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Page 1 of 1

1. EDT 617659

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

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

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Abstract: This document summarizes the information on the historical uses, present status, and the sampling and analysis results of waste stored in Tank 241-A-101. This report supports the requirements of the Tri-Party Agreement Milestone M-44-10.

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

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CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

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LIST OF TERMS

A1SltCk	saltcake waste generated from the 242-A Evaporator, 1977-1980
AES	atomic emission spectroscopy
ANOVA	analysis of variance
Btu/Ci	British thermal units per curie
Btu/hr	British thermal units per hour
c/s	counts per second
Ci/L	curies per liter
Ci	curies
CI	confidence interval
cm	centimeters
df	degrees of freedom
DL	drainable liquid
DQO	data quality objectives
DSC	differential scanning calorimetry
ft	feet
g/cm^3	grams per cubic centimeter
g/mL	grams per milliliter
g/L	grams per liter
g	grams
GEA	gamma energy analysis
HDW	Hanford defined waste
HHF	hydrostatic head fluid
HLW	high-level waste
HTCE	historical tank content estimate
IC	ion chromatography
ICP	inductively coupled plasma spectroscopy
ICP:A	inductively coupled plasma - acid prepared sample results
in.	inches
J/g	joules per gram
kg	kilograms
kgal	kilogallons
kL	kiloliters
kW	kilowatts
LFL	lower flammability limit
LL	lower limit
LLW	low-level waste
m	meters
M	moles per liter
m^3	cubic meters

LIST OF TERMS (Continued)

mg/L	milligrams per liter
mg	milligrams
mL	milliliters
mm	millimeters
mR/hr	millirem per hour
n/a	not applicable
n/r	not reported
N/D	not decided
NA	not available
OWW	PUREX organic wash waste
P1	PUREX high-level waste
PHMC	Project Hanford Management Contractor
PNNL	Pacific Northwest National Laboratory
ppm	parts per million
ppmv	parts per million volume
PUREX	plutonium-uranium extraction
QC	quality control
Rad/hr	rads per hour
REML	restricted maximum likelihood estimation
RGS	retained gas sample
RPD	relative percent difference
SACS	Surveillance Analysis Computer System
SAP	sampling and analysis plan
SMM	supernatant mixing model
SMMA1	supernatant mixing model saltcake waste generated from the 242-A Evaporator, 1977-1980
SORWT	sort on radioactive waste type
SRR	strontium recovery supernatant
STP	standard temperature and pressure
TCP	tank characterization plan
TCR	tank characterization report
TGA	thermogravimetric analysis
TIC	total inorganic carbon
TLM	tank layer model
TOC	total organic carbon
TWRS	Tank Waste Remediation System
UL	upper limit
VIS-OTR	visual - over top reading

LIST OF TERMS (Continued)

W	watts
W/L	watts per liter
WSTRS	waste status and transaction record summary
wt%	weight percent
WVR	waste volume reduction
°C	degrees Celsius
°F	degrees Fahrenheit
μCi/L	microcuries per liter
μCi/mL	microcuries per milliliter
μCi/g	microcuries per gram
μeq/g	microequivalents per gram
μeq/mL	microequivalents per milliliter
μg C/g	micrograms carbon per gram
μg/mL	micrograms per milliliter
μgC/g	micrograms carbon per gram
μg/g	micrograms per gram
μmole/L	micromoles per liter

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1.0 INTRODUCTION

One of the major functions 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, along with other available information about a tank, are compiled and maintained in a tank characterization report (TCR). This report and its appendixes serve as the TCR for single-shell tank 241-A-101.

The objectives of this report are: 1) to use characterization data in response to technical issues associated with 241-A-101 waste; and 2) to provide a standard characterization of this waste in terms of a best-basis inventory estimate. The response to technical issues is summarized in Section 2.0, and the best-basis inventory estimate is presented in Section 3.0. Recommendations regarding safety status and additional sampling needs are provided in Section 4.0. Supporting data and information are contained in the appendixes. This report also supports the requirements of the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1996) milestone M-44-10.

1.1 SCOPE

Characterization information presented in this report originated from sample analyses and known historical sources. Although the data quality objectives (DQOs) required that technical issues be resolved using results from recent sampling events (listed in Table 1-1), other information could be used to support (or challenge) conclusions derived from these results. Historical information for tank 241-A-101, provided in Appendix A, includes surveillance information, records pertaining to waste transfers and tank operations, and expected tank contents derived from a process knowledge model.

The recent sampling events listed in Table 1-1, as well as sample data obtained before 1989, are summarized in Appendix B along with the sampling results. The results of the 1996 sampling events, also reported in the laboratory data package (Steen 1997) and the retained gas samples (RGS) report (Shekarriz et al. 1996), satisfied the data requirements specified in the tank characterization plan (TCP) for this tank (Winkelman 1996). The statistical analysis and numerical manipulation of data used in issue resolution are reported in Appendix C. Appendix D contains the evaluation to establish the best basis for the inventory estimate and the statistical analysis performed for this evaluation. A bibliography that resulted from an in-depth literature search of all known information sources applicable to tank 241-A-101 and its respective waste types is contained in Appendix E. The reports listed in Appendix E may be found in the Lockheed Martin Hanford Corporation Tank Characterization and Safety Resource Center.

Table 1-1. Summary of Recent Sampling.

Sample/Date	Phase	Location	Segmentation	% Recovery
Vapor sample (June 8, 1995)	Gas	Tank headspace, Riser 11, 6 m (20 ft) below top of riser	n/a	n/a
Grab sample (April 3, 1996)	Solid/ liquid	Riser 4	n/a	100
Push core (July 11 to July 25, 1996)	Solid/ liquid	Risers 15 and 24	Divided sample in half (upper and lower)	94

Note:
n/a = not applicable

1.2 TANK BACKGROUND

Tank 241-A-101 is located in the 200 East Area A Tank Farm on the Hanford Site. It is the first tank in a four-tank cascade series. The tank went into service in 1956. It was filled with a combination of plutonium-uranium extraction (PUREX) high-level waste (HLW) and organic wash wastes (OWW) through 1973. Most of the waste was transferred to other A Farm and C Farm tanks during this same period. Tank 241-A-101 received strontium recovery supernatant (SRR) from B Plant and supernatant from the sluicing of other high-level waste tanks in A and AX Tank Farms between 1973 and 1975. By 1976, all but 11 kL (3 kgal) of sludge was transferred from tank 241-A-101 to tanks 241-A-106 and 241-C-104. From 1976 to 1980, tank 241-A-101 was filled with dilute double-shell slurry feed from evaporator campaigns 80-10 and 81-1. Partial isolation of tank 241-A-101 was completed in 1982 and the tank remains to be stabilized (Brevick et al. 1996).

A description of tank 241-A-101 is given in Table 1-2. The tank has an operating capacity of 3,785 kL (1,000 kgal) and presently contains 3,600 kL (953 kgal) of waste (Hanlon 1997). The tank waste is made up of two distinct layers: a lower convective layer described as a salt slurry and an upper nonconvective layer described as a moist salt. The nonconvective layer was found to contain trapped gas. A detailed analysis of these layers is presented in this report. This tank is on the Flammable Gas and Organic Watch Lists (Public Law 101-510).

Table 1-2. Description and Status of Tank 241-A-101.

TANK DESCRIPTION	
Type	Single-shell
Constructed	1954 to 1955
In-service	1956
Diameter	22.9 m (75 ft)
Maximum operating depth	9.5 m (31 ft)
Capacity	3,785 kL (1,000 kgal)
Bottom shape	Flat
Ventilation	Passive
TANK STATUS	
Waste classification	Double-shell slurry feed
Total waste volume[1]	3,607 kL (953 kgal)
Sludge volume	11 kL (3 kgal)
Saltcake volume	3,596 kL (950 kgal)
Drainable interstitial liquid	1,563 kL (413 kgal)
Waste surface level (November 25, 1996)	876 cm (345 in.)[1]
Temperature (October 24, 1993 to November 18, 1996)	20.7 °C (63.9 °F) to 82.2 °C (180 °F)
Integrity	Sound
Watch Lists	Flammable Gas Organic
SAMPLING DATES	
Push core sample	July 1996
Grab sample	April 1996
Vapor sample	June 1995
SERVICE STATUS	
Declared inactive	November 1980
Intrusion prevention	Not completed
Interim stabilized	Not completed

Note:

[1]Hanlon (1997)

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2.0 RESPONSE TO TECHNICAL ISSUES

Eight technical issues have been identified for tank 241-A-101 (Brown et al. 1996). They are:

- **Safety Screening:** Does the waste pose or contribute to any recognized potential safety problems?
- **Flammable Gas:** Is there a possibility of releasing flammable gases into the headspace of the tank or releasing chemical or radioactive materials into the environment?
- **Organic Complexants:** Are organic complexants at sufficiently low concentrations and temperatures to prevent a propagating reaction?
- **Hazardous Vapor Screening:** Are there hazardous storage conditions or regulatory compliance issues associated with gases and vapors in the tank?
- **Organic Solvents:** Does an organic solvent pool exist that may cause a fire or ignition of organic solvents in entrained waste solids?
- **Historical Model Evaluation:** Is the waste inventory generated by a model based on process knowledge and historical information (Agnew et al. 1997) representative of the current tank waste inventory?
- **Compatibility:** Will safety problems be created as a result of commingling wastes under interim storage? Are there any operations issues to be addressed before transferring waste?
- **Pretreatment:** Is it feasible to use sludge washing or liquid treatment to separate low-level waste (LLW) and HLW streams?

The TCP (Winkelman 1996) provides the types of sampling and analysis used to address the above issues. Data from the recent analysis of push core samples, grab samples and tank headspace measurements, as well as available historical information, provided the means to respond to the technical issues. This response is detailed in the following sections. See Appendix B for sample and analysis data for tank 241-A-101.

2.1 SAFETY SCREENING

The data needed to screen the waste in tank 241-A-101 for potential safety problems are documented in *Tank Safety Screening Data Quality Objective*, Rev. 2 (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 of these conditions is addressed separately below.

2.1.1 Exothermic Conditions (Energetics)

The first requirement outlined in the safety screening DQO (Dukelow et al. 1995) is to ensure that there are not sufficient exothermic constituents (organic or ferrocyanide) in tank 241-A-101 to pose a safety hazard. Because of this requirement, energetics in the tank 241-A-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 if the energetics exceed the safety threshold limit. The threshold limit for energetics is 480 J/g on a dry weight basis. Results obtained using differential scanning calorimetry indicated that no sample obtained from tank 241-A-101 had mean exothermic reactions (on a dry-weight basis) exceeding the safety screening DQO limit. The maximum dry weight exotherm observed was 129 J/g. The maximum upper limit to a 95 percent confidence interval on the mean was 317 J/g from core 154, segment 10 upper half.

2.1.2 Flammable Gas

Headspace measurements were taken in the tank headspace from risers 15 and 24 before taking the July 1996 push core samples. Flammable gas was detected in the tank headspace (at 3 percent of the lower flammability limit [LFL]) before sampling. During sampling, the LFL in the tank headspace reached 7 percent. This figure is below the safety screening limit of 25 percent of the LFL. Data for the July 1996 and June 1995 vapor phase measurements are presented in Appendix B.

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/mL instead of g/L, the 1 g/L limit is converted into units of μCi/mL by assuming that all of the 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 density of 1.66 g/mL, 1 g/L of ^{239}Pu is 36.1 μCi/g of alpha activity. All total alpha activity results were well below the safety screening limit. The maximum total alpha activity result was 0.13 μCi/g (core 156, segment 5). The maximum upper limit to a 95 percent confidence interval on the mean was 0.16 μCi/g (core 156, segment 4 lower half), indicating that the potential for a criticality event is extremely low. Therefore, criticality is not a concern for this tank. The method used to calculate confidence limits is contained in Appendix C.

2.2 FLAMMABLE GAS DATA QUALITY OBJECTIVE

Retained gas samples were taken and analyzed to address flammable gas issues (Cash 1996a). No specific notification limits or "acceptance levels" have been determined to meet this DQO. Results of RGS testing are reported in Shekarriz et al. (1996), and summarized in Appendix B of this document. The RGS measurements showed that 14 percent by volume of the upper nonconvective layer in the tank was filled with gas. The gas in this layer was made up of 16 percent nitrogen, 75 percent hydrogen and 5.6 percent nitrous oxide, with small amounts of ammonia, methane and other hydrocarbons. High concentrations of ammonia were found entrained in the liquid phase. RGS extraction results showed that insoluble gases were primarily retained in an upper non-convective waste layer in the tank. These results meet all sampling requirements for the flammability program to complete an evaluation of flammable gas issues.

2.3 ORGANIC COMPLEXANTS

The data required to support the issue of organic complexants are documented in *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue* (Turner et al. 1995). Total organic carbon (TOC) and sample moisture analyses were conducted to address the organic DQO. No organic layer was observed in any of the samples.

2.3.1 Total Organic Carbon

The first requirement of the organic DQO is to test the TOC content to the threshold limit of 3.0 dry weight percent. The TOC was below 3.0 dry weight percent in all samples. The mean TOC for solids was 4,800 μg/g on a wet weight basis and 3,340 μg/mL for drainable liquids. The upper 95 percent confidence interval on the mean TOC (dry weight) exceeded 3 percent for three of the samples: core 154, segment 9 lower half; core 154, segment 17 drainable liquid; and core 156, segment 6 lower half. The percent water content for these samples was 27.1, 93.5, and 33.7 percent respectively. Because all sample analyses were below 3 percent and percent water is high, TOC is not a concern for this tank. See Appendix C1 for the statistical analysis of the data.

2.3.2 Tank Moisture

The second requirement of the organic DQO is to compare the moisture content of the tank waste with the threshold limit of 17 weight percent. The average moisture content was 37.5 percent for the solids and 55 percent for the drainable liquids. After reruns, the lower 95 percent confidence limit on the mean was less than 17 weight percent water for four of the samples. All samples showed a moisture content of over 17 weight percent, except core 154, segment 18, where the moisture content was 11.7 percent (this segment contained 324 g of drainable liquid (DL) with 42.9 percent water content. Therefore, moisture content is not a concern for this tank. See Appendix C1 for a statistical analysis of the data.

2.4 HAZARDOUS VAPOR SAFETY SCREENING

The data required to support vapor screening are documented in *Data Quality Objective for Tank Hazardous Vapor Safety Screening*, Rev. 2 (Osborne and Buckley 1995). The vapor screening DQO addresses the two problems: 1) Does the vapor headspace exceed 25 percent of the LFL? If so, what are the principal fuel components? 2) Is there potential for worker hazards associated with the toxicity of constituents in any fugitive vapor emissions from these tanks? These problems will be dealt with in this section.

2.4.1 Flammable Gas

This is the same requirement as the safety screening flammability requirement. As noted previously, flammable gas was not detected in the tank headspace (0 percent of the LFL) before sampling.

2.4.2 Toxicity

The vapor screening DQO requires the analysis of ammonia, carbon dioxide (CO_2), carbon monoxide (CO), nitric oxide (NO), nitrous oxide (N_2O), and nitrogen dioxide (NO_2) from a sample. The vapor screening DQO specifies a threshold limit for each of the above listed compounds. Data from the June 8, 1995 vapor sampling event (Huckaby and Bratzel 1995), presented in Appendix B2.3, were used to address the issue of toxicity. All of the analytes were within the threshold limits, except ammonia and nitrous oxide. The toxicity issue has been closed for all tanks (Hewitt 1996).

