S

ENGINEERING CHANGE NOTICE

0049665

1. ECN 643828

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	T. A. Hu, Data Assessment and Interpretation, R2-11, 373-4098	[] Yes [X] No	08/28/98
	6. Project Title/No./Work Order No. Tank 241-SX-101	7. Bldg./Sys./Fac. No. 241-SX-101	8. Approval Designator N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-SD-WM-ER-660, Rev. 0	10. Related ECN No(s). N/A	11. Related PO No. N/A

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

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

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.

SEP 1998 RECEIVED EDMC

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: SEP 14 1998

STA. 4

HANFORD

ID: 2

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

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) ECN-643828

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. T.A. Hu	Alex Hu	8-31-98	PE		
Cog. Mgr. K.M. Hall	Kathleen M. Hall	8/31/98	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other J.W. Cammann	J W Cammann	9/10/98	Other		
R.J. Cash	R J Cash	9/10/98	DEPARTMENT OF ENERGY		
J.G. Kristofzski	J G K	9/10/98	Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

Tank Characterization Report for Single-Shell Tank 241-SX-101

T. A. Hu
Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: ECN-643828 UC: 2070
Org Code: 74620 Charge Code: N4G4C
B&R Code: EW 3120074 Total Pages: 289

Key Words: Waste Characterization, Single-Shell Tank, SST, Tank 241-SX-101, Tank SX-101, SX-101, 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-101. This report supports the requirements of the Tri-Party Agreement Milestone M-44-15B.

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

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

9/11/98
Release Approval Date

DATE:
STA: 4 ID: 2
SEP 14 1998
Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-SD-WM-ER-660	Page 1

(2) Title
Tank Characterization Report for Single-Shell Tank 241-SX-101

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-622669.	M.J. Kupfer	K.M. Hodgson
1 RS	Incorporate per ECN-643828.	T.A. Hu	K.M. Hall
		[illegible] 9/14/98	[illegible] 9/14/98

A-7320-005 (08/91) WEF168

HNF-SD-WM-ER-660
Revision 1

Tank Characterization Report for Single-Shell Tank 241-SX-101

T. A. Hu
S. R. Wilmarth
Lockheed Martin Hanford Corp.

M. D. Crippen
COGEMA Engineering Corporation

L. Fergestrom
Technical Resources International, Inc.

Date Published
September 1998

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

Approved for Public Release; Further Dissemination Unlimited

CONTENTS

1.0 INTRODUCTION 1-1
1.1 SCOPE 1-1
1.2 TANK BACKGROUND 1-2

2.0 RESPONSE TO TECHNICAL ISSUES 2-1
2.1 SAFETY SCREENING 2-1
2.1.1 Exothermic Conditions (Energetics) 2-2
2.1.2 Flammable Gas 2-2
2.1.3 Criticality 2-2
2.2 ORGANIC COMPLEXANTS 2-2
2.3 ORGANIC SOLVENTS SAFETY SCREENING 2-3
2.4 HISTORICAL EVALUATION 2-3
2.5 OTHER TECHNICAL ISSUES 2-4
2.6 SUMMARY 2-5

3.0 BEST-BASIS STANDARD INVENTORY ESTIMATE 3-1

4.0 RECOMMENDATIONS 4-1

5.0 REFERENCES 5-1

APPENDICES

APPENDIX A: HISTORICAL TANK INFORMATION A-1

A1.0 CURRENT TANK STATUS A-3

A2.0 TANK DESIGN AND BACKGROUND A-4

A3.0 PROCESS KNOWLEDGE A-9
A3.1 WASTE TRANSFER HISTORY A-9
A3.2 HISTORICAL ESTIMATION OF TANK CONTENTS A-10

A4.0 SURVEILLANCE DATA A-16
A4.1 SURFACE-LEVEL READINGS A-16
A4.2 DRY WELL READINGS A-17
A4.3 INTERNAL TANK TEMPERATURES A-17
A4.4 TANK 241-SX-101 PHOTOGRAPHS A-17

A5.0 APPENDIX A REFERENCES A-20

CONTENTS (Continued)

APPENDIX B: SAMPLING OF TANK 241-SX-101 . . . . . B-1

B1.0 TANK SAMPLING OVERVIEW B-3

B2.0 SAMPLING EVENTS B-4
B2.1 DESCRIPTION OF 1997 ROTARY CORE SAMPLING EVENT B-4
B2.1.1 Sample Handling B-9
B2.1.2 Performance of Sample Analysis B-9
B2.1.3 Discussion of Analytical Results B-17
B2.1.4 Analytical Results Summary Tables for the 1997 Rotary Mode Core Samples B-20
B2.3 VAPOR PHASE MEASUREMENT B-158
B2.4 DESCRIPTION OF HISTORICAL SAMPLING EVENTS AND ANALYTICAL RESULTS B-159

B3.0 ASSESSMENT OF CHARACTERIZATION RESULTS B-161
B3.1 FIELD OBSERVATIONS B-161
B3.2 QUALITY CONTROL ASSESSMENT B-162
B3.3 DATA CONSISTENCY CHECKS B-164
B3.3.1 Comparison of Results from Different Analytical Methods B-164
B3.3.2 Mass and Charge Balance B-165
B3.4 MEAN CONCENTRATIONS AND CONFIDENCE INTERVALS B-169
B3.4.1 Solid Data B-169
B3.4.2 Liquid Data B-177

B4.0 APPENDIX B REFERENCES B-180

APPENDIX C: STATISTICAL ANALYSIS FOR ISSUE RESOLUTION C-1

C1.0 STATISTICS FOR THE SAFETY SCREENING DATA QUALITY OBJECTIVE C-3

C2.0 GATEWAY ANALYSIS FOR HISTORICAL MODEL DATA QUALITY OBJECTIVE C-5

C3.0 APPENDIX C REFERENCES C-15

APPENDIX D: EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-SX-101 . . . . . D-1

D1.0 CHEMICAL INFORMATION SOURCES D-3

CONTENTS (Continued)

D2.0 COMPARISON OF COMPONENT INVENTORY VALUES D-3

D3.0 COMPONENT INVENTORY EVALUATION D-6
D3.1 WASTE HISTORY D-6
D3.2 CONTRIBUTING WASTE TYPES D-6
D3.3 EVALUATION OF TANK WASTE VOLUME D-6
D3.4 ASSUMPTIONS USED D-8
D3.5 BASIS FOR CALCULATIONS USED IN THIS ENGINEERING EVALUATION D-8
D3.6 ESTIMATED COMPONENT INVENTORIES D-10

D4.0 DEFINE THE BEST BASIS AND ESTABLISH COMPONENT INVENTORIES D-12

D5.0 APPENDIX D REFERENCES D-17

APPENDIX E: BIBLIOGRAPHY FOR TANK 241-SX-101 . . . . . E-1

LIST OF FIGURES

A2-1 Riser Configuration for Tank 241-SX-101 . . . . . A-7

A2-2 Tank 241-SX-101 Cross Section and Schematic A-8

A3-1 Tank Layer Model A-12

A4-1 Tank 241-SX-101 Level History A-18

A4-2 Tank 241-SX-101 High Temperature Plot A-19

LIST OF TABLES

1-1 Summary of Recent Sampling 1-2

1-2 Description of Tank 241-SX-101 1-3

2-1 Heat Load Estimate for Tank 241-SX-101 Based on Radionuclide Inventory 2-5

2-2 Summary of Technical Issues 2-5

3-1 Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-101 3-2

3-2 Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-101 Decayed to January 1, 1994 3-3

4-1 Acceptance of Tank 241-SX-101 Sampling and Analysis 4-2

4-2 Acceptance of Evaluation of Characterization Data and Information for Tank 241-SX-101 4-2

A1-1 Tank Contents Status Summary A-4

A2-1 Tank 241-SX-101 Risers A-5

A3-1 Tank 241-SX-101 Major Transfers A-9

LIST OF TABLES (Cont'd)

A3-2 Historical Tank Inventory Estimate A-13

B2-1 Integrated Data Quality Objective Requirements for Tank 241-SX-101 . . . . . B-5

B2-2a Sample Receipt and Extrusion Information for 241-SX-101, Riser 19, Core 225 . . . . . B-6

B2-2b Sample Receipt and Extrusion Information for 241-SX-101, Riser 4, Core 227 . . . . . B-8

B2-3 Tank 241-SX-101 Sample Analysis Summary B-9

B2-4 Analytical Procedures Used for 1997 Rotary Mode Core Samples. B-16

B2-5 Table of Summary Analytical Tables B-17

B2-6 Required Inductively Coupled Plasma Analytes By Tank Issue B-19

B2-7 Tank 241-SX-101 Analytical Results: Aluminum (ICP) B-21

B2-8 Tank 241-SX-101 Analytical Results: Antimony (ICP) B-24

B2-9 Tank 241-SX-101 Analytical Results: Arsenic (ICP) B-27

B2-10 Tank 241-SX-101 Analytical Results: Barium (ICP) B-30

B2-11 Tank 241-SX-101 Analytical Results:Beryllium (ICP) B-33

B2-12 Tank 241-SX-101 Analytical Results: Bismuth (ICP) B-36

B2-13 Tank 241-SX-101 Analytical Results: Boron (ICP) B-39

B2-14 Tank 241-SX-101 Analytical Results: Cadmium (ICP) B-42

B2-15 Tank 241-SX-101 Analytical Results: Calcium (ICP) B-45

B2-16 Tank 241-SX-101 Analytical Results: Cerium (ICP) B-48

B2-17 Tank 241-SX-101 Analytical Results: Chromium (ICP) B-51

LIST OF TABLES (Continued)

B2-18 Tank 241-SX-101 Analytical Results: Cobalt (ICP) B-54

B2-19 Tank 241-SX-101 Analytical Results: Copper (ICP) B-57

B2-20 Tank 241-SX-101 Analytical Results: Iron (ICP) B-60

B2-21 Tank 241-SX-101 Analytical Results: Lanthanum (ICP) B-63

B2-22 Tank 241-SX-101 Analytical Results: Lead (ICP) B-66

B2-23 Tank 241-SX-101 Analytical Results: Lithium (ICP) B-69

B2-24 Tank 241-SX-101 Analytical Results: Magnesium (ICP) B-72

B2-25 Tank 241-SX-101 Analytical Results: Manganese (ICP) B-75

B2-26 Tank 241-SX-101 Analytical Results: Molybdenum (ICP) B-78

B2-27 Tank 241-SX-101 Analytical Results: Neodymium (ICP) B-81

B2-28 Tank 241-SX-101 Analytical Results: Nickel (ICP) B-84

B2-29 Tank 241-SX-101 Analytical Results: Phosphorus (ICP) B-86

B2-30 Tank 241-SX-101 Analytical Results: Potassium (ICP) B-89

B2-31 Tank 241-SX-101 Analytical Results: Samarium (ICP) B-91

B2-32 Tank 241-SX-101 Analytical Results: Selenium (ICP) B-94

B2-33 Tank 241-SX-101 Analytical Results: Silicon (ICP) B-97

B2-34 Tank 241-SX-101 Analytical Results: Silver (ICP) B-100

B2-35 Tank 241-SX-101 Analytical Results: Sodium (ICP) B-103

B2-36 Tank 241-SX-101 Analytical Results: Strontium (ICP) B-106

B2-37 Tank 241-SX-101 Analytical Results: Sulfur (ICP) B-109

LIST OF TABLES (Continued)

B2-38 Tank 241-SX-101 Analytical Results: Thallium (ICP) B-112

B2-39 Tank 241-SX-101 Analytical Results: Titanium (ICP) B-115

B2-40 Tank 241-SX-101 Analytical Results: Total Uranium (ICP) B-118

B2-41 Tank 241-SX-101 Analytical Results: Vanadium (ICP) B-121

B2-42 Tank 241-SX-101 Analytical Results: Zinc (ICP) B-124

B2-43 Tank 241-SX-101 Analytical Results: Zirconium (ICP) B-127

B2-44 Tank 241-SX-101 Analytical Results: Total Uranium (U) B-129

B2-45 Tank 241-SX-101 Analytical Results: Bromide (IC) B-130

B2-46 Tank 241-SX-101 Analytical Results: Chloride (IC) B-132

B2-47 Tank 241-SX-101 Analytical Results: Fluoride (IC) B-134

B2-48 Tank 241-SX-101 Analytical Results: Nitrate (IC) B-136

B2-49 Tank 241-SX-101 Analytical Results: Nitrite (IC) B-138

B2-50 Tank 241-SX-101 Analytical Results: Phosphate (IC) B-140

B2-51 Tank 241-SX-101 Analytical Results: Sulfate (IC) B-142

B2-52 Tank 241-SX-101 Analytical Results: Oxalate (IC) B-144

B2-53 Tank 241-SX-101 Analytical Results: Bulk Density B-146

B2-54 Tank 241-SX-101 Analytical Results: Exotherms - Calculated Dry Weight (DSC) B-146

B2-55 Tank 241-SX-101 Analytical Results: Percent Water (TGA) B-147

B2-56 Tank 241-SX-101 Analytical Results: Specific Gravity B-148

B2-57 Tank 241-SX-101 Analytical Results: Total Alpha B-149

LIST OF TABLES (Continued)

B2-58 Tank 241-SX-101 Analytical Results: Total Alpha B-150

B2-59 Tank 241-SX-101 Analytical Results: Total Beta (Alpha) B-150

B2-60 Tank 241-SX-101 Analytical Results: Cesium-137 (GEA) B-151

B2-61 Tank 241-SX-101 Analytical Results: Cobalt-60 (GEA) B-152

B2-62 Tank 241-SX-101 Analytical Results: Strontium-89/90 (Sr) B-153

B2-63 Tank 241-SX-101 Analytical Results: Ammonia (Ion Sel. Electrode [NH_3]) . . . B-153

B2-64 Tank 241-SX-101 Analytical Results: Total Inorganic Carbon B-154

B2-65 Tank 241-SX-101 Analytical Results: Total Organic Carbon B-156

B2-66 Results of Combustible Gas Tests for Tank 241-SX-101. . . . . B-158

B2-67 Results of July 21, 1995 Headspace Vapor Sample Measurements B-158

B2-68 April 1989 Tank 241-SX-101 Liquid Sample B-160

B3-1 Cation Mass and Charge Data (Solids) B-166

B3-2 Anion Mass and Charge Data (Solids) B-166

B3-3 Cation Mass and Charge Data (Liquid) B-167

B3-4 Anion Mass and Charge Data B-168

B3-5 Mass and Charge Balance Totals B-168

B3-6 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Segment Data B-171

B3-7 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data B-174

B3-8. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Sample Data B-178

LIST OF TABLES (Continued)

C1-1 95 Percent Upper Confidence Limits for Total Alpha Activity C-4

C1-2 95 Percent Upper Confidence Limits for Differential Scanning Calorimetry C-5

C2-1 Tank 241-SX-101 Historical Model Evaluation for REDOX Material C-7

C2-2 Tank 241-SX-101 Historical Model Evaluation for REDOX Salt C-9

C2-3 Tank 241-SX-101 Historical Model Evaluation for SMMS1 Material C-11

C2-4 Tank 241-SX-101 Historical Model Evaluation for SMMS2 Material C-13

D2-1 Comparison of Inventory Estimates for Nonradioactive Components in Tank 241-SX-101 . . . . . D-4

D2-2 Comparison of Inventory Estimates for Selected Radioactive Components in Tank 241-SX-101 . . . . . D-5

D3-1 Engineering Evaluation Approach Used On Tank 241-SX-101 . . . . . D-8

D3-2 Tank 241-SX-101 Concentration Comparisons D-9

D3-3 Comparison of Inventory Estimates for Tank 241-SX-101 . . . . . D-11

D4-1 Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-101 . . . . . D-13

D4-2 Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-101 Decayed to January 1, 1994 . . . . . D-15

LIST OF TERMS

Btu/hr	British thermal units per hour
Ci	curie
Ci/L	curies per liter
CI	confidence interval
cm	centimeter
df	degrees of freedom
DQO	data quality objective
DSC	differential scanning calorimetry
ft	feet
GEA	gamma energy analysis
g	gram
gal	gallon
gal/in.	gallons per inch
g/cm^3	grams per cubic centimeter
g/L	grams per liter
g/mL	grams per milliliter
HDW	Hanford defined waste
IC	ion chromatography
ICP	inductively coupled plasma (spectroscopy)
in.	inch
J/g	joules per gram
kg	kilogram
kgal	kilogallon
kL	kiloliter
kW	kilowatt
LL	lower limit
LFL	lower flammability limit
m	meter
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
M	moles per liter
mm	millimeters
n/a	not applicable
N/A	not available
NR	not requested
PHMC	Project Hanford Management Contractor
ppm	parts per million
ppmv	parts per million by volume
R1	REDOX high-level waste generated from 1952 to 1957
REDOX	reduction-oxidation (facility)
RPD	relative percent difference

LIST OF TERMS (Continued)

SAP	sampling and analysis plan
SMM	supernatant mixing model
SMMS1	SMM 242-S Evaporator saltcake generated from 1973 to 1976
SMMS2	SMM 242-S Evaporator saltcake generated from 1977 to 1980
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
W/Ci	watts per curie
wt%	weight percent
%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
μCi/g	microcuries per gram
μCi/L	microcuries per liter
μeq/g	microequivalents per gram
μeq/mL	microequivalents per milliliter
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-101. The objectives of this report are 1) to use characterization data in response to technical issues associated with tank 241-SX-101 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, Section 4.0 makes recommendations about the safety status of the tank and additional sampling needs. The appendices contain supporting data and information. This report supports the requirements of the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1997), Milestone M-44-15B, change request M-44-97-03, to "issue characterization deliverables consistent with the Waste Information Requirements Document developed for 1998."

1.1 SCOPE

The characterization information in this report originated from sample analyses and known historical sources. The results of recent sample events will be used to fulfill the requirements of the data quality objectives (DQOs) and memoranda of understanding specified in Brown et al. (1997) for this tank. Other information can be used to support conclusions derived from these results. Appendix A contains historical information for tank 241-SX-101 including surveillance information, records pertaining to waste transfers and tank operations, and expected tank contents derived from a process knowledge model. Appendix B summarizes sampling events (see Table 1-1), sample data obtained before 1989, and sampling results. Appendix C reports the statistical analysis and numerical manipulation of data used in issue resolution. Appendix D contains the evaluation to establish the best basis for the inventory estimate. Appendix E is a bibliography that resulted from an in-depth literature search of all known information sources applicable to tank 241-SX-101 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
Rotary core 225 (12/10/97 to 12/26/98)	Solid/liquid	Riser 19	12 sub segments, upper half and lower half	Overall 69%
Rotary core 227 (1/22/98 to 2/09/98)	Solid/liquid	Riser 4	8 subsegments, upper half and lower half	Overall 36%
Vapor samples (7/21/95)	Gas	Tank headspace, riser 19 (20 ft) below top of riser	n/a	n/a

Notes:

n/a = not applicable

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

1.2 TANK BACKGROUND

The SX Tank Farm was constructed from 1953 to 1954 in the West Area of the Hanford Site. Tank 241-SX-101 was filled with waste from the reduction-oxidation (REDOX) facility 202-S Plant from the second quarter of 1954 until the third quarter of 1957 (Agnew et. al. 1997b). During this time condensed waste was transferred to the tank. In the third quarter of 1958 and the fourth quarter of 1960, condensed waste from tank 241-SX-101 was sent to a crib. In 1971, tank 241-SX-101 received supernatant from tank 241-BX-101. From 1974 to 1975, tank 241-SX-101 received evaporator bottoms waste from the 242-S Evaporator via tank 241-S-102. Also in support of evaporator operations, from the first quarter of 1979 to the fourth quarter of 1980, supernatant waste was transferred from tank 241-SX-101 to tanks 241-SY-102, 241-TX-118, 241-S-103, and 241-BX-105. During this time the tank received waste from tanks 241-SY-102, 241-U-107, 241-U-111, and 241-SX-106. The last addition to tank 241-SX-101 was flush water from miscellaneous sources added in the fourth quarter of 1980.

Table 1-2 summarizes the description of tank 241-SX-101. The tank has a maximum storage capacity of 3,800 kL (1000 kgal) and presently contains an estimated 1,674 kL (442 kgal) of dilute complexed waste (see Appendix, Section D3.3). The tank is on the Watch List for the flammable gas issue (Public Law 101-510).

Table 1-2. Description of Tank 241-SX-101.

TANK DESCRIPTION	
Type	Single-shell
Constructed	1953 to 1954
In service	1954
Diameter	22.9 m (75.0 ft)
Operating depth	9.85 m (32.2 ft)
Capacity	3,800 kL (1,000 kgal)
Bottom shape	Dish
Ventilation	Active
TANK STATUS	
Waste classification	Dilute complexed
Total waste volume[1]	1,674 kL (442 kgal)
Supernatant volume[2]	0 kL (0 kgal)
Saltcake volume[2]	1,674 kL (442 kgal)
Sludge volume[2]	0 kL (0 kgal)
Drainable interstitial liquid volume[2]	625 kL (165 kgal)
Waste surface level [1]	426.7 cm (168.0 in.)
Temperature (5/31/97 to 5/31/98)[3]	34 °C (93.2 °F) to 56.7 °C (134.1 °F)
Integrity	Sound
Watch List	Flammable gas
Flammable gas facility group	2
SAMPLING DATE	
Vapor samples and combustible gas test	July 1995
Rotary core samples	December 1997 to February 1998
SERVICE STATUS	
Declared inactive	1980
Partial interim isolation	1985
Interim stabilization/intrusion prevention	Not completed

Notes:

[1] Based on zip cord measurement. This value differs from Hanlon (1998), see Appendix D3.3.

[2] Value differs from Hanlon (1998), see Appendix D3.3.

This page intentionally left blank.

2.0 RESPONSE TO TECHNICAL ISSUES

The following technical issues have been identified for tank 241-SX-101 (Brown et al. 1997).

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

The sampling and analysis plan (SAP) (Hu 1997b) provides the types of sampling and analysis used to address the above issues. Data from the analysis of rotary core samples and headspace measurements, along with available historical information, provided the means to respond to the technical issues. Sections 2.1 through 2.7 present the responses. Data from the July 1995 vapor sample provided the means to address the vapor screening issue. See Appendix B for sample and analysis data for tank 241-SX-101.

2.1 SAFETY SCREENING

The data needed to screen the waste in tank 241-SX-101 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. Two rotary core samples were collected. Because of the hardness of the waste, core 225 samples were obtained through segment 7, but segment 8 samples could not be recovered. Core 227 samples were obtained through segment 6, but the last two segments could not be recovered. The overall recovery was 69 percent for core 225 and 36 percent for core 227. Consequently, the safety screening DQO requirement to analyze two complete cores was not met.

2.1.1 Exothermic Conditions (Energetics)

The first requirement outlined in the safety screening DQO (Dukelow et al. 1995) is to ensure there are not sufficient exothermic constituents (organic or ferrocyanide) in tank 241-SX-101 to pose a safety hazard. Because of this requirement, energetics in tank 241-SX-101 waste were evaluated. 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 no sample exceeded the notification limit. Exotherms were detected, on a dry weight basis, ranging from 22.7 J/g to 92.1 J/g (see Appendix C). As a result, it was concluded that a propagating reaction is highly unlikely.

2.1.2 Flammable Gas

Headspace measurements were taken before obtaining the 1997/98 rotary core samples. The flammable gas level was zero percent. This is below the safety screening limit of 25 percent of the lower flammability limit (LFL). July 1995 vapor samples also showed low concentrations in flammable gases. Data for the combustible gas headspace gas tests (sniff tests) and the July 1995 vapor samples are presented in Appendix B. In addition, the SHMS data (Wilkins et al. 1997) shows that the maximum hydrogen concentration reading is 400 ppm on August 22, 1995, and the hydrogen concentration from grab data ranged from 5 to 10 ppm with an average of 8 ppm in the time period of June 2 to September 25, 1995. All these hydrogen concentration data are well below the hydrogen concentration of 9,300 ppm (Hu 1997a), which is equivalent to the level of 25 percent LFL in the tank headspace.

2.1.3 Criticality

The safety screening DQO threshold for criticality, based on the total alpha activity, is 1 g/L. Because total alpha activity is measured in μCi/g instead of g/L, the 1 g/L limit is converted into units of μCi/g by assuming that all alpha decay originates from ^{239}Pu. The safety threshold limit is 1 g ^{239}Pu per liter of waste. Assuming that all alpha is from ^{239}Pu, for a maximum solids density of 1.92, this limit corresponds to 32.0 μCi/g of total alpha for solids. The maximum total alpha activity dry weight result was 2.66 μCi/g (core 225, segment 2, lower half). The maximum upper limit to a 95 percent confidence interval on the mean was 3.08 μCi/g (core 225, segment 2, 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.

2.2 ORGANIC COMPLEXANTS

The data requirements to support the issue of organic complexants are documented in *Memorandum of Understanding for the Organic Complexant Safety Issue Data Requirements* (Schreiber 1997). Total organic carbon (TOC) results were well below 4.5 percent dry weight in all samples. The maximum TOC for solids was 1.83 percent dry weight and for drainable liquids was 0.079 percent dry weight with percent water of 40 percent and 48 percent, respectively. The analytical results indicates that at least 50 percent of the TOC in solids are oxalate, which is the least reactive organic species. An analysis of variance conducted in accordance with Schreiber (1997) showed that this tank should be classified "safe" for the organic complexant issue. Analysis of variance results for this tank and an updated safety classification will be included in a revision to the organic complexants topical report (Meacham et al. 1997b). The organic complexants issue is expected to be closed for all tanks in fiscal year 1998.

2.3 ORGANIC SOLVENTS SAFETY SCREENING

The data required to support the organic solvent safety screening issue are documented in the *Data Quality Objective to Support Resolution of the Organic Solvent Safety Issue* (Meacham et al. 1997a). The DQO requires tank headspace samples be analyzed for total nonmethane organic compounds to determine whether any significant 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. The organic solvents issue is expected to be closed in fiscal year 1998.

Analytical results for tank 241-SX-101 showed that the concentration of total nonmethane organic compounds (semivolatile species) in tank headspace vapors was 0.98 mg/m^3 (Evans et al. 1996). The size of the vapor pool has not been estimated for this tank. 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 of the tanks (Brown et al. 1997). The organic solvents issue is expected to be closed for all tanks in fiscal year 1998.

2.4 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. 1997a) 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 the 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 model evaluation. 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 core sample taken from tank 241-SX-101 in December 1997 to February 1998. The following waste types are identified by the Hanford defined waste (HDW) model (Agnew et al. 1997a) for this tank: REDOX waste, REDOX salt, supernatant mixing model (SMM) 242-S Evaporator saltcake generated from 1973 to 1976 (SMMS1), and SMM242-S Evaporator saltcake generated from 1977 to 1980 (SMMS2). The fingerprint analytes of these waste types were examined for each sample from tank 241-SX-101. 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 greater than 10 percent of the predicted concentration (as specified in the DQO). The second test was to determine whether the gateway analytes contributed to more than 85 percent (by mass) of the total waste. The gateway analysis for tank 241-SX-101 is shown in Appendix C.

In summary, few of the analyzed segments were consistent with three of the predicted waste types (REDOX, REDOX saltcake, and SMMS2). About half of the analyzed segments were consistent with the SMMS1 waste type. As shown in Table C2-3, three of the segments failed because the sulphate composition was less than 10 percent of the gateway value for SMMS1. One segment failed because of low aluminum and low water content. The fingerprint analytes accounted for >85 percent of the sample mass for ten of the segments. However, of the ten segments that passed the gateway analysis criteria, there appeared to be little, if any, vertical homogeneity between the cores sampled. It was concluded that the tank exhibits a marginal match only to the SMMS1 waste type.

2.5 OTHER TECHNICAL ISSUES

Vapor samples were taken to address the *Data Quality Objective 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.

A factor in assessing tank safety is the heat generation and temperature of the waste. Heat is generated in the tanks from radioactive decay. The tank heat load estimate based on the 1997/1998 core samples was 3,949 W (13,487 Btu/hr) (see Table 2-1). This estimate

compares closely to the heat load estimate based on tank temperature of 3,692 W (12,600 Btu/hr) (Kummerer 1995) and the heat load estimate based on the tank process history of 6,300 W (21,500 Btu/hr) (Agnew et al. 1997a). All these estimates are well below the limit of 11,700 W (40,000 Btu/hr) that separates high- and low-heat-load tanks (Smith 1986).

Table 2-1. Heat Load Estimate for Tank 241-SX-101 Based on Radionuclide Inventory.

Radionuclide	Inventory[1] (Ci)	Decay Heat Rate (W/Ci)	Heat Load (W)
^{137}Cs	313,000	0.00472	1,477
^{90}Sr	369,000	0.00670	2,472
Total			3,949

Note:

[1]See Appendix D.

2.6 SUMMARY

The results of all analyses performed to address potential safety issues showed that no exothermic activity exceeded safety decision threshold limits. All requirements for the safety screening and organic complexant issues were met based on the available samples. However, the recovery of these samples are 69 percent for core 225 and 36 percent for core 227.

Historical DQO requirements were performed. In general, it may be concluded that the tank exhibits a marginal match only to the SMMS1 waste type, while the HDW models predicted waste types of REDOX waste, REDOX salt, SMMS1, and SMMS2.

Vapor samples were taken to meet the organic solvents safety screening DQO requirements.

Sample results are summarized in Table 2-3.

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

Issue	Sub-issue	Result
Safety screening	Energetics	No exotherms exceeded 480 J/g.
	Flammable gas	Vapor data showed 0% of the LFL .
	Criticality	All analyses were well below 32.0 μCi/g total alpha (within 95% confidence limit on each sample).

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

Issue	Sub-issue	Result
Organic complexants[1]	Safety categorization	Tank was classified as safe, with low TOC and no visible separate layers.
Organic solvents[1]	Solvent pool size	Total nonmethane organic compounds were 0.98 mg/m^3. Organic solvent pool size is not estimated.
Historical (gateway analysis)	Total mass of gateway analytes	Fingerprint analytes for the SMMS1 waste type accounted for greater than 85% of the weight for about half of the segments. Most of samples failed the analysis for REDOX, REDOX salt, and SMMS2 waste types.
	Selected segment comparison with ≤10% of DQO values	About half of the segments passed the analysis for the SMMS1 waste type. Most segments failed the analysis for REDOX, REDOX salt, and SMMS2 waste types.

Note:

[1]The organic solvent and organic complexant safety issues are expected to be closed in fiscal year 1998.

3.0 BEST-BASIS STANDARD INVENTORY ESTIMATE

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

Chemical and radiological inventory information are generally derived using one of three approaches: 1) component inventories are estimated using results of sample analyses, 2) component inventories are estimated 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 use, and other operating data. The information derived from these different approaches is often inconsistent.

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-101 was performed, and a best-basis inventory was established. This work, detailed in the following sections, follows the methodology that was established by the standard inventory task. The following information was used in the evaluation:

- Analytical results from December 1997/February 1998 rotary-mode core samples (see Appendix B)
- Tank waste photographs
- The inventory estimate generated by the HDW model (Agnew et al. 1997a).

Based on this evaluation, a best-basis inventory was developed for tank 241-SX-101. The sampling/engineering-based inventory was chosen as the best basis for those analytes for which analytical values were available. The engineering inventory was calculated assuming a liquid volume of 625 kL (165 kgal) and solid volume of 1,049 kL (277 kgal). Although layers of REDOX waste, REDOX salts, SMMS1, and SMMS2 were predicted by Agnew et al. (1997a) and Hanlon (1998), it was concluded that only SMMS1 waste type was marginally observed in 1997/1998 core samples (Appendix C). HDW model results were used if no sample based information was available.

Best-basis tank inventory values are derived for 46 key radionuclides (as defined in Section 3.1 of Kupfer et al. 1997), 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. For this reason it has been necessary to derive most of the 46 key radionuclides by computer models. These models estimate radionuclide activity in batches of reactor fuel, account for the split of radionuclides to various separations plant waste streams, and track their movement with tank waste transactions. (These computer models are described in Kupfer et al. [1997], Section 6.1, and in Watrous and Wootan [1997]). Model-generated values for radionuclides in any of 177 tanks are reported in the HDW Revision 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-101 is presented in Tables 3-1 and 3-2. The inventory values reported in Tables 3-1 and 3-2 are subject to change. Refer to the Tank Characterization Database for the most current inventory values (LMHC 1998).

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-101 (Effective June 17, 1998). (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
Al	1.74E+05	S	
Bi	0	E	Not expected
Ca	159	S/E	Upper bound
Cl	22,300	S	
TIC as CO_3	18,900	S	
Cr	29,800	S	
F	757	S/E	No contribution from liquid phase
Fe	4,120	S/E	No contribution from liquid phase
Hg	0	E	Per change package #7 (Simpson 1998)
K	2,870	S	
La	0	E	Not expected
Mn	2,180	S/E	No contribution from liquid phase
Na	5.55E+05	S	
Ni	0	E	Not expected
NO_2	92,400	S	
NO_3	7.41E+05	S	
OH_{TOTAL}	5.08E+05	C	Based on charge balance
Pb	0	E	Not expected

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-101 (Effective June 17, 1998). (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
PO_4	11,400	S	
Si	705	S	
SO_4	5,720	S	
Sr	6.38	S/E	Based on ^{90}Sr activity
TOC	3,210	S	
U_{TOTAL}	3,140	S/E	No contribution from liquid phase
Zr	0	E	Not expected

Note:

[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, and SiO_3.

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-101 Decayed to January 1, 1994 (Effective June 17, 1998). (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	217	M	
^{14}C	17.7	M	
^{59}Ni	13.3	M	
^{60}Co	17.2	M	
^{63}Ni	1,260	M	
^{79}Se	5.35	M	
^{90}Sr	2.66E+05	S	
^{90}Y	2.66E+05	S	Based on Sr activity
^{93}Zr	25.5	M	
^{93m}Nb	20.3	M	
^{99}Tc	131	M	
^{106}Ru	0.00329	M	

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-101 Decayed to January 1, 1994 (Effective June 17, 1998). (3 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{113m}Cd	56.2	M	
^{125}Sb	68.1	M	
^{126}Sn	8.19	M	
^{129}I	0.250	M	
^{134}Cs	2.09	M	
^{137}Cs	243,000	S	
^{137m}Ba	230,000	S	Based on 0.946 of ^{137}Cs activity
^{151}Sm	19,000	M	
^{152}Eu	10.4	M	
^{154}Eu	331	M	
^{155}Eu	523	M	
^{226}Ra	0.000948	M	
^{227}Ac	0.00466	M	
^{228}Ra	0.0461	M	
^{229}Th	0.00109	M	
^{231}Pa	0.00772	M	
^{232}Th	0.00257	M	
^{232}U	0.264	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{233}U	1.01	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{234}U	1.19	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{235}U	0.0482	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{236}U	0.0445	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{237}Np	0.542	M	
^{238}Pu	12.9	S/M	
^{238}U	1.05	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotope.

4.0 RECOMMENDATIONS

Rotary-mode core samples and vapor samples were taken to satisfy applicable issues for tank 241-SX-101. Two rotary core samples were collected. Because of the hardness of the waste, sample recovery was poor, with 69 percent recovery for core 225 and 36 percent for core 227. Consequently, the safety screening DQO requirement to analyze two complete cores was not met. Analytical results for the samples obtained showed no exotherm, total alpha, or TOC values exceeded safety screening limits. Therefore, there are no safety screening issues or organic complexant issues of concern, and no further sampling and analyses are required by the safety screening DQO.

Vapor samples showed that the LFL in the tank headspace is 0 percent. Although the organic solvent pool size was not estimated, the risk assessment (Meacham et al. 1997b) shows that the organic solvent pool is no longer a concern and will be closed out for all tanks.

The historical gateway analysis failed for most segments. The HDW model (Agnew et al. 1997a) predicts waste layers of REDOX waste, REDOX salt, SMMS1, and SMMS2 for tank 241-SX-101. Based on gateway analysis results, about half the segments match the SMMS1 waste type for this tank. The other segments did not match any of the waste types predicted by the HDW model. This concludes that the waste of tank 241-SX-101 is quite complex and can be marginally defined as SMMS1 waste. No further sampling and analysis are required by the historical DQO.

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," "no," or "partial" whether the requirements were met in full or in part by the sampling and analysis activities performed. Column 3 indicates concurrence and acceptance by the responsible PHMC TWRS program that the sampling and analysis activities performed adequately. A "yes" or "no" in column 3 indicates acceptance or disapproval of the sampling and analysis information in the tank characterization report.

Table 4-1. Acceptance of Tank 241-SX-101 Sampling and Analysis.

Issue	Sampling and Analysis Performed	Program[1] Acceptance
Safety screening DQO	Partial[2]	Yes
Organic complexant MOU	Yes	Yes
Organic solvents DQO	Yes	Yes
Historical evaluation DQO	Yes	Yes

Notes:

[1]PHMC TWRS Program Office

[2]Poor sample recovery

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. Columns 2 and 3 are in the same format as in Table 4-1. The manner in which concurrence and acceptance are summarized is also the same as that in Table 4-1. The safety screening categorization of the tank is listed as "partial" in Table 4-2 because two full-depth cores were not obtained. However, the safety program has determined that the samples obtained were representative of tank contents, and no additional sampling is required to resolve this issue.

Table 4-2. Acceptance of Evaluation of Characterization Data and Information for Tank 241-SX-101.

Issue	Evaluation Performed	TWRS[1] Program Acceptance
Safety screening DQO	Partial	Yes[2]
Organic complexant memorandum of understanding	Yes, Classified as "Safe"	Yes
Organic solvents DQO	Yes	Yes
Historical evaluation DQO	Yes	Yes

Notes:

[1]PHMC TWRS Program Office

[2]Although only partial cores were received, all results were well below safety screening criteria. No additional sampling is required for this issue.

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

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.

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.

Evans, J. C., T. W. Clauss, B.D. McVeety, K. H. Pool, K. B. Olson, J. S. Fruchter, and K. L. Silvers, 1996, *Headspace Vapor Characterization of Hanford Waste Tank 241-SX-101: Results from Samples Collected on 07/21/95*, PNNL-10881, Pacific Northwest National Laboratory, Richland, Washington.

Hanlon, B. M., 1998, *Waste Tank Summary Report for Month Ending May 31, 1998*, HNF-EP-0182-122, 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.

Hu, T. A., 1997a, *Calculations of Hydrogen Release Rate at Steady State for Double-Shell Tanks*, HNF-SD-WM-CN-117, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Hu, T. A., 1997b, *Rotary-Mode Core Sampling and Analysis Plan for Tank 241-SX-101*, HNF-SD-WM-TSAP-143, Rev. 1, Lockheed Martin Hanford Corp. 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., 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, 1997, *Standard Inventories of Chemicals and Radionuclides in Hanford Site Tank Wastes*, HNF-SD- WM-TI-740, Rev. 0A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

LMHC, 1998, *SACS: Surveillance Analysis Computer System*. In: SQLServer/Visual Basic, [Mainframe], Available: Hanford Local Area Network, Lockheed Martin Hanford Corp., Richland, Washington.

Meacham, J. E., D. L. Banning, M. R. Allen, and L. D. Muhlestein, 1997a, *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., A. B. Webb, N. W. Kirch, J. A. Lechelt, D. A. Reynolds, G. S. Barney, D. M. Camaioni, F. Gao, R. T. Hallen, and P. G. Heasler, 1997b, *Organic Complexant Topical Report*, HNF-SD-WM-CN-058, Rev. 1A, DE&S Hanford, Inc., 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.

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*.

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 TA120-98-005 to S. W. Conmann, 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.

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.

Wilkins, N. E., R. E. Bauer, and D. M. Ogden, 1997, *Results of Vapor Space Monitoring of Flammable Gas Watch List Tanks*, HNF-SD-WM-TI-797, Rev. 2, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

This page intentionally left blank.

APPENDIX A

HISTORICAL TANK INFORMATION

This page intentionally left blank.

APPENDIX A

HISTORICAL TANK INFORMATION

Appendix A describes tank 241-SX-101 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-101, including surface-level readings, temperatures, and a description of the waste surface based on photographs
- **Section A5.0**: References for Appendix A.

A1.0 CURRENT TANK STATUS

As of March 31, 1998, tank 241-SX-101 contained an estimated 1674 kL (442 kgal) of dilute complexed waste (see Appendix D). The waste volumes were estimated using a Food Instrument Corporation surface-level gauge and photographic evaluation. Table A1-1 shows the volumes of the waste phases found in the tank.

Tank 241-SX-101 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 for flammable gas (Public Law 101-510).

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

Waste Type	kL (kgal)
Total waste	1,674 (442)
Supernatant	0 (0)
Sludge	0 (0)
Saltcake	1,674 (442)
Drainable interstitial liquid	625 (165)
Drainable liquid remaining	625 (165)
Pumpable liquid remaining	587 (155)

Note:
[1]Values differ from Hanlon (1998), see Appendix D3.3.

A2.0 TANK DESIGN AND BACKGROUND

The SX Tank Farm was constructed from 1953 to 1954 in the 200 West Area of the Hanford Site. The SX Tank Farm contains fifteen 100 series tanks. These tanks have a capacity of 3,800 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 5- to 10-year boiling period) with a maximum fluid temperature of 121 °C (250 °F) (Leach and Stahl 1997). Because the tanks are were designed specifically for boiling waste, airlift circulators were installed to control waste temperatures.

Tank 241-SX-101 entered service in 1954 and is the first 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 9.85 m (32.3 ft) from the tank bottom and 4.04 m (13.3 ft) below the top of the steel liner. These single-shell tanks in the 241-SX Tank Farm are constructed of 30-cm- (1-ft)- thick reinforced concrete with a 6.4-mm (0.25-in.) mild carbon steel liner on the bottom and sides and a 38-cm- (1.25-ft)- thick domed concrete top. These tanks have a dished bottom with a 1.2-m (4-ft) radius knuckle and a 9.85-m (32.3-ft) operating depth. The tanks are covered with approximately 7 ft 3 in. of overburden.

Tank 241-SX-101 has 24 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. Riser 11, 20.3 cm (8 in.), and riser 19, 30.5 cm (12 in.), are tentatively available for sampling with riser 4, 10.2 (4 in.) used as a backup (Lipnicki 1997). A tank cross section showing the approximate waste level along with a schematic of the tank equipment is given in Figure A2-2.

Table A2-1. Tank 241-SX-101 Risers.[1] (2 sheets)

Number	Diameter (in.)	Description and Comments
R1	4	Spare, below grade
R2	4	Temperature probe cut off in riser
R3	4	Concrete covered
R4	4	Food Instrument Corporation (ENRAF[2] 854 Engineering Change Notice 620751, February 27, 1995)
R5	12	Below grade
R6	12	Underground vent line, below grade
R7	12	Slurry riser
R8	12	Air inlet circulator in caisson
R9	12	Salt well pump
R10	3	Drywell
R11[3]	8	Flange
R12	0.5	Concrete covered
R13	42	Air circulator, below grade
R14	4	B-436 liquid observation well (benchmark Change Engineering Order 36906, December 11, 1986)
R15	4	B-221 thermocouple tree
R16	6	Plug and grout, below grade
R18	4	Breather filter (bench mark Change Engineering Order 36906 December 11, 1986) (Standard Hydrogen Monitor System with air filter W-369-012 December 20, 1994)
R19[3]	12	B-222 observation port [benchmark Change Engineering Order 36906 December 11, 1986)
R20	0.5	Concrete covered
R21	0.5	Concrete covered
R22	0.5	Concrete covered
R23	0.5	Concrete covered
<unmarked>	6	Flange

Table A2-1. Tank 241-SX-101 Risers.[1] (2 sheets)

Number	Diameter (in.)	Description and Comments
N1	3.5	Inlet line V-578
N2	4	Overflow
N3	5	Spare inlet, capped

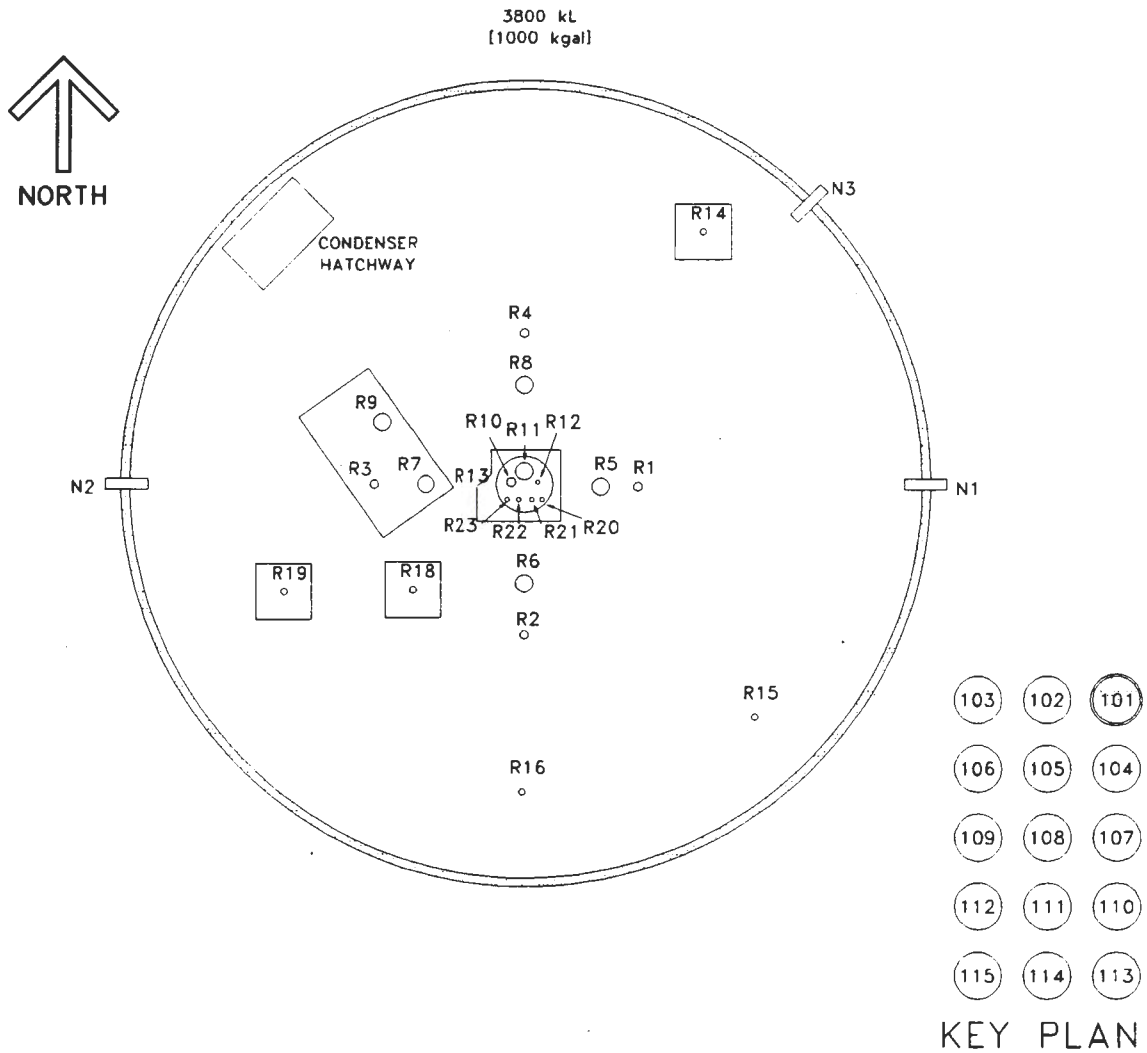
Notes:

[1]Alstad (1993), Tran (1993), and Vitro (1985)

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

[3] Denotes risers tentatively available for sampling (Lipnicki 1997).

