 Core Sample Analytical Results: Sulfate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	3,390	3,660	3,530
S98T001486	235:5	Drainable liquid	2,080	2,270	2,170
S98T001668	239:1A	Drainable liquid	1,430	1,540	1,480
S98T001566	239:2	Drainable liquid	1,650	1,690	1,670
S98T001654	239:3	Drainable liquid	1,980	1,880	1,930
S98T001579	239:4	Drainable liquid	3,170	2,990	3,080
S98T001715	239:5	Drainable liquid	1,460	1,410	1,440
S98T001595	239:6	Drainable liquid	2,850	3,310	3,080
S98T001719	239:7	Drainable liquid	<1,410	<1,410	<1,410
S98T001658	239:8	Drainable liquid	827	970	899
S98T001605	239:9R1	Drainable liquid	2,940	2,090	2,510[QC:e]
S98T001571	239:10R1	Drainable liquid	2,390	2,660	2,520

Table B2-56. Tank 241-SX-103 Core Sample Analytical Results: Oxalate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001504	235:3	Lower half	10,400	9,380	9,880
S98T001499	235:6	Lower half	9,040	7,840	8,440
S98T001554	235:6A	Lower half	2,930	3,460	3,190
S98T001493	235:7	Lower half	5,500	5,210	5,360
S98T001555	235:8	Lower half	18,600	20,300	19,500
S98T002493	235:9	Lower half	6,890	8,540	7,710[QC:e]
S98T001510	235:9A	Lower half	6,000	5,650	5,820
S98T001700	235:10	Lower half	3,150	2,990	3,070
S98T001556	235:11	Lower half	7,350	12,000	9,680[QC:e]
S98T001640	235:12A	Lower half	5,680	5,180	5,430
S98T001586	239:1	Lower half	8,870	8,910	8,890

Table B2-56. Tank 241-SX-103 Core Sample Analytical Results: Oxalate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T001645	239:1A	Lower half	<1,070	<1,070	<1,070
S98T001732	239:5	Upper half	11,100	12,300	11,700
S98T001712		Lower half	8,200	10,200	9,200[QC:e]
S98T001592	239:6	Lower half	2,880	3,640	3,260[QC:e]
S98T001726	239:7	Lower half	6540	5,960	6,250
S98T001665	239:8	Lower half	17,000	16,700	16,800
S98T001706	239:9	Lower half	12,500	9,940	11,200[QC:e]
S98T001895	239:9R1	Lower half	16,700	15,300	16,000
S98T001576	239:10R1	PARTIAL	12,800	12,200	12,500
S98T001894	239:11R	Upper half	28,000	30,700	29,400
S98T001618		Lower half	17,400	12,800	15,100[QC:e]
S98T001651	239:12	Lower half	13,600	9,890	11,700[QC:e]
S98T001624	239:12A	Lower half	<2,090	<2,120	<2,100
S98T001803	Core 235	Solid Composite	10,600	7,950	9,280[QC:e]
S98T001809	Core 239	Solid Composite	10,100	8,760	9,440
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001544	235:4	Drainable liquid	<1,070	<1,070	<1,070
S98T001486	235:5	Drainable liquid	<1,070	<1,070	<1,070
S98T001668	239:1A	Drainable liquid	<541	<541	<541
S98T001566	239:2	Drainable liquid	<1,070	<1,070	<1,070
S98T001654	239:3	Drainable liquid	<541	590	<565
S98T001579	239:4	Drainable liquid	<1,070	1,310	<1,190[QC:e]
S98T001715	239:5	Drainable liquid	<541	<541	<541
S98T001595	239:6	Drainable liquid	<1,070	<1,070	<1,070
S98T001719	239:7	Drainable liquid	<1,070	<1,070	<1,070
S98T001658	239:8	Drainable liquid	<541	<541	<541
S98T001605	239:9R1	Drainable liquid	<1,070	<1,070	<1,070
S98T001571	239:10R1	Drainable liquid	<1,070	1,600	<1,340[QC:e]

Table B2-57. Tank 241-SX-103 Core Sample Analytical Results: Ammonia (Ion Selective Electrode).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S98T001544	235:4	Drainable liquid	5.9	5.27	5.59
S98T001486	235:5	Drainable liquid		<5	<5
S98T001668	239:1A	Drainable liquid	<10	<10	<10
S98T001566	239:2	Drainable liquid	102	96.4	99.2
S98T001654	239:3	Drainable liquid	<10	12.9	<11.4[QC:e]
S98T001579	239:4	Drainable liquid	<20	<20	<20
S98T001715	239:5	Drainable liquid	13.7	9.57	10.3[QC:e]
S98T001595	239:6	Drainable liquid	<5	<5	< 5
S98T001719	239:7	Drainable liquid	13.7	10.5	11.2
S98T001658	239:8	Drainable liquid	12.7	14	13.3
S98T001605	239:9R1	Drainable liquid	7.68	7.7	7.69
S98T001571	239:10R1	Drainable liquid	6.25	13.9	10.1[QC:e]

Table B2-58. Tank 241-SX-103 Core Sample Analytical Results: Total Inorganic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids			µg/g	µg/g	µg/g	µg/g
S98T001501	235:3	Lower half	19,000	19,800		19,400
S98T001495	235:6	Lower half	9,380	11,600	10,800	10,600[QC:d,e]
S98T001547	235:6A	Lower half	3,440	3,510		3,480
S98T001489	235:7	Lower half	3,910	4,930	5,000	4,610[QC:e]
S98T001558	235:8	Lower half	20,400	17,200		18,800
S98T002489	235:9	Lower half	4,680	5,290	5,750	5,240
S98T001506	235:9A	Lower half	3,390	3,190		3,290
S98T001697	235:10	Lower half	1,070	1,130		1,100
S98T001561	235:11	Lower half	2,740	2,600	4,130	3,160
S98T001637	235:12A	Lower half	1,180	1,450	1,220	1,280[QC:e]

Table B2-58. Tank 241-SX-103 Core Sample Analytical Results: Total Inorganic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g	µg/g
S98T001582	239:1	Lower half	12,100	12,400		12,300
S98T001642	239:1A	Lower half	1,020	1,050		1,040
S98T001728	239:5	Upper half	11,600	11,400		11,500
S98T001708		Lower half	10,700	8,530	10,700	9,980[QC:e]
S98T001588	239:6	Lower half	10,900	6,360	5,040	7,430[QC:e]
S98T001722	239:7	Lower half	6,940	6,280	6,860	6,690[QC:c]
S98T001661	239:8	Lower half	11,300	12,400		11,900
S98T001702	239:9	Lower half	11,700	11,800		11,800
S98T001598	239:9R1	Lower half	12,900	14,100		13,500
S98T001573	239:10R1	Partial	35,300	15,200	21,100	23,900[QC:c,e]
S98T001608	239:11R	Upper half	6,690	6,690		6,690
S98T001614		Lower half	10,100	8,030	6,670	8,270[QC:c,e]
S98T001647	239:12	Lower half	757	517	557	610[QC:e]
S98T001620	239:12A	Lower half	225	265		245
S98T001800	Core 235	Solid composite	6,760	6640		6,700
S98T001806	Core 239	Solid composite	6,530	6,970		6,750

Table B2-59. Tank 241-SX-103 Core Sample Analytical Results: Total Organic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids			µg/g	µg/g	µg/g	µg/g
S98T001501	235:3	Lower half	5,810	5,360		5,590
S98T001495	235:6	Lower half	4,310	<40	4,410	2,920[QC:e]
S98T001547	235:6A	Lower half	1,740	1,820		1,780
S98T001489	235:7	Lower half	2,450	2,780		2,620
S98T001558	235:8	Lower half	8,590	7,830		8,210
S98T002489	235:9	Lower half	4,800	3,420	3,640	3,950[QC:e]

Table B2-59. Tank 241-SX-103 Core Sample Analytical Results: Total Organic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g	µg/g
S98T001506	235:9A	Lower half	1,840	1,760		1,800
S98T001697	235:10	Lower half	1,110	1,080		1,100
S98T001561	235:11	Lower half	4,620	12,000	4,240	6,950[QC:c,e]
S98T001637	235:12A	Lower half	777	1,500	1,440	1,240[QC:e]
S98T001582	239:1	Lower half	4,000	4,970	4,310	4,430[QC:e]
S98T001642	239:1A	Lower half	1,620	1,570		1,600
S98T001728	239:5	Upper half	5,440	5,080		5,260
S98T001708		Lower half	5,660	4,120	5,940	5,240[QC:e]
S98T001588	239:6	Lower half	2,560	2,240		2,400
S98T001722	239:7	Lower half	3,480	2,640	4,110	3,410[QC:c,e]
S98T001661	239:8	Lower half	5,420	5,820		5,620
S98T001702	239:9	Lower half	5,910	5,850		5,880
S98T001598	239:9R1	Lower half	3,620	3,960		3,790
S98T001573	239:10R1	Partial	3,100	3,550	3,650	3,430
S98T001608	239:11R	Upper half	5,690	6,190		5,940
S98T001614		Lower half	6,010	4,650	4,680	5,110[QC:e]
S98T001647	239:12	Lower half	2,560	1,490	1,170	1,740[QC:e]
S98T001620	239:12A	Lower half	217	201		209
S98T001800	Core 235	Solid composite	3,650	2,980		3,320[QC:e]
S98T001806	Core 239	Solid composite	3,470	3,980		3,730

Table B2-60. Tank 241-SX-103 Core Sample Analytical Results: Cesium-137 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S98T001502	235:3	Lower half	149	133	141
S98T001497	235:6	Lower half	88.9	99.6	94.2
S98T001548	235:6A	Lower half	64.7	62.2	63.5
S98T001491	235:7	Lower half	92.5	87.9	90.2
S98T001549	235:8	Lower half	148	157	152
S98T002491	235:9	Lower half	149	142	146
S98T001508	235:9A	Lower half	48.3	46.8	47.6
S98T001698	235:10	Lower half	42.4	43.8	43.1
S98T001550	235:11	Lower half	138	141	140
S98T001638	235:12A	Lower half	45.4	45.3	45.3
S98T001584	239:1	Lower half	191	194	192
S98T001643	239:1A	Lower half	180	206	193
S98T001730	239:5	Upper half	157	156	156
S98T001710		Lower half	116	118	117
S98T001590	239:6	Lower half	198	229	214
S98T001724	239:7	Lower half	144	173	159
S98T001663	239:8	Lower half	136	144	140
S98T001704	239:9	Lower half	145	121	133
S98T001600	239:9R1	Lower half	202	219	211
S98T001574	239:10R1	Partial	103	106	104
S98T001610	239:11R	Upper half	182	185	183
S98T001616		Lower half	173	168	171
S98T001649	239:12	Lower half	88.2	92.2	90.2
S98T001622	239:12A	Lower half	12.5	14.1	13.3
S98T001802	Core 235	Solid composite	99	94	96.5
S98T001808	Core 239	Solid composite	133	133	133

Table B2-61. Tank 241-SX-103 Core Sample Analytical Results: Cobalt-60 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S98T001502	235:3	Lower half	<0.0314	<0.0307	<0.031
S98T001497	235:6	Lower half	<0.0155	<0.0173	<0.0164
S98T001548	235:6A	Lower half	<0.0115	<0.0111	<0.0113
S98T001491	235:7	Lower half	<0.0149	<0.015	<0.0149
S98T001549	235:8	Lower half	0.0469	0.0434	0.0451
S98T002491	235:9	Lower half	0.0124	0.0167	0.0146[QC:e]
S98T001508	235:9A	Lower half	<0.0124	<0.0128	<0.0126
S98T001698	235:10	Lower half	<0.00919	<0.0089	<0.00904
S98T001550	235:11	Lower half	<0.529	<0.502	<0.516
S98T001638	235:12A	Lower half	<0.0966	<0.108	<0.102
S98T001584	239:1	Lower half	<0.0159	<0.0158	<0.0158
S98T001643	239:1A	Lower half	<0.0155	<0.0179	<0.0167
S98T001730	239:5	Upper half	0.0159	0.0167	0.0163
S98T001710		Lower half	0.0147	0.0152	0.015
S98T001590	239:6	Lower half	<0.0172	<0.0141	<0.0156
S98T001724	239:7	Lower half	<0.00743	0.00726	<0.00734
S98T001663	239:8	Lower half	<0.019	0.0263	<0.0227[QC:e]
S98T001704	239:9	Lower half	<0.04	<0.0387	<0.0394
S98T001600	239:9R1	Lower half	<0.0176	<0.0137	<0.0157
S98T001574	239:10R1	Partial	<0.0807	<0.0869	<0.0838
S98T001610	239:11R	Upper half	<0.1	<0.0996	<0.0999
S98T001616		Lower half	<0.0954	<0.0959	<0.0957
S98T001649	239:12	Lower half	<0.2	<0.193	<0.197
S98T001622	239:12A	Lower half	<0.00699	<0.00763	<0.00731
S98T001802	Core 235	Solid composite	<0.0395	<0.0336	<0.0366
S98T001808	Core 239	Solid composite	<0.0224	<0.0202	<0.0213

Table B2-62. Tank 241-SX-103 Core Sample Analytical Results: Strontium-89/90.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S98T001502	235:3	Lower half	24	20.5	22.3
S98T001497	235:6	Lower half	19.5	19.2	19.4
S98T001548	235:6A	Lower half	5.69	5.92	5.8
S98T001491	235:7	Lower half	16.9	15.5	16.2
S98T001549	235:8	Lower half	59.2	64.5	61.9
S98T002491	235:9	Lower half	21.5	20.7	21.1
S98T001508	235:9A	Lower half	15.5	14.5	15
S98T001698	235:10	Lower half	15.7	16.3	16
S98T001550	235:11	Lower half	1030	1110	1070
S98T001638	235:12A	Lower half	433	435	434
S98T001584	239:1	Lower half	15.5	14.8	15.2
S98T001643	239:1A	Lower half	0.693	0.465	0.579[QC:e,f]
S98T002048		Lower half	0.628	0.21	0.419[QC:e]
S98T001710	239:5	Lower half	16.1	16	16.1
S98T001590	239:6	Lower half	7.12	7.75	7.44
S98T001724	239:7	Lower half	9.89	11.5	10.7
S98T001663	239:8	Lower half	22.6	22.2	22.4
S98T001704	239:9	Lower half	31.7	27.8	29.8
S98T001600	239:9R1	Lower half	25.5	26.1	25.8
S98T001574	239:10R1	Partial	31.2	32.5	31.9
S98T001616	239:11R	Lower half	554	528	541
S98T001649	239:12	Lower half	661	681	671
S98T001622	239:12A	Lower half	7.72	7.97	7.84[QC:f]
S98T001802	Core 235	Solid composite	207	198	203
S98T001808	Core 239	Solid composite	185	162	174

Table B2-63. Tank 241-SX-103 Core Sample Analytical Results: Total Alpha. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S98T001502	235:3	Lower half	0.242	0.255	0.249
S98T001497	235:6	Lower half	0.107	0.124	0.115
S98T001548	235:6A	Lower half	0.119	0.0489	0.084[QC:e]
S98T001491	235:7	Lower half	0.0578	0.051	0.0544
S98T001549	235:8	Lower half	0.255	0.235	0.245
S98T002491	235:9	Lower half	0.0853	0.0857	0.0855
S98T001508	235:9A	Lower half	0.0998	0.0546	0.0772[QC:e]
S98T001698	235:10	Lower half	0.052	0.0448	0.0484[QC:c]
S98T001550	235:11	Lower half	0.796	0.836	0.816
S98T001638	235:12A	Lower half	0.0955	0.148	0.122[QC:e]
S98T001584	239:1	Lower half	0.118	0.107	0.112
S98T001643	239:1A	Lower half	0.015	<0.00731	<0.0112[QC:e]
S98T002048		Lower half	0.0115	0.00395	0.00773[QC:e]
S98T001710	239:5	Lower half	0.0885	0.0821	0.0853[QC:f]
S98T001590	239:6	Lower half	0.0305	0.033	0.0318[QC:f]
S98T001724	239:7	Lower half	0.059	0.0327	0.0459[QC:e]
S98T001663	239:8	Lower half	0.148	0.137	0.143
S98T001704	239:9	Lower half	0.143	0.116	0.13[QC:e]
S98T001600	239:9R1	Lower half	0.0988	0.115	0.107[QC:f]
S98T001574	239:10R1	Partial	0.102	0.106	0.104[QC:c]
S98T001616	239:11R	Lower half	0.801	0.752	0.777
S98T001649	239:12	Lower half	0.258	0.36	0.309[QC:e]
S98T001622	239:12A	Lower half	0.00266	0.00285	0.00276
S98T001802	Core 235	Solid composite	0.277	0.218	0.248[QC:e]
S98T001808	Core 239	Solid composite	0.206	0.164	0.185[QC:e]
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T001543	235:4	Drainable liquid	0.00151	0.00151	0.00151
S98T001485	235:5	Drainable liquid	< 0.00349	0.00163	< 0.00256[QC:e]

Table B2-63. Tank 241-SX-103 Core Sample Analytical Results: Total Alpha. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T001667	239:1A	Drainable liquid	<0.0181	<0.0181	<0.0181
S98T001565	239:2	Drainable liquid	0.0173	0.0184	0.0178[QC:f]
S98T001653	239:3	Drainable liquid	<0.0181	<0.0228	<0.0205
S98T001578	239:4	Drainable liquid	<0.00502	<0.00339	<0.00421
S98T001714	239:5	Drainable liquid	<0.116	<0.0136	<0.0648[QC:f]
S98T001594	239:6	Drainable liquid	<0.00946	<0.00421	<0.00684
S98T001718	239:7	Drainable liquid	<0.0166	<0.0166	<0.0166[QC:f]
S98T001657	239:8	Drainable liquid	0.0307	<0.025	<0.0279[QC:e]
S98T001604	239:9R1	Drainable liquid	<0.00582	<0.00339	<0.00461
S98T001569	239:10R1	Drainable liquid	0.0173	0.0105	0.0139[QC:e,f]