2.5 ORGANIC SOLVENTS SCREENING

The data required to support the organic solvent screening issue are documented in the 93-5 implementation plan (DOE-RL 1996). A new DQO is currently being developed to address the organic solvent issue. In the interim, tanks are to be sampled for total non-methane hydrocarbon, to determine if an organic extractant pool greater than 1 m^2 (10.8 ft^2) exists (Cash 1996b). The purpose of this assessment is to ensure that an organic solvent pool fire or ignition of organic solvents cannot occur. Specific analyses for total non-methane organic hydrocarbon were not conducted (Huckaby and Bratzel 1996). However, the size of the organic extractant pool will be determined by the organics program, based on the analyses that were conducted for the June 1995 vapor sampling, and the tank headspace temperature and ventilation rate.

2.6 HISTORICAL EVALUATION

The purpose of the historical evaluation is to determine whether the model based on process knowledge and historical information (Brevick et al. 1996, Agnew et al. 1997) predicts tank inventories that are in agreement with current tank inventories. If the historical model can be shown to accurately predict the waste characteristics as observed through sample characterization, then there is a possibility that the amount of total sampling and analysis needed may be reduced. Data requirements for this evaluation are documented in *Historical Model Evaluation Data Requirements*, Rev. 1 (Simpson and McCain 1996).

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 that the model waste composition estimate is not comparable to the sample data and that the tank is not a good tank on which to perform the historical DQO. If the gateway analysis fails, the remainder of the sampling and analysis for the historical DQO will only be applied to composite sample results. 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 (HTCEs) (Simpson and McCain 1996).

The gateway analysis was applied to each push core sample taken from tank 241-A-101 in June/July 1996. The gateway analytes for tank 241-A-101 are sodium, aluminum, chromium, percent water, nitrite, nitrate, carbonate, phosphate, sulfate, ^{137}Cs and ^{90}Sr. These analytes were chosen because the tank waste is predicted to be composed entirely of supernatant mixing model saltcake waste generated from the 242-A Evaporator from 1977 through 1980 (SMMA1).

The gateway analysis required that two tests be performed for each sample. The first test was to determine if the concentration of each gateway analyte was over 10 percent of the predicted concentration (as specified in the DQO) for SMMA1. Segment 4, lower half was selected for this analysis to represent the upper layer in the tank containing moist saltcake, and segment 14, lower half was selected to represent the lower salt slurry layer. The gateway analysis for tank 241-A-101 is shown in Appendix C.

The second test was to determine if the gateway analytes accounted for more than 85 percent (by mass) of the total waste. The gateway analytes accounted for over 95 percent of the waste mass; therefore, the tank passed the second test. All the gateway analytes in segment 4 had concentrations greater than 10 percent of the DQO values for SMMA1 (see Appendix C, Section C2.0). However, segment 14 had much lower concentrations of ^{90}Sr and chromium than were predicted by the model. Therefore, segment 4 passed the first test, showing good comparison with DQO analytes for SMMA1 Segment 14 failed the test.

Another test was conducted to assess whether gateway analytes in composite core samples exceeded 10 percent of historical values (Agnew et al. 1997). As shown in Appendix C, this test passed, supporting the conclusion that the tank contains two distinct layers of evaporator waste. The composition of the upper layer is a good example of an SMMA1. The lower layer is not a typical SMMA1 waste.

2.7 COMPATIBILITY

Tank 241-A-101 has not yet been interim stabilized. Before pumping the supernatant and other drainable liquids from tank 241-A-101, a waste compatibility assessment was performed by Tank Farm Operations. The waste compatibility assessment ensures that the waste in tank 241-A-101 is compatible with the waste in the double-shell receiver tank 241-AN-101. The *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Fowler 1995) directs the waste compatibility assessment.

Sampling and analysis of grab samples were performed to the requirements of the waste compatibility DQO for tank 241-A-101 as specified in the sampling and analysis plan (Field 1996a). In addition to analyses to meet compatibility DQO requirements, non-routine analyses were performed because of an apparent crystallizing of liquid samples between sampling and transfer of the samples to the laboratory. Because grab samples may have solidified and liquid analyses were limited, compatibility requirements were also applied to drainable liquid samples in segments 13, 15 and 17 (cores 154 and 156) from the 1996 core sample event (Field 1996b).

A waste compatibility assessment for transfer of waste to tank 241-AN-101 (Blaak 1997) recommended that tank 241-A-101 waste be transferred to tank 241-AN-101, provided requirements specified by the assessment were addressed. Various requirements were specified in the waste compatibility assessment. One condition requires that an evaluation be performed to assess whether tank 241-A-101 waste would make tank 241-AN-101 a Watch List tank when the transfer is complete. The assessment concluded that exotherms in tank 241-A-101 were small in comparison to endotherms and preclude the possibility of a propagating reaction, and that all compatibility and safety requirements were in compliance. The assessment also determined that transfer lines should be heat traced to prevent line fouling caused by the potential formation of crystals.

2.8 PRETREATMENT

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

2.9 OTHER TECHNICAL ISSUES

Heat generation and temperature of the waste are factors in assessing tank safety. Heat is generated in the tanks from radioactive decay. An estimated heat load of 6.59 kW (22,500 Btu/hr) was given in Agnew et al. (1997). This figure compares with an analytical estimate for the tank of 6.28 kW (21,450 Btu/hr) based on radionuclides that generate heat (Table 2-1). These estimates are below the limit of 11.7 kW (40,000 Btu/hr) that separates high- and low-heat-load tanks (Smith 1986).

Table 2-1. Tank 241-A-101 Radionuclide Inventory and Projected Heat Load.

Radionuclide	Projected Inventory (Ci)	Decay Heat Generation Rate (W/Ci)	Decay Heat Generation (W)
^{137}Cs	1,245,500	0.00472	5,940
$^{89/90}Sr$	53,400	0.00669	337
Total watts			6,277

2.10 SUMMARY

This section summarizes the results of sampling and analysis for the issues that apply to tank 241-A-101. The sampling performed on the tank to date has met the needs of the data quality objectives that apply to the tank. Table 2-2 summarizes the characterization results for the safety screening, flammable gas, organic, historical model evaluation, compatibility, vapor screening and pretreatment issues.

Table 2-2. Summary of Safety Screening, Flammable Gas, Organic, Vapor Screening Historical Model Evaluation, Compatibility and Pretreatment Evaluation Results. (2 sheets)

Issue	Sub-issue	Results
Safety screening	Energetics	The maximum 95% CI was 317 J/g, below the threshold limit of 480 J/g for all samples.
	Flammable gas	Vapor measurement reported a maximum flammable gas reading of 7% of the LFL - under the threshold limit of 25% of the LFL.
	Criticality	All samples were <0.2 μCi/g, well below 36.1 μCi/g total alpha.

Table 2-2. Summary of Safety Screening, Flammable Gas, Organic, Vapor Screening Historical Model Evaluation, Compatibility and Pretreatment Evaluation Results. (2 sheets)

Issue	Sub-issue	Results
Organic	TOC	TOC ranged from 1,000 to 12,500 $\mu g/g$ and was below the threshold limit of 3 wt% (dry basis). The 95% CI exceeded 3 wt% for two of the samples, but moisture content for these samples was 27.1%, 33.7%, and 93.5%; therefore, TOC is not a concern for this tank.
	Moisture	One sample had a moisture level lower than the threshold limit of 17 wt%. The average solids moisture was 37.5%.
	Propagation	No propagation was observed.
Hazardous vapor	Flammability	See safety screening - flammable gas.
	Toxicity	All analytes were within the toxicity threshold limits except ammonia and nitrous oxide.
Organic solvents	Solvent pool size	Total non-methane hydrocarbon was not measured. The size of the organic solvent pool will be estimated from vapor results obtained.
Historical (gateway analysis)	Total mass of gateway analytes	Greater than 95% by weight of the waste was accounted for by the gateway analytes for segments 4 and 14.
	Selected segment comparison with ≥ 10% of DQO values	Segment 4 passed for all analytes. Segment 14 did not pass for chromium and ^{90}Sr.
	Core composite comparison with HDW	The composition of analytes in a core 154 composite was ≥ 10% of HDW model estimates.
Compatibility	Waste compatibility assessment	All compatibility and safety requirements were in compliance. Transfer of waste to tank 241-AN-101 was recommended if requirements specified by Blaak (1997) are met.
Pretreatment	Analyses for treatment to separate LLW and HLW streams	Samples were archived for future analysis.

Notes:

CI = confidence interval
HDW = Hanford defined waste

3.0 BEST-BASIS 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 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 suitable for long-term storage.

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

An effort is underway to provide waste inventory estimates that will serve as the standard characterization for the various waste management activities (Hodgson and LeClair 1996). As part of this effort, an evaluation of available information for tank 241-A-101 was performed using the following:

- Two core samples taken in July 1996 (Steen 1997).
- Waste transactions and operating data that confirm expected waste types.
- Comparison with composition data from two waste tanks (241-A-102 and 241-A-103) that are expected to have a similar SMMA1 salt compositions.
- An inventory estimate generated by the HDW model (Agnew et al. 1997).

Based on this evaluation, a best-basis inventory was developed. The sample-based inventories were preferred in all cases. The HDW model inventories were used when analytical data were not available.

The waste in tank 241-A-101 consists primarily of saltcake and saturated liquid produced by the 241-A Evaporator (3,596 kL [950 kgal]). A small layer of sludge (approximately 11 kL [3 kgal]) with higher concentrations of silicon, iron and ^{90}Sr is also present. The best-basis inventory for tank 241-A-101 is presented in Tables 3-1 and 3-2.

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-A-101, Effective May 31, 1997. (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, or E)[1]	Comment
Al	147,000	S	
Bi	<378	S	
Ca	<782	S	The saltcake inventory is 697 kg. Drainable liquid concentrations were less than detection limits.
Cl	24,100	S	
CO_3	169,000	S	
Cr	5,430	S	
F	<1,560	S	The saltcake inventory is 1,430 kg. Drainable liquid concentrations were less than detection limits.
Fe	1,390	S	
Hg	5.9	M	
K	25,800	S	
La	10	M/E	
Mn	<110	S	The saltcake inventory is 102 kg. Drainable liquid concentrations were less than detection limits.
Na	955,000	S	
Ni	<211	S	The saltcake inventory is 194 kg. Drainable liquid concentrations were less than detection limits.
NO_2	461,000	S	
NO_3	821,000	S	
OH_{TOTAL}	451,000	C	Total hydroxide estimated by charge balance.
Pb	<502	S	
P as PO_4	24,700	S	
Si	2,570	S	
S as SO_4	39,900	S	
Sr	<37.8	S	
TOC	19,600	S	

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-A-101, Effective May 31, 1997. (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, or E)[1]	Comment
U_{TOTAL}	<1,600	S	The saltcake inventory is 1,180 kg. Drainable liquid concentrations were less than detection limits.
Zr	<88.4	S	The saltcake inventory is 79.6 kg. Drainable liquid concentrations were less than detection limits.

Note:

[1]S = Sample-based (based on 1996 core samples, see Appendix B), M = HDW model-based, and E = Engineering assessment-based

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-A-101 Effective May 31, 1997 (Decayed to January 1, 1994). (2 Sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	731	M	
^{14}C	115	M	
^{59}Ni	7.16	M	
^{60}Co	<127	S	
^{63}Ni	703	M	
^{79}Se	11.9	M	
^{90}Sr	135,000	S	
^{90}Y	135,000	S/E	Based on ^{90}Sr analysis.
^{93}Zr	58.1	M	
^{93m}Nb	42.3	M	
^{99}Tc	869	M	
^{106}Ru	0.0256	M	
^{113m}Cd	308	M	
^{125}Sb	651	M	
^{126}Sn	18.0	M	
^{129}I	1.68	M	
^{134}Cs	12.6	M	
^{137}Cs	994,000	S	
^{137m}Ba	940,000	S/E	Based on ^{137}Cs analysis.
^{151}Sm	41,900	M	

Table 3-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-A-101 Effective May 31, 1997 (Decayed to January 1, 1994). (2 Sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{152}Eu	16.1	M	
^{154}Eu	<466	S	
^{155}Eu	<1,700	S	
^{226}Ra	5.2E-04	M	
^{227}Ac	0.0032	M	
^{228}Ra	1.11	M	
^{229}Th	0.026	M	
^{231}Pa	0.014	M	
^{232}Th	0.12	M	
^{232}U	3.38	M	
^{233}U	13.0	M	
^{234}U	2.19	M	
^{235}U	0.087	M	
^{236}U	0.070	M	
^{237}Np	3.0	M	
^{238}Pu	5.05	M	
^{238}U	3.0	M	
^{239}Pu	181	M	
^{240}Pu	30.6	M	
^{241}Am	197	M/S	
^{241}Pu	352	M	
^{242}Cm	0.54	M	
^{242}Pu	0.0019	M	
^{243}Am	0.0073	M	
^{243}Cm	0.049	M	
^{244}Cm	0.40	M	

Note:

[1]S = Sample-based (based on 1996 core samples, see Appendix B), M = HDW model-based, and E = Engineering assessment-based

4.0 RECOMMENDATIONS

Results of core samples obtained during July 1996, grab samples obtained in April 1996, and vapor samples obtained in June 1995 from tank 241-A-101 are presented in this report. All analytical results for the safety screening DQO were well within the safety notification limits. Core samples obtained from two horizontally spaced risers and vapor samples from a third riser indicate that the tank contains two vertically homogeneous waste layers. Flammable gas trapped in the (upper) nonconvective waste layer in the tank is of concern and is being further investigated to assess whether the tank can be classified as "safe."

Flammability analyses performed in accordance with Cash (1996a) showed that the LFL in the tank headspace was well under the threshold limit of 25 percent. However, RGS samples showed that 14 percent by volume of the nonconvective waste layer in the tank was filled with gas that contained about 75 percent hydrogen. RGS samples also showed that a high concentration of ammonia was dissolved in tank liquids in a convective layer (lower portion of the tank). These RGS results are being evaluated by the flammability program.

Organic analyses were performed in accordance with the organic complexants DQO (Turner et al. 1995). Analytical results showed that the TOC was below the threshold limit of 3 percent, and no separate organic layer was observed. Based on samples obtained, all analyses indicated that organic Watch List status for tank 241-A-101 should be reevaluated.

Vapor samples confirmed that the LFL is below the threshold limit of 25 percent and showed that vapor toxicity is not a concern for this tank.

The gateway analysis for the historical DQO passed for segment 4 samples (which represented the nonconvective layer in the tank), but failed for segment 14 (which represented the convective layer). These results indicate that historical models of tank waste types agree with sample results for segment 4 sufficiently to meet requirements specified in the historical DQO (Simpson and McCain 1996). However, segment 14 sample results did not agree with the historical model. A characterization best-basis inventory was developed for the tank contents based on the core sample data obtained.

As a result of a compatibility assessment based on grab samples and push core drainable liquid samples, salt well pumping is planned for tank 241-A-101, contingent on meeting requirements specified by Blaak (1997). Final evaluations based on core sample results will be conducted before salt well pumping begins.

Table 4-1 summarizes the status of the Project Hanford Management Contractor (PHMC) TWRS Program review and acceptance of the sampling and analysis results reported in this TCR. All DQO issues required to be addressed by sampling and analysis are listed in column one of Table 4-1. The second column indicates whether the requirements of the DQO were met by the sampling and analysis activities performed and is answered with a "Yes" or a "No." The third column indicates concurrence and acceptance by the program in

TWRS that is responsible for the DQO that the sampling and analysis activities performed adequately meet the needs of the DQO. A "Yes" or "No" in column three indicates acceptance or disapproval of the sampling and analysis information presented in the TCR. If the results/information have not yet been reviewed, "N/R" is shown in the column. If the results/information have been reviewed, but acceptance or disapproval has not been decided, "N/D" is shown in the column. Because waste was only sampled in the top portion of the tank (see Section B3.1) the safety screening DQO has been only partially completed. The upper part of the waste was sampled and analyzed in accordance with the safety screening DQO and accepted by the responsible TWRS program.