Figure A2-1. Riser Configuration for Tank 241-SX-101.[1]



[1]Unmarked riser is not identified on drawing.

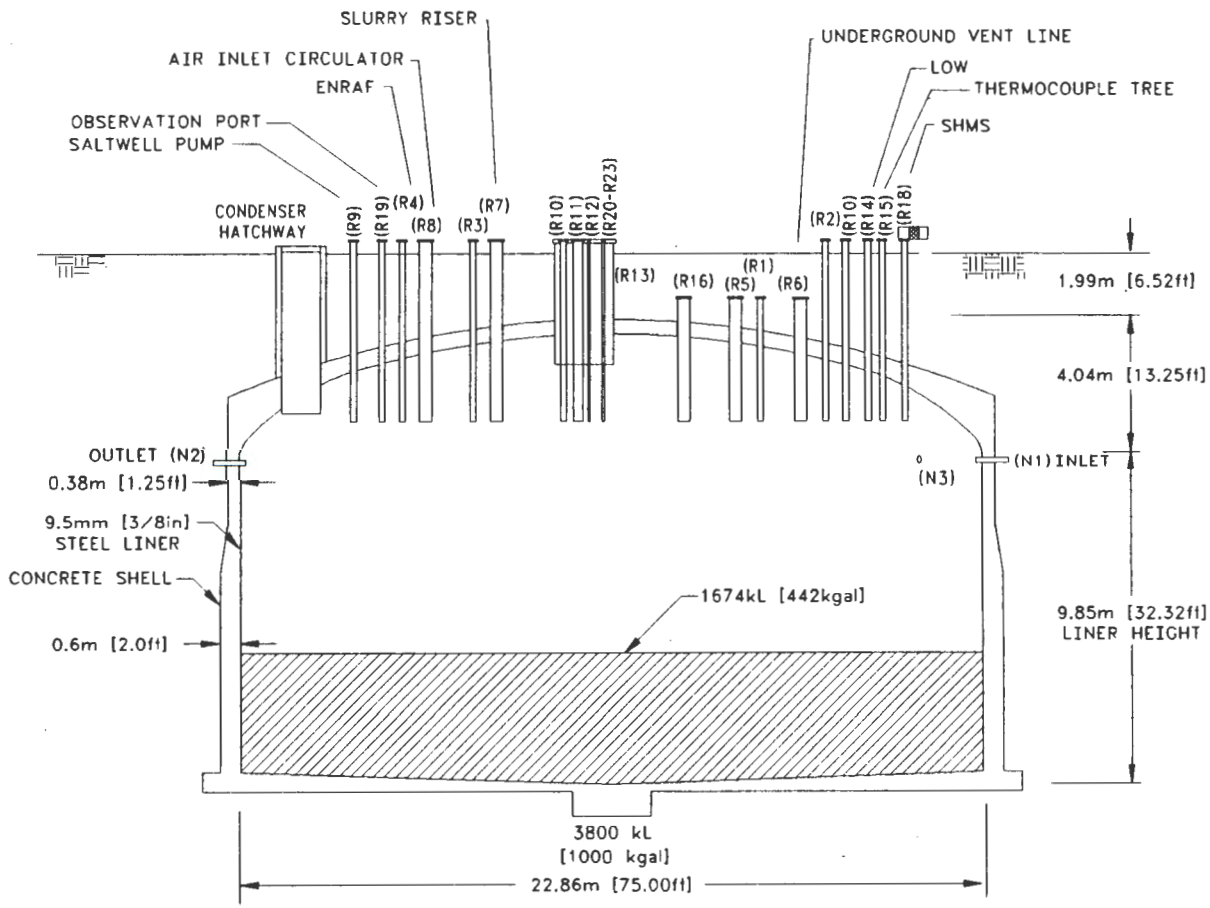


Figure A2-2. Tank 241-SX-101 Cross Section and Schematic.

A3.0 PROCESS KNOWLEDGE

The sections below 1) provide information about the transfer history of tank 241-SX-101; 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-101 (Agnew et al. 1997b). Waste, consisting of high-level REDOX waste from 202-S Plant, was initially added to tank 241-SX-101 in the second quarter of 1954. The tank received high-level REDOX waste from 202-S Plant and flush water from miscellaneous sources until the third quarter of 1957. During this time and continuing until the third quarter of 1959, condensed waste was sent from the tank to tank 241-SX-106. In the last half of 1954, some of the high-level REDOX waste cascaded to tank 241-SX-102. In the third quarter of 1958 and the fourth quarter of 1960, condensed waste was sent to a crib.

In the fourth quarter of 1971, tank 241-SX-101 received supernatant waste from tank 241-BX-101. Flush water from miscellaneous sources was subsequently added to the tank in the second quarter of 1972 and the first quarter of 1974. From the third quarter of 1974 to the fourth quarter of 1975, waste was transferred to and received from tank 241-S-102 in support of 242-S Evaporator operation. Also in support of evaporator operations, from the first quarter of 1979 to the fourth quarter of 1980, supernatant waste was transferred from the tank to tanks 241-SY-102, 241-TX-118, 241-S-103, and 241-BX-105. During this time the tank received waste from tanks 241-SY-102, 241-U-107, 241-U-111, and 241-SX-106. The last addition to tank 241-SX-101 was flush water from miscellaneous sources added in the fourth quarter of 1980.

Table A3-1. Tank 241-SX-101 Major Transfers.[1, 2] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume	
				kL	kgal
S Plant	---	R1	1954 to 1955	13,211	3,490
---	241-SX-102	R1	1954	6,299	1,664
Miscellaneous sources	---	Flush water	1955 to 1957	689	182
---	241-SX-106	Condensate	1954 to 1959	5,875	1,552
---	Crib	Condensate	1958, 1960	19	5
241-BX-101	---	Supernate	1971	1,605	424

Table A3-1. Tank 241-SX-101 Major Transfers.[1,2] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume	
				kL	kgal
Miscellaneous sources	---	Flush water	1972, 1974	144	38
---	241-S-102	Evaporator feed	1974 to 1975	2,090	552
241-S-102	---	Evaporator bottoms	1975	2,086	551
---	241-SY-102, 241-TX-118, 241-S-103, 241-BX-105	Supernate	1979 to 1980	9,948	2,628
241-SY-102, 241-U-107, 241-U-111, 241-SX-106	---	Supernate	1979 to 1980	10,043	2,653
Miscellaneous sources	---	Flush water	1980	424	112

Notes:

R1 = REDOX waste generated between 1952 and 1957.
Waste volumes and types are best estimates based on historical data.

[1]Agnew et al. 1997b

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

A3.2 HISTORICAL ESTIMATION OF TANK CONTENTS

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

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

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

- 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*, the TLM, and the HDW list to describe the supernatants and concentrates in each tank. Together the *Waste Status and Transaction Record Summary*, 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-101 contains five layers. A top layer of 4 kL (1 kgal) of supernatant is predicted to be above a layer of 197 kL (52 kgal) SMMS2, over a layer of 352 kL (93 kgal) SMMS1, over a layer of 590 kL (156 kgal) REDOX saltcake, over a bottom layer of 583 kL (154 kgal) of high-level REDOX waste. Figure A3-1 is a graphical representation of the estimated waste type and volume for the tank layer.

Based on the Agnew et al. (1997a) estimates, the high-level REDOX waste layer should contain, from highest concentration above one weight percent, the following major constituents: hydroxide, nitrate, aluminum, sodium, and nitrite. Constituents contained in this layer above a tenth of a weight percent are chromium, nickel, calcium, carbonate, chloride, and ammonia. The REDOX salt layer should contain, from highest concentration above one weight percent, the following major constituents: sodium, nitrate, nitrite, hydroxide, and aluminum. Constituents contained in this layer above a tenth of a weight percent are chromium, potassium, sulfate, and chloride. Table A3-2 shows the historical estimate of the expected waste constituents and their concentrations.

Figure A3-1. Tank Layer Model.

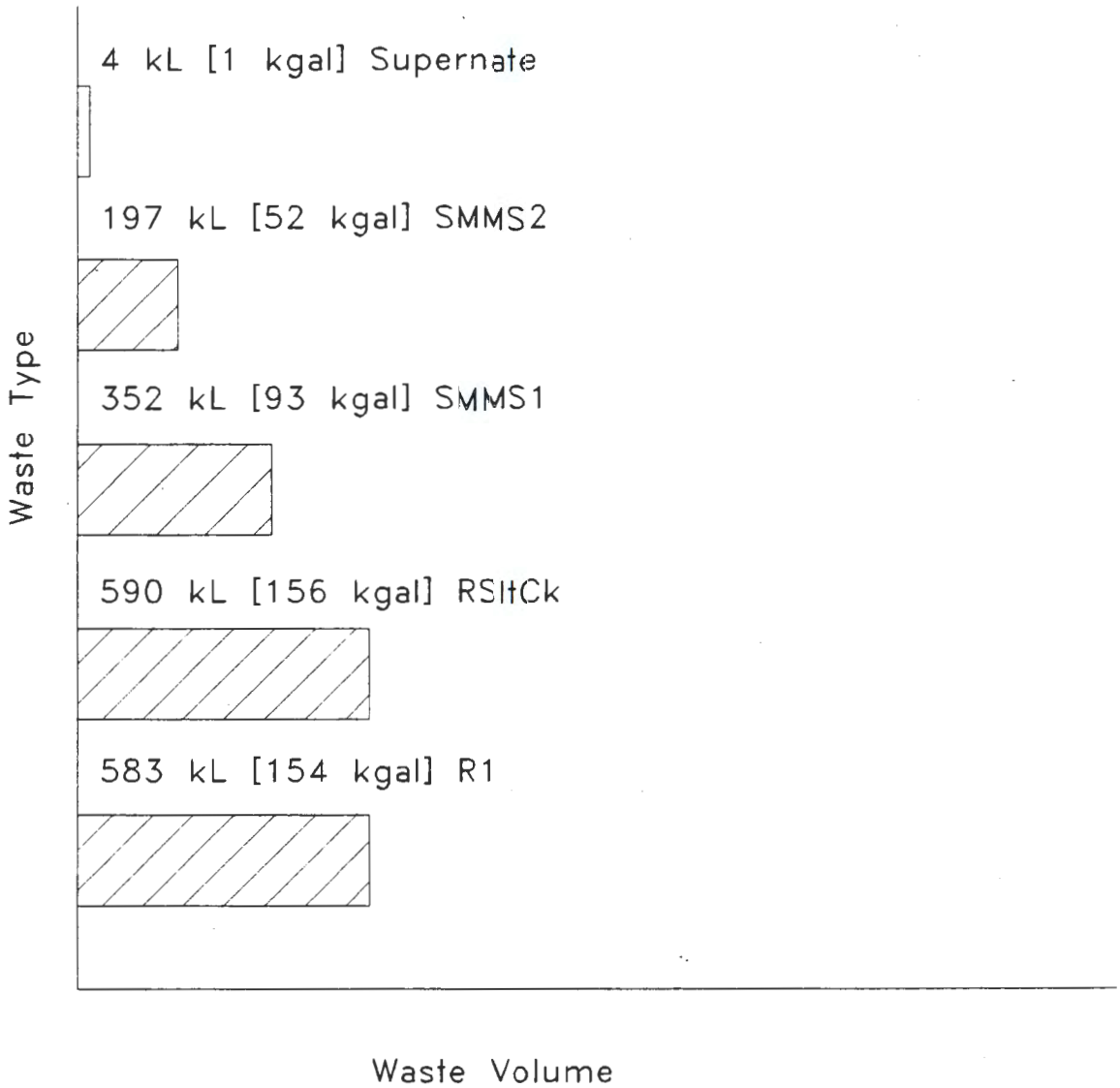


Table A3-2. Historical Tank Inventory Estimate[1, 2] (4 sheets)

Total Inventory Estimate					
Physical Properties				**-95 CI**	**+95 CI**
Total waste	2.75E+06 (kg) (456 kgal)			---	---
Heat load	6.30 (kW) (2.15E+04 Btu/hr)			5.25	6.71
Bulk density[3]	1.59 (g/cm^3)			1.50	1.76
Water wt%[3]	38.3			26.9	46.2
TOC wt% C (wet)[3]	0.115			7.65E-02	0.155
Constituents	***M***	**ppm**	**kg[4]**	**-95 CI**	**+95 CI**
Na^+	9.56	1.38E+05	3.79E+05	7.73	12.9
Al^{3+}	3.78	6.41E+04	1.76E+05	3.11	4.82
Fe^{3+}	0.350	1.23E+04	3.37E+04	0.343	0.356
Cr^{3+}	0.326	1.06E+04	2.93E+04	0.209	0.658
Bi^{3+}	1.98E-04	26.0	71.6	1.80E-04	2.16E-04
La^{3+}	5.30E-06	0.462	1.27	3.84E-06	6.77E-06
Hg^{2+}	1.73E-06	0.218	0.599	1.64E-06	1.81E-06
Zr	3.73E-05	2.14	5.87	3.40E-05	4.05E-05
Pb^{2+}	2.09E-04	27.2	74.8	1.79E-04	2.40E-04
Ni^{2+}	2.33E-02	858	2.36E+03	1.85E-02	2.46E-02
Sr^{2+}	0	0	0	0	0
Mn^{4+}	5.91E-04	20.4	56.1	4.46E-04	7.37E-04
Ca^{2+}	0.106	2.66E+03	7.31E+03	8.09E-02	0.131
K^+	2.48E-02	609	1.68E+03	2.15E-02	2.72E-02
OH^-	16.6	1.77E+05	4.88E+05	13.5	21.0
NO^{3-}	4.35	1.69E+05	4.66E+05	2.58	8.58
NO^{2-}	1.52	4.38E+04	1.21E+05	1.06	1.76
CO_3^{2-}	0.167	6.29E+03	1.73E+04	0.142	0.192
PO_4^{3-}	1.36E-02	810	2.23E+03	1.17E-02	1.42E-02
SO_4^{2-}	5.42E-02	3.26E+03	8.98E+03	4.61E-02	6.23E-02
Si	5.92E-02	1.04E+03	2.87E+03	4.33E-02	7.14E-02
F^-	9.72E-03	116	319	8.16E-03	1.11E-02
Cl^-	0.101	2.25E+03	6.18E+03	7.78E-02	0.136

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

Total Inventory Estimate					
Constituents (Cont'd)	***M***	**ppm**	**kg[5]**	**-95 CI**	**+95 CI**
$C_6H_5O_7^{3-}$	4.35E-03	516	1.42E+03	4.01E-03	4.69E-03
$EDTA^{4-}$	2.21E-03	399	1.10E+03	6.80E-04	3.76E-03
$HEDTA^{3-}$	4.12E-03	709	1.95E+03	1.07E-03	7.22E-03
$Glycolate^-$	1.33E-02	626	1.72E+03	8.75E-03	1.78E-02
$Acetate^-$	9.36E-04	34.7	95.3	7.69E-04	1.10E-03
$Oxalate^{2-}$	6.94E-06	0.384	1.05	6.15E-06	7.74E-06
DBP	2.96E-03	391	1.07E+03	2.45E-03	3.46E-03
Butanol	2.96E-03	138	379	2.45E-03	3.46E-03
NH_3	0.112	1.19E+03	3.28E+03	4.70E-02	0.121
$Fe(CN)_6^{4-}$	0	0	0	0	0
Total Pu	3.20E-03 (g/L)	----	5.52	2.45E-03	3.94E-03
Total U	6.76E-03	1.01E+03	2.78E+03	4.08E-03	9.78E-03
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci[3]**	**-95 CI (Ci/L)**	**+95 CI (Ci/L)**
^{3}H	1.26E-04	7.89E-02	217	4.15E-05	1.36E-04
^{14}C	1.03E-05	6.45E-03	17.7	5.96E-06	1.08E-05
^{59}Ni	7.71E-06	4.84E-03	13.3	5.36E-06	8.09E-06
^{63}Ni	7.30E-04	0.458	1.26E+03	5.02E-04	7.65E-04
^{60}Co	9.99E-06	6.27E-03	17.2	5.54E-06	1.05E-05
^{79}Se	3.10E-06	1.94E-03	5.35	6.66E-07	5.32E-06
^{90}Sr	0.422	265	7.28E+05	0.332	0.457
^{90}Y	0.422	265	7.28E+05	0.331	0.457
^{93}Zr	1.48E-05	9.26E-03	25.5	3.23E-06	2.41E-05
^{93m}Nb	1.18E-05	7.37E-03	20.3	2.43E-06	2.18E-05
^{99}Tc	7.57E-05	4.75E-02	131	6.12E-05	9.03E-05
^{106}Ru	1.91E-09	1.20E-06	3.29E-03	1.01E-09	2.15E-09
^{113m}Cd	3.26E-05	2.04E-02	56.2	1.51E-05	4.95E-05
^{125}Sb	3.94E-05	2.47E-02	68.1	2.02E-05	4.11E-05
^{126}Sn	4.74E-06	2.98E-03	8.19	1.01E-06	8.32E-06

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

Total Inventory Estimate					
Radiological Constituents (Cont'd)	Ci/L	μCi/g	Ci[3]	-95 CI (Ci/L)	+95 CI (Ci/L)
^{129}I	1.45E-07	9.10E-05	0.250	1.17E-07	1.73E-07
^{134}Cs	1.21E-06	7.58E-04	2.09	3.50E-07	1.33E-06
^{137}Cs	0.173	109	2.99E+05	0.159	0.192
^{137m}Ba	0.164	103	2.83E+05	4.94E-02	0.176
^{151}Sm	1.10E-02	6.92	1.90E+04	2.35E-03	1.92E-02
^{152}Eu	6.03E-06	3.79E-03	10.4	2.97E-06	6.12E-06
^{154}Eu	1.92E-04	0.120	331	9.88E-05	2.23E-04
^{155}Eu	3.03E-04	0.190	523	1.47E-04	3.08E-04
^{226}Ra	5.49E-10	3.45E-07	9.48E-04	2.38E-10	8.61E-10
^{228}Ra	2.67E-08	1.68E-05	4.61E-02	1.42E-08	4.19E-08
^{227}Ac	2.70E-09	1.69E-06	4.66E-03	1.21E-09	4.50E-09
^{231}Pa	4.47E-09	2.81E-06	7.72E-03	8.77E-10	9.83E-09
^{229}Th	6.30E-10	3.95E-07	1.09E-03	3.57E-10	9.65E-10
^{232}Th	1.49E-09	9.35E-07	2.57E-03	8.01E-10	2.18E-09
^{232}U	1.35E-07	8.48E-05	0.233	8.52E-08	1.96E-07
^{233}U	5.18E-07	3.25E-04	0.894	3.27E-07	7.52E-07
^{234}U	6.08E-07	3.82E-04	1.05	3.64E-07	8.81E-07
^{235}U	2.47E-08	1.55E-05	4.27E-02	1.48E-08	3.58E-08
^{236}U	2.28E-08	1.43E-05	3.93E-02	1.30E-08	3.31E-08
^{238}U	5.75E-07	3.61E-04	0.992	3.59E-07	8.17E-07
^{237}Np	3.14E-07	1.97E-04	0.542	2.67E-07	3.62E-07
^{238}Pu	3.26E-06	2.05E-03	5.64	2.64E-06	3.89E-06
^{239}Pu	1.93E-04	0.121	333	1.49E-04	2.38E-04
^{240}Pu	2.84E-05	1.79E-02	49.1	2.21E-05	3.48E-05
^{241}Pu	1.91E-04	0.120	329	1.53E-04	2.28E-04
^{242}Pu	9.18E-10	5.76E-07	1.58E-03	7.47E-10	1.09E-09
^{241}Am	5.21E-05	3.27E-02	89.9	3.43E-05	9.71E-05
^{243}Am	1.62E-09	1.02E-06	2.80E-03	9.16E-10	2.05E-09

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

Total Inventory Estimate					
Radiological Constituents (Cont'd)	Ci/L	μCi/g	Ci[3]	-95 CI (Ci/L)	+95 CI (Ci/L)
^{242}Cm	7.88E-08	4.94E-05	0.136	6.62E-08	8.19E-08
^{243}Cm	3.46E-09	2.17E-06	5.98E-03	2.26E-09	3.75E-09
^{244}Cm	2.29E-08	1.44E-05	3.95E-02	1.05E-08	2.98E-08

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]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-101 surveillance consists of surface-level measurements (liquid and solid) and temperature monitoring inside the tank (waste and headspace). Surveillance data provide the basis for determining tank integrity.

Liquid-level measurements can indicate whether the tank has a major leak. Solid surface-level measurements indicate physical changes in and consistencies of the solid layers of a tank.

A4.1 SURFACE-LEVEL READINGS

Tank 241-SX-101 is categorized as a sound tank. Before May 1995 a Food Instrument Corporation gauge or manual tape was used to measure surface level. The Food Instrument Corporation gauge has been replaced by an ENRAF[2] gauge that is used to monitor the surface level through riser 4. On March 24, 1998, the waste surface level was 4.12 m (162.35 in.) as

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

measured by the manual ENRAF™ gauge (LMHC 1998). However, the waste level should be 168 in. as discussed in Appendix D3.3. Figure A4-1 is a level history graph of the volume measurements.

A4.2 DRY WELL READINGS

Tank 241-SX-101 has seven dry wells. Only one dry well has had readings greater than 200 counts per second.

A4.3 INTERNAL TANK TEMPERATURES

Tank 241-SX-101 has a single thermocouple tree with six thermocouples to monitor the waste temperature through riser 15. Temperature readings are available from the Surveillance Analysis Computer System from January 1988 to March 1998 (LMHC 1998). Thermocouple elevations and current temperature data are recorded for thermocouples 1 through 6. The average temperature of the Surveillance Analysis Computer System data is 51.6°C (124.8°F), the minimum is 32.2°C (90 °F), and the maximum is 67.9°C (154.2°F). The average temperature of the Surveillance Analysis Computer System data over the last year (May 31, 1997, through May 31, 1998) was 50.4°C (122.8°F), the minimum was 34°C (93.2°F), and the maximum was 56.7°C (134.1°F). The high temperature on May 31, 1998, was 55.6°C (132.1°F) on thermocouple 2 (located in the waste) and the minimum was 36°C (96.8°F) on thermocouple 6 (located in the vapor space). A graph of the weekly high temperatures can be found in Figure A4.2. Plots of the individual thermocouple readings can be found in the *Supporting Document for the Historical Tank Content Estimate for SX Tank Farm* (Brevick et al. 1997).

A4.4 TANK 241-SX-101 PHOTOGRAPHS

The June 1989 photographic montage of the interior of tank 241-SX-101 shows a light-colored thin saltcake surface with dark liquid underneath. Various pieces of equipment are visible. The waste level has not changed since the photographs were taken; therefore, the photographic montage should represent the current appearance of the tank's waste.

Figure A4-1. Tank 241-SX-101 Level History.

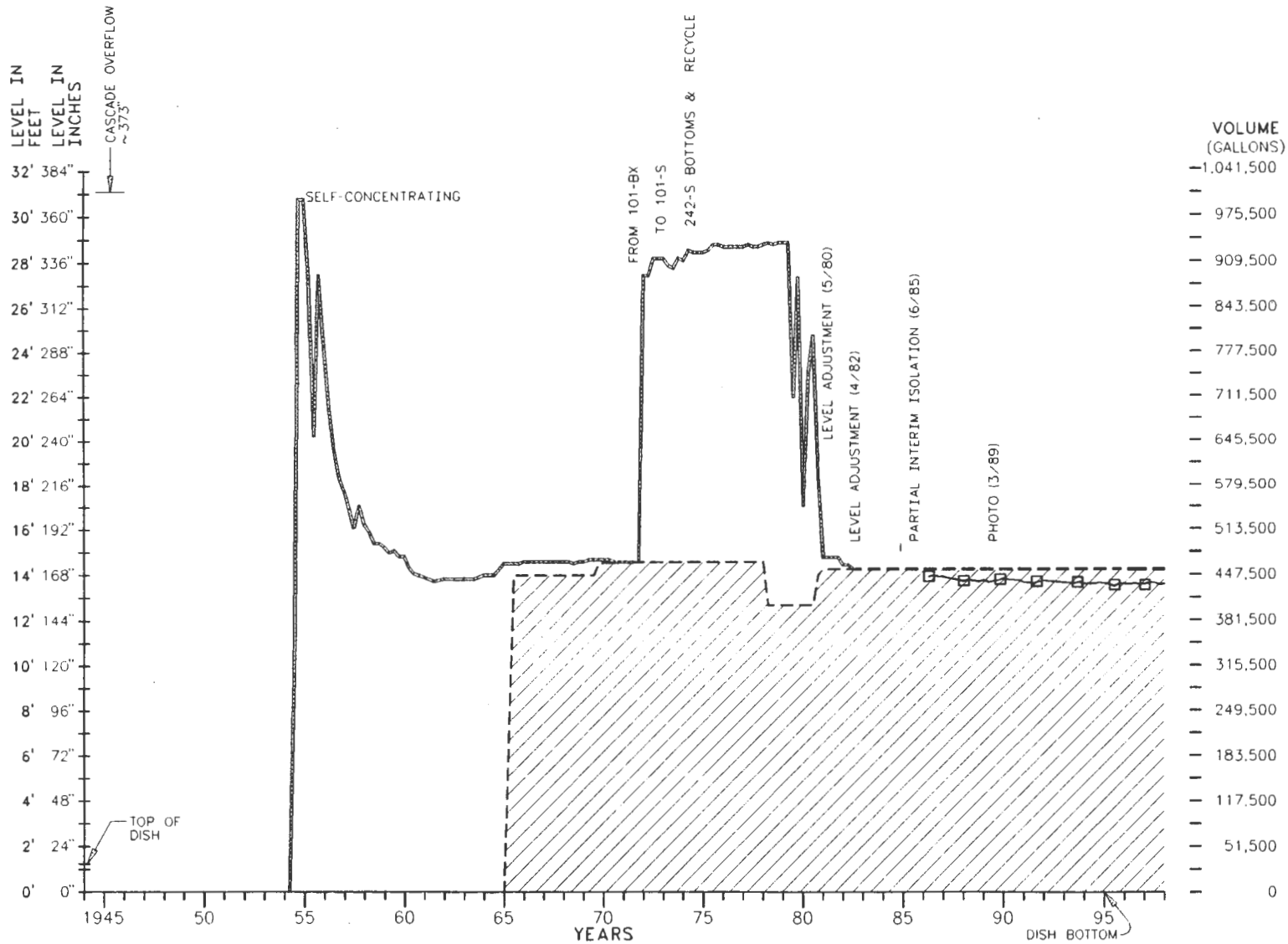
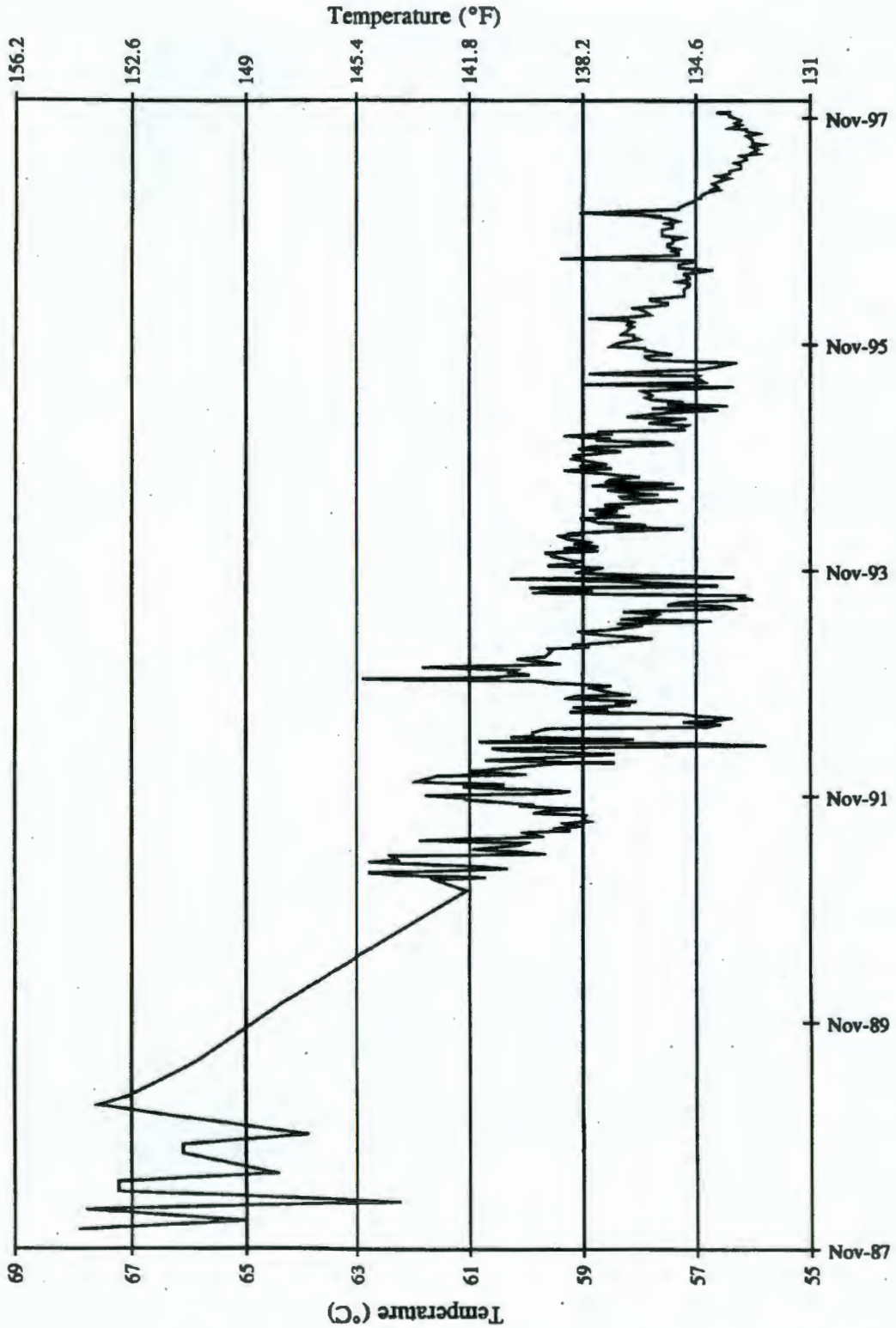


Figure A4-2. Tank 241-SX-101 High Temperature Plot.



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., P. Baca, R. A. Corbin, T. B. Duran, and K. A. Jurgensen, 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 SX Tank Farm*, WHC-SD-WM-ER-324, Rev. 1, Fluor Daniel Northwest for Fluor Daniel Hanford, Inc., Richland, Washington.

Hanlon, B. M., 1998, *Waste Tank Summary Report for Month Ending May 31, 1998*, HNF-EP-0182-122, 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, Numatec Hanford Corporation for Fluor Daniel Hanford, Inc., Richland, Washington.

LMHC, 1998, SACS: Surveillance Analysis Computer System, In: SQLServer/Visual Basic, [Mainframe], Available: Hanford Local Area Network, Lockheed Martin Hanford Corporation, Richland, Washington.

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*.

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-101*, H-2-73218, Rev. 2, Vitro Engineering Corporation, Richland, Washington.

APPENDIX B

SAMPLING OF TANK 241-SX-101

This page intentionally left blank.

APPENDIX B

SAMPLING OF TANK 241-SX-101

Appendix B provides sampling and analysis information for each known sampling event for tank 241-SX-101 and assesses the 1997 rotary mode core sample results. It includes the following.

- **Section B1.0**: Tank sampling overview
- **Section B2.0**: Sampling events and analytical results
- **Section B3.0**: Assessments of characterization results from the 1997 rotary mode core sampling event
- **Section B4.0**: References for Appendix B.

B1.0 TANK SAMPLING OVERVIEW

Rotary mode core samples were taken during the time period between December 1997 and February 1998 to satisfy the requirements of the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995) and the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1997). The sampling and analyses were performed in accordance with the *Tank 241-SX-101 Rotary Mode Core Sampling and Analysis Plan* (Hu 1997). These analyses are discussed in Section B2.1.

Tank headspace vapors were characterized from samples collected in July 1995 in accordance with the *Vapor Sampling and Analysis Plan* (Homi 1995). These analyses are discussed in Section B2.2.

There is one analysis of liquid samples reported on February 1990 (Weiss 1990). The analytical results of these samples are discussed in Section B2.3. In addition, several historical samples were reported between November 1974 and December 1978 and will be referenced in Appendix E.

B2.0 SAMPLING EVENTS

This section describes sampling events and analytical results. The tables in Section B2.1.4 show analytical results for the 1997/1998 rotary mode core sampling event. The headspace vapor sampling event and analytical results are given in Section B2.2. Historical sample results are provided in Section B2.3.

B2.1 DESCRIPTION OF 1997 ROTARY CORE SAMPLING EVENT

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

Tank 241-SX-101 also was evaluated against the historical model requirements (Simpson and McCain 1997). The specified gateway analytes to evaluate the tank layer model (TLM) for this tank are chromium, sodium, aluminum, ion, nitrate, carbonate, sulfate, phosphate, uranium, cesium, strontium, and water content. Historical model analyses include DSC, TGA, ICP, and ion chromatography (IC). The full range of analytes is required for both ICP and IC analyses. Table B2-1 summarizes the sampling and analytical requirements for applicable issues.

Description of Core 225. Rotary mode core segments were removed from tank 241-SX-101, riser 19, between December 10, 1997, and December 26, 1997. Segments were received by the 222-S Laboratory December 12, 1997, and December 29, 1997. Table B2-2a summarizes the extrusion and subsampling information. Eight and one-half full 19-in. segments were expected. However, because of the hard material encountered during sampling, only partial segments (less than 19 in.) were recovered for segments 3 to 8 and repeat samples were required.

Description of Core 227. Rotary mode core segments were removed from tank 241-SX-101, riser 4, between January 22, 1998, and February 9, 1998. Segments were received by the 222-S Laboratory between January 23, 1998, and February 18, 1998. Table B2-2b summarizes the subsampling and extrusion information. Approximately eight and one-half full 19-in. segments were expected. However, because of the hard material encountered during sampling, only partial segments (less than 19 in.) were recovered and repeat samples were required. No sample was recovered for segment 3.

Table B2-1. Integrated Data Quality Objective Requirements for Tank 241-SX-101.[1]

Sampling Event	Applicable Issues	Sampling Requirements	Analytical Requirements
Rotary core sampling	Safety screening - Energetics - Moisture content - Total alpha - Flammable gas Dukelow et al. (1995) Organic complexants Schreiber (1997) Historical Simpson and McCain (1997)	Core samples from a minimum of two risers separated radially to the maximum extent possible Combustible gas measurement	Flammability, energetics, moisture, total alpha activity, density, anions, cations, radionuclides, TOC, separable organics, physical properties, TIC, pH, Cr(VI)
Vapor sampling	Hazardous vapor Osborne and Buckley (1995) Organic solvents Meacham et al. (1997)	Steel canisters, triple sorbent traps, sorbent trap systems	Flammable gas, organic vapors, permanent gases

Note:
[1]Brown et al. (1997)

Field Blank. A field blank was provided to the 222-S Laboratory with core 225. The field blank underwent the same analyses as the drainable liquid, as indicated in the tank sampling and analysis plan (Hu 1997).

Hydrostatic Head Fluid. A sample of the lithium bromide solution used as hydrostatic head fluid was provided with core 225 and was analyzed by IC and ICP.

Table B2-2a. Sample Receipt and Extrusion Information for 241-SX-101, Riser 19, Core 225. (2 sheets)

Sample ID	Segment	Date Sampled[1]	Date Received	Date Extruded	Inches Extruded	Liquid Recovered (g)	Solids Recovered (g)	Sample Description
225-01	1	12/10/97	12/12/97	12/16/97	2.5	238.9, drainable	48.0, lower half	The solids were white and yellow in color and resembled a salt slurry. The liquid was brownish-yellow in color and opaque. 170 mL of liquid was collected. No organic layer was observed.
225-02	2	12/10/97	12/12/97	12/16/97	7.0	198.5, drainable	213.3, lower half	The solids were dark gray in color and resembled a sludge slurry. The liquid was dark gray in color and opaque. 120 mL of liquid was collected. No organic layer was observed.
225-03	3	12/11/97	12/12/97	12/16/97	0.0	454.5, drainable	0.0	An unmeasurable amount of solids was extruded. The solids were added to the drainable liquid portion of the segment. The liquid was dark gray in color and opaque. 310 mL of liquid was collected. No organic layer was observed.
225-3A	3A	12/12/97	12/15/97	12/18/97	2.0	223.3, drainable	66.4, lower half	The solids were dark gray in color and resembled a sludge slurry. The liquid was brownish-yellow in color and opaque. 160 mL of liquid was collected. No organic layer was observed.
225-04	4	12/12/97	12/15/97	12/18/97	2.0	0.0	64.0, lower half	The solids were white to light gray in color and resembled a dry salt.
225-05	5	12/12/97	12/15/97	12/18/97	2.0	347.8, drainable	100.7, lower half	The solids were dark gray in color and resembled a sludge slurry. The liquid was dark gray in color and opaque. 250 mL of liquid was collected. No organic layer was observed.
225-5R	5R	12/15/97	12/18/97	12/19/97	3.0	352.1, drainable	70.8, lower half	The solids were black in color and resembled a sludge slurry. The liquid was black in color and opaque. A small amount of fine black solids was suspended in the liquid. 240 mL of liquid was collected. No organic layer was observed.
225-06	6	12/15/97	12/18/97	12/19/97	11.5	0.0	114.1, upper half 163.3, lower half	The upper 4.5 in. of solids were black in color and resembled a dry salt. The lower 7 in. of solids were gray in color and resembled a dry salt.
225-07	7	12/22/97	12/18/97	12/30/97	8.0	23.5, liner	144.4, lower half	The solids were dark gray and white in color and resembled a dry salt.

Table B2-2a. Sample Receipt and Extrusion Information for 241-SX-101, Riser 19, Core 225. (2 sheets)

Sample ID	Segment	Date Sampled[1]	Date Received	Date Extruded	Inches Extruded	Liquid Recovered (g)	Solids Recovered (g)	Sample Description
225-7A	7A	12/22/97	12/26/97	12/30/97	N/A	265.2, drainable	171.2, lower half	The solids were dark gray in color and resembled a sludge slurry. The liquid was dark gray in color and opaque. 180 mL of liquid was collected. No organic layer was observed.
225-7B	7B	12/23/97	12/29/97	12/30/97	4.0	0.0	119.3, lower half	The solids were dark gray and white in color and resembled a dry salt.
225-08	8	12/26/97	12/29/97	12/30/97	3.0	131.3, drainable 37.7, liner	54.1, lower half	The solids were dark gray to white in color and resembled a salt slurry. The liquid was dark gray in color and opaque. 90 mL of liquid was collected. No organic layer was observed.

Note:

N/A = Information was not available or not applicable.

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

Table B2-2b. Sample Receipt and Extrusion Information for 241-SX-101, Riser 4, Core 227.

Sample ID	Segment	Date Sampled	Date Received	Date Extruded	Inches Extruded	Liquid Recovered (g)	Solids Recovered (g)	Sample Description
227-01	1	1/22/98	1/23/98	2/02/98	12.0	0.0	91.8, upper half 121.8, lower half	The solids were greenish black in color and resembled a sludge slurry.
227-02	2	1/22/98	1/23/98	2/02/98	3.0	0.0	99.8, lower half	The solids were greenish black in color and resembled a sludge slurry.
227-04	4	1/27/98	1/29/98	2/02/98	2.5	0.0	84.0, lower half	The solids were dark gray in color and resembled a wet sludge.
227-05	5	1/28/98	1/29/98	2/02/98	10.0	46.1, drainable	269.8, lower half	The solids were dark gray in color and resembled a wet salt. The liquid was dark gray-green in color and opaque. 30 mL of liquid was collected. No organic layer was observed.
227-5A	5A	1/28/98	1/29/98	2/02/98	18.0	0.0	241.3, upper half 224.1, lower half	The solids were light yellow and gray in color and resembled a dry salt.
227-06	6	1/29/98	2/03/98	2/05/98	18.0	0.0	225.8, upper half 237.0, lower half	The solids were light yellow and gray in color and resembled a dry salt.
227-07	7	1/29/98	2/03/98	2/05/98	3.0	44.7, drainable	91.0, lower half	The solids were dark gray in color and resembled a dry salt. The liquid was dark gray in color and opaque. 30 mL of liquid was collected. No organic layer was observed.
227-7A	7A	1/30/98	2/18/98	2/19/98	2.0	0.0	37.7, lower half	The solids were dark and light gray in color and resembled a dry salt.
227-7BR	7BR	2/09/98	2/18/98	2/19/98	0.0	126.7, liner	0.0	The liquid was amber in color and opaque. 125 mL of liquid was collected. No organic layer was observed.

B2.1.1 Sample Handling

The rotary mode samples were shipped to the 222-S Laboratory for subsampling and analysis. Samples were assigned LABCORE numbers and were subjected to visual inspection for color, clarity, and solids content. The radiation dose rate on contact was also measured. Drainable liquid (and liner liquid, when present in sufficient amount) was collected and clarified by centrifugation. Segments containing solids were divided into upper and lower half segments. Solid core composites were created for cores 225 and 227 as requested by the historical DQO (Simpson and McCain 1997).

B2.1.2 Performance of Sample Analysis

Obtaining reproducible results with this nonhomogeneous material was difficult and may have been responsible for the large relative percent difference (RPD) between the sample and duplicate measurements for some analyses.

Table B2-3 identifies and correlates the samples (and subsamples) with the analyses that were performed on them.

Table B2-3. Tank 241-SX-101 Sample Analysis Summary. (6 sheets)

Sample Identification	Sample Portion	Sample Number	Analyses
Core 225, segment 1	Drainable liquid	S97T002410	Specific gravity, NH_3, DSC/TGA, alpha
		S97T002411	IC
		S98T001090	TIC/TOC, ICP
	Lower sample	S97T002404	Bulk density
		S97T002405	TIC/TOC, DSC/TGA
		S97T002407	ICP, GEA, alpha
		S97T002408	IC
		S97T002434	ICP
Core 225, segment 2	Drainable liquid	S97T002421	Specific gravity, NH_3, DSC/TGA
		S97T002423	IC
		S98T000040	Alpha
		S98T001091	TIC/TOC, ICP

Table B2-3. Tank 241-SX-101 Sample Analysis Summary. (6 sheets)

Sample Identification	Sample Portion	Sample Number	Analyses
Core 225, segment 2 (Cont'd)	Lower sample	S97T002413	Bulk density
		S97T002414	TIC/TOC, DSC/TGA
		S97T002416	ICP, GEA, alpha
		S97T002417	IC
		S97T002435	ICP
Core 225, segment 3	Drainable liquid	S97T002420	Specific gravity, NH_3, DSC/TGA, Alpha
		S97T002422	IC
		S98T001092	TIC/TOC, ICP
Core 225, segment 3A	Drainable liquid	S97T002443	Specific gravity, NH_3, DSC/TGA, Alpha
		S97T002444	TIC/TOC, ICP, IC
	Lower sample	S97T002436	Bulk density
		S97T002437	TIC/TOC, DSC/TGA
		S97T002439	ICP, GEA, alpha
		S97T002440	ICP
		S97T002441	IC
Core 225, segment 4	Lower sample	S97T002450	TIC/TOC, DSC/TGA
		S97T002458	ICP, GEA, alpha
		S97T002462	ICP
		S97T002466	IC
Core 225, segment 5	Drainable liquid	S97T002473	Specific gravity, NH_3, DSC/TGA, alpha
		S97T002477	TIC/TOC, ICP, IC
	Lower sample	S97T002449	Bulk density
		S97T002453	TIC/TOC, DSC/TGA
		S97T002461	ICP, GEA, alpha
		S97T002465	ICP
		S97T002469	IC

Table B2-3. Tank 241-SX-101 Sample Analysis Summary. (6 sheets)

Sample Identification	Sample Portion	Sample Number	Analyses
Core 225, segment 5R	Drainable liquid	S97T002472	Specific gravity, NH_3, DSC/TGA, alpha
		S97T002476	TIC/TOC, ICP, IC
	Lower sample	S97T002448	Bulk density
		S97T002452	TIC/TOC, DSC/TGA
		S97T002460	ICP, GEA, alpha
		S97T002464	ICP
		S97T002468	IC
Core 225, segment 6	Upper Sample	S97T002480	TIC/TOC, DSC/TGA
		S97T002483	ICP, GEA
		S97T002484	ICP
		S97T002485	IC
	Lower sample	S97T002447	Bulk density
		S97T002451	TIC/TOC, DSC/TGA
		S97T002459	ICP, GEA, alpha
		S97T002463	ICP
		S97T002467	IC
Core 225, segment 7	Lower sample	S97T002493	Bulk density
		S97T002497	TIC/TOC, DSC/TGA
		S97T002505	ICP, GEA, alpha
		S98T000013	ICP
		S98T000017	IC
Core 225, segment 7A	Drainable liquid	S98T000004	Specific gravity, NH_3, DSC/TGA, alpha
		S98T000005	TIC/TOC, ICP, IC
	Lower sample	S97T002494	Bulk density
		S97T002498	TIC/TOC, DSC/TGA
		S97T002506	ICP, GEA, alpha
		S98T000014	ICP
		S98T000018	IC

Table B2-3. Tank 241-SX-101 Sample Analysis Summary. (6 sheets)

Sample Identification	Sample Portion	Sample Number	Analyses
Core 225, segment 7B	Lower sample	S97T002495	Bulk density
		S97T002499	TIC/TOC, DSC/TGA
		S97T002507	ICP, GEA, alpha
		S98T000015	ICP
		S98T000019	IC
Core 225, segment 8	Drainable liquid	S98T000008	Specific gravity, NH_3, DSC/TGA, alpha
		S98T000009	TIC/TOC, ICP, IC
		S98T000012	ICP, IC
	Lower sample	S97T002496	Bulk density
		S97T002500	TIC/TOC, DSC/TGA
		S97T002508	ICP, GEA, alpha
		S98T000016	ICP
		S98T000020	IC
Core 225, composite	Core composite	S98T000395	Bulk density
		S98T000406	TIC/TOC, DSC/TGA
		S98T000408	Uranium, strontium, ICP, GEA, alpha, beta
		S98T000410	ICP
		S98T001685	IC
Core 227, segment 1	Upper sample	S98T000335	TIC/TOC, DSC/TGA
		S98T000341	ICP, GEA
		S98T000342	ICP
		S98T000343	IC
	Lower sample	S98T000329	Bulk density
		S98T000337	TIC/TOC, DSC/TGA
		S98T000344	ICP, GEA
		S98T000345	ICP
		S98T000346	IC

Table B2-3. Tank 241-SX-101 Sample Analysis Summary. (6 sheets)

Sample Identification	Sample Portion	Sample Number	Analyses
Core 227, segment 2	Lower sample	S98T000330	Bulk density
		S98T000347	TIC/TOC, DSC/TGA
		S98T000358	ICP, GEA
		S98T000362	ICP
		S98T000367	IC
Core 227, segment 4	Lower sample	S98T000331	Bulk density
		S98T000348	TIC/TOC, DSC/TGA
		S98T000359	ICP, GEA
		S98T000363	ICP
		S98T000368	IC
Core 227, segment 5	Drainable liquid	S98T000373	Specific gravity, NH_3, DSC/TGA, alpha
		S98T000374	TIC/TOC, ICP, IC
	Lower sample	S98T000332	Bulk density
		S98T000349	TIC/TOC, DSC/TGA
		S98T000360	ICP, GEA
		S98T000364	ICP
		S98T000369	IC
Core 227, segment 5A	Upper sample	S98T000350	TIC/TOC, DSC/TGA
		S98T000357	ICP, GEA
		S98T000365	ICP
		S98T000370	IC
	Lower sample	S98T000334	Bulk density
		S98T000351	TIC/TOC, DSC/TGA
		S98T000361	ICP, GEA
		S98T000366	ICP
		S98T000371	IC

Table B2-3. Tank 241-SX-101 Sample Analysis Summary. (6 sheets)

Sample Identification	Sample Portion	Sample Number	Analyses
Core 227, segment 6	Upper sample	S98T000433	TIC/TOC, DSC/TGA
		S98T000439	ICP, GEA
		S98T000442	ICP
		S98T000445	IC
	Lower sample	S98T000431	Bulk density
		S98T000434	TIC/TOC, DSC/TGA
		S98T000440	ICP, GEA
		S98T000443	ICP
		S98T000446	IC

Table B2-3. Tank 241-SX-101 Sample Analysis Summary. (6 sheets)

Sample Identification	Sample Portion	Sample Number	Analyses
Core 227, segment 7	Drainable liquid	S98T000449	Specific gravity, NH_3, DSC/TGA, alpha
		S98T000450	TIC/TOC, ICP, IC
	Lower sample	S98T000432	Bulk density
		S98T000435	TIC/TOC, DSC/TGA
		S98T000441	ICP, GEA
		S98T000444	ICP
		S98T000447	IC
Core 227, segment 7A	Lower sample	S98T000553	TIC/TOC, DSC/TGA
		S98T000554	ICP, GEA
		S98T000555	ICP
		S98T000556	IC
Core 227, segment 7BR	Liner liquid	S98T000559	ICP, IC
Core 227, Composite	Core composite	S98T00680	Bulk density
		S98T00682	TIC/TOC, DSC/TGA
		S98T00686	Uranium, strontium, ICP, GEA, alpha, beta
		S98T00690	ICP
		S98T00691	IC

All reported analyses were performed according to approved laboratory procedures.
Table B2-4 lists the field and 222-S Laboratory analytical procedures that were used to analyze the push mode samples.