Table B2-64. Tank 241-SX-103 Core Sample Analytical Results: Total Beta.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S98T001802	Core 235	Solid composite	494	456	475
S98T001808	Core 239	Solid composite	476	433	455

Table B2-65. Tank 241-SX-103 Core Sample Analytical Results: Exotherms – Calculated Dry Weight (DSC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			**J/g DW**	**J/g DW**	**J/g DW**
S98T001697	235:10	Lower half	4	1.26	2.63[QC:e]
S98T001582	239:1	Lower half	74.9	93.2	84.1
S98T001588	239:6	Lower half	75.8	78.2	77
S98T001608	239:11R	Upper half	42.5	43.8	43.2
S98T001806	Core 239	Solid composite	69.6	85.6	77.6

Table B2-65. Tank 241-SX-103 Core Sample Analytical Results: Exotherms – Calculated Dry Weight (DSC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			**J/g DW**	**J/g DW**	**J/g DW**
S98T001543	235:4	Drainable liquid	96.6	125	111[QC:e]
S98T001485	235:5	Drainable liquid	83.5	72.7	78.1
S98T001667	239:1A	Drainable liquid	65.4	68.1	66.8
S98T001565	239:2	Drainable liquid	45.6	46.1	45.8
S98T001653	239:3	Drainable liquid	59.6	39.7	49.6[QC:e]
S98T001714	239:5	Drainable liquid	69.7	85.9	77.8[QC:e]
S98T001594	239:6	Drainable liquid	73.8	67	70.4
S98T001718	239:7	Drainable liquid	179	195	187
S98T001657	239:8	Drainable liquid	43.4	60.1	51.7[QC:e]
S98T001604	239:9R1	Drainable liquid	77.3	73.4	75.3
S98T001569	239:10R1	Drainable liquid	53	43.2	48.1[QC:e]

Note:
DW = dry weight

Table B2-66. Tank 241-SX-103 Core Sample Analytical Results: Exotherm (DSC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			**J/g**	**J/g**	**J/g**
S98T001697	235:10	Lower half	3.81	1.2	2.51[QC:e]
S98T001582	239:1	Lower half	42	52.3	47.2
S98T001588	239:6	Lower half	39.6	40.9	40.3
S98T001608	239:11R	Upper half	28.3	29.1	28.7
S98T001806	Core 239	Solid composite	44.6	54.8	49.7
Liquids			**J/g**	**J/g**	**J/g**
S98T001543	235:4	Drainable liquid	50	65	57.5[QC:e]
S98T001485	235:5	Drainable liquid	43.1	37.6	40.4
S98T001667	239:1A	Drainable liquid	34	35.5	34.8

Table B2-66. Tank 241-SX-103 Core Sample Analytical Results: Exotherm (DSC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**J/g**	**J/g**	**J/g**
S98T001565	239:2	Drainable liquid	24.5	24.7	24.6
S98T001653	239:3	Drainable liquid	35.5	23.7	29.6[QC:e]
S98T001714	239:5	Drainable liquid	36.6	45	46.2[QC:e]
S98T001594	239:6	Drainable liquid	38.4	34.8	36.6
S98T001718	239:7	Drainable liquid	93.6	102	97.8
S98T001657	239:8	Drainable liquid	22.4	31	26.7[QC:e]
S98T001604	239:9R1	Drainable liquid	45.1	42.8	44
S98T001569	239:10R1	Drainable liquid	27.7	22.6	25.1[QC:e]

Table B2-67. Tank 241-SX-103 Core Sample Analytical Results: Percent Water (TGA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids			**%**	**%**	**%**	**%**
S98T001501	235:3	Lower half	39.7	38		38.9
S98T001495	235:6	Lower half	17.9	17.3		17.6
S98T001547	235:6A	Lower half	9.96	9.02		9.49
S98T001489	235:7	Lower half	15.3	14.4		14.8
S98T001558	235:8	Lower half	29.6	29.7		29.6
S98T002489	235:9	Lower half	22.7	21.4		22
S98T001506	235:9A	Lower half	6.5	5.97		6.24
S98T001697	235:10	Lower half	4.61	4.71		4.66
S98T001561	235:11	Lower half	39.2	43.3		41.3
S98T001637	235:12A	Lower half	10.5	10.7		10.6
S98T001582	239:1	Lower half	44.3	43.5		43.9
S98T001642	239:1A	Lower half	37.1	35.6		36.4
S98T001728	239:5	Upper half	47.4	32.1	31.4	37[QC:e]
S98T001708		Lower half	47.1	46.1		46.6

Table B2-67. Tank 241-SX-103 Core Sample Analytical Results: Percent Water (TGA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Average
Solids			%	%	%	%
S98T001588	239:6	Lower half	48.2	47.2		47.7
S98T001722	239:7	Lower half	46.7	46.7		46.7
S98T001661	239:8	Lower half	44.1	40.3		42.2
S98T001702	239:9	Lower half	41.1	40.8		41
S98T001598	239:9R1	Lower half	33.7	41.2		37.4
S98T001573	239:10R1	Partial	22.4	21.1		21.8
S98T001608	239:11R	Upper half	36.4	30.6		33.5
S98T001614		Lower half	44.1	38		41
S98T001647	239:12	Lower half	13.4	13.9		13.7
S98T001620	239:12A	Lower half	1.39	1.72		1.55
S98T001800	Core 235	Solid composite	16	24	19.5	19.9[QC:e]
S98T001806	Core 239	Solid composite	38.5	28.4	41	35.9[QC:e]
Liquids			%	%	%	%
S98T001543	235:4	Drainable liquid	48	48.4		48.2
S98T001485	235:5	Drainable liquid	48.2	48.4		48.3
S98T001667	239:1A	Drainable liquid	48.7	47.3		48
S98T001565	239:2	Drainable liquid	44.6	48.1		46.4
S98T001653	239:3	Drainable liquid	40.6	40.2		40.4
S98T001578	239:4	Drainable liquid	47.7	47.2		47.4
S98T001714	239:5	Drainable liquid	48.2	46.9		47.6
S98T001594	239:6	Drainable liquid	47.9	48		48
S98T001718	239:7	Drainable liquid	48	47.5		47.8
S98T001657	239:8	Drainable liquid	48.2	48.5		48.3
S98T001604	239:9R1	Drainable liquid	41.8	41.5		41.6
S98T001569	239:10R1	Drainable liquid	47.7	47.8		47.7

Table B2-68. Tank 241-SX-103 Core Sample Analytical Results: Bulk Density.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			g/mL	g/mL	g/mL
S98T001494	235:6	Lower half	1.75	n/a	1.75
S98T001546	235:6A	Lower half	1.87	n/a	1.87
S98T001488	235:7	Lower half	1.87	n/a	1.87
S98T001557	235:8	Lower half	1.67	n/a	1.67
S98T002488	235:9	Lower half	1.75	n/a	1.75
S98T001505	235:9A	Lower half	1.24	n/a	1.24
S98T001560	235:11	Lower half	1.88	n/a	1.88
S98T001581	239:1	Lower half	1.71	n/a	1.71
S98T001707	239:5	Lower half	1.73	n/a	1.73
S98T001587	239:6	Lower half	1.71	n/a	1.71
S98T001721	239:7	Lower half	1.8	n/a	1.8
S98T001660	239:8	Lower half	1.81	n/a	1.81
S98T001701	239:9	Lower half	1.82	n/a	1.82
S98T001597	239:9R1	Lower half	1.64	n/a	1.64
S98T001613	239:11R	Lower half	1.72	n/a	1.72
S98T001798	Core 235	Solid composite	1.75	n/a	1.75
S98T001799	Core 239	Solid composite	1.57	n/a	1.57

Table B2-69. Tank 241-SX-103 Core Sample Analytical Results: Specific Gravity. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			Unitless	Unitless	Unitless
S98T001544	235:4	Drainable liquid	1.47	1.49	1.48
S98T001486	235:5	Drainable liquid	1.48	1.51	1.5
S98T001668	239:1A	Drainable liquid	1.47	1.47	1.47
S98T001566	239:2	Drainable liquid	1.44	1.5	1.47
S98T001654	239:3	Drainable liquid	1.46	1.46	1.46
S98T001579	239:4	Drainable liquid	1.46	1.48	1.47

Table B2-69. Tank 241-SX-103 Core Sample Analytical Results: Specific Gravity. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			**Unitless**	**Unitless**	**Unitless**
S98T001715	239:5	Drainable liquid	1.48	1.48	1.48
S98T001595	239:6	Drainable liquid	1.47	1.44	1.45
S98T001719	239:7	Drainable liquid	1.48	1.48	1.48
S98T001658	239:8	Drainable liquid	1.49	1.5	1.49
S98T001605	239:9R1	Drainable liquid	1.46	1.49	1.47
S98T001571	239:10R1	Drainable liquid	1.49	1.54	1.51

B2.6 1997 GRAB SAMPLE DATA TABLES

Table B2-70. Tank 241-SX-103 Grab Sample Analytical Results: Aluminum (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	14,500	13,700	14,100
S97T001561		3SX-97-3	30,300	32,300	31,300
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	41,900	39,700	40,800[QC:c]
S97T001402		3SX-97-2	51,700	52,900	52,300
S97T001404		3SX-97-3	51,900	51,000	51,500

Table B2-71. Tank 241-SX-103 Grab Sample Analytical Results: Antimony (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,160	1,640	<1,400[QC:e]
S97T001561		3SX-97-3	1,260	<1,200	<1,230
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<36.1	<36.1	<36.1
S97T001402		3SX-97-2	<72.1	<72.1	<72.1
S97T001404		3SX-97-3	<36.1	<36.1	<36.1

Table B2-72. Tank 241-SX-103 Grab Sample Analytical Results: Arsenic (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-73. Tank 241-SX-103 Grab Sample Analytical Results: Barium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<968	<976	<972
S97T001561		3SX-97-3	<998	<997	<998
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<30.1	<30.1	<30.1
S97T001402		3SX-97-2	<60.1	<60.1	<60.1
S97T001404		3SX-97-3	<30.1	<30.1	<30.1

Table B2-74. Tank 241-SX-103 Grab Sample Analytical Results: Beryllium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<96.8	<97.6	<97.2
S97T001561		3SX-97-3	<99.8	<99.7	<99.8
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<3	<3	<3
S97T001402		3SX-97-2	<6	<6	<6
S97T001404		3SX-97-3	<3	<3	<3

Table B2-75. Tank 241-SX-103 Grab Sample Analytical Results: Bismuth (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-76. Tank 241-SX-103 Grab Sample Analytical Results: Boron (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<968	<976	<972
S97T001561		3SX-97-3	<998	<997	<998
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	89.2	84.8	87
S97T001402		3SX-97-2	96	94.2	95.1
S97T001404		3SX-97-3	102	102	102

Table B2-77. Tank 241-SX-103 Grab Sample Analytical Results: Cadmium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<96.8	<97.6	<97.2
S97T001561		3SX-97-3	<99.8	<99.7	<99.8
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<3	<3	<3
S97T001402		3SX-97-2	<6	<6	<6
S97T001404		3SX-97-3	<3	<3	<3

Table B2-78. Tank 241-SX-103 Grab Sample Analytical Results: Calcium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-79. Tank 241-SX-103 Grab Sample Analytical Results: Cerium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-80. Tank 241-SX-103 Grab Sample Analytical Results: Chromium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	526	526	526
S97T001561		3SX-97-3	20,000	20,300	20,200
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	260	251	256
S97T001402		3SX-97-2	1,130	1,140	1,140
S97T001404		3SX-97-3	2,200	2,170	2,190

Table B2-81. Tank 241-SX-103 Grab Sample Analytical Results: Cobalt (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<387	<390	<389
S97T001561		3SX-97-3	<399	<399	<399
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<12	<12	<12
S97T001402		3SX-97-2	74.7	71.4	73.1
S97T001404		3SX-97-3	< 12	< 12	< 12

Table B2-82. Tank 241-SX-103 Grab Sample Analytical Results: Copper (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	<200	<199	<200
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<6.01	<6.01	<6.01
S97T001402		3SX-97-2	<12	<12	<12
S97T001404		3SX-97-3	<6.01	<6.01	<6.01

Table B2-83. Tank 241-SX-103 Grab Sample Analytical Results: Iron (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<968	<976	<972
S97T001561		3SX-97-3	1440	1,370	1,410
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<30.1	<30.1	<30.1
S97T001402		3SX-97-2	<60.1	<60.1	<60.1
S97T001404		3SX-97-3	<30.1	<30.1	<30.1

Table B2-84. Tank 241-SX-103 Grab Sample Analytical Results: Lanthanum (ICP)..

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<968	<976	<972
S97T001561		3SX-97-3	<998	<997	<998
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<30.1	<30.1	<30.1
S97T001402		3SX-97-2	<60.1	<60.1	<60.1
S97T001404		3SX-97-3	<30.1	<30.1	<30.1

Table B2-85. Tank 241-SX-103 Grab Sample Analytical Results: Lead (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-86. Tank 241-SX-103 Grab Sample Analytical Results: Lithium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	<200	<199	<200
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<6.01	<6.01	<6.01
S97T001402		3SX-97-2	<12	<12	<12
S97T001404		3SX-97-3	<6.01	<6.01	<6.01

Table B2-87. Tank 241-SX-103 Grab Sample Analytical Results: Magnesium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-88. Tank 241-SX-103 Grab Sample Analytical Results: Manganese (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	831	857	844
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<6.01	<6.01	<6.01
S97T001402		3SX-97-2	<12	<12	<12
S97T001404		3SX-97-3	<6.01	<6.01	<6.01

Table B2-89. Tank 241-SX-103 Grab Sample Analytical Results: Molybdenum (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<968	<976	<972
S97T001561		3SX-97-3	<998	<997	<998
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	127	122	125
S97T001402		3SX-97-2	156	155	156
S97T001404		3SX-97-3	159	158	159

Table B2-90. Tank 241-SX-103 Grab Sample Analytical Results: Neodymium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-91. Tank 241-SX-103 Grab Sample Analytical Results: Nickel (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<12	<12	<12
S97T001402		3SX-97-2	<24	<24	<24
S97T001404		3SX-97-3	<12	<12	<12

Table B2-92. Tank 241-SX-103 Grab Sample Analytical Results: Phosphorus (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	5,010	4,920	4,970
S97T001561		3SX-97-3	<3990	<3990	<3990
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	1,390	1,330	1,360
S97T001402		3SX-97-2	1,250	1,300	1,280
S97T001404		3SX-97-3	1,390	1,390	1,390

Table B2-93. Tank 241-SX-103 Grab Sample Analytical Results: Potassium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	3,930	3,710	3,820[QC:c]
S97T001402		3SX-97-2	4,480	4,520	4,500
S97T001404		3SX-97-3	4,890	4,800	4,850

Table B2-94. Tank 241-SX-103 Grab Sample Analytical Results: Samarium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	<2,000	<1,990	<2,000
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	<60.1	<60.1
S97T001402		3SX-97-2	<120	<120	<120
S97T001404		3SX-97-3	<60.1	<60.1	<60.1

Table B2-95. Tank 241-SX-103 Grab Sample Analytical Results: Selenium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<60.1	64.6	<62.3
S97T001404		3SX-97-3	71.6	<60.1	<65.8

Table B2-96. Tank 241-SX-103 Grab Sample Analytical Results: Silicon (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<968	<976	<972
S97T001561		3SX-97-3	1,130	1,490	1,310[QC:e]
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	30.3	30.6	30.5
S97T001402		3SX-97-2	<60.1	<60.1	<60.1
S97T001404		3SX-97-3	36.2	39.8	38

Table B2-97. Tank 241-SX-103 Grab Sample Analytical Results: Silver (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	<200	<199	<200
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	18.8	18.1	18.5
S97T001402		3SX-97-2	<12	<12	<12
S97T001404		3SX-97-3	20.4	19.7	20

Table B2-98. Tank 241-SX-103 Grab Sample Analytical Results: Sodium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	2.91E+05	2.69E+05	2.80E+05[QC:c]
S97T001561		3SX-97-3	2.16E+05	2.23E+05	2.20E+05
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	2.68E+05	2.53E+05	2.61E+05[QC:c]
S97T001402		3SX-97-2	2.63E+05	2.73E+05	2.68E+05
S97T001404		3SX-97-3	2.83E+05	2.77E+05	2.80E+05

Table B2-99. Tank 241-SX-103 Grab Sample Analytical Results: Strontium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	<200	<199	<200
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<6.01	<6.01	<6.01
S97T001402		3SX-97-2	<12	<12	<12
S97T001404		3SX-97-3	<6.01	<6.01	<6.01

Table B2-100. Tank 241-SX-103 Grab Sample Analytical Results: Sulfur (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<1,940	<1,950	<1,950
S97T001561		3SX-97-3	3,390	3,240	3,320
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	1,900	1,800	1,850
S97T001402		3SX-97-2	968	977	973
S97T001404		3SX-97-3	1,390	1,370	1,380

Table B2-101. Tank 241-SX-103 Grab Sample Analytical Results: Thallium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<3,870	<3,900	<3,890
S97T001561		3SX-97-3	<3,990	<3,990	<3,990
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<120	<120	<120
S97T001402		3SX-97-2	<240	<240	<240
S97T001404		3SX-97-3	<120	<120	<120

Table B2-102. Tank 241-SX-103 Grab Sample Analytical Results: Titanium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	<200	<199	<200
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<6.01	<6.01	<6.01
S97T001402		3SX-97-2	<12	<12	<12
S97T001404		3SX-97-3	<6.01	<6.01	<6.01

Table B2-103. Tank 241-SX-103 Grab Sample Analytical Results: Total Uranium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<9,680	<9,760	<9,720
S97T001561		3SX-97-3	<9,980	<9,970	<9,980
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<300	<300	<300
S97T001402		3SX-97-2	<600	<600	<600
S97T001404		3SX-97-3	<300	<300	<300

Table B2-104. Tank 241-SX-103 Grab Sample Analytical Results: Vanadium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<968	<976	<972
S97T001561		3SX-97-3	<998	<997	<998
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<30.1	<30.1	<30.1
S97T001402		3SX-97-2	<60.1	<60.1	<60.1
S97T001404		3SX-97-3	<30.1	<30.1	<30.1