Table 4-2 summarizes the status of PHMC TWRS Program review and acceptance of the evaluations and other characterization information contained in this report. The evaluations specifically outlined in this report are the best-basis inventory evaluation, the gateway analysis, and the evaluation to determine whether the tank is safe, conditionally safe, or unsafe. Column one lists the different evaluations performed in this report. Columns two and three are in the same format as Table 4-1. The manner in which concurrence and acceptance are summarized is also the same as that in Table 4-1.

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

Issue	Samples/Analysis Performed	PHMC TWRS Program Acceptance
Safety screening DQO	Yes	Yes
Flammable gas DQO	Yes	Yes
Organic DQO	Yes	Yes
Hazardous vapor screening DQO	Yes	Yes
Organic solvents	Yes	Yes
Historical evaluation DQO	Yes	Yes
Waste compatibility DQO	Yes	Yes
Pretreatment DQO	Yes	Yes

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

Issue	Evaluation performed	PHMC TWRS Program acceptance
Safety categorization (undetermined)	Yes	N/D
Flammability analysis	(in progress)	N/D
Organic analysis	Yes	Yes
Organic solvents	no	N/D
Historical "gateway" analysis	Yes	Yes
Waste compatibility evaluation	Yes	Yes

Note:
N/D = not decided

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APPENDIX A

HISTORICAL TANK INFORMATION

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APPENDIX A

HISTORICAL TANK INFORMATION

Appendix A describes tank 241-A-101 based on historical information. For this report, historical information includes any information about the fill history, waste types, surveillance, or modeling data about the tank. This information is necessary for providing a balanced assessment of the sampling and analytical results.

This appendix contains the following information:

- **Section A1:** Current status of the tank, including the current waste levels and the stabilization and isolation status of the tank.
- **Section A2:** Information about the tank's design.
- **Section A3:** Process knowledge of the tank; i.e., the waste transfer history and the estimated contents of the tank based on modeling data.
- **Section A4:** Surveillance data for tank 241-A-101, including surface-level readings, temperatures, and a description of the waste surface based on photographs.
- **Section A5:** References for Appendix A.

Historical sampling results (results from samples obtained before 1989) are included in Appendix B.

A1.0 CURRENT TANK STATUS

As of December 31, 1996, tank 241-A-101 contained an estimated 3,607 kL (953 kgal) of waste classified as double-shell slurry feed (Hanlon 1997). Liquid waste volumes are estimated using a photographic evaluation. The solid waste volumes are estimated using an ENRAF[1] surface level gauge. The solid waste volume was last updated on November 21, 1980. The amounts of various waste phases in the tank are presented in Table A1-1.

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

Table A1-1. Tank Contents Status Summary (Hanlon 1997).

Waste Type	kL (kgal)
Total waste	3,607 (953)
Supernatant liquid	0 (0)
Sludge	11 (3)
Saltcake	3596 (950)
Drainable interstitial liquid	1563 (413)
Drainable liquid remaining	1563 (413)
Pumpable liquid remaining	1669 (441)

Tank 241-A-101 is out of service, as are all single-shell tanks, and is categorized as sound. The tank is on the Organics and Flammable Gas Watch Lists. The tank is passively ventilated, and partial isolation has been completed (Hanlon 1997). All monitoring systems were in compliance with documented standards as of December 31, 1997 (Hanlon 1997).

A2.0 TANK DESIGN AND BACKGROUND

The 241-A Tank Farm was constructed during 1954 and 1955 in the 200 East Area. The farm contains six 100 series tanks. The tanks have 3,785-kL (1,000-kgal) capacities, 23-m (75-ft) diameters, and 9.5-m (31-ft) operating depths (Leach and Stahl 1997). The 241-A Tank Farm was designed for self-boiling waste with a maximum fluid temperature of 121 °C (250 °F) (Brevick et al. 1996). A 75-mm (3-in.)-diameter cascade overflow line connects tank 241-A-101 as first in a cascade series of four tanks continuing through tanks 241-A-102 and -103 to -106. Each tank in the cascade series is set one foot lower in elevation from the preceding tank.

Tank 241-A-101 has a flat bottom, and was designed with a primary carbon steel liner (ASTM[2] A283 Grade C) and a concrete dome with various risers. The tank is set on a reinforced concrete foundation that was waterproofed by a three-ply, asphalt-impregnated waterproofing fabric protected by a layer of grout. Lead flashing was used to protect the joint where the steel liner meets the concrete dome. One coat of red lead paint was sprayed on all exposed interior tank steel surfaces (Engler 1953).

[2]American Society for Testing and Materials

According to drawings and engineering change notices, tank 241-A-101 has 24 risers ranging in diameter from 100 mm (4 in.) to 1.1 m (42 in.). Table A2-1 shows numbers, diameters, and descriptions of the risers and the inlet, overflow, and spare nozzles.

Table A2-1. Tank 241-A-101 Risers.[1,2,3,4] (2 sheets)

Number	Diameter (inches)	Description and Comments
R1	12	Air circulator line, cut & capped
R2	8	Lead-covered (early thermocouple tree)
R3	8	Dry well welded to bottom (not movable)
R4	12	Salt well screen, weather covered
R5	4	Blind flange
R6	4	ENRAF™ (Benchmark CEO 37760, December 11, 1986)
R7	4	Crust breaker, weather covered
R8	4	Distributor pit 01H drain, weather covered
R9	20	Underground vent line, below grade
R10	6	Blind flange (early thermocouple tree)
R11	4	Process waste line, sealed in diversion box
R12	4	Thermocouple tree
R13	42	Spare
R14	8	Spare, (instrumentation removed, ECN 171167, May 12, 1992]
R15[5]	4	Flange in caisson
R16[5]	12	Spare/observation port (12-in. spool)
R17	18	Welded flange, weather covered
R18	18	Welded flange, weather covered
R19	4	B-436 liquid observation well (LOW)
R20	4	Breather filter, (Benchmark CEO 37760, December 12, 1986)
R21	12	Pump pit 01B, weather covered
R22	12	Sluice pit 01C, weather covered
R23	4	Drain from transfer box 241-A-153, sealed in box
R24[5]	4	Flange in caisson
N1	6	Overflow outlet
N2	4	Spare inlet nozzle, capped

Table A2-1. Tank 241-A-101 Risers.[1,2,3,4] (2 sheets)

Number	Diameter (inches)	Description and Comments
N3	3	Spare, sealed in diversion box 241-A-152
N4	3	Fill, sealed in diversion box 241-A-152
N5	3	Fill, sealed in valve pit 241-A-501

Notes:

CEO = change engineering order
ECN = engineering change order
LOW = liquid observation well

[1]Alstad (1993)
[2]Tran (1993)
[3]Vitro Engineering Corporation (1988)
[4]General Electric (1967)
[5]Indicates risers tentatively available for sampling (Lipnicki 1997)

A plan view that depicts the riser and nozzle configuration is shown as Figure A2-1. Risers 15, 16, and 24 are tentatively available for sampling (Lipnicki 1997). A tank cross-section showing the approximate waste level, along with a schematic of the tank equipment, is in Figure A2-2.

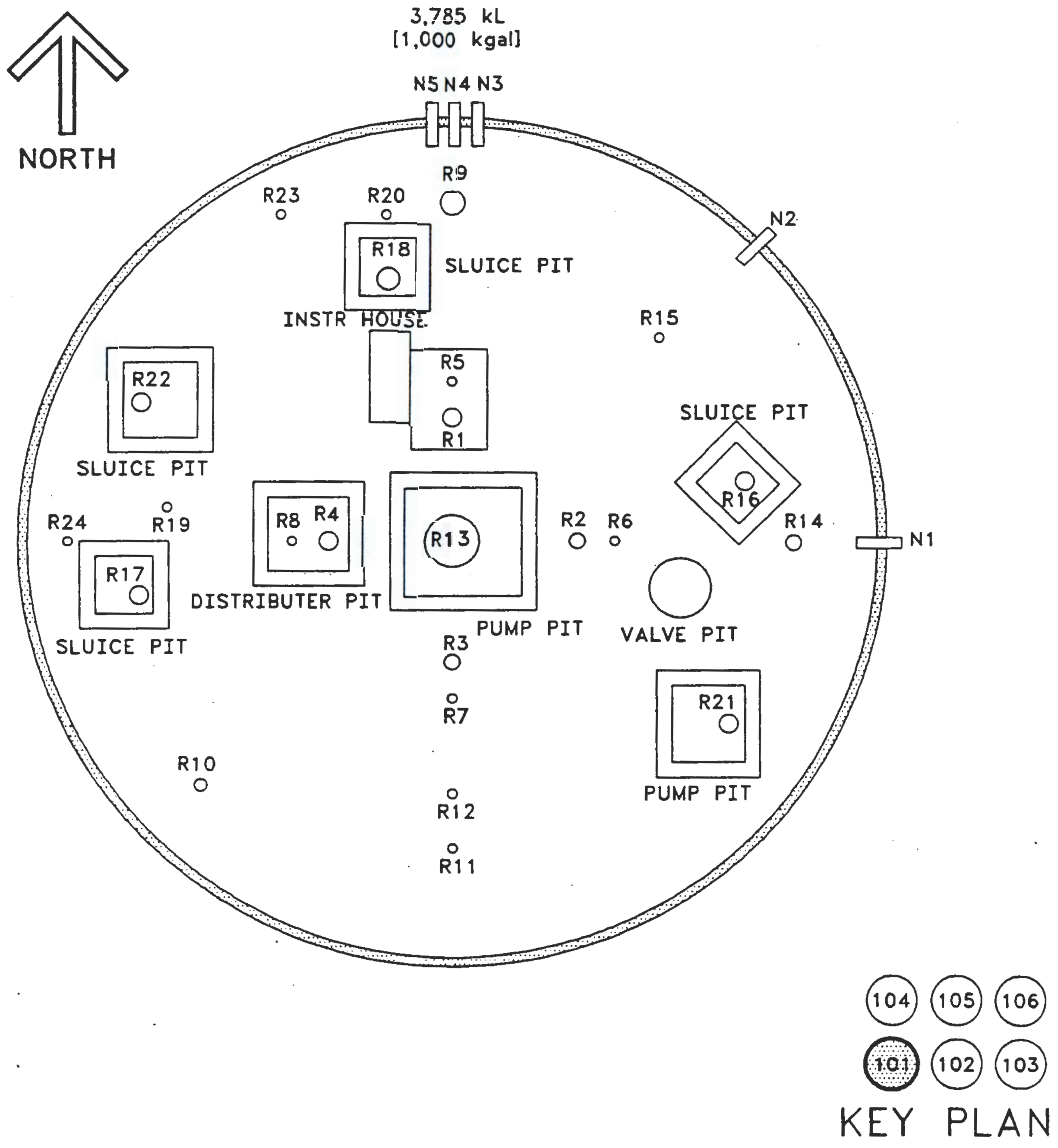
A3.0 PROCESS KNOWLEDGE

The following sections: 1) provide information about the waste transfer history of 241-A-101; 2) describe the process wastes that were transferred; and 3) give an estimate of the current tank contents based on waste transfer history.

A3.1 WASTE TRANSFER HISTORY

Table A3-1 summarizes the waste transfer history of tank 241-A-101 (Agnew et al. 1997b). PUREX organic wash waste was initially added to tank 241-A-101 in the first quarter of 1956. PUREX HLW was added to tank 241-A-101 from the first quarter of 1957 through the first quarter of 1961. PUREX low-level waste was also added to tank 241-A-101 during the second, third and fourth quarters of 1958. Evaporated water condensate from the waste was sent to the 216-A-008 crib in the third and fourth quarters of 1956. From the second quarter of 1957 through the first quarter of 1961, the condensate from tank 241-A-101 was sent to tank 241-A-106.

Figure A2-1. Riser Configuration for Tank 241-A-101.



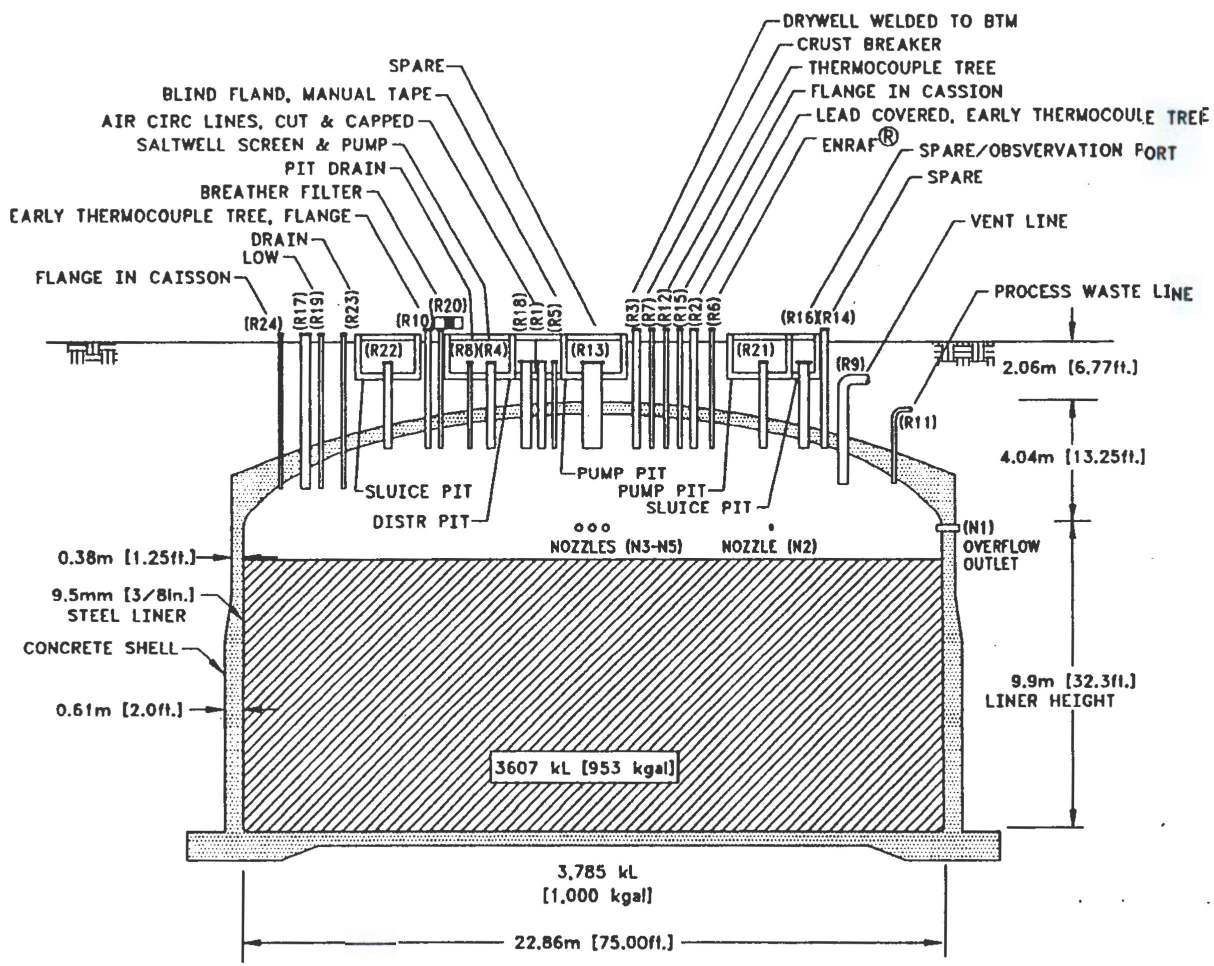


Figure A2-2. Tank 241-A-101 Cross Section and Schematic.