Table B2-4. Analytical Procedures Used for 1997 Rotary Mode Core Samples.

Analysis	Preparation Procedure	Analysis Procedure
Bulk density	Direct analysis	LO-160-103 Rev. B-0LA-519-132 Rev. B-0
DSC	Direct analysis	LA-514-113 Rev. C-1 LA-514-114 Rev. D-0
TGA	Direct analysis	LA-514-114 Rev. D-0 LA-560-112 Rev. C-0 and C-1
Specific gravity	Direct analyses	LA-510-112 Rev. C-3 and D-1
IC	Liquid-direct analysis Solid-LA-504-101 Rev. E-0[1]	LA-533-105 Rev. E-0
ICP	Liquid-acid dilution Solid-LA-505-159 Rev. D-0[2] and LA-549-141 Rev. D-0[3]	LA-505-161 Rev. B-1 and C-1
NH_3	Direct analysis-liquid	LA-631-001 Rev. C-0
TOC-Persulfate oxidation	Direct analysis-liquid and solid	LA-342-100 Rev. E-0
TIC	Direct analysis	LA-342-100 Rev. E-0
Total uranium	LA-549-141 Rev. F-0[3]	LA-925-009 Rev. A-1
Radionuclide Analyses		
Total alpha	Liquid-direct analysis Solid-LA-549-141 Rev. F-0[3]	LA-508-101 Rev. E-1 and G-0
Total beta	LA-549-141 Rev. F-0[3]	LA-508-101 Rev. G-0
GEA	LA-549-141 Rev. F-0[3]	LA-548-121 Rev. F-0
^{90}Sr	LA-549-141 Rev. F-0[3]	LA-220-101 Rev. E-3
Flammable Gas		
Combustible gas analyzer	Direct analysis	WHC-IP-0030, IH 1.4 and IH 2.1[4]

Notes:

GEA = gamma energy analysis

[1]Water digestion procedure
[2]Acid digestion procedure
[3]Fusion digestion procedure
[4]WHC (1992)

B2.1.3 Discussion of Analytical Results

This section summarizes the analytical results associated with the 1997 rotary mode samples. Table B2-5 indicates which summary result tables are associated with each analyte.

Table B2-5. Table of Summary Analytical Tables.

Analysis	Table Number(s)
Metals by ICP/emission spectrometry	B2-7 through B2-43
Total uranium by laser fluorimetry	B2-44
Anions by IC	B2-45 through B2-52
Bulk density	B2-53
Energetics by DSC	B2-54
Percent water by TGA	B2-55
Specific gravity	B2-56
Total alpha by proportional counter	B2-57 through B2-58
Total beta by proportional counter	B2-59
Gamma energy analysis	B2-60 through B2-61
$^{89/90}$Sr by separation/ß counting	B2-62
Ammonia	B2-63
TOC by persulfate oxidation/coulometry	B2-64
TIC by persulfate oxidation	B2-65

B2.1.3.1 Total Alpha Activity. The total alpha activity analyses were performed in duplicate on direct subsamples for the drainable liquids. Lower half segment solid subsamples were prepared for analysis by performing a fusion digest in duplicate. The maximum total alpha result was 2.73 μCi/g from core 225, segment 2.

B2.1.3.2 Total Beta Activity. In support of the historical DQO (Simpson and McCain 1997), total beta analysis was performed in duplicate on core composite subsamples. The highest value is 561 μCi/g from the core 225 composite sample.

B2.1.3.3 Strontium-89/90. In support of the historical DQO (Simpson and McCain 1997), $^{89/90}$Sr analysis was performed in duplicate on core composite subsamples. The highest value is 189 μCi/g from the core 225 composite sample.

B2.1.3.4 Gamma Energy Analysis. This analysis was performed for ^{137}Cs and ^{60}Co on solids. The subsamples were prepared for analysis by a fusion digestion. Only ^{137}Cs was measured at values above detection levels. Results for ^{137}Cs ranged from 12 to 256 μCi/g.

B2.1.3.5 Thermogravimetric Analysis. Thermogravimetric analysis measures the mass of a sample as its temperature is increased at a constant rate. Nitrogen is passed over the sample during heating to remove any released gases. A decrease in the weight of a sample during TGA represents a loss of gaseous matter from the sample, through evaporation or through a reaction that forms gas phase products. The moisture content is estimated by assuming that all TGA sample weight loss up to a certain temperature (typically 150 to 200 °C [300 to 390 °F]) is caused by water evaporation. The temperature limit for moisture loss is chosen by the operator at an inflection point on the TGA plot. Other volatile matter fractions can often be differentiated by inflection points as well.

The TGA analyses were performed in duplicate on direct subsamples. Typically TGA results are determined by summing the weight loss steps which occurred below 250 °C; weight loss steps above this are not used to determine the result. However, for tank 241-SX-101 approximately 44 percent of the thermograms showed weight loss beyond 250 °C. The results for 21 of the 36 subsamples were the sum of two or more weight-loss steps. Percent water by TGA ranged from 1.33 to 50.6 percent for solids samples and 46.7 to 51.1 percent for drainable liquids.

B2.1.3.6 Differential Scanning Calorimetry. In the DSC analyses, heat absorbed or emitted by substances was measured while the sample was heated at a constant rate. A nitrogen purge was applied to remove oxygen from the analytical system. The onset temperature for an endothermic or exothermic event was determined graphically.

The DSC analyses were performed in duplicate on direct subsamples. The dry weight exothermic energy was calculated for all subsamples. The average TGA result for each subsample was used in the dry weight calculation for that subsample. The highest DSC (dry weight) was 104 J/g from core 227, segment 1, lower half.

B2.1.3.7 Specific Gravity and Bulk Density. Bulk density was performed on the solid subsamples as required by the sampling and analysis plan (Hu 1997). The results of the bulk density test ranged from 1.53 to 1.94 g/mL. The maximum bulk density (1.94 g/mL) was used to calculate the solid total alpha activity action limit for the tank.

The specific gravity results for the liquid samples ranged from 1.46 to 1.63. The standard recoveries and RPDs for this analysis were within the required limits.

B2.1.3.8 Inductively Coupled Plasma Spectrophotometry. Solid samples were prepared by acid and fusion digests, and liquid samples were prepared by acid dilution. Core composites were also prepared by water digest.

The review of quality control was limited to specific analytes listed in Table B2-6, which depended on individual DQO requirements. All other ICP analyte results were considered "opportunistic" and did not have program-specified quality control acceptance criteria. Therefore, any anomalies in those results are not discussed in this report. However, these "opportunistic" results were shown in the summary data tables with qualifier flags, which assume the same quality control limits as specified for the required analytes.

Table B2-6. Required Inductively Coupled Plasma Analytes By Tank Issue.

Issue	Required Analytes
Safety screening	Li-primary on all half segments
Organic	Al, Bi, Ca, Fe, P, Na- secondary on all half segments. Analytes required if DSC exceeded notification
Historical	Al, Cr, Na-fingerprint on all half segments; Full ICP

All laboratory control standard recoveries were within the requested limits of 80 to 120 percent except for the following: silicon for all solid samples; and iron, selenium, thallium, titanium, and zinc for six solid samples.

In addition to the matrix spike and post-digestion spike analyses, a serial dilution analysis was performed by diluting the sample by an additional five-fold. The serial dilution is a more appropriate measure of accuracy of the analysis when the sample concentration is more than 50 times the instrument detection limit.

For acceptable performance, the percent difference between the serial dilution value multiplied by the five-fold dilution factor and the undiluted results must be ≤ 10 percent. Serial dilution results were less than 10 percent for all required analytes. Specific dilution results are specified in *Cores 225 and 227 Analytical Results for the Final Report*, (Steen 1998). The primary metals observed were aluminum and sodium. Nineteen of the ICP analyte concentrations were lower than detection levels. Lithium concentrations were lower than 100 μg/g except for core 227, segment 7A lower half, indicating that there was no significant hydrostatic head fluid intrusion.

B2.1.3.9 Ion Chromatography (Anions). The IC analysis was performed on direct aliquots for the drainable liquids. The centrifuged solids were prepared for analysis by a water digestion. Bromide (Br^-) analysis was required on the liquids and solids by the safety screening DQO (Dukelow et al. 1995). Nitrate (NO_3^-) and sulfate (SO_4^{-2}) fingerprint analyses were required on the solids by the historical DQO (Simpson and McCain 1997). All other anion results are considered "opportunistic" and do not have program-defined quality control

parameters. Qualifier flags have been applied to the opportunistic analytical data in the summary tables for which no quality control acceptance limits were specified in the sampling and analysis plan (Hu 1997). This qualification of data assumes that the quality control limits would have been the same as for the required analytes.

The primary analytes were nitrate and nitrite. Bromide concentrations ranged from "lower than detect" values to 2,030 μg/g in solids and up to 4,540 μg/mL in liquids. As with the lithium value, the highest bromide value was observed for core 227, segment 7A, lower half.

B2.1.3.10 Total Uranium. The total uranium analysis by phosphoresence was performed in duplicate for the core composite samples. The highest value for total uranium was 2,680 μg/g of solid samples from core 225 composite samples.

B2.1.3.11 Total Inorganic Carbon. Analyses by persulfate oxidation/coulometry were performed in duplicate on the direct subsamples for every half segment and all of the drainable liquids. Total inorganic carbon values ranged from 249 to 6,010 μgC/g for solids and from 1,100 to 2,340 μg/mL for drainable liquids.

B2.1.3.12 Total Organic Carbon. Total organic carbon analyses by persulfate oxidation/coulometry were performed in duplicate on the direct subsamples for every half segment and all drainable liquids. Total organic carbon analyses by furnace oxidation/coulometry were performed only on direct liquid aliquots. Total organic carbon values ranged from 43 to 11,000 μgC/g for solids and from 112 to 628 μg/mL for drainable liquids.

B2.1.3.13 Ammonia. The ammonia analysis was performed on direct aliquots of the liquid subsamples. The analytical results of ammonia values ranged from less than 5 to 132 μg/mL.

B2.1.4 Analytical Results Summary Tables for the 1997 Rotary Mode Core Samples

The quality control parameters assessed in conjunction with tank 241-SX-101 samples were standard recoveries, spike recoveries (and serial dilutions), duplicate analyses (RPDs), and blanks. The quality control criteria are specified in the sampling and analysis plan (Hu 1997). Sample and duplicate analytical results, in which any quality control parameter was outside the acceptance limits, are flagged with qualifiers in the sample mean column of the following data summary tables with QC and an a,b,c, d, e, or f as follows.

- "a" indicates that the standard recovery was below the sampling and analysis plan quality control range.
- "b" indicates that the standard recovery was above the sampling and analysis plan quality control range.

- "c" indicates that the spike recovery was below the quality control range.
- "d" indicates that the spike recovery was above the quality control range.
- "e" indicates that the RPD was greater than the quality control limit range.
- "f" indicates that there was blank contamination.

In Tables B2-7 through B2-65, 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.

Table B2-7. Tank 241-SX-101 Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	41,300	42,300	41,800[QC:d]
S97T002435	225:2	Lower half	55,800	54,800	55,300[QC:d]
S97T002440	225:3A	Lower half	34,600	35,600	35,100
S97T002462	225:4	Lower half	3,380	3,290	3,340
S97T002465	225:5	Lower half	47,400	49,400	48,400
S97T002464	225:5R	Lower half	44,400	46,200	45,300
S97T002484	225:6	Upper half	71,800	64,500	68,200[QC:c]
S97T002463		Lower half	81,300	60,900	71,100[QC:d,e]
S98T000013	225:7	Lower half	68,800	75,000	71,900[QC:c]
S98T000014	225:7A	Lower half	46,600	41,200	43,900
S98T000015	225:7B	Lower half	58,600	51,600	55,100[QC:c]
S98T000016	225:8	Lower half	41,900	43,200	42,600[QC:c]
S98T000342	227:1	Upper half	75,400	87,300	81,400
S98T000345		Lower half	46,400	48,800	47,600[QC:c]
S98T000362	227:2	Lower half	49,900	49,800	49,900
S98T000363	227:4	Lower half	140,000	140,000	140,000
S98T000364	227:5	Lower half	149,000	139,000	144,000

Table B2-7. Tank 241-SX-101 Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T000365	227:5A	Upper half	61,800	59,300	60,600
S98T000366		Lower half	40,700	42,500	41,600[QC:d]
S98T000442	227:6	Upper half	40,200	44,500	42,400
S98T000443		Lower half	38,500	45,600	42,100[QC:d]
S98T000444	227:7	Lower half	59,600	63,500	61,600
S98T000555	227:7A	Lower half	107,000	118,000	113,000
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T002407	225:1	Lower half	39,200	41,900	40,600
S97T002416	225:2	Lower half	56,500	56,700	56,600
S97T002439	225:3A	Lower half	32,700	32,300	32,500
S97T002458	225:4	Lower half	2,590	2,970	2,780
S97T002461	225:5	Lower half	47,400	41,500	44,500
S97T002460	225:5R	Lower half	43,900	45,600	44,800
S97T002483	225:6	Upper half	70,100	66,600	68,400
S97T002459		Lower half	64,800	72,000	68,400
S97T002505	225:7	Lower half	84,000	68,100	76,100[QC:e]
S97T002506	225:7A	Lower half	46,300	45,700	46,000
S97T002507	225:7B	Lower half	64,900	62,900	63,900
S97T002508	225:8	Lower half	42,300	41,000	41,700
S98T000341	227:1	Upper half	96,800	85,500	91,200
S98T000344		Lower half	48,400	46,300	47,400
S98T000358	227:2	Lower half	46,200	47,200	46,700
S98T000359	227:4	Lower half	1.65E+05	1.69E+05	1.67E+05
S98T000360	227:5	Lower half	1.47E+05	1.49E+05	1.48E+05
S98T000357	227:5A	Upper half	58,500	60,400	59,500
S98T000361		Lower half	47,800	43,000	45,400
S98T000439	227:6	Upper half	50,000	41,700	45,900
S98T000440		Lower half	42,400	43,900	43,200
S98T000441	227:7	Lower half	63,100	63,300	63,200

Table B2-7. Tank 241-SX-101 Analytical Results: Aluminum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T000554	227:7A	Lower half	111,000	109,000	110,000
S98T000408	Core 225	Solid composite	45,500	54,800	50,200
S98T000686	Core 227	Solid composite	83,800	70,200	77,000
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	67,500	70,600	69,100[QC:d]
S98T001091	225:2	Drainable liquid	76,600	75,600	76,100
S98T001092	225:3	Drainable liquid	79,900	83,100	81,500
S97T002444	225:3A	Drainable liquid	83,100	91,500	87,300
S97T002477	225:5	Drainable liquid	86,800	89,900	88,400[QC:c]
S97T002476	225:5R	Drainable liquid	94,400	101,000	97,700
S98T000005	225:7A	Drainable liquid	82,100	83,500	82,800
S98T000009	225:8	Drainable liquid	81,700	89,200	85,500
S98T000012		Liner liquid	82,200	81,100	81,700
S98T000374	227:5	Drainable liquid	63,200	62,100	62,700[QC:c]
S98T000450	227:7	Drainable liquid	69,900	70,300	70,100[QC:c]
S98T000559	227:7BR	Drainable liquid	200	199	200
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	67,300	54,500	60,900[QC:e]
S98T000691	Core 227	Solid composite	62,800	63,100	63,000[QC:c]

Table B2-8. Tank 241-SX-101 Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	<37	<37.5	<37.3
S97T002435	225:2	Lower half	<35.2	<34.8	<35
S97T002440	225:3A	Lower half	<36.5	<36.5	<36.5
S97T002462	225:4	Lower half	<60.6	<60.1	<60.4
S97T002465	225:5	Lower half	<24.6	<24.9	<24.8
S97T002464	225:5R	Lower half	<24.3	<24.3	<24.3
S97T002484	225:6	Upper half	<59.9	<59.9	<59.9
S97T002463		Lower half	<59.8	<59.9	<59.8
S98T000013	225:7	Lower half	<60.1	<60.1	<60.1
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S98T000014	225:7A	Lower half	<35.8	<36	<35.9
S98T000015	225:7B	Lower half	<47.9	<47.9	<47.9
S98T000016	225:8	Lower half	<36.1	<36	<36
S98T000342	227:1	Upper half	<34.4	<34.9	<34.6
S98T000345		Lower half	<36.2	<36.9	<36.5
S98T000362	227:2	Lower half	<35	<34.7	<34.9
S98T000363	227:4	Lower half	<35	<35.5	<35.3
S98T000364	227:5	Lower half	<39.9	<39.5	<39.7
S98T000365	227:5A	Upper half	<33.4	<33.4	<33.4
S98T000366		Lower half	<35.7	<33.8	<34.8
S98T000442	227:6	Upper half	<34.2	<34.4	<34.3
S98T000443		Lower half	<33.8	<35.1	<34.5
S98T000444	227:7	Lower half	<36.9	<34.1	<35.5
S98T000555	227:7A	Lower half	<34.4	<34.5	<34.5
S97T002407	225:1	Lower half	<1,320	<1,310	<1,320
S97T002416	225:2	Lower half	<1,210	<1,220	<1,220
S97T002439	225:3A	Lower half	<1,220	<1,230	<1,230
S97T002458	225:4	Lower half	<1,160	<1,200	<1,180
S97T002461	225:5	Lower half	<1,210	<1,210	<1,210
S97T002460	225:5R	Lower half	<1,230	<1,190	<1,210

Table B2-8. Tank 241-SX-101 Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<1,280	<1,310	<1,300
S97T002459		Lower half	<1,280	<1,330	<1,310
S97T002505	225:7	Lower half	<1,180	<1,130	<1,160
S97T002506	225:7A	Lower half	<1,150	<1,140	<1,150
S97T002507	225:7B	Lower half	<1,260	<1,230	<1,250
S97T002508	225:8	Lower half	<1,380	<1,370	<1,380
S98T000341	227:1	Upper half	<1,200	<1,190	<1,200
S98T000344		Lower half	<1,140	<1,090	<1,120
S98T000358	227:2	Lower half	<1,240	<1,230	<1,240
S98T000359	227:4	Lower half	<1,230	<1,200	<1,220
S98T000360	227:5	Lower half	<1,260	<1,260	<1,260
S98T000357	227:5A	Upper half	<1,220	<1,220	<1,220
S98T000361		Lower half	<1,160	<1,160	<1,160
S98T000439	227:6	Upper half	<1,200	<1,210	<1,210
S98T000440		Lower half	<1,190	<1,140	<1,170
S98T000441	227:7	Lower half	<1,220	<1,220	<1,220
S98T000554	227:7A	Lower half	<1,220	<1,200	<1,210
S98T000408	Core 225	Solid composite	<1,200	<1,210	<1,210
S98T000686	Core 227	Solid composite	<1,210	<1,130	<1,170
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<36.1	<36.1	<36.1
S98T001091	225:2	Drainable liquid	<36.1	<36.1	<36.1
S98T001092	225:3	Drainable liquid	<36.1	<36.1	<36.1
S97T002444	225:3A	Drainable liquid	<36.1	<36.1	<36.1
S97T002477	225:5	Drainable liquid	<36.1	<36.1	<36.1
S97T002476	225:5R	Drainable liquid	71.2	72.9	72.1
S98T000005	225:7A	Drainable liquid	<36.1	<36.1	<36.1
S98T000009	225:8	Drainable liquid	<36.1	<36.1	<36.1
S98T000012		Drainable liquid	<36.1	<36.1	<36.1

Table B2-8. Tank 241-SX-101 Analytical Results: Antimony (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<36.1	<36.1	<36.1
S98T000450	227:7	Drainable liquid	<36.1	<36.1	<36.1
S98T000559	227:7BR	Drainable liquid	<0.6	<0.6	<0.6
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<36.5	<36.8	<36.6
S98T000691	Core 227	Solid composite	<36.3	<36.1	<36.2

Table B2-9. Tank 241-SX-101 Analytical Results: Arsenic (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	<58.7	<58.1	<58.4
S97T002440	225:3A	Lower half	<60.9	<60.8	<60.8
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	<41	<41.4	<41.2
S97T002464	225:5R	Lower half	<40.4	<40.6	<40.5
S97T002484	225:6	Upper half	<99.8	<99.8	<99.8
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	<57.3	<58.1	<57.7
S98T000345		Lower half	<60.4	<61.5	<61
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	<58.3	<59.2	<58.8
S98T000364	227:5	Lower half	<66.5	<65.9	<66.2
S98T000365	227:5A	Upper half	<55.7	<55.7	<55.7
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	<61.5	<56.8	<59.1
S98T000555	227:7A	Lower half	<57.3	<57.4	<57.3
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-9. Tank 241-SX-101 Analytical Results: Arsenic (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	<60.1	<60.1	<60.1
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-9. Tank 241-SX-101 Analytical Results: Arsenic (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont')			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-10. Tank 241-SX-101 Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<30.8	<31.3	<31.1
S97T002435	225:2	Lower half	<29.3	<29	<29.1
S97T002440	225:3A	Lower half	<30.4	<30.4	<30.4
S97T002462	225:4	Lower half	<50.5	<50.1	<50.3
S97T002465	225:5	Lower half	<20.5	<20.7	<20.6
S97T002464	225:5R	Lower half	<20.2	<20.3	<20.3
S97T002484	225:6	Upper half	<49.9	<49.9	<49.9
S97T002463		Lower half	<49.8	<49.9	<49.8
S98T000013	225:7	Lower half	<50.1	<50.1	<50.1
S98T000014	225:7A	Lower half	<29.8	<30	<29.9
S98T000015	225:7B	Lower half	<39.9	<39.9	<39.9
S98T000016	225:8	Lower half	<30.1	<30	<30.1
S98T000342	227:1	Upper half	<28.7	<29.1	<28.9
S98T000345		Lower half	<30.2	<30.7	<30.4
S98T000362	227:2	Lower half	<29.1	<29	<29.1
S98T000363	227:4	Lower half	<29.2	<29.6	<29.4
S98T000364	227:5	Lower half	<33.3	<32.9	<33.1
S98T000365	227:5A	Upper half	<27.9	<27.9	<27.9
S98T000366		Lower half	<29.8	<28.2	<29
S98T000442	227:6	Upper half	<28.5	<28.7	<28.6
S98T000443		Lower half	<28.2	<29.3	<28.8
S98T000444	227:7	Lower half	<30.7	<28.4	<29.5
S98T000555	227:7A	Lower half	<28.6	<28.7	<28.6
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<1,100	<1,100	<1,100
S97T002416	225:2	Lower half	<1,010	<1,020	<1,020
S97T002439	225:3A	Lower half	<1,020	<1,030	<1,030
S97T002458	225:4	Lower half	<964	<1,000	<982
S97T002461	225:5	Lower half	<1,010	<1,010	<1,010
S97T002460	225:5R	Lower half	<1,020	<991	<1,010

Table B2-10. Tank 241-SX-101 Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<1,070	<1,090	<1,080
S97T002459		Lower half	<1,060	<1,110	<1,090
S97T002505	225:7	Lower half	<986	<945	<966
S97T002506	225:7A	Lower half	<959	<954	<957
S97T002507	225:7B	Lower half	<1,050	<1,030	<1,040
S97T002508	225:8	Lower half	<1,150	<1,150	<1,150
S98T000341	227:1	Upper half	<997	<990	<994
S98T000344		Lower half	<948	<904	<926
S98T000358	227:2	Lower half	<1,030	<1,030	<1,030
S98T000359	227:4	Lower half	<1,030	<998	<1,010
S98T000360	227:5	Lower half	<1,050	<1,050	<1,050
S98T000357	227:5A	Upper half	<1,020	<1,020	<1,020
S98T000361		Lower half	<969	<971	<970
S98T000439	227:6	Upper half	<997	<1,010	<1,000
S98T000440		Lower half	<988	<947	<968
S98T000441	227:7	Lower half	<1,020	<1,010	<1,020
S98T000554	227:7A	Lower half	<1,010	<1,000	<1,010
S98T000408	Core 225	Solid composite	<999	<1,000	<1,000
S98T000686	Core 227	Solid composite	<1,010	<940	<975
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<30.1	<30.1	<30.1
S98T001091	225:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001092	225:3	Drainable liquid	<30.1	<30.1	<30.1
S97T002444	225:3A	Drainable liquid	<30.1	<30.1	<30.1
S97T002477	225:5	Drainable liquid	<30.1	<30.1	<30.1
S97T002476	225:5R	Drainable liquid	<30.1	<30.1	<30.1
S98T000005	225:7A	Drainable liquid	<30.1	<30.1	<30.1
S98T000009	225:8	Drainable liquid	<30.1	<30.1	<30.1
S98T000012		Drainable liquid	<30.1	<30.1	<30.1

Table B2-10. Tank 241-SX-101 Analytical Results: Barium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<30.1	<30.1	<30.1
S98T000450	227:7	Drainable liquid	<30.1	<30.1	<30.1
S98T000559	227:7BR	Drainable liquid	<0.5	<0.5	<0.5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<30.4	<30.7	<30.5
S98T000691	Core 227	Solid composite	<30.3	<30.1	<30.2

Table B2-11. Tank 241-SX-101 Analytical Results:Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<3.08	<3.12	<3.1
S97T002435	225:2	Lower half	<2.93	<2.9	<2.92
S97T002440	225:3A	Lower half	<3.04	<3.04	<3.04
S97T002462	225:4	Lower half	<5.05	<5.01	<5.03
S97T002465	225:5	Lower half	<2.05	<2.07	<2.06
S97T002464	225:5R	Lower half	<2.02	<2.03	<2.02
S97T002484	225:6	Upper half	<4.99	<4.99	<4.99
S97T002463		Lower half	<4.98	<4.99	<4.99
S98T000013	225:7	Lower half	<5.01	<5.01	<5.01
S98T000014	225:7A	Lower half	<2.98	<3	<2.99
S98T000015	225:7B	Lower half	<3.99	<3.99	<3.99
S98T000016	225:8	Lower half	<3.01	<3	<3
S98T000342	227:1	Upper half	<2.87	<2.91	<2.89
S98T000345		Lower half	<3.02	<3.07	<3.04
S98T000362	227:2	Lower half	<2.91	<2.9	<2.91
S98T000363	227:4	Lower half	<2.92	<2.96	<2.94
S98T000364	227:5	Lower half	<3.33	<3.29	<3.31
S98T000365	227:5A	Upper half	<2.79	<2.79	<2.79
S98T000366		Lower half	<2.98	<2.82	<2.9
S98T000442	227:6	Upper half	<2.85	<2.87	<2.86
S98T000443		Lower half	<2.82	<2.93	<2.88
S98T000444	227:7	Lower half	<3.07	<2.84	<2.96
S98T000555	227:7A	Lower half	<2.86	<2.87	<2.87
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<110	<110	<110
S97T002416	225:2	Lower half	<101	<102	<102
S97T002439	225:3A	Lower half	<102	<103	<103
S97T002458	225:4	Lower half	<96.4	<100	<98.2
S97T002461	225:5	Lower half	<101	<101	<101
S97T002460	225:5R	Lower half	<102	<99.1	<101

Table B2-11. Tank 241-SX-101 Analytical Results:Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<107	<109	<108
S97T002459		Lower half	<106	<111	<109
S97T002505	225:7	Lower half	<98.6	<94.5	<96.5
S97T002506	225:7A	Lower half	<95.9	<95.4	<95.7
S97T002507	225:7B	Lower half	<105	<103	<104
S97T002508	225:8	Lower half	<115	<115	<115
S98T000341	227:1	Upper half	<99.7	<99	<99.3
S98T000344		Lower half	<94.8	<90.4	<92.6
S98T000358	227:2	Lower half	<103	<103	<103
S98T000359	227:4	Lower half	<103	<99.8	<101
S98T000360	227:5	Lower half	<105	<105	<105
S98T000357	227:5A	Upper half	<102	<102	<102
S98T000361		Lower half	<96.9	<97.1	<97
S98T000439	227:6	Upper half	<99.7	<101	<100
S98T000440		Lower half	<98.8	<94.7	<96.8
S98T000441	227:7	Lower half	<102	<101	<102
S98T000554	227:7A	Lower half	<101	<100	<101
S98T000408	Core 225	Solid composite	<99.9	<100	<100
S98T000686	Core 227	Solid composite	<101	<94	<97.5
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<3	<3	<3
S98T001091	225:2	Drainable liquid	<3	<3	<3
S98T001092	225:3	Drainable liquid	<3	<3	<3
S97T002444	225:3A	Drainable liquid	<3	<3	<3
S97T002477	225:5	Drainable liquid	<3	<3	<3
S97T002476	225:5R	Drainable liquid	<3	<3	<3
S98T000005	225:7A	Drainable liquid	<3	<3	<3
S98T000009	225:8	Drainable liquid	<3	<3	<3
S98T000012		Drainable liquid	<3	<3	<3

Table B2-11. Tank 241-SX-101 Analytical Results:Beryllium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<3	<3	<3
S98T000450	227:7	Drainable liquid	<3	<3	<3
S98T000559	227:7BR	Drainable liquid	<0.05	<0.05	<0.05
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<3.04	<3.07	<3.05
S98T000691	Core 227	Solid composite	<3.03	<3.01	<3.02

Table B2-12. Tank 241-SX-101 Analytical Results: Bismuth (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	59.5	<58.1	<58.8
S97T002440	225:3A	Lower half	<60.9	<60.8	<60.8
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	<41	<41.4	<41.2
S97T002464	225:5R	Lower half	<40.4	<40.6	<40.5
S97T002484	225:6	Upper half	<99.8	<99.8	<99.8
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	<57.3	85.3	<71.3[QC:e]
S98T000345		Lower half	<60.4	<61.5	<61
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	<58.3	<59.2	<58.8
S98T000364	227:5	Lower half	<66.5	<65.9	<66.2
S98T000365	227:5A	Upper half	<55.7	<55.7	<55.7
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	<61.5	<56.8	<59.1
S98T000555	227:7A	Lower half	<57.3	<57.4	<57.3
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-12. Tank 241-SX-101 Analytical Results: Bismuth (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	<60.1	<60.1	<60.1
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-12. Tank 241-SX-101 Analytical Results: Bismuth (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-13. Tank 241-SX-101 Analytical Results: Boron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	92.8	104	98.4
S97T002435	225:2	Lower half	48.9	81.2	65[QC:e]
S97T002440	225:3A	Lower half	<30.4	84.3	<57.3[QC:e]
S97T002462	225:4	Lower half	<50.5	139	<94.8[QC:e]
S97T002465	225:5	Lower half	131	133	132
S97T002464	225:5R	Lower half	153	92.6	123[QC:e]
S97T002484	225:6	Upper half	<49.9	<49.9	<49.9
S97T002463		Lower half	72.9	110	91.5[QC:e]
S98T000013	225:7	Lower half	<50.1	<50.1	<50.1
S98T000014	225:7A	Lower half	121	153	137[QC:e]
S98T000015	225:7B	Lower half	<39.9	<39.9	<39.9
S98T000016	225:8	Lower half	165	151	158
S98T000342	227:1	Upper half	57.1	86.8	72[QC:e]
S98T000345		Lower half	142	77.9	110[QC:e]
S98T000362	227:2	Lower half	99.1	105	102
S98T000363	227:4	Lower half	112	117	115
S98T000364	227:5	Lower half	122	55.1	88.5[QC:e]
S98T000365	227:5A	Upper half	111	111	111
S98T000366		Lower half	124	<28.2	<76.1[QC:e]
S98T000442	227:6	Upper half	125	96.6	111[QC:e]
S98T000443		Lower half	99.2	93.7	96.5
S98T000444	227:7	Lower half	91.6	115	103[QC:e]
S98T000555	227:7A	Lower half	104	87.7	95.8
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T002407	225:1	Lower half	<1,100	<1,100	<1,100
S97T002416	225:2	Lower half	<1,010	<1,020	<1,020
S97T002439	225:3A	Lower half	<1,020	<1,030	<1,030
S97T002458	225:4	Lower half	<964	<1,000	<982
S97T002461	225:5	Lower half	<1,010	<1,010	<1,010
S97T002460	225:5R	Lower half	<1,020	<991	<1,010

Table B2-13. Tank 241-SX-101 Analytical Results: Boron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<1,070	<1,090	<1,080
S97T002459		Lower half	<1,060	<1,110	<1,090
S97T002505	225:7	Lower half	<986	<945	<966
S97T002506	225:7A	Lower half	<959	<954	<957
S97T002507	225:7B	Lower half	<1,050	<1,030	<1,040
S97T002508	225:8	Lower half	<1,150	<1,150	<1,150
S98T000341	227:1	Upper half	<997	<990	<994
S98T000344		Lower half	<948	<904	<926
S98T000358	227:2	Lower half	<1,030	<1,030	<1,030
S98T000359	227:4	Lower half	<1,030	<998	<1,010
S98T000360	227:5	Lower half	<1,050	<1,050	<1,050
S98T000357	227:5A	Upper half	<1,020	<1,020	<1,020
S98T000361		Lower half	<969	<971	<970
S98T000439	227:6	Upper half	<997	<1,010	<1,000
S98T000440		Lower half	<988	<947	<968
S98T000441	227:7	Lower half	<1,020	<1,010	<1,020
S98T000554	227:7A	Lower half	<1,010	<1,000	<1,010
S98T000408	Core 225	Solid composite	<999	<1,000	<1,000
S98T000686	Core 227	Solid composite	<1,010	<940	<975
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<30.1	30.9	<30.5
S98T001091	225:2	Drainable liquid	37.7	38.5	38.1
S98T001092	225:3	Drainable liquid	<30.1	<30.1	<30.1
S97T002444	225:3A	Drainable liquid	37.9	41.9	39.9
S97T002477	225:5	Drainable liquid	37.2	39.8	38.5
S97T002476	225:5R	Drainable liquid	52.7	53.4	53
S98T000005	225:7A	Drainable liquid	<30.1	<30.1	<30.1
S98T000009	225:8	Drainable liquid	<30.1	30.4	<30.3
S98T000012		Drainable liquid	33.3	32.5	32.9

Table B2-13. Tank 241-SX-101 Analytical Results: Boron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	34	34	34
S98T000450	227:7	Drainable liquid	30.9	<30.1	<30.5
S98T000559	227:7BR	Drainable liquid	3.99	4	4
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	442	496	469
S98T000691	Core 227	Solid composite	522	330	426[QC:e]

Table B2-14. Tank 241-SX-101 Analytical Results: Cadmium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<3.08	<3.12	<3.1
S97T002435	225:2	Lower half	22.7	20.1	21.4
S97T002440	225:3A	Lower half	11.4	10.7	11.1
S97T002462	225:4	Lower half	<5.05	<5.01	<5.03
S97T002465	225:5	Lower half	12.3	13.1	12.7
S97T002464	225:5R	Lower half	6.28	10.1	8.19[QC:e]
S97T002484	225:6	Upper half	<4.99	<4.99	<4.99
S97T002463		Lower half	<4.98	<4.99	<4.99
S98T000013	225:7	Lower half	<5.01	<5.01	<5.01
S98T000014	225:7A	Lower half	8.42	10.8	9.61[QC:e]
S98T000015	225:7B	Lower half	<3.99	<3.99	<3.99
S98T000016	225:8	Lower half	3.41	3.66	3.54
S98T000342	227:1	Upper half	27.5	31.8	29.6
S98T000345		Lower half	11.2	12.2	11.7
S98T000362	227:2	Lower half	8.98	9.4	9.19
S98T000363	227:4	Lower half	<2.92	<2.96	<2.94
S98T000364	227:5	Lower half	<3.33	<3.29	<3.31
S98T000365	227:5A	Upper half	<2.79	<2.79	<2.79
S98T000366		Lower half	<2.98	<2.82	<2.9
S98T000442	227:6	Upper half	<2.85	<2.87	<2.86
S98T000443		Lower half	<2.82	<2.93	<2.88
S98T000444	227:7	Lower half	<3.07	<2.84	<2.96
S98T000555	227:7A	Lower half	<2.86	<2.87	<2.87
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<110	<110	<110
S97T002416	225:2	Lower half	<101	<102	<102
S97T002439	225:3A	Lower half	<102	<103	<103
S97T002458	225:4	Lower half	<96.4	<100	<98.2
S97T002461	225:5	Lower half	<101	<101	<101
S97T002460	225:5R	Lower half	<102	<99.1	<101

Table B2-14. Tank 241-SX-101 Analytical Results: Cadmium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
S97T002483	225:6	Upper half	<107	<109	<108
S97T002459		Lower half	<106	<111	<109
S97T002505	225:7	Lower half	<98.6	<94.5	<96.5
S97T002506	225:7A	Lower half	<95.9	<95.4	<95.7
S97T002507	225:7B	Lower half	<105	<103	<104
S97T002508	225:8	Lower half	<115	<115	<115
S98T000341	227:1	Upper half	<99.7	<99	<99.3
S98T000344		Lower half	<94.8	<90.4	<92.6
S98T000358	227:2	Lower half	<103	<103	<103
S98T000359	227:4	Lower half	<103	<99.8	<101
S98T000360	227:5	Lower half	<105	<105	<105
S98T000357	227:5A	Upper half	<102	<102	<102
S98T000361		Lower half	<96.9	<97.1	<97
S98T000439	227:6	Upper half	<99.7	<101	<100
S98T000440		Lower half	<98.8	<94.7	<96.8
S98T000441	227:7	Lower half	<102	<101	<102
S98T000554	227:7A	Lower half	<101	<100	<101
S98T000408	Core 225	Solid composite	<99.9	<100	<100
S98T000686	Core 227	Solid composite	<101	<94	<97.5
Liquids			µg/mL	µg/mL	µg/mL
S98T001090	225:1	Drainable liquid	<3	<3	<3
S98T001091	225:2	Drainable liquid	<3	<3	<3
S98T001092	225:3	Drainable liquid	<3	<3	<3
S97T002444	225:3A	Drainable liquid	<3	<3	<3
S97T002477	225:5	Drainable liquid	<3	<3	<3
S97T002476	225:5R	Drainable liquid	3.09	<3	<3.04
S98T000005	225:7A	Drainable liquid	<3	<3	<3
S98T000009	225:8	Drainable liquid	<3	<3	<3
S98T000012		Drainable liquid	<3	<3	<3

Table B2-14. Tank 241-SX-101 Analytical Results: Cadmium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<3	<3	<3
S98T000450	227:7	Drainable liquid	<3	<3	<3
S98T000559	227:7BR	Drainable liquid	<0.05	<0.05	<0.05
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<3.04	<3.07	<3.05
S98T000691	Core 227	Solid composite	<3.03	<3.01	<3.02

Table B2-15. Tank 241-SX-101 Analytical Results: Calcium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	104	98.7	101
S97T002435	225:2	Lower half	377	424	401
S97T002440	225:3A	Lower half	164	132	148[QC:e]
S97T002462	225:4	Lower half	<101	103	<102
S97T002465	225:5	Lower half	117	113	115
S97T002464	225:5R	Lower half	103	81.3	92.2[QC:e]
S97T002484	225:6	Upper half	326	286	306
S97T002463		Lower half	161	124	143[QC:e]
S98T000013	225:7	Lower half	172	162	167
S98T000014	225:7A	Lower half	104	80.8	92.4[QC:e]
S98T000015	225:7B	Lower half	154	174	164
S98T000016	225:8	Lower half	61.6	70.1	65.8
S98T000342	227:1	Upper half	398	358	378
S98T000345		Lower half	150	140	145
S98T000362	227:2	Lower half	114	116	115
S98T000363	227:4	Lower half	79.9	71.2	75.6
S98T000364	227:5	Lower half	154	149	152
S98T000365	227:5A	Upper half	65.8	120	92.9[QC:e]
S98T000366		Lower half	<59.5	65.6	<62.5
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	112	230	171[QC:e]
S98T000444	227:7	Lower half	71.3	<56.8	<64[QC:e]
S98T000555	227:7A	Lower half	152	189	171[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-15. Tank 241-SX-101 Analytical Results: Calcium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			µg/mL	µg/mL	µg/mL
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	<60.1	<60.1	<60.1
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-15. Tank 241-SX-101 Analytical Results: Calcium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-16. Tank 241-SX-101 Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	172	166	169
S97T002440	225:3A	Lower half	<60.9	<60.8	<60.8
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	<41	<41.4	<41.2
S97T002464	225:5R	Lower half	<40.4	<40.6	<40.5
S97T002484	225:6	Upper half	<99.8	<99.8	<99.8
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	170	198	184
S98T000345		Lower half	<60.4	<61.5	<61
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	<58.3	<59.2	<58.8
S98T000364	227:5	Lower half	<66.5	<65.9	<66.2
S98T000365	227:5A	Upper half	<55.7	<55.7	<55.7
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	<61.5	<56.8	<59.1
S98T000555	227:7A	Lower half	<57.3	<57.4	<57.3
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-16. Tank 241-SX-101 Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	<60.1	<60.1	<60.1
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-16. Tank 241-SX-101 Analytical Results: Cerium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-17. Tank 241-SX-101 Analytical Results: Chromium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	4,980	5,120	5,050
S97T002435	225:2	Lower half	23,900	22,100	23,000[QC:c]
S97T002440	225:3A	Lower half	12,400	12,500	12,500
S97T002462	225:4	Lower half	2,260	2,490	2,380
S97T002465	225:5	Lower half	14,500	15,400	15,000
S97T002464	225:5R	Lower half	9,590	12,400	11,000[QC:e]
S97T002484	225:6	Upper half	5,430	5,220	5,330
S97T002463		Lower half	1,100	1,080	1,090
S98T000013	225:7	Lower half	1,830	1,830	1,830
S98T000014	225:7A	Lower half	12,200	13,000	12,600
S98T000015	225:7B	Lower half	1,350	1,480	1,420
S98T000016	225:8	Lower half	7,520	7,620	7,570[QC:c]
S98T000342	227:1	Upper half	31,100	35,300	33,200
S98T000345		Lower half	34,300	37,600	36,000[QC:d]
S98T000362	227:2	Lower half	33,300	34,100	33,700
S98T000363	227:4	Lower half	7,310	7,650	7,480
S98T000364	227:5	Lower half	6,440	7,020	6,730
S98T000365	227:5A	Upper half	798	785	792
S98T000366		Lower half	1,260	1,270	1,270
S98T000442	227:6	Upper half	925	872	899
S98T000443		Lower half	2,280	2,080	2,180[QC:c]
S98T000444	227:7	Lower half	6,160	5,840	6,000
S98T000555	227:7A	Lower half	6,110	6,740	6,430
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	4,980	5,300	5,140
S97T002416	225:2	Lower half	23,900	24,000	24,000
S97T002439	225:3A	Lower half	12,100	12,200	12,200
S97T002458	225:4	Lower half	1,560	2,230	1,900[QC:e]
S97T002461	225:5	Lower half	12,200	12,600	12,400
S97T002460	225:5R	Lower half	13,700	14,000	13,900