Table B2-105. Tank 241-SX-103 Grab Sample Analytical Results: Zinc (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	<200	244	<222
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<6.01	<6.01	<6.01
S97T001402		3SX-97-2	<12	12.4	<12.2
S97T001404		3SX-97-3	<6.01	<6.01	<6.01

Table B2-106. Tank 241-SX-103 Grab Sample Analytical Results: Zirconium (ICP).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	<194	<195	<195
S97T001561		3SX-97-3	<200	<199	<200
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<6.01	<6.01	<6.01
S97T001402		3SX-97-2	<12	<12	<12
S97T001404		3SX-97-3	<6.01	<6.01	<6.01

Table B2-107. Tank 241-SX-103 Grab Sample Analytical Results: Total Uranium (U).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T001560	Riser 9	3SX-97-2	28.4	8.93	18.7[QC:e]
S97T001561		3SX-97-3	1,120	1,100	1,110

Table B2-108. Tank 241-SX-103 Grab Sample Analytical Results: Bromide (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	<965	<983	<974[QC:c]
S97T001563		3SX-97-3	<1,270	<1,270	<1,270
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<518	<518	<518
S97T001402		3SX-97-2	<1,280	<1,280	<1,280
S97T001404		3SX-97-3	<518	<518	<518

Table B2-109. Tank 241-SX-103 Grab Sample Analytical Results: Chloride (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	2,730	2,490	2,610
S97T001563		3SX-97-3	5,050	5,020	5,040
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	8,120	8,190	8,160
S97T001402		3SX-97-2	12,000	12,200	12,100
S97T001404		3SX-97-3	10,300	10,300	10,300

Table B2-110. Tank 241-SX-103 Grab Sample Analytical Results: Fluoride (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	349	955	652[QC:d,e]
S97T001563		3SX-97-3	372	410	391
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<49.7	<49.7	<49.7[QC:c]
S97T001402		3SX-97-2	<122	<122	<122
S97T001404		3SX-97-3	<49.7	<49.7	<49.7

Table B2-111. Tank 241-SX-103 Grab Sample Analytical Results: Nitrate (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	4.74E+05	4.95E+05	4.85E+05
S97T001563		3SX-97-3	1.86E+05	1.86E+05	1.86E+05
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	1.84E+05	1.85E+05	1.84E+05
S97T001402		3SX-97-2	1.98E+05	1.98E+05	1.98E+05
S97T001404		3SX-97-3	1.68E+05	1.68E+05	1.68E+05

Table B2-112. Tank 241-SX-103 Grab Sample Analytical Results: Nitrite (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	45,100	39,800	42,500
S97T001563		3SX-97-3	83,800	83,200	83,500
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	1.35E+05	1.36E+05	1.35E+05
S97T001402		3SX-97-2	1.70E+05	1.75E+05	1.72E+05
S97T001404		3SX-97-3	1.62E+05	1.66E+05	1.64E+05

Table B2-113. Tank 241-SX-103 Grab Sample Analytical Results: Phosphate (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	11,400	16,400	13,900[QC:e]
S97T001563		3SX-97-3	6,800	8,300	7,550
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	2,760	2,680	2,720
S97T001402		3SX-97-2	3,140	6,010	4,580[QC:e]
S97T001404		3SX-97-3	2,900	2,750	2,820

Table B2-114. Tank 241-SX-103 Grab Sample Analytical Results: Sulfate (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	<1,070	<1,090	<1,080
S97T001563		3SX-97-3	9,020	9,540	9,280
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	3,890	3,980	3,940
S97T001402		3SX-97-2	1,830	1,970	1,900
S97T001404		3SX-97-3	2,740	2,660	2,700

Table B2-115. Tank 241-SX-103 Grab Sample Analytical Results: Oxalate (IC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	<811	<826	<818
S97T001563		3SX-97-3	27,300	28,900	28,100
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	<435	<435	<435
S97T001402		3SX-97-2	<1,070	<1,070	<1,070
S97T001404		3SX-97-3	<435	<435	<435

Table B2-116. Tank 241-SX-103 Grab Sample Analytical Results: Hydroxide.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T001562	Riser 9	3SX-97-2	9,460	9,360	9,410
S97T001563		3SX-97-3	19,500	20,700	20,100
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	33,800	34,500	34,200
S97T001402		3SX-97-2	46,500	47,300	46,900
S97T001404		3SX-97-3	43,700	43,300	43,500

Table B2-117. Tank 241-SX-103 Grab Sample Analytical Results: Ammonia (Ion Selective Electrode).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid: acid digest			**µg/mL**	**µg/mL**	**µg/mL**
S97T002000	Riser 9	3SX-97-1	247	260	254
S97T002001		3SX-97-2	1,680	1,800	1,740
S97T002002		3SX-97-3	1,090		1,090
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001884	Riser 9	3SX-97-1	274	317	296
S97T001403		3SX-97-2	1,440	1,730	1,590
S97T001885		3SX-97-3	1,020	1,020	1,020

Table B2-118. Tank 241-SX-103 Grab Sample Analytical Results: Total Inorganic Carbon.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Triplicate	Average
Centrifuged Solids			**µg/g**	**µg/g**	**µg/g**	**µg/g**
S97T001409	Riser 9	3SX-97-2	557	547		552
S97T001411		3SX-97-3	2,880	2,400		2,640
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	4,080	3,630		3,860
S97T001402		3SX-97-2	1,930	1,870		1,900
S97T001404		3SX-97-3	1,820	1,960		1,890

Table B2-119. Tank 241-SX-103 Grab Sample Analytical Results: Total Organic Carbon.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Triplicate	Average
Centrifuged Solids			**µg/g**	**µg/g**	**µg/g**	**µg/g**
S97T001409	Riser 9	3SX-97-2	811	761		786
S97T001411		3SX-97-3	8,810	8,490		8,650
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**	**µg/mL**
S97T001400	Riser 9	3SX-97-1	3,360	2,980		3,170
S97T001402		3SX-97-2	2,490	2,350		2,420
S97T001404		3SX-97-3	2,380	2,370		2,380

Table B2-120. Tank 241-SX-103 Grab Sample Analytical Results: Total Organic Carbon (Furnace Oxidation).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid			**µg/mL**	**µg/mL**	**µg/mL**
S97T001884	Riser 9	3SX-97-1	3,620	3,560	3,590
S97T001403		3SX-97-2	3,810	4,360	4,090
S97T001885		3SX-97-3	2,650	2,680	2,670

Table B2-121. Tank 241-SX-103 Grab Sample Analytical Results: Americium-241 (GEA).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	<0.523	<0.504	<0.513
S97T001561		3SX-97-3	<1.36	<1.43	<1.4

Table B2-122. Tank 241-SX-103 Grab Sample Analytical Results: Cesium-137 (GEA).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	105	99.5	102
S97T001561		3SX-97-3	192	208	200
Drainable Liquid			**µCi/mL**	**µCi/mL**	**µCi/mL**
S97T001401	Riser 9	3SX-97-1	377	378	378
S97T001403		3SX-97-2	496	532	514
S97T001417		3SX-97-3	426	428	427

Table B2-123. Tank 241-SX-103 Grab Sample Analytical Results: Cobalt-60 (GEA).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	<0.0131	<0.0141	<0.0136
S97T001561		3SX-97-3	<0.0654	<0.0668	<0.0661
Drainable Liquid			**µCi/mL**	**µCi/mL**	**µCi/mL**
S97T001401	Riser 9	3SX-97-1	<0.0137	<0.0145	<0.0141
S97T001403		3SX-97-2	<0.0201	<0.0166	<0.0184
S97T001417		3SX-97-3	<0.0137	<0.0142	<0.014

Table B2-124. Tank 241-SX-103 Grab Sample Analytical Results: Europium-154 (GEA).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	<0.0466	<0.0421	<0.0444
S97T001561		3SX-97-3	<0.241	0.48	<0.36[QC:e]

Table B2-125. Tank 241-SX-103 Grab Sample Analytical Results: Europium-155 (GEA).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	<0.199	<0.195	<0.197
S97T001561		3SX-97-3	<0.518	<0.537	<0.528

Table B2-126. Tank 241-SX-103 Grab Sample Analytical Results: Americium-241 (AEA).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	<0.00424	<0.00405	<0.00414
S97T001561		3SX-97-3	0.425	0.508	0.467
Drainable Liquid			**µCi/mL**	**µCi/mL**	**µCi/mL**
S97T001401	Riser 9	3SX-97-1	1.01E-04	1.03E-04	1.02E-04
S97T001403		3SX-97-2	2.84E-04	<2.99E-04	<2.92E-04
S97T001417		3SX-97-3	<6.14E-04	<6.74E-04	<6.44E-04

Table B2-127. Tank 241-SX-103 Grab Sample Analytical Results: Plutonium-239/240.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	<0.00152	<0.00158	<0.00155
S97T001561		3SX-97-3	0.0753	0.0773	0.0763
Drainable Liquid			**µCi/mL**	**µCi/mL**	**µCi/mL**
S97T001401	Riser 9	3SX-97-1	8.69E-06	9.21E-06	8.95E-06
S97T001403		3SX-97-2	<1.72E-04	<1.76E-04	<1.74E-04
S97T001417		3SX-97-3	2.34E-05	2.15E-05	2.25E-05

Table B2-128. Tank 241-SX-103 Grab Sample Analytical Results: Strontium-89/90.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
S97T001560	Riser 9	3SX-97-2	0.887	0.962	0.925
S97T001561		3SX-97-3	31.6	32.4	32
Drainable Liquid			**µCi/mL**	**µCi/mL**	**µCi/mL**
S97T001401	Riser 9	3SX-97-1	0.152	0.153	0.153
S97T001403		3SX-97-2	0.14	0.138	0.139
S97T001417		3SX-97-3	0.0572	0.0507	0.054

Table B2-129. Tank 241-SX-103 Grab Sample Analytical Results: Exotherms - Calculated Dry Weight (DSC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid			**J/g DW**	**J/g DW**	**J/g DW**
S97T001402	Riser 9	3SX-97-2	78	77.4	77.7

Table B2-130. Tank 241-SX-103 Grab Sample Analytical Results: Exotherm (DSC).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid			**J/g**	**J/g**	**J/g**
S97T001402	Riser 9	3SX-97-2	36.2	35.9	36.1

Table B2-131. Tank 241-SX-103 Grab Sample Analytical Results: Percent Water (TGA).

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids			**%**	**%**	**%**
S97T001409	Riser 9	3SX-97-2	46.8	46.9	46.9
S97T001411		3SX-97-3	46.8	42.3	44.6
Drainable Liquid			**%**	**%**	**%**
S97T001400	Riser 9	3SX-97-1	49	49.2	49.1
S97T001402		3SX-97-2	48	47.6	47.8
S97T001404		3SX-97-3	47.7	47.6	47.6

Table B2-132. Tank 241-SX-103 Grab Sample Analytical Results: Bulk Density.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Supernatant			**g/mL**	**g/mL**	**G/mL**
S97T001333	Riser 9	3SX-97-2	1.55	n/a	1.55
S97T001334		3SX-97-3	1.59	n/a	1.59
Centrifuged Solids			**g/mL**	**g/mL**	**g/mL**
S97T001409	Riser 9	3SX-97-2	1.94	n/a	1.94
S97T001411		3SX-97-3	1.78	n/a	1.78
Drainable Liquid			**g/mL**	**g/mL**	**g/mL**
S97T001402	Riser 9	3SX-97-2	1.43	n/a	1.43
S97T001404		3SX-97-3	1.36	n/a	1.36

Table B2-133. Tank 241-SX-103 Grab Sample Analytical Results: Specific Gravity.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Drainable Liquid			**Unitless**	**Unitless**	**Unitless**
S97T001400	Riser 9	3SX-97-1	1.98	2.04	2.01

Table B2-134. Tank 241-SX-103 Grab Sample Analytical Results: pH Measurement.

Sample Number	Sample Location	Grab Sample	Result	Duplicate	Average
Centrifuged Solids			**Unitless**	**Unitless**	**Unitless**
S97T001409	Riser 9	3SX-97-2	13.5	13.5	13.5
S97T001411		3SX-97-3	13.5	13.4	13.5
Drainable Liquid			**Unitless**	**Unitless**	**Unitless**
S97T001400	Riser 9	3SX-97-1	13.2	13.3	13.3
S97T001402		3SX-97-2	13.7		13.7
S97T001404		3SX-97-3	13.1	13.1	13.1

B3.0 ASSESSMENT OF CHARACTERIZATION RESULTS

This section discusses the overall quality and consistency of the current sampling results for tank 241-SX-103 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

Two cores, 12 segments each, were expected from this tank during the 1998 core sampling event. Because of the high downforces encountered during sampling of core 235, additional segments were taken and identified as 6A, 9A, and 12A. Because of high downforces encountered during the sampling of core 239, additional samples were taken and identified as 1A, 9R1, and 10R1. As a result of the sampler being empty, sampling of segment 11 was retaken and identified as 11R1.

Three grab samples were collected from this tank during the 1997 grab sampling event. Two of the three samples contained settled solids that appeared to be large salt crystals that precipitated upon cooling to ambient temperature.

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 quality control results outside the specified criteria were identified by footnotes in the data summary tables (see Section B2.0).

The standard and spike recovery results provide an estimate of the accuracy of the analysis. 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.

B3.2.1 Quality Control Assessment of April/May 1998 Core Sample

All pertinent quality control tests were conducted on the 1998 core samples, allowing a full assessment of the data's accuracy and precision. The specific criteria for the analytes required by the safety screening DQO were given in the rotary mode core SAP (Conner 1998), whereas the criteria governing the opportunistic analytes were given in DOE (1997).

Of the 36 ICP analytes, only aluminum, chromium, lithium, and sodium for the solid subsamples and lithium for the liquid subsamples were DQO requirements. Spike recoveries were outside the control limits for sodium, which was attributed to the high concentration of this analyte in the samples with respect to the amount of spike standard added. A post-digestion spike analysis was performed as an additional instrument performance check. The post-digestion spike recoveries were within the required limits. High RPDs were reported for several samples and were attributed to sample heterogeneity. No reruns were requested. The standard recoveries were within the required limits.

A spike recovery outside the required range was reported for one subsample submitted for uranium analyses, and was attributed to the high concentration of this analyte in the samples with respect to the amount of spike standard added. No rerun was requested. The standard recoveries and RPDs were within the required limits. The preparation blanks for some samples showed a small amount of contamination.

Of the eight anions analyzed by IC, only bromide, nitrate, and sulfate for the solid subsamples and bromide for the liquid subsamples were a DQO requirement. High RPDs were reported for six subsamples analyzed for nitrate and six subsamples analyzed for sulfate. These high RPDs were attributed to sample heterogeneity. Selected samples were redigested or reanalyzed with no improvement in RPD. A spike recovery outside of the required range was reported for one nitrate subsample, and was attributed to the high concentration of this analyte in the samples with respect to the amount of spike standard added. No rerun was requested. The standard recoveries were within the required limits.

High RPDs were reported for three of the 12 subsamples submitted for ammonia analyses. The sample results were near the detection limit, which decreased the precision of the analyses. No reruns were requested because of the low levels of ammonia found in the samples. The standard recoveries and spike recoveries were within the required limits.

High RPDs were reported for eight subsamples analyzed for TIC and nine subsamples analyzed for TOC. Selected samples were reanalyzed or had triplicate analyses performed. There was little improvement in the RPDs. Four subsamples anlayzed for TIC and two subsamples analyzed for TOC reported spike recoveries outside of the required range. These spike recoveries were attributed to sample heterogeneity and the high concentration of these analytes with respect to the amount of spike standard added. Selected samples were reanalyzed with little improvement in the spike recoveries. The standard recoveries were within the required limits.

Of the two radionuclides analyzed by GEA, only ^{137}Cs was a DQO requirement. The RPDs and standard recoveries for the ^{137}Cs analysis were within the required limits.

High RPDs were reported for two of the 25 subsamples submitted for $^{89/90}Sr$ analyses. Reruns were performed with no improvement in the RPDs. The preparation blanks showed a small amount of $^{89/90}Sr$ contamination. The levels of contamination were inconsequential when compared to the results of the samples. These contaminants did not impact sample data quality. The standard recoveries were within the required limits.

High RPDs were reported for ten of the 37 subsamples submitted for total alpha activity analyses. These high RPDs were attributed to sample heterogeneity. Selected samples were reanalyzed with no improvement in the RPD. Spike recoveries outside the required range were reported for two subsamples. The spike recoveries were within the laboratory statistical control limits for the quality control standard, and no reruns were requested. The standard recoveries were within the required limits.

The RPDs, standard recoveries, and spike recoveries for the total beta activity analyses were within the required limits.

The RPD for five of the 38 subsamples were outside the specified acceptance limits for DSC. The heterogeneous material and the small sample size required for these analyses made it difficult to obtain reproducible results. Triplicate analyses were performed on selected samples. The standard recoveries were within the required limits.

The RPD for three of the 38 subsamples analyzed for TGA exceeded the acceptance limits. Results from triplicate analyses showed a slight improvement in RPDs for two samples. No further reanalyses were requested. The standard recoveries were within the required limits.

The RPDs and standard recoveries for the specific gravity analyses were within the required limits.

In summary, the quality control results were within accepted tolerances, and the minor discrepancies mentioned here and footnoted in the data summary tables should not impact either the validity or the use of the data.

B3.2.2 Quality Control Assessment of June 1997 Grab Sample

All pertinent quality control tests were conducted on the 1997 grab samples, allowing a full assessment of the data's accuracy and precision. The specific criteria for the analytes required by the safety screening DQO were given in the compatibility SAP (Sasaki 1997), whereas the criteria governing the opportunistic analytes were given in DOE (1997).

Of the 36 ICP analytes, only aluminum, iron, and sodium were DQO requirements. Spike recoveries were outside the control limits for aluminum and sodium, which was attributed to the high concentration of these analytes in the samples with respect to the amount of spike standard added. A post-digestion spike analysis was performed as an additional instrument performance check. The post-digestion spike recoveries were within the required limits. The RPDs and standard recoveries were within the required limits.