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

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume	
				kL	kgal
PUREX		OWW	1956	250	66
	A-008	PCOND	1956	-102	-27
PUREX		P	1956 - 1961	16,021	4,232
	241-C-106	Supernatant	1957	-886	-234
	241-A-106	PCOND	1957 - 1961	-15,642	-4,132
241-A-106		P	1958	344	91
PUREX		PL	1958	2,063	545
Water		Water	1960	980	259
PUREX		OWW	1960	64	17
	A-024	PCOND	1961 - 1964	-3,085	-815
PUREX		OWW	1963 - 1968	8,468	2,237
	241-A-102	P, OWW	1963 - 1969	-7,389	-1,952
	241-C-103	P, OWW	1965 - 1966	-2,453	-648
241-A-103		P	1966, 1968	3,555	969
PUREX		P	1966, 1970	401	106
	241-A-105	P, OWW	1968	-3,081	-814
	SRR	P	1969	-34	-9
	241-A-104	P	1969	-2,586	-683
	241-A-106	P	1969 - 1971	-1,190	-473
241-AX-104		P	1970	1,499	396
	241-C-105	P	1972	-1,454	-384
PUREX		PL	1973	19	5
WATER		WATER	1969, 1970	4,444	1,174
B Plant		SRR	1973 - 1975	4,058	1,072
	241-A-106	P, B	1973, 1975	-856	-226
	241-C-104	P, B	1973 - 1976	-6,163	-1628
241-A-102, 241-A-106		B	1975 - 1980	2,835	473

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

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume	
				kL	kgal
241-A-102, 241-AX-103, 241-SY-102		EVAP	1976 - 1980	17,496	4,622
	241-A-102, 241-AY-102	EVAP	1977 - 1980	-12,791	-3,379
241-BX-104		DSSF	1980	731	193
	241-AW-103	DSSF	1980	-890	-235

Notes:

B	B Plant HLW returned to tanks from strontium recovery
DSSF	Double-shell slurry feed. Waste used for feed into 242-A Evaporator (post 1980).
EVAP	Evaporator waste for feed into 242-A Evaporator (1976 - 1980)
OWW	Organic wash waste from PUREX
P	PUREX high-level waste
PCOND	PUREX condensate
PL	PUREX low-level waste
SRR	Slurried PUREX sludge from A and AX Farms; sent to B Plant for strontium recovery from 1967 to 1976.

[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.

Flush water and dilute feed for the evaporator were received between the first and fourth quarters of 1960. Organic wash waste was added to tank 241-A-101 in the fourth quarter of 1960. From the third quarter of 1961 until the fourth quarter of 1963, evaporated condensate was sent to the 216-A-024 crib. Organic wash waste was added to tank 241-A-101 in the first quarter of 1963 and continued until the first quarter of 1968. From the fourth quarter of 1963 to the first quarter of 1969, waste was sent to tank 241-A-102. In the fourth quarter of 1965 and first quarter of 1966, waste was sent from tank 241-A-101 to tank 241-C-103. Tank 241-A-101 received PUREX HLW from tank 241-A-103 in the first quarter of 1966. During the third quarter of 1966 and the fourth quarter of 1970 the tank received PUREX HLW.

Tank 241-A-101 sent waste to tank 241-A-105 during the first and second quarter of 1968 and received PUREX HLW from tank 241-A-103 in the third quarter of 1968. Flush water from miscellaneous sources was sent to tank 241-A-101 in the first quarter of 1969 and the second quarter of 1970. Waste was sent from tank 241-A-101 to the strontium recovery operations in B Plant during the first quarter of 1969. Additional waste was sent from tank 241-A-101 to tanks 241-A-104 and -106 during the second, third and fourth quarters of 1969.

Tank 241-AX-104 sent PUREX HLW to tank 241-A-101 in the first and second quarters of 1970. During 1970 and the first quarter of 1971, waste was sent to tank 241-A-106 from tank 241-A-101. Tank 241-A-101 sent waste to tank 241-C-105 during the second quarter of 1972.

Strontium recovery waste from B Plant was received into tank 241-A-101 during 1973, the first quarter of 1974, and the third quarter of 1975. PUREX low-level waste was received by tank 241-A-101 and waste was sent to tanks 241-A-106 and 241-C-104 from tank 241-A-101 from the fourth quarter of 1973 to the second quarter of 1975. Flush water from miscellaneous sources was received by tank 241-A-101 in the third quarter of 1975. From the third quarter of 1975 to the third quarter of 1976 the tank received waste from tanks 241-A-102, 241-A-106 and 241-AX-103. During that time waste was sent to tanks 241-C-104 and 241-A-106. After these transfers only 11 kL (3 kgal) of waste remained in the tank from the PUREX and B Plant transfers that occurred between 1956 and the third quarter of 1976.

From the fourth quarter of 1976 through the third quarter of 1980, tank 241-A-101 exchanged evaporator feed waste with tank 241-A-102 to be used for 242-A Evaporator operations. The cumulative waste received during this period (1,983 kL [524 kgal]) makes up the convective salt slurry layer on top of the sludge heel in the tank. During this time waste was also received from tank 241-BX-104 and sent to tank 241-AW-103.

From October to November 1980, the last batch (1,669 kL [441 kgal]) of waste was transferred to tank 241-A-101 from tank 241-A-102 (Brevick et al. 1996). This waste was the residual from the 81-1 evaporator campaign and constitutes the upper nonconvective saltcake layer in the tank.

A3.2 HISTORICAL ESTIMATION OF TANK CONTENTS

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

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

- *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4,* (Agnew et al. 1997a). This document contains the HDW list, the SMM, the tank layer model (TLM) and the Historical Tank Inventory Estimate.

- Tank Layer Model. The TLM defines the sludge and saltcake layers in each tank using waste composition and waste transfer information.

- The Hanford Defined Waste List (HDW list). The HDW list is comprised of approximately 50 waste types defined by concentration for major analytes/compounds for both sludge and supernatant layers.

- Supernatant Mixing Model. This is a subroutine within the HDW model that calculates the volume and composition of certain supernatant blends and concentrates.

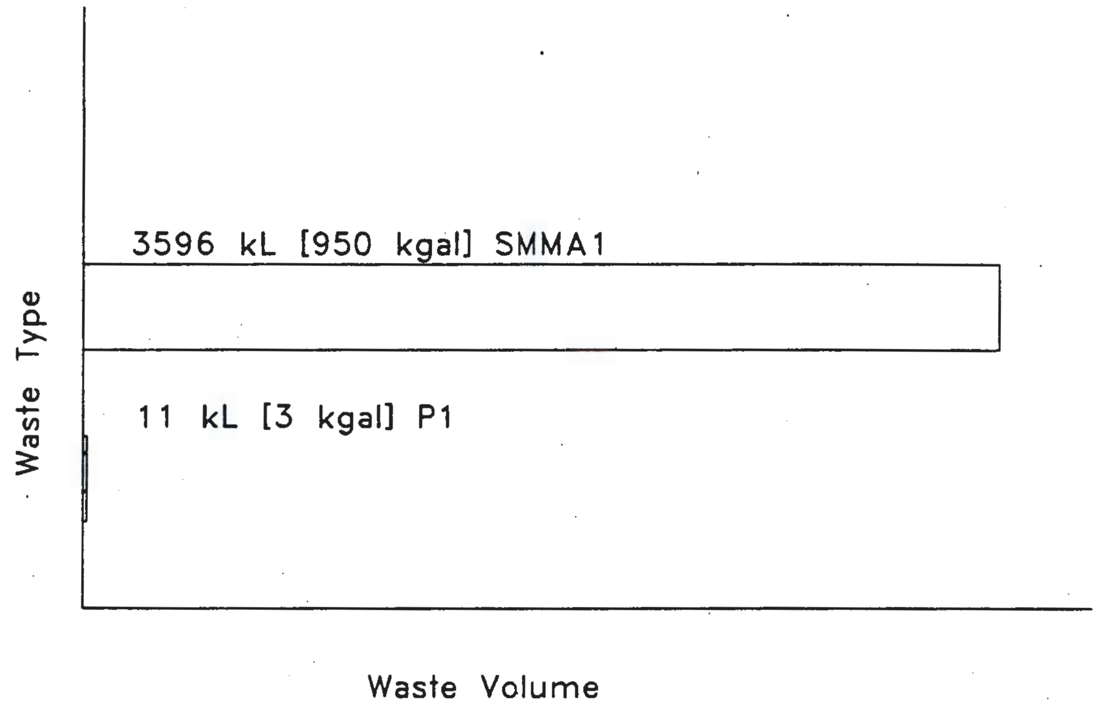
Using these records, the TLM defines the sludge and saltcake layers in each tank. The SMM uses information from the WSTRS, the TLM and the HDW list to describe the supernatants and concentrates in each tank. Together, the WSTRS, TLM, SMM and HDW list determine each tank's inventory estimate. These model predictions are considered estimates that require further evaluation using analytical data.

Based on Agnew et al. (1997a), tank 241-A-101 contains 3,607 kL (953 kgal) of waste comprised of a bottom layer of 11 kL (3 kgal) of PUREX HLW (P1) beneath a 3,596 kL (950 kgal) layer of SMMA1. Figure A3-1 shows a graphical representation of the estimated waste types and volumes for each tank layer.

The P1 layer should contain above one weight percent of iron, hydroxide, sodium, carbonate, silicate, nitrite, and calcium, and above a tenth of a weight percent of nickel, sulfate, and ammonia. High radioactivity will be found because of the quantity of strontium and cesium present.

Based on the Agnew et al. (1997a) tank model, the SMMA1 layer is expected to contain greater than one weight percent of nitrate, sodium, hydroxide, nitrite, aluminum, carbonate, and sulfate, and between one and 0.1 weight percent of phosphate, chloride, chromium, potassium, silicate, and various organic species. SMMA1 waste is expected to have on the order of 100 times lower radioactivity than the P1 layer. Table A3-2 shows the tank layer model estimate for waste types and concentrations in tank 241-A-101.

Figure A3-1. Tank Layer Model.



A4.0 SURVEILLANCE DATA

Tank 241-A-101 surveillance includes surface-level measurements (liquid and solid) and temperature monitoring inside the tank (waste and headspace). The data provide the basis for determining tank integrity.

Liquid level measurements may indicate if there is a major leak from a tank. Solid surface-level measurements provide an indication of physical changes and consistency of the solid layers.

Table A3-2. Historical Tank Inventory Estimate.[1,2] (5 sheets)

Total Inventory Estimate							
Physical Properties				**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Total waste	5.37E+06 (kg)	(953 kgal)	----	----	----	----	----
Heat load	7.29 (kW)	(2.49E+04 Btu/hr)	----	6.66	7.03	7.53	7.88
Bulk density[4]	1.49 (g/cm^3)	----	----	1.44	1.47	1.50	1.51
Water wt%[5]	42.3	----	----	40.1	40.8	43.6	45.4
TOC wt% C	1.19	----	----	0.664	0.921	1.45	1.71
Constituents	***M***	**ppm**	**kg[3]**	**-95 CI**	**-67 CI**	**+67 CI**	**+95 CI**
Na^+	11.2	1.73E+05	9.27E+05	10.2	10.7	11.6	11.9
Al_3^+	1.39	2.53E+04	1.36E+05	1.17	1.34	1.43	1.47
Fe_3^+	1.60E-02	601	3.23E+03	1.49E-02	1.55E-02	1.66E-02	1.71E-02
Cr^{3+}	9.83E-02	3.43E+03	1.84E+04	8.69E-02	9.30E-02	0.103	0.109
Bi^{3+}	1.02E-03	143	767	9.58E-04	9.87E-04	1.05E-03	1.10E-03
La^{3+}	1.95E-05	1.82	9.78	1.44E-05	1.69E-05	2.22E-05	2.47E-05
Hg^{2+}	8.12E-06	1.09	5.88	7.79E-06	7.95E-06	8.29E-06	8.46E-06
Zr	1.29E-04	7.88	42.3	1.19E-04	1.22E-04	1.33E-04	1.38E-04
Pb^{2+}	1.09E-03	152	817	8.49E-04	9.68E-04	1.22E-03	1.34E-03
Ni^{2+}	4.62E-03	182	978	4.34E-03	4.53E-03	4.67E-03	4.71E-03
Sr^{2+}	0	0	0	0	0	0	0
Mn^{4+}	3.76E-03	139	746	3.23E-03	3.49E-03	4.03E-03	4.29E-03
Ca^{2+}	2.47E-02	666	3.58E+03	2.32E-02	2.39E-02	2.55E-02	2.63E-02
K^+	5.37E-02	1.41E+03	7.58E+03	4.62E-02	4.94E-02	5.88E-02	6.56E-02
OH^-	7.88	9.00E+04	4.83E+05	6.80	7.58	8.07	8.22

Table A3-2. Historical Tank Inventory Estimate.[1,2] (5 sheets)

Total Inventory Estimate							
Constituents (Cont'd)	*M*	ppm	kg[3]	-95 CI	-67 CI	+67 CI	+95 CI
NO^{3-}	3.57	1.49E+05	7.98E+05	3.39	3.48	3.66	3.75
NO^{2-}	2.04	6.30E+04	3.38E+05	1.64	1.81	2.29	2.35
CO_3^{2-}	0.422	1.70E+04	9.13E+04	0.389	0.405	0.439	0.450
PO_4^{3-}	7.66E-02	4.88E+03	2.62E+04	6.65E-02	7.09E-02	8.11E-02	8.70E-02
SO_4^{2-}	0.234	1.51E+04	8.11E+04	0.188	0.207	0.266	0.268
Si	6.45E-02	1.22E+03	6.53E+03	5.69E-02	6.06E-02	6.83E-02	7.21E-02
F^-	5.51E-02	704	3.78E+03	4.72E-02	5.05E-02	6.03E-02	6.81E-02
Cl^-	0.194	4.61E+03	2.47E+04	0.167	0.179	0.200	0.205
$C_6H_5O_7^{3-}$	2.72E-02	3.45E+03	1.85E+04	2.49E-02	2.58E-02	2.86E-02	3.08E-02
$EDTA^{4-}$	2.86E-02	5.53E+03	2.97E+04	9.24E-03	1.87E-02	3.86E-02	4.83E-02
$HEDTA^{3-}$	5.14E-02	9.46E+03	5.08E+04	1.27E-02	3.16E-02	7.13E-02	9.08E-02
glycolate$^-$	0.106	5.35E+03	2.87E+04	6.75E-02	8.64E-02	0.126	0.146
acetate$^-$	1.86E-02	737	3.96E+03	1.48E-02	1.64E-02	2.09E-02	2.45E-02
oxalate^{2-}	2.56E-05	1.51	8.12	2.28E-05	2.42E-05	2.70E-05	2.84E-05
dibutyl phosphate	2.17E-02	3.06E+03	1.65E+04	1.81E-02	1.97E-02	2.39E-02	2.71E-02
butanol	2.17E-02	1.08E+03	5.80E+03	1.81E-02	1.97E-02	2.39E-02	2.71E-02
NH_3	5.06E-02	578	3.10E+03	4.20E-02	4.54E-02	5.72E-02	6.49E-02
$Fe(CN)_6^{4-}$	0	0	0	0	0	0	0

Table A3-2. Historical Tank Inventory Estimate.[1,2] (5 sheets)