Table B2-17. Tank 241-SX-101 Analytical Results: Chromium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	5,090	4,820	4,960
S97T002459		Lower half	1,230	950	1,090[QC:e]
S97T002505	225:7	Lower half	1,780	1,870	1,830
S97T002506	225:7A	Lower half	13,800	14,400	14,100
S97T002507	225:7B	Lower half	1,380	1,430	1,410
S97T002508	225:8	Lower half	7,180	7,260	7,220
S98T000341	227:1	Upper half	34,000	34,700	34,400
S98T000344		Lower half	37,500	36,400	37,000
S98T000358	227:2	Lower half	34,700	35,500	35,100
S98T000359	227:4	Lower half	7,100	7,310	7,210
S98T000360	227:5	Lower half	6,850	6,590	6,720
S98T000357	227:5A	Upper half	774	817	796
S98T000361		Lower half	1,190	1,170	1,180
S98T000439	227:6	Upper half	1,020	994	1,010
S98T000440		Lower half	2,330	2,410	2,370
S98T000441	227:7	Lower half	6,320	5,390	5,860
S98T000554	227:7A	Lower half	6,390	6,680	6,540
S98T000408	Core 225	Solid composite	9,030	10,400	9,720
S98T000686	Core 227	Solid composite	12,900	11,900	12,400
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	8,040	8,380	8,210
S98T001091	225:2	Drainable liquid	8,390	8,350	8,370
S98T001092	225:3	Drainable liquid	8,980	9,360	9,170
S97T002444	225:3A	Drainable liquid	9,050	9,990	9,520
S97T002477	225:5	Drainable liquid	9,630	9,970	9,800
S97T002476	225:5R	Drainable liquid	11,000	11,000	11,000
S98T000005	225:7A	Drainable liquid	9,550	9,750	9,650
S98T000009	225:8	Drainable liquid	9,570	10,500	10,000
S98T000012		Drainable liquid	9,620	9,520	9,570

Table B2-17. Tank 241-SX-101 Analytical Results: Chromium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	14,700	14,800	14,800
S98T000450	227:7	Drainable liquid	15,000	15,100	15,100[QC:c]
S98T000559	227:7BR	Drainable liquid	123	123	123
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	2,790	3,480	3,140[QC:e]
S98T000691	Core 227	Solid composite	3,610	3,490	3,550

Table B2-18. Tank 241-SX-101 Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<12.3	<12.5	<12.4
S97T002435	225:2	Lower half	<11.7	<11.6	<11.6
S97T002440	225:3A	Lower half	<12.2	<12.2	<12.2
S97T002462	225:4	Lower half	<20.2	<20	<20.1
S97T002465	225:5	Lower half	<8.2	<8.29	<8.24
S97T002464	225:5R	Lower half	<8.08	<8.11	<8.09
S97T002484	225:6	Upper half	<20	<20	<20
S97T002463		Lower half	<19.9	<20	<19.9
S98T000013	225:7	Lower half	<20	<20	<20
S98T000014	225:7A	Lower half	<11.9	<12	<11.9
S98T000015	225:7B	Lower half	<16	<16	<16
S98T000016	225:8	Lower half	<12	<12	<12
S98T000342	227:1	Upper half	12	13.2	12.6
S98T000345		Lower half	<12.1	<12.3	<12.2
S98T000362	227:2	Lower half	<11.7	<11.6	<11.6
S98T000363	227:4	Lower half	<11.7	<11.8	<11.8
S98T000364	227:5	Lower half	<13.3	<13.2	<13.3
S98T000365	227:5A	Upper half	<11.1	<11.1	<11.1
S98T000366		Lower half	<11.9	<11.3	<11.6
S98T000442	227:6	Upper half	<11.4	<11.5	<11.4
S98T000443		Lower half	<11.3	<11.7	<11.5
S98T000444	227:7	Lower half	<12.3	<11.4	<11.9
S98T000555	227:7A	Lower half	<11.5	<11.5	<11.5
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<439	<438	<439
S97T002416	225:2	Lower half	<405	<408	<407
S97T002439	225:3A	Lower half	<406	<411	<409
S97T002458	225:4	Lower half	<386	<402	<394
S97T002461	225:5	Lower half	<403	<404	<404
S97T002460	225:5R	Lower half	<410	<396	<403

Table B2-18. Tank 241-SX-101 Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<427	<437	<432
S97T002459		Lower half	<425	<444	<435
S97T002505	225:7	Lower half	<394	<378	<386
S97T002506	225:7A	Lower half	<384	<381	<383
S97T002507	225:7B	Lower half	<418	<411	<415
S97T002508	225:8	Lower half	<460	<458	<459
S98T000341	227:1	Upper half	<399	<396	<398
S98T000344		Lower half	<379	<362	<371
S98T000358	227:2	Lower half	<413	<410	<412
S98T000359	227:4	Lower half	<410	<399	<405
S98T000360	227:5	Lower half	<420	<418	<419
S98T000357	227:5A	Upper half	<407	<407	<407
S98T000361		Lower half	<388	<388	<388
S98T000439	227:6	Upper half	<399	<404	<402
S98T000440		Lower half	<395	<379	<387
S98T000441	227:7	Lower half	<406	<405	<406
S98T000554	227:7A	Lower half	<405	<401	<403
S98T000408	Core 225	Solid composite	<400	<402	<401
S98T000686	Core 227	Solid composite	<403	<376	<390
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<12	<12	<12
S98T001091	225:2	Drainable liquid	<12	<12	<12
S98T001092	225:3	Drainable liquid	<12	<12	<12
S97T002444	225:3A	Drainable liquid	<12	<12	<12
S97T002477	225:5	Drainable liquid	<12	<12	<12
S97T002476	225:5R	Drainable liquid	<12	<12	<12
S98T000005	225:7A	Drainable liquid	<12	<12	<12
S98T000009	225:8	Drainable liquid	<12	<12	<12
S98T000012		Drainable liquid	<12	<12	<12

Table B2-18. Tank 241-SX-101 Analytical Results: Cobalt (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<12	<12	<12
S98T000450	227:7	Drainable liquid	<12	<12	<12
S98T000559	227:7BR	Drainable liquid	<0.2	<0.2	<0.2
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<12.2	<12.3	<12.3
S98T000691	Core 227	Solid composite	<12.1	<12	<12.1

Table B2-19. Tank 241-SX-101 Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<6.16	<6.25	<6.21
S97T002435	225:2	Lower half	<5.87	<5.81	<5.84
S97T002440	225:3A	Lower half	<6.09	<6.08	<6.08
S97T002462	225:4	Lower half	<10.1	<10	<10.1
S97T002465	225:5	Lower half	<4.1	<4.14	<4.12
S97T002464	225:5R	Lower half	<4.04	<4.06	<4.05
S97T002484	225:6	Upper half	<9.98	<9.98	<9.98
S97T002463		Lower half	<9.97	<9.98	<9.98
S98T000013	225:7	Lower half	<10	<10	<10
S98T000014	225:7A	Lower half	<5.97	<6	<5.98
S98T000015	225:7B	Lower half	<7.98	<7.98	<7.98
S98T000016	225:8	Lower half	<6.01	<5.99	<6
S98T000342	227:1	Upper half	<5.73	<5.81	<5.77
S98T000345		Lower half	<6.04	<6.15	<6.1
S98T000362	227:2	Lower half	<5.83	<5.79	<5.81
S98T000363	227:4	Lower half	<5.83	<5.92	<5.88
S98T000364	227:5	Lower half	<6.65	<6.59	<6.62
S98T000365	227:5A	Upper half	<5.57	<5.57	<5.57
S98T000366		Lower half	<5.95	<5.63	<5.79
S98T000442	227:6	Upper half	<5.71	<5.74	<5.72
S98T000443		Lower half	<5.63	<5.85	<5.74
S98T000444	227:7	Lower half	<6.15	<5.68	<5.92
S98T000555	227:7A	Lower half	<5.73	<5.74	<5.74
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	<202	<204	<203
S97T002439	225:3A	Lower half	<203	<206	<205
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	<202	<202
S97T002460	225:5R	Lower half	<205	<198	<202

Table B2-19. Tank 241-SX-101 Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<213	<219	<216
S97T002459		Lower half	<213	<222	<218
S97T002505	225:7	Lower half	<197	<189	<193
S97T002506	225:7A	Lower half	<192	<191	<192
S97T002507	225:7B	Lower half	<209	<206	<208
S97T002508	225:8	Lower half	<230	<229	<230
S98T000341	227:1	Upper half	<199	<198	<199
S98T000344		Lower half	<190	<181	<186
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	<205	<200	<203
S98T000360	227:5	Lower half	<210	<209	<210
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	<203	<203
S98T000554	227:7A	Lower half	<203	<200	<202
S98T000408	Core 225	Solid composite	<200	<201	<201
S98T000686	Core 227	Solid composite	<201	<188	<195
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<6.01	<6.01	<6.01
S98T001091	225:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001092	225:3	Drainable liquid	<6.01	<6.01	<6.01
S97T002444	225:3A	Drainable liquid	<6.01	<6.01	<6.01
S97T002477	225:5	Drainable liquid	<6.01	<6.01	<6.01
S97T002476	225:5R	Drainable liquid	<6.01	<6.01	<6.01
S98T000005	225:7A	Drainable liquid	<6.01	<6.01	<6.01
S98T000009	225:8	Drainable liquid	<6.01	<6.01	<6.01
S98T000012		Drainable liquid	<6.01	<6.01	<6.01

Table B2-19. Tank 241-SX-101 Analytical Results: Copper (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<6.01	<6.01	<6.01
S98T000450	227:7	Drainable liquid	<6.01	<6.01	<6.01
S98T000559	227:7BR	Drainable liquid	<0.1	<0.1	<0.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<6.09	<6.14	<6.12
S98T000691	Core 227	Solid composite	<6.06	<6.02	<6.04

Table B2-20. Tank 241-SX-101 Analytical Results: Iron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	<30.8	<31.3	<31.1
S97T002435	225:2	Lower half	9,230	8,910	9,070
S97T002440	225:3A	Lower half	1,040	1,150	1,100
S97T002462	225:4	Lower half	<50.5	<50.1	<50.3
S97T002465	225:5	Lower half	805	860	833
S97T002464	225:5R	Lower half	430	640	535[QC:e]
S97T002484	225:6	Upper half	4,540	4,330	4,440
S97T002463		Lower half	1,280	1,440	1,360
S98T000013	225:7	Lower half	2,300	2,380	2,340
S98T000014	225:7A	Lower half	579	704	642
S98T000015	225:7B	Lower half	1,900	2,090	2,000
S98T000016	225:8	Lower half	398	391	395
S98T000342	227:1	Upper half	10,400	12,200	11,300
S98T000345		Lower half	1,180	1,280	1,230
S98T000362	227:2	Lower half	1,350	1,000	1,180[QC:e]
S98T000363	227:4	Lower half	622	600	611
S98T000364	227:5	Lower half	357	397	377
S98T000365	227:5A	Upper half	66.2	62.3	64.3
S98T000366		Lower half	41.6	53.1	47.4[QC:e]
S98T000442	227:6	Upper half	31.7	30.1	30.9
S98T000443		Lower half	48.7	45.4	47
S98T000444	227:7	Lower half	170	172	171
S98T000555	227:7A	Lower half	335	381	358
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T002407	225:1	Lower half	<1,100	<1,100	<1,100
S97T002416	225:2	Lower half	9,290	9,520	9,410
S97T002439	225:3A	Lower half	<1,020	<1,030	<1,030
S97T002458	225:4	Lower half	<964	<1,000	<982
S97T002461	225:5	Lower half	<1,010	<1,010	<1,010
S97T002460	225:5R	Lower half	<1,020	<991	<1,010

Table B2-20. Tank 241-SX-101 Analytical Results: Iron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	4,140	3,830	3,990
S97T002459		Lower half	1,290	1,140	1,220
S97T002505	225:7	Lower half	2,420	2,390	2,410
S97T002506	225:7A	Lower half	<959	<954	<957
S97T002507	225:7B	Lower half	1,730	1,730	1,730
S97T002508	225:8	Lower half	<1,150	<1,150	<1,150
S98T000341	227:1	Upper half	11,400	11,600	11,500
S98T000344		Lower half	1,270	1,290	1,280
S98T000358	227:2	Lower half	1,160	<1,030	<1,100
S98T000359	227:4	Lower half	<1,030	<998	<1,010
S98T000360	227:5	Lower half	<1,050	<1,050	<1,050
S98T000357	227:5A	Upper half	<1,020	<1,020	<1,020
S98T000361		Lower half	<969	<971	<970
S98T000439	227:6	Upper half	<997	<1,010	<1,000
S98T000440		Lower half	<988	<947	<968
S98T000441	227:7	Lower half	<1,020	<1,010	<1,020
S98T000554	227:7A	Lower half	<1,010	<1,000	<1,010
S98T000408	Core 225	Solid composite	2,560	3,030	2,800
S98T000686	Core 227	Solid composite	1,400	1,260	1,330
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<30.1	<30.1	<30.1
S98T001091	225:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001092	225:3	Drainable liquid	<30.1	<30.1	<30.1
S97T002444	225:3A	Drainable liquid	<30.1	<30.1	<30.1
S97T002477	225:5	Drainable liquid	<30.1	<30.1	<30.1
S97T002476	225:5R	Drainable liquid	140	<30.1	<85[QC:e]
S98T000005	225:7A	Drainable liquid	<30.1	<30.1	<30.1
S98T000009	225:8	Drainable liquid	<30.1	<30.1	<30.1
S98T000012		Drainable liquid	<30.1	<30.1	<30.1

Table B2-20. Tank 241-SX-101 Analytical Results: Iron (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<30.1	<30.1	<30.1
S98T000450	227:7	Drainable liquid	<30.1	<30.1	<30.1
S98T000559	227:7BR	Drainable liquid	<0.5	<0.5	<0.5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<30.4	<30.7	<30.5
S98T000691	Core 227	Solid composite	<30.3	<30.1	<30.2

Table B2-21. Tank 241-SX-101 Analytical Results: Lanthanum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<30.8	<31.3	<31.1
S97T002435	225:2	Lower half	94.2	92.3	93.3
S97T002440	225:3A	Lower half	<30.4	<30.4	<30.4
S97T002462	225:4	Lower half	<50.5	<50.1	<50.3
S97T002465	225:5	Lower half	<20.5	<20.7	<20.6
S97T002464	225:5R	Lower half	<20.2	<20.3	<20.3
S97T002484	225:6	Upper half	<49.9	<49.9	<49.9
S97T002463		Lower half	<49.8	<49.9	<49.8
S98T000013	225:7	Lower half	<50.1	<50.1	<50.1
S98T000014	225:7A	Lower half	<29.8	<30	<29.9
S98T000015	225:7B	Lower half	<39.9	<39.9	<39.9
S98T000016	225:8	Lower half	<30.1	<30	<30.1
S98T000342	227:1	Upper half	100	118	109
S98T000345		Lower half	<30.2	<30.7	<30.4
S98T000362	227:2	Lower half	<29.1	<29	<29.1
S98T000363	227:4	Lower half	<29.2	<29.6	<29.4
S98T000364	227:5	Lower half	<33.3	<32.9	<33.1
S98T000365	227:5A	Upper half	<27.9	<27.9	<27.9
S98T000366		Lower half	<29.8	<28.2	<29
S98T000442	227:6	Upper half	<28.5	<28.7	<28.6
S98T000443		Lower half	<28.2	<29.3	<28.8
S98T000444	227:7	Lower half	<30.7	<28.4	<29.5
S98T000555	227:7A	Lower half	<28.6	<28.7	<28.6
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<1,100	<1,100	<1,100
S97T002416	225:2	Lower half	<1,010	<1,020	<1,020
S97T002439	225:3A	Lower half	<1,020	<1,030	<1,030
S97T002458	225:4	Lower half	<964	<1,000	<982
S97T002461	225:5	Lower half	<1,010	<1,010	<1,010
S97T002460	225:5R	Lower half	<1,020	<991	<1,010

Table B2-21. Tank 241-SX-101 Analytical Results: Lanthanum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<1,070	<1,090	<1,080
S97T002459		Lower half	<1,060	<1,110	<1,090
S97T002505	225:7	Lower half	<986	<945	<966
S97T002506	225:7A	Lower half	<959	<954	<957
S97T002507	225:7B	Lower half	<1,050	<1,030	<1,040
S97T002508	225:8	Lower half	<1,150	<1,150	<1,150
S98T000341	227:1	Upper half	<997	<990	<994
S98T000344		Lower half	<948	<904	<926
S98T000358	227:2	Lower half	<1,030	<1,030	<1,030
S98T000359	227:4	Lower half	<1,030	<998	<1,010
S98T000360	227:5	Lower half	<1,050	<1,050	<1,050
S98T000357	227:5A	Upper half	<1,020	<1,020	<1,020
S98T000361		Lower half	<969	<971	<970
S98T000439	227:6	Upper half	<997	<1,010	<1,000
S98T000440		Lower half	<988	<947	<968
S98T000441	227:7	Lower half	<1,020	<1,010	<1,020
S98T000554	227:7A	Lower half	<1,010	<1,000	<1,010
S98T000408	Core 225	Solid composite	<999	<1,000	<1,000
S98T000686	Core 227	Solid composite	<1,010	<940	<975
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<30.1	<30.1	<30.1
S98T001091	225:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001092	225:3	Drainable liquid	<30.1	<30.1	<30.1
S97T002444	225:3A	Drainable liquid	<30.1	<30.1	<30.1
S97T002477	225:5	Drainable liquid	<30.1	<30.1	<30.1
S97T002476	225:5R	Drainable liquid	<30.1	<30.1	<30.1
S98T000005	225:7A	Drainable liquid	<30.1	<30.1	<30.1
S98T000009	225:8	Drainable liquid	<30.1	<30.1	<30.1
S98T000012		Drainable liquid	<30.1	<30.1	<30.1

Table B2-21. Tank 241-SX-101 Analytical Results: Lanthanum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<30.1	<30.1	<30.1
S98T000450	227:7	Drainable liquid	<30.1	<30.1	<30.1
S98T000559	227:7BR	Drainable liquid	<0.5	<0.5	<0.5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<30.4	<30.7	<30.5
S98T000691	Core 227	Solid composite	<30.3	<30.1	<30.2

Table B2-22. Tank 241-SX-101 Analytical Results: Lead (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	590	559	575
S97T002440	225:3A	Lower half	76.9	68.4	72.7
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	50.5	59.3	54.9
S97T002464	225:5R	Lower half	<40.4	51.4	<45.9[QC:e]
S97T002484	225:6	Upper half	620	<99.8	<360[QC:e]
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	653	748	701
S98T000345		Lower half	89.4	84.5	87
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	<58.3	<59.2	<58.8
S98T000364	227:5	Lower half	<66.5	<65.9	<66.2
S98T000365	227:5A	Upper half	<55.7	<55.7	<55.7
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	<61.5	<56.8	<59.1
S98T000555	227:7A	Lower half	<57.3	<57.4	<57.3
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-22. Tank 241-SX-101 Analytical Results: Lead (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	8,410	<2,290	<5,350[QC:c,e]
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	8,850	8,760	8,810
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-22. Tank 241-SX-101 Analytical Results: Lead (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-23. Tank 241-SX-101 Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<6.16	<6.25	<6.21
S97T002435	225:2	Lower half	7.72	7.52	7.62
S97T002440	225:3A	Lower half	<6.09	<6.08	<6.08
S97T002462	225:4	Lower half	<10.1	<10	<10.1
S97T002465	225:5	Lower half	6.23	6.67	6.45
S97T002464	225:5R	Lower half	<4.04	5.05	<4.54[QC:e]
S97T002484	225:6	Upper half	17.9	17.3	17.6
S97T002463		Lower half	<9.97	<9.98	<9.98
S98T000013	225:7	Lower half	20.1	20.4	20.3
S98T000014	225:7A	Lower half	7.58	8.01	7.8
S98T000015	225:7B	Lower half	113	127	120
S98T000016	225:8	Lower half	13.8	13.6	13.7
S98T000342	227:1	Upper half	12	13.7	12.8
S98T000345		Lower half	10.5	11	10.8
S98T000362	227:2	Lower half	10.5	10.6	10.6
S98T000363	227:4	Lower half	20.2	19.2	19.7
S98T000364	227:5	Lower half	7.9	8.67	8.29
S98T000365	227:5A	Upper half	<5.57	<5.57	<5.57
S98T000366		Lower half	<5.95	<5.63	<5.79
S98T000442	227:6	Upper half	<5.71	<5.74	<5.72
S98T000443		Lower half	<5.63	<5.85	<5.74
S98T000444	227:7	Lower half	<6.15	<5.68	<5.92
S98T000555	227:7A	Lower half	112	131	122
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	<202	<204	<203
S97T002439	225:3A	Lower half	<203	<206	<205
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	<202	<202
S97T002460	225:5R	Lower half	<205	<198	<202

Table B2-23. Tank 241-SX-101 Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<213	<219	<216
S97T002459		Lower half	<213	<222	<218
S97T002505	225:7	Lower half	<197	<189	<193
S97T002506	225:7A	Lower half	<192	<191	<192
S97T002507	225:7B	Lower half	<209	<206	<208
S97T002508	225:8	Lower half	<230	<229	<230
S98T000341	227:1	Upper half	<199	<198	<199
S98T000344		Lower half	<190	<181	<186
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	<205	<200	<203
S98T000360	227:5	Lower half	<210	<209	<210
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	<203	<203
S98T000554	227:7A	Lower half	<203	<200	<202
S98T000408	Core 225	Solid composite	<200	<201	<201
S98T000686	Core 227	Solid composite	<201	<188	<195
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<6.01	<6.01	<6.01
S98T001091	225:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001092	225:3	Drainable liquid	<6.01	<6.01	<6.01
S97T002444	225:3A	Drainable liquid	<6.01	<6.01	<6.01
S97T002477	225:5	Drainable liquid	<6.01	<6.01	<6.01
S97T002476	225:5R	Drainable liquid	<6.01	<6.01	<6.01
S98T000005	225:7A	Drainable liquid	<6.01	<6.01	<6.01
S98T000009	225:8	Drainable liquid	<6.01	<6.01	<6.01
S98T000012		Drainable liquid	<6.01	<6.01	<6.01

Table B2-23. Tank 241-SX-101 Analytical Results: Lithium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	11.9	11.7	11.8
S98T000450	227:7	Drainable liquid	6.77	6.56	6.66
S98T000559	227:7BR	Drainable liquid	1,290	1,280	1,290
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<6.09	<6.14	<6.12
S98T000691	Core 227	Solid composite	<6.06	<6.02	<6.04

Table B2-24. Tank 241-SX-101 Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	93.1	90.3	91.7
S97T002440	225:3A	Lower half	<60.9	<60.8	<60.8
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	<41	<41.4	<41.2
S97T002464	225:5R	Lower half	<40.4	<40.6	<40.5
S97T002484	225:6	Upper half	128	128	128
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	75	81	78
S98T000345		Lower half	<60.4	<61.5	<61
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	<58.3	<59.2	<58.8
S98T000364	227:5	Lower half	<66.5	<65.9	<66.2
S98T000365	227:5A	Upper half	<55.7	<55.7	<55.7
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	<61.5	<56.8	<59.1
S98T000555	227:7A	Lower half	<57.3	<57.4	<57.3
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-24. Tank 241-SX-101 Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	<60.1	<60.1	<60.1
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-24. Tank 241-SX-101 Analytical Results: Magnesium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-25. Tank 241-SX-101 Analytical Results: Manganese (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<6.16	<6.25	<6.21
S97T002435	225:2	Lower half	2,320	2,190	2,260
S97T002440	225:3A	Lower half	249	253	251
S97T002462	225:4	Lower half	15.7	17.7	16.7
S97T002465	225:5	Lower half	203	218	211
S97T002464	225:5R	Lower half	101	154	128[QC:e]
S97T002484	225:6	Upper half	6,450	6,180	6,320
S97T002463		Lower half	1,720	2,060	1,890
S98T000013	225:7	Lower half	3,000	3,040	3,020
S98T000014	225:7A	Lower half	193	234	214
S98T000015	225:7B	Lower half	2,520	2,790	2,660
S98T000016	225:8	Lower half	196	202	199
S98T000342	227:1	Upper half	2,470	2,870	2,670
S98T000345		Lower half	287	311	299
S98T000362	227:2	Lower half	143	143	143
S98T000363	227:4	Lower half	882	834	858
S98T000364	227:5	Lower half	450	514	482
S98T000365	227:5A	Upper half	44.6	44.8	44.7
S98T000366		Lower half	26.9	36.2	31.6[QC:e]
S98T000442	227:6	Upper half	11.5	11.4	11.4
S98T000443		Lower half	20.9	21.7	21.3
S98T000444	227:7	Lower half	193	195	194
S98T000555	227:7A	Lower half	209	228	219
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	2,290	2,330	2,310
S97T002439	225:3A	Lower half	250	253	252
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	205	<204
S97T002460	225:5R	Lower half	235	238	237

Table B2-25. Tank 241-SX-101 Analytical Results: Manganese (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	5,990	5,610	5,800
S97T002459		Lower half	1,800	1,620	1,710
S97T002505	225:7	Lower half	3,110	3,140	3,130
S97T002506	225:7A	Lower half	262	273	268
S97T002507	225:7B	Lower half	2,620	2,630	2,630
S97T002508	225:8	Lower half	231	245	238
S98T000341	227:1	Upper half	2,720	2,750	2,740
S98T000344		Lower half	348	337	343
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	1,100	1,110	1,110
S98T000360	227:5	Lower half	451	455	453
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	249	<226[QC:e]
S98T000554	227:7A	Lower half	253	233	243
S98T000408	Core 225	Solid composite	1,530	1,870	1,700
S98T000686	Core 227	Solid composite	504	465	485
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<6.01	<6.01	<6.01
S98T001091	225:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001092	225:3	Drainable liquid	<6.01	<6.01	<6.01
S97T002444	225:3A	Drainable liquid	<6.01	<6.01	<6.01
S97T002477	225:5	Drainable liquid	<6.01	<6.01	<6.01
S97T002476	225:5R	Drainable liquid	35.5	<6.01	<20.8[QC:e]
S98T000005	225:7A	Drainable liquid	<6.01	<6.01	<6.01
S98T000009	225:8	Drainable liquid	<6.01	<6.01	<6.01
S98T000012		Drainable liquid	<6.01	<6.01	<6.01

Table B2-25. Tank 241-SX-101 Analytical Results: Manganese (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<6.01	<6.01	<6.01
S98T000450	227:7	Drainable liquid	<6.01	<6.01	<6.01
S98T000559	227:7BR	Drainable liquid	<0.1	<0.1	<0.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<6.09	<6.14	<6.12
S98T000691	Core 227	Solid composite	<6.06	<6.02	<6.04

Table B2-26. Tank 241-SX-101 Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	39.2	39.4	39.3
S97T002435	225:2	Lower half	32.8	30.9	31.8
S97T002440	225:3A	Lower half	<30.4	<30.4	<30.4
S97T002462	225:4	Lower half	<50.5	<50.1	<50.3
S97T002465	225:5	Lower half	35.8	37.2	36.5
S97T002464	225:5R	Lower half	33.8	34.5	34.1
S97T002484	225:6	Upper half	<49.9	<49.9	<49.9
S97T002463		Lower half	<49.8	<49.9	<49.8
S98T000013	225:7	Lower half	<50.1	<50.1	<50.1
S98T000014	225:7A	Lower half	34.8	30.3	32.5
S98T000015	225:7B	Lower half	<39.9	<39.9	<39.9
S98T000016	225:8	Lower half	31.7	30.8	31.3
S98T000342	227:1	Upper half	32	34.7	33.4
S98T000345		Lower half	37.8	39.1	38.5
S98T000362	227:2	Lower half	38.7	39.2	39
S98T000363	227:4	Lower half	<29.2	<29.6	<29.4
S98T000364	227:5	Lower half	<33.3	<32.9	<33.1
S98T000365	227:5A	Upper half	<27.9	<27.9	<27.9
S98T000366		Lower half	<29.8	<28.2	<29
S98T000442	227:6	Upper half	<28.5	<28.7	<28.6
S98T000443		Lower half	<28.2	<29.3	<28.8
S98T000444	227:7	Lower half	<30.7	<28.4	<29.5
S98T000555	227:7A	Lower half	<28.6	<28.7	<28.6
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<1,100	<1,100	<1,100
S97T002416	225:2	Lower half	<1,010	<1,020	<1,020
S97T002439	225:3A	Lower half	<1,020	<1,030	<1,030
S97T002458	225:4	Lower half	<964	<1,000	<982
S97T002461	225:5	Lower half	<1,010	<1,010	<1,010
S97T002460	225:5R	Lower half	<1,020	<991	<1,010

Table B2-26. Tank 241-SX-101 Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<1,070	<1,090	<1,080
S97T002459		Lower half	<1,060	<1,110	<1,090
S97T002505	225:7	Lower half	<986	<945	<966
S97T002506	225:7A	Lower half	<959	<954	<957
S97T002507	225:7B	Lower half	<1,050	<1,030	<1,040
S97T002508	225:8	Lower half	<1,150	<1,150	<1,150
S98T000341	227:1	Upper half	<997	<990	<994
S98T000344		Lower half	<948	<904	<926
S98T000358	227:2	Lower half	<1,030	<1,030	<1,030
S98T000359	227:4	Lower half	<1,030	<998	<1,010
S98T000360	227:5	Lower half	<1,050	<1,050	<1,050
S98T000357	227:5A	Upper half	<1,020	<1,020	<1,020
S98T000361		Lower half	<969	<971	<970
S98T000439	227:6	Upper half	<997	<1,010	<1,000
S98T000440		Lower half	<988	<947	<968
S98T000441	227:7	Lower half	<1,020	<1,010	<1,020
S98T000554	227:7A	Lower half	<1,010	<1,000	<1,010
S98T000408	Core 225	Solid composite	<999	<1,000	<1,000
S98T000686	Core 227	Solid composite	<1,010	<940	<975
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	64.1	65.3	64.7
S98T001091	225:2	Drainable liquid	65.4	65.6	65.5
S98T001092	225:3	Drainable liquid	60.9	65.9	63.4
S97T002444	225:3A	Drainable liquid	61.8	67.6	64.7
S97T002477	225:5	Drainable liquid	65.6	67.4	66.5
S97T002476	225:5R	Drainable liquid	71.5	78.6	75
S98T000005	225:7A	Drainable liquid	63.8	66.1	64.9
S98T000009	225:8	Drainable liquid	64.7	68.1	66.4
S98T000012		Drainable liquid	65.9	66.1	66

Table B2-26. Tank 241-SX-101 Analytical Results: Molybdenum (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	66.4	66.9	66.7
S98T000450	227:7	Drainable liquid	70.4	69.1	69.8
S98T000559	227:7BR	Drainable liquid	1.01	0.985	0.998
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<30.4	<30.7	<30.5
S98T000691	Core 227	Solid composite	<30.3	<30.1	<30.2

Table B2-27. Tank 241-SX-101 Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	252	247	250
S97T002440	225:3A	Lower half	<60.9	<60.8	<60.8
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	<41	<41.4	<41.2
S97T002464	225:5R	Lower half	<40.4	<40.6	<40.5
S97T002484	225:6	Upper half	109	105	107
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	273	323	298
S98T000345		Lower half	<60.4	<61.5	<61
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	<58.3	<59.2	<58.8
S98T000364	227:5	Lower half	<66.5	<65.9	<66.2
S98T000365	227:5A	Upper half	<55.7	<55.7	<55.7
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	<61.5	<56.8	<59.1
S98T000555	227:7A	Lower half	<57.3	<57.4	<57.3
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-27. Tank 241-SX-101 Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	<60.1	<60.1	<60.1
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-27. Tank 241-SX-101 Analytical Results: Neodymium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-28. Tank 241-SX-101 Analytical Results: Nickel (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	<12.3	<12.5	<12.4
S97T002435	225:2	Lower half	91.4	86.1	88.8
S97T002440	225:3A	Lower half	42.5	45.9	44.2
S97T002462	225:4	Lower half	<20.2	<20	<20.1
S97T002465	225:5	Lower half	53	52.2	52.6
S97T002464	225:5R	Lower half	24.2	35.2	29.7[QC:e]
S97T002484	225:6	Upper half	200	191	196
S97T002463		Lower half	49	58.3	53.6
S98T000013	225:7	Lower half	88.8	97.7	93.3
S98T000014	225:7A	Lower half	38.5	44.3	41.4
S98T000015	225:7B	Lower half	83.8	91.2	87.5
S98T000016	225:8	Lower half	21.1	20.5	20.8
S98T000342	227:1	Upper half	105	114	110
S98T000345		Lower half	41.2	42.2	41.7
S98T000362	227:2	Lower half	35.5	31.9	33.7
S98T000363	227:4	Lower half	32.8	29.7	31.3
S98T000364	227:5	Lower half	14.8	19.5	17.1[QC:e]
S98T000365	227:5A	Upper half	<11.1	<11.1	<11.1
S98T000366		Lower half	<11.9	<11.3	<11.6
S98T000442	227:6	Upper half	<11.4	<11.5	<11.4
S98T000443		Lower half	<11.3	<11.7	<11.5
S98T000444	227:7	Lower half	17.1	<11.4	<14.3[QC:e]
S98T000555	227:7A	Lower half	52.1	20.4	36.3[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<12	<12	<12
S98T001091	225:2	Drainable liquid	<12	<12	<12
S98T001092	225:3	Drainable liquid	<12	<12	<12
S97T002444	225:3A	Drainable liquid	<12	<12	<12
S97T002477	225:5	Drainable liquid	<12	<12	<12
S97T002476	225:5R	Drainable liquid	<12	<12	<12

Table B2-28. Tank 241-SX-101 Analytical Results: Nickel (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000005	225:7A	Drainable liquid	<12	<12	<12
S98T000009	225:8	Drainable liquid	<12	<12	<12
S98T000012		Drainable liquid	<12	<12	<12
S98T000374	227:5	Drainable liquid	<12	<12	<12
S98T000450	227:7	Drainable liquid	<12	<12	<12
S98T000559	227:7BR	Drainable liquid	<0.2	<0.2	<0.2
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<12.2	<12.3	<12.3
S98T000691	Core 227	Solid composite	<12.1	<12	<12.1

Table B2-29. Tank 241-SX-101 Analytical Results: Phosphorus (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	1,460	1,350	1,410
S97T002435	225:2	Lower half	968	5,610	3,290[QC:e]
S97T002440	225:3A	Lower half	1,130	1,130	1,130
S97T002462	225:4	Lower half	<202	<200	<201
S97T002465	225:5	Lower half	1,000	1,080	1,040
S97T002464	225:5R	Lower half	758	862	810
S97T002484	225:6	Upper half	<200	<200	<200
S97T002463		Lower half	<199	<200	<200
S98T000013	225:7	Lower half	<200	<200	<200
S98T000014	225:7A	Lower half	952	1,050	1,000
S98T000015	225:7B	Lower half	<160	<160	<160
S98T000016	225:8	Lower half	904	975	940
S98T000342	227:1	Upper half	12,400	2,550	7,480[QC:e]
S98T000345		Lower half	9,780	6,020	7,900[QC:c,e]
S98T000362	227:2	Lower half	2,480	2,670	2,580
S98T000363	227:4	Lower half	304	310	307
S98T000364	227:5	Lower half	401	400	401
S98T000365	227:5A	Upper half	<111	<111	<111
S98T000366		Lower half	<119	<113	<116
S98T000442	227:6	Upper half	<114	<115	<115
S98T000443		Lower half	<113	<117	<115
S98T000444	227:7	Lower half	<123	<114	<119
S98T000555	227:7A	Lower half	<115	119	<117
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<4,390	<4,380	<4,390
S97T002416	225:2	Lower half	<4,050	<4,080	<4,070
S97T002439	225:3A	Lower half	<4,060	<4,110	<4,090
S97T002458	225:4	Lower half	<3,860	<4,020	<3,940
S97T002461	225:5	Lower half	<4,030	<4,040	<4,040
S97T002460	225:5R	Lower half	<4,100	<3,960	<4,030

Table B2-29. Tank 241-SX-101 Analytical Results: Phosphorus (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
S97T002483	225:6	Upper half	<4,270	<4,370	<4,320
S97T002459		Lower half	<4,250	<4,440	<4,350
S97T002505	225:7	Lower half	<3,940	<3,780	<3,860
S97T002506	225:7A	Lower half	<3,840	<3,810	<3,830
S97T002507	225:7B	Lower half	<4,180	<4,110	<4,150
S97T002508	225:8	Lower half	<4,600	<4,580	<4,590
S98T000341	227:1	Upper half	<3,990	5,800	<4,900[QC:e]
S98T000344		Lower half	8,360	8,630	8,500
S98T000358	227:2	Lower half	6,240	<4,100	<5,170[QC:e]
S98T000359	227:4	Lower half	<4,100	<3,990	<4,050
S98T000360	227:5	Lower half	<4,200	<4,180	<4,190
S98T000357	227:5A	Upper half	<4,070	<4,070	<4,070
S98T000361		Lower half	<3,880	<3,880	<3,880
S98T000439	227:6	Upper half	<3,990	<4,040	<4,020
S98T000440		Lower half	<3,950	<3,790	<3,870
S98T000441	227:7	Lower half	<4,060	<4,050	<4,060
S98T000554	227:7A	Lower half	<4,050	<4,010	<4,030
S98T000408	Core 225	Solid composite	<4,000	<4,020	<4,010
S98T000686	Core 227	Solid composite	<4,030	4,580	<4,310
Liquids			µg/mL	µg/mL	µg/mL
S98T001090	225:1	Drainable liquid	758	784	771
S98T001091	225:2	Drainable liquid	836	870	853
S98T001092	225:3	Drainable liquid	868	918	893
S97T002444	225:3A	Drainable liquid	701	772	737
S97T002477	225:5	Drainable liquid	868	915	892
S97T002476	225:5R	Drainable liquid	845	823	834
S98T000005	225:7A	Drainable liquid	795	804	800
S98T000009	225:8	Drainable liquid	977	1,090	1,030
S98T000012		Drainable liquid	685	683	684

Table B2-29. Tank 241-SX-101 Analytical Results: Phosphorus (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	568	540	554
S98T000450	227:7	Drainable liquid	781	792	787
S98T000559	227:7BR	Drainable liquid	<2	<2	<2
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	989	1,330	1,160[QC:e]
S98T000691	Core 227	Solid composite	915	3,650	2,280[QC:e]

Table B2-30. Tank 241-SX-101 Analytical Results: Potassium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	1,270	1,350	1,310
S97T002435	225:2	Lower half	994	952	973
S97T002440	225:3A	Lower half	859	720	790
S97T002462	225:4	Lower half	<505	<501	<503
S97T002465	225:5	Lower half	1,090	1,120	1,110
S97T002464	225:5R	Lower half	1,040	1,140	1,090
S97T002484	225:6	Upper half	580	<499	<540
S97T002463		Lower half	<498	<499	<499[QC:d]
S98T000013	225:7	Lower half	<501	<501	<501[QC:d]
S98T000014	225:7A	Lower half	1,140	932	1,040[QC:e]
S98T000015	225:7B	Lower half	<399	<399	<399
S98T000016	225:8	Lower half	1,090	1,040	1,070
S98T000342	227:1	Upper half	1,050	1,120	1,090
S98T000345		Lower half	1,270	1,190	1,230
S98T000362	227:2	Lower half	1,350	1,380	1,370
S98T000363	227:4	Lower half	872	991	932
S98T000364	227:5	Lower half	789	942	866
S98T000365	227:5A	Upper half	<279	<279	<279
S98T000366		Lower half	361	312	337
S98T000442	227:6	Upper half	<285	308	<297
S98T000443		Lower half	294	350	322
S98T000444	227:7	Lower half	385	363	374
S98T000555	227:7A	Lower half	438	400	419
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	2,120	2,280	2,200[QC:c]
S98T001091	225:2	Drainable liquid	2,120	2,110	2,120
S98T001092	225:3	Drainable liquid	2,190	2,250	2,220
S97T002444	225:3A	Drainable liquid	2,240	2,470	2,360
S97T002477	225:5	Drainable liquid	2,350	2,440	2,400
S97T002476	225:5R	Drainable liquid	2,600	2,740	2,670

Table B2-30. Tank 241-SX-101 Analytical Results: Potassium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000005	225:7A	Drainable liquid	2,200	2,370	2,290
S98T000009	225:8	Drainable liquid	2,260	2,390	2,330
S98T000012		Drainable liquid	2,350	2,420	2,390
S98T000374	227:5	Drainable liquid	2,830	2,890	2,860
S98T000450	227:7	Drainable liquid	2,630	2,620	2,630[QC:c]
S98T000559	227:7BR	Drainable liquid	34.8	35.2	35
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	591	821	706[QC:e]
S98T000691	Core 227	Solid composite	653	517	585[QC:e]

Table B2-31. Tank 241-SX-101 Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	60.3	<58.1	<59.2
S97T002440	225:3A	Lower half	<60.9	<60.8	<60.8
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	<41	<41.4	<41.2
S97T002464	225:5R	Lower half	<40.4	<40.6	<40.5
S97T002484	225:6	Upper half	<99.8	<99.8	<99.8
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	59.9	69.1	64.5
S98T000345		Lower half	<60.4	<61.5	<61
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	<58.3	<59.2	<58.8
S98T000364	227:5	Lower half	<66.5	<65.9	<66.2
S98T000365	227:5A	Upper half	<55.7	<55.7	<55.7
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	<61.5	<56.8	<59.1
S98T000555	227:7A	Lower half	<57.3	<57.4	<57.3
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-31. Tank 241-SX-101 Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<60.1	<60.1	<60.1
S98T001091	225:2	Drainable liquid	<60.1	<60.1	<60.1
S98T001092	225:3	Drainable liquid	<60.1	<60.1	<60.1
S97T002444	225:3A	Drainable liquid	<60.1	<60.1	<60.1
S97T002477	225:5	Drainable liquid	<60.1	<60.1	<60.1
S97T002476	225:5R	Drainable liquid	<60.1	<60.1	<60.1
S98T000005	225:7A	Drainable liquid	<60.1	<60.1	<60.1
S98T000009	225:8	Drainable liquid	<60.1	<60.1	<60.1
S98T000012		Drainable liquid	<60.1	<60.1	<60.1

Table B2-31. Tank 241-SX-101 Analytical Results: Samarium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	<60.1	<60.1	<60.1
S98T000559	227:7BR	Drainable liquid	<1	<1	<1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<60.9	<61.4	<61.1
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-32. Tank 241-SX-101 Analytical Results: Selenium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	<61.6	<62.5	<62
S97T002435	225:2	Lower half	<58.7	<58.1	<58.4
S97T002440	225:3A	Lower half	<60.9	<60.8	<60.8
S97T002462	225:4	Lower half	<101	<100	<101
S97T002465	225:5	Lower half	48.7	<41.4	<45
S97T002464	225:5R	Lower half	<40.4	42	<41.2
S97T002484	225:6	Upper half	<99.8	<99.8	<99.8
S97T002463		Lower half	<99.7	<99.8	<99.8
S98T000013	225:7	Lower half	<100	<100	<100
S98T000014	225:7A	Lower half	<59.7	<60	<59.9
S98T000015	225:7B	Lower half	<79.8	<79.8	<79.8
S98T000016	225:8	Lower half	<60.1	<59.9	<60
S98T000342	227:1	Upper half	<57.3	<58.1	<57.7
S98T000345		Lower half	<60.4	<61.5	<61
S98T000362	227:2	Lower half	<58.3	<57.9	<58.1
S98T000363	227:4	Lower half	97.9	103	100
S98T000364	227:5	Lower half	120	99.4	110
S98T000365	227:5A	Upper half	55.8	<55.7	<55.8
S98T000366		Lower half	<59.5	<56.3	<57.9
S98T000442	227:6	Upper half	<57.1	<57.4	<57.3
S98T000443		Lower half	<56.3	<58.5	<57.4
S98T000444	227:7	Lower half	61.9	65.8	63.8
S98T000555	227:7A	Lower half	86.9	102	94.5
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-32. Tank 241-SX-101 Analytical Results: Selenium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	82	85.4	83.7
S98T001091	225:2	Drainable liquid	85	75.1	80
S98T001092	225:3	Drainable liquid	87.4	100	93.7
S97T002444	225:3A	Drainable liquid	64.4	68.2	66.3
S97T002477	225:5	Drainable liquid	<60.1	68.4	<64.3
S97T002476	225:5R	Drainable liquid	72.5	75.8	74.2
S98T000005	225:7A	Drainable liquid	63.9	70.8	67.3
S98T000009	225:8	Drainable liquid	67.8	70.8	69.3
S98T000012		Drainable liquid	89.4	92.1	90.8

Table B2-32. Tank 241-SX-101 Analytical Results: Selenium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<60.1	<60.1	<60.1
S98T000450	227:7	Drainable liquid	69.4	60.5	65
S98T000559	227:7BR	Drainable liquid	1.28	1.41	1.35
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	62	<61.4	<61.7
S98T000691	Core 227	Solid composite	<60.6	<60.2	<60.4

Table B2-33. Tank 241-SX-101 Analytical Results: Silicon (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	119	119	119[QC:a]
S97T002435	225:2	Lower half	312	267	290[QC:a,c]
S97T002440	225:3A	Lower half	163	174	169[QC:a]
S97T002462	225:4	Lower half	299	316	308[QC:a,c]
S97T002465	225:5	Lower half	151	142	147[QC:a]
S97T002464	225:5R	Lower half	135	130	133[QC:a]
S97T002484	225:6	Upper half	986	943	965[QC:b]
S97T002463		Lower half	270	283	277[QC:b]
S98T000013	225:7	Lower half	503	465	484[QC:b,c]
S98T000014	225:7A	Lower half	157	164	161[QC:b]
S98T000015	225:7B	Lower half	770	793	782[QC:b,c]
S98T000016	225:8	Lower half	210	205	208[QC:b]
S98T000342	227:1	Upper half	510	593	552[QC:b]
S98T000345		Lower half	203	211	207[QC:a]
S98T000362	227:2	Lower half	232	222	227[QC:a]
S98T000363	227:4	Lower half	319	317	318[QC:a]
S98T000364	227:5	Lower half	339	341	340[QC:b]
S98T000365	227:5A	Upper half	117	113	115[QC:b]
S98T000366		Lower half	90.8	90.6	90.7[QC:b]
S98T000442	227:6	Upper half	374	354	364[QC:b]
S98T000443		Lower half	154	147	151[QC:b]
S98T000444	227:7	Lower half	238	248	243[QC:b]
S98T000555	227:7A	Lower half	465	568	517[QC:b]
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<1,100	<1,100	<1,100
S97T002416	225:2	Lower half	<1,010	<1,020	<1,020
S97T002439	225:3A	Lower half	<1,020	<1,030	<1,030
S97T002458	225:4	Lower half	<964	<1,000	<982
S97T002461	225:5	Lower half	1460	<1,010	<1,240[QC:e]
S97T002460	225:5R	Lower half	<1,020	2750	<1,890[QC:e]