A high RPD was reported for one of the samples submitted for uranium analyses and was attributed to sample heterogeneity. No reruns were requested. The standard recoveries and spike recoveries were within the required limits.

Of the eight anions analyzed by IC, only fluoride, chloride, nitrate, nitrite, phosphate, and sulfate were a DQO requirement. High RPDs were reported for two samples analyzed for fluoride and two samples analyzed for phosphate. These high RPDs were attributed to sample heterogeneity. No reruns were requested. Spike recoveries outside of the required range were reported for two fluoride samples. The high spike recovery for 3SX-97-2 was attributed to the high concentration of this analyte in the sample with respect to the amount of spike standard added. The low spike recovery for 3SX-97-1 was attributed to organic acid interference. No reruns were requested. The standard recoveries were within the required limits.

Ammonia was detected in the method blank for the non-acidified sample analysis. However, the level of contamination was insignificant with respect to the sample results and does not affect the usability of these results. The RPDs, standard recoveries, and spike recoveries for the ammonia analyses were within the required limits.

The RPDs, standard recoveries, and spike recoveries for the TIC and TOC analyses by persulfate oxidation were within the required limits.

The RPDs, standard recoveries, and spike recoveries for the TOC analyses by furnace oxidation were within the required limits.

Of the radionuclides analyzed by GEA, only ^{137}Cs was a DQO requirement. The RPDs and standard recoveries for the ^{137}Cs analyses were within the required limits.

The RPDs and standard recoveries for the ^{241}Am, $^{2339/240}$Pu, $^{89/90}$Sr, DSC, TGA, and specific gravity analyses were within the required limits.

In summary, the quality control results were within accepted tolerances, and the minor discrepancies mentioned here and footnoted in the data summary tables should not impact either the validity or the use of the data.

B3.3 DATA CONSISTENCY CHECKS

This section assesses the data consistency and quality from the tank 241-SX-103 core samples. Comparisons of different analytical methods can help to assess the consistency and quality of the data. In addition, mass and charge balances were calculated to help assess the overall data consistency.

B3.3.1 Comparison of Results from Different Analytical Methods

The following data consistency checks compare the results from two different analytical methods. Close agreement between the two methods strengthens the credibility of both results, but poor agreement brings the reliability of the data into question. All analytical mean results were taken from Section B2.0 tables.

A comparison was possible between the phosphorus and sulfur as analyzed by ICP with phosphate and sulfate as analyzed by IC. Additionally, a comparison was made between the individual beta emitters and the total beta activity in the core composite samples.

The solids analytical phosphorus mean result as determined by ICP was 1,360 µg/g, which converts to 4,170 µg/g of phosphate. This compares extremely well with the IC phosphate mean result of 4,590 µg/g. The RPD between these two phosphate results was 9.6 percent. The solids analytical sulfur mean result as determined by ICP was 4,620 µg/g, which converts to 13,800 µg/g of sulfate. This compares extremely well with the IC sulfate mean result of 14,300 µg/g. The RPD between these two sulfate results was 3.3 percent.

The liquid analytical phosphorus mean result as determined by ICP was 1,040 µg/mL, which converts to 3,190 µg/mL of phosphate. This compares extremely well with the IC phosphate mean result of 3,330 µg/mL. The RPD between these two phosphate results was 4.4 percent. The liquid analytical sulfur mean result as determined by ICP was 1,420 µg/mL, which converts to 4,250 µg/mL of sulfate; the IC sulfate mean result was 2,280 µg/mL. The RPD between these two sulfate results was 60.4 percent.

The core composite analytical phosphorus mean result as determined by ICP was 1,000 µg/g, which converts to 3,060 µg/g of phosphate. This compares reasonably well with the IC phosphate mean result of 3,750 µg/g. The RPD between these two phosphate results was 20.1 percent. The core composite analytical sulfur mean result as determined by ICP was 4,610 µg/g, which converts to 13,800 µg/g of sulfate. This compares reasonably well with the IC sulfate mean result of 11,900 µg/g. The RPD between these two sulfate results was 14.8 percent. The sum of the individual beta emitters, $^{89/90}Sr$ and ^{137}Cs, in the core composite was 491 μCi/g. The total beta activity as determined by proportional counting was 465 μCi/g. The RPD between the two determinations is 5.4 percent.

B3.3.2 Mass and Charge Balance

The principal objective in performing mass and charge balances is to determine whether the measurements are consistent. Separate mass and charge balances were calculated for the liquid and solids layers because these waste phases were analyzed separately. The results of these comparisons are presented in Sections B3.3.2.1 and B3.3.2.2.

B3.3.2.1 Solids Mass and Charge Balance. In calculating the mass and charge balances for the solids layer, only those analytes listed in Table B3-7 that were detected at a concentration of 1,000 μg/g or greater were considered. With the exception of sodium and potassium, all cations listed in Table B3-1 were assumed to be in their most common hydroxide or oxide form, and the concentrations of the assumed species were calculated stoichiometrically. Because precipitates are neutral species, all positive charge was attributed to the sodium and potassium cations. The anions listed in Table B3-2 were assumed to be present as sodium or potassium salts and were expected to balance the positive charge exhibited by sodium and potassium. The carbonate value was derived from the TIC analyses. The acetate value was derived from the TOC analyses. Phosphate and sulfate, as determined by IC, were assumed to be completely water soluble and appear only in the anion mass and charge calculations. Because oxalate was assumed to be adequately accounted for in the TOC concentration, it was not included separately in the mass balance. The concentrations of cationic species in Table B3-1, the anionic species in Table B3-2, 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.

Mass balance = Percent water + 0.0001 x {total analyte concentration}

= Percent water + 0.0001 x $\{K^+ + Na^+ + Al(OH)_3 + Cr(OH)_3 + Cl^- + NO_3^- + NO_2^- + PO_4^{3-} + SO_4^{2-} + CO_3^{2-} + C_2H_3O_2^-\}$.

The total analyte concentration calculated from the above equation is 795,000 μg/g. The mean weight percent water is 27.1 percent or 271,000 μg/g. The mass balance resulting from adding the percent water to the total analyte concentration is 107 percent (see Table B3-3).

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) = $[K^+]/39.1 + [Na^+]/23.0 = 9{,}030$ μeq/g.

Total anions (μeq/g) = $[Cl^-]/35.4 + [NO_3^-]/62.0 + [NO_2^-]/46.0 + [PO_4^{3-}]/31.7 + [SO_4^{2-}]/48.1 + [CO_3^{2-}]/30.0 + [C_2H_3O_2^-]/59.0 = 8{,}670$ μeq/g.

The charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 1.04. There is a net positive charge of 360 μeq/g

In summary, the above calculations yield reasonable mass and charge balance values (close to 1.00 for charge balance and 100 percent for mass balance), indicating that the analytical results are generally self-consistent.

Table B3-1. Cation Mass and Charge Data for Solids.

Analyte	**Concentration (µg/g)**	**Assumed Species**	**Concentration of Assumed Species (µg/g)**	**Charge (µeq/g)**
Aluminum	38,500	$Al(OH)_3$	1.11E+05	0
Chromium	4,670	$Cr(OH)_3$	9,250	0
Potassium	1,300	K^+	1,300	33
Sodium	2.07E+05	Na^+	2.07E+05	9,000
Totals			3.28E+05	9,030

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

Analyte	**Concentration (µg/g)**	**Assumed Species**	**Concentration of Assumed Species (µg/g)**	**Charge (µeq/g)**
Chloride	3,120	Cl^-	3,120	88
Nitrate	3.48E+05	NO_3^-	3.48E+05	5,610
Nitrite	47,300	NO_2^-	47,300	1,030
Phosphate	4,590	PO_4^{3-}	4,590	145
Sulfate	14,300	SO_4^{2-}	14,300	298
TIC	8,100	CO_3^{2-}	40,500	1,350
TOC	3,620	$C_2H_3O_2^-$	8,900	151
Totals			4.67E+05	8,670

Table B3-3. Mass and Charge Balance Totals for Solids.

Totals	**Concentrations (µg/g)**	**Charge (µeq/g)**
Total from Table B3-1 (cations)	3.28E+05	9,030
Total from Table B3-2 (anions)	4.67E+05	8,670
Water percent	2.71E+05	0
Totals	1.07E+06	+360

B3.3.2.2 Liquid Mass and Charge Balance. In calculating the mass and charge balances for the 1998 core sample liquids, only those analytes listed in Table B3-9 that were detected at a concentration of 1,000 μg/g or greater were considered. All analytical results were first converted from μg/mL to μg/g (using the liquid specific gravity mean of 1.48) before use in the tables. Because this portion of the tank is liquid, the cations listed in Table B3-4 and the anions listed in Table B3-5 were all assumed to be present as ions, with the exception of aluminum. Aluminum is assumed to be present as aluminate. Phosphate and sulfate, as determined by IC, are assumed to be completely water soluble and appear only in the anion mass and charge calculations. The concentrations of cationic species in Table B3-4, the anionic species in Table B3-5, 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.

Mass balance = Percent water + 0.0001 x {total analyte concentration}

= Percent water + 0.0001 x $\{K^+ + Na^+ + AlO_2^- + Cl^- + NO_3^- + NO_2^- + PO_4^{3-} + SO_4^{2-}\}$.

The total analyte concentration calculated from the above equation is 453,000 μg/g. The mean weight percent water is 46.6 percent or 466,000 μg/g. The mass balance resulting from adding the percent water to the total analyte concentration is 91.9 percent (see Table B3-6).

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) = $[K^+]/39.1 + [Na^+]/23.0$ = 7,150 μeq/g.

Total anions (μeq/g) = $[AlO_2^-]/59.0 + [Cl^-]/35.4 + [NO_3^-]/62.0 + [NO_2^-]/46.0 + [PO_4^{3-}]/31.7 + [SO_4^{2-}]/48.1$ = 5,410 μeq/g.

The charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 1.32. There is a net positive charge of 1,740 μeq/g. If it were assumed that this net positive charge is a result of the omission of hydroxide, this would equate to 29,600 μg/g of hydroxide in the liquid. However, with the omission of carbonate and acetate data, it is difficult to determine what fraction of this charge difference can be attributed to which analyte.

In summary, the above calculations indicate a deficit in the anion mass and charge data. This is reasonable considering that there were no hydroxide, TIC, or TOC results provided. The concentrations and charges of these anions would be expected to account for the deficit.

Table B3-4. Cation Mass and Charge Data for Liquid.

Analyte	Concentration (µg/g)	Assumed Species	Concentration of Assumed Species (µg/g)	Charge (µeq/g)
Potassium	2,870	K^+	2,870	73
Sodium	1.63E+05	Na^+	1.63E+05	7,080
Totals			1.66E+05	7,150

Table B3-5. Anion Mass and Charge Data for Liquid.

Analyte	Concentration (µg/g)	Assumed Species	Concentration of Assumed Species (µg/g)	Charge (µeq/g)
Aluminum	29,400	AlO_2^-	64,200	1,090
Chloride	7,230	Cl^-	7,230	204
Nitrate	1.06E+05	NO_3^-	1.06E+05	1,710
Nitrite	1.06E+05	NO_2^-	1.06E+05	2,310
Phosphate	2,250	PO_4^{3-}	2,250	71
Sulfate	1,540	SO_4^{2-}	1,540	32
Totals			2.87e+05	5,410

Table B3-6. Mass and Charge Balance Totals for Liquid.

Totals	Concentrations (µg/g)	Charge (µeq/g)
Total from Table B3-4 (cations)	1.66E+05	7,150
Total from Table B3-5 (anions)	2.87E+05	5,410
Water percent	4.66E+05	0
Totals	9.19E+05	+1,740

B3.4 MEAN CONCENTRATIONS AND CONFIDENCE INTERVALS

B3.4.1 1998 Core Sample Solid Data

A nested analysis of variance (ANOVA) model was fit to the core segment data. Mean values, and 95 percent confidence intervals on the mean, were determined from the ANOVA. Four variance components were used in the calculations. The variance components represent concentration differences between risers, segments, laboratory samples, and analytical replicates. The model is:

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

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

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 ijkth 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 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. The mean value and standard deviation of the mean were used to calculate the 95 percent confidence intervals. The following table gives the mean, degrees of freedom, and confidence interval for each constituent. The statistical results were obtained using the statistical analysis package S-PLUS[1] (Statistical Sciences 1993). Some analytes had results below the detection limit. In these cases, the value of the detection limit was used for nondetected results. For analytes with a majority of results below the detection limit, a simple average is all that is reported. For those analytes with less-than values, including the detection limit in the computation of the mean may bias the result high.

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

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

In this equation, $\hat{\mu}$ is the restricted maximum likelihood method estimate of the mean concentration, $\hat{\sigma}(\hat{\mu})$ is the restricted maximum likelihood method 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 equals the number of risers with data minus one. In cases where the lower limit of the confidence interval was negative, it is reported as zero.

Table B3-7. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Subdivision Data. (Reference Date- October 21, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP:A	2.58E+04	1	0.00E+00	1.12E+05	µg/g
Aluminum	ICP:F	3.85E+04	1	0.00E+00	2.12E+05	µg/g
Antimony[1]	ICP:A	<3.73E+01	n/a	n/a	n/a	µg/g
Antimony[1]	ICP:F	<1.22E+03	n/a	n/a	n/a	µg/g
Arsenic[1]	ICP:A	<6.22E+01	n/a	n/a	n/a	µg/g
Arsenic[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
Barium[1]	ICP:A	<3.30E+01	n/a	n/a	n/a	µg/g
Barium[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	µg/g
Beryllium[1]	ICP:A	<3.11E+00	n/a	n/a	n/a	µg/g
Beryllium[1]	ICP:F	<1.02E+02	n/a	n/a	n/a	µg/g
Bismuth[1]	ICP:A	<6.59E+01	n/a	n/a	n/a	µg/g
Bismuth[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
Boron	ICP:A	1.20E+02	1	3.57E+01	2.05E+02	µg/g
Boron[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	µg/g
Bromide[1]	IC:W	<1.27E+03	n/a	n/a	n/a	µg/g
Cadmium[1]	ICP:A	6.26E+00	1	0.00E+00	1.81E+01	µg/g

[1] S-PLUS is a registered trademark of Statistical Sciences, Seattle, Washington.

Table B3-7. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Subdivision Data. (Reference Date- October 21, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Cadmium[1]	ICP:F	<1.02E+02	n/a	n/a	n/a	µg/g
Calcium[1]	ICP:A	2.12E+02	1	0.00E+00	5.67E+02	µg/g
Calcium[1]	ICP:F	<2.06E+03	n/a	n/a	n/a	µg/g
Cerium[1]	ICP:A	<6.54E+01	n/a	n/a	n/a	µg/g
Cerium[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
^{137}Cesium	GEA:F	1.22E+02	1	0.00E+00	4.45E+02	µCi/g
Chloride	IC:W	3.12E+03	1	0.00E+00	1.09E+04	µg/g
Chromium	ICP:A	4.29E+03	1	0.00E+00	1.22E+04	µg/g
Chromium[1]	ICP:F	4.67E+03	1	0.00E+00	1.31E+04	µg/g
Cobalt[1]	ICP:A	<1.24E+01	n/a	n/a	n/a	µg/g
Cobalt[1]	ICP:F	<4.06E+02	n/a	n/a	n/a	µg/g
^{60}Cobalt[1]	GEA:F	<5.92E-02	n/a	n/a	n/a	µCi/g
Copper[1]	ICP:A	<8.98E+00	n/a	n/a	n/a	µg/g
Copper[1]	ICP:F	<2.03E+02	n/a	n/a	n/a	µg/g
Fluoride[1]	IC:W	3.07E+02	1	0.00E+00	7.01E+02	µg/g
Iron[1]	ICP:A	9.85E+02	1	0.00E+00	4.62E+03	µg/g
Iron[1]	ICP:F	<1.68E+03	n/a	n/a	n/a	µg/g
Lanthanum[1]	ICP:A	<3.31E+01	n/a	n/a	n/a	µg/g
Lanthanum[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	µg/g
Lead[1]	ICP:A	<8.49E+01	n/a	n/a	n/a	µg/g
Lead[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
Lithium[1]	ICP:A	<1.32E+01	n/a	n/a	n/a	µg/g
Lithium[1]	ICP:F	<2.03E+02	n/a	n/a	n/a	µg/g
Magnesium[1]	ICP:A	<6.61E+01	n/a	n/a	n/a	µg/g
Magnesium[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
Manganese[1]	ICP:A	5.32E+02	1	0.00E+00	2.83E+03	µg/g
Manganese[1]	ICP:F	6.33E+02	1	0.00E+00	3.01E+03	µg/g
Molybdenum[1]	ICP:A	4.53E+01	1	0.00E+00	1.17E+02	µg/g
Molybdenum[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	µg/g
Neodymium[1]	ICP:A	<6.89E+01	n/a	n/a	n/a	µg/g
Neodymium[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
Nickel[1]	ICP:A	8.21E+01	1	0.00E+00	3.15E+02	µg/g
Nitrate	IC:W	3.48E+05	1	0.00E+00	8.34E+05	µg/g