Total Inventory Estimate							
Radiological Constituents	Ci/L	μCi/g	Ci[3]	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
H-3	2.03E-04	0.136	731	1.35E-04	1.35E-04	2.18E-04	2.37E-04
C-14	3.18E-05	2.14E-02	115	1.76E-05	1.76E-05	3.24E-05	3.29E-05
Ni-59	1.99E-06	1.33E-03	7.16	1.32E-06	1.32E-06	2.04E-06	2.08E-06
Ni-63	1.95E-04	0.131	703	1.29E-04	1.29E-04	2.00E-04	2.04E-04
Co-60	4.02E-05	2.70E-02	145	2.40E-05	2.40E-05	4.13E-05	4.24E-05
Se-79	3.29E-06	2.21E-03	11.9	2.39E-06	2.39E-06	3.62E-06	3.93E-06
Sr-90	0.133	89.5	4.81E+05	0.126	0.131	0.136	0.138
Y-90	0.133	89.6	4.81E+05	0.102	0.102	0.136	0.138
Zr-93	1.61E-05	1.08E-02	58.1	1.16E-05	1.16E-05	1.77E-05	1.93E-05
Nb-93m	1.17E-05	7.87E-03	42.3	8.55E-06	8.55E-06	1.29E-05	1.40E-05
Tc-99	2.41E-04	0.162	869	1.88E-04	2.14E-04	2.71E-04	3.12E-04
Ru-106	7.09E-09	4.76E-06	2.56E-02	4.99E-09	4.99E-09	7.69E-09	8.27E-09
Cd-113m	8.53E-05	5.73E-02	308	5.82E-05	5.82E-05	9.52E-05	1.05E-04
Sb-125	1.80E-04	0.121	651	1.10E-04	1.10E-04	1.87E-04	1.93E-04
Sn-126	4.98E-06	3.35E-03	18.0	3.63E-06	3.63E-06	5.47E-06	5.95E-06
I-129	4.65E-07	3.13E-04	1.68	3.63E-07	4.13E-07	5.24E-07	6.03E-07
Cs-134	3.50E-06	2.35E-03	12.6	2.03E-06	2.75E-06	4.25E-06	4.99E-06
Cs-137	0.240	161	8.66E+05	0.213	0.225	0.254	0.274
Ba-137m	0.227	152	8.19E+05	0.188	0.188	0.240	0.253

Table A3-2. Historical Tank Inventory Estimate.[1,2] (5 sheets)

Total Inventory Estimate							
Radiological Constituents	Ci/L	μCi/g	Ci[3]	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
Sm-151	1.16E-02	7.79	4.19E+04	8.44E-03	8.44E-03	1.28E-02	1.38E-02
Eu-152	4.46E-06	2.99E-03	16.1	3.34E-06	3.34E-06	4.99E-06	5.52E-06
Eu-154	6.29E-04	0.422	2.27E+03	4.03E-04	4.03E-04	7.10E-04	7.47E-04
Eu-155	2.66E-04	0.179	961	2.00E-04	2.00E-04	2.99E-04	3.31E-04
Ra-226	1.46E-10	9.78E-08	5.25E-04	1.18E-10	1.18E-10	1.56E-10	1.66E-10
Ra-228	3.08E-07	2.07E-04	1.11	8.87E-08	8.87E-08	3.40E-07	3.74E-07
Ac-227	8.78E-10	5.89E-07	3.17E-03	7.15E-10	7.15E-10	9.36E-10	9.93E-10
Pa-231	3.79E-09	2.54E-06	1.37E-02	2.88E-09	2.88E-09	4.11E-09	4.43E-09
Th-229	7.16E-09	4.81E-06	2.58E-02	2.08E-09	2.08E-09	7.85E-09	8.59E-09
Th-232	3.29E-08	2.21E-05	0.119	5.73E-09	5.73E-09	4.03E-08	4.75E-08
U-232	9.37E-07	6.30E-04	3.38	7.24E-07	8.14E-07	1.08E-06	1.23E-06
U-233	3.59E-06	2.41E-03	13.0	2.78E-06	3.12E-06	4.13E-06	4.71E-06
U-234	6.08E-07	4.08E-04	2.19	5.88E-07	6.00E-07	6.16E-07	6.23E-07
U-235	2.41E-08	1.62E-05	8.71E-02	2.33E-08	2.38E-08	2.45E-08	2.48E-08
U-236	1.96E-08	1.31E-05	7.05E-02	1.90E-08	1.93E-08	1.98E-08	2.00E-08
U-238	8.34E-07	5.60E-04	3.01	8.15E-07	8.26E-07	8.42E-07	8.68E-07
Np-237	8.40E-07	5.64E-04	3.03	6.67E-07	7.51E-07	9.38E-07	1.07E-06
Pu-238	1.40E-06	9.39E-04	5.05	1.20E-06	1.30E-06	1.50E-06	1.60E-06
Pu-239	5.00E-05	3.36E-02	181	4.48E-05	4.74E-05	5.27E-05	5.52E-05

Table A3-2. Historical Tank Inventory Estimate.[1,2] (5 sheets)

Total Inventory Estimate								
Radiological Constituents (Cont'd)	Ci/L	μCi/g	Ci[3]	-95 CI (Ci/L)	-67 CI (Ci/L)	+67 CI (Ci/L)	+95 CI (Ci/L)
Pu-240	8.47E-06	5.69E-03	30.6	7.51E-06	7.98E-06	8.97E-06	9.44E-06
Pu-241	9.75E-05	6.55E-02	352	8.37E-05	9.05E-05	1.05E-04	1.11E-04
Pu-242	5.19E-10	3.49E-07	1.87E-03	4.37E-10	4.77E-10	5.61E-10	6.02E-10
Am-241	5.47E-05	3.68E-02	197	4.51E-05	4.98E-05	5.96E-05	6.43E-05
Am-243	2.01E-09	1.35E-06	7.26E-03	1.63E-09	1.81E-09	2.25E-09	2.46E-09
Cm-242	1.48E-07	9.97E-05	0.536	1.03E-07	1.03E-07	1.69E-07	1.89E-07
Cm-243	1.36E-08	9.11E-06	4.89E-02	9.18E-09	9.18E-09	1.54E-08	1.72E-08
Cm-244	1.10E-07	7.39E-05	0.397	6.48E-08	6.48E-08	1.25E-07	1.35E-07
Totals		μg/g	kg	-95 CI	-67 CI	+67 CI	+95 CI
Pu	6.04E-04 (g/L)	----	2.18	5.06E-04	5.54E-04	6.54E-04	7.02E-04
U	6.82E-03 (*M*)	1.09E+03	5.86E+03	6.59E-03	6.73E-03	6.93E-03	7.00E-03

Notes:

[1]Agnew et al. (1997b)
[2]These predictions have not been validated and should be used with caution.
[3]Differences exist among the inventories in this column and the inventories calculated from the two sets of concentrations.
[4]Unknowns in tank solids inventory are assigned by the TLM.
[5]Volume average for density, mass average water weight percent, and TOC weight percent carbon.

A4.1 SURFACE-LEVEL READINGS

A Food Instrument Corporation gauge, in the automatic mode, was used to monitor the waste surface level in tank 241-A-101 until May 10, 1982. A manual tape was used to monitor the waste surface level in tank 241-A-101 until July 3, 1995. A manual ENRAF™ system was used to begin taking readings on September 12, 1995 through riser 6. On November 25, 1996, the waste surface level was 876 cm (345 in.), as measured by the manual ENRAF™ system. A graphical representation of the volume measurements is presented as a level history graph in Figure A4-1.

A4.2 DRY WELL READINGS

Tank 241-A-101 has 11 dry wells. Dry wells 10-01-04, 10-01-16, and 10-01-28 (all active before 1990, current readings >200 c/s) have readings greater than 50 c/s background radiation. An occurrence report was issued in July 1980 due to an increase of activity in dry well 10-01-04. The source of activity for dry wells 10-01-04 and 10-01-16 was attributed to contamination leaching into the soil around the 241-A-01B pit area (Brevick et al. 1996).

A4.3 INTERNAL TANK TEMPERATURES

Tank 241-A-101 contains three thermocouple trees located in risers 2, 10, and 12. The thermocouple tree located in riser 12, with 18 thermocouples to monitor the waste temperature, is the only operable thermocouple tree. Temperature data recorded from October 24, 1976 to November 18, 1996 were obtained from the Surveillance Analysis Computer System (SACS). The average temperature from the SACS data is 58.3 °C (136.9 °F), the minimum is 20.7 °C (69.3 °F), and the maximum is 82.2 °C (180 °F).

The average tank 241-A-101 temperature from the SACS data over the last year (November 1995 through November 1996) was 56.5 °C (133.7 °F), the minimum was 20.7 °C (69.3 °F), and the maximum was 68.61 °C (155.5 °F). The high temperature on November 18, 1996 was 64.56 °C (148.2 °F) on thermocouple 9 (located in the waste) and the minimum was 36.3 °C (97.4 °F) on thermocouple 18 (located in the headspace). A graph of the weekly high temperatures can be found in Figure A4-2. Plots of the individual thermocouple readings can be found in Brevick et al. (1996).

A4.4 TANK 241-A-101 PHOTOGRAPHS

The August 1985 photographic montage of tank 241-A-101's interior shows a dry and solid surface of saltcake. Various pieces of equipment and risers that are identifiable have been labeled on the montage. The waste level has not changed since the photographs were taken; therefore, this photographic montage should accurately represent the current appearance of the tank's waste.

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

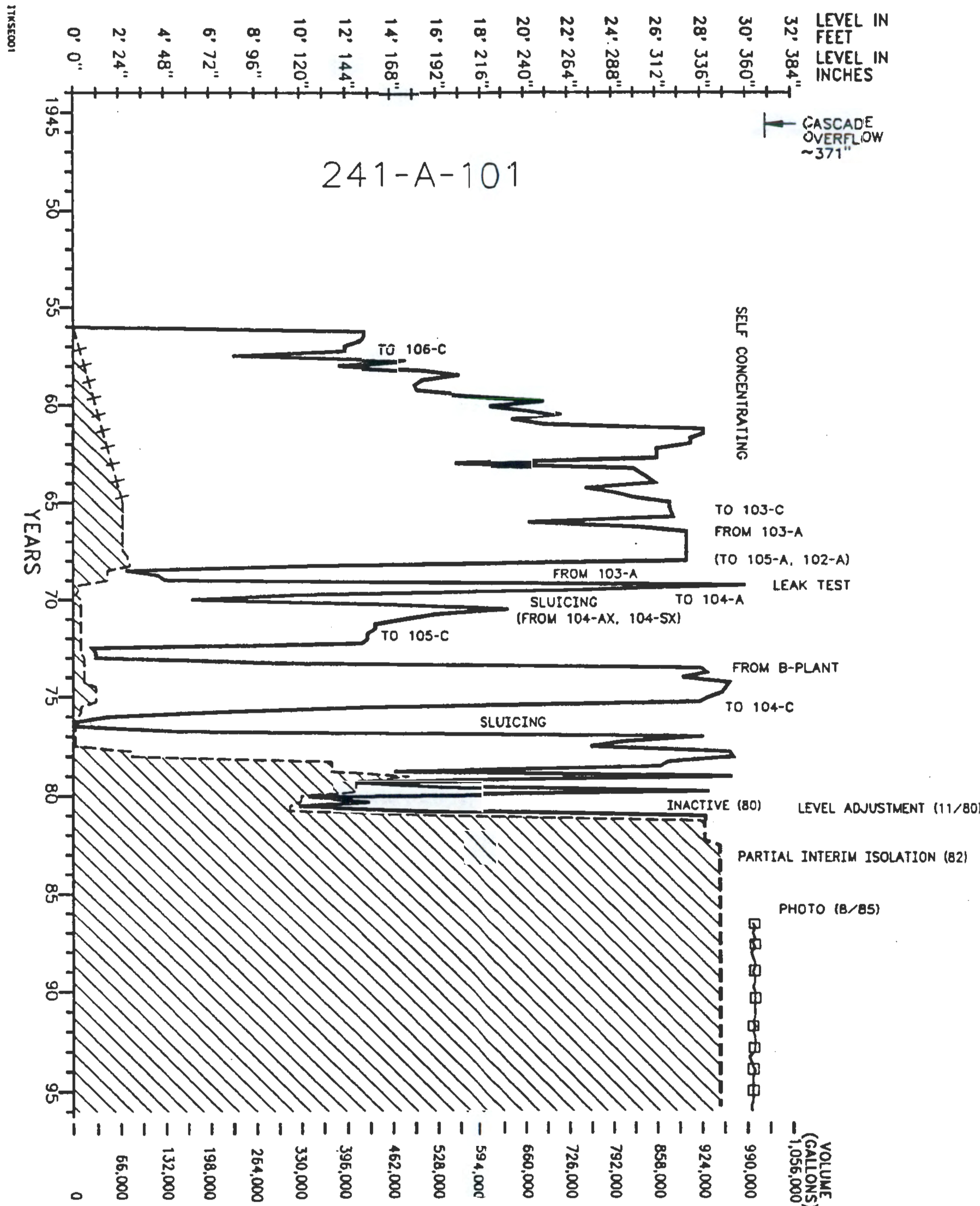
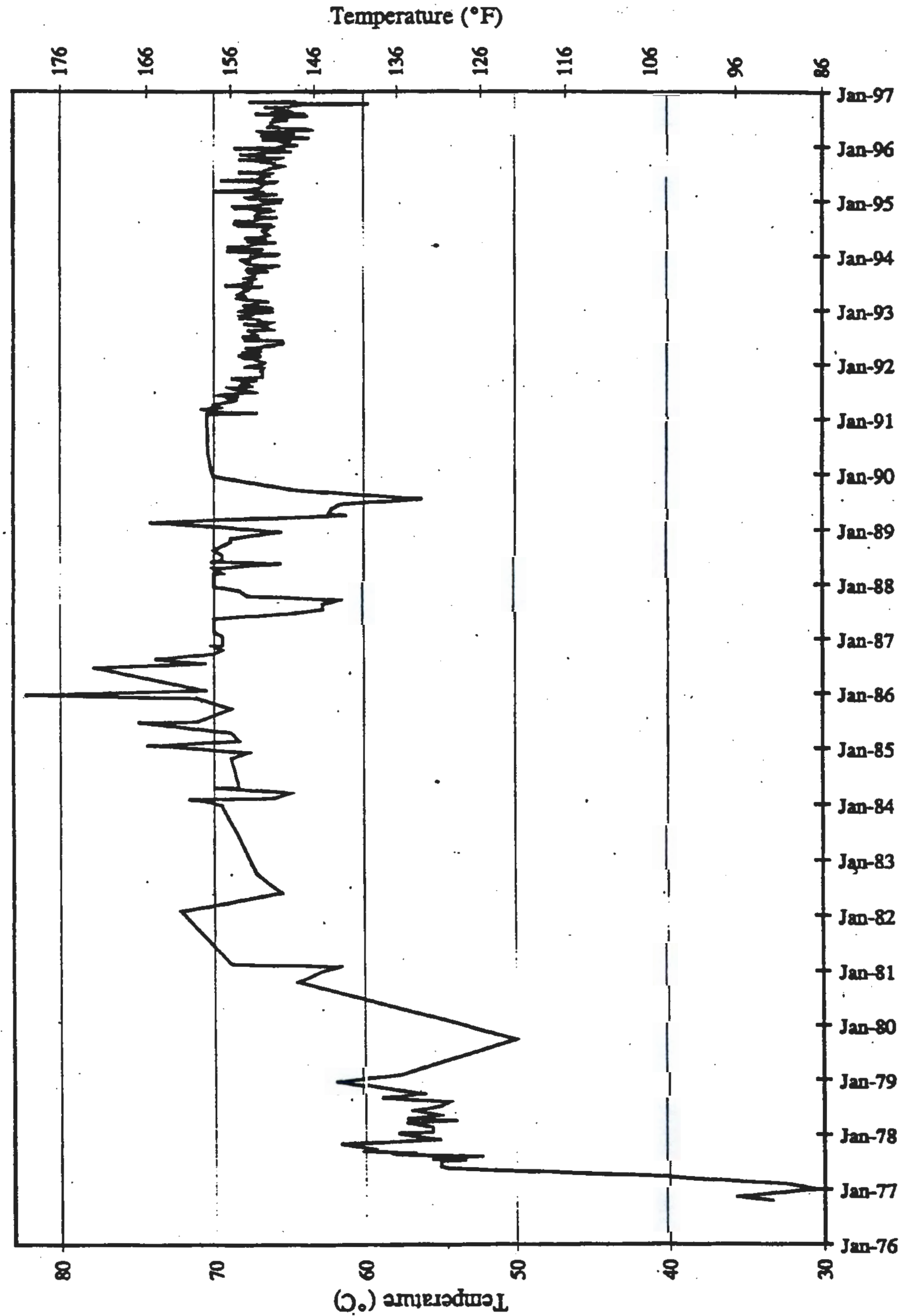


Figure A4-2. Tank 241-A-101 Weekly High Temperature Plot.