Table B2-33. Tank 241-SX-101 Analytical Results: Silicon (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	2,550	1,340	1,950[QC:e]
S97T002459		Lower half	<1,060	<1,110	<1,090
S97T002505	225:7	Lower half	<986	<945	<966
S97T002506	225:7A	Lower half	<959	<954	<957
S97T002507	225:7B	Lower half	1,170	1,110	1,140
S97T002508	225:8	Lower half	<1,150	<1,150	<1,150
S98T000341	227:1	Upper half	<997	<990	<994
S98T000344		Lower half	1,960	975	1,470[QC:e]
S98T000358	227:2	Lower half	<1,030	1270	<1,150[QC:e]
S98T000359	227:4	Lower half	<1,030	<998	<1,010
S98T000360	227:5	Lower half	2,170	<1,050	<1,610[QC:e]
S98T000357	227:5A	Upper half	<1,020	<1,020	<1,020
S98T000361		Lower half	<969	<971	<970
S98T000439	227:6	Upper half	<997	<1,010	<1,000
S98T000440		Lower half	<988	<947	<968
S98T000441	227:7	Lower half	<1,020	<1,010	<1,020
S98T000554	227:7A	Lower half	<1,010	<1,000	<1,010
S98T000408	Core 225	Solid composite	<999	<1,000	<1,000
S98T000686	Core 227	Solid composite	<1,010	<940	<975
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	118	125	122
S98T001091	225:2	Drainable liquid	220	218	219
S98T001092	225:3	Drainable liquid	272	283	278
S97T002444	225:3A	Drainable liquid	173	195	184
S97T002477	225:5	Drainable liquid	190	184	187
S97T002476	225:5R	Drainable liquid	257	263	260
S98T000005	225:7A	Drainable liquid	136	130	133
S98T000009	225:8	Drainable liquid	196	213	205
S98T000012		Drainable liquid	152	147	150

Table B2-33. Tank 241-SX-101 Analytical Results: Silicon (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	156	155	156
S98T000450	227:7	Drainable liquid	207	206	207
S98T000559	227:7BR	Drainable liquid	42.1	42.3	42.2
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	280	333	307
S98T000691	Core 227	Solid composite	290	268	279

Table B2-34. Tank 241-SX-101 Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	12	12.6	12.3
S97T002435	225:2	Lower half	26.5	26.8	26.6
S97T002440	225:3A	Lower half	17	15.8	16.4
S97T002462	225:4	Lower half	17.9	18	17.9
S97T002465	225:5	Lower half	13.7	13.5	13.6
S97T002464	225:5R	Lower half	13.9	13.7	13.8
S97T002484	225:6	Upper half	22.3	21.4	21.9
S97T002463		Lower half	20	19.4	19.7
S98T000013	225:7	Lower half	19.2	18.1	18.6[QC:c]
S98T000014	225:7A	Lower half	12.6	13.6	13.1
S98T000015	225:7B	Lower half	16.6	18.6	17.6[QC:c]
S98T000016	225:8	Lower half	13.4	12.9	13.2[QC:c]
S98T000342	227:1	Upper half	26.8	28.4	27.6[QC:a]
S98T000345		Lower half	14.3	14.8	14.6
S98T000362	227:2	Lower half	23.8	18.8	21.3[QC:e]
S98T000363	227:4	Lower half	17.4	18.8	18.1
S98T000364	227:5	Lower half	14.5	14.6	14.6
S98T000365	227:5A	Upper half	15.9	15.9	15.9[QC:a]
S98T000366		Lower half	18.6	18	18.3
S98T000442	227:6	Upper half	15.8	15.8	15.8[QC:a]
S98T000443		Lower half	21.7	20.4	21
S98T000444	227:7	Lower half	15.9	15.2	15.6[QC:a]
S98T000555	227:7A	Lower half	15.2	14.8	15[QC:a]
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	<202	<204	<203
S97T002439	225:3A	Lower half	<203	<206	<205
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	<202	<202[QC:c]
S97T002460	225:5R	Lower half	<205	<198	<202[QC:c]

Table B2-34. Tank 241-SX-101 Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<213	<219	<216
S97T002459		Lower half	<213	<222	<218
S97T002505	225:7	Lower half	<197	<189	<193
S97T002506	225:7A	Lower half	<192	<191	<192
S97T002507	225:7B	Lower half	<209	<206	<208
S97T002508	225:8	Lower half	<230	<229	<230
S98T000341	227:1	Upper half	<199	<198	<199
S98T000344		Lower half	<190	<181	<186
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	<205	<200	<203
S98T000360	227:5	Lower half	<210	<209	<210
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194[QC:c]
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	<203	<203
S98T000554	227:7A	Lower half	<203	<200	<202
S98T000408	Core 225	Solid composite	<200	<201	<201[QC:c]
S98T000686	Core 227	Solid composite	<201	<188	<195
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	17	17.8	17.4
S98T001091	225:2	Drainable liquid	17.1	18	17.6
S98T001092	225:3	Drainable liquid	17.7	18	17.9
S97T002444	225:3A	Drainable liquid	16.5	18.8	17.6
S97T002477	225:5	Drainable liquid	18.5	18.7	18.6
S97T002476	225:5R	Drainable liquid	19.4	20.3	19.9
S98T000005	225:7A	Drainable liquid	16.2	16.2	16.2
S98T000009	225:8	Drainable liquid	16.1	17.1	16.6
S98T000012		Drainable liquid	17.5	17.7	17.6

Table B2-34. Tank 241-SX-101 Analytical Results: Silver (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	17.5	17.6	17.6
S98T000450	227:7	Drainable liquid	18.4	18.5	18.4
S98T000559	227:7BR	Drainable liquid	0.257	0.238	0.248
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	15.6	14.8	15.2
S98T000691	Core 227	Solid composite	14.8	13.3	14.1

Table B2-35. Tank 241-SX-101 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	1.66E+05	1.63E+05	1.65E+05[QC:b,c]
S97T002435	225:2	Lower half	1.48E+05	1.57E+05	1.53E+05[QC:b,d]
S97T002440	225:3A	Lower half	1.90E+05	1.88E+05	1.89E+05[QC:b]
S97T002462	225:4	Lower half	2.48E+05	2.47E+05	2.48E+05[QC:b,c]
S97T002465	225:5	Lower half	1.67E+05	1.64E+05	1.66E+05[QC:b]
S97T002464	225:5R	Lower half	1.71E+05	1.61E+05	1.66E+05[QC:b]
S97T002484	225:6	Upper half	2.33E+05	2.33E+05	2.33E+05[QC:c]
S97T002463		Lower half	2.39E+05	2.39E+05	2.39E+05[QC:d]
S98T000013	225:7	Lower half	2.32E+05	2.19E+05	2.26E+05[QC:c]
S98T000014	225:7A	Lower half	1.67E+05	1.80E+05	1.74E+05
S98T000015	225:7B	Lower half	2.25E+05	2.30E+05	2.28E+05[QC:d]
S98T000016	225:8	Lower half	1.82E+05	1.82E+05	1.82E+05[QC:d]
S98T000342	227:1	Upper half	1.38E+05	1.30E+05	1.34E+05
S98T000345		Lower half	1.71E+05	1.67E+05	1.69E+05[QC:b,c]
S98T000362	227:2	Lower half	1.71E+05	1.68E+05	1.70E+05[QC:b]
S98T000363	227:4	Lower half	1.86E+05	1.87E+05	1.87E+05[QC:b]
S98T000364	227:5	Lower half	1.94E+05	1.92E+05	1.93E+05[QC:b]
S98T000365	227:5A	Upper half	2.30E+05	2.31E+05	2.31E+05
S98T000366		Lower half	2.41E+05	2.41E+05	2.41E+05[QC:b,d]
S98T000442	227:6	Upper half	2.34E+05	2.31E+05	2.33E+05
S98T000443		Lower half	2.46E+05	2.41E+05	2.44E+05[QC:b,c]
S98T000444	227:7	Lower half	2.25E+05	2.19E+05	2.22E+05
S98T000555	227:7A	Lower half	2.16E+05	2.16E+05	2.16E+05
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	1.65E+05	1.60E+05	1.63E+05[QC:c]
S97T002416	225:2	Lower half	1.58E+05	1.60E+05	1.59E+05
S97T002439	225:3A	Lower half	1.99E+05	2.04E+05	2.02E+05
S97T002458	225:4	Lower half	2.65E+05	2.66E+05	2.66E+05[QC:d]
S97T002461	225:5	Lower half	1.83E+05	1.94E+05	1.89E+05[QC:d]
S97T002460	225:5R	Lower half	1.78E+05	1.84E+05	1.81E+05[QC:d]

Table B2-35. Tank 241-SX-101 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	2.21E+05	2.16E+05	2.19E+05[QC:c]
S97T002459		Lower half	2.32E+05	2.31E+05	2.32E+05
S97T002505	225:7	Lower half	2.26E+05	2.22E+05	2.24E+05
S97T002506	225:7A	Lower half	1.64E+05	1.68E+05	1.66E+05
S97T002507	225:7B	Lower half	2.11E+05	2.08E+05	2.10E+05
S97T002508	225:8	Lower half	1.68E+05	1.69E+05	1.69E+05
S98T000341	227:1	Upper half	1.33E+05	1.39E+05	1.36E+05
S98T000344		Lower half	1.69E+05	1.73E+05	1.71E+05
S98T000358	227:2	Lower half	1.67E+05	1.73E+05	1.70E+05
S98T000359	227:4	Lower half	1.96E+05	1.96E+05	1.96E+05
S98T000360	227:5	Lower half	2.01E+05	1.98E+05	2.00E+05
S98T000357	227:5A	Upper half	2.47E+05	2.48E+05	2.48E+05
S98T000361		Lower half	2.48E+05	2.47E+05	2.48E+05
S98T000439	227:6	Upper half	2.54E+05	2.50E+05	2.52E+05
S98T000440		Lower half	2.51E+05	2.50E+05	2.51E+05
S98T000441	227:7	Lower half	2.26E+05	2.29E+05	2.28E+05
S98T000554	227:7A	Lower half	2.26E+05	2.27E+05	2.27E+05
S98T000408	Core 225	Solid composite	2.09E+05	2.06E+05	2.08E+05[QC:d]
S98T000686	Core 227	Solid composite	2.02E+05	1.90E+05	1.96E+05
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	2.34E+05	2.46E+05	2.40E+05[QC:d]
S98T001091	225:2	Drainable liquid	2.42E+05	2.37E+05	2.40E+05[QC:d]
S98T001092	225:3	Drainable liquid	2.38E+05	2.46E+05	2.42E+05
S97T002444	225:3A	Drainable liquid	2.29E+05	2.50E+05	2.40E+05
S97T002477	225:5	Drainable liquid	2.46E+05	2.54E+05	2.50E+05[QC:c]
S97T002476	225:5R	Drainable liquid	2.54E+05	2.71E+05	2.63E+05
S98T000005	225:7A	Drainable liquid	2.27E+05	2.30E+05	2.29E+05
S98T000009	225:8	Drainable liquid	2.23E+05	2.43E+05	2.33E+05
S98T000012		Drainable liquid	2.32E+05	2.30E+05	2.31E+05

Table B2-35. Tank 241-SX-101 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	2.41E+05	2.45E+05	2.43E+05[QC:d]
S98T000450	227:7	Drainable liquid	2.43E+05	2.46E+05	2.45E+05[QC:c]
S98T000559	227:7BR	Drainable liquid	3300	3270	3290
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	2.23E+05	2.11E+05	2.17E+05
S98T000691	Core 227	Solid composite	2.12E+05	1.98E+05	2.05E+05[QC:c]

Table B2-36. Tank 241-SX-101 Analytical Results: Strontium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<6.16	<6.25	<6.21
S97T002435	225:2	Lower half	9.14	9.02	9.08
S97T002440	225:3A	Lower half	<6.09	<6.08	<6.08
S97T002462	225:4	Lower half	27.8	32.1	30
S97T002465	225:5	Lower half	5.65	6.1	5.88
S97T002464	225:5R	Lower half	<4.04	<4.06	<4.05
S97T002484	225:6	Upper half	1010	960	985
S97T002463		Lower half	280	319	300
S98T000013	225:7	Lower half	461	468	465
S98T000014	225:7A	Lower half	13.8	16.9	15.3[QC:e]
S98T000015	225:7B	Lower half	380	414	397
S98T000016	225:8	Lower half	21.4	22.2	21.8
S98T000342	227:1	Upper half	10.3	11.8	11.1
S98T000345		Lower half	<6.04	6.5	<6.27
S98T000362	227:2	Lower half	<5.83	<5.79	<5.81
S98T000363	227:4	Lower half	168	155	162
S98T000364	227:5	Lower half	105	119	112
S98T000365	227:5A	Upper half	13.6	14.4	14
S98T000366		Lower half	<5.95	9.32	<7.63[QC:e]
S98T000442	227:6	Upper half	<5.71	5.98	<5.85
S98T000443		Lower half	<5.63	<5.85	<5.74
S98T000444	227:7	Lower half	36.4	42.6	39.5
S98T000555	227:7A	Lower half	54.6	72.9	63.8[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	<202	<204	<203
S97T002439	225:3A	Lower half	<203	<206	<205
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	<202	<202
S97T002460	225:5R	Lower half	<205	<198	<202

Table B2-36. Tank 241-SX-101 Analytical Results: Strontium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	923	852	888
S97T002459		Lower half	273	249	261
S97T002505	225:7	Lower half	473	472	473
S97T002506	225:7A	Lower half	<192	<191	<192
S97T002507	225:7B	Lower half	392	392	392
S97T002508	225:8	Lower half	<230	<229	<230
S98T000341	227:1	Upper half	<199	<198	<199
S98T000344		Lower half	<190	<181	<186
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	<205	203	<204
S98T000360	227:5	Lower half	<210	<209	<210
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	<203	<203
S98T000554	227:7A	Lower half	<203	<200	<202
S98T000408	Core 225	Solid composite	<200	211	<206
S98T000686	Core 227	Solid composite	<201	<188	<195
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<6.01	<6.01	<6.01
S98T001091	225:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001092	225:3	Drainable liquid	<6.01	<6.01	<6.01
S97T002444	225:3A	Drainable liquid	<6.01	<6.01	<6.01
S97T002477	225:5	Drainable liquid	<6.01	<6.01	<6.01
S97T002476	225:5R	Drainable liquid	<6.01	<6.01	<6.01
S98T000005	225:7A	Drainable liquid	<6.01	<6.01	<6.01
S98T000009	225:8	Drainable liquid	<6.01	<6.01	<6.01
S98T000012		Drainable liquid	<6.01	<6.01	<6.01

Table B2-36. Tank 241-SX-101 Analytical Results: Strontium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<6.01	<6.01	<6.01
S98T000450	227:7	Drainable liquid	<6.01	<6.01	<6.01
S98T000559	227:7BR	Drainable liquid	<0.1	<0.1	<0.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<6.09	<6.14	<6.12
S98T000691	Core 227	Solid composite	<6.06	<6.02	<6.04

Table B2-37. Tank 241-SX-101 Analytical Results: Sulfur (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	355	352	354
S97T002435	225:2	Lower half	313	308	311
S97T002440	225:3A	Lower half	294	290	292
S97T002462	225:4	Lower half	598	758	678[QC:e]
S97T002465	225:5	Lower half	308	317	313
S97T002464	225:5R	Lower half	304	314	309
S97T002484	225:6	Upper half	2,140	2,070	2,110
S97T002463		Lower half	1,270	1,510	1,390
S98T000013	225:7	Lower half	1,010	1,010	1,010
S98T000014	225:7A	Lower half	314	305	310
S98T000015	225:7B	Lower half	1,090	1,260	1,180
S98T000016	225:8	Lower half	268	265	267
S98T000342	227:1	Upper half	318	346	332
S98T000345		Lower half	579	604	592
S98T000362	227:2	Lower half	834	755	795
S98T000363	227:4	Lower half	1,080	1,020	1,050
S98T000364	227:5	Lower half	270	291	281
S98T000365	227:5A	Upper half	877	746	812
S98T000366		Lower half	649	574	612
S98T000442	227:6	Upper half	484	527	506
S98T000443		Lower half	522	522	522
S98T000444	227:7	Lower half	594	559	577
S98T000555	227:7A	Lower half	729	682	706
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<2,200	<2,190	<2,200
S97T002416	225:2	Lower half	<2,020	<2,040	<2,030
S97T002439	225:3A	Lower half	<2,030	<2,060	<2,050
S97T002458	225:4	Lower half	<1,930	<2,010	<1,970
S97T002461	225:5	Lower half	<2,020	<2,020	<2,020
S97T002460	225:5R	Lower half	<2,050	<1,980	<2,020

Table B2-37. Tank 241-SX-101 Analytical Results: Sulfur (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<2,130	<2,190	<2,160
S97T002459		Lower half	<2,130	<2,220	<2,180
S97T002505	225:7	Lower half	<1,970	<1,890	<1,930
S97T002506	225:7A	Lower half	<1,920	<1,910	<1,920
S97T002507	225:7B	Lower half	<2,090	<2,060	<2,080
S97T002508	225:8	Lower half	<2,300	<2,290	<2,300
S98T000341	227:1	Upper half	<1,990	<1,980	<1,990
S98T000344		Lower half	<1,900	<1,810	<1,860
S98T000358	227:2	Lower half	<2,070	<2,050	<2,060
S98T000359	227:4	Lower half	<2,050	<2,000	<2,030
S98T000360	227:5	Lower half	<2,100	<2,090	<2,100
S98T000357	227:5A	Upper half	<2,040	<2,040	<2,040
S98T000361		Lower half	<1,940	<1,940	<1,940
S98T000439	227:6	Upper half	<1,990	<2,020	<2,010
S98T000440		Lower half	<1,980	<1,890	<1,940
S98T000441	227:7	Lower half	<2,030	<2,030	<2,030
S98T000554	227:7A	Lower half	<2,030	<2,000	<2,020
S98T000408	Core 225	Solid composite	<2,000	<2,010	<2,010
S98T000686	Core 227	Solid composite	<2,010	<1,880	<1,950
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	523	543	533
S98T001091	225:2	Drainable liquid	534	521	528
S98T001092	225:3	Drainable liquid	452	469	461
S97T002444	225:3A	Drainable liquid	438	477	458
S97T002477	225:5	Drainable liquid	465	478	472
S97T002476	225:5R	Drainable liquid	521	543	532
S98T000005	225:7A	Drainable liquid	446	441	444
S98T000009	225:8	Drainable liquid	441	473	457
S98T000012		Drainable liquid	464	454	459

Table B2-37. Tank 241-SX-101 Analytical Results: Sulfur (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	252	172	212[QC:e]
S98T000450	227:7	Drainable liquid	387	327	357
S98T000559	227:7BR	Drainable liquid	16.7	16.8	16.8
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	856	718	787
S98T000691	Core 227	Solid composite	680	599	640

Table B2-38. Tank 241-SX-101 Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<123	<125	<124
S97T002435	225:2	Lower half	<117	<116	<117
S97T002440	225:3A	Lower half	<122	<122	<122
S97T002462	225:4	Lower half	<202	<200	<201
S97T002465	225:5	Lower half	<82	<82.9	<82.5
S97T002464	225:5R	Lower half	<80.8	<81.1	<80.9
S97T002484	225:6	Upper half	<200	<200	<200
S97T002463		Lower half	<199	<200	<200
S98T000013	225:7	Lower half	<200	<200	<200
S98T000014	225:7A	Lower half	<119	<120	<120
S98T000015	225:7B	Lower half	<160	<160	<160
S98T000016	225:8	Lower half	<120	<120	<120
S98T000342	227:1	Upper half	<115	<116	<116
S98T000345		Lower half	<121	<123	<122
S98T000362	227:2	Lower half	<117	<116	<117
S98T000363	227:4	Lower half	<117	<118	<118
S98T000364	227:5	Lower half	<133	<132	<133
S98T000365	227:5A	Upper half	<111	<111	<111
S98T000366		Lower half	<119	<113	<116
S98T000442	227:6	Upper half	<114	<115	<115
S98T000443		Lower half	<113	<117	<115
S98T000444	227:7	Lower half	<123	<114	<119
S98T000555	227:7A	Lower half	<115	<115	<115
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<4,390	<4,380	<4,390
S97T002416	225:2	Lower half	<4,050	<4,080	<4,070
S97T002439	225:3A	Lower half	<4,060	<4,110	<4,090
S97T002458	225:4	Lower half	<3,860	<4,020	<3,940
S97T002461	225:5	Lower half	<4,030	<4,040	<4,040
S97T002460	225:5R	Lower half	<4,100	<3,960	<4,030

Table B2-38. Tank 241-SX-101 Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<4,270	<4,370	<4,320
S97T002459		Lower half	<4,250	<4,440	<4,350
S97T002505	225:7	Lower half	<3,940	<3,780	<3,860
S97T002506	225:7A	Lower half	<3,840	<3,810	<3,830
S97T002507	225:7B	Lower half	<4,180	<4,110	<4,150
S97T002508	225:8	Lower half	<4,600	<4,580	<4,590
S98T000341	227:1	Upper half	<3,990	<3,960	<3,980
S98T000344		Lower half	<3,790	<3,620	<3,710
S98T000358	227:2	Lower half	<4,130	<4,100	<4,120
S98T000359	227:4	Lower half	<4,100	<3,990	<4,050
S98T000360	227:5	Lower half	<4,200	<4,180	<4,190
S98T000357	227:5A	Upper half	<4,070	<4,070	<4,070
S98T000361		Lower half	<3,880	<3,880	<3,880
S98T000439	227:6	Upper half	<3,990	<4,040	<4,020
S98T000440		Lower half	<3,950	<3,790	<3,870
S98T000441	227:7	Lower half	<4,060	<4,050	<4,060
S98T000554	227:7A	Lower half	<4,050	<4,010	<4,030
S98T000408	Core 225	Solid composite	<4,000	<4,020	<4,010
S98T000686	Core 227	Solid composite	<4,030	<3,760	<3,900
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<120	<120	<120
S98T001091	225:2	Drainable liquid	<120	<120	<120
S98T001092	225:3	Drainable liquid	<120	<120	<120
S97T002444	225:3A	Drainable liquid	<120	<120	<120
S97T002477	225:5	Drainable liquid	<120	<120	<120
S97T002476	225:5R	Drainable liquid	<120	<120	<120
S98T000005	225:7A	Drainable liquid	<120	<120	<120
S98T000009	225:8	Drainable liquid	<120	<120	<120
S98T000012		Drainable liquid	<120	<120	<120

Table B2-38. Tank 241-SX-101 Analytical Results: Thallium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	< 120	< 120	< 120
S98T000450	227:7	Drainable liquid	< 120	< 120	< 120
S98T000559	227:7BR	Drainable liquid	< 2	< 2	< 2
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	< 122	< 123	< 123
S98T000691	Core 227	Solid composite	< 121	< 120	< 121

Table B2-39. Tank 241-SX-101 Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<6.16	<6.25	<6.21
S97T002435	225:2	Lower half	13.6	13.2	13.4
S97T002440	225:3A	Lower half	<6.09	<6.08	<6.08
S97T002462	225:4	Lower half	<10.1	<10	<10.1
S97T002465	225:5	Lower half	<4.1	4.5	<4.3
S97T002464	225:5R	Lower half	<4.04	<4.06	<4.05
S97T002484	225:6	Upper half	<9.98	<9.98	<9.98
S97T002463		Lower half	<9.97	<9.98	<9.98
S98T000013	225:7	Lower half	<10	<10	<10
S98T000014	225:7A	Lower half	<5.97	<6	<5.98
S98T000015	225:7B	Lower half	<7.98	<7.98	<7.98
S98T000016	225:8	Lower half	<6.01	<5.99	<6
S98T000342	227:1	Upper half	17	19.1	18.1
S98T000345		Lower half	11.1	12	11.6
S98T000362	227:2	Lower half	10	10.7	10.3
S98T000363	227:4	Lower half	<5.83	<5.92	<5.88
S98T000364	227:5	Lower half	<6.65	<6.59	<6.62
S98T000365	227:5A	Upper half	<5.57	<5.57	<5.57
S98T000366		Lower half	<5.95	<5.63	<5.79
S98T000442	227:6	Upper half	<5.71	<5.74	<5.72
S98T000443		Lower half	<5.63	<5.85	<5.74
S98T000444	227:7	Lower half	<6.15	<5.68	<5.92
S98T000555	227:7A	Lower half	<5.73	<5.74	<5.74
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	<202	<204	<203
S97T002439	225:3A	Lower half	<203	<206	<205
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	<202	<202
S97T002460	225:5R	Lower half	<205	<198	<202

Table B2-39. Tank 241-SX-101 Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<213	<219	<216
S97T002459		Lower half	<213	<222	<218
S97T002505	225:7	Lower half	<197	<189	<193
S97T002506	225:7A	Lower half	<192	<191	<192
S97T002507	225:7B	Lower half	<209	<206	<208
S97T002508	225:8	Lower half	<230	<229	<230
S98T000341	227:1	Upper half	<199	<198	<199
S98T000344		Lower half	<190	<181	<186
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	<205	<200	<203
S98T000360	227:5	Lower half	<210	<209	<210
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	<203	<203
S98T000554	227:7A	Lower half	<203	<200	<202
S98T000408	Core 225	Solid composite	<200	<201	<201
S98T000686	Core 227	Solid composite	<201	<188	<195
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<6.01	<6.01	<6.01
S98T001091	225:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001092	225:3	Drainable liquid	<6.01	<6.01	<6.01
S97T002444	225:3A	Drainable liquid	<6.01	<6.01	<6.01
S97T002477	225:5	Drainable liquid	<6.01	<6.01	<6.01
S97T002476	225:5R	Drainable liquid	<6.01	<6.01	<6.01
S98T000005	225:7A	Drainable liquid	<6.01	<6.01	<6.01
S98T000009	225:8	Drainable liquid	<6.01	<6.01	<6.01
S98T000012		Drainable liquid	<6.01	<6.01	<6.01

Table B2-39. Tank 241-SX-101 Analytical Results: Titanium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<6.01	<6.01	<6.01
S98T000450	227:7	Drainable liquid	<6.01	<6.01	<6.01
S98T000559	227:7BR	Drainable liquid	<0.1	<0.1	<0.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<6.09	<6.14	<6.12
S98T000691	Core 227	Solid composite	<6.06	<6.02	<6.04

Table B2-40. Tank 241-SX-101 Analytical Results: Total Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<308	<312	<310
S97T002435	225:2	Lower half	2,340	2,340	2,340
S97T002440	225:3A	Lower half	<304	<304	<304
S97T002462	225:4	Lower half	<505	<501	<503
S97T002465	225:5	Lower half	225	232	229
S97T002464	225:5R	Lower half	<202	<203	<203
S97T002484	225:6	Upper half	11,600	11,100	11,400
S97T002463		Lower half	3,100	3,560	3,330
S98T000013	225:7	Lower half	5,270	5,340	5,310
S98T000014	225:7A	Lower half	<298	317	<308
S98T000015	225:7B	Lower half	4,490	4,880	4,690
S98T000016	225:8	Lower half	<301	317	<309
S98T000342	227:1	Upper half	2,590	3,050	2,820
S98T000345		Lower half	333	357	345
S98T000362	227:2	Lower half	<291	<290	<291
S98T000363	227:4	Lower half	1,700	1,590	1,650
S98T000364	227:5	Lower half	886	1,000	943
S98T000365	227:5A	Upper half	<279	<279	<279
S98T000366		Lower half	<298	<282	<290
S98T000442	227:6	Upper half	<285	<287	<286
S98T000443		Lower half	<282	<293	<288
S98T000444	227:7	Lower half	338	351	345
S98T000555	227:7A	Lower half	409	436	423
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<11,000	<11,000	<11,000
S97T002416	225:2	Lower half	<10,100	<10,200	<10,200
S97T002439	225:3A	Lower half	<10,200	<10,300	<10,300
S97T002458	225:4	Lower half	<9,640	<10,000	<9,820
S97T002461	225:5	Lower half	<10,100	<10,100	<10,100
S97T002460	225:5R	Lower half	<10,200	<9,910	<10,100

Table B2-40. Tank 241-SX-101 Analytical Results: Total Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<10,700	<10,900	<10,800
S97T002459		Lower half	<10,600	<11,100	<10,900
S97T002505	225:7	Lower half	<9,860	<9,450	<9,660
S97T002506	225:7A	Lower half	<9,590	<9,540	<9,570
S97T002507	225:7B	Lower half	<10,500	<10,300	<10,400
S97T002508	225:8	Lower half	<11,500	<11,500	<11,500
S98T000341	227:1	Upper half	<9,970	<9,900	<9,940
S98T000344		Lower half	<9,480	<9,040	<9,260
S98T000358	227:2	Lower half	<10,300	<10,300	<10,300
S98T000359	227:4	Lower half	<10,300	<9,980	<10,100
S98T000360	227:5	Lower half	<10,500	<10,500	<10,500
S98T000357	227:5A	Upper half	<10,200	<10,200	<10,200
S98T000361		Lower half	<9,690	<9,710	<9,700
S98T000439	227:6	Upper half	<9,970	<10,100	<10,000
S98T000440		Lower half	<9,880	<9,470	<9,680
S98T000441	227:7	Lower half	<10,200	<10,100	<10,200
S98T000554	227:7A	Lower half	<10,100	<10,000	<10,100
S98T000408	Core 225	Solid composite	<9,990	<10,000	<10,000
S98T000686	Core 227	Solid composite	<10,100	<9,400	<9,750
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<300	<300	<300
S98T001091	225:2	Drainable liquid	<300	<300	<300
S98T001092	225:3	Drainable liquid	<300	<300	<300
S97T002444	225:3A	Drainable liquid	<300	<300	<300
S97T002477	225:5	Drainable liquid	<300	<300	<300
S97T002476	225:5R	Drainable liquid	<300	<300	<300
S98T000005	225:7A	Drainable liquid	<300	<300	<300
S98T000009	225:8	Drainable liquid	<300	<300	<300
S98T000012		Drainable liquid	<300	<300	<300

Table B2-40. Tank 241-SX-101 Analytical Results: Total Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<300	<300	<300
S98T000450	227:7	Drainable liquid	<300	<300	<300
S98T000559	227:7BR	Drainable liquid	<5	<5	<5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<304	<307	<306
S98T000691	Core 227	Solid composite	<303	<301	<302

Table B2-41. Tank 241-SX-101 Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
S97T002434	225:1	Lower half	<30.8	<31.3	<31.1
S97T002435	225:2	Lower half	<29.3	30.5	<29.9
S97T002440	225:3A	Lower half	<30.4	<30.4	<30.4
S97T002462	225:4	Lower half	<50.5	<50.1	<50.3
S97T002465	225:5	Lower half	<20.5	<20.7	<20.6
S97T002464	225:5R	Lower half	<20.2	<20.3	<20.3
S97T002484	225:6	Upper half	<49.9	<49.9	<49.9
S97T002463		Lower half	<49.8	<49.9	<49.8
S98T000013	225:7	Lower half	<50.1	<50.1	<50.1
S98T000014	225:7A	Lower half	<29.8	<30	<29.9
S98T000015	225:7B	Lower half	<39.9	<39.9	<39.9
S98T000016	225:8	Lower half	<30.1	<30	<30.1
S98T000342	227:1	Upper half	44.5	<29.1	<36.8[QC:e]
S98T000345		Lower half	45.7	<30.7	<38.2[QC:e]
S98T000362	227:2	Lower half	<29.1	<29	<29.1
S98T000363	227:4	Lower half	<29.2	<29.6	<29.4
S98T000364	227:5	Lower half	<33.3	<32.9	<33.1
S98T000365	227:5A	Upper half	<27.9	<27.9	<27.9
S98T000366		Lower half	<29.8	<28.2	<29
S98T000442	227:6	Upper half	<28.5	<28.7	<28.6
S98T000443		Lower half	<28.2	<29.3	<28.8
S98T000444	227:7	Lower half	<30.7	<28.4	<29.5
S98T000555	227:7A	Lower half	<28.6	<28.7	<28.6
Solids: fusion			µg/g	µg/g	µg/g
S97T002407	225:1	Lower half	<1,100	<1,100	<1,100
S97T002416	225:2	Lower half	<1,010	<1,020	<1,020
S97T002439	225:3A	Lower half	<1,020	<1,030	<1,030
S97T002458	225:4	Lower half	<964	<1,000	<982
S97T002461	225:5	Lower half	<1,010	<1,010	<1,010
S97T002460	225:5R	Lower half	<1,020	<991	<1,010

Table B2-41. Tank 241-SX-101 Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<1,070	<1,090	<1,080
S97T002459		Lower half	<1,060	<1,110	<1,090
S97T002505	225:7	Lower half	<986	<945	<966
S97T002506	225:7A	Lower half	<959	<954	<957
S97T002507	225:7B	Lower half	<1,050	<1,030	<1,040
S97T002508	225:8	Lower half	<1,150	<1,150	<1,150
S98T000341	227:1	Upper half	<997	<990	<994
S98T000344		Lower half	<948	<904	<926
S98T000358	227:2	Lower half	<1,030	<1,030	<1,030
S98T000359	227:4	Lower half	<1,030	<998	<1,010
S98T000360	227:5	Lower half	<1,050	<1,050	<1,050
S98T000357	227:5A	Upper half	<1,020	<1,020	<1,020
S98T000361		Lower half	<969	<971	<970
S98T000439	227:6	Upper half	<997	<1,010	<1,000
S98T000440		Lower half	<988	<947	<968
S98T000441	227:7	Lower half	<1,020	<1,010	<1,020
S98T000554	227:7A	Lower half	<1,010	<1,000	<1,010
S98T000408	Core 225	Solid composite	<999	<1,000	<1,000
S98T000686	Core 227	Solid composite	<1,010	<940	<975
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<30.1	<30.1	<30.1
S98T001091	225:2	Drainable liquid	<30.1	<30.1	<30.1
S98T001092	225:3	Drainable liquid	<30.1	<30.1	<30.1
S97T002444	225:3A	Drainable liquid	<30.1	<30.1	<30.1
S97T002477	225:5	Drainable liquid	<30.1	<30.1	<30.1
S97T002476	225:5R	Drainable liquid	<30.1	<30.1	<30.1
S98T000005	225:7A	Drainable liquid	<30.1	<30.1	<30.1
S98T000009	225:8	Drainable liquid	<30.1	<30.1	<30.1
S98T000012		Drainable liquid	<30.1	<30.1	<30.1

Table B2-41. Tank 241-SX-101 Analytical Results: Vanadium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<30.1	<30.1	<30.1
S98T000450	227:7	Drainable liquid	<30.1	<30.1	<30.1
S98T000559	227:7BR	Drainable liquid	<0.5	<0.5	<0.5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<30.4	<30.7	<30.5
S98T000691	Core 227	Solid composite	<30.3	<30.1	<30.2

Table B2-42. Tank 241-SX-101 Analytical Results: Zinc (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	93	65.6	79.3[QC:e]
S97T002435	225:2	Lower half	173	161	167[QC:d]
S97T002440	225:3A	Lower half	181	92.6	137[QC:e]
S97T002462	225:4	Lower half	67.1	63.7	65.4
S97T002465	225:5	Lower half	84.7	84.7	84.7
S97T002464	225:5R	Lower half	68.9	72.2	70.6
S97T002484	225:6	Upper half	21.1	18.8	20
S97T002463		Lower half	37.1	24.3	30.7[QC:e]
S98T000013	225:7	Lower half	16	19.2	17.6
S98T000014	225:7A	Lower half	39.3	49.2	44.3[QC:e]
S98T000015	225:7B	Lower half	22.6	25.5	24.1
S98T000016	225:8	Lower half	32.2	30.7	31.5
S98T000342	227:1	Upper half	164	187	176
S98T000345		Lower half	80.8	91.9	86.3
S98T000362	227:2	Lower half	76	76.4	76.2
S98T000363	227:4	Lower half	15.7	19.1	17.4
S98T000364	227:5	Lower half	<6.65	<6.59	<6.62
S98T000365	227:5A	Upper half	<5.57	10.6	<8.09[QC:e]
S98T000366		Lower half	<5.95	<5.63	<5.79
S98T000442	227:6	Upper half	19.7	<5.74	<12.7[QC:e]
S98T000443		Lower half	6.87	8.65	7.76[QC:e]
S98T000444	227:7	Lower half	19.1	6.4	12.8[QC:e]
S98T000555	227:7A	Lower half	<5.73	<5.74	<5.74
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	<202	<204	<203
S97T002439	225:3A	Lower half	<203	<206	<205
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	<202	<202
S97T002460	225:5R	Lower half	<205	<198	<202

Table B2-42. Tank 241-SX-101 Analytical Results: Zinc (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<213	<219	<216
S97T002459		Lower half	<213	<222	<218
S97T002505	225:7	Lower half	<197	<189	<193
S97T002506	225:7A	Lower half	<192	<191	<192
S97T002507	225:7B	Lower half	<209	<206	<208
S97T002508	225:8	Lower half	<230	<229	<230
S98T000341	227:1	Upper half	<199	<198	<199
S98T000344		Lower half	<190	<181	<186
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	<205	<200	<203
S98T000360	227:5	Lower half	<210	<209	<210
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	<203	<203
S98T000554	227:7A	Lower half	<203	<200	<202
S98T000408	Core 225	Solid composite	<200	<201	<201
S98T000686	Core 227	Solid composite	<201	<188	<195
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<6.01	<6.01	<6.01
S98T001091	225:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001092	225:3	Drainable liquid	<6.01	<6.01	<6.01
S97T002444	225:3A	Drainable liquid	<6.01	<6.01	<6.01
S97T002477	225:5	Drainable liquid	<6.01	<6.01	<6.01
S97T002476	225:5R	Drainable liquid	22.6	20.6	21.6
S98T000005	225:7A	Drainable liquid	<6.01	<6.01	<6.01
S98T000009	225:8	Drainable liquid	<6.01	<6.01	<6.01
S98T000012		Drainable liquid	22.1	22.2	22.1

Table B2-42. Tank 241-SX-101 Analytical Results: Zinc (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<6.01	<6.01	<6.01
S98T000450	227:7	Drainable liquid	<6.01	<6.01	<6.01
S98T000559	227:7BR	Drainable liquid	<0.1	<0.1	<0.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<6.09	<6.14	<6.12
S98T000691	Core 227	Solid composite	<6.06	<6.02	<6.04

Table B2-43. Tank 241-SX-101 Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
S97T002434	225:1	Lower half	<6.16	<6.25	<6.21[QC:a]
S97T002435	225:2	Lower half	39.7	19.9	29.8[QC:a,c,e]
S97T002440	225:3A	Lower half	29.3	29.7	29.5[QC:a]
S97T002462	225:4	Lower half	<10.1	<10	<10.1
S97T002465	225:5	Lower half	22.2	23.2	22.7
S97T002464	225:5R	Lower half	11	17.2	14.1[QC:e]
S97T002484	225:6	Upper half	114	109	112
S97T002463		Lower half	30	34.5	32.3
S98T000013	225:7	Lower half	51.6	53.9	52.8
S98T000014	225:7A	Lower half	17.9	21.8	19.9
S98T000015	225:7B	Lower half	47.3	50.2	48.8
S98T000016	225:8	Lower half	10.6	11	10.8
S98T000342	227:1	Upper half	228	144	186[QC:e]
S98T000345		Lower half	35.2	37.9	36.5
S98T000362	227:2	Lower half	16.1	17.4	16.8
S98T000363	227:4	Lower half	19.6	18.3	19
S98T000364	227:5	Lower half	10.4	11.2	10.8
S98T000365	227:5A	Upper half	<5.57	<5.57	<5.57
S98T000366		Lower half	<5.95	<5.63	<5.79
S98T000442	227:6	Upper half	<5.71	<5.74	<5.72
S98T000443		Lower half	<5.63	<5.85	<5.74
S98T000444	227:7	Lower half	<6.15	<5.68	<5.92
S98T000555	227:7A	Lower half	7.19	8.91	8.05[QC:e]
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S97T002407	225:1	Lower half	<220	<219	<220
S97T002416	225:2	Lower half	<202	<204	<203
S97T002439	225:3A	Lower half	<203	<206	<205
S97T002458	225:4	Lower half	<193	<201	<197
S97T002461	225:5	Lower half	<202	<202	<202
S97T002460	225:5R	Lower half	<205	<198	<202

Table B2-43. Tank 241-SX-101 Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S97T002483	225:6	Upper half	<213	<219	<216
S97T002459		Lower half	<213	<222	<218
S97T002505	225:7	Lower half	<197	<189	<193
S97T002506	225:7A	Lower half	<192	<191	<192
S97T002507	225:7B	Lower half	<209	<206	<208
S97T002508	225:8	Lower half	<230	<229	<230
S98T000341	227:1	Upper half	<199	<198	<199
S98T000344		Lower half	<190	<181	<186
S98T000358	227:2	Lower half	<207	<205	<206
S98T000359	227:4	Lower half	<205	<200	<203
S98T000360	227:5	Lower half	<210	<209	<210
S98T000357	227:5A	Upper half	<204	<204	<204
S98T000361		Lower half	<194	<194	<194
S98T000439	227:6	Upper half	<199	<202	<201
S98T000440		Lower half	<198	<189	<194
S98T000441	227:7	Lower half	<203	<203	<203
S98T000554	227:7A	Lower half	<203	<200	<202
S98T000408	Core 225	Solid composite	<200	<201	<201
S98T000686	Core 227	Solid composite	<201	<188	<195
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S98T001090	225:1	Drainable liquid	<6.01	<6.01	<6.01
S98T001091	225:2	Drainable liquid	<6.01	<6.01	<6.01
S98T001092	225:3	Drainable liquid	<6.01	<6.01	<6.01
S97T002444	225:3A	Drainable liquid	<6.01	<6.01	<6.01
S97T002477	225:5	Drainable liquid	<6.01	<6.01	<6.01
S97T002476	225:5R	Drainable liquid	<6.01	<6.01	<6.01
S98T000005	225:7A	Drainable liquid	<6.01	<6.01	<6.01
S98T000009	225:8	Drainable liquid	<6.01	<6.01	<6.01
S98T000012		Drainable liquid	<6.01	<6.01	<6.01

Table B2-43. Tank 241-SX-101 Analytical Results: Zirconium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			**µg/mL**	**µg/mL**	**µg/mL**
S98T000374	227:5	Drainable liquid	<6.01	<6.01	<6.01
S98T000450	227:7	Drainable liquid	<6.01	<6.01	<6.01
S98T000559	227:7BR	Drainable liquid	<0.1	<0.1	<0.1
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S98T000410	Core 225	Solid composite	<6.09	<6.14	<6.12
S98T000691	Core 227	Solid composite	<6.06	<6.02	<6.04

Table B2-44. Tank 241-SX-101 Analytical Results: Total Uranium (U).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
S98T000408	Core 225	Solid composite	2,260	2,680	2,470
S98T000686	Core 227	Solid composite	702	655	679

Table B2-45. Tank 241-SX-101 Analytical Results: Bromide (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T002408	225:1	Lower half	<969	<997	<983
S97T002417	225:2	Lower half	<1,050	<1,060	<1,060
S97T002441	225:3A	Lower half	<997	<993	<995
S97T002466	225:4	Lower half	<954	<976	<965
S97T002469	225:5	Lower half	<1,010	<1,020	<1,010
S97T002468	225:5R	Lower half	<1,020	<1,020	<1,020
S97T002485	225:6	Upper half	<1,390	<1,390	<1,390
S97T002467		Lower half	<1,390	<1,400	<1,390
S98T000017	225:7	Lower half	<1,210	<1,210	<1,210
S98T000018	225:7A	Lower half	<920	<931	<926
S98T000019	225:7B	Lower half	1,330	1,540	1,440
S98T000020	225:8	Lower half	<1,470	<1,340	<1,410
S98T000343	227:1	Upper half	<1,000	<987	<996
S98T000346		Lower half	<1,020	<1,040	<1,030
S98T000367	227:2	Lower half	<946	<1,020	<983
S98T000368	227:4	Lower half	<504	505	<505
S98T000369	227:5	Lower half	<1,050	<976	<1,010
S98T000370	227:5A	Upper half	<990	<987	<989
S98T000371		Lower half	<1,630	<1,570	<1,600
S98T000445	227:6	Upper half	<1,640	<1,670	<1,660
S98T000446		Lower half	<1,640	<1,640	<1,640
S98T000447	227:7	Lower half	<991	<969	<980
S98T000556	227:7A	Lower half	1,420	2,030	1,730[QC:e]
S98T001685	Core 225	Solid composite	<1,010	<1,020	<1,020
S98T000690	Core 227	Solid composite	<1,010	<1,000	<1,000
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S97T002411	225:1	Drainable liquid	<644	<644	<644
S97T002423	225:2	Drainable liquid	<265	<265	<265
S97T002422	225:3	Drainable liquid	<644	<644	<644
S97T002444	225:3A	Drainable liquid	<518	<518	<518

Table B2-45. Tank 241-SX-101 Analytical Results: Bromide (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002477	225:5	Drainable liquid	<518	<518	<518
S97T002476	225:5R	Drainable liquid	<518	<518	<518
S98T000005	225:7A	Drainable liquid	<1,280	<1,280	<1,280
S98T000009	225:8	Drainable liquid	<1,280	<1,280	<1,280
S98T000012		Drainable liquid	1,820	1,810	1,810
S98T000374	227:5	Drainable liquid	<1,280	<1,280	<1,280
S98T000450	227:7	Drainable liquid	<518	708	<613[QC:e]
S98T000559	227:7BR	Drainable liquid	16,300	17,000	16,700

Table B2-46. Tank 241-SX-101 Analytical Results: Chloride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T002408	225:1	Lower half	14,200	14,500	14,400
S97T002417	225:2	Lower half	11,000	13,600	12,300[QC:e]
S97T002441	225:3A	Lower half	10,200	10,600	10,400
S97T002466	225:4	Lower half	723	7,570	4,150[QC:e]
S97T002469	225:5	Lower half	6,980	7,720	7,350
S97T002468	225:5R	Lower half	8,130	7,940	8,040
S97T002485	225:6	Upper half	2,720	2,550	2,630
S97T002467		Lower half	1,290	1,170	1,230
S98T000017	225:7	Lower half	1,550	1,570	1,560
S98T000018	225:7A	Lower half	9,220	8,990	9,100
S98T000019	225:7B	Lower half	2,920	3,340	3,130
S98T000020	225:8	Lower half	7,380	7,950	7,660
S98T000343	227:1	Upper half	8,790	8,460	8,630
S98T000346		Lower half	7,950	7,830	7,890
S98T000367	227:2	Lower half	7,880	9,010	8,450
S98T000369	227:5	Lower half	6,290	6,400	6,340
S98T000370	227:5A	Upper half	5,820	7,100	6,460
S98T000371		Lower half	7,110	7,480	7,300
S98T000445	227:6	Upper half	2,560	2,660	2,610
S98T000446		Lower half	10,300	10,500	10,400
S98T000447	227:7	Lower half	8,320	8,460	8,390
S98T000556	227:7A	Lower half	5,060	5,490	5,280
S98T001685	Core 225	Solid composite	5,240	4,620	4,930
S98T000690	Core 227	Solid composite	7,010	6,990	7,000
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S97T002411	225:1	Drainable liquid	15,700	15,400	15,500
S97T002423	225:2	Drainable liquid	7,610	7,500	7,560
S97T002422	225:3	Drainable liquid	16,200	16,100	16,100
S97T002444	225:3A	Drainable liquid	15,000	15,200	15,100
S97T002477	225:5	Drainable liquid	15,800	15,800	15,800[QC:d]