Table B3-7. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Subdivision Data . (Reference Date- October 21, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Nitrite	IC:W	4.73E+04	1	0.00E+00	1.49E+05	µg/g
Oxalate[1]	IC:W	9.40E+03	1	0.00E+00	2.75E+04	µg/g
Percent water	DSC/TGA	2.71E+01	1	0.00E+00	1.21E+02	%
Phosphate[1]	IC:W	4.59E+03	1	0.00E+00	1.64E+04	µg/g
Phosphorus[1]	ICP:A	1.36E+03	1	0.00E+00	3.52E+03	µg/g
Phosphorus[1]	ICP:F	<4.10E+03	n/a	n/a	n/a	µg/g
Potassium[1]	ICP:A	1.30E+03	1	0.00E+00	3.52E+03	µg/g
Samarium[1]	ICP:A	<6.22E+01	n/a	n/a	n/a	µg/g
Samarium[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
Selenium[1]	ICP:A	<6.76E+01	n/a	n/a	n/a	µg/g
Selenium[1]	ICP:F	<2.03E+03	n/a	n/a	n/a	µg/g
Silicon	ICP:A	3.14E+02	1	0.00E+00	9.34E+02	µg/g
Silicon[1]	ICP:F	<1.16E+03	n/a	n/a	n/a	µg/g
Silver	ICP:A	1.61E+01	1	6.52E+00	2.57E+01	µg/g
Silver[1]	ICP:F	<2.03E+02	n/a	n/a	n/a	µg/g
Sodium	ICP:A	2.03E+05	1	7.23E+04	3.33E+05	µg/g
Sodium	ICP:F	2.07E+05	1	8.39E+04	3.29E+05	µg/g
Strontium[1]	ICP:A	<2.31E+01	n/a	n/a	n/a	µg/g
Strontium[1]	ICP:F	<2.03E+02	n/a	n/a	n/a	µg/g
Sulfate[1]	IC:W	1.43E+04	1	0.00E+00	4.65E+04	µg/g
Sulfur[1]	ICP:A	4.62E+03	1	0.00E+00	1.53E+04	µg/g
Sulfur[1]	ICP:F	5.41E+03	1	0.00E+00	1.56E+04	µg/g
Thallium[1]	ICP:A	<1.24E+02	n/a	n/a	n/a	µg/g
Thallium[1]	ICP:F	<4.06E+03	n/a	n/a	n/a	µg/g
Titanium[1]	ICP:A	<7.99E+00	n/a	n/a	n/a	µg/g
Titanium[1]	ICP:F	<2.03E+02	n/a	n/a	n/a	µg/g
Total inorganic carbon	TIC/TOC	8.10E+03	1	0.00E+00	2.61E+04	µg C/g
Total organic carbon[1]	TIC/TOC	3.62E+03	1	0.00E+00	9.26E+03	µg C/g
Uranium[1]	ICP:A	<5.26E+02	n/a	n/a	n/a	µg/g
Uranium[1]	ICP:F	<1.02E+04	n/a	n/a	n/a	µg/g
Uranium	U:F	4.35E+02	1	0.00E+00	1.64E+03	µg/g
Vanadium[1]	ICP:A	<3.11E+01	n/a	n/a	n/a	µg/g
Vanadium[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	µg/g

Table B3-7. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Subdivision Data . (Reference Date- October 21, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Zinc[1]	ICP:A	2.01E+01	1	0.00E+00	6.60E+01	µg/g
Zinc[1]	ICP:F	<2.03E+02	n/a	n/a	n/a	µg/g
Zirconium[1]	ICP:A	1.44E+01	1	0.00E+00	6.16E+01	µg/g
Zirconium[1]	ICP:F	<2.03E+02	n/a	n/a	n/a	µg/g

Notes:

A = acid digest
F = fusion
W = water digest

[1]A "less-than" value was used in the calculation.

Table B3-8. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (Reference Date - October 14, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP:F	5.86E+04	1	0.00E+00	2.96E+05	µg/g
Aluminum	ICP:W	1.22E+04	1	0.00E+00	3.68E+04	µg/g
Antimony[1]	ICP:F	<1.13E+03	n/a	n/a	n/a	µg/g
Antimony[1]	ICP:W	<3.66E+01	n/a	n/a	n/a	µg/g
Arsenic[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Arsenic[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
Barium[1]	ICP:F	<9.38E+02	n/a	n/a	n/a	µg/g
Barium[1]	ICP:W	<3.05E+01	n/a	n/a	n/a	µg/g
Beryllium[1]	ICP:F	<9.38E+01	n/a	n/a	n/a	µg/g
Beryllium[1]	ICP:W	<3.05E+00	n/a	n/a	n/a	µg/g
Bismuth[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Bismuth[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
Boron[1]	ICP:F	<9.38E+02	n/a	n/a	n/a	µg/g
Boron	ICP:W	8.44E+02	1	3.86E+02	1.30E+03	µg/g
Bromide[1]	IC:W	1.33E+03	1	5.56E+02	2.09E+03	µg/g
Cadmium[1]	ICP:F	<9.38E+01	n/a	n/a	n/a	µg/g
Cadmium[1]	ICP:W	<3.05E+00	n/a	n/a	n/a	µg/g
Calcium[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g

Table B3-8. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (Reference Date - October 14, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Calcium[1]	ICP:W	<6.39E+01	n/a	n/a	n/a	µg/g
Cerium[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Cerium[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
^{137}Cesium	GEA:F	1.15E+02	1	0.00E+00	3.47E+02	µCi/g
Chloride	IC:W	3.29E+03	1	0.00E+00	1.00E+04	µg/g
Chromium	ICP:F	5.12E+03	1	3.09E+03	7.15E+03	µg/g
Chromium	ICP:W	4.86E+02	1	0.00E+00	1.20E+03	µg/g
Cobalt[1]	ICP:F	<3.75E+02	n/a	n/a	n/a	µg/g
Cobalt[1]	ICP:W	<1.22E+01	n/a	n/a	n/a	µg/g
^{60}Cobalt[1]	GEA:F	<2.89E-02	n/a	n/a	n/a	µCi/g
Copper[1]	ICP:F	<1.88E+02	n/a	n/a	n/a	µg/g
Copper[1]	ICP:W	<6.11E+00	n/a	n/a	n/a	µg/g
Fluoride	IC:W	3.61E+02	1	1.09E+02	6.13E+02	µg/g
Gross alpha	Alpha:F	2.16E-01	1	0.00E+00	6.13E-01	µCi/g
Gross beta	Alpha:F	4.65E+02	1	2.98E+02	6.32E+02	µCi/g
Iron	ICP:F	1.15E+03	1	0.00E+00	3.09E+03	µg/g
Iron[1]	ICP:W	<3.05E+01	n/a	n/a	n/a	µg/g
Lanthanum[1]	ICP:F	<9.38E+02	n/a	n/a	n/a	µg/g
Lanthanum[1]	ICP:W	<3.05E+01	n/a	n/a	n/a	µg/g
Lead[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Lead[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
Lithium[1]	ICP:F	<1.88E+02	n/a	n/a	n/a	µg/g
Lithium[1]	ICP:W	8.06E+00	1	0.00E+00	3.29E+01	µg/g
Magnesium[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Magnesium[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
Manganese	ICP:F	6.77E+02	1	0.00E+00	2.11E+03	µg/g
Manganese[1]	ICP:W	<6.11E+00	n/a	n/a	n/a	µg/g
Molybdenum[1]	ICP:F	<9.38E+02	n/a	n/a	n/a	µg/g
Molybdenum	ICP:W	4.09E+01	1	0.00E+00	1.11E+02	µg/g
Neodymium[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Neodymium[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
Nickel[1]	ICP:W	<1.22E+01	n/a	n/a	n/a	µg/g
Nitrate	IC:W	3.75E+05	1	5.53E+04	6.96E+05	µg/g

Table B3-8. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (Reference Date - October 14, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Nitrite	IC:W	5.05E+04	1	0.00E+00	1.42E+05	µg/g
Oxalate	IC:W	9.36E+03	1	1.60E+03	1.71E+04	µg/g
Percent water	DSC/TGA	2.79E+01	1	0.00E+00	1.30E+02	%
Phosphate	IC:W	3.75E+03	1	0.00E+00	1.14E+04	µg/g
Phosphorus[1]	ICP:F	<3.75E+03	n/a	n/a	n/a	µg/g
Phosphorus	ICP:W	1.00E+03	1	0.00E+00	3.21E+03	µg/g
Potassium	ICP:W	1.29E+03	1	0.00E+00	3.29E+03	µg/g
Samarium[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Samarium[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
Selenium[1]	ICP:F	<1.88E+03	n/a	n/a	n/a	µg/g
Selenium[1]	ICP:W	<6.11E+01	n/a	n/a	n/a	µg/g
Silicon[1]	ICP:F	<9.56E+02	n/a	n/a	n/a	µg/g
Silicon	ICP:W	4.64E+02	1	0.00E+00	1.10E+03	µg/g
Silver[1]	ICP:F	<1.88E+02	n/a	n/a	n/a	µg/g
Silver	ICP:W	1.49E+01	1	1.14E+01	1.84E+01	µg/g
Sodium	ICP:F	1.98E+05	1	4.50E+04	3.50E+05	µg/g
Sodium	ICP:W	2.13E+05	1	1.66E+05	2.61E+05	µg/g
Strontium[1]	ICP:F	<1.88E+02	n/a	n/a	n/a	µg/g
Strontium[1]	ICP:W	<6.11E+00	n/a	n/a	n/a	µg/g
$^{89/90}$Strontium	Sr:F	1.88E+02	1	3.76E+00	3.72E+02	µCi/g
Sulfate	IC:W	1.19E+04	1	1.78E+03	2.20E+04	µg/g
Sulfur	ICP:F	4.13E+03	1	2.70E+03	5.55E+03	µg/g
Sulfur	ICP:W	4.61E+03	1	1.02E+03	8.20E+03	µg/g
Thallium[1]	ICP:F	<3.75E+03	n/a	n/a	n/a	µg/g
Thallium[1]	ICP:W	<1.22E+02	n/a	n/a	n/a	µg/g
Titanium[1]	ICP:F	<1.88E+02	n/a	n/a	n/a	µg/g
Titanium[1]	ICP:W	<6.11E+00	n/a	n/a	n/a	µg/g
Total inorganic carbon	TIC/TOC	6.73E+03	1	5.53E+03	7.92E+03	µg C/g
Total organic carbon	TIC/TOC	3.52E+03	1	8.68E+02	6.17E+03	µg C/g
Uranium[1]	ICP:F	<9.38E+03	n/a	n/a	n/a	µg/g
Uranium[1]	ICP:W	<3.05E+02	n/a	n/a	n/a	µg/g
Uranium	U:F	5.70E+02	1	0.00E+00	1.20E+03	µg/g
Vanadium[1]	ICP:F	<9.38E+02	n/a	n/a	n/a	µg/g

Table B3-8. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (Reference Date - October 14, 1998) (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Vanadium[1]	ICP:W	<3.05E+01	n/a	n/a	n/a	µg/g
Zinc[1]	ICP:F	<1.88E+02	n/a	n/a	n/a	µg/g
Zinc[1]	ICP:W	<6.11E+00	n/a	n/a	n/a	µg/g
Zirconium[1]	ICP:F	<1.88E+02	n/a	n/a	n/a	µg/g
Zirconium[1]	ICP:W	<6.11E+00	n/a	n/a	n/a	µg/g

Notes:

A = acid digest
F = fusion
W = water digest

[1]A "less-than" value was used in the calculation.

B3.4.2 1998 Core Sample Liquid Data

The model fit to the liquid data was a nested ANOVA model. The model determined the mean value, and 95 percent confidence interval, for each constituent. Two variance components were used in the calculations. The variance components represent concentration differences between samples taken from different risers, and between analytical replicates. The model is:

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

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

where

Y_{ijk} = concentration from the k^{th} analytical result of the j^{th} sample from the i^{th} segment

μ = the mean

R_i = the effect of the i^{th} riser

A_{ij} = the analytical error

a = the number of segments

n_i = the number of analytical results from the i^{th} riser.

The variable R_i is a random effect. This variable, along with A_{ij}, is assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(R)$ and $\sigma^2(A)$, respectively.

Table B3-9 gives the mean, degrees of freedom, and confidence intervals for each constituent. The degrees of freedom associated with the standard deviation of the mean is the number of risers with data minus one.

Table B3-9. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Subdivision Data. (Reference Date - October 21, 1998) (2 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP	4.35E+04	1	2.60E+04	6.11E+04	µg/mL
Ammonia[1]	ISE	1.74E+01	1	0.00E+00	1.13E+02	µg/mL
Antimony[1]	ICP	<3.61E+01	n/a	n/a	n/a	µg/mL
Arsenic[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Barium[1]	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Beryllium[1]	ICP	<3.00E+00	n/a	n/a	n/a	µg/mL
Bismuth[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Boron	ICP	9.56E+01	1	7.25E+01	1.19E+02	µg/mL
Bromide[1]	IC	<1.07E+03	n/a	n/a	n/a	µg/mL
Cadmium[1]	ICP	<3.00E+00	n/a	n/a	n/a	µg/mL
Calcium[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Cerium[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Chloride	IC	1.07E+04	1	3.50E+03	1.79E+04	µg/mL
Chromium	ICP	1.98E+02	1	0.00E+00	1.27E+03	µg/mL
Cobalt[1]	ICP	<1.20E+01	n/a	n/a	n/a	µg/mL
Copper[1]	ICP	<1.21E+01	n/a	n/a	n/a	µg/mL
Fluoride[1]	IC	<1.02E+02	n/a	n/a	n/a	µg/mL
Iron[1]	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Lanthanum[1]	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Lead[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Lithium[1]	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Magnesium[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Manganese[1]	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Molybdenum	ICP	1.36E+02	1	9.93E+01	1.73E+02	µg/mL
Neodymium[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Nickel[1]	ICP	<1.20E+01	n/a	n/a	n/a	µg/mL
Nitrate	IC	1.57E+05	1	8.65E+04	2.27E+05	µg/mL
Nitrite	IC	1.57E+05	1	9.64E+04	2.18E+05	µg/mL

Table B3-9. Tank 241-SX-103 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Subdivision Data. (Reference Date - October 21, 1998) (2 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Oxalate[1]	IC	<9.28E+02	n/a	n/a	n/a	µg/mL
Percent water	DSC/TGA	4.66E+01	1	3.68E+01	5.65E+01	%
Phosphate	IC	3.33E+03	1	1.31E+03	5.36E+03	µg/mL
Phosphorus	ICP	1.04E+03	1	7.65E+02	1.32E+03	µg/mL
Potassium	ICP	4.25E+03	1	3.04E+03	5.46E+03	µg/mL
Samarium[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Selenium[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Silicon	ICP	1.52E+02	1	0.00E+00	3.67E+02	µg/mL
Silver[1]	ICP	1.49E+01	1	0.00E+00	3.45E+01	µg/mL
Sodium	ICP	2.41E+05	1	1.89E+05	2.93E+05	µg/mL
Specific gravity	SpG	1.48E+00	1	1.41E+00	1.54E+00	
Strontium[1]	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Sulfate[1]	IC	2.28E+03	1	0.00E+00	7.34E+03	µg/mL
Sulfur	ICP	1.42E+03	1	9.57E+02	1.88E+03	µg/mL
Thallium[1]	ICP	<1.20E+02	n/a	n/a	n/a	µg/mL
Titanium[1]	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Uranium[1]	ICP	<3.00E+02	n/a	n/a	n/a	µg/mL
Vanadium[1]	ICP	<3.01E+01	n/a	n/a	n/a	µg/mL
Zinc[1]	ICP	<2.41E+01	n/a	n/a	n/a	µg/mL
Zirconium[1]	ICP	<6.83E+00	n/a	n/a	n/a	µg/mL

Notes:

ISE = ion selective electrode

[1]A "less-than" value was used in the calculation.

B4.0 APPENDIX B REFERENCES

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.

Conner, J. M., 1998, *Tank 241-SX-103 Rotary Mode Core Sampling and Analysis Plan*, HNF-SD-WM-TSAP-122, Rev. 1, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

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

DOE, 1997, *Hanford Analytical Services Quality Assurance Requirements Document*, DOE/RL-96-68, Rev. 1, U.S. Department of Energy, Richland, Washington.

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

Fowler, K. D., 1995, *Data Quality Objectives for Tank Farms Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Homi, C. S., 1995, *Tank 241-SX-103 Tank Characterization Plan*, WHC-SD-WM-TP-313, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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

Kupfer, M. J., W. W. Shulz, 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.

Ligotke, M. W., T. W. Clauss, K. H. Pool, B. D. McVeety, G. S. Klinger, K. B. Olsen, O. P. Bredt, J. S. Fruchter, and S. C. Goheen, 1995, *Vapor Space Characterization of Waste 241-SX-103: Results from Samples Collected on 3/23/95*, PNNL-10814, Pacific Northwest National Laboratory, Richland, Washington.

McCain, D. J., and R. E. Bauer, 1998, *Results of Vapor Space Monitoring of Flammable Gas Watch List Tanks*, HNF-SD-WM-TI-797, Rev. 3A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

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.

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.

Osborne, J. W., and L. L. Buckley, 1995, *Data Quality Objectives for Tank Hazardous Vapor Safety Screening*, WHC-SD-WM-DQO-002, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Sasaki, L. M., 1997, *Compatibility Grab Sampling and Analysis Plan for Fiscal Year 1997*, WHC-SD-WM-TSAP-115, Rev. 0H, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

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.

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.

Statistical Science, 1993, *S-PLUS Reference Manual, Version 3.2*, Statistical Sciences, a division of MathSoft, Inc., Seattle, Washington.

Steen, F. H., 1997, *Tank 241-SX-103, Grab Samples, 3SX-97-1, 3SX-97-2 and 3SX-97-3 Analytical Results for the Final Report*, HNF-SD-WM-DP-260, Rev. 0, Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

Steen, F. H., 1998, *Tank 241-SX-103, Cores 229 and 233, Analytical Results for the Final Report*, HNF-SD-WM-DP-311, Rev. 0, Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

WHC, 1992, *Safety Department Administrative Manuals*, WHC-IP-0030, Westinghouse Hanford Company, Richland, Washington.

This page intentionally left blank.

APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

This page intentionally left blank.

APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

Appendix C documents the results of the statistical analyses and numerical manipulations required by the DQOs applicable to tank 241-SX-103. The analyses required for tank 241-SX-103 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 C3.0**: 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 61.5 µCi/mL for gross alpha and 480 J/g dry weight for DSC. Confidence intervals on the mean were calculated for each sample using the analytical data from the 1998 core sampling event (Steen 1998).

The upper limit (UL) of a one-sided 95 percent confidence interval on the mean is

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

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.

C1.1 TOTAL ALPHA ACTIVITY STATISTICAL ANALYSIS

For the samples with at least one total alpha activity 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 32.7 µCi/g (61.5 µCi/mL for drainable liquid), then reject the null hypothesis that the alpha activity is greater than or equal to 32.7 µCi/g (61.5 µCi/mL for drainable liquid) at the 0.05 level of significance.