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APPENDIX B

SAMPLING OF TANK 241-A-101

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APPENDIX B

SAMPLING OF TANK 241-A-101

Appendix B provides sampling and analysis information for each known sampling event for tank 241-A-101 and provides an assessment of results.

- **Section B1:** Tank Sampling Overview
- **Section B2:** Sampling Events
  - B2.1 1996 Push Core
  - B2.2 1996 Grab Sample
  - B2.3 1995 Vapor Sample
  - B2.4 Historical Samples
- **Section B3:** Assessment of Characterization Results
- **Section B4:** Appendix B References

Future sampling of tank 241-A-101 will be appended to the above list.

B1.0 TANK SAMPLING OVERVIEW

This section describes the sampling and analysis events for tank 241-A-101. Push core samples were taken in July 1996 to satisfy the requirements of the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), *Flammable Gas Tank Safety Program Data Requirements for Core Sampling Analysis* (Cash 1996a), *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue* (Turner et al. 1995), the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1996), *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Fowler 1995), and *Strategy for Sampling Hanford Site Tanks for Development of Disposal Technology* (Kupfer et al. 1995). Sampling and analyses were performed in accordance with the *Tank 241-A-101 Push Core Sampling and Analysis Plan* (Field 1996b).

Three grab samples were taken in April 1996 to satisfy requirements for *Data Quality Objectives for Tank Farms Waste Compatibility Program* (Fowler 1995). Sampling and analyses were performed in accordance with the *Compatibility Grab Sample and Analysis Plan* (Field 1996a).

Vapor samples were taken in June 1995 to satisfy the *Data Quality Objectives for Tank Hazardous Vapor Screening* (Osborne and Buckley 1995) and the organic solvents issue

(DOE-RL 1996 and Cash 1996b). Sampling and analysis were performed in accordance with the vapor sampling and analysis plan (Homi 1995).

Sampling and analytical requirements from the safety screening, historical and vapor screening DQOs are summarized in Table B1-1.

Table B1-1. Integrated Requirements for Tank 241-A-101.[1]

Sampling Event	Applicable DQOs	Sampling Requirements	Applicable References
Push mode core sampling	Safety screening - Energetics - Moisture content - Total alpha - Flammable gas	Core samples from a minimum of two risers separated radially to the maximum extent possible.	Dukelow et al. (1995)
	Flammable gas	Combustible gas measurement	Cash (1996a)
	Organic		Cash (1996b)
	Historical		Simpson and McCain (1996)
	Compatibility		Fowler (1995)
Grab sampling	Compatibility	Grab samples	Fowler (1995)
Vapor sampling	Hazardous vapor	Steel canisters, triple sorbent traps, sorbent trap systems	Osborne and Buckley (1995)
	Organic solvents		DOE-RL (1996) and Cash (1996b)

Note:

[1]Winkelman (1996)

B2.0 TANK 241-A-101 SAMPLING EVENTS

Sampling events are described in this section. Analytical results are presented in Tables B2-10 through B2-129. The 1995 vapor sample and 1996 core sample analytical results were used to characterize current tank contents. Historical sample results are presented in Section 2.4.

B2.1 1996 PUSH CORE SAMPLING EVENT

Two cores of 19 segments each were recovered from tank 241-A-101 during the July 1996 sampling event.

Core 154, riser 15 was sampled from July 11 to July 18, 1996. Nineteen segments were retrieved with 94 percent recovery. Malfunctions occurred during sampling of segments 11 and 19 of this core. Liquids retrieved for both of these segments were primarily hydrostatic head fluid (HHF). During sampling, flammable gas readings in the drill string exceeded the operating limit of 5 percent of the LFL, requiring argon gas purges to stay within procedural LFL limits. Retained gas samples were taken for segments 5, 8 and 12. X-rays were obtained for each of these segments during sampling. Segment 19 was also taken as an RGS sample, but was extruded and analyzed as a routine sample because of sampling problems encountered.

Core 156, riser 24 samples were obtained from July 22 to July 25, 1996. Nineteen segments were retrieved, with 94 percent recovery. Flammable gas readings in the drill string were even higher than for core 154, and required frequent argon gas purges to stay within procedural LFL limits. Lower flammability limit readings in the drill string reached as high as 24 percent during sampling of segment 12. Segments 2, 9, 16 and 19 were RGS samples; sampling X-rays were obtained for each of these segments.

In addition to segment samples, a field blank obtained during the sampling operation and a lithium bromide blank were sent to the 222-S Laboratory for analysis.

B2.1.1 Sample Handling

Two cores were received by the 222-S Laboratory between July 16 and August 21, 1996. Retained gas samples were extruded by the Process Chemistry and Statistical Analysis Group. The samples were extruded between July 24 and August 26, 1996. The sample numbers were 96-297 to 96-315 for core 154 and 96-336 to 96-354 for core 156. No liner liquid was collected for any of the samples. Drainable liquid made up most of the sample for segments 11 through 19 for both cores and segment 10 of core 156. Segments 1 through 9 of both cores contained solids classified as moist salt and no drainable liquid.

Table B2-1 describes cores 154 and 156, including segment numbers, phase (solid or liquid), color, texture, and amount of material recovered.

B2.1.2 Sample Analysis

Samples/subsamples from core 154 and core 156 were analyzed based on safety screening, organic, flammable gas, historical, and compatibility DQOs. Analyses included: total alpha activity, energetics, water content, flammable gas, TOC, total inorganic carbon (TIC), bulk density, IC, ICP, and gamma energy analysis (GEA). Samples were separated for analysis at the half-segment level where both drainable liquid and solids were present.

Solids analyses were performed by the laboratory on homogenized samples, and liquids were measured directly. Weight percent water was determined by thermogravimetric analysis (TGA). The fuel content of the waste was determined by differential scanning calorimetry (DSC). Metals were measured using inductively coupled plasma spectroscopy (ICP); before analysis the subsamples were prepared by both a fusion and an acid digestion. Anions were measured on water-leached samples using ion chromatography (IC). Total organic carbon was measured using hot persulfate oxidation and coulometry. Total alpha activity and gamma energy analyses were performed on fusion-digested samples. Density was measured using centrifugation. Table B2-2 provides further information regarding the various laboratory procedures used in the analysis of these samples. Composite samples were analyzed for core 154 only.

A summary of the segments, segment portions, individual sample numbers, and the analyses performed on each sample is included in Table B2-3.

B2.1.3 1996 Push Core Analytical Results

This section summarizes the sampling and analytical results associated with the August/September 1996 push core sampling and analysis of tank 241-A-101. The total alpha activity, percent water, energetics, IC, and ICP analytical results associated with this tank are presented in Table B2-4. These results are documented in Steen (1997).

Table B2-1. Sample Description.[1] (4 sheets)

Segment	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
Core 154, Riser 15				
1	96-297	80.7	Upper half	Extruded 28 cm of yellowish-brown solids. The upper 13 cm resembled a dry salt and the lower 15 cm resembled a moist salt.
		176	Lower half	
2	96-298	186	Upper half	Extruded 43 cm of dark grey solids resembling a moist salt.
		202	Lower half	
3	96-299	222	Upper half	Extruded 48 cm of dark grey solids resembling a moist salt.
		205	Lower half	
4	96-300	225	Upper half	Extruded 48 cm of dark grey solids resembling a moist salt.
		197	Lower half	
5	96-301	n/a	n/a	RGS
6	96-302	203	Upper half	Extruded 43 cm of dark grey solids resembling a moist salt.
		203	Lower half	
7	96-303	198	Upper half	Extruded 48 cm of dark grey solids resembling a moist salt.
		213	Lower half	
8	96-304	n/a	n/a	RGS
9	96-305	162	Upper half	Extruded 48 cm of dark grey solids resembling a moist salt.
		226	Lower half	
10	96-306	98	Upper half	Extruded 36 cm of light gray solids resembling a salt slurry. Less than 5 mL of yellow opaque liquid was subsampled with the solids.
		159	Lower half	
11	96-307	58	Drainable liquid	Extruded approximately 60 mL of colorless and opaque liquid (HHF fluid). No organic layer was observed.
12	96-308	n/a	n/a	RGS
13	96-309	314	Drainable liquid	Extruded 14 cm of white solids resembling a salt slurry. Collected approximately 230 mL of yellow and opaque liquid. No organic layer was observed.
		90.5	Lower half	

Table B2-1. Sample Description.[1] (4 sheets)

Segment	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
Core 154, Riser 15 (Cont'd)				
14	96-310	248	Drainable liquid	Extruded 8 cm of white solids resembling a salt slurry. Collected approximately 175 mL of yellow and opaque liquid. No organic layer was observed.
		52.1	Lower half	
15	96-311	287	Drainable liquid	Extruded 10 cm of white solids resembling a salt slurry. Collected approximately 200 mL of yellow and opaque liquid. No organic layer was observed.
		135	Lower half	
16	96-312	298	Drainable liquid	Extruded 17 cm of white solids resembling a salt slurry. Collected approximately 205 mL of yellow and opaque liquid. No organic layer was observed.
		133	Lower half	
17	96-313	289	Drainable liquid	Extruded an unmeasurable amount of white solids resembling a salt slurry. Collected approximately 300 mL of white and opaque liquid. No organic layer was observed. (HHF contamination was found)
		0	Lower half	
18	96-314	324	Drainable liquid	Extruded 13 cm of white solids resembling a salt slurry. Collected approximately 230 mL of yellow and opaque liquid. No organic layer was observed.
		114	Lower half	
19	96-315	48.0	Drainable liquid	Extruded 8 cm of white solids resembling a salt slurry. Collected approximately 230 mL of green and opaque liquid. No organic layer. (HHF contamination was found)
		87.4	Lower half	

Table B2-1. Sample Description.[1] (4 sheets)

Segment	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
Core 156, Riser 24				
1	96-336	33.3	Lower half	Extruded 3 cm of green-brown solids resembling a salt slurry. Collected approximately 5 mL of green-brown and opaque liquid, subsampled with the solids. No organic layer was observed.
2	96-337	n/a	n/a	RGS
3	96-338	214	Upper half	Extruded 48 cm of dark gray solids resembling a moist salt.
		212	Lower half	
4	96-339	217	Upper half	Extruded 46 cm of gray solids resembling a moist salt.
		204	Lower half	
5	96-340	197	Upper half	Extruded 46 cm of dark gray solids resembling a moist salt.
		212	Lower half	
6	96-341	226	Upper half	Extruded 48 cm of dark gray solids resembling a moist salt.
		194	Lower half	
7	96-342	214	Upper half	Extruded 41 cm of light to dark gray solids resembling a moist salt.
		140	Lower half	
8	96-343	189	Upper half	Extruded 48 cm of gray solids resembling a moist salt.
		180	Lower half	
9	96-344	n/a	n/a	RGS
10	96-345	134	Upper half	Extruded 18 cm of white to gray solids resembling a salt slurry. Collected approximately 110 mL of yellow and opaque liquid. No organic layer was observed.
		17.9	Lower half	
		164	Drainable liquid	
11	96-346	323	Drainable liquid	Extruded 13 cm of white solids resembling a salt slurry. Collected approximately 230 mL of green and opaque liquid. No organic layer was observed.
		96.3	Lower half	

Table B2-1. Sample Description.[1] (4 sheets)

Segment	Sample ID	Weight (g)	Sample Portion	Sample Characteristics
Core 156, Riser 24 (Cont'd)				
12	96-347	306	Drainable liquid	Extruded 5 cm of white solids resembling a salt slurry. Collected approximately 230 mL of green and opaque liquid. No organic layer was observed.
		101	Lower half	
13	96-348	351	Drainable liquid	Extruded 13 cm of white solids resembling a salt slurry. Collected approximately 250 mL of green and opaque liquid. No organic layer was observed.
		69.9	Lower half	
14	96-349	348	Drainable liquid	Extruded 9 cm of white solids resembling a salt slurry. Collected approximately 245 mL of yellow and opaque liquid. No organic layer was observed.
		82.7	Lower half	
15	96-350	336	Drainable liquid	Extruded 5 cm of white solids resembling a salt slurry. Collected approximately 240 mL of green and opaque liquid. No organic layer was observed.
		81.2	Lower half	
16	96-351	n/a	n/a	RGS
17	96-352	345	Drainable liquid	Extruded 3 cm of white solids resembling a salt slurry. Collected approximately 250 mL of green and opaque liquid. No organic layer was observed.
		65.6	Lower half	
18	96-353	283	Drainable liquid	Extruded 18 cm of white to light gray solids resembling a salt slurry. Collected approximately 200 mL of green and opaque liquid. No organic layer was observed.
		118	Lower half	
19	96-354	n/a	n/a	RGS

Note:

[1]Steen (1997)

Table B2-2. Analytical Procedures[1].

Analysis	Method	Procedure Number
Energetics by DSC	Mettler[2] Perkin-Elmer[3]	LA-514-113 LA-514-114
Percent water by TGA	Mettler[2] Perkin-Elmer[3]	LA-560-112 LA-514-114
Total alpha activity	Alpha proportional counter	LA-508-101
Flammable gas	Combustible gas analyzer	WHC-IP-0030 IH 1.4 and IH-2.1[4]
TOC/TIC	Coulometer	LA-342-100
Metals by ICP/AES	Inductively coupled plasma spectrometer	LA-505-151 LA-505-161
Anions by IC	Ion chromatograph	LA-533-105
Radionuclides	GEA	LA-548-121
Uranium	Kinetic phosphorescence	LA-925-009
^{90}Sr	Beta proportional counter	LA-220-101
Total beta activity	Beta proportional counter	LA-508-101
Hydroxide	Titration	LA-661-102
pH	Direct	LA-212-102
Bulk density	Gravimetry	LO-160-103

Notes:

AES = atomic emission spectroscopy
n/a = not applicable

[1]Field (1996b)

[2]Mettler is registered trademark of Mettler Electronics, Anaheim, California.

[3]Perkin-Elmer is a registered trademark of Perkins Research and Manufacturing Company, Inc., Canoga Park, California.