Table B2-46. Tank 241-SX-101 Analytical Results: Chloride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002476	225:5R	Drainable liquid	13,800	13,800	13,800
S98T000005	225:7A	Drainable liquid	13,000	13,100	13,100
S98T000009	225:8	Drainable liquid	17,900	18,200	18,100
S98T000374	227:5	Drainable liquid	22,200	22,400	22,300
S98T000450	227:7	Drainable liquid	17,200	17,800	17,500
S98T000559	227:7BR	Drainable liquid	340	361	350

Table B2-47. Tank 241-SX-101 Analytical Results: Fluoride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
S97T002408	225:1	Lower half	234	417	325[QC:e]
S97T002417	225:2	Lower half	220	286	253[QC:e]
S97T002441	225:3A	Lower half	164	199	182
S97T002466	225:4	Lower half	<226	<231	<228
S97T002469	225:5	Lower half	350	337	343
S97T002468	225:5R	Lower half	359	350	354
S97T002485	225:6	Upper half	<133	<133	<133
S97T002467		Lower half	<133	<134	<134
S98T000017	225:7	Lower half	<116	<116	<116
S98T000018	225:7A	Lower half	354	227	290[QC:e]
S98T000019	225:7B	Lower half	<111	<108	<109
S98T000020	225:8	Lower half	212	234	223
S98T000343	227:1	Upper half	407	1130	769[QC:e]
S98T000346		Lower half	1,930	1,950	1,940
S98T000367	227:2	Lower half	1,520	1,760	1,640
S98T000368	227:4	Lower half	<48.4	<48.2	<48.3
S98T000369	227:5	Lower half	<100	<93.7	<97
S98T000370	227:5A	Upper half	<95	<94.7	<94.9
S98T000371		Lower half	<157	<151	<154
S98T000445	227:6	Upper half	<157	<160	<159
S98T000446		Lower half	<158	<158	<158
S98T000447	227:7	Lower half	<234	<229	<232
S98T000556	227:7A	Lower half	<235	<235	<235
S98T001685	Core 225	Solid composite	<97.4	206	<152[QC:e]
S98T000690	Core 227	Solid composite	181	1,030	606[QC:e]
Liquids			µg/mL	µg/mL	µg/mL
S97T002411	225:1	Drainable liquid	<61.8	<61.8	<61.8
S97T002423	225:2	Drainable liquid	<25.4	<25.5	<25.5[QC:c]
S97T002422	225:3	Drainable liquid	<61.8	<61.8	<61.8

Table B2-47. Tank 241-SX-101 Analytical Results: Fluoride (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002444	225:3A	Drainable liquid	<49.7	<49.7	<49.7
S97T002477	225:5	Drainable liquid	<49.7	<49.7	<49.7[QC:c]
S97T002476	225:5R	Drainable liquid	<49.7	<49.7	<49.7
S98T000005	225:7A	Drainable liquid	<122	<122	<122
S98T000009	225:8	Drainable liquid	<122	<122	<122
S98T000012		Drainable liquid	<122	<122	<122
S98T000374	227:5	Drainable liquid	<122	<122	<122
S98T000450	227:7	Drainable liquid	<49.7	<49.7	<49.7
S98T000559	227:7BR	Drainable liquid	<61.8	<61.8	<61.8

Table B2-48. Tank 241-SX-101 Analytical Results: Nitrate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T002408	225:1	Lower half	1.19E+05	1.02E+05	1.11E+05
S97T002417	225:2	Lower half	1.16E+05	1.18E+05	1.17E+05
S97T002441	225:3A	Lower half	3.22E+05	<1,100	<1.61E+05 [QC:e]
S97T002466	225:4	Lower half	7.11E+05	7.54E+05	7.32E+05
S97T002469	225:5	Lower half	2.82E+05	2.27E+05	2.55E+05 [QC:e]
S97T002468	225:5R	Lower half	2.31E+05	2.33E+05	2.32E+05
S97T002485	225:6	Upper half	4.55E+05	4.13E+05	4.34E+05
S97T002467		Lower half	4.86E+05	5.00E+05	4.93E+05
S98T000017	225:7	Lower half	4.46E+05	4.49E+05	4.48E+05
S98T000018	225:7A	Lower half	1.51E+05	1.73E+05	1.62E+05
S98T000019	225:7B	Lower half	4.62E+05	4.77E+05	4.70E+05
S98T000020	225:8	Lower half	2.50E+05	2.35E+05	2.43E+05
S98T000343	227:1	Upper half	81,700	78,100	79,900
S98T000346		Lower half	1.13E+05	92900	1.03E+05
S98T000367	227:2	Lower half	1.28E+05	1.11E+05	1.20E+05
S98T000368	227:4	Lower half	1.09E+05	73,200	91,000 [QC:e]
S98T000369	227:5	Lower half	62,800	68,900	65,800
S98T000370	227:5A	Upper half	5.75E+05	5.61E+05	5.68E+05
S98T000371		Lower half	5.53E+05	5.70E+05	5.62E+05
S98T000445	227:6	Upper half	6.25E+05	6.04E+05	6.14E+05
S98T000446		Lower half	5.40E+05	5.28E+05	5.34E+05
S98T000447	227:7	Lower half	4.99E+05	4.88E+05	4.93E+05
S98T000556	227:7A	Lower half	2.94E+05	2.83E+05	2.89E+05
S98T001685	Core 225	Solid composite	3.72E+05	4.35E+05	4.04E+05
S98T000690	Core 227	Solid composite	2.83E+05	2.60E+05	2.72E+05
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S97T002411	225:1	Drainable liquid	1.40E+05	1.40E+05	1.40E+05
S97T002423	225:2	Drainable liquid	69,100	69,400	69,300

Table B2-48. Tank 241-SX-101 Analytical Results: Nitrate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002422	225:3	Drainable liquid	1.31E+05	1.33E+05	1.32E+05
S97T002444	225:3A	Drainable liquid	1.12E+05	1.13E+05	1.13E+05
S97T002477	225:5	Drainable liquid	1.18E+05	1.18E+05	1.18E+05[QC]
S97T002476	225:5R	Drainable liquid	99,700	100,000	99,800
S98T000005	225:7A	Drainable liquid	85,900	85,900	85,900
S98T000009	225:8	Drainable liquid	116,000	115,000	115,000
S98T000012		Drainable liquid	79,800	81,900	80,800
S98T000374	227:5	Drainable liquid	1.01E+05	99,400	1.00E+05
S98T000450	227:7	Drainable liquid	1.04E+05	1.06E+05	1.05E+05
S98T000559	227:7BR	Drainable liquid	3,210	3,200	3,200

Table B2-49. Tank 241-SX-101 Analytical Results: Nitrite (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T002408	225:1	Lower half	48,100	52,100	50,100
S97T002417	225:2	Lower half	40,700	43,000	41,900
S97T002441	225:3A	Lower half	27,800	27,800	27,800
S97T002466	225:4	Lower half	5,300	4,860	5,080
S97T002469	225:5	Lower half	34,900	38,500	36,700
S97T002468	225:5R	Lower half	40,900	38,800	39,800
S97T002485	225:6	Upper half	10,400	10,100	10,200
S97T002467		Lower half	5,870	5,800	5,830
S98T000017	225:7	Lower half	7,840	7,780	7,810
S98T000018	225:7A	Lower half	44,000	43,800	43,900
S98T000019	225:7B	Lower half	4,010	4,180	4,100
S98T000020	225:8	Lower half	36,400	38,600	37,500
S98T000343	227:1	Upper half	43,700	42,400	43,100
S98T000346		Lower half	39,500	38,200	38,800
S98T000367	227:2	Lower half	37,600	42,500	40,100
S98T000368	227:4	Lower half	13,900	15,100	14,500
S98T000369	227:5	Lower half	25,700	25,600	25,700
S98T000370	227:5A	Upper half	4,970	5,020	5,000
S98T000371		Lower half	6,270	6,310	6,290
S98T000445	227:6	Upper half	5,750	5,540	5,650
S98T000446		Lower half	7,790	7,450	7,620
S98T000447	227:7	Lower half	15,800	16,200	16,000
S98T000556	227:7A	Lower half	18,400	21,700	20,000
S98T001685	Core 225	Solid composite	22,500	20,500	21,500
S98T000690	Core 227	Solid composite	22,200	22,000	22,100
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S97T002411	225:1	Drainable liquid	77,600	77,300	77,400
S97T002423	225:2	Drainable liquid	39,700	39,600	39,700
S97T002422	225:3	Drainable liquid	78,900	79,900	79,400
S97T002444	225:3A	Drainable liquid	77,000	78,500	77,800

Table B2-49. Tank 241-SX-101 Analytical Results: Nitrite (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002477	225:5	Drainable liquid	77,300	77,500	77,400
S97T002476	225:5R	Drainable liquid	67,400	67,400	67,400
S98T000005	225:7A	Drainable liquid	62,400	63,200	62,800
S98T000009	225:8	Drainable liquid	86,600	87,600	87,100
S98T000012		Drainable liquid	61,100	59,800	60,500
S98T000374	227:5	Drainable liquid	95,100	96,800	96,000
S98T000450	227:7	Drainable liquid	83,500	83,600	83,600
S98T000559	227:7BR	Drainable liquid	1,620	1,650	1,630

Table B2-50. Tank 241-SX-101 Analytical Results: Phosphate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T002408	225:1	Lower half	4,180	3,470	3,820
S97T002417	225:2	Lower half	3,830	4,770	4,300[QC:e]
S97T002441	225:3A	Lower half	3,740	3,250	3,500
S97T002466	225:4	Lower half	<2,260	<2,310	<2,280
S97T002469	225:5	Lower half	3,510	4,010	3,760
S97T002468	225:5R	Lower half	4,530	3,830	4,180
S97T002485	225:6	Upper half	1,520	<1,330	<1,430
S97T002467		Lower half	<1,330	<1,340	<1,340
S98T000017	225:7	Lower half	<1,160	<1,160	<1,160
S98T000018	225:7A	Lower half	3,580	4,410	3,990[QC:e]
S98T000019	225:7B	Lower half	<1,110	<1,080	<1,090
S98T000020	225:8	Lower half	3,760	4,150	3,950
S98T000343	227:1	Upper half	7,090	9,720	8,400[QC:e]
S98T000346		Lower half	20,100	20,500	20,300
S98T000367	227:2	Lower half	15,700	19,400	17,600[QC:e]
S98T000368	227:4	Lower half	1,020	782	902[QC:e]
S98T000369	227:5	Lower half	1,720	1,670	1,690
S98T000370	227:5A	Upper half	<951	<947	<949
S98T000371		Lower half	<1,570	<1,510	<1,540
S98T000445	227:6	Upper half	<1,570	<1,600	<1,590
S98T000446		Lower half	<1,580	<1,580	<1,580
S98T000447	227:7	Lower half	<2,340	<2,290	<2,320
S98T000556	227:7A	Lower half	9,300	<2,350	<5,830[QC:e]
S98T001685	Core 225	Solid composite	2,750	3,360	3,060
S98T000690	Core 227	Solid composite	3,450	10,200	6,820[QC:e]
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S97T002411	225:1	Drainable liquid	2,450	2,310	2,380
S97T002423	225:2	Drainable liquid	2,200	1,850	2,020
S97T002422	225:3	Drainable liquid	2,500	2,750	2,630
S97T002444	225:3A	Drainable liquid	2,850	2,150	2,500[QC:e]

Table B2-50. Tank 241-SX-101 Analytical Results: Phosphate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002477	225:5	Drainable liquid	2,650	2,590	2,620
S97T002476	225:5R	Drainable liquid	2,380	2,160	2,270
S98T000005	225:7A	Drainable liquid	2,300	2,240	2,270
S98T000009	225:8	Drainable liquid	3,850	3,970	3,910
S98T000012		Drainable liquid	2,790	2,430	2,610
S98T000374	227:5	Drainable liquid	2,360	2,370	2,360
S98T000450	227:7	Drainable liquid	2,480	26,900	14,700[QC:e]
S98T000559	227:7BR	Drainable liquid	<618	<618	<618

Table B2-51. Tank 241-SX-101 Analytical Results: Sulfate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S97T002408	225:1	Lower half	<1,070	<1,100	<1,080
S97T002417	225:2	Lower half	<1,160	3,600	<2,380[QC:e]
S97T002441	225:3A	Lower half	<1,100	2,410	<1,760[QC:e]
S97T002466	225:4	Lower half	<2,600	<2,650	<2,620
S97T002469	225:5	Lower half	<2,750	<2,770	<2,760
S97T002468	225:5R	Lower half	<2,780	5,950	<4,360[QC:e]
S97T002485	225:6	Upper half	6,030	7,510	6,770[QC:e]
S97T002467		Lower half	4,820	4,080	4,450
S98T000017	225:7	Lower half	3,430	3,590	3,510
S98T000018	225:7A	Lower half	<1,020	<1,030	<1,020
S98T000019	225:7B	Lower half	2,200	2,370	2,280
S98T000020	225:8	Lower half	<1,630	<1,480	<1,550
S98T000343	227:1	Upper half	2,980	2,510	2,740
S98T000346		Lower half	1,550	<1,150	<1,350[QC:e]
S98T000367	227:2	Lower half	1,830	1,470	1,650[QC:e]
S98T000368	227:4	Lower half	3,600	3,000	3,300
S98T000369	227:5	Lower half	<1,150	<1,080	<1,120
S98T000370	227:5A	Upper half	3,570	4,600	4,090[QC:e]
S98T000371		Lower half	<1,800	<1,740	<1,770
S98T000445	227:6	Upper half	4,310	4,290	4,300
S98T000446		Lower half	<1,810	<1,820	<1,820
S98T000447	227:7	Lower half	<2,700	<2,640	<2,670
S98T000556	227:7A	Lower half	<2,700	<2,700	<2,700
S98T001685	Core 225	Solid composite	2,620	2,630	2,630
S98T000690	Core 227	Solid composite	2,000	1,920	1,960
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S97T002411	225:1	Drainable liquid	1,570	1,120	1,350[QC:e]
S97T002423	225:2	Drainable liquid	1,150	3,730	2,440[QC:e]
S97T002422	225:3	Drainable liquid	1,550	1,390	1,470
S97T002444	225:3A	Drainable liquid	2,390	1,020	1,700[QC:e]

Table B2-51. Tank 241-SX-101 Analytical Results: Sulfate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002477	225:5	Drainable liquid	<572	658	<615
S97T002476	225:5R	Drainable liquid	1,480	1,420	1,450
S98T000005	225:7A	Drainable liquid	1,770	1,580	1,680
S98T000009	225:8	Drainable liquid	<1,410	<1,410	<1,410
S98T000012		Drainable liquid	2,830	7,580	5,200[QC:e]
S98T000374	227:5	Drainable liquid	<1,410	<1,410	<1,410
S98T000450	227:7	Drainable liquid	1,470	1,420	1,450
S98T000559	227:7BR	Drainable liquid	<711	<711	<711

Table B2-52. Tank 241-SX-101 Analytical Results: Oxalate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
S97T002408	225:1	Lower half	<814	<837	<825
S97T002417	225:2	Lower half	8,180	8,060	8,120
S97T002441	225:3A	Lower half	9,010	8,910	8,960
S97T002466	225:4	Lower half	<1,980	<2,020	<2,000
S97T002469	225:5	Lower half	9,840	6,520	8,180[QC:e]
S97T002468	225:5R	Lower half	8,410	7,980	8,200
S97T002485	225:6	Upper half	<1,170	<1,170	<1,170
S97T002467		Lower half	<1,170	<1,170	<1,170
S98T000017	225:7	Lower half	<1,020	<1,020	<1,020
S98T000018	225:7A	Lower half	7,920	8,430	8,170
S98T000019	225:7B	Lower half	<970	<941	<956
S98T000020	225:8	Lower half	<1,240	1,340	<1,290
S98T000343	227:1	Upper half	12,300	8,600	10,400[QC:e]
S98T000346		Lower half	34,500	32,100	33,300
S98T000367	227:2	Lower half	26,600	27,900	27,200
S98T000368	227:4	Lower half	621	542	582
S98T000369	227:5	Lower half	<878	<820	<849
S98T000370	227:5A	Upper half	<832	<829	<830
S98T000371		Lower half	<1,370	<1,320	<1,350
S98T000445	227:6	Upper half	<1,380	<1,400	<1,390
S98T000446		Lower half	<1,380	1,970	<1,670[QC:e]
S98T000447	227:7	Lower half	<2,050	<2,010	<2,030
S98T000556	227:7A	Lower half	2,120	2,100	2,110
S98T001685	Core 225	Solid composite	3,940	3,830	3,880
S98T000690	Core 227	Solid composite	6,690	6,470	6,580
Liquids			µg/mL	µg/mL	µg/mL
S97T002411	225:1	Drainable liquid	<541	<541	<541
S97T002423	225:2	Drainable liquid	6,300	6,490	6,390
S97T002422	225:3	Drainable liquid	964	1,100	1,030
S97T002444	225:3A	Drainable liquid	723	<435	<579[QC:e]

Table B2-52. Tank 241-SX-101 Analytical Results: Oxalate (IC). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S97T002477	225:5	Drainable liquid	<435	<435	<435
S97T002476	225:5R	Drainable liquid	494	<435	<464
S98T000005	225:7A	Drainable liquid	7,580	7,590	7,590
S98T000009	225:8	Drainable liquid	99.3	108	104
S98T000012		Drainable liquid	<1,070	<1,070	<1,070
S98T000374	227:5	Drainable liquid	<1,070	<1,070	<1,070
S98T000450	227:7	Drainable liquid	<435	<435	<435
S98T000559	227:7BR	Drainable liquid	<541	<541	<541

Table B2-53. Tank 241-SX-101 Analytical Results: Bulk Density.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**g/mL**	**g/mL**	**g/mL**
S97T002404	225:1	Lower half	1.53	N/A	1.53
S97T002413	225:2	Lower half	1.62	N/A	1.62
S97T002436	225:3A	Lower half	1.77	N/A	1.77
S97T002449	225:5	Lower half	1.59	N/A	1.59
S97T002448	225:5R	Lower half	1.66	N/A	1.66
S97T002494	225:7A	Lower half	1.59	N/A	1.59
S97T002496	225:8	Lower half	1.59	N/A	1.59
S98T000329	227:1	Lower half	1.7	N/A	1.7
S98T000330	227:2	Lower half	1.78	N/A	1.78
S98T000331	227:4	Lower half	1.94	N/A	1.94
S98T000332	227:5	Lower half	1.86	N/A	1.86
S98T000395	Core 225	Solid composite	1.88	N/A	1.88
S98T000680	Core 227	Solid composite	1.93	N/A	1.93

Table B2-54. Tank 241-SX-101 Analytical Results: Exotherms - Calculated Dry Weight (DSC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**J/g DW**	**J/g DW**	**J/g DW**
S97T002453	225:5	Lower half	20.1	25.4	22.7
S97T002498	225:7A	Lower half	58.8	61.2	60
S98T000337	227:1	Lower half	104	80.3	92.1
S98T000347	227:2	Lower half	46.5	39.5	43
S98T000406	Core 225	Solid composite	25.1	37.6	31.4[QC:e]
Liquids			**J/g DW**	**J/g DW**	**J/g DW**
S98T000449	227:7	Drainable liquid	58.2	2.52	30.4[QC:e]

Table B2-55. Tank 241-SX-101 Analytical Results: Percent Water (TGA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			%	%	%
S97T002405	225:1	Lower half	50.6	50.5	50.6
S97T002414	225:2	Lower half	42.4	43	42.7
S97T002437	225:3A	Lower half	48.3	45.5	46.9
S97T002450	225:4	Lower half	1.33	1.78	1.56
S97T002453	225:5	Lower half	47.6	46.8	47.2
S97T002452	225:5R	Lower half	48.6	47.1	47.9
S97T002480	225:6	Upper half	10.8	9.65	10.3
S97T002451		Lower half	6.22	4.81	5.51
S97T002497	225:7	Lower half	7	7.97	7.48
S97T002498	225:7A	Lower half	45.8	45.8	45.8
S97T002499	225:7B	Lower half	7.08	7.18	7.13
S97T002500	225:8	Lower half	46.9	47.9	47.4
S98T000335	227:1	Upper half	38.9	35.1	37
S98T000337		Lower half	39.4	40.7	40.1
S98T000347	227:2	Lower half	39.9	40	40
S98T000348	227:4	Lower half	35.7	32.5	34.1
S98T000349	227:5	Lower half	33.6	29.8	31.7
S98T000350	227:5A	Upper half	4.92	6.36	5.64
S98T000351		Lower half	7.56	6.11	6.84
S98T000433	227:6	Upper half	4.32	3.23	3.78
S98T000434		Lower half	6.21	5.45	5.83
S98T000435	227:7	Lower half	8.3	9.12	8.71
S98T000553	227:7A	Lower half	13.3	14.1	13.7
S98T000406	Core 225	Solid composite	41.5	36.6	39.1
S98T000682	Core 227	Solid composite	22.9	23.6	23.3
Liquids			%	%	%
S97T002410	225:1	Drainable liquid	50.9	51.1	51
S97T002421	225:2	Drainable liquid	47.7	46.7	47.2
S97T002420	225:3	Drainable liquid	49.4	49.5	49.5
S97T002443	225:3A	Drainable liquid	49.6	49.3	49.5

Table B2-55. Tank 241-SX-101 Analytical Results: Percent Water (TGA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids (Cont'd)			%	%	%
S97T002473	225:5	Drainable liquid	49.7	49.7	49.7
S97T002472	225:5R	Drainable liquid	49.8	49.7	49.7
S98T000004	225:7A	Drainable liquid	49.5	49.4	49.4
S98T000008	225:8	Drainable liquid	49.1	48.2	48.6
S98T000373	227:5	Drainable liquid	48.5	48.9	48.7
S98T000449	227:7	Drainable liquid	48.1	47.3	47.7

Table B2-56. Tank 241-SX-101 Analytical Results: Specific Gravity.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids			unitless	unitless	unitless
S97T002410	225:1	Drainable liquid	1.47	1.47	1.47
S97T002421	225:2	Drainable liquid	1.63	1.63	1.63
S97T002420	225:3	Drainable liquid	1.5	1.5	1.5
S97T002443	225:3A	Drainable liquid	1.46	1.47	1.47
S97T002473	225:5	Drainable liquid	1.46	1.46	1.46
S97T002472	225:5R	Drainable liquid	1.48	1.52	1.5
S98T000004	225:7A	Drainable liquid	1.49	1.48	1.49
S98T000008	225:8	Drainable liquid	1.48	1.49	1.49
S98T000373	227:5	Drainable liquid	1.49	1.49	1.49
S98T000449	227:7	Drainable liquid	1.5	1.51	1.51

Table B2-57. Tank 241-SX-101 Analytical Results: Total Alpha.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids			**µCi/mL**	**µCi/mL**	**µCi/mL**
S97T002410	225:1	Drainable liquid	<0.00811	<0.00811	<0.00811
S97T002420	225:3	Drainable liquid	<0.0162	<0.0162	<0.0162
S97T002443	225:3A	Drainable liquid	<0.0138	<0.0151	<0.0145
S97T002473	225:5	Drainable liquid	<0.0151	<0.0138	<0.0145
S97T002472	225:5R	Drainable liquid	<0.0124	<0.0164	<0.0144[QC:e]
S98T000004	225:7A	Drainable liquid	<0.0174	<0.023	<0.0202[QC:e]
S98T000008	225:8	Drainable liquid	<0.012	<0.0134	<0.0127
S98T000373	227:5	Drainable liquid	<0.012	<0.012	<0.012
S98T000449	227:7	Drainable liquid	<0.0252	0.0264	<0.0258
Liquids: acid digest			**µCi/mL**	**µCi/mL**	**µCi/mL**
S98T000040	225:2	Drainable liquid	1.36	1.08	1.22[QC:e]

Table B2-58. Tank 241-SX-101 Analytical Results: Total Alpha.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µCi/g	µCi/g	µCi/g
S97T002407	225:1	Lower half	<0.0147	<0.0193	<0.017[QC:e]
S97T002416	225:2	Lower half	2.6	2.73	2.67
S97T002439	225:3A	Lower half	0.234	0.252	0.243
S97T002458	225:4	Lower half	<0.361	<0.289	<0.325[QC:e]
S97T002461	225:5	Lower half	0.061	0.0573	0.0591
S97T002460	225:5R	Lower half	0.0725	0.066	0.0693
S97T002459	225:6	Lower half	0.156	0.222	0.189[QC:e]
S97T002505	225:7	Lower half	0.295	0.343	0.319
S97T002506	225:7A	Lower half	0.195	0.229	0.212
S97T002507	225:7B	Lower half	0.392	0.433	0.413
S97T002508	225:8	Lower half	0.0717	0.0721	0.0719[QC:c]
S98T000408	Core 225	Solid composite	0.703	0.853	0.778
S98T000686	Core 227	Solid composite	0.342	0.295	0.319

Table B2-59. Tank 241-SX-101 Analytical Results: Total Beta (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µCi/g	µCi/g	µCi/g
S98T000408	Core 225	Solid composite	476	561	519
S98T000686	Core 227	Solid composite	196	182	189

Table B2-60. Tank 241-SX-101 Analytical Results: Cesium-137 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µCi/g	µCi/g	µCi/g
S97T002407	225:1	Lower half	237	256	246
S97T002416	225:2	Lower half	203	205	204
S97T002439	225:3A	Lower half	150	145	148
S97T002458	225:4	Lower half	11.6	12.6	12.1
S97T002461	225:5	Lower half	208	183	195
S97T002460	225:5R	Lower half	197	194	196
S97T002483	225:6	Upper half	55.7	53.9	54.8
S97T002459		Lower half	21.5	17.9	19.7
S97T002505	225:7	Lower half	32.3	34.2	33.2
S97T002506	225:7A	Lower half	211	201	206
S97T002507	225:7B	Lower half	18.5	17.6	18.1
S97T002508	225:8	Lower half	195	193	194
S98T000341	227:1	Upper half	175	175	175
S98T000344		Lower half	182	174	178
S98T000358	227:2	Lower half	184	181	183
S98T000359	227:4	Lower half	85.1	90.6	87.8
S98T000360	227:5	Lower half	154	144	149
S98T000357	227:5A	Upper half	16.2	16.6	16.4
S98T000361		Lower half	25.6	24.9	25.2
S98T000439	227:6	Upper half	17.1	16.8	16.9
S98T000440		Lower half	27.5	29.7	28.6
S98T000441	227:7	Lower half	39.3	35.8	37.6
S98T000554	227:7A	Lower half	54.4	49.3	51.8
S98T000408	Core 225	Solid composite	109	118	113
S98T000686	Core 227	Solid composite	92.3	87.5	89.9

Table B2-61. Tank 241-SX-101 Analytical Results: Cobalt-60 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µCi/g	µCi/g	µCi/g
S97T002407	225:1	Lower half	<0.0511	<0.0473	<0.0492
S97T002416	225:2	Lower half	<0.0619	0.0881	<0.075[QC:e]
S97T002439	225:3A	Lower half	<0.0507	<0.0487	<0.0497
S97T002458	225:4	Lower half	<0.0387	<0.0327	<0.0357
S97T002461	225:5	Lower half	<0.0379	<0.0429	<0.0404
S97T002460	225:5R	Lower half	<0.0362	<0.0394	<0.0378
S97T002483	225:6	Upper half	<0.142	<0.144	<0.143
S97T002459		Lower half	<0.135	<0.145	<0.14
S97T002505	225:7	Lower half	<0.0752	<0.0785	<0.0769
S97T002506	225:7A	Lower half	<0.081	<0.0711	<0.076
S97T002507	225:7B	Lower half	<0.0899	<0.0849	<0.0874
S97T002508	225:8	Lower half	<0.0976	<0.107	<0.102
S98T000341	227:1	Upper half	<0.151	<0.145	<0.148
S98T000344		Lower half	<0.0359	<0.0339	<0.0349
S98T000358	227:2	Lower half	<0.0358	<0.0337	<0.0348
S98T000359	227:4	Lower half	<0.0873	<0.0848	<0.086
S98T000360	227:5	Lower half	<0.0443	<0.0488	<0.0466
S98T000357	227:5A	Upper half	<0.013	<0.013	<0.013
S98T000361		Lower half	<0.0078	<0.00833	<0.00807
S98T000439	227:6	Upper half	<0.0126	<0.0139	<0.0133
S98T000440		Lower half	<0.00787	<0.00811	<0.00799
S98T000441	227:7	Lower half	<0.0185	<0.0189	<0.0187
S98T000554	227:7A	Lower half	<0.0195	<0.0196	<0.0195
S98T000408	Core 225	Solid composite	<0.0252	<0.0282	<0.0267
S98T000686	Core 227	Solid composite	<0.0226	<0.0207	<0.0216

Table B2-62. Tank 241-SX-101 Analytical Results: Strontium-89/90 (Sr).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µCi/g	µCi/g	µCi/g
S98T000408	Core 225	Solid composite	187	189	188
S98T000686	Core 227	Solid composite	54.4	51.5	53

Table B2-63. Tank 241-SX-101 Analytical Results: Ammonia (Ion Sel. Electrode [NH_3]).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids			µg/mL	µg/mL	µg/mL
S97T002410	225:1	Drainable liquid	84.3	90.6	87.4
S97T002421	225:2	Drainable liquid	74.2	86.2	80.2
S97T002420	225:3	Drainable liquid	74.6	88.8	81.7
S97T002443	225:3A	Drainable liquid	113	112	113
S97T002473	225:5	Drainable liquid	108	132	120
S97T002472	225:5R	Drainable liquid	117	126	122
S98T000004	225:7A	Drainable liquid	21.5	19.3	20.4
S98T000008	225:8	Drainable liquid	<5	<5	<5
S98T000373	227:5	Drainable liquid	<50	<50	<50
S98T000449	227:7	Drainable liquid	<5	<5	<5

Table B2-64. Tank 241-SX-101 Analytical Results: Total Inorganic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Mean
Solids			µg/g	µg/g	µg/g	µg/g
S97T002405	225:1	Lower half	1,570	1,650		1,610
S97T002414	225:2	Lower half	1,610	1,610		1,610
S97T002437	225:3A	Lower half	993	952		973
S97T002450	225:4	Lower half	421	571	568	520[QC:e]
S97T002453	225:5	Lower half	1,450	1,460		1,460
S97T002452	225:5R	Lower half	5,850	6,010		5,930
S97T002480	225:6	Upper half	909	772		841
S97T002451		Lower half	4,250	3,970		4,110
S97T002497	225:7	Lower half	722	754		738
S97T002498	225:7A	Lower half	1,220	1,240		1,230
S97T002499	225:7B	Lower half	540	577		559
S97T002500	225:8	Lower half	1,010	1,000	997	1,000
S98T000335	227:1	Upper half	1,300	1,280		1,290
S98T000337		Lower half	1,540	1,370	1,690	1,530
S98T000347	227:2	Lower half	1,420	1,560		1,490
S98T000348	227:4	Lower half	463	372		418[QC:e]
S98T000349	227:5	Lower half	717	276	249	414[QC:e]
S98T000350	227:5A	Upper half	724	638	621	661
S98T000351		Lower half	537	619	665	607
S98T000433	227:6	Upper half	427	428	311	389[QC:c]
S98T000434		Lower half	1,320	1,340	1,220	1,290
S98T000435	227:7	Lower half	1,300	1,040	1,210	1,180[QC:e]
S98T000553	227:7A	Lower half	1,500	1,020	960	1,160[QC:e]
S98T000406	Core 225	Solid composite	1,180	1,500	1,480	1,390[QC:e]
S98T000682	Core 227	Solid composite	1,930	856		1,390[QC:e]
Liquids			µg/mL	µg/mL	µg/mL	µg/mL
S98T001090	225:1	Drainable liquid	2,340	2,340		2,340
S98T001091	225:2	Drainable liquid	1,990	2,020		2,010
S98T001092	225:3	Drainable liquid	1,870	1,950		1,910
S97T002444	225:3A	Drainable liquid	2,060	2,140		2,100

Table B2-64. Tank 241-SX-101 Analytical Results: Total Inorganic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL	µg/mL
S97T002477	225:5	Drainable liquid	1,830	1,770	1,820	1,810[QC:c]
S97T002476	225:5R	Drainable liquid	1,730	1,770	1,760	1,750
S98T000005	225:7A	Drainable liquid	1,800	1,810		1,810
S98T000009	225:8	Drainable liquid	1,360	1,410		1,390
S98T000374	227:5	Drainable liquid	1,120	1,100	1,110	1,110
S98T000450	227:7	Drainable liquid	1,450	1,440		1,450

Table B2-65. Tank 241-SX-101 Analytical Results: Total Organic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Mean
Solids			µg/g	µg/g	µg/g	µg/g
S97T002405	225:1	Lower half	403	437		420
S97T002414	225:2	Lower half	3,770	3,800		3,790
S97T002437	225:3A	Lower half	2,740	2,630		2,690
S97T002450	225:4	Lower half	119	161	137	139[QC:e]
S97T002453	225:5	Lower half	2,570	2,200		2,390
S97T002452	225:5R	Lower half	4,440	4,490		4,470
S97T002480	225:6	Upper half	195	232		214
S97T002451		Lower half	3,700	4,220		3,960
S97T002497	225:7	Lower half	241	133		187[QC:e,f]
S97T002498	225:7A	Lower half	2,050	2,350		2,200
S97T002499	225:7B	Lower half	130	111		121
S97T002500	225:8	Lower half	671	423	395	496[QC:e]
S98T000335	227:1	Upper half	4,690	5,450		5,070
S98T000337		Lower half	11,000	8,720	10,700	10,100[QC:c,e]
S98T000347	227:2	Lower half	7,050	7,690		7,370
S98T000348	227:4	Lower half	588	503		546
S98T000349	227:5	Lower half	606	541	602	583
S98T000350	227:5A	Upper half	272	78.5	413	255[QC:e]
S98T000351		Lower half	111	42.9	79.5	77.8[QC:e]
S98T000433	227:6	Upper half	124	1,190	109	474[QC:c,e]
S98T000434		Lower half	151	119	127	132[QC:e]
S98T000435	227:7	Lower half	134	150	167	150
S98T000553	227:7A	Lower half	365	300	348	338
S98T000406	Core 225	Solid composite	870	1,480	1,440	1,260[QC:e]
S98T000682	Core 227	Solid composite	2,250	1,350		1,800[QC:c,e]
Liquids			µg/mL	µg/mL	µg/mL	µg/mL
S98T001090	225:1	Drainable liquid	353	326		340
S98T001091	225:2	Drainable liquid	414	534		474[QC:e]
S98T001092	225:3	Drainable liquid	285	279		282[QC:f]

Table B2-65. Tank 241-SX-101 Analytical Results: Total Organic Carbon. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Triplicate	Mean
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL	µg/mL
S97T002444	225:3A	Drainable liquid	312	337		325
S97T002477	225:5	Drainable liquid	121	406	387	305[QC:c,e,f]
S97T002476	225:5R	Drainable liquid	628	442	112	394[QC:e,f]
S98T000005	225:7A	Drainable liquid	261	304		283[QC:f]
S98T000009	225:8	Drainable liquid	347	372		360
S98T000374	227:5	Drainable liquid	210	375	275	287[QC:e]
S98T000450	227:7	Drainable liquid	324	299		312

B2.3 VAPOR PHASE MEASUREMENT

Vapor sampling and combustible gas testing were completed on July 21, 1995, to support the hazardous vapor safety screening DQO (Osborne and Buckley 1995) and the organic solvents DQO (Meacham et al. 1997). Results are shown in Tables B2-66 and B2-67.

In addition to the 1996 samples, headspace combustible gas measurements were obtained during the February 12 to March 21 push mode sampling of tank 241-SX-101. 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 B2-67.

Table B2-66. Results of Combustible Gas Tests for Tank 241-SX-101.

Measurement	December 1997 to February 1998 (During Rotary Sampling Event)
LFL, headspace	0%
NH_3	0 to 40 ppmv
O_2	19.8 to 21.0%
TOC	0 ppmv

Table B2-67. Results of July 21, 1995 Headspace Vapor Sample Measurements.[1] (2 sheets)

Category	Sample Medium	Analyte	Concentration	Units
Inorganic analytes	Sorbent traps	NH_3	3.8±0.4	ppmv
		NO_2	0.10±0.02	ppmv
		NO	0.13±0.01	ppmv
		H_2O	11.8 ±0.5	mg/L
Permanent gases	SUMMA[2] canister	H_2	<25	ppmv
		CH_4	<25	ppmv
		CO_2	338	ppmv
		CO	<25	ppmv
		N_2O	<25	ppmv

Table B2-67. Results of July 21, 1995 Headspace Vapor Sample Measurements.[1] (2 sheets)

Category	Sample Medium	Analyte	Concentration	Units
Total nonmethane hydrocarbons	SUMMA™ canister	Hydrocarbons	0.98	mg/m^3 at standard temperature and pressure
Volatile organics	SUMMA™ canister[2]	Methanol	0.060	ppmv
		Trichlorofluoromethane	0.023	ppmv
		Acetone	0.033	ppmv
Semivolatile organics	Sorbent traps	Acetone	0.034	ppmv
		Trichlorofluoromethane	0.024	ppmv

Notes:

[1]Evans et al. (1996)

[2]SUMMA is a trademark of Molectrics, Inc., Cleveland, Ohio.

B2.4 DESCRIPTION OF HISTORICAL SAMPLING EVENTS AND ANALYTICAL RESULTS

Several historical analytical sample results were obtained for tank 241-SX-101. Table B2-68 shows results of a supernatant sample (R4884) received on April 1989 by the Process Chemistry Laboratory. This 1989 data have not been validated and should be used with caution. Earlier historical samples are not likely representative of current tank contents and are not presented in this report. Appendix E references pre-1989 historical sample information.

Table B2-68. April 1989 Tank 241-SX-101 Liquid Sample.[1] (2 sheets)

Received: April 26, 1989		
Component	**Lab Value**	**Lab Unit**
Anions		
F	<0.067	*M*
Cl	0.155	*M*
NO_3	1.45	*M*
PO_4	<0.056	*M*
SO_4	0.073	*M*
NO_2	0.11	*M*
OH	0.16	*M*
Cations		
Al	0.046	*M*
B	0.0004	*M*
Ca	0.0001	*M*
Cd	<0.00002	*M*
Cr	0.0064	*M*
K	0.0030	*M*
Na	1.21	*M*
Ni	<0.0003	*M*
P	0.0052	*M*
Pd	<0.0003	*M*
Sn	<0.0005	*M*
Other ICP elements	<0.0002	*M*
Radiological Analysis		
$^{239/240}Pu$	<0.03	μCi/L
^{137}Cs	28,500	μCi/L
^{241}Am	<0.08	μCi/L
$^{89/90}Sr$	2.2	μCi/L
^{99}Tc	14.5	μCi/L
Total alpha	<3.7	μCi/L
Total beta	40100	μCi/L

Table B2-68. April 1989 Tank 241-SX-101 Liquid Sample.[1] (2 sheets)

Received: April 26, 1989		
Component	**Lab Value**	**Lab Unit**
Other Analysis		
Total Organic Carbon	0.32	g/L
Density	1.11	g/ml
pH	13.1	

Note:
[1]Weiss (1990)

B3.0 ASSESSMENT OF CHARACTERIZATION RESULTS

This section discusses the overall quality and consistency of the 1997 rotary mode sampling results for tank 241-SX-101 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

According to the sampling analysis plan (Hu 1997), rotary mode sampling was planned for two cores from risers 4 and 19. Eight and one-half segments were expected from each core. However, because hard material was encountered during sampling, several partial segments with poor recovery were recovered. Core 225 samples were obtained to segment 7. Segment 8 was abandoned after several unsuccessful attempts. A total of 111 in. of material was collected. Core 227 samples were obtained to segment 6. The last two segments were too hard to penetrate and were abandoned. A total of 58 in. of material was collected. By considering the recovery of each subsamples and how far each subsample was collected out of full, 19-inch segments, the total recovery can be estimated. In total, only 36 percent of the waste from core 227 and 69 percent of core 225 were recovered.

In-tank photographs, surveillance videotape, and zip-cord measurements indicate that there is no liquid layer on the waste surface. Likewise, core 227 data showed no supernatant above the solids. However, the upper segments of core 225 were liquid. This may be attributed to disturbing the waste configuration during the first trial of rotary mode sampling, which

resulted in zero retrieval. Subsequent resampling in push-mode resulted in obtaining three segments of liquid. No other evidence indicates the presence of a supernatant layer.

B3.2 QUALITY CONTROL ASSESSMENT

The usual quality control assessment includes an evaluation of the appropriate standard recoveries, spike recoveries, duplicate analyses, and blanks that are performed in conjunction with the chemical analyses. All pertinent quality control tests were conducted on 1997 rotary mode core samples, allowing a full assessment regarding the accuracy and precision of the data. Hu (1997) established specific acceptance criteria for all required analytes. Sample and duplicate pairs with one or more quality control results outside the specified criteria were identified by footnotes in the data summary tables.

The standard and spike recovery results provide an estimate of analysis accuracy. If a standard or spike recovery was above or below the given acceptance 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.

The DSC analyses were performed in duplicate on direct subsamples. The exothermic energy based on dry weight of the subsample was calculated for all subsamples. Relative percent differences outside of the required range (30 percent for solids, 20 percent for liquids) were reported for 2 of the 36 subsamples submitted for analysis. The nonhomogeneous material and small sample size required for this analysis made it difficult to obtain reproducible results. No reruns were requested. For the samples that did not exhibit exothermic energy, the calculation for the RPD is indeterminate. The standard recoveries for this analysis were within the required limits of 80 to 120 percent.

The TGA results for 21 of the 36 subsamples were the sum of two or more weight-loss steps. More information may be obtained by examining the raw data. The RPDs for solids were ≤30 percent, and those for the liquids were ≤20 percent. All samples were within the required limits. The standard recoveries for this analysis were within the required limits of 80 to 120 percent.

The bulk density analysis was attempted for segments 4, 6, 7, and 7B from core 225 and segments 5A, 6, and 7 from core 227. These samples were very dry, and accurate volumes could not be measured because of the void spaces in the material. There were no quality control parameters stated in the tank sampling and analysis plan (Hu, 1997) for these samples.

Specific gravity analyses were performed on the liquid subsamples. The results for this analyses are provided in Table B3-1. Although there were no quality control (QC) parameters stated in the tank sampling and analysis plan (Hu 1997) for these samples, the standard recoveries and RPDs were within the control limits of the laboratory.

For NH_3 analysis, a small amount of ammonia was detected in the method blank for one sample. However, the level of contamination was insignificant with respect to the sample result and did not affect the useability of the results. The RPDs were within the required limits of ≤20 percent, the standard recoveries were within the required limits of 80 to 120 percent, and the spike recoveries were within the required limits of 75 to 125 percent.

For IC analyses, the quality control review discussed in this report is limited to bromide. A high RPD (>20 percent) was reported for core 227, segment 7A, lower half. This was attributed to sample inhomogeneity, and no rerun was requested. The standard recoveries for bromide were within the required limits of 80 to 120 percent, and the spike recoveries were within the required limits of 75 to 125 percent.

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 limit of 32.0 μCi/g (based on a bulk density of 1.92 g/mL). High RPDs (>20 percent) were reported for two subsamples. The sample from core 225, segment 2, drainable liquid (S98T000040) was reanalyzed with no improvement in the RPD. More information may be obtained by examining the raw data. For the sample from core 225, segment 6, lower half solids (S97T002459) the high RPD may have been caused in part by sample homogeneity problems but is mainly attributed to the proximity of sample alpha activities to the minimum detectable activity, near which the variability is expected to be greater. No rerun was requested because of the low alpha activity in the sample. A spike recovery outside of the required range (75 to 125 percent) was reported for one subsample of core 225, segment 8, lower half solids (S97T002508). The spike recovery was within the laboratory statistical control limits for the quality control standard, and no rerun was requested. The standard recoveries were within the required limits of 70 to 130 percent.

The RPDs of total beta analysis were within the required limits of ≤20 percent, the standard recoveries were within the required limits of 80 to 120 percent, and the spike recoveries were within the required limits of 75 to 125 percent.

Quality control review of gamma energy analysis discussed in this report is limited to ^{137}Cs. Actual detection limits for GEA analytes are not currently available. The latest GEA software does not report a minimum detectable activity. If an analyte is reported as "less than," the value reported is the detection limit.

For the GEA analysis, some radionuclides have peak energies that are very close together and cannot always be separated. When this occurs, most software will report all isotopes with an energy near the found peak energy. The data from the radionuclides that are not present are eliminated by crossing out the unused peaks. The RPDs were within the required limits of ≤20 percent, and the standard recoveries were within the required limits of 80 to 120 percent.

The RPDs of strontium analysis were within the required limits of ≤20 percent, the standard recoveries were within the required limits of 70 to 130 percent, and the spike recoveries were within the required limits of 75 to 125 percent.

Total inorganic carbon/total organic carbon analyses by persulfate oxidation/coulometry were performed in duplicate on direct subsamples. The blank is considered a reagent blank. The value was within the acceptance limits, and all results were corrected for the concentration found in the blank. Difficulties were noted in the analysis of the tank 241-SX-101 samples because of sample inhomogeneity. High RPDs (>20 percent) were reported for 14 of the 36 subsamples submitted for analysis. Some of these samples were reanalyzed or had triplicate analyses performed. More information may be obtained by examining the raw data.

Total inorganic carbon spike recoveries outside of the 75 to 125 percent range were reported for two samples, and four samples failed the spike recovery requirements for TOC (75 to 125 percent). These spike failures were a result of sample inhomogeneity and the high concentration of these analytes with respect to the amount of spike standard added.

The RPDs of uranium analyses were within the required limits of ≤20 percent, the standard recoveries were within the required limits of 80 to 120 percent, and the spike recoveries were within the required limits of 75 to 125 percent.