Table C1-1. 95 Percent Upper Confidence Limits for Total Alpha Activity. (2 sheets)

Laboratory Sample Identification	Description	û	*df*	Upper Limit	Units
S98T001543	Core 235, segment 4, drainable liquid	1.51E-03	1	1.51E-03	µCi/mL
S98T001485[1]	Core 235, segment 5, drainable liquid	2.56E-03	1	8.43E-03	µCi/mL
S98T001565	Core 239, segment 2, drainable liquid	1.78E-02	1	2.13E-02	µCi/mL
S98T001657[1]	Core 239, segment 8, drainable liquid	2.78E-02	1	4.58E-02	µCi/mL
S98T001569	Core 239, segment 10R1, drainable liquid	1.39E-02	1	3.54E-02	µCi/mL
S98T001502F	Core 235, segment 3, lower half	2.48E-01	1	2.90E-01	µCi/g
S98T001497F	Core 235, segment 6, lower half	1.15E-01	1	1.69E-01	µCi/g
S98T001548F	Core 235, segment 6A, lower half	8.40E-02	1	3.05E-01	µCi/g
S98T001491F	Core 235, segment 7, lower half	5.44E-02	1	7.59E-02	µCi/g
S98T001549F	Core 235, segment 8, lower half	2.45E-01	1	3.08E-01	µCi/g
S98T002491F	Core 235, segment 9, lower half	8.55E-02	1	8.68E-02	µCi/g
S98T001508F	Core 235, segment 9A, lower half	7.72E-02	1	2.20E-01	µCi/g
S98T001698F	Core 235, segment 10, lower half	4.84E-02	1	7.11E-02	µCi/g
S98T001550F	Core 235, segment 11, lower half	8.16E-01	1	9.42E-01	µCi/g
S98T001638F	Core 235, segment 12, lower half	1.22E-01	1	2.87E-01	µCi/g
S98T001584F	Core 239, segment 1, lower half	1.12E-01	1	1.47E-01	µCi/g
S98T002048F	Core 239, segment 1A, lower half	7.72E-03	1	3.16E-02	µCi/g
S98T001643F[1]	Core 239, segment 1A, lower half	1.12E-02	1	3.54E-02	µCi/g
S98T001710F	Core 239, segment 5, lower half	8.53E-02	1	1.06E-01	µCi/g
S98T001590F	Core 239, segment 6, lower half	3.18E-02	1	3.96E-02	µCi/g
S98T001724F	Core 239, segment 7, lower half	4.58E-02	1	1.29E-01	µCi/g
S98T001663F	Core 239, segment 8, lower half	1.43E-01	1	1.77E-01	µCi/g
S98T001704F	Core 239, segment 9, lower half	1.30E-01	1	2.15E-01	µCi/g
S98T001600F	Core 239, segment 9R, lower half	1.07E-01	1	1.58E-01	µCi/g
S98T001574F	Core 239, segment 10R1	1.04E-01	1	1.17E-01	µCi/g
S98T001616F	Core 239, segment 11R, lower half	7.76E-01	1	9.31E-01	µCi/g

Table C1-1. 95 Percent Upper Confidence Limits for Total Alpha Activity. (2 sheets)

Laboratory Sample Identification	Description	û	df	Upper Limit	Units
S98T001649F	Core 239, segment 12, lower half	3.09E-01	1	6.31E-01	µCi/g
S98T001622F	Core 239, segment 12A, lower half	2.76E-03	1	3.35E-03	µCi/g
S98T001802F	Core 235, core composite	2.48E-01	1	4.34E-01	µCi/g
S98T001808F	Core 239, core composite	1.85E-01	1	3.18E-01	µCi/g

Note:

[1]A "less-than" value was used in the calculation.

All twenty-three of the total alpha activity solids mean results from the 1998 core samples were above the detection limit but well below the limit of 32.7 µCi/g. The solids upper limit closest to the threshold was 0.942 for core 235, segment 11, lower half. Five of the 12 total alpha activity liquid mean results from the 1998 core samples were above the detection limit but well below the limit of 61.5 µCi/mL. The liquid upper limit closest to the threshold was 0.0458 µCi/mL for core 239, segment 8.

C1.2 DIFFERENTIAL SCANNING CALORIMETRY STATISTICAL ANALYSIS

For the samples with at least one DSC value above the detection limit, the upper limit of a 95 percent confidence interval is given in Table C1-2. Each confidence interval can be used to make the following statement. If the upper limit is less than 480 J/g dry weight, then reject the null hypothesis that DSC is greater than or equal to 480 J/g dry weight at the 0.05 level of significance.

Table C1-2. 95 Percent Upper Confidence Limits for Differential Scanning Calorimetry. (2 sheets)

Laboratory Sample Identification	Description	û	df	Upper Limit	Units
S98T001543	Core 235, segment 4, drainable liquid	1.11E+02	1	2.02E+02	J/g DW
S98T001485	Core 235, segment 5, drainable liquid	7.81E+01	1	1.12E+02	J/g DW
S98T001667	Core 239, segment 1A, drainable liquid	6.68E+01	1	7.53E+01	J/g DW
S98T001565	Core 239, segment 2, drainable liquid	4.58E+01	1	4.73E+01	J/g DW
S98T001653	Core 239, segment 3, drainable liquid	4.96E+01	1	1.12E+02	J/g DW

Table C1-2. 95 Percent Upper Confidence Limits for Differential Scanning Calorimetry. (2 sheets)

Laboratory Sample Identification	Description	û	*df*	Upper Limit	Units
S98T001714	Core 239, segment 5, drainable liquid	8.81E+01	2	1.21E+02	J/g DW
S98T001594	Core 239, segment 6, drainable liquid	7.04E+01	1	9.18E+01	J/g DW
S98T001718	Core 239, segment 7, drainable liquid	1.87E+02	1	2.37E+02	J/g DW
S98T001657	Core 239, segment 8, drainable liquid	5.17E+01	1	1.04E+02	J/g DW
S98T001604	Core 239, segment 9R1, drainable liquid	7.53E+01	1	8.76E+01	J/g DW
S98T001569	Core 239, segment 10R1, drainable liquid	4.81E+01	1	7.89E+01	J/g DW
S98T001697	Core 235, segment 10, lower half	2.63E+00	1	1.13E+01	J/g DW
S98T001582	Core 239, segment 1, lower half	8.41E+01	1	1.42E+02	J/g DW
S98T001588	Core 239, segment 6, lower half	7.70E+01	1	8.47E+01	J/g DW
S98T001608	Core 239, segment 11R, upper half	4.32E+01	1	4.73E+01	J/g DW
S98T001806	Core 239, core composite	7.76e+01	1	1.28e+02	J/g DW

Four DSC solids mean results from the 1998 core samples were above the detection limit but below the limit of 480 J/g dry weight. The maximum solids upper limit to a 95 percent confidence interval on the mean for DSC was 142 J/g dry weight for core 239, segment 1, lower half. Eleven DSC liquid mean results from the 1998 core samples were above the detection limit but below the limit 480 J/g dry weight. The liquid upper limit closest to the threshold was 237 J/g dry weight for core 239, segment 7.

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.

The first step in the evaluation is to compare the analytical results with the DQO-defined concentration levels for a selected number of analytes. This comparison ensures that the predicted waste type may be in the tank at the predicted location. If the analytical results are ≥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).

Although tank 241-SX-103 was not listed as a priority tank in Simpson and McCain (1997), it is an acceptable alternative for tank 241-SX-104. Except for a heel of R1 sludge, Agnew et al. (1997) predicts that tank solids are SMM 242-S Evaporator saltcake generated from 1973 until 1976 (SMMS1). Sample results showed that with the exception of a floating salt layer in core 239 the top four to five segments of the cores were primarily drainable liquid. These segments were not included in the gateway analysis. Table C2-1 compares the expected and measured concentrations for the SMMS1 in core 235 and core 239 solids samples.

Table C2-1. Tank 241-SX-103 Historical Model Evaluation for SMMS1.

	Fingerprint Analytes (% by Weight)								Analytes >10% of
Core: Segment	**Na**	**Al**	**NO_3**	**SO_4**	**Cr**	**CO_3**	**H_2O**	**Total**	**Expected**
235:6 Lower half	22.9	1.03	39.8	1.86	0.44	5.30	17.6	88.9	Yes
235:7 Lower half	22.7	0.98	49.0	0.85	0.35	2.31	14.8	91.0	Yes
235:8 Lower half	23.1	1.71	19.1	3.29	1.20	9.40	29.6	87.4	Yes
235:9 Lower half	22.3	1.45	42.0	1.17	0.38	2.62	22.0	91.9	Yes
235:10 Lower half	25.0	0.51	64.8	0.11	0.18	0.55	4.66	95.8	No[1]
239:5 Upper half	21.9	1.79	32.2	3.89	0.52	5.75	37.0	103	Yes
239:5 Lower half	23.2	1.26	30.8	1.73	0.40	4.99	46.6	109	Yes
239:6 Lower half	18.3	2.37	15.8	0.56	0.19	3.72	47.7	88.6	Yes
239:7 Lower half	21.7	1.72	47.0	0.98	0.28	3.35	46.7	122	Yes
239:8 Lower half	22.8	1.60	31.0	3.12	0.64	5.95	42.2	107	Yes
239:9 Lower half	22.2	1.47	40.4	1.95	0.69	5.90	41.0	114	Yes
239:11R Upper half	19.5	3.49	19.8	1.62	1.34	3.35	33.5	82.6[1]	Yes
239:11R Lower half	18.8	4.92	13.7	0.88	1.09	4.14	41.0	84.5[1]	Yes
Expected for SMMS1[2]	19.54	3.10	27.43	1.30	0.30	1.70	32.1	85.5	n/a

Note:

[1]Less than 85 percent of total mass or analyte is less than 10 percent of expectation. Segment fails the gateway analysis

[2]Simpson and McCain (1997)

Table C2-1 shows that most of the segments and analytes passed the gateway analysis. The amount of sulfate in segment 235:10 lower half was <10 percent of the amount expected for

SMMS1 waste. The fingerprint analytes accounted for <85 percent of the waste mass for segments 239:11R upper half and 239:11R lower half. This indicates that except for these segments the waste is consistent with the SMMS1 waste type. Segments 239:11R upper and lower halves are located near the bottom of the tank and may be a combination of SMMS1 and some other waste type. Based on process history and results for surrounding segments, segment 235:10 lower half is expected to be SMMS1 waste. Additional analyses were performed on these segments even though they did not pass the gateway analysis.

The final test was to compare analytical results for composite samples and selected segments with HDW model estimates (Agnew et al. 1997) for SMM analyte concentrations in tank 241-SX-103. Results of the analyses are shown in Table C2-2.

Table C2-2. Comparison of Composite Samples and HDW Estimates for 241-SX-103 Saltcake.

Analytes	**Core 235**	**Core 239**	**HDW Estimates (SMM for tank 241-SX-103)**
Na (µg/g)	210,000	186,000	220,000
Al (µg/g)	40,000	77,300	29,400
NO_3 (µg/g)	401,000	350,000	211,000
CO_3 (µg/g)	33,500	33,750	18,900
SO_4 (µg/g)	11,100	12,700	16,800
Cr (µg/g)	4,960	5,280	4,910
H_2O (%)	19.9%	35.9%	27.3%
U_{TOTAL} (µg/g)	620	520	1,620
^{90}Sr (µCi/g)	203	174	83.3
Total beta (µCi/g)	475	455	~ 357 ^{90}Sr + ^{137}Cs
Total alpha (µCi/g)	0.248	0.185	~ 0.0779 ^{239}Pu + ^{241}Am
TOC (µgC/g)	3,320	3,730	9,170
Bulk density (g/mL)	1.75	1.57	1.69

Table C2-2 shows that the concentration of all of the indicator analyte values for the composite samples were >10 percent of the historical model estimates for the SMM saltcake in this tank.

In general, the segments and composites analyzed agree with SMMS1 saltcake estimates and historical model predictions. The upper four to five segments of tank 241-SX-103 are mostly drainable liquids with few solids. Segments 5 to 9 are mostly solids, probably precipitated from the SMMS1 solution. Segments 10 and 11 appear to be saltcake, but do not exhibit the characteristics of SMMS1. Based on the aluminum concentrations, the bottom of the tank (segment 12) appears to be a dense sludge.

C3.0 ANALYSIS FOR HYDROSTATIC HEAD FLUID CONTAMINATION

Water was used as a hydrostatic head fluid (HHF) in the acquisition of cores 235 and 239. 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 (Conner 1998) to detect contamination of the waste samples with HHF.

C3.1 LITHIUM

The sample results shown in Table C3-1 are for samples having lithium results that exceeded 100 µg/g. Because of probable incursion of HHF into these samples, bromide was requested as a secondary analysis.

Table C3-1. Tank 241-SX-103 Lithium Results.

Sample Number	Core: Segment Portion	Average Lithium
Solids		(µg/g)
S98T001553	235:11 lower half	144

C3.2 BROMIDE

Bromide analyses were reported for all samples shown in Table C3-1. The amount of HHF contamination in core 235, segment 11, solid sample was determined using the approach outlined in Winkelman (1996). Corrected water content for this sample is shown in Table C3-3. The result indicates that HHF intrusion was significant (>10% of total water content) for this sample.

Table C3-2. Tank 241-SX-103 Bromide Results.

Sample Number	Core: Segment Portion	Average Bromide
Solids		(µg/g)
S98T001556	235:11 lower half	2,110

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		
235:11 lower half	41.3	35.7

C4.0 APPENDIX C REFERENCES

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, Los Alamos National Laboratory, Los Alamos, New Mexico.

Conner, J. M., 1998, *Tank 241-SX-103 Rotary Mode Core Sampling and Analysis Plan*, HNF-SD-WM-TSAP-122, Rev. 1, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

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

Simpson, B. C., and D. J. McCain, 1997, *Historical Model Evaluation Data Requirements*, HNF-SD-WM-DQO-018, Rev. 2, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Steen, F. H., 1998, *Tank 241-SX-103, Cores 229 and 233, Analytical Results for the Final Report*, HNF-SD-WM-DP-311, Rev. 0, Waste Management Federal Services of Hanford, Inc., for Fluor Daniel Hanford, Inc., Richland, Washington.

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

This page intentionally left blank.

APPENDIX D

EVALUATION TO ESTABLISH THE BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-SX-103

This page intentionally left blank.

APPENDIX D

EVALUATION TO ESTABLISH THE BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-SX-103

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-SX-103 was performed, and a best-basis inventory was established. This work follows the methodology established by the standard inventory task.

D1.0 CHEMICAL INFORMATION SOURCES

Available waste (chemical) information for tank 241-SX-103 includes:

- Analytical data from the April/May 1998 rotary core samples (Steen 1998)
- Analytical data from the June 1997 grab samples (Steen 1997)
- Analytical data from other S and U farm tanks that contain similar SMMS1 and R1 waste types
- The HDW model document (Agnew et al. 1997a) provides tank content estimates in terms of component concentrations and inventories.
-

D2.0 COMPARISON OF COMPONENT INVENTORY VALUES

The tank 241-SX-103 chemical and radionuclide inventories predicted from the HDW model estimates (Agnew et al. 1997a), and previous best-basis estimates, are shown in Tables D2-1 and D2-2. The chemical species are reported without charge designation according to the best-basis inventory convention. The HDW model and previous best basis inventory estimates are based on the same volume 2,468 kL (652 kgal), and density of 1.69 g/mL. Based on zip cord readings and surface level measurements (Section A.4.1), a new tank volume of 2,400 kL (634 kgal) is assumed for the new best-basis inventory. The difference in surface level measurements and the Hanlon (1998) and HDW volume is attributed to evaporation from the tank.

Table D2-1. Comparison of Inventory Estimates for Nonradioactive Components in Tank 241-SX-103.

Analyte	HDW Inventory Estimate[1] (kg)	Previous Best Basis Estimate[2] (kg)
Al	1.44E+05	1.27E+05
Bi	739	259
Ca	4,810	14,530
Cl	22,300	14,300
Cr	33,500	19,500
F	3,310	15,900
Fe	3,990	6,640
Hg	4.67	0
K	6,650	4,000
La	18.4	132
Mn	495	3,280
Na	8.86E+05	6.77E+05
Ni	1,370	604
NO_2	2.92E+05	2.14E+05
NO_3	8.65E+05	6.33E+05
OH	5.23E+05	3.76E+05
Pb	521	660
PO_4	21,800	1.13E+05
Si	6,670	7,540
SO_4	59,400	46,800
TIC as CO_3	67,600	67,600
TOC	31,700	30,900
U_{TOTAL}	6,870	8,950
Zr	60.3	207

Notes:

[1]Agnew et al. (1997a)

[2]Effective January 31, 1997 (LMHC 1998)

Table D2-2. Comparison of Inventory Estimates for Selected Radioactive Components in Tank 241-SX-103.

Analyte	HDW Inventory Estimate[1] (Ci)	Previous Best Basis Estimate[2, 3] (Ci)
^{90}Sr	4.24E+05	5.19E+05
^{137}Cs	7.81E+05	5.66E+05

Notes:

[1]Agnew et al. (1997a), decayed to January 1, 1994

[2]Effective January 31, 1997 (LMHC 1998). Decayed to January 1, 1994.

[3]All other previous best-basis inventory estimates were HDW model-based values.

D3.0 COMPONENT INVENTORY EVALUATION

D3.1 WASTE HISTORY

Tank 241-SX-103 was filled with waste from the REDOX facility from 1954 until 1971. Waste was initially added to the tank with the cascade of R1 from tank 241-SX-102. In support of the 242-S Evaporator campaigns, waste was transferred to and received from tank 241-S-102 from 1975 to 1977, and tank 241-SY-102 from 1977 to 1980. The tank was labeled inactive in 1978 and removed from service in 1980. The tank was partially interim isolated in June 1985. Tank 241-SX-103 continued to send waste to tank 241-AW-102 as late as 1992 (Agnew et al. 1997b).