[4]Safety Department Administrative Manuals, Westinghouse Hanford Company, Richland, Washington:
IH 1.4, Industrial Hygiene Direct Reading Instrument Survey
IH 2.1, Standard Operating Procedure, MSA Model 260 Combustible Gas and Oxygen Analyzer

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 154			
Field blank	Drainable liquid	S96T004654 S96T004670 S96T004674	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
1	Upper half	S96T004663 S96T004691 S96T004711 S96T004717 S96T004723 S96T004677	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004656 S96T004689 S96T004705 S96T004707 S96T004709 S96T004678	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
2	Upper half	S96T004664 S96T004693 S96T004713 S96T004719 S96T004725 S96T004679	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004657 S96T004697 S96T004729 S96T004735 S96T004741 S96T004680	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 154 (Cont'd)			
3	Upper half	S96T004665 S96T004692 S96T004712 S96T004718 S96T004724 S96T004681	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004658 S96T004690 S96T004706 S96T004708 S96T004710 S96T004682	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
4	Upper half	S96T004666 S96T004694 S96T004714 S96T004720 S96T004726 S96T004683	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004659 S96T004698 S96T004730 S96T004736 S96T004742 S96T004684	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha/beta, ^{90}Sr, U ICP (acid digest) IC (water digest) Archive
5	RGS		
6	Upper half	S96T004667 S96T004695 S96T004715 S96T004721 S96T004727 S96T004685	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004660 S96T004699 S96T004731 S96T004737 S96T004743 S96T004686	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 154 (Cont'd)			
7	Upper half	S96T004053 S96T004067 S96T004069 S96T004070 S96T004071 S96T004068	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004051 S96T004074 S96T004086 S96T004093 S96T004100 S96T004079	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
8	RGS		
9	Upper half	S96T004668 S96T004696 S96T004716 S96T004722 S96T004728 S96T004687	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004661 S96T004700 S96T004732 S96T004738 S96T004744 S96T004688	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
10	Upper half	S96T004054 S96T004072 S96T004087 S96T004094 S96T004101 S96T004080	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004055 S96T004073 S96T004088 S96T004095 S96T004102 S96T004081	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 154 (Cont'd)			
11	Drainable liquid	S96T004052 S96T004110 S96T004109	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
12	RGS		
13	Drainable liquid	S96T004060 S96T004115 S96T005327 S96T004111	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG ^{241}Am, GEA, ^{239}Pu, ^{90}Sr, OH, pH Archive
	Lower half	S96T004056 S96T004075 S96T004089 S96T004096 S96T004103 S96T004082	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
14	Drainable liquid	S96T004060 S96T004115 S96T004111	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
	Lower half	S96T004057 S96T004076 S96T004090 S96T004097 S96T004104 S96T004083	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
15	Drainable liquid	S96T004062 S96T004117 S96T005328 S96T004113	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG ^{241}Am, GEA, ^{239}Pu, ^{90}Sr, OH, pH Archive
	Lower half	S96T004058 S96T004077 S96T004091 S96T004098 S96T004105 S96T004084	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 154 (Cont'd)			
16	Drainable liquid	S96T004063 S96T004118 S96T004114	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
	Lower half	S96T004059 S96T004078 S96T004092 S96T004099 S96T004106 S96T004085	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
17	Drainable liquid	S96T004520 S96T004671 S96T005329 S96T004675	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG ^{241}Am, GEA, ^{239}Pu, ^{90}Sr, OH, pH Archive
18	Drainable liquid	S96T004655 S96T004669 S96T004673	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
	Lower half	S96T004062 S96T004702 S96T004733 S96T004739 S96T004745 S96T004704	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
19	Drainable liquid	S96T004521 S96T004672 S96T004676	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
	Lower half	S96T004522 S96T004701 S96T004734 S96T004740 S96T004746 S96T004703	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha, ^{90}Sr, U ICP (acid digest) IC (water digest) Archive
HHF	HHF	S96T004015	IC, ICP

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 156			
1	Lower half	S96T004532 S96T004533 S96T004594 S96T004597 S96T004600 S96T004562	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
2	RGS	RGS	
3	Upper half	S96T004454 S96T004536 S96T004603 S96T004610 S96T004617 S96T004563	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004453 S96T004534 S96T004595 S96T004598 S96T004601 S96T004564	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
4	Upper half	S96T004524 S96T004537 S96T004604 S96T004611 S96T004618 S96T004565	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004523 S96T004538 S96T004624 S96T004634 S96T004644 S96T004566	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 156 (Cont'd)			
5	Upper half	S96T004455 S96T004539 S96T004605 S96T004612 S96T004619 S96T004567	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004456 S96T004540 S96T004625 S96T004635 S96T004645 S96T004568	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
6	Upper half	S96T004526 S96T004541 S96T004606 S96T004613 S96T004620 S96T004569	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004525 S96T004542 S96T004626 S96T004636 S96T004646 S96T004570	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
7	Upper half	S96T004458 S96T004543 S96T004607 S96T004614 S96T004621 S96T004571	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004457 S96T004535 S96T004596 S96T004599 S96T004602 S96T004572	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 156 (Cont'd)			
8	Upper half	S96T004459 S96T004544 S96T004608 S96T004615 S96T004622 S96T004573	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004460 S96T004545 S96T004627 S96T004637 S96T004647 S96T004574	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
9	RGS	RGS	
10	Upper half	S96T004528 S96T004546 S96T004609 S96T004616 S96T004623 S96T004575	Density DSC, TGA, TIC/TOC Fusion, GEA ICP (acid digest) IC (water digest) Archive
	Lower half	S96T004527 S96T004547 S96T004628 S96T004638 S96T004648 S96T004576	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
	Drainable liquid	S96T004530 S96T004582 S96T004588	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
11	Drainable liquid	S96T004466 S96T004583 S96T004589	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
	Lower half	S96T004461 S96T004548 S96T004629 S96T004639 S96T004649 S96T004577	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 156 (Cont'd)			
12	Drainable liquid	S96T004467	Filter
		S96T004584	DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG
		S96T004590	Archive
	Lower half	S96T004462	Density
		S96T004549	DSC, TGA, TIC/TOC
		S96T004630	Fusion, GEA, alpha
		S96T004640	ICP (acid digest)
		S96T004650	IC (water digest)
		S96T004578	Archive
13	Drainable liquid	S96T004275	Filter
		S96T004289	DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG
		S96T005330	^{241}Am GEA, ^{239}Pu, ^{90}Sr, OH, pH
		S96T004291	Archive
	Lower half	S96T004277	Density
		S96T004279	DSC, TGA, TIC/TOC
		S96T004283	Fusion, GEA, alpha
		S96T004285	ICP (acid digest)
		S96T004287	IC (water digest)
		S96T004281	Archive
14	Drainable liquid	S96T004531	Filter
		S96T004585	DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG
		S96T005591	Archive
	Lower half	S96T004529	Density
		S96T004550	DSC, TGA, TIC/TOC
		S96T004631	Fusion, GEA, alpha
		S96T004641	ICP (acid digest)
		S96T004651	IC (water digest)
		S96T004579	Archive
15	Drainable liquid	S96T004468	Filter
		S96T004586	DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG
		S96T005331	^{241}Am GEA, ^{239}Pu, ^{90}Sr, OH, pH
		S96T004592	Archive
	Lower half	S96T004464	Density
		S96T004551	DSC, TGA, TIC/TOC
		S96T004632	Fusion, GEA, alpha
		S96T004642	ICP (acid digest)
		S96T004652	IC (water digest)
		S96T004580	Archive

Table B2-3. Sample Analyses Summary.[1] (10 Sheets)

Segment	Segment Portion	Sample Number	Analyses
Core 156 (Cont'd)			
16	RGS		
17	Drainable liquid	S96T004469 S96T004587 S96T005332 S96T004593	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG ^{241}Am GEA, ^{239}Pu, ^{90}Sr, OH, pH Archive
	Lower half	S96T004465 S96T004552 S96T004633 S96T004643 S96T004653 S96T004581	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
18	Drainable liquid	S96T004276 S96T004290 S96T004292	Filter DSC, TGA, TIC/TOC, alpha, IC, ICP, SpG Archive
	Lower half	S96T004278 S96T004280 S96T004284 S96T004286 S96T004288 S96T004282	Density DSC, TGA, TIC/TOC Fusion, GEA, alpha ICP (acid digest) IC (water digest) Archive
19	RGS	RGS	

Notes:

SpG = specific gravity

[1]Steen (1997)

Table B2-4. Analytical Presentation Tables.

Analysis	Table number
Metals by ICP	B2-10 through B2-33
Anions by IC	B2-34 through B2-41
Hydroxide	B2-42
TIC	B2-43
TOC	B2-44
Radionuclides	B2-45 through B2-50
Percent water	B2-51
pH	B2-52
Bulk density/SpG	B2-53 and B2-54
Differential scanning calorimetry	B2-55

The four quality control (QC) parameters assessed in conjunction with the tank 241-A-101 samples were standard recoveries, spike recoveries, relative percent differences (RPDs), and blanks. Quality control criteria are specified in the sampling and analysis plan (SAP) (Field 1996b). The only QC parameter for which limits are not specified in the SAP is blank contamination. The limits for blanks are set forth in guidelines followed by the laboratory, and all data results presented in this report have met those guidelines. Sample and duplicate pairs in which any of the QC parameters were outside of these limits are footnoted in the sample mean column of the following data summary tables with an "a, b, c, d, e, or f" as follows:

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

B2.1.3.1 Inductively Coupled Plasma. Samples were prepared by acid and water digest. The ICP analyses were performed per procedures LA-505-161 or LA-505-151, depending on the ICP instrument used. Although a full suite of analyses were reported, only aluminum, sodium, and chromium were requested by the historical DQO. Lithium was requested for HHF analysis and iron for compatibility analysis. If data for other metals are to be used, the quality control criteria and raw data should be evaluated. Only 11 of 36 ICP analytes were identified above detection limits. These included: aluminum, boron, calcium, chromium, iron, lithium (from HHF), manganese, phosphorous, silicon, silver and sodium. Spike recoveries outside the required range were reported for Al, Cr, and Na. Serial dilutions may be found in the data tables and are signified by an "L" at the end of the sample number. The percent difference between the serial dilution and the undiluted results was ≤ 10 percent, indicating that the accuracy of the analyses was acceptable (Steen 1997).

Consistently poor spike recoveries (outside of the 75 to 25 percent range) were reported for Al and Na. The poor recoveries were attributed to the high concentration of these analytes in the samples with respect to the amount of spike standard added. A post-digestion spike was performed; the results for Al ranged from 92.5 to 104.3 percent and the results for Na ranged from 87.8 to 106.1 percent.

Occasional preparation blanks showed results above the detection level. The levels of these contaminants in the preparation blanks are inconsequential when compared to the result for the sample and do not impact sample data quality.

B2.1.3.2 Ion Chromatography. Samples for IC were prepared by water digestion and performed in duplicate per procedure LA-533-105. A full suite of analytes are reported. All of the anions were above detection limits. The primary anion in all samples was nitrate.

High RPDs (>20 percent) were reported for several analytes (F, NO_3, SO_4, PO_4) and were attributed to sample inhomogeneity. Several subsamples had spike recoveries outside the 75 to 125 percent range for Cl, F, and NO_3. The chemist noted that the low spike recoveries for F were the result of organic acid interference. The spike failures for NO_3 were due to the high concentration of NO_3 in the sample with respect to the amount of spike standard added. No analytical anomalies were reported for Br. The standard recoveries for these analyses were within the required limits.

B2.1.3.3 Hydroxide. Hydroxide analyses were performed on direct drainable liquid samples using procedure LA-661-102. No anomalies or difficulties were encountered. Sample results ranged from 1.75E+04 to 4.96E+04 μg/g.

B2.1.3.4 Total Inorganic Carbon/Total Organic Carbon. TIC and TOC analyses were performed using procedure LA-342-100. The chemist noted difficulties in the overall analysis of the tank 241-A-101 samples caused by the samples reacting with the reagents used in the method. High RPDs (>20 percent) were reported for 12 subsamples and selected subsamples had rerun or triplicate analyses performed. Consistently poor spike recoveries (outside the 75 to 125 percent range) were reported for the TIC analyses, and two samples failed the spike recovery for TOC. The chemist noted these failures may have been caused by matrix interferences and the high concentration of these analytes with respect to the amount of spike standard added. Sample results for TIC ranged from 761 to 22,900 μg/g and for TOC from 1,000 to 12,500 μg/g.

B2.1.3.5 Total Alpha Activity. Total alpha analyses were performed on a fusion digested sample with an alpha proportional counter according to procedure LA-508-101. All total alpha results were well below the DQO notification limit of 41.0 μCi/g. The maximum total alpha activity result was 0.13 μCi/g (core 156, segment 5), indicating that the potential for a criticality event is extremely low. RPD values for six of the samples exceeded $\pm$20 percent; however, no reruns were requested because all results were well below the notification limit.

B2.1.3.6 Total Beta Activity. Total beta analyses were performed on fusion digested samples using procedure LA-508-101. No analytical problems were encountered. Total beta values ranged from 91.3 to 310 μCi/g.

B2.1.3.7 Radionuclides. Gamma energy analyses were performed on fusion digested samples using procedure LA-548-121. No analytical difficulties were encountered. Four of the radionuclides analyzed were below detection levels: ^{241}Am, ^{154}Eu, ^{155}Eu, and $^{239/240}$Pu. Radionuclides detected were ^{137}Cs and ^{60}Co.

The $^{89/90}$Sr radionuclide was analyzed by a beta proportional counter, using procedure LA-220-101. No difficulties were encountered during the analysis. Solids sample results ranged from 0.04 to 38 μCi/g.

B2.1.3.8 Thermogravimetric Analyses. Thermogravimetric analysis measures the mass of a sample while its temperature is increased at a constant rate. Nitrogen is passed over the sample during heating to remove any released gases. Any decrease in the weight of a sample during TGA represents a loss of gaseous matter from the sample, either 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[302 to 392 °F]) is due to 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.

Weight percent water by TGA was performed by the 222-S Laboratory under a nitrogen purge using procedures LA-560-112 and LA-514-114. Because of the high RPD, reruns were conducted for 6 of the samples.

After reruns, solids results ranged from 11.7 to 46.6 weight percent water with an average of 37.5 percent. Drainable liquid results ranged from 45.9 to 52.9 weight percent water, not including core 154 segments 11, 17, and 19, which were contaminated by tracer fluid.

Section B2.3.4 briefly discusses results for the tracer used to determine whether a sample has been contaminated and provides analytical results.

B2.1.3.9 pH. Liquid sample pH analyses were conducted on direct samples using procedure LA-212-102. No anomalies or difficulties were encountered. Sample results ranged from 12.76 to 13.73, showing that the tank waste is highly alkaline.

B2.1.3.10 Density. Density measurements for solids and specific gravity measurements for liquids were performed on all samples. The mean density for the samples taken was 1.66 g/mL, with a range of 1.54 to 1.75 g/mL. The mean density was used to calculate tank inventory for each analyte. The mean specific gravity for the drainable liquid sample was 1.4 g/mL.

B2.1.3.11 Differential Scanning Calorimetry. The DSC analyses were performed under a nitrogen atmosphere using procedure LA-514-113 and a Mettler™ Model 20 differential scanning calorimeter, and procedure LA-514-114 and Perkin-Elmer™ equipment. No exotherms were observed in excess of the safety screening notification limits. However, small exotherms were observed in a few of the solids and drainable liquid samples. No quality control problems were noted.

B2.1.4 1996 Push Core Retained Gas Sample Results

Retained gas measurement results show three major constituents in the vapor phase: 16 ± 0.9 percent nitrogen, 75 ± 3.8 percent hydrogen and 5.6 ± 0.3 percent nitrous oxide. The remainder of the gas composition is ammonia, methane and other hydrocarbons. The ammonia concentrations in tank 241-A-101 ranged from 3,200 to 16,000 μmole/L of waste (These concentrations should be regarded as lower bounds because they do not account for ammonia lost to condensation.) This translates to approximately 890 m^3 (31,400 ft^3) of ammonia at standard temperature and pressure (STP), more than 99.9 percent of which is dissolved in the waste.

The extraction results show that the insoluble gasses were primarily retained in the upper nonconvective layer. About 14 percent by volume of the nonconvective (upper) layer was filled with retained free gases, while 0.5 percent by volume of the convective (lower) layer was retained gas. Based on these RGS estimates, the inventory of hydrogen at STP was 218 m^3 (7,700 ft^3).

Table B2-56 shows the estimated concentrations of the insoluble and low solubility gases in Tank 241-A-101. Table B2-57 shows the total ammonia concentration per liter of waste under in-tank conditions, and Table B2-58 shows a preliminary estimate of the volume of gas constituents in the nonconvective layer in Tank 241-A-101 at STP. The method for determining these values and additional detail on the RGS samples, analytical methods used and results are presented in Shekkariz et al. (1996).

B2.2 1996 GRAB SAMPLE

B2.2.1 Sample Handling

Three grab samples, 1A-96-1, 1A-96-2 and 1A-96-3, were obtained from riser 4 on April 3, 1996 and received by the Westinghouse Hanford Company 222-S Laboratory on April 4, 1996. Table B2-5 describes each of the three samples, including sample number, depth, phase (solid or liquid), color, texture, and amount of material recovered.