B3.3 DATA CONSISTENCY CHECKS

Comparing different analytical methods is helpful in assessing the consistency and quality of the data. Comparisons were made for sulfur analyzed by ICP versus sulfate analyzed by IC, and for phosphorous analyzed by ICP versus phosphate analyzed by IC. 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 analytical methods. 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.

B3.3.1.1 Sulfate in Solids. The analytical sulfur mean result as determined by ICP was 714 μg/g, which converts to 2,141 μg/g of sulfate. This compared well with the IC sulfate mean result of 2,295 μg/g for solids. The RPD between these two sulfate results was 6.9 percent.

B3.3.1.2 Phosphate in Solids. The analytical phosphorous mean result as determined by ICP was 1,720 μg/g, which converts to 5,272 μg/g of phosphate. This compared well with the IC phosphate mean result of 4,940 μg/g for solids. The RPD between these two phosphate results was 6.5 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. In calculating the balances, only the analytes listed in Section B2.0 that were detected at a concentration of 1,000 μg/g or greater were considered.

Except sodium, all cations listed in Table B3-1 and B3-3 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 cation. The aluminum in the solid phase was considered to be associated with sodium aluminate and would carry a single negative charge. The anions listed in Table B3-2 and B3-4 were assumed to be present as sodium salts and were expected to balance the positive charge exhibited by the cations. Phosphorus was considered to be a better representative of the total phosphate. Sulfate, as determined by IC, is assumed to be completely water soluble and appears only in the anion mass and charge calculations.

B3.3.2.1 Solids Mass and Charge Balance. The mass balance was calculated from the formula below. The factor 0.0001 is the conversion factor from μg/g to weight percent.

$$\text{Mass balance} = \%\ \text{water} + 0.0001 \times \{\text{total analyte concentration}\}$$

$$= \%\ \text{water} + 0.0001 \times \{Na + AlO_2 + Cr(OH)_3 + Fe_2O_3 + Mn_2O_3 + PO_4 + U_2O_3 + Cl + NO_3 + NO_2 + SO_4 + Ox + OH + CO_3\}$$

The total analyte concentration calculated from the above equation is 755,000 μg/g. The mean weight percent water (obtained from the gravimetric analyses reported in Table B3-3) is 31.2 percent or 312,000 μg/g. The mass balance resulting from adding the percent water to the total analyte concentration is 106.7 percent (see Table B3-5).

Table B3-1. Cation Mass and Charge Data (Solids).

Analyte	Concentration (μg/g)	Assumed Species	Concentration of Assumed Species (μg/g)	Charge (μeq/g)
Sodium	2.02E+05	Na^+	2.02E+05	+8,783
Chromium	1.11E+04	$Cr(OH)_3$	2.20E+04	0.00
Iron	2.06E+03	Fe_2O_3	2.95E+03	0.00
Manganese	1.09E+03	Mn_2O_3	1.57E+03	0.00
Uranium	1.57E+03	U_2O_3	1.73E+03	0.00
Total			2.30E+05	+8,783

Table B3-2. Anion Mass and Charge Data (Solids).

(μg/g)	Concentration (μg/g)	Assumed Species	Concentration of Assumed Species (μg/g)	Charge (μeq/g)
Aluminum	6.36E+04	AlO_2^-	1.39E+05	-2,356
NO_3	3.38E+05	NO_3^-	3.38E+05	-5,452
NO_2	2.18E+04	NO_2^-	2.18E+04	-474
Chlorine	5.96E+03	Cl^-	5.96E+03	-168
Phosphorus	1.72E+03	PO_4^{-3}	5.27E+03	-166
SO_4	2.29E+03	SO_4^{-2}	2.29E+03	-48
Oxalate	5.23E+03	$C_2O_4^{-2}$	5.23E+03	-119
TIC	1.39E+03	CO_3^{-2}	6.95E+03	-232
Total			5.25E+05	-9,015

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

<u>Total cations</u> (μeq/g) = $[Na^+]/23.0 = 8{,}730$ μeq/g

<u>Total anions</u> (μeq/g) = $[Cl^-]/35.5 + [NO_3^-]/62.0 + [NO_2^-]/46 + [AlO_2^-]/27 + [PO_4^{-3}]*3/95 + [SO_4^{-2}]*2/96 + [C_2O_4^{-2}]*2/88 + [CO_3^{-2}]*2/60$

= 9,015 μeq/g

The charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 0.974.

In summary, the above calculations yield both a reasonable mass balance and charge balance (close to 100 percent). No caustic is needed in the solid phase.

B3.3.2.2 Liquid Mass and Charge Balance

Mass balance = % water + 0.0001 x {total analyte concentration}/density

= % water + 0.0001 x {Al +K + Na + Cr + Cl + NO_3 + NO_2 + SO_4 + OH + CO_3}/rho

The total analyte concentration calculated from the above equation is 703,000 μg/mL. For a density of 1.499 g/mL the concentration is 469,000 μg/g. The mean weight percent water (obtained from the gravimetric analyses reported in Table B3-8) is 49.0 percent or 490,000 μg/g. The mass balance resulting from adding the percent water to the total analyte concentration is 95.8 percent (see Table B3-5). The latest core sample data (Steen 1998) show that the "titrated hydroxide" value for this liquid is 32,400 μg/g, which indicates that the case of minimum hydroxide yields the most realistic results.

Table B3-3. Cation Mass and Charge Data (Liquid).

Analyte	Concentration (μg/mL)	Assumed Species	Concentration of Assumed Species (μg/mL)	Charge (μeq/mL)
Potassium	2.52E+03	K^+	2.52E+03	+ 65
Sodium	2.42E+05	Na^+	2.42E+05	+10,522
Totals			2.45E+05	+10,587

Table B3-4. Anion Mass and Charge Data.

Analyte	Concentration (μg/mL)	Assumed Species	Concentration of Assumed Species (μg/mL)	Charge (μeq/mL)
Aluminum	7.56E+04	AlO_2^-	1.65E+05	-2,800
Chromium	1.21E+04	CrO_4^{-2}	2.70E+04	-465
NO_3	1.05E+05	NO_3^-	1.05E+05	-1,694
NO_2	7.80E+04	NO_2^-	7.80E+04	-1,696
Chlorine	1.67E+04	Cl^-	1.67E+04	-470
SO_4	1.83E+03	SO_4^{-2}	1.83E+03	-38
TIC	1.61E+03	CO_3^{-2}	8.05E+03	-268
Totals			4.07E+05	-7,595

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

Total cations (μeq/g) = $[Na^+]/23.0 + [K^+]/39 = 10{,}587$ μeq/mL

Total anions (μeq/g) = $[Al^-]/27 + [Cr^{-2}]/52 + [Cl^-]/35.5 + [NO_3^-]/62.0 + [NO_2^-]/46 + [SO_4^{-2}]/96 + [CO_3^{-2}]/60 = 7{,}595$ μeq/mL

The charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 1.39.

Inclusion of caustic values is used to balance the charge. The amount required is 2,992 * 17 = 50,900 μg/mL or 33,900 μg/g. The charge balance values are now exactly one, and the mass balance is 95.8 percent.

Table B3-5. Mass and Charge Balance Totals

Totals	Concentrations (μg/g)	Charge (μeq/g)
Solids		
Total from Table B3-1 (cations)	2.30E+05	+8,783
Total from Table B3-2 (anions)	5.25E+05	-9,015
Added caustic	0	-0
Water percent	3.12E+05	N/A
Total	10.67E+05	-232.00
Liquids		
Total from Table B3-3 (cations)	1.63E+05	+7,063
Total from Table B3-4 (anions)	2.71E+05	-5,067
Added caustic	0.34E+05	-1,996
Water percent	4.90E+05	N/A
Total	9.58E+05	0.00

B3.4 MEAN CONCENTRATIONS AND CONFIDENCE INTERVALS

B3.4.1 Solid Data

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

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

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

where:

Y_{ijkm} = concentration from the mth analytical result of the kth sample of the jth segment of the ith riser

μ = the mean

R_i = the effect of the ith riser

S_{ij} = the effect of the jth segment from the ith riser

L_{ijk} = the effect of the kth sample from the jth segment of the ith riser

A_{ijkm} = the analytical error

a = the number of risers

b_i = the number of segments from the ith riser

c_{ij} = the number of samples from the jth segment of the ith riser

n_{ijk} = the number of analytical results from the ijk^{th} sample

The variables R_i, S_{ij}, and L_{ijk} are random effects. These variables, as well as A_{ijkm}, are assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(R)$, $\sigma^2(S)$, $\sigma^2(L)$ and $\sigma^2(A)$, respectively.

The restricted maximum likelihood method 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. Table B3-6 gives the mean, degrees of freedom, and confidence interval for each constituent for solid segment data.

Some analytes had results that were 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.

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 B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Segment Data. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP:A	6.40E+04	1	0.00E+00	2.87E+05	μg/g
Aluminum	ICP:F	6.63E+04	1	0.00E+00	3.12E+05	μg/g
Antimony[1]	ICP:A	<3.94E+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	<6.56E+01	n/a	n/a	n/a	μg/g
Arsenic[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	μg/g
Barium[1]	ICP:A	<3.28E+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	<3.28E+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	<6.62E+01	n/a	n/a	n/a	μg/g
Bismuth[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	μg/g
Boron[1]	ICP:A	9.47E+01	1	1.59E+01	1.73E+02	μg/g
Boron[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	μg/g
Bromide[1]	IC:W	<1.17E+03	n/a	n/a	n/a	μg/g
Cadmium[1]	ICP:A	<7.29E+00	n/a	n/a	n/a	μg/g
Cadmium[1]	ICP:F	<1.02E+02	n/a	n/a	n/a	μg/g
Calcium[1]	ICP:A	1.47E+02	1	0.00E+00	3.97E+02	μg/g
Calcium[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	μg/g
Cerium[1]	ICP:A	<7.59E+01	n/a	n/a	n/a	μg/g
Cerium[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	μg/g
Cesium-137	GEA:F	1.16E+02	1	0.00E+00	3.95E+02	μCi/g
Chloride	IC:W	6.92E+03	1	0.00E+00	1.64E+04	μg/g
Chromium	ICP:A	1.02E+04	1	0.00E+00	3.98E+04	μg/g
Chromium	ICP:F	1.04E+04	1	0.00E+00	4.12E+04	μg/g
Cobalt[1]	ICP:A	<1.32E+01	n/a	n/a	n/a	μg/g
Cobalt[1]	ICP:F	<4.07E+02	n/a	n/a	n/a	μg/g
Cobalt-60[1]	GEA:F	<5.85E-02	n/a	n/a	n/a	μCi/g
Copper[1]	ICP:A	<6.56E+00	n/a	n/a	n/a	μg/g
Copper[1]	ICP:F	<2.04E+02	n/a	n/a	n/a	μg/g
Fluoride[1]	IC:W	<3.57E+02	n/a	n/a	n/a	μg/g

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Segment Data. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Gross alpha[1]	Alpha:F	4.17E-01	10	0.00E+00	9.25E-01	µCi/g
Iron[1]	ICP:A	1.66E+03	1	0.00E+00	9.34E+03	µg/g
Iron[1]	ICP:F	<2.08E+03	n/a	n/a	n/a	µg/g
Lanthanum[1]	ICP:A	<3.91E+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	<1.30E+02	n/a	n/a	n/a	µg/g
Lead[1]	ICP:F	<2.17E+03	n/a	n/a	n/a	µg/g
Lithium[1]	ICP:A	2.13E+01	1	0.00E+00	1.24E+02	µg/g
Lithium[1]	ICP:F	<2.04E+02	n/a	n/a	n/a	µg/g
Magnesium[1]	ICP:A	<6.92E+01	n/a	n/a	n/a	µg/g
Magnesium[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	µg/g
Manganese[1]	ICP:A	9.20E+02	1	0.00E+00	6.71E+03	µg/g
Manganese[1]	ICP:F	9.80E+02	1	0.00E+00	6.29E+03	µg/g
Molybdenum[1]	ICP:A	<3.57E+01	n/a	n/a	n/a	µg/g
Molybdenum[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	µg/g
Neodymium[1]	ICP:A	<8.47E+01	n/a	n/a	n/a	µg/g
Neodymium[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	µg/g
Nickel[1]	ICP:A	4.56E+01	1	0.00E+00	2.43E+02	µg/g
Nitrate[1]	IC:W	2.99E+05	1	0.00E+00	8.91E+05	µg/g
Nitrite	IC:W	2.48E+04	1	0.00E+00	7.16E+04	µg/g
Oxalate[1]	IC:W	<5.73E+03	n/a	n/a	n/a	µg/g
Percent H2O	DSC/TGA	2.77E+01	1	0.00E+00	8.97E+01	%
Phosphate[1]	IC:W	4.25E+03	1	0.00E+00	2.14E+04	µg/g
Phosphorus[1]	ICP:A	1.18E+03	1	0.00E+00	6.94E+03	µg/g
Phosphorus[1]	ICP:F	<4.36E+03	n/a	n/a	n/a	µg/g
Potassium[1]	ICP:A	7.90E+02	1	0.00E+00	1.83E+03	µg/g
Samarium[1]	ICP:A	<6.59E+01	n/a	n/a	n/a	µg/g
Samarium[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	µg/g
Silicon	ICP:A	3.11E+02	1	0.00E+00	8.95E+02	µg/g
Silicon[1]	ICP:F	<1.16E+03	n/a	n/a	n/a	µg/g
Silver	ICP:A	1.75E+01	1	6.67E+00	2.83E+01	µg/g

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Segment Data. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Silver[1]	ICP:F	<2.04E+02	n/a	n/a	n/a	μg/g
Sodium	ICP:A	1.97E+05	1	1.02E+05	2.93E+05	μg/g
Sodium	ICP:F	2.01E+05	1	1.01E+05	3.01E+05	μg/g
Strontium[1]	ICP:A	1.10E+02	1	0.00E+00	9.05E+02	μg/g
Strontium[1]	ICP:F	<2.55E+02	n/a	n/a	n/a	μg/g
Sulfate[1]	IC:W	<2.70E+03	n/a	n/a	n/a	μg/g
Sulfur	ICP:A	6.34E+02	1	0.00E+00	1.85E+03	μg/g
Sulfur[1]	ICP:F	<2.04E+03	n/a	n/a	n/a	μg/g
Thallium[1]	ICP:A	<1.31E+02	n/a	n/a	n/a	μg/g
Thallium[1]	ICP:F	<4.07E+03	n/a	n/a	n/a	μg/g
Titanium[1]	ICP:A	<7.87E+00	n/a	n/a	n/a	μg/g
Titanium[1]	ICP:F	<2.04E+02	n/a	n/a	n/a	μg/g
Total inorganic carbon	TIC/TOC	1.34E+03	1	0.00E+00	6.20E+03	μg/g
Total organic carbon	TIC/TOC	1.94E+03	1	0.00E+00	9.35E+03	μg/g
Uranium[1]	ICP:A	1.53E+03	1	0.00E+00	1.15E+04	μg/g
Uranium[1]	ICP:F	<1.02E+04	n/a	n/a	n/a	μg/g
Vanadium[1]	ICP:A	<3.35E+01	n/a	n/a	n/a	μg/g
Vanadium[1]	ICP:F	<1.02E+03	n/a	n/a	n/a	μg/g
Zinc[1]	ICP:A	5.18E+01	1	0.00E+00	2.57E+02	μg/g
Zinc[1]	ICP:F	<2.04E+02	n/a	n/a	n/a	μg/g
Zirconium[1]	ICP:A	2.96E+01	1	0.00E+00	1.41E+02	μg/g
Zirconium[1]	ICP:F	<2.04E+02	n/a	n/a	n/a	μg/g

Note:

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

A nested analysis of variance model was fit to the core composite data. Two variance components were used in the calculations. The variance components represent concentration differences between risers and analytical replicates. The model is:

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

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

where

Y_{ij} = concentration from the jth analytical result of the ith riser

μ = the mean

R_i = the effect of the ith riser

A_{ij} = the analytical error

a = the number of risers

n_i = the number of laboratory samples from the ith riser.

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

Table B3-7 gives the mean, degrees of freedom, and confidence interval for each constituent for solid core composite data.

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP:F	6.36E+04	1	0.00E+00	2.34E+05	μg/g
Aluminum	ICP:W	6.19E+04	1	2.79E+04	9.60E+04	μg/g
Antimony[1]	ICP:F	<1.19E+03	n/a	n/a	n/a	μg/g
Antimony[1]	ICP:W	<3.64E+01	n/a	n/a	n/a	μg/g
Arsenic[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Arsenic[1]	ICP:W	<6.08E+01	n/a	n/a	n/a	μg/g
Barium[1]	ICP:F	<9.87E+02	n/a	n/a	n/a	μg/g
Barium[1]	ICP:W	<3.04E+01	n/a	n/a	n/a	μg/g

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Beryllium[1]	ICP:F	<9.87E+01	n/a	n/a	n/a	μg/g
Beryllium[1]	ICP:W	<3.04E+00	n/a	n/a	n/a	μg/g
Bismuth[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Bismuth[1]	ICP:W	<6.08E+01	n/a	n/a	n/a	μg/g
Boron[1]	ICP:F	<9.87E+02	n/a	n/a	n/a	μg/g
Boron	ICP:W	4.48E+02	1	0.00E+00	9.88E+02	μg/g
Bromide[1]	IC:W	<1.01E+03	n/a	n/a	n/a	μg/g
Cadmium[1]	ICP:F	<9.87E+01	n/a	n/a	n/a	μg/g
Cadmium[1]	ICP:W	<3.04E+00	n/a	n/a	n/a	μg/g
Calcium[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Calcium[1]	ICP:W	<6.08E+01	n/a	n/a	n/a	μg/g
Cerium[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Cerium[1]	ICP:W	<6.08E+01	n/a	n/a	n/a	μg/g
Cesium-137	GEA:F	1.02E+02	1	0.00E+00	2.50E+02	μCi/g
Chloride	IC:W	5.96E+03	1	0.00E+00	1.91E+04	μg/g
Chromium	ICP:F	1.11E+04	1	0.00E+00	2.81E+04	μg/g
Chromium	ICP:W	3.34E+03	1	7.06E+02	5.98E+03	μg/g
Cobalt[1]	ICP:F	<3.95E+02	n/a	n/a	n/a	μg/g
Cobalt[1]	ICP:W	<1.22E+01	n/a	n/a	n/a	μg/g
Cobalt-60[1]	GEA:F	<2.42E-02	n/a	n/a	n/a	μCi/g
Copper[1]	ICP:F	<1.98E+02	n/a	n/a	n/a	μg/g
Copper[1]	ICP:W	<6.08E+00	n/a	n/a	n/a	μg/g
Fluoride[1]	IC:W	3.79E+02	1	0.00E+00	3.26E+03	μg/g
Gross alpha	Alpha:F	5.48E-01	1	0.00E+00	3.47E+00	μCi/g
Gross beta	Alpha:F	3.54E+02	1	0.00E+00	2.45E+03	μCi/g
Iron	ICP:F	2.06E+03	1	0.00E+00	1.14E+04	μg/g
Iron[1]	ICP:W	<3.04E+01	n/a	n/a	n/a	μg/g
Lanthanum[1]	ICP:F	<9.87E+02	n/a	n/a	n/a	μg/g
Lanthanum[1]	ICP:W	<3.04E+01	n/a	n/a	n/a	μg/g
Lead[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Lead[1]	ICP:W	<6.08E+01	n/a	n/a	n/a	μg/g

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Lithium[1]	ICP:F	<1.98E+02	n/a	n/a	n/a	μg/g
Lithium[1]	ICP:W	<6.08E+00	n/a	n/a	n/a	μg/g
Magnesium[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Magnesium[1]	ICP:W	<6.08E+01	n/a	n/a	n/a	μg/g
Manganese	ICP:F	1.09E+03	1	0.00E+00	8.81E+03	μg/g
Manganese[1]	ICP:W	<6.08E+00	n/a	n/a	n/a	μg/g
Molybdenum[1]	ICP:F	<9.87E+02	n/a	n/a	n/a	μg/g
Molybdenum[1]	ICP:W	<3.04E+01	n/a	n/a	n/a	μg/g
Neodymium[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Neodymium[1]	ICP:W	<6.08E+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	3.38E+05	1	0.00E+00	1.18E+06	μg/g
Nitrite	IC:W	2.18E+04	1	1.61E+04	2.75E+04	μg/g
Oxalate	IC:W	5.23E+03	1	0.00E+00	2.23E+04	μg/g
Percent water	DSC/TGA	3.12E+01	1	0.00E+00	1.31E+02	%
Phosphate	IC:W	4.94E+03	1	0.00E+00	2.89E+04	μg/g
Phosphorus[1]	ICP:F	<4.16E+03	n/a	n/a	n/a	μg/g
Phosphorus	ICP:W	1.72E+03	1	0.00E+00	9.97E+03	μg/g
Potassium	ICP:W	6.46E+02	1	0.00E+00	1.47E+03	μg/g
Samarium[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Samarium[1]	ICP:W	<6.08E+01	n/a	n/a	n/a	μg/g
Silicon[1]	ICP:F	<9.87E+02	n/a	n/a	n/a	μg/g
Silicon	ICP:W	2.93E+02	1	1.13E+02	4.73E+02	μg/g
Silver[1]	ICP:F	<1.98E+02	n/a	n/a	n/a	μg/g
Silver	ICP:W	1.46E+01	1	7.32E+00	2.19E+01	μg/g
Sodium	ICP:F	2.02E+05	1	1.29E+05	2.75E+05	μg/g
Sodium	ICP:W	2.11E+05	1	1.35E+05	2.87E+05	μg/g
Strontium[1]	ICP:F	<2.00E+02	n/a	n/a	n/a	μg/g
Strontium[1]	ICP:W	<6.08E+00	n/a	n/a	n/a	μg/g
Strontium-89/90	Sr:F	1.20E+02	1	0.00E+00	9.78E+02	μCi/g
Sulfate	IC:W	2.29E+03	1	0.00E+00	6.52E+03	μg/g

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Core Composite Data. (4 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Sulfur[1]	ICP:F	<1.98E+03	n/a	n/a	n/a	μg/g
Sulfur	ICP:W	7.13E+02	1	0.00E+00	1.65E+03	μg/g
Thallium[1]	ICP:F	<3.95E+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	<1.98E+02	n/a	n/a	n/a	μg/g
Titanium[1]	ICP:W	<6.08E+00	n/a	n/a	n/a	μg/g
Total inorganic carbon	TIC/TOC	1.39E+03	1	0.00E+00	3.66E+03	μg/g
Total organic carbon	TIC/TOC	1.50E+03	1	0.00E+00	4.88E+03	μg/g
Uranium[1]	ICP:F	<9.87E+03	n/a	n/a	n/a	μg/g
Uranium[1]	ICP:W	<3.04E+02	n/a	n/a	n/a	μg/g
Uranium	U:F	1.57E+03	1	0.00E+00	1.30E+04	μg/g
Vanadium[1]	ICP:F	<9.87E+02	n/a	n/a	n/a	μg/g
Vanadium[1]	ICP:W	<3.04E+01	n/a	n/a	n/a	μg/g
Zinc[1]	ICP:F	<1.98E+02	n/a	n/a	n/a	μg/g
Zinc[1]	ICP:W	<6.08E+00	n/a	n/a	n/a	μg/g
Zirconium[1]	ICP:F	<1.98E+02	n/a	n/a	n/a	μg/g
Zirconium[1]	ICP:W	<6.08E+00	n/a	n/a	n/a	μg/g

Note:

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

B3.4.2 Liquid Data

A nested analysis of variance model was fit to the liquid segment data. 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:

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

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

where

Y_{ijkm} = concentration from the mth analytical result of the kth sample of the jth segment of the ith riser

μ = the mean

R_i = the effect of the ith riser

S_{ij} = the effect of the jth segment from the ith riser

L_{ijk} = the effect of the kth sample from the jth segment of the ith riser

A_{ijkm} = the analytical error

a = the number of risers

b_i = the number of segments from the ith riser

c_{ij} = the number of samples from the jth segment of the ith riser

n_{ijk} = the number of analytical results from the ijk^{th} sample

The variables R_i, S_{ij}, and L_{ijk} are random effects. These variables, as well as A_{ijkm}, are assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(R)$, $\sigma^2(S)$, $\sigma^2(L)$ and $\sigma^2(A)$, respectively.

Table B3-8 gives the mean, degrees of freedom, and confidence interval for each constituent for liquid sample data.

Table B3-8. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Sample Data. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Aluminum	ICP	7.56E+04	1	0.00E+00	1.83E+05	μg/mL
Ammonia[1]	Ion Selective Electrode (NH_3)	5.97E+01	1	0.00E+00	3.73E+02	μg/mL
Antimony[1]	ICP	<3.94E+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

Table B3-8. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Sample Data. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Bismuth[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Boron[1]	ICP	3.56E+01	1	6.68E+00	6.46E+01	µg/mL
Bromide[1]	IC	<8.51E+02	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	1.67E+04	1	0.00E+00	5.27E+04	µg/mL
Chromium	ICP	1.21E+04	1	0.00E+00	4.68E+04	µg/mL
Cobalt[1]	ICP	<1.20E+01	n/a	n/a	n/a	µg/mL
Copper[1]	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Fluoride[1]	IC	<7.61E+01	n/a	n/a	n/a	µg/mL
Gross alpha[1]	Alpha rad	<1.54E-02	n/a	n/a	n/a	µCi/mL
Iron[1]	ICP	<3.51E+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	<8.55E+02	n/a	n/a	n/a	µg/mL
Lithium[1]	ICP	<6.60E+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	<7.35E+00	n/a	n/a	n/a	µg/mL
Molybdenum	ICP	6.67E+01	1	5.33E+01	8.01E+01	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	1.05E+05	1	2.34E+04	1.87E+05	µg/mL
Nitrite	IC	7.80E+04	1	0.00E+00	2.02E+05	µg/mL
Oxalate[1]	IC	<1.79E+03	n/a	n/a	n/a	µg/mL
Percent H2O	DSC/TGA	4.90E+01	1	4.23E+01	5.56E+01	%
Phosphate[1]	IC	5.18E+03	1	0.00E+00	4.27E+04	µg/mL
Phosphorus[1]	ICP	7.66E+02	1	0.00E+00	1.78E+03	µg/mL
Potassium	ICP	2.52E+03	1	0.00E+00	5.17E+03	µg/mL
Samarium[1]	ICP	<6.01E+01	n/a	n/a	n/a	µg/mL
Silicon	ICP	1.91E+02	1	3.63E-01	3.81E+02	µg/mL
Silver	ICP	1.78E+01	1	1.39E+01	2.17E+01	µg/mL

Table B3-8. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Sample Data. (3 sheets)

Analyte	Method	Mean	df	LL	UL	Units
Sodium	ICP	2.42E+05	1	2.04E+05	2.80E+05	µg/mL
Strontium[1]	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL
Sulfate[1]	IC	1.83E+03	1	0.00E+00	6.40E+03	µg/mL
Sulfur	ICP	3.87E+02	1	0.00E+00	1.66E+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
Total inorganic carbon	TIC/TOC	1.61E+03	1	0.00E+00	5.47E+03	µg/mL
Total organic carbon	TIC/TOC	3.35E+02	1	3.43E+01	6.35E+02	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	<8.89E+00	n/a	n/a	n/a	µg/mL
Zirconium[1]	ICP	<6.01E+00	n/a	n/a	n/a	µg/mL

Note:

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

B4.0 APPENDIX B REFERENCES

Brown, T. M., S. J. Eberlein, 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.

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.

Evans, J. C., K. H. Pool, K. B. Olson, J. S. Fruchter, and K. L. Silvers, 1996, *Headspace Vapor Characterization of Hanford Tank 241-SX-101: Results from Samples Collected on 07/21/95*, PNNL-10881, Pacific Northwest National Laboratory, Richland, Washington.

Homi, C. S., 1995, *Vapor Sampling and Analysis Plan*, WHC-SD-WM-TP-335, Rev. 2A, Westinghouse Hanford Company, Richland, Washington.

Hu, T. A., 1997, *Tank 241-SX-101 Rotary Mode Core Sampling and Analysis Plan*, WHC-SD-WM-TSAP-143, Rev. 1, 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.

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.

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.

Steen, F. H., 1998, *Tank 241-SX-101, Cores 225 and 227 Analytical Results for the Final Report*, HNF-SD-WM-DP-293, Rev. 0A, Waste Management Federal Services of Hanford, Inc., for Fluor Daniel Hanford, Inc., Richland, Washington.

Weiss, R. L., 1990, *Analysis of Liquid Sample from Tank 241-SX-101*, (Letter 12712-PCL90-043 to V. C. Boyles, February 22), Westinghouse Hanford Company, Richland, Washington.

WHC (1992), Safety Department Administrative Manuals, 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 analyses and statistical and numerical manipulations required by the DQOs applicable to tank 241-SX-101. The analyses required for tank 241-SX-101 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**: 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 41 μCi/g for gross alpha and 480 J/g for DSC. Confidence intervals were calculated for the mean values from each laboratory sample. Table C1-1 presents the gross alpha results. The DSC results are given in Table C1-2.

The upper limit of a one-sided 95 percent confidence interval on the mean is:

$$\hat{\mu} + t_{(df,0.05)}\,\hat{\sigma}_{\hat{\mu}}.$$

In this equation, $\hat{\mu}$ is the arithmetic mean of the data, $\hat{\sigma}_{\hat{\mu}}$ is the estimate of the standard deviation of the mean, and $t_{(df,0.05)}$ is the quantile from Student's t distribution with *df* degrees of freedom. The degrees of freedom equals the number of samples minus one.

For sample numbers with at least one value above the detection limit, the upper limit of a 95 percent confidence interval is given in Table C1-1. Each confidence interval can be used to make the following statement: If the upper limit is less than 41 μCi/g (61.5 μCi/mL for drainable liquid), then reject the null hypothesis that the alpha is greater than or equal to 41 μCi/g (61.5 μCi/mL for drainable liquid) at the 0.05 level of significance.

Twenty-five of the 46 gross alpha results were above the detection limit. The UL closest to the threshold was 3.08 μCi/g for core 225, segment 2, lower half. This is well below the limit of 41 μCi/g.

Table C1-1. 95 Percent Upper Confidence Limits for Total Alpha Activity.

Sample ID	Description	$\hat{\mu}$	*df*	Upper Limit	Units
S97T002416F	Core 225, segment 2, lower half	2.66E+00	1	3.08E+00	μCi/g
S97T002439F	Core 225, segment 3A, lower half	2.43E-01	1	3.00E-01	μCi/g
S97T002459F	Core 225, segment 6, lower half	1.89E-01	1	3.97E-01	μCi/g
S97T002460F	Core 225, segment 5R, lower half	6.93E-02	1	8.98E-02	μCi/g
S97T002461F	Core 225, segment 5, lower half	5.91E-02	1	7.08E-02	μCi/g
S97T002505F	Core 225, segment 7, lower half	3.19E-01	1	4.71E-01	μCi/g
S97T002506F	Core 225, segment 7A, lower half	2.12E-01	1	3.19E-01	μCi/g
S97T002507F	Core 225, segment 7B, lower half	4.12E-01	1	5.42E-01	μCi/g
S97T002508F	Core 225, segment 8, lower half	7.19E-02	1	7.32E-02	μCi/g
S98T000040A	Core 225, segment 2 ***AA/Radchem ****	1.22E+00	1	2.10E+00	μCi/mL
S98T000408F	Core 225, core composite	7.78E-01	1	1.25E+00	μCi/g
S98T000449[1]	Core 227, segment 7, subsample	2.58E-02	1	2.96E-02	μCi/mL
S98T000686F	Core 227, core composite	3.18E-01	1	4.67E-01	μCi/g

Note:
[1]A "less than" value was used in the calculations.

Twelve of the 70 DSC results had an exothermic reaction. In Table C1-2, 95 percent upper confidence limit is given for each laboratory sample identification number with at least one exothermic value. All of the results are expressed on a dry weight basis. Each confidence interval can be used to make the following statement: If the upper limit is less than 480 J/g, then reject the null hypothesis that DSC is greater than or equal to 480 J/g at the 0.05 level of significance. The maximum upper limit to a 95 percent confidence level on the mean for DSC was 92.1 J/g dry weight for core 227, segment 1, lower half. This is below the threshold limit of 480 J/g.

Table C1-2. 95 Percent Upper Confidence Limits for Differential Scanning Calorimetry.

Sample ID	Description	$\hat{\mu}$	*df*	Upper Limit	Units
S97T002453	Core 225, segment 5, lower half	2.27E+01	1	3.96E+01	J/g dry weight
S97T002498	Core 225, segment 7A, lower half	6.00E+01	1	6.78E+01	J/g dry weight
S98T000337	Core 227, segment 1, lower half	9.21E+01	1	1.67E+02	J/g dry weight
S98T000347	Core 227, segment 2, lower half	4.30E+01	1	6.49E+01	J/g dry weight
S98T000406	Core 225, core composite	3.14E+01	1	7.07E+01	J/g dry weight
S98T000449	Core 227, segment 7	3.04E+01	1	2.06E+02	J/g dry weight

C2.0 GATEWAY ANALYSIS FOR HISTORICAL MODEL DATA QUALITY OBJECTIVE

The primary objective of the historical model evaluation DQO (Simpson and McCain 1997) 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. 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 DQO-defined concentration levels for a selected number of analytes. This ensures that the predicted waste type will may be in the tank at the predicted location. If the analytical results are $\geq$10 percent of the DQO levels (ratio of 0.1 or more), the waste type and layer identification are considered acceptable for further investigation, and additional analyses are requested on selected segments and composite samples.

Although tank 241-SX-101 in not listed as a priority tank in Simpson and McCain (1997), it has received the following waste types: REDOX, REDOX Ssalt, SMMS1, and SMMS2 (Agnew et al. 1997). All of the core segments, half segments, and core composite are examined in turn against each waste type and the measured and expected concentrations compared. Table C2-1 compares the expected and measured concentrations for the REDOX type and the solid samples. Table C2-2 compares the expected and measured concentrations for the Redox salt type and the solid samples. Table C2-3 compares the expected and measured concentrations for the SMMS1 type and the solid samples. Table C2-4 compares the expected and measured concentrations for the SMMS2 type and the solid samples.

Inspection of Table C2-1 shows that almost all of the samples (22 of 25) fail on the basis that one or more analytes are less than 10 percent of their gateway values. Most samples are low

in iron, chromium, and/or uranium; many fail on at least two of these elements. Of the three samples that pass the 10 percent criteria, all are low in total analytes at 42, 65, and 69 percent, which are far below the 85 percent total criteria. Therefore, these samples do not exhibit the characteristics of REDOX waste.

Inspection of Table C2-2 shows that many of the samples (15 of 25) fail on the basis that the uranium concentration is less than 10 percent of its gateway value. No ^{90}Sr values are available for the individual segments or half segments. Because the composite values are well within the target range, it is presumed that no segment value is below the 10 percent criteria. In other words, a segment is not failed in the test for lack of ^{90}Sr data if all other criteria are met. Of the nine samples that pass the 10 percent criteria, most fall below the 85 percent total criteria. Only two samples pass all tests: core 225, segment 6, lower half, and the core 225 composite. Therefore, these samples do not generally exhibit the characteristics of REDOX salt waste.

Inspection of Table C2-3 shows that three of the samples fail on the basis of the sulphate being less than 10 percent of its gateway value and one other fails on the basis of low aluminum and low water content. About half of the remaining samples (11 of 21) pass the gateway on the basis of having more than 85 percent total analytes. Of the ten segments or half segments that pass, there does not seem to be any clear consistency of position (top, middle, bottom) between the two cores. Therefore, some of the samples exhibit the characteristics of SMMS1 waste.

Inspection of Table C2-4 shows that nearly all of the samples (24 of 25) fail on the basis that one or more analytes are less than 10 percent of their gateway values. Most are low in phosphate, sulphate, and/or carbonate; many fail on at least two of these elements. The one sample, core 225, segment 5R, that passes the 10 percent criteria also passes the 85 percent total criteria. Therefore, these samples do not exhibit the characteristics of SMMS2 waste.

In summary, few of the analyzed segments agree with the four waste types except the SMMS1 type. The agreement for this waste type is not strong between the two cores or within either core. Therefore, the tank exhibits a marginal match only to the SMMS1 waste type.

Table C2-1. Tank 241-SX-101 Historical Model Evaluation for REDOX Material. (2 sheets)

Core: Segment	Al	Cr	Fe	Na	U	Water	^{137}Cs	^{90}Sr	TIC	Total	Fails >10% Criteria for:
	sol,fus	sol,fus	sol,fus	sol,fus	acid/fus	sol	sol,fus	sol,fus	sol		
	μg/g	μg/g	μg/g	μg/g	μg/g	%	μCi/g	μCi/g	μg/g	%	
Analyte Concentrations of REDOX Waste in Historical DQO for Gateway Analysis											
REDOX waste	58	30,600	38,100	33,000	3,500	44	41	94	1,740	61.2	
									8,700	as CO_3	
Analyte Concentrations of 1997 Core Samples of Tank 241-SX-101											
225:1	40	5,140	1,100	16,300	310	50.6	246		1,610	72.4	Fe, U
225:2	56	24,000	9,410	15,900	2,340	42.7	204		1,610	68.6	
225:3A	32	12,200	1,030	20,200	304	46.9	148		973	72.2	Fe, U
225:4	2,780	1,900	982	26,600	503	1.56	12.1		520	29.0	Al, Cr, Fe, water
225:5	4,450	12,400	1,010	2.00E+05	229	47.2	195		1,460	72.6	Fe, U
225:5R	4,480	13,900	1,010	2.00E+05	203	47.9	196		5,930	75.0	Fe, U
225:6	6,840	4,960	3,990	2.00E+05	1,140	10.3	54.8		841	41.5	
	6,840	1,090	1,220	2.00E+05	3,330	5.51	19.7		4,110	38.2	Cr, Fe
225:7	7,610	1,830	2,410	2.00E+05	5,310	7.48	33.2		738	38.8	Cr, Fe
225:7A	4,600	14,100	957	2.00E+05	308	45.8	206		1,230	69.2	Fe, U
225:7B	6,390	1,410	1,730	2.00E+05	4,690	7.13	18.1		559	35.6	Cr, Fe
225:8	4,170	7,220	1,150	2.00E+05	309	47.4	194		1,000	69.8	Fe, U

Table C2-1. Tank 241-SX-101 Historical Model Evaluation for REDOX Material. (2 sheets)

Core: Segment	Al sol,fus µg/g	Cr sol,fus µg/g	Fe sol,fus µg/g	Na sol,fus µg/g	U acid/fus µg/g	Water sol %	^{137}Cs sol,fus µCi/g	^{90}Sr sol,fus µCi/g	TIC sol µg/g	Total %	Fails >10% Criteria for:
227:1	9,120	34,400	11,500	1,360	2,820	37	175		1,290	65.2	
	4,740	37,000	1,280	1,710	345	40.1	178		1,530	66.6	Fe,
Analyte Concentrations of 1997 Core Samples of Tank 241-SX-101 (Cont'd)											
227:2	4,670	35,100	1,100	1,700	291	40	183		1,490	66.1	Fe, U
227:4	1.67	7,210	1,010	2.00E+05	1,650	34.1	87.8		418	71.6	Fe
227:5	1.48E+05	6,720	1,050	2.00E+05	943	31.7	149		414	67.6	Fe
227:5A	59,500	796	1,020	24,800	279	5.64	16.4		661	36.9	Cr, Fe, U
	45,400	1,180	970	2.00E+05	290	6.84	25.2		607	36.7	Cr, Fe, U
227:6	45,900	1,010	1,000	25,200	286	3.78	16.9		389	34.0	Cr, Fe, U, water
	43,200	2,370	968	2.00E+05	288	5.83	28.6		1,290	36.3	Cr, Fe, U
227:7	63,200	5,860	1,020	2.00E+05	345	8.71	37.6		1,180	39.1	Fe, U
227:7A	1.10E+05	6,540	1,010	2.00E+05	423	13.7	51.8		1,160	48.8	Fe
Core 225	50,200	9,720	2,800	2.00E+05	2,470	39.1	113	188	1,390	67.1	Fe
Core 227	77,000	12,400	1,330	2.00E+05	679	23.3	89.9	53	1,390	52.7	Fe

Table C2-2. Tank 241-SX-101 Historical Model Evaluation for REDOX Salt. (2 sheets)

Core: Segment	Al	Cr	Na	U	NO_3	Water	^{137}Cs	^{90}Sr	Total	
	sol,fus	sol,fus	sol,fus	acid/fus	sol,watdig	sol	sol,fus	sol,fus		Fails >10%
	μg/g	μg/g	μg/g	μg/g	μg/g	%	μCi/g	μCi/g	%	Criteria for:
Analyte Concentrations of R-Waste in Historical DQO for Gateway Analysis										
REDOX salt	2,500	7,900	1.37E+05	5,600	2.20E+05	48.6	194	175	88.1	
Analyte Concentrations of 1997 Core Samples of Tank 241-SX-101										
225:1	40,600	5,140	1.63E+05	310	1.11E+05	50.6	246		82.6	U
225:2	56,600	24,000	1.59E+05	2,340	1.17E+05	42.7	204		78.6	
225:3A	32,500	12,200	2.02E+05	304	1.61E+05	46.9	148		87.7	U
225:4	2,780	1,900	2.66E+05	503	7.32E+05	1.56	12.1		101.9	U, water, Cs
225:5	44,500	12,400	1.89E+05	229	2.55E+05	47.2	195		97.3	U
225:5R	44,800	13,900	1.81E+05	203	2.32E+05	47.9	196		95.1	U
225:6	68,400	4,960	2.19E+05	11,400	4.34E+05	10.3	54.8		84.1	
	68,400	1,090	2.32E+05	3,330	4.93E+05	5.51	19.7		85.3	
225:7	76,100	1,830	2.24E+05	5,310	4.48E+05	7.48	33.2		83.0	
225:7A	46,000	14,100	1.66E+05	308	1.62E+05	45.8	206		84.6	U
225:7B	63,900	1,410	2.10E+05	4,690	4.70E+05	7.13	18.1		82.1	Cs
225:8	41,700	7,220	1.69E+05	309	2.43E+05	47.4	194		93.5	U
227:1	91,200	34,400	1.36E+05	2,820	79,900	37	175		71.4	
	47,400	37,000	1.71E+05	345	1.03E+05	40.1	178		76.0	U
227:2	46,700	35,100	1.70E+05	291	1.20E+05	40	183		77.2	U

Table C2-2. Tank 241-SX-101 Historical Model Evaluation for REDOX Salt. (2 sheets)

Core: Segment	Al	Cr	Na	U	NO_3	Water	^{137}Cs	^{90}Sr	Total	
	sol,fus	sol,fus	sol,fus	acid/fus	sol,watdig	sol	sol,fus	sol,fus		Fails > 10%
	µg/g	µg/g	µg/g	µg/g	µg/g	%	µCi/g	µCi/g	%	Criteria for:
Analyte Concentrations of 1997 Core Samples of Tank 241-SX-101 (Cont'd)										
227:4	1.67E+05	7,210	1,96E+05	1,650	91,000	34.1	87.8		80.4	
227:5	1.48E+05	6,720	2.00E+05	943	65,800	31.7	149		73.8	
227:5A	59,500	796	2.48E+05	279	5.68E+05	5.64	16.4		93.3	U, Cs
	45,400	1,180	2.48E+05	290	5.62E+05	6.84	25.2		92.5	U
227:6	45,900	1,010	2.52E+05	286	6.14E+05	3.78	16.9		95.1	U, water, Cs
	43,200	2,370	2.51E+05	288	5.34E+05	5.83	28.6		88.9	U
227:7	63,200	5,860	2.28E+05	345	4.93E+05	8.71	37.6		87.8	U
227:7A	1.10E+05	6,540	2.27E+05	423	2.89E+05	13.7	51.8		77.0	U
Core 225	50,200	9,720	208,000	2,470	4.04E+05	39.1	113	188	106.5	
Core 227	77,000	12,400	196,000	679	2.72E+05	23.3	89.9	53	79.1	

Table C2-3. Tank 241-SX-101 Historical Model Evaluation for SMMS1 Material. (2 sheets)

Core: Segment	Al	Cr	Na	NO_3	SO_4	Water	TIC	Total	
	sol,fus	sol,fus	sol,fus	sol,watdig	sol,watdig	sol	sol		Fails > 10%
	µg/g	µg/g	µg/g	µg/g	µg/g	%	µg/g	%	Criteria for:
Analyte Concentrations of R-Waste in Historical DQO for Gateway Analysis									
SMMS1	31,000	3,000	1.95E+05	3.00E+05	13,000	32.1	3,400	85.5	
							17,000	as CO_3	
Analyte Concentrations of 1997 Core Samples of Tank 241-SX-101									
225:1	40,600	5,140	1.63E+05	1.11E+05	1,080	50.6	1,610	83.5	SO_4
225:2	56,600	24,000	1.59E+05	1.00E+05	2,380	42.7	1,610	79.4	
225:3A	32,500	12,200	2.02E+05	1.61E+05	1,760	46.9	973	88.3	
225:4	2,780	1,900	2.66E+05	7.32E+05	2,620	1.56	520	102.4	Al, water
225:5	44,500	12,400	1.89E+05	2.55E+05	2,760	47.2	1,460	98.3	
225:5R	44,800	13,900	1.81E+05	2.32E+05	4,360	47.9	5,930	98.5	
225:6	68,400	4,960	2.19E+05	4.34E+05	6,770	10.3	841	84.0	
	68,400	1,090	2.32E+05	4.93E+05	4,450	5.51	4,110	87.5	
225:7	76,100	1,830	2.24E+05	4.48E+05	3,510	7.48	738	83.2	
225:7A	46,000	14,100	1.66E+05	1.62E+05	1,020	45.8	1,230	85.3	SO_4
225:7B	63,900	1,410	2.10E+05	4.70E+05	2,280	7.13	559	82.2	
225:8	41,700	7,220	1.69E+05	2.43E+05	1,550	47.4	1,000	94.1	
227:1	91,200	34,400	1.36E+05	79,900	2,740	37	1,290	72.1	
	47,400	37,000	1.71E+05	1.03E+05	1,350	40.1	1,530	76.8	

Table C2-3. Tank 241-SX-101 Historical Model Evaluation for SMMS1 Material. (2 sheets)

Core: Segment	Al	Cr	Na	NO_3	SO_4	Water	TIC	Total	
	sol,fus	sol,fus	sol,fus	sol,watdig	sol,watdig	sol	sol		Fails > 10%
	µg/g	µg/g	µg/g	µg/g	µg/g	%	µg/g	%	Criteria for:
Analyte Concentrations of 1997 Core Samples of Tank 241-SX-101 (Cont'd)									
227:2	46,700	35,100	1.70E+05	1.20E+05	1,650	40	1,490	78.1	
227:4	1.67E+05	7,210	1.96E+05	91E+05	3,300	34.1	418	80.8	
227:5	1.48E+05	6,720	2.00E+05	65,800	1,120	31.7	414	74.1	SO_4
227:5A	59,500	796	2.48E+05	5.68E+05	4,090	5.64	661	94.0	
	45,400	1,180	2.48E+05	5.62E+05	1,770	6.84	607	93.0	
227:6	45,900	1,010	2.52E+05	6.14E+05	4,300	3.78	389	95.7	
	43,200	2,370	2.51E+05	5.34E+05	1,820	5.83	1,290	89.7	
227:7	63,200	5,860	2.28E+05	4.93E+05	2,670	8.71	1,180	88.6	
227:7A	1.10E+05	6,540	2.27E+05	2.89E+05	2,700	13.7	1,160	77.8	
Core 225	50,200	9,720	2.08E+05	4.04E+05	2,630	39.1	1,390	107.3	
Core 227	77,000	12,400	1.96E+05	2.72E+05	1,960	23.3	1,390	79.9	

Notes:

The Historic Model document lists 17,000 ppm of carbonate, and the samples are reported as carbon.
The Total column computes the true total including carbonate.