D3.2 CONTRIBUTING WASTE TYPES

The HDW model (Agnew et al. 1997a) predicts that the tank contains a total of 2,468 kL (652 kgal) of waste. The HDW model defines the waste as 37.85 kL (10 kgal) of R1, 386 kL (102 kgal) of RsltCk, and 2,044 kL (540 kgal) of saltcake and supernatant predicted from the SMM (SMMS1).

The sort on radioactive waste type (SORWT) model (Hill et al. 1995) lists high-level REDOX process waste and evaporator bottoms as the primary and secondary waste types, respectively. Evaporator bottoms waste is a generic waste in the SORWT model definition for saltcake that is roughly equivalent to the SMM waste type. Hill et al.(1995) also lists plutonium-uranium extraction (PUREX) cladding waste and organic wash waste as tertiary waste contributors.

Hanlon (1998) reports 2,468 kL (652 kgal) of waste that consists of 3.785 kL (1 kgal) of supernatant, 435 kL (115 kgal) of sludge, and 2,029 kL (536 kgal) of saltcake with 1,064 kL (281 kgal) of drainable interstitial liquid.

D3.3 ASSUMPTIONS USED

An engineering evaluation based on tank 241-SX-103 sample results was conducted to predict tank contents and compare results with the previous best basis and HDW model results. The engineering evaluation assumes the following:

- The total tank volume, based on surface level measurements (Section A.4.1) is 2,400 kL (634 kgal).
- The sludge volume used to calculate analyte inventories is listed in Hanlon (1998). The saltcake volume (including drainable liquid) is the total tank volume, less the sludge volume. The volume of drainable liquid is equivalent to 50 percent of the total saltcake volume based on porosity values, with the remaining volume attributed to the sludge layer. The saltcake analytical mean density is 1.75 g/mL, the sludge analytical mean density is 1.88 g/mL, and the specific gravity of the liquids is 1.47.
- Only the SMMS1 and R1 waste streams contributed to solids formation.
- All radionuclide data are corrected to January 1, 1994.

D3.4 BASIS FOR CALCULATIONS USED IN THIS ENGINEERING EVALUATION

The sample-based concentrations listed in Table D3-1 are the unweighted mean of means of the sludge, and saltcake, and liquid obtained as follows:

- Solid samples from core 235, segments 11 and 12A, and core 239, segment 12 were identified as sludge. The mean sludge concentrations were determined by first averaging the results on the same segment level and then averaging the segment averages. (that is, core 235, segment 12A and core 239, segment 12 results were averaged to give a segment 12 sludge average for the tank. This value was then averaged with the core 235, segment 11 result to give the overall mean sludge concentrations.)

- Except for the segment resamples from core 235 (6A and 9A) and core 239 (1A, 9R, 10R, and 12A) all other laboratory solid samples were assumed to be saltcake. The mean saltcake concentrations were calculated like the sludge concentrations, by first averaging the results on the same segment level and then averaging the segment averages.

- The mean liquid concentrations were calculated, similarly, by first averaging the results on the same segment level and then averaging the segment averages.

Table D3-1 lists the resulting "segment-weighted" mean concentrations. These mean concentrations are different than the REML means listed in Appendix B, Section B3.4. The REML means for the liquids and solids were computed using all the available core sample results. In contrast, separate "segment-weighted" means were computed for the saltcake and sludge phases in the solids layer. Furthermore, data from the segment resamples were not used in calculating the "segment-weighted" means unless data were not available from the initial attempt to obtain the segment. Because they were obtained from disturbed waste, resampled segments were determined to be nonrepresentative of the tank waste.

The liquid concentrations for carbonate (CO_3, total organic carbon $^{89/90}$Sr, and ^{137}CS were obtained from the analytical results for the 1997 grab sample (Steen 1997).

Table D3-1. Tank 241-SX-103 Sample-Based Concentrations. (2 sheets)

Analyte	**Sludge** (µg/g)	**Saltcake** (µg/g)	**Liquid** (µg/mL)
Al	1.63E+05	18,300	44,100
Bi	<39.4[1]	<73.5[1]	<60.1
Ca	429[1]	213[1]	<60.1
Cl	2,680	3,720	11,000
CO_3	10,300	49,700	12,800[2]
Cr	5,100	5,600	83.6
F	339	327	<101
Fe	2,740	1,330[1]	<30.1
K	867[1]	1,440[1]	4,240
La	<25.0[1]	<36.4[1]	<30.1
Mn	1,720	662	<6.01
Na	1.11E+05	2.18E+05	2.37E+05
Ni	230[1]	84.5[1]	<12.0
NO_2	46,500	57,000	1.58E+05
NO_3	1.58E+05	3.19E+05	1.59E+05
Pb	<67.0[1]	<96.0[1]	<60.1

Table D3-1. Tank 241-SX-103 Sample-Based Concentrations. (2 sheets)

Analyte	Sludge (µg/g)	Saltcake (µg/g)	Liquid (µg/mL)
PO_4	5,750	4,060	3,330
Si	1,370	329[1]	146
SO_4	1,410	18,500	2,010
Sr	114[1]	<13.0[1]	<6.01
TOC	4,220	4,380	2,660[2]
U	930[3]	467[3]	<300
Zr	22.5[1]	16.3[1]	<6.01
Percent water (%)	26.7	33.0	46.7
Specific gravity	n/a	n/a	1.47
Density (g/mL)	1.88	1.75	N/a
Radionuclides (µCi/g)[4]	**(µCi/g)**	**(µCi/g)**	**(µCi/mL)**
Total alpha	0.516	0.188	<0.0180
$^{89/90}Sr$	811	78.3	0.115[2]
^{137}Cs	104	139	440[2]

Notes:

n/a = not applicable

[1] Acid digestion results
[2] Grab sample results as of June 6, 1997 (Steen 1997)
[3] Kinetic phosporescence results
[4] Radionuclide results as of May 13, 1998, (Steen 1998) except as noted

Table D3-2. Engineering Evaluation Approach Used for Tank 241-SX-103. (2 sheets)

Type of Waste	How Calculated	Check Method
Drainable liquid	The sample-based mean analytical liquid concentrations (see Table D3-1) were multiplied by a volume of 982 kL (259.5 kgal).	Liquid concentrations were compared with predicted SMMS and R1 liquid waste types (Agnew et al. 1997a).
Saltcake	The sample-based mean analytical saltcake concentrations (see Table D3-1) were multiplied by a saltcake density of 1.75 g/mL and volume of 982 kL (259.5 kgal).	Saltcake concentrations were compared with sample-based concentrations for other tanks containing SMMS1 waste (see Table D3-3).

Table D3-2. Engineering Evaluation Approach Used for Tank 241-SX-103. (2 sheets)

Type of Waste	How Calculated	Check Method
Sludge	The sample-based mean analytical concentrations from core 235, segments 11 and 12A, and core 239, segment 12 (see Table D3-1) were multiplied by a sludge density of 1.88 g/mL and volume of 435 kL (115 kgal).	Sludge concentrations were compared with sample-based concentrations for other tanks containing R1 waste (Table D3-4).

D3.5.1 Supernatant Mixing Model S1 Saltcake

The SMMS1 component concentrations for four tanks (241-S-101, 241-S-102, 241-U-106, and 241-U-109) known to contain the same saltcake waste type were averaged to provide a generalized composition template for SMMS1 saltcake (Sasaki et al. 1998). This composition for SMMS1 saltcake is compared with tank 241-SX-103 saltcake sample concentrations in Table D3-3. In addition, the solids composition predicted by Agnew et al. (1997a) for the 242-S Evaporator saltcake generated from 1973 to 1976 (S1-SltCk) is shown in Table D3-3. With the exception of a few analytes, the sample-based results from 241-SX-103 more closely resemble the template values for SMMS1 than the HDW model values. These differences in values may be attributed to the simplifying assumptions made in the model, the complicated and unique history associated with evaporation concentrates, and potentially biased sample data.

Table D3-3. Tank 241-SX-103 S1 Saltcake Concentrations. (2 sheets)

Analyte	SMMS1 Template Mean[1] (µg/g)	HDW Model Waste Type S1-SltCk[2] (µg/g)	241-SX-103 Saltcake Analytical Mean[3] (µg/g)
Al	15,100	33,400	18,300
Bi	73.5	144	<73.5
Ca	282	1,210	213
Cl	3,840	2,910	3,720
CO_3	NR	16,600	49,700
Cr	5,440	7,870	5,600
F	6,260	611	327
Fe	1,630	539	1,330
Hg	NR	1.03	NR
K	1,110	1,260	1,440
La	40.0	0.75	<36.4

Table D3-3. Tank 241-SX-103 S1 Saltcake Concentrations. (2 sheets)

Analyte	SMMS1 Template Mean[1] (μg/g)	HDW Model Waste Type S1-SltCk[2] (μg/g)	241-SX-103 Saltcake Analytical Mean[3] (μg/g)
Mn	684	175	662
Na	1.82E+05	2.31E+05	2.18E+05
Ni	155	340	84.5
NO_2	57,500	82,400	57,000
NO_3	1.63E+05	2.57E+05	3.19E+05
Pb	192	109	<96.0
PO_4	34,000	5,310	4,060
Si	1,990	1,870	329
SO_4	13,800	12,700	18,500
Sr	7.00	0.00	<13.0
TOC	8,950	6,130	4,380
U	914	2,060	467
Zr	47.0	8.71	16.3
Density (g/mL)	1.63	1.86	1.75
Radionuclides (μCi/g)			
Total alpha	N/A	N/A	0.188
^{90}Sr	90.3	110	78.3
^{137}Cs	153	175	139

Notes:

N/A=not available
NR=not requested

[1]Sasaki et al. (1998)
[2]Agnew et al. (1997a)
[3]See Table D3-1

D3.5.2 High-Level REDOX Process Sludge

The R1 component concentrations for three tanks (241-S-102, 241-S-104, and 241-S-107) known to contain the same waste type were averaged to provide a generalized composition template for R1 sludge (Sasaki et al. 1998). This composition for R1 sludge is compared with tank 241-SX-103 sludge sample concentrations in Table D3-4. In addition, the solids composition predicted by Agnew et al. (1997a) for the R1 waste generated from 1952 to 1957 is shown in Table D3-4.

While the template and the HDW model values are reasonably comparable, some of the major analytes are noticeably different. In general, neither the template nor the model are very good predictors for the solid analyte concentrations in the tank, perhaps because of the simplifying assumptions made in the model or the potentially biased sample data.

Table D3-4. Tank 241-SX-103 REDOX Process Sludge Concentrations. (2 sheets)

Analyte	**R1 Template Mean[1] (µg/g)**	**HDW Model Waste Type R1[2] (µg/g)**	**241-SX-103 Sludge Analytical Mean[3] (µg/g)**
Al	1.00E+05	1.07E+05	1.63E+05
Bi	<42.2	0.00	<39.4
Ca	268	5,020	429
Cl	2,370	1,040	2,680
CO_3	4,140	7,510	10,300
Cr	1,920	1,830	5,100
F	<120	0.00	339
Fe	1,613	32,200	2,740
Hg	<0.126	0.00	NR
K	432	250	867
La	<10.8	0.00	<25.0
Mn	1,330	0.00	1,720
Na	97,800	1.06E+05	1.11E+05
Ni	118	1,690	230
NO_2	30,433	38,200	46,500
NO_3	1.225E+05	1.87E+05	1.58E+05
Pb	33.2	0.00	<67.0
PO_4	<1,730	0.00	5,750
Si	1,250	129	1,370
SO_4	1,489	569	1,410
Sr	420	0.00	114
TOC	1,730	0.00	4,220
U	7,690	207	930
Zr	66.9	0.00	22.5
Density (g/mL)	1.77	1.76	1.88

Table D3-4. Tank 241-SX-103 REDOX Process Sludge Concentrations. (2 sheets)

Analyte	R1 Template Mean[1] (μg/g)	HDW Model Waste Type R1[2] (μg/g)	241-SX-103 Sludge Analytical Mean[3] (μg/g)
Radionuclides (μCi/g)			
Total alpha	N/A	N/A	0.516
^{90}Sr	288	529	811
^{137}Cs	77.6	31.9	104

Notes:

[1]Sasaki et al. (1998)
[2]Agnew et al. (1997a)
[3]See Table D3-1

D3.5.3 Liquid

The tank 241-SX-103 liquid concentrations from the analytical liquid means are provided in Table D3-5. In addition, the liquid compositions predicted by Agnew et al. (1997a) for S1-SltCk and R1 are shown in Table D3-5. The sample-based results from 241-SX-103 more closely resemble the HDW model values for SMMS1 than R1, as would be expected because the majority of the liquid in the tank is attributed to drainable interstitial liquid in the saltcake layer.

Table D3-5. Tank 241-SX-103 Liquid Concentrations. (2 sheets)

Analyte	HDW Model Waste Type S1-SltCk[1] (μg/mL)	HDW Model Waste Type R1[2] (μg/mL)	241-SX-103 Liquid Analytical Mean[3] (μg/mL)
Al	54,200	23,000	44,100
Bi	410	0.00	<60.1
Ca	256	361	<60.1
Cl	8,280	3,410	11,000
CO_3	26,700	540	12,800
Cr	4,620	6,000	83.6
F	1,740	0.00	<101
Fe	39.3	112	<30.1
Hg	2.25	0.00	NR
K	3,590	819	4,240
La	2.14	0.00	<30.1

Table D3-5. Tank 241-SX-103 Liquid Concentrations. (2 sheets)

Analyte	HDW Model Waste Type S1-SltCk[1] (µg/mL)	HDW Model Waste Type R1[2] (µg/mL)	241-SX-103 Liquid Analytical Mean[3] (µg/mL)
Mn	61.7	0.00	<6.01
Na	3.37E+05	1.24E+05	2.37E+05
Ni	71.0	106	<12.0
NO_2	1.26E+05	41,400	1.58E+05
NO_3	1.62E+05	1.18E+05	1.59E+05
Pb	311	0.00	<60.1
PO_4	15,100	0.00	3,330
Si	769	422	146
SO_4	36,300	1,860	2,010
Sr	0.00	0.00	<6.01
TOC	17,500	0.00	2,660
U	639	679	<300
Zr	24.8	0.00	<6.01
Density (g/mL)	1.63	1.23	1.47
Radionuclides (µCi/g)	**(µCi/g)**	**(µCi/g)**	**(µCi/mL)**
Total alpha	N/A	N/A	<0.0180
^{90}Sr	33.5	34.0	0.115
^{137}Cs	400	86.8	440

Notes:

[1]Agnew et al. (1997a) after applying a density of 1.63 g/mL

[2]Agnew et al. (1997a) after applying a density of 1.23 g/mL

[3]See Table D3-1

D3.6 ESTIMATED COMPONENT INVENTORIES

The chemical inventory of tank 241-SX-103 is based on the sludge, saltcake, and liquid concentrations (see Table D3-1) and the estimated volumes (see Table D3-2). The resulting inventories are provided in Table D3-6. The inventories estimated by the HDW model are included for comparison.

Manganese. Potassium permanganate was used in the REDOX process until 1959, so manganese is expected to be found in tanks containing waste from that process. It is most likely present as highly insoluble manganese dioxide in the alkaline waste materials and would be expected to be in the sludge. The R1 sludge composition estimate developed in this engineering assessment for manganese was 1,720 μg/g. Potassium permanganate was also used in 242-S Evaporator. The SMMS1 saltcake composition assessment for manganese was 662 μg/g. The HDW model inventory estimate for manganese is 495 kg. The inventory estimate of 2,540 kg developed in this engineering assessment is likely to be closer to the true value.

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

Table D3-6. Comparison of Inventory Estimates for Tank 241-SX-103. (2 sheets)

Component	Sample Based Saltcake Inventory[1] (kg)	Sample Based Sludge Inventory[2] (kg)	Sample Based Liquid Inventory[3] (kg)	Sample Based Total Inventory (kg)	HDW Model Estimates[4] (kg)
Al	31,400	1.33E+05	43,300	2.08E+05	1.44E+05
Bi	<126	<32.3	<59.0	<217	739
Ca	366	351	<59.0	<776	4,810
Cl	6,400	2,190	10,800	19,400	22,300
TIC as CO_3	85,400	8,400	12,500	1.06E+05	67,600
Cr	9,630	4,180	82.1	13,900	33,500
F	562	277	<99.2	<939	3,310
Fe	2,290	2,250	<29.5	<4,540	3,990
K	2,480	710	4,170	7,360	6,650
La	<62.6	<20.5	<29.5	<113	18.4
Mn	1,140	1,410	<6.97	<2,540	495
Na	3.75E+05	91,200	2.33E+05	7.21E+05	8.86E+05
Ni	145	188	<13.9	<333	1,370
NO_2	98,000	38,100	1.56E+05	2.92E+05	2.92E+05
NO_3	5.48E+05	1.29E+05	1.56E+05	8.33E+05	8.65E+05
Pb	<165	<54.8	<59.0	<279	521
PO_4	6,980	4,700	3,270	15,000	21,800
Si	566	1,120	143	1,830	6,670
SO_4	31,700	1,150	1,980	34,900	59,400
Sr	<22.3	93.3	<5.90	<116	0.00
TOC	7,520	3,450	2,610	13,600	31,700
U_{TOTAL}	803	761	<295	<1,560	6,870

Table D3-6. Comparison of Inventory Estimates for Tank 241-SX-103. (2 sheets)

Component	Sample Based Saltcake Inventory[1] (kg)	Sample Based Sludge Inventory[2] (kg)	Sample Based Liquid Inventory[3] (kg)	Sample Based Total Inventory (kg)	HDW Model Estimates[4] (kg)
Zr	28.0	18.4	<5.90	<46.4	60.3
Total alpha (Ci)	334	374	<19.2	<727	NR
^{137}Cs (Ci)[5]	2.64E+05	94,100	4.68E+05	8.26E+05	7.81E+05
$^{89/90}$Sr (Ci)[5]	1.49E+05	7.36E+05	123	8.86E+05	4.24E+05

Notes:

[1]Based on the mean saltcake concentrations from Table D3-3 with a volume of 982 kL (259.5 kgal) and a density of 1.75 g/mL

[2]Based on the mean sludge concentrations from Table D3-4 with a volume of 435 kL (115 kgal) and a density of 1.88 g/mL

[3]Based on the mean liquid concentrations from Table D3-5 with a volume of 982 kL (259.5 kgal).