Table C2-4. Tank 241-SX-101 Historical Model Evaluation for SMMS2 Material. (2 sheets)

Core: Segment	Al	P	Na	NO_3	SO_4	Water	TIC	Total	
	sol,fus	acid/wat	sol,fus	sol,watdig	sol,watdig	sol	sol		Fails > 10%
	µg/g	µg/g	µg/g	µg/g	µg/g	%	µg/g	%	Criteria for:
Analyte Concentrations of R-Waste in Historical DQO for Gateway Analysis									
SMMS2	37,000	5,873	2.15E+05	1.75E+05	2,870	29.9	5,050	79.8	
		18,000	as phosphate				20,200	as carbonate	
Analyte Concentrations of 1997 Core Samples of Tank 241-SX-101									
225:1	40,600	1,410	1.63E+05	1.11E+05	1,080	50.6	1,610	83.4	S
225:2	56,600	3,290	1.59E+05	1.17E+05	2,380	42.7	1,610	78	S
225:3A	32,500	1,130	2.02E+05	1.61E+05	1,760	46.9	973	87.5	S
225:4	2,780	201	2.66E+05	7.32E+05	2,620	1.56	520	102.2	Al, P, S, water
225:5	44,500	1,040	1.89E+05	2.55E+05	2,760	47.2	1,460	97.4	S
225:5R	44,800	810	1.81E+05	2.32E+05	4,360	47.9	5,930	97.3	
225:6	68,400	200	2.19E+05	4.34E+05	6,770	10.3	841	83.6	P
	68,400	200	2.32E+05	4.93E+05	4,450	5.51	4,110	87.4	P
225:7	76,100	200	2.24E+05	4.48E+05	3,510	7.48	738	83.1	P
225:7A	46,000	1,000	1.66E+05	1.62E+05	1,020	45.8	1,230	84.2	S
225:7B	63,900	160	2.10E+05	4.70E+05	2,280	7.13	559	82.1	P, S
225:8	41,700	940	1.69E+05	2.43E+05	1,550	47.4	1,000	93.7	S
227:1	91,200	7,480	1.36E+05	79,900	2,740	37	1,290	70.9	S
	47,400	7,900	1.71E+05	1.03E+05	1,350	40.1	1,530	75.6	S
227:2	46,700	2,580	1.70E+05	1.20E+05	1,650	40	1,490	75.4	S

Table C2-4. Tank 241-SX-101 Historical Model Evaluation for SMMS2 Material. (2 sheets)

Core: Segment	Al	P	Na	NO_3	SO_4	Water	TIC	Total	
	sol,fus	acid/wat	sol,fus	sol,watdig	sol,watdig	sol	sol		Fails >10%
	µg/g	µg/g	µg/g	µg/g	µg/g	%	µg/g	%	Criteria for:
Analyte Concentrations of R-Waste in Historical DQO for Gateway Analysis (Cont'd)									
227:4	1.67E+05	307	1.96E+05	91,000	3,300	34.1	418	80.1	P, C
227:5	1.48E+05	401	2.00E+05	6.5,800	1,120	31.7	414	73.5	P, S, C
227:5A	59,500	111	2.48E+05	5.68E+05	4,090	5.64	661	94	P
	45,400	116	2.48E+05	5.62E+05	1,770	6.84	607	92.9	P, S
227:6	45,900	115	2.52E+05	6.14E+05	4,300	3.78	389	95.6	P, C
	43,200	115	2.51E+05	5.34E+05	1,820	5.83	1,290	89.5	P, S
227:7	63,200	119	2.28E+05	4.93E+05	2,670	8.71	1,180	88	P, S
227:7A	1.10E+05	117	2.27E+05	2.89E+05	2,700	13.7	1,160	77.2	P, S
Core 225	50,200	1,160	2.08E+05	4.04E+05	2,630	39.1	1,390	106.6	S
Core 227	77,000	2,280	1.96E+05	2.72E+05	1,960	23.3	1,390	79.4	S

Notes:

The Historic Model document lists 18,000 ppm of phosphate, and the samples are reported as phosphorus.
The Historic Model document lists 20,200 ppm of carbonate, and the samples are reported as carbon.
The Total column computes the true total, including phosphate and carbonate.

C3.0 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, Rev. 0, Los Alamos National Laboratory, New Mexico.

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*, WHC-SD-WM-DQO-118, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

This page intentionally left blank.

APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-SX-101

This page intentionally left blank.

APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-SX-101

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-101 was performed, and a best-basis inventory was established. This work, detailed in the following sections, follows the methodology established by the standard inventory task.

D1.0 CHEMICAL INFORMATION SOURCES

Available waste information for tank 241-SX-101 includes the following:

- Analytical data from December 1997/January 1998 push and rotary core samples (see Appendix B, Table B3-7 and B3-8)
- Tank waste photographs (Brevick et al. 1997)
- The HDW model document (Agnew et al. 1997a), which provides tank content estimates of component concentrations and inventories.

D2.0 COMPARISON OF COMPONENT INVENTORY VALUES

The tank 241-SX-101 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 tank volume used to generate the HDW inventory is 1,726 kL (456 kgal) waste that is partitioned into 553 kL (146 kgal) sludge and 1,173 kL (310 kgal) saltcake (Agnew et al. 1997a). This differs from the 1,726 kL (456 kgal) total waste, of which 424 kL (112 kgal) is sludge, 1,298 kL (343 kgal) is saltcake, and 3.78 kL (1 kgal) is supernatant reported in *Waste Tank Summary Report for March 31, 1998* (Hanlon 1998). The 3.78 kL (1 kgal) of supernatant reported by Hanlon (1998) was not included in these calculations. The amount that may be in the supernatant is a small amount and will cause only a small error in

determining this estimate. The volumes used for the best-basis inventory of 625 kL liquid and 1,049 kL solids are developed in Section D3.3. The chemical species are reported without charge designation per the best-basis inventory convention.

Table D2-1. Comparison of Inventory Estimates for Nonradioactive Components in Tank 241-SX-101. (2 sheets)

Analyte	HDW[1] Inventory Estimate (kg)	Previous Best-Basis Estimate[2] (kg)
Al	176,000	104,000
Bi	71.6	233
Ca	7,310	78.7
Cl	6,180	8,870
Cr	29,300	11,300
F	319	6,940
Fe	33,700	3,910
Hg	0.559	0
K	1,680	2,610
La	1.27	58
Mn	56.1	2,110
Na	379,000	463,000
Ni	2,360	349
NO_2	121,000	129,000
NO_3	466,000	588,000
OH_{TOTAL}	488,000	280,000
Pb	74.8	349
PO_4	2,230	56,800
Si	2,870	3,960
SO_4	8,980	28,200
Sr	0	345
TIC as CO_3	17,300	17,300
TOC	3,160	15,800

Table D2-1. Comparison of Inventory Estimates for Nonradioactive Components in Tank 241-SX-101. (2 sheets)

Analyte	HDW[1] Inventory Estimate (kg)	Previous Best-Basis Estimate[2] (kg)
U_{TOTAL}	2,780	7,710
Zr	5.87	123
H_2O, wt %	38.3	28.4
Density, g/mL	1.59	1.41

Notes:
[1]Agnew et al. (1997a)
[2]LMHC(1998a)

Table D2-2. Comparison of Inventory Estimates for Selected Radioactive Components in Tank 241-SX-101.

Analyte	HDW[1] Inventory Estimate (Ci)	Previous Best-Basis Estimate[2] (Ci)
^{14}C	17.7	17.7
^{90}Sr	728,000	401,000
^{99}Tc	131	131
^{129}I	0.250	0.25
^{137}Cs	299,000	347,000
^{154}Eu	331	331
^{155}Eu	523	523
^{237}Np	0.542	0.542
$^{239/240}Pu$	382	382
^{241}Pu	329	329
^{241}Am	89.9	89.9
^{60}Co	17.2	17.2

Notes:
[1]Agnew et al. (1997a), decayed to January 1, 1994
[2]LMHC (1998a)

D3.0 COMPONENT INVENTORY EVALUATION

D3.1 WASTE HISTORY

According to Agnew et al. (1997b), tank 241-SX-101 was filled with waste from the REDOX facility from the second quarter of 1954 until the third quarter of 1971. Tank 241-SX-101 received 15,660 kL (4,136 kgal) of first-cycle REDOX process waste during 1954 and 1955. Much of the waste transferred into tank 241-SX-101 was later transferred to other tanks, evaporated, or cascaded to tank 241-SX-102. From 1972 until the tank was removed from service, tank 241-SX-101 sent and received waste from the 242-S Evaporator. The tank was removed from service in 1980 and was partially isolated in June 1985. See Appendix A, Section A3.1 for a more detailed account of the transfer history.

D3.2 CONTRIBUTING WASTE TYPES

The HDW model (Agnew et al. 1997a) predicts that the tank contains a total of 1,726 kL (456 kgal) of waste. This consists of:

- 583 kL (154 kgal) REDOX process high-level waste
- 590 kL (156 kgal) REDOX process saltcake
- 352 kL (93 kgal) SMMS1 waste
- 197 kL (52 kgal) SMMS2 waste.

The Sort on Radioactive Waste Type model (Hill et al. 1995) lists high-level REDOX process waste and evaporator bottoms as the primary and secondary waste types, respectively. Evaporatory bottoms waste is the Sort on Radioactive Waste Type definition for saltcake that is equivalent to the SMM waste type. Hill also lists REDOX process ion exchange waste as a tertiary contributor.

Hanlon (1998) reports 1,727 kL (456 kgal) of waste that consists of 424 kL (112 kgal) of sludge, 1,300 kL (343 kgal) of saltcake, 4 kL (1 kgal) of supernatant, and 697 kL (184 kgal) of drainable interstitial liquid.

D3.3 EVALUATION OF TANK WASTE VOLUME

Tank 241-SX-101 is categorized as sound and is partially isolated. Tank 241-SX-101 surface level was monitored with a Food Instrument Corporation gauge through riser 4 until it was replaced with an ENRAF™ gauge in 1995. As a result of the Food Instrument Corporation

gauge setting, a limited number of surface level measurements are available during its operation. As of January 16, 1997, the ENRAF™ surface level reading was 409.4 cm (161.19 in.), which correlates to 1,624 kL (429 kgal) of total waste.

The HDW model (Agnew et al. 1997a) used a total waste volume of 1,726 kL (456 kgal), with an estimated 1,193 kL (310 kgal) of saltcake, 553 kL (146 kgal) of sludge, and no supernatant. This estimate was primarily based on the historical data of waste transfer and waste process. The total reported waste (Hanlon 1998) was 1,726 kL (456 kgal) with saltcake of 1,300 kL (343 kgal), sludge of 424 kL (112 kgal), and supernatant of 4 kL (1 kgal).

Further investigation shows that the waste level remained at 167 in. from June 1996 to November 1997. In preparation for the core sampling event, the ENRAF™ was removed from riser 4 to permit access by the sampling equipment. At that time a zip-cord measurement was taken, which showed a level of 168 in. After the core sampling, the ENRAF™ was put back on the riser. The measurement from the database showed a level of 162.6 in. on March 1998 and was adjusted to 159 in. on April 1998. The readings from this instrument remain at 159 in. to date since April. It appears that the difference between 168 in. and 158 in. is not a result of natural water evaporation, waste transfers (either in or out), or leakage but was solely a result of the level instrument adjustment. Thus, the 168 in. is considered the level and is used below.

The core 227 data show no drainable liquid layer observed above the solids; the first segments confirm that observation. However, core 225 showed the upper segments to be liquid. It is believed that the waste configuration was perturbed in the first trial of rotary mode sampling that resulted in zero retrieval. The subsequent resampling in push-mode collected three segments of only the interstitial liquid. It could be argued that core 225 shows a local pocket of drainable liquid concealed by a crust. However, because there is no strong evidence of a free liquid layer, this anomaly is believed to be solely a result of the first, failed sampling attempt.

Additional information is gained by examining the average moisture content. The bottom saltcake is generally less than 10 weight percent water, and the top sludge layer is generally greater than 40 weight percent water. The average moisture content of the drainable liquid samples is 49 weight percent. Based on this information, the estimated liquid or brine is 20 weight percent in the saltcake layer and about 80 weight percent in the sludge layer. The fluid in the tank is then 625 kL (165 kgal) of liquid/brine and 1,049 kL (277 kgal) of solid phase material.

The standard formula for waste volume based on level (which accounts for the slightly coned bottom) is:

$$\text{waste volume} = (\text{waste level} - 12 \text{ in.}) \times 2{,}754 \text{ gal/in.} + 12{,}500 \text{ gal.}$$

Based on the zip-cord measurement of 168 in. taken during riser preparation of the 1997/1998 core sampling, the waste volume is 442 kgal or 1,674 kL. The chemical analysis does not support the presence of metals typically found in sludge. Consistent with this total, the waste type distribution is taken as 29 percent of sludge-like solids on the top (485 kL (128 kgal)) and 71 percent of saltcake-like material on the bottom (1,188 kL [314 kga]). This waste distribution estimate was based only on the physical appearance of the waste from the extrusion of core samples and should not be confused with any HDW model type sludge.

D3.4 ASSUMPTIONS USED

An engineering evaluation based on tank 241-SX-101 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 of 1,674 kL (442 kgal) is used. This is within 3 percent of all previous volume estimates.
- The liquid and solid volumes used to calculate analyte inventories are specified in Section D3.3. The solids analytical mean density is 1.905 g/mL, and specific gravity of the liquids is 1.499.
- All radionuclide data are corrected to January 1, 1994.

D3.5 BASIS FOR CALCULATIONS USED IN THIS ENGINEERING EVALUATION

Table D3-1 summarizes the engineering evaluation approach.

Table D3-1. Engineering Evaluation Approach Used On Tank 241-SX-101.

Type of Waste	How Calculated	Check Method
Liquid	Multiplied drainable liquid sample-based concentrations (see Table B3-8) by the liquid volume of 625 kL (165 kgal)	Compare total with previous best basis for tank (see Table D2-1).
Solid	Multiplied sample-based core composite solids concentrations (see Table B3-7) by an average density of 1.905 g/mL and solids volume of 1,049 kL (277 kgal)	

Table D3-2 compares the concentration of a number of analytes to sample data from tank 241-SX-101. The waste type template uses the average of tanks S-101, S-102, U-106, and U-109. The HDW model waste uses the general SMMS1 salt solids. Tank 241-SX-101 analytical data use the mean of the core composites. Because the gateway analysis previously presented in Appendix C, Section C2, showed that SMMS1 material was the only type approximating the tank, it is the only comparison made in this section.

Table D3-2. Tank 241-SX-101 Concentration Comparisons. (2 sheets)

Analyte	Waste Type Template Average[1] (μg/g)	HDW Model Waste Type S1-SltCk[2] (μg/g)	241-SX-101 Solids Analytical Mean[3] (μg/g)
Al	15,100	33,350	63,600
Bi	73.5	144	<60.8
Ca	282	1,210	<60.8
Cl	3,842	2,905	5,960
CO_3	NR	16,600	6,950
Cr	5,440	7,870	11,100
F	6,255	611	379
Fe	1,630	539	2,060
Hg	NR	1.03	NR
K	1,110	1,260	646
La	40	0.75	<30.4
Mn	684	175	1,090
Na	182,000	230,600	202,000
Ni	155	340	<12.2
NO_2	57,500	82,400	21,800
NO_3	163,000	257,100	338,000
Pb	192	109	<60.8
PO_4	34,000	5,310	5,270
Si	1,990	1,870	293
SO_4	13,800	12,740	2,290
Sr	7	0	<6.08
TOC	8,950	6,130	1,500
U	914	2,060	1,570
Zr	47	8.71	<6.08

Table D3-2. Tank 241-SX-101 Concentration Comparisons. (2 sheets)

Analyte	Waste Type Template Average[1] (μg/g)	HDW Model Waste Type S1-SltCk[2] (μg/g)	241-SX-101 Solids Analytical Mean[3] (μg/g)
Density, g/mL	1.63	1.855	1.905
Radionuclides (μCi/g)			
Total alpha	NR	NR	0.548[4]
^{90}Sr	90	110	120[4]
^{137}Cs	153	175	102[4]

Notes:

NR = not requested.

[1] Conner (1997) Table D3-2, Average of Tank Samples
[2] Agnew et al. (1997a), page B-43
[3] Table B3-7 composite data
[4] Radionuclide concentration as of May 1998

D3.6 ESTIMATED COMPONENT INVENTORIES

The approach used to derive the best-basis inventory was to rely on the actual core sample data instead of models or templates. This requires the measured concentrations to be multiplied by the estimated volumes of the solids and interstitial liquid. Because the measured concentration data were very consistent and the total volume well known, the major source of error would be in the estimate of relative volume of solids and liquid. Table D3-3 compares the sample inventory to the HDW model inventory.

A comparison of inventory calculations for selected analytes follows.

Nitrate/Nitrite. The nitrate/nitrite anions are the most prevalent component. The total concentration in both the samples and the HDW model are the same on a molar basis. This would indicate that the HDW model conversion rate of nitrate to nitrite is higher than actually occurs. However, the average values of the other tanks are notably lower than either the HDW model or the sample data.

Sodium/Aluminum. The sodium concentration is similar in all cases of comparison, but the aluminum is much higher than either the HDW model or the average of other tanks.
A number of other components (e.g., F, SO_4, TOC) vary widely on a relative basis, but their absolute value is small in the overall inventory.

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). It was determined that all of the aluminum in the solids is present as $NaAlO_2$, and the remaining sodium exists as the nitrate/nitrite salt. The entire hydroxide inventory is present in the liquid phase, which is consistent with Barney (1976).

Table D3-3. Comparison of Inventory Estimates for Tank 241-SX-101. (2 sheets)

Component	Sample-Based Solids Inventory[1] (kg)	Sample-Based Liquids Inventory[1] (kg)	Sample-Based Total Inventory[1] (kg)	HDW Model Estimates[2] (kg)
Al	127,000	47,300	174,000	176,000
Bi	<121	<38	<159	71.6
Ca	<121	<38	<159	7,310
Cl	11,900	10,400	22,300	6,180
TIC as CO_3	13,900	5,030	18,900	17,300
Cr	22,200	7,560	29,800	29,300
F	757	<48	805	319
Fe	4,120	<22	4,140	33,700
K	1,290	1,580	2,870	1,680
La	<61	<19	<80	1.27
Mn	2,180	<5	2,180	56.1
Na	404,000	151,300	555,000	379,000
Ni	<24	<8	<32	2,360
NO_2	43,600	48,800	92,400	121,000
NO_3	675,000	65,600	741,000	466,000
Pb	<121	<534	<656	74.8
PO_4	9,900	1,470	11,400	2,230
Si	586	119	705	2,870
SO_4	4,580	1,140	5,720	8,980
Sr	<12	<4	<16	0
TOC	3,000	209	3,210	3,160
U	3,140	<188	<3,330	2,780
Zr	<12	<4	<16	5.87

Table D3-3. Comparison of Inventory Estimates for Tank 241-SX-101. (2 sheets)

Component	Sample-Based Solids Inventory[1] (kg)	Sample-Based Liquids Inventory[1] (kg)	Sample-Based Total Inventory[1] (kg)	HDW Model Estimates[2] (kg)
^{137}Cs (Ci)[3]	225,000	17,800[4]	243,000	299,000
^{90}Sr (Ci)[3]	266,000	1.38[4]	266,000	728,000
Total alpha (Ci)[3]	1,100	<9.63	1,100	NR

Notes:

[1]Based on average sample concentrations (see Tables B3-4 and B3-5)
[2]Agnew et al. (1997a)
[3]Radionuclides decayed to January 1, 1994.
[4]Based on Table B2-72

D4.0 DEFINE THE BEST BASIS AND ESTABLISH COMPONENT INVENTORIES

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

Chemical and radiological inventory information are generally derived using three approaches: 1) component inventories are estimated using the results of sample analysis, 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 flow sheets, 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-101 was performed, and a best-basis inventory was established. This work, detailed in the following sections, follows the methodology established by the standard inventory task. The following information was used in the evaluation:

- Analytical data from December 1997/January 1998 push/rotary core samples (see Tables B3-7 and B3-8)

- Tank waste photographs (Brevick et al. 1997)
- The inventory estimate generated by the HDW model (Agnew et al. 1997a).

Based on this evaluation, a best-basis inventory was developed for tank 241-SX-101. The sampling-based inventory was chosen as the best basis for those analytes for which analytical values were available. The engineering inventory was calculated assuming a liquid volume of 625 kL (165 kgal) at a density of 1.499 and a solid volume of 1,049 kL (277 kgal) at a density of 1.905. Several analytes are shown as zero because all samples were below detection limits and that element was not used in the process history. HDW model results were used if no sample-based information was available.

Best-basis tank inventory values are derived for 46 key radionuclides (as defined in Section 3.1 of Kupfer et al. 1997), 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. 1997, Section 6.1 and in Watrous and Wootan 1997.) Model-generated values for radionuclides in any of 177 tanks are reported in the HDW Revision 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-101 is presented in Tables D4-1 and D4-2. Mercury values were specified in Simpson (1998). The inventory values reported in Tables D4-1 and D4-2 are subject to change. Refer to the Tank Characterization Database(LMHC 1998a) for the most current inventory values.

Table D4-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-101 (Effective June 17, 1998). (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
Al	1.74E+05	S	
Bi	0	E	Not expected
Ca	159	S/E	Upper bound
Cl	22,300	S	
TIC as CO_3	18,900	S	

Table D4-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-SX-101 (Effective June 17, 1998). (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, E, or C)[1]	Comment
Cr	29,800	S	
F	757	S/E	No contribution from liquid phase
Fe	4,120	S/E	No contribution from liquid phase
Hg	0	E	Simpson 1998
K	2,870	S	
La	0	E	Not expected
Mn	2,180	S/E	No contribution from liquid phase
Na	5.55E+05	S	
Ni	0	E	Not expected
NO_2	92,400	S	
NO_3	7.41E+05	S	
OH_{TOTAL}	5.08E+05	C	Based on charge balance
Pb	0	E	Not expected
PO_4	11,400	S	
Si	705	S	
SO_4	5,720	S	
Sr	6.38	S/E	Based on ^{90}Sr activity
TOC	3,210	S	
U_{TOTAL}	3,140	S/E	No contribution from liquid phase
Zr	0	E	Not expected

Note:

[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, and SiO_3.

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-101 Decayed to January 1, 1994 (Effective June 17, 1998). (2 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	217	M	
^{14}C	17.7	M	
^{59}Ni	13.3	M	
^{60}Co	17.2	M	
^{63}Ni	1,260	M	
^{79}Se	5.35	M	
^{90}Sr	2.66E+05	S	
^{90}Y	2.66E+05	S	Based on Sr activity
^{93}Zr	25.5	M	
^{93m}Nb	20.3	M	
^{99}Tc	131	M	
^{106}Ru	0.00329	M	
^{113m}Cd	56.2	M	
^{125}Sb	68.1	M	
^{126}Sn	8.19	M	
^{129}I	0.250	M	
^{134}Cs	2.09	M	
^{137}Cs	2.43E+05	S	
^{137m}Ba	2.30E+05	S	Based on 0.946 of ^{137}Cs activity
^{151}Sm	19,000	M	
^{152}Eu	10.4	M	
^{154}Eu	331	M	
^{155}Eu	523	M	
^{226}Ra	0.000948	M	
^{227}Ac	0.00466	M	
^{228}Ra	0.0461	M	
^{229}Th	0.00109	M	
^{231}Pa	0.00772	M	
^{232}Th	0.00257	M	
^{232}U	0.264	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-SX-101 Decayed to January 1, 1994 (Effective June 17, 1998). (2 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{233}U	1.01	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{234}U	1.19	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{235}U	0.0482	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{236}U	0.0445	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotopes
^{237}Np	0.542	M	
^{238}Pu	12.9	S/M	
^{238}U	1.05	S/E/M	Based on ICP uranium sample result ratioed to HDW estimates for uranium isotope.
^{239}Pu	761	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{240}Pu	112	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{241}Am	205	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{241}Pu	751	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{242}Cm	0.310	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{242}Pu	0.00362	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{243}Am	0.00640	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{243}Cm	0.0136	S/M	Based on total alpha sample result ratioed to HDW estimates for alpha isotopes
^{244}Cm	0.0902	S/M	Based on total alpha 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, Rev. 0, 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, Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

Barney, B. S., 1976, *Vapor-Liquid-Solid Phase Equilibria of Radioactive Sodium Salt Wastes at Hanford*, ARH-ST-133, Atlantic Richfield Hanford Company, Richland, Washington.

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.

Conner, J. M., 1997, *Tank Characterization Report for Single-Shell Tank 241-S-111*, HNF-SD-WM-ER-638, Rev. 0A, Lockheed Martin Hanford, Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Hanlon, B. M., 1998, *Waste Tank Summary Report for March 31, 1998*, HNF-EP-0182-123, 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, S. L. Lambert, D. E. Place, R. M. Orme, G. L. Borsheim, N. G. Colton, M. D. LeClair, R. T. Winward, and W. W. Schulz, 1997, *Standard Inventories of Chemicals and Radionuclides in Hanford Site Tank Wastes*, HNF-SD-WM-TI-740, Rev. 0A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

LMHC, 1998a, *Best-Basis Inventory*, Tank Characterization Database, January 12, 1998, internet at http://twins.pnl.gov:8001/TCD/main.html.

LMHC, 1998b, *SACS: Surveillance Analysis Computer System in SQLServer/Visual Basic, [Mainframe]*, Available: Hanford Local Area Network, Lockheed Martin Hanford Corp., 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.

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 E

BIBLIOGRAPHY FOR TANK 241-SX-101

This page intentionally left blank.

APPENDIX E

BIBLIOGRAPHY FOR TANK 241-SX-101

Appendix E provides a bibliography of information that supports the characterization of tank 241-SX-101. This bibliography represents an in-depth literature search of all known information sources that provide sampling, analysis, surveillance, and modeling information, as well as processing occurrences associated with tank 241-SX-101 and its respective waste types.

The references in this bibliography are separated into three broad 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-101
- 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 to use, with an annotation at the end of each reference, or set of references, describing the information source. Where possible, a reference is provided for information sources. A majority of the information listed below may be found in the Lockheed Martin Hanford Corporation Tank Characterization and Safety Resource Center.

I. NON-ANALYTICAL DATA

Ia. Models/Waste Type Inventories/Campaign Information

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

- Contains single-shell tank fill history and primary campaign/waste type information up 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, and constraints.

Ib. Fill History/Waste Transfer Records

Agnew, S. F., P. Baca, R. A. Corbin, T. B. Duran, and K. A. Jurgensen, 1997, *Waste Status and Transaction Record Summary, WSTRS Rev. 4*, LA-UR-97-311, Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains spreadsheets showing all known tank additions/transfers.

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

- Contains tank fill histories and primary campaign/waste type information up to 1981.

Ic. Surveillance/Tank Configuration

Alstad, A. T., 1993, *Riser Configuration Document for Single-Shell Waste Tanks*, WHC-SD-WM-TI-053, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Shows riser locations in relation to tank aerial view and describes each riser and its contents.

Lipnicki, J., 1997, *Waste Tank Risers Available for Sampling*, WHC-SD-WM-TI-710, Rev. 4, Westinghouse Hanford Company, Richland, Washington.

- Assesses riser locations for each tank; not all tanks are included/completed. Also includes an estimate of the risers available for sampling.

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

- Provides thermocouple location and status information for double- and single-shell tanks.

Welty, R. K., 1988, *Waste Storage Tank Status and Leak Detection Criteria*, WHC-SD-WM-TI-356, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Provides leak detection information for all single- and double-shell tanks including liquid level, liquid observation well, and dry well readings.

Id. Sample Planning/Tank Prioritization

Brown, T. M., J. W. Hunt, and L. J. Fergestrom, 1997, *Tank Waste Characterization Basis*, HNF-SD-WM-TA-164, Rev. 3, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Establishes an approach to determine the priority for tank sampling and characterization and identifies high priority tanks for sampling.

Haller, C. S., 1992, *Integrated Sampling and Analysis Plan For Samples Measuring >10 mrem/hour*, WHC-EP-0533, Westinghouse Hanford Company, Richland, Washington.

- Contains information on analysis of samples measuring >10 mrem/hour.

Hu, T. A.,1997, *Tank 241-SX-101 Push Mode Core Sampling and Analysis Plan*, HNF-SD-WM-TSAP-143, Rev. 1, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains a detailed sampling and analysis scheme for core samples to be taken from tank 241-SX-101 to address applicable data quality objectives.

Mulkey, C. H., 1996, *Single-Shell Tank System Waste Analysis Plan*, WHC-EP-0356, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- The waste analysis plan for single-shell tanks as required by WAC-173-303 and 40 CFR Part 265.

Stanton, G. A., 1998, *Baseline Sampling Schedule, Change 98-01*, (internal memorandum 79520-98-001 to Distribution, February 5), Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Provides a tank waste sampling schedule through fiscal year 2002 and lists samples taken since 1994.

Winkelman, W. D., 1996, *Tank 241-SX-101 Tank Characterization Plan*, WHC-SD-WM-TP-450, Rev. 2, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Discusses relevant data quality objectives and how their requirements will be met for tank 241-SX-101.

Winkelman, W. D., M. R. Adams, T. M. Brown, J. W. Hunt, D. J. McCain, and L. J. 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. These, along with managerial and operational constraints, are combined to summarize the Tank Waste Remediation System characterization program deliverables for fiscal years 1997 and 1998.

Ie. Data Quality Objectives/Customers of Characterization Data

Bauer, R. E., and L. P. Jackson, 1997, *Data Quality Objective To Support Resolution of the Flammable Gas Safety Issue*, HNF-SD-WM-DQO-004, Rev. 3, DE&S Hanford 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.

Cash, R. J., 1996, *Scope Increase of "Data Quality Objective to Support Resolution Of the Organic Complexant Safety Issue" Rev. 2*, (internal memorandum 79300-96-029 to S. J. Eberlein, July 12), Westinghouse Hanford Company, Richland, Washington.

- Identifies the organic solvent test needed for all single-shell tanks.

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.

Esch, R. A., and F. H. Steen, 1998, *Interim Results in Support of Resolution of the Organic Complexant Unreviewed Safety Question (USQ)*, (external letter WMH-9853871 to K. M. Hall, April 30), Waste Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains thermogravimetric analysis and total organic carbon results for various tanks including tank 241-SX-101.

Kupfer, M. J., 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.

- Contains a sample strategy to meet pretreatment and disposal data needs and lists tanks to be evaluated.

Osborne, J. W., J. L. Huckaby, and E. R. Hewitt, 1995, *Data Quality Objectives for Generic In -Tank Health and Safety Vapor Issue Resolution*, WHC-SD-WM-DQO-002, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Determines whether tank vapor spaces contain potentially hazardous gases and vapors to human health and safety.

Schofield, J. S., 1998, *Particulate Releases To the Exhauster During Rotary Mode Sampling in Tank SX-101*, (internal letter 74910-98-002 to D. L. Dyekman, March 27), Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains filter paper sample analysis results from tank headspace and assesses the particulate release caused by sampling.

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 organic program data needs and lists tanks to be evaluated, decision thresholds, and decision logic flow diagram.

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.

- Identifies analytical parameters to characterize waste into one of five waste types.

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.

- Contains data needs for pretreatment and disposal including information on sludge washing, solid/liquid separation; and cesium, strontium and transuranics removal.

Turner, D. A., H. Babad, L. L. Buckley, and J. E. Meacham, 1995, *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue*, WHC-SD-WM-DQO-006, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Categorizes organic tanks as "safe," "conditionally safe," or "unsafe" based on fuel and moisture concentrations and supports resolution of the safety issue.

II. ANALYTICAL DATA - SAMPLING OF TANK WASTE AND WASTE TYPES

IIa. Sampling of Tank 241-SX-101

Buckingham, J. S., 1974, *Analysis of Salt Sample From Tank 101-SX*, (internal letter to W. R. Christensen, November 13), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sample analysis results.

Caprio, G. S., 1995, *Vapor and Gas Sampling of Single-Shell Tank 241-SX-101 Using the Vapor Sampling System*, WHC-SD-WM-RPT-177, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains July 1995 vapor sample analysis results.

Evans, J. C., T. W. Clauss, B. D. McVeety, K. H. Pool, K. B. Olsen, J. S. Fruchter, and K. L. Silvers, 1996, *Tank Vapor Characterization Project, Headspace Vapor Characterization of Hanford Waste Tank SX-101: Results from Samples Collected on 07/21/95*, PNNL-108881, Pacific Northwest National Laboratory, Richland, Washington.

- Contains July 1995 vapor sample analysis results.

Horton, J. E., 1978, *Analysis of Tank 101SX*, (internal letter to J. E. Mirabella, December 4), Rockwell Hanford Operations, Richland, Washington.

- Contains historical sample analysis results.

Jansky, M. T., 1980, *101SX Solids in T-1013*, (internal letter to D. E. Bowers, July 14), Rockwell Hanford Operations, Richland, Washington.

- Contains historical sample analysis results.

Jansky, M. T., 1980, *Viscosity and Analysis of Tank 101SX Waste*, (internal letter 65453-80-316 to D. E. Bowers, October 29), Rockwell Hanford Operations, Richland, Washington.

- Contains historical sample analysis results.

Lane, T. A., 1979, *Transfer of 101-SX to 101-TX*, (internal letter to T. B. Veneziano, February 7), Rockwell Hanford Operations, Richland, Washington.

- Contains historical sample analysis results.

Puryear, D. A., 1976, *Laboratory Investigation of HLSW Neutralization*, (internal letter to J. C. Womack, March 23), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sample analysis results.

Steen, F. H., 1998, *Tank 241-SX-101, Cores 225 and 227, Analytical Results for the Final Report*, HNF-SD-WM-DP-293, Rev. 0, Waster Management Federal Services of Hanford, Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains sample analysis results from December 1997 and January 1998 core sampling events.

Weiss, R. L., 1990, *Analysis of Liquid Sample From Tank 241-SX-101*, (internal letter 12712-PCL90-043 to V. C. Boyles, February 22), Westinghouse Hanford Company, Richland, Washington.

- Contains April 1989 supernatant sample analysis results.

Wheeler, R. E., 1974, *Analysis of Tank Farm Samples, Sample: T-6496*, 101-SX, (internal letter to R. L. Walser, November 20), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sample analysis results.

IIb. Sampling of Similar Waste Types

Allen, G. K., 1976, *Proposed Sludge Standard For Waste Characterization*, (internal letter to L. P. McRae, July 7), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains proposed chemical compositions of $BiPO_4$/uranium recovery and PUREX/REDOX sludge.

Bell, K. E., 1997, *Tank Characterization Report for Single-Shell Tank 241-U-108*, HNF-SD-WM-ER-639, Rev. 0B, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-U-108 including SMMS1 and SMMS2 waste.

Brown, G. E., 1978, *Complexed Waste Evaporation Studies*, (internal letter 60120-78-049 J to K. G. Carothers, June 20), Rockwell Hanford Operations, Richland, Washington.

- Contains approximate feed solution composition for the 242-S Evaporator.

Brown, G. E., 1978, *Operating Parameters for Evaporator Crystallizers*, (internal letter 60120-78-058 J to K. G. Carothers, July 5), Rockwell Hanford Operations, Richland, Washington.

- Contains approximate feed solution composition range for 242-S and 242-A Evaporators.

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., 1975, *Recipe For Synthetic REDOX Waste Sludge*, (internal letter to N. L. Harms, April 25), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains chemical composition of synthetic REDOX sludge.

Delegard, C. H., 1979, *Customer Waste Flowsheet Development: Third Pass Run of Tank 106-SX/107-S Blend*, (internal letter 65120-79-134 J), Rockwell Hanford Operations, Richland, Washington.

- Contains historical sample analysis results in support of the 242-S Evaporator.

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 including SMMS1 and SMMS2 waste.

Higley, B. A., 1997, *Tank Characterization Report for Single-Shell Tank 241-U-105*, HNF-SD-WM-ER-617, Rev. 0A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc, Richland, Washington.

- Contains characterization data for the waste in tank 241-U-105 including SMMS2 waste.

Higley, B. A., 1997, *Tank Characterization Report for Single-Shell Tank 241-U-107*, HNF-SD-WM-ER-614, Rev. 0A, Lockheed Martin Hanford Company, Richland, Washington.

- Contains characterization data for the waste in tank 241-U-107 including SMMS2 waste.

Hu, T. A., 1997, *Tank Characterization Report for Single-Shell Tank 241-U-102*, HNF-SD-WM-ER-618, Rev. 0A, Lockheed Martin Hanford Company, Richland, Washington.

- Contains characterization data for the waste in tank 241-U-109 including SMMS2 waste.

Kupfer, M. J., 1997, *Tank Characterization Report for Single-shell Tank 241-BX-101*, WHC-SD-WM-ER-408, Rev. 0C, Lockheed Martin Hanford Company, Richland, Washington.

- Contains characterization data for the waste in tank 241-BX-101 including metal waste type..

Kupfer, M. J., 1977, *Synthetic Sludge Preparation and Characterization*, (internal letter to Distribution, October 18), Rockwell Hanford Operations, Richland, Washington.

- Contains proposed chemical compositions of PUREX and REDOX sludge.

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., Process Aids 00362, on July 23), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains historical sample separation results in support of the 242-S Evaporator.

Schulz, W. W., T. E. Jones, and M. J. Kupfer, 1997, *Preliminary Tank Characterization Report for Single-Shell Tank 241-SX-109: Best Basis Inventory*, HNF-SD-WM-ER-706, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-SX-109 including REDOX saltcake waste.

Schulz, W. W., T. E. Jones, and M. J. Kupfer, 1997, *Preliminary Tank Characterization Report for Single-Shell Tank 241-SX-114: Best Basis Inventory*, HNF-SD-WM-ER-707, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-SX-114 including REDOX saltcake waste.

Stout, R. E., R. T. Winward, and M. J. Kupfer, 1997, *Preliminary Tank Characterization Report for Single-Shell Tank 241-S-110: Best Basis Inventory*, HNF-SD-WM-ER-642, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-S-110 including REDOX waste.

Stout, R. E., R. T. Winward, and M. J. Kupfer, 1997, *Preliminary Tank Characterization Report for Single-Shell Tank 241-SX-103: Best Basis Inventory*, HNF-SD-WM-ER-662, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-SX-103 including REDOX saltcake waste.

Stout, R. E., R. T. Winward, and M. J. Kupfer, 1997, *Preliminary Tank Characterization Report for Single-Shell Tank 241-SX-104: Best Basis Inventory*, HNF-SD-WM-ER-643, Rev. 0, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-SX-104 including REDOX saltcake waste.

Winward, R. T., and M. J. Kupfer, 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 including SMMS1 and SMMS2 waste.

Winward, R. T., and M. J. Kupfer, 1997, *Tank Characterization Report for Single-Shell Tank 241-S-107*, HNF-SD-WM-ER-589, Rev. 0B, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains characterization data for the waste in tank 241-S-107 including REDOX waste.

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

IIIa. Inventories using both 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 Rev. 4*, LA-UR-96-3860, Rev. 0, 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 supernatant, tank layer model, and individual tank inventory estimates.

Agnew, S. F., R. A. Corbin, J. Boyer, T. B. Duran, K. A. Jurgensen, T. P. Ortiz, B. L. Young, R. Anema, and C. Ungerecht, 1996, *History of Organic Carbon in Hanford HLW Tanks: HDW Model Rev. 3*, LA-UR-96-989, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Attempts to account for the disposition of soluble organics and provides estimates of the total organic carbon content for each tank.

Allen, G. K., 1976, *Estimated Inventory of Chemicals Added to Underground Waste Tanks, 1944 - 1975*, ARH-CD-601B, Rev. 0, Atlantic Richfield Hanford Company, Richland, Washington.

- Contains major components for waste types and some assumptions. Purchase records are used to estimate chemical inventories.

Brevick, C. H., J. L. Stroup, and J. W. Funk, 1997, *Historical Tank Content Estimate for the Southwest Quadrant of the Hanford 200 East Area*, WHC-SD-WM-ER-352, Rev. 1, Fluor Daniel Northwest Inc. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains summary information for tanks in S, SX and U Tank Farms, in-tank photograph collages and inventory estimates.

Klem, M. J., 1988, *Inventory of Chemicals Used at Hanford Production Plants and Support Operations (1944 - 1980)*, WHC-EP-0172, Westinghouse Hanford Company, Richland, Washington.

- Provides a list of chemicals used in production facilities and support operations that sent wastes to the single-shell tanks. The list is based on chemical process flowsheets, essential materials consumption records, letters, reports, and other historical data.

Kupfer, M. J., A. L. Boldt, and M. D. LeClair, 1997, *Standard Inventories of Chemicals and Radionuclides in Hanford Site Tank Wastes*, HNF-SD-WM-TI-740, Rev. 0A, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- Contains a global component inventory for major constituents in 200 Area waste tanks.

Klem, M. J., 1990, *Total Organic Carbon Concentration of Single-Shell Tank Waste*, (internal letter 82316-90-032 to R. E. Raymond, April 27), Westinghouse Hanford Company, Richland, Washington.

- Provides a list of total organic carbon concentration for many tanks.

Schmittroth, F. A., 1995, *Inventories for Low-Level Tank Waste*, WHC-SD-WM-RPT-164, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains a global inventory based on process knowledge and radioactive decay estimations using ORIGEN2. Plutonium and uranium waste contributions are taken at one percent of the amount used in the processes. Also compares information on technetium-99 from both ORIGEN2 and analytical data.

Stout, R. E., R. T. Winward, and M. J. Kupfer, 1997, *Preliminary Tank Characterization Report for Single-Shell Tank 241-SX-101: Best Basis Inventory*, HNF-SD-WM-ER-660, Rev. 0, Richland, Washington.

- Contains a chemical and radionuclide inventory based on previous sampling and historical process knowledge.

Toth, J. J., C. E. Willingham, P. G. Heasler, and P.D. Whitney, 1994, *Organic Carbon in Hanford Single-Shell Tank Waste*, PNL-9434, Pacific Northwest Laboratory, Richland, Washington.

- Contains organic carbon analytical results and model estimates for tanks.

IIIb. Compendium of Existing Physical and Chemical Documented Data Sources

Agnew, S. F., and J. G. Watkin, 1994, *Estimation of Limiting Solubilities for Ionic Species in Hanford Waste Tank Supernates*, LA-UR-94-3590, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Gives solubility ranges used for key chemical and radionuclide components based on supernatant sample analysis.

Brevick, C. H., J. L. Stroup, and J. W. Funk, 1997, *Supporting Document for the Southwest Quadrant Historical Tank Content Estimate Report 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 appendices containing information including tank waste level history, tank temperature history, cascade and dry well charts, riser information, in-tank photograph collages, and the tank layer model bar chart and spreadsheet.

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 24 chemicals and 11 radionuclides for all tanks.

Hanlon, B. M., 1998, *Waste Tank Summary Report for Month Ending June 30, 1998*, HNF-EP-0182-120, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

- This document, updated monthly, 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.

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.

- Describes a system of sorting single-shell tanks into groups based on the major waste types contained in each tank.

Husa, E. I., 1993, *Hanford Site Waste Storage Tank Information Notebook*, WHC-EP-0625, Westinghouse Hanford Company, Richland, Washington.

- Contains in-tank photographs and summaries of 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, Washingt

- Assesses the relative dryness of tank wastes.

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.

Shelton, L. W., 1995, *Chemical and Radionuclide Inventory for Single and Double-Shell tanks*, (internal memorandum 75520-95-007 to R. M. Orme, August 8), Westinghouse Hanford Company, Richland, Washington.

- Contains a tank inventory estimate based on analytical information.

Shelton, L. W., 1995, *Radionuclide Inventories for Single and Double-Shell Tanks*, (internal memorandum 71320-95-002 to F. M. Cooney, February 14), 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 selected sample analysis tables before 1993 for single-shell tanks.

DISTRIBUTION SHEET

To	From	Page 1 of 2
Distribution	Data Assessment and Interpretation	Date 08/28/98
Project Title/Work Order		EDT No. N/A
Tank Characterization Report for Single-Shell Tank 241-SX-101, HNF-SD-WM-ER-660, Rev. 1		ECN No. ECN-643828

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 08/28/98
Project Title/Work Order		EDT No. N/A
Tank Characterization Report for Single-Shell Tank 241-SX-101, HNF-SD-WM-ER-660, Rev. 1		ECN No. ECN-643828

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
ONSITE					
Department of Energy - Richland Operations					
J. F. Thompson	S7-54	X			
W. S. Liou	S7-54	X			
J. A. Poppiti	S7-54	X			
DE&S Hanford, Inc.					
W. L. Cowley	R1-49	X			
G. D. Johnson	S7-73	X			
Fluor Daniel Northwest					
E. D. Johnson	S2-47	X			
Lockheed Martin Hanford, Corp.					
J. G. Burton	S7-21	X			
J. W. Cammann	R2-11	X			
J. G. Field	R2-12	X			
T. A. Hu	R2-12	X			
W. E. Ross	S7-84	X			
L. M. Sasaki	R2-12	X			
B. C. Simpson	R2-12	X			
R. R. Thompson	R2-12	X			
ERC (Environmental Resource Center)	R1-51	X			
T.C.S.R.C.	R1-10	5			
Lockheed Martin Services, Inc.					
B. G. Lauzon	R1-08	X			
Central Files	B1-07	X			
EDMC	H6-08	X			
Numatec Hanford Corporation					
J. S. Garfield	H5-49	X			
D. L. Herting	T6-07	X			
J. S. Hertzel	H5-61	X			
D. L. Lamberd	H5-61	X			
Pacific Northwest National Laboratory					
A. F. Noonan	K9-91	X			