[4]Agnew et al. (1997a)

[5]Radionuclides decayed to January 1, 1994

D4.0 DEFINE THE BEST BASIS AND ESTABLISH COMPONENT INVENTORIES

Tank farm activities include overseeing tank farm operations and identifying, monitoring, and resolving safety issues associated with these operations and with the storage of tank wastes. Disposal activities involve designing equipment, processes, and facilities for retrieving wastes and processing them into a form 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 work associated with tank farm operation and disposal.

Chemical and radiological inventory information is generally derived using one of three approaches: 1) component inventories are estimated using the results of sample analyses,

2) component inventories are predicted using the HDW model based on 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 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 chemical information for tank 241-SX-103 was performed, and a best-basis inventory was established. This work follows the methodology established by the standard inventory task. The following information was used in the evaluation:

- Analytical data from the April/May 1998 rotary-mode core samples (Steen 1998)
- Analytical data from the June 1997 grab samples (Steen 1997)
- Analytical data from other S and U farm tanks that contain similar SMMS1 and R1 waste types
- The inventory estimates generated by the HDW model (Agnew et al. 1997a).

Based on this evaluation, a best-basis inventory was developed for tank 241-SX-103 using the 1998 core and 1997 grab sampling analytical data. Where analytical data were not available, the HDW model inventory estimates reported by Agnew et al. (1997a) were used as the best basis for this tank.

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 have been infrequently reported. Therefore, 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 the 177 Hanford Site tanks are reported in the HDW Rev. 4 model results (Agnew et al. 1997a). The best basis value for any one analyte may be either a model result or a sample- or engineering assessment-based result, if available.

The best-basis inventory estimate for tank 241-SX-103 is presented in Tables D4-1 and D4-2. The mercury inventory was specified in Simpson (1998). Once the best-basis inventories were determined, the hydroxide inventory was calculated by performing a charge balance with the valance of other analytes. This charge balance approach is consistent with that used by Agnew et al. (1997a).

The inventory values reported in Tables D4-1 and D4-2 are subject to change. Refer to the Tank Characterization Database for the most current inventory values.

Table D4-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-103. (Effective January 31, 1999) (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
Al	2.08E+05	S	
Bi	0	S/E	Not expected in waste based on process history
Ca	776	S/E	Upper bounding limit
Cl	19,400	S	
TIC as CO_3	1.06E+05	S	
Cr	13,900	S	
F	939	S/E	Based on IC analysis
Fe	4,540	S/E	Iron not expected in liquid phase
Hg	0	E	Per change package #7 (Simpson 1998)
K	7,360	S	
La	0	S/E	Not expected in waste based on process history
Mn	2,540	S/E	Manganese not expected in liquid phase
Na	7.00E+05	S	
Ni	333	S/E	Nickel not expected in liquid phase
NO_2	2.92E+05	S	
NO_3	8.33E+05	S	
OH_{TOTAL}	5.01E+05	C	
Pb	279	S/E	Upper bounding limit
PO_4	15,000	S	Based on IC analysis
Si	1,830	S	
SO_4	34,900	S	Based on IC analysis
Sr	116	S/E	Strontium not expected in liquid phase; upper bounding limit
TOC	13,600	S/E	

Table D4-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-103. (Effective January 31, 1999) (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
U_{TOTAL}	1,560	S/E	Uranium not expected in liquid phase
Zr	46.4	S/E	Zirconium not expected in liquid phase

Note:

IC = ion chromatography
TIC = total inorganic carbon

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

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-103 Decayed to January 1, 1994. (Effective January 31, 1999) (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	672	M	
^{14}C	90.6	M	
^{59}Ni	8.76	M	
^{60}Co	101	M	
^{63}Ni	854	M	
^{79}Se	11.2	M	
^{90}Sr	8.86E+05	S	
^{90}Y	8.86E+05	S	Based on ^{90}Sr activity
^{93}Zr	54.7	M	
^{93m}Nb	40.8	M	
^{99}Tc	648	M	
^{106}Ru	0.0185	M	
^{113m}Cd	240	M	
^{125}Sb	432	M	
^{126}Sn	17.1	M	
^{129}I	1.25	M	
^{134}Cs	7.85	M	
^{137}Cs	8.26E+05	S	

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-103 Decayed to January 1, 1994. (Effective January 31, 1999) (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{137m}Ba	7.82E+05	S	Based on 0.946 of ^{137}Cs activity
^{151}Sm	39,700	M	
^{152}Eu	14.0	M	
^{154}Eu	1,670	M	
^{155}Eu	797	M	
^{226}Ra	5.86E-04	M	
^{227}Ac	0.00355	M	
^{228}Ra	0.395	M	
^{229}Th	0.00926	M	
^{231}Pa	0.0146	M	
^{232}Th	0.0259	M	
^{232}U	0.457	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{233}U	1.75	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{234}U	0.582	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{235}U	0.0235	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{236}U	0.0195	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{237}Np	2.37	M	
^{238}Pu	9.15	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{238}U	0.523	S/E/M	Based on ICP U sample result ratioed to HDW estimates for U isotopes.
^{239}Pu	326	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{240}Pu	54.3	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{241}Am	369	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{241}Pu	588	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{242}Cm	0.770	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{242}Pu	0.00319	S/E/M	Based on total alpha activity sample result

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-103 Decayed to January 1, 1994. (Effective January 31, 1999) (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
			ratioed to HDW estimates for alpha isotopes.
^{243}Am	0.0129	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{243}Cm	0.0706	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.
^{244}Cm	0.685	S/E/M	Based on total alpha activity sample result ratioed to HDW estimates for alpha isotopes.

Notes:

[1]S = sample-based (see Appendix B), M = HDW model-based Agnew et al. (1997a), and E = engineering assessment-based.

D5.0 APPENDIX D REFERENCES

Agnew, S. F., J. Boyer, R. A. Corbin, T. B. Duran, J. R. Fitzpatrick, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1997a, *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4*, LA-UR-96-3860, Los Alamos National Laboratory, Los Alamos, New Mexico.

Agnew, S. F., R. A. Corbin, T. B. Duran, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1997b, *Waste Status and Transaction Record Summary (WSTRS) Rev. 4*, LA-UR-97-311, Los Alamos National Laboratory, Los Alamos, New Mexico.

Hanlon, B. M., 1998, *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.

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 Laboratory, Richland, Washington.

Hodgson, K. M., and M. D. LeClair, 1996, *Work Plan for Defining a Standard Inventory Estimate for Wastes Stored in Hanford Site Underground Tanks*, WHC-SD-WM-WP-311, Rev. 1, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Kupfer, M. J., A. L. Boldt, B. A. Higley, K. M. Hodgson, L. W. Shelton, B. C. Simpson, R. A. Watrous, M. D. LeClair, G. L. Borsheim, R. T. Winward, R. M. Orme, N. G. Colton, S. L. Lambert, D. E. Place, and W. W. Schulz, 1998, *Standard Inventories of Chemicals and Radionuclides in Hanford Site Tank Wastes*, HNF-SD-WM-TI-740, Rev. 0B, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

LMHC, 1998, Best-Basis Inventory for Tank 241-SX-103, Tank Characterization Database, September 30, 1998, Internet at http://twins.pnl.gov:8001/TCD/main.html, Lockheed Martin Hanford Corp., Richland, Washington.

Sasaki, L. M., S. R. Wilmarth, and T. T. Tran, 1998, *Tank Characterization Report for Single-Shell Tank 241-U-103*, HNF-SD-WM-ER-712, Rev. 1, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Simpson, B. C., 1998, *Best Basis Inventory Change Package for Reconciliation of Mercury Values, Change Package 7*, (internal memorandum TA120-98-005 to J. W. Cammann, February 26), Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Steen, F. H., 1997, *Tank 241-SX-103, Grab Samples, 3SX-97-1, 3SX-97-2 and 3SX-97-3 Analytical Results for the Final Report*, HNF-SD-WM-DP-260, Rev. 0, Waste Management Federal Services of Hanford Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

Steen, F. H., 1998, *Tank 241-SX-103, Cores 229 and 233, Analytical Results for the Final Report*, HNF-SD-WM-DP-311, Rev. 0, Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

Watrous, R. A., and D. W. Wootan, 1997, *Activity of Fuel Batches Processed Through Hanford Separations Plants, 1944 Through 1989,* HNF-SD-WM-TI-794, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

This page intentionally left blank.

APPENDIX E

BIBLIOGRAPHY FOR TANK 241-SX-103

This page intentionally left blank.

APPENDIX E

BIBLIOGRAPHY FOR TANK 241-SX-103

Appendix E provides a bibliography of information that supports the characterization of tank 241-SX-103. This bibliography represents an indepth literature search of all known information sources that provide sampling, analysis, surveillance, modeling information, and processing occurrences associated with tank 241-SX-103 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-SX-103
IIb. Sampling of 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

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, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains waste type summaries, primary chemical compound/analyte and radionuclide estimates for sludge, supernatant, and solids, as well as SMM, TLM, and individual tank inventory estimates.

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/waste type 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.

- Describes a model for estimating tank waste inventories using process knowledge; radioactive decay estimates using ORIGEN; and assumptions about waste types, solubility parameters, and constraints.

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, 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/waste type 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 as well as a description of each riser and its 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 the risers available 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.

Welty, R. K., 1988, *Waste Storage Tank Status and Leak Detection Criteria, Volumes I and II*, WHC-SD-WM-TI-356, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Provides leak detection information for all single-and double-shell tanks. Liquid level, liquid observation well, and dry well readings are included.

Id. Sample Planning/Tank Prioritization

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.

Conner, J. M., 1998, *Tank 241-SX-103 Rotary Mode Core Samping and Analysis Plan*, HNF-SD-WM-TSAP-122, Rev. 1, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains the detailed sampling and analysis scheme for core samples to be taken from tank 241-SX-103 to address applicable DQOs.

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.

Winkelman, W. D., M. R. Adams, T. M. Brown, J. W. Hunt, D. J. McCain, and L. S. Fergestrom, 1997, *Fiscal Year 1997-1998 Waste Information Requirements Document*, HNF-SD-WM-PLN-126, Rev. 0A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains requirements from the Hanford Federal Facility Agreement and Consent Order, Recommendation 93-5 Implementation Plan, and other requirement sources that, along with managerial and operational constraints, are combined to summarize the TWRS characterization program deliverables for fiscal years 1997 and 1998.

Ie. Data Quality Objectives/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 program data needs, list of tanks to be evaluated, decision thresholds, and decision logic flow diagram.

DOE-RL, 1996, *Recommendation 93-5 Implementation Plan*, DOE/RL-94-0001, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

- Defines needs and milestones identified by the Defense Nuclear Facility Safety Board.

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.

Fowler, K. D., 1995, *Data Quality Objectives for Tank Farms Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Documents operational-related compatibility requirements for tank waste transfers.

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 solvents 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 waste 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.

II. ANALYTICAL DATA - SAMPLING OF TANK WASTE AND WASTE TYPES

IIa. Sampling of Tank 241-SX-103

Buckingham, J. S., 1976, *Analysis of Salts from Tanks 102-SX and 103-SX*, (internal letter to R. E. Van der Cook, March 18), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical salt sample analysis results.

Caprio, G. S., 1995, *Vapor and Gas Sampling of Single-Shell Tank 241-SX-103 Using the Vapor Sampling System*, WHC-SD-WM-RPT-144, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains March 1995 vapor sample analysis results.

Horton, J. E., 1975, *Analysis of Sludge from Tank 103-SX*, (internal letter to W. R. Christensen, May 14), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sludge sample analysis results.

Horton, J. E., 1976, *Analysis of Tank 103-SX Salts*, (internal letter to W. R. Christensen, December 8), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical salt slurry sample analysis results.

Huckaby, J. L., and D. R. Bratzel, 1995, *Tank 241-SX-103 Headspace Gas and Vapor Characterization Results for Samples Collected in March 1995*, WHC-SD-WM-ER-508, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains March 1995 vapor sample analysis results.

Ligotke, M. W., T. W. Clauss, K. H. Pool, B. D. McVeety, G. S. Klinger, K. B. Olsen, O. P. Bredt, J. S. Fruchter, and S. C. Goheen, 1995, *Vapor Space Characterization of Waste 241-SX-103: Results from Samples Collected on 3/23/95*, PNNL-10814, Pacific Northwest National Laboratory, Richland, Washington.

- Contains March 1995 vapor sample analysis results.

Starr, J. L., 1977, *241-103-SX Sample #1104*, (internal letter to G. A. Olsen, December 16), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical salt sample analysis results.

Steen, F. H., 1997, *Tank 241-SX-103, Grab Samples, 3SX-97-1, 3SX-97-2 and 3SX-97-3 Analytical Results for the Final Report*, HNF-SD-WM-DP-260, Rev. 0, Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains sample analysis results from the liquid grab samples taken in June 1997.

Steen, F. H., 1998, *Tank 241-SX-103, Cores 229 and 233, Analytical Results for the Final Report*, HNF-SD-WM-DP-311, Rev. 0, Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains sample analysis results from the rotary core samples taken in April and May of 1998.

Supervisor, Analytical Services, 1977, *Analysis of Tank Farm Samples, Sample No: T8981, Tank: 103-SX, Received: 11/7/76*, (internal letter), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sample analysis results.

Wheeler, R. E., 1974, *Analysis of Tank Farm Samples, Sample: T-6737, 103-SX*, (internal letter to R. L. Walser, October 21), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sample analysis results.

IIb. Sampling of Similar Waste Types

Brown, T. M., R. D. Cromer, 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 Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-U-106, which includes the SMMS1 waste type.

Campbell, G. D., 1975, *242-S Evaporator-Crystallizer Material Balance*, (internal memorandum to R. L. Walker, August 5), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains chemical species material balance in support of the 242-S Evaporator.

Delegard, C. H., 1979, *Customer Waste Flowsheet Development: Third Pass Run of Tank 106-SX/107-S Blend*, (internal letter 65120-79-134 J to D. R. Jorgenson, September 5), Rockwell Hanford Operations, Richland, Washington.

- Contains historical sample analysis results in support of the 242-S Evaporator.

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

- Contains characterization data for the waste in tank 241-S-104, which includes R1 waste type.

Eggers, R. F., R. H. Stephens, and T. T. Tran, 1997, *Tank Characterization Report for Single-Shell Tank 241-S-102*, HNF-SD-WM-ER-611, Rev. 0A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-S-102, which includes the SMMS1 waste type.

Field, J. G., and B. A. Higley, 1997, *Tank Characterization Report for Single-Shell Tank 241-U-109*, HNF-SD-WM-ER-609, Rev. 0A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-U-109, which includes the SMMS1 waste type.

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.

- Contains characterization data for the waste in tank 241-S-101, which includes the SMMS1 and R1 waste types.

Puryear, D. A., and J. S. Buckingham, 1971, *Status Report on Waste Solidification Studies and Separations Chemistry Laboratory*, (internal memorandum to M. H. Campbell et al., July 23), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sample separation results in support of the 242-S Evaporator.

Sasaki, L. M., S. R. Wilmarth, and T. T. Tran., 1998, *Tank Characterization Report for Single-Shell Tank 241-U-103*, HNF-SD-WM-ER-712, Rev. 1, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-U-103, which includes the SMMS1 and R1 waste types.

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.

- Contains characterization data for the waste in tank 241-S-107, which includes the R1 waste type.

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, 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.

- Contains major components for waste types, and some assumptions. Purchase record 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.

- 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-MW-ER-352, Rev. 1, Fluor Daniel Northwest, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- 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.

- Contains tank inventory information.

IIIb. Compendium of Data from Other Physical and Chemical Sources

Brevick, C. H., L. A. Gaddis, and E. D. Johnson, 1996, *Tank Waste Source Term Inventory Validation, Vol I, II and III*, WHC-SD-WM-ER-400, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

- Contains a quick reference to sampling information in spreadsheet or graphical form for 23 chemicals and 11 radionuclides for all the tanks.

Brevick, C. H., J. L. Stroup, and J. W. Funk, 1997, *Supporting Document for the Historical Tank Content Estimate for SX-Tank Farm*, WHC-SD-WM-ER-324, Rev. 1, Fluor Daniel Northwest, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains summary information for tanks in the SX-Tank Farm and the appendices contain more detailed information including tank waste level history, tank temperature history, cascade and dry well charts, riser information, in-tank photograph collages; and tank layer model bar chart and spreadsheet.

Claybrook, S. W., 1993, *An Evaporation Analysis for Tanks 241-SX-103, 241-SX-105, and 241-SX-106*, Westinghouse Hanford Company, Richland, Washington.

- Contains analysis of evaporation of waste from specific tanks.

Hanlon, B. M., 1998, *Waste Tank Summary Report for Month Ending December 31, 1998*, WHC-EP-0182-129, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains a summary of tank waste volumes, watch list tanks, occurrences, tank integrity information, equipment readings, tank location, leak volumes, and other miscellaneous tank information updated monthly.

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, Pacific Northwest Laboratory, Richland, Washington.

- Describes a system of sorting single-shell tanks into groups based on the major waste types contained in each tank.

Husa, E. I., R. E. Raymond, R. K. Welty, S. M. Griffith, B. M. Hanlon, R. R. Rios, and N. J. Vermeulen, 1993, *Hanford Site Waste Storage Tank Information Notebook*, WHC-EP-0625, Rev. 0, 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 the relative dryness of tank wastes.

LMHC, 1998, *Tank Characterization Data Base*, Internet at http://twins.pnl.gov:8001/TCD/main.html, Lockheed Martin Hanford Corp., Richland, Washington.

- 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 for the Single-Shell Tanks*, WHC-SD-WM-TI-565, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains tank inventory information based on analysis completed prior to 1993.

This page intentionallly left blank.