B2.2.2 Sample Analysis

Grab samples from riser 4 were analyzed based on compatibility DQOs. Analyses included: energetics, water content, TOC, TIC, ICP, IC, GEA, pH, OH, SpG, NH_3, $^{239/240}Pu$, ^{90}Sr and ^{241}Am. Supernatant analyses were performed on all samples, but only limited analyses could be performed for sample 1A-96-3 because of the small amount of liquids. Table B2-6 provides information regarding the various laboratory procedures used in the analysis of these samples.

Table B2-5. Sample Description.[1]

Riser/Depth[2]	Sample ID	Sample Portion	Sample Characteristics
4/518	1A-96-1	Whole	Slightly opaque yellow liquid with less than 1% solids. No organic layer was present.
4/1,163	1A-96-2	Whole	Opaque yellow liquid with approximately 30% solids. Solids were dirty white and crystalline with dark, hard chunks. No organic layer was present.
4/1,387	1A-96-3	Whole	Dark gray and wet with a crystalline slurry. The sample was 90% solids with approximately 16 mL of supernatant. No organic layer was present.

Notes:

[1]Steen (1997)

[2]Depth in cm from the baseline of the tank.

Table B2-6. Analytical Procedures[1].

Analysis	Instrument	Procedure Number
Energetics by DSC	Mettler™ Perkin-Elmer™	LA-514-113 LA-514-114
Percent water by TGA	Mettler™	LA-560-112
TOC	Coulometer	LA-344-105
TIC	Coulometer	LA-622-102
Metals by ICP/AES	Inductively coupled plasma spectrometer	LA-505-151 LA-505-161
Anions by IC	Ion chromatograph	LA-533-105
NH_3		LA-631-001
OH	Titration	LA-211-102
pH	H^+	LA-212-106
SpG	Density	LA-510-112
Radionuclides	GEA	LA-548-121
^{241}Am	Alpha proportional counter	LA-953-103
$^{239/240}$Pu	Beta proportional counter	LA-943-128
^{90}Sr	Beta proportional counter	LA-220-101

Notes:

n/a = not applicable

[1]Field (1996a)

Samples 1A-96-2, and 1A-96-3 contained a significant amount of solids, and special analyses were requested. IC and ICP analyses were performed on centrifuged samples for sample 1A-96-3 since it was about 90 percent solids. In addition, portions of all three samples were heated to boiling and cooled to determine if solids would dissolve or form because of temperature differences (Beck 1996). No phase changes were observed as a result of heating or cooling.

A summary of the segments, segment portions, individual sample numbers, and the analyses performed on each sample is included in Table B2-7.

Table B2-7. Sample Analyses Summary.[1]

Grab Sample	Segment Portion	Sample Number[2]	Analyses
1	Supernatant	S96T001831	Appearance, Volume % solids
		S96T002012	DSC, TGA, TIC/TOC, ICP, IC, pH, OH, SpG, NH_3
		S96T002015	GEA:^{137}Cs, $^{239/240}$Pu, ^{90}Sr, ^{241}Am
		S96T002018	Archive
2	Supernatant	S96T001832	Appearance, Volume % solids
		S96T002013	DSC, TGA, TIC/TOC, ICP, IC, pH, OH, SpG, NH_3
		S96T002016	GEA:^{137}Cs, $^{239/240}$Pu, ^{90}Sr, ^{241}Am
		S96T002019	Archive
3	Supernatant	S96T001833	Appearance, Volume % solids
		S96T002014	DSC, TGA, TOC, IC, OH, $^{239/240}$Pu
		S96T002020	Archive
	Centrifuged Solids	S96T002239	ICP acid digest
		S96T002240	IC water digest

B2.2.3 1996 Grab Sample Analytical Results

This section summarizes the sampling and analytical results associated with April grab samples and analysis. Tables containing the percent water, energetics, IC, ICP, radionuclide and other analytical results associated with this tank are identified in Table B2-8. These results are documented in Steen (1996).

Table B2-8. Analytical Presentation Tables.

Analysis	Table number
Percent water	B2-92
Differential scanning calorimetry	B2-89
Summary data for metals by ICP	B2-60 through B2-81
Anions by IC	B2-82 through B2-88
Radionuclides	B2-93 through B2-96
NH_3	B2-98
OH	B2-87
pH	B2-90
SpG	B2-91
TOC	B2-97
TIC	B2-99

The four QC parameters assessed in conjunction with the tank 241-S-109 samples were standard recoveries, spike recoveries, duplicate analyses (RPDs), and blanks. The QC criteria specified in the SAP (Field 1996a) were 80 to 120 percent recovery for standards and spikes and ≤ 20 percent for RPDs. These criteria applied to all of the analytes. The only QC parameter for which limits are not specified in the SAP is blank contamination. The limits for blanks are set forth in guidelines followed by the laboratory, and all data results presented in this report have met those guidelines. Sample and duplicate pairs in which any of the QC parameters were outside of these limits are footnoted in the sample mean column of the following data summary tables with an "a, b, c, d, e or f" as follows:

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

B2.3 VAPOR SAMPLES

During July 1996, core sampling, vapor sniff tests were performed using a combustible gas analyzer. Table B2-9 shows headspace vapor concentrations measured before sampling and ranges of vapor concentrations measured during sampling.

On June 8, 1995, vapor samples were obtained from riser 11. Sampling and analysis were conducted in accordance with *Data Quality Objectives for Tank Hazardous Vapor Screening* (Osborne and Buckley 1995) and the vapor sampling and analysis plan (Homi 1995). Sorbent traps were analyzed by the Pacific Northwest National Laboratory (PNNL) for inorganic gases and vapors by either selective electrode or ion chromatography. Tank headspace canister samples and triple sorbent traps were analyzed by PNNL for organic gases and vapors using gas chromatography/thermal conductivity detection (GC/TCD) and for total non-methane organic compounds using gas chromatography/flame ionization detection (GC/FID).

It was determined that no headspace constituents exceeded the flammability notification limit, but that ammonia and N_2O, measured to be an average 754 ppmv and 218 ppmv, respectively, did exceed the 150 ppmv industrial hygiene notification limit specified in the sampling and analysis plan (Homi 1995). A summary of sample results is included in Table B2-9. Additional results are documented in Huckaby and Bratzel (1995).

Table B2-9. Summary Results of July 1996 Headspace Sniff Tests and June 1995 Vapor Samples. (2 sheets)

Category	Sample Medium	Analyte	Vapor Concentration[2] (ppmv)
Headspace vapor (Before sampling)	Sniff tests	LEL	3%
		O_2	21%
		TOC	34
		NH_3	550
Headspace vapor (Range during sampling)	Sniff tests	LEL	0 - 7%
		O_2	20 - 21%
		TOC	20 - 35
		NH_3	500 - 600
Inorganic analytes[1]	Sorbent traps	NH_3	754 ± 29
		NO	<0.09
		NO_2	<0.01
		H_2O	22.3 ± 0.3 (mg/L)
	SUMMA™ canister	CO_2	<23
		CO	<12
		H_2	758 ± 24
		N_2O	218 ± 1

Table B2-9. Summary Results of July 1996 Headspace Sniff Tests and June 1995 Vapor Samples. (2 sheets)

Category	Sample Medium	Analyte	Vapor Concentration[2] (ppmv)
Organic vapors	SUMMA™ canister or triple sorbent trap[3]	Dichlorodifluoromethane	0.010
		Chloromethane	0.018
		Ethanenitrile (acetonitrile)	0.057
		Propanone (acetone)	0.72
		Trichlorofluoromethane	0.072
		1,1-Dichloroethene	0.0066
		Dichloromethane	0.012
		Propanenitrile	0.019
		Propanol	0.15
		2-Butanone	0.084
		Tetrahydrofuran	0.16
		n-Butanenitrile	0.012
		Benzene	0.013
		n-Heptane	0.020
		Pyridine	0.0085
		Toluene	0.014
Organic vapors	SUMMA™ canister or triple sorbent trap[3]	Tetrachloroethylene	0.013
		1,3 Dimethylbenzene + 1,4 Dimethylbenzene	0.0073

Notes:

[1]Vapor concentrations were determined using sample-volume data provided by Westinghouse Hanford Company and are based on averaged data.

[2]Inorganic analyte concentrations are based on dry-tank air at standard temperature and pressure.

[3]The maximum value for the two types of samples is shown. In general, there was a good comparison between results for SUMMA canisters and triple sorbent traps.

SUMMA is a trademark of Molectrics, Inc. (Cleveland, Ohio).

B2.4 HISTORICAL SAMPLING EVENTS

Eleven sampling events for tank 241-A-101 were identified in historical records from June 25, 1974 through October, 1983. These data have not been validated and should be used with caution.

Analytical results for the 11 sampling events for tank 241-A-101 are located in Tables B2-101 through B2-117. Samples were both supernatant liquids and solids. The most recent samples were a mix of supernatant and solids (i.e., a slurry) taken for waste characterization and tank deactivation. The samples before 1980 appeared to be taken for waste compatibility for use in the 242-A Evaporator.

A brief description of each the sample events follows.

B2.4.1 1983 Sample Events

Two samples were received during October 1993 by Chemical Sciences Group for analyses of waste in tank 241-A-101 (Jansky 1984). The samples were dated as received on October 10 and 11, 1983. The sample numbers for these sample analyses were #7879 and 7898. Each sample was heated to 65 °C (149 °F) for 30 minutes and observed. Aliquots of each were centrifuged and the physical data gathered. Supernatant and dissolved solids were analyzed, as well as an aliquot of the total slurry.

B2.4.2 1980 Sample Events

Three samples were received on November 10, 1980 by the Separations Process Development Unit for characterization of waste in tank 241-A-101 before deactivation and to meet the 1-1-81 Rockwell milestone (Jansky 1980f). The samples were taken from depths of 0.6 m and 1.2 m (2 ft and 4 ft) below the waste surface. The samples were labeled by depth. The 0.6-m and 1.2-m samples were vacuum filtered at 65 °C (149 °F). The slurry solids and filtrate were analyzed. Viscosity for these samples was measured using a Brookfield cup-and-cone microviscometer. The samples taken at 1.2 m (4 ft) were later analyzed for other radionuclides (Jansky 1980d).

The third sample (also labeled as 1.2 m [4 ft] below surface, but taken from approximately 0.45 m [1.5 ft] below the waste surface) contained large grainy particles and was treated identically to the previous two samples. The 0.6-m (2-ft) sample bottle was noted as only half-filled when received. ^{99}Tc analytical results for these samples are reported in Jansky (1981).

A sample was received from tank 241-A-101 on October 22, 1980 for analysis (Jansky 1980d). The data show that the solids were primarily sodium nitrate and sodium carbonate. The high percentage of sodium hydroxide in the solids may be attributed to a large volume of interstitial liquor trapped within the solids.

Two samples were received from tank 241-A-101 and reported on October 13, 1980 (Jansky 1980b). The samples were taken to determine the final product of slurry returned from the 242-A Evaporator. One sample was taken from 0.3 m (1 ft) below the waste surface, and the other from 1.8 m (6 ft) below the waste surface. Both samples contained granular solids that had settled to the bottom of the sample bottle. Both samples were centrifuged and separated for analysis.

Three samples from different depths were received in September, 1980 from tank 241-A-101 for analysis to determine the effects the solids present in the tank may have on the 242-A processing parameters (Jansky 1980c).

In August 1980, two samples (labeled T-2691 and T-2692) were analyzed from tank 241-A-101 to determine waste volume reduction (WVR) in the 242-A Evaporator (Jansky 1980e). A 50-mL composite was prepared for a hot boildown. The dark brown solution made determination of the nucleation point difficult. At 30 percent WVR, a slight color change was noted and at 40 percent WVR the color was even darker. At 50 percent WVR, the sample turned a "pea soup green" color indicating final nucleation. The product was allowed to stand for one hour before aliquots of the mixed product were taken and centrifuged. The supernatant was separated from the solids and both were submitted for analysis.

B2.4.3 1979 Sample Event

Samples from tank 241-A-101 taken October 2, 1979 were analyzed for boildown characteristics and WVR for the 242-A Evaporator (Delegard 1979). The samples were boiled to nucleation at a pressure of 40 torr, allowed to cool to room temperature, then centrifuged with the supernatant and solids analyzed.

B2.4.4 1976 Sample Events

On April 30, 1976, five samples of tank 241-A-101 waste were analyzed for heat generation in the residual sludge (Horton 1976b). The samples were identified as follows: Sample No. 4355 riser 19 north, No. 4365 01B sluice pit, No. 4364 riser 19 south side (did not have enough solids to analyze), No. 4554 riser 19, and No. 4555 riser 20. Analyses were made by fusing a known volume of solids from each sample with KOH, dissolving each melt with concentrated HCl, and diluting each sample to a known volume with water.

A sample was taken from tank 241-A-101 on April 1, 1976 to be analyzed (Horton 1976a). The sample had coarse, granular crystals "like sand" intermixed with small particles and hard chunks about the size of a quarter. The hard chunks would not soften in water. The coarse, granular crystals were grayish in color, while the small particles were reddish brown.

B2.4.5 1974 Sample Events

A sample was taken from tank 241-A-101 on October 14, 1974 to be analyzed. The sample was reddish brown and was to be used for 242-A Evaporator feed evaluation (Wheeler 1974a).

A sample was taken from tank 241-A-101 in June, 1974 (Wheeler 1974b). The sample was dark brown with about five percent solids. The sample was to be used for feed in the 242-A Evaporator.

1996 Push Core Data Tables

Table B2-10. Nondetected ICP Analytes.

Analyte	Maximum Nondetected Value (μg/g)	Analyte	Maximum Nondetected Value (μg/g)
Antimony	<117	Arsenic	<147
Barium	<97.5	Beryllium	<9.7
Bismuth	<195	Cerium	<195
Lanthanum	<97.3	Magnesium	<195
Neodymium	<195	Samarium	<195
Selenium	<185	Strontium	<19.5
Thallium	<389	Titanium	<19.5
Vanadium	<97.3		

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			μg/g	μg/g	μg/g
S96T004707	154:1	Upper half	2.27E+04	2.22E+04	2.24E+04
S96T004707	154:1	Lower half	2.85E+04	2.65E+04	2.75E+04
S96T004719	154:2	Upper half	2.57E+04	2.63E+04	2.60E+04
S96T004735	154:2	Lower half	2.73E+04	2.72E+04	2.72E+04
S96T004718	154:3	Upper half	2.59E+04	2.62E+04	2.60E+04
S96T004708	154:3	Lower half	2.49E+04	2.52E+04	2.50E+04
S96T004720	154:4	Upper half	2.50E+04	2.49E+04	2.50E+04
S96T004736	154:4	Lower half	2.55E+04	2.54E+04	2.54E+04
S96T004721	154:6	Upper half	2.18E+04	2.02E+04	2.10E+04
S96T004737	154:6	Lower half	2.30E+04	2.55E+04	2.42E+04
S96T004070	154:7	Upper half	2.32E+04	2.36E+04	2.34E+04
S96T004093	154:7	Lower half	2.29E+04	2.36E+04	2.32E+04
S96T004722	154:9	Upper half	2.61E+04	2.80E+04	2.70E+04
S96T004738	154:9	Lower half	2.66E+04	2.69E+04	2.68E+04
S96T004094	154:10	Upper half	2.96E+04	3.02E+04	2.99E+04

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			μg/g	μg/g	μg/g
S96T004095	154:10	Lower half	2.80E+04	2.94E+04	2.87E+04
S96T004096	154:13	Lower half	2.32E+04	2.01E+04	2.16E+04
S96T004097	154:14	Lower half	1.68E+04	2.25E+04	1.96E+04
S96T004098	154:15	Lower half	2.52E+04	2.21E+04	2.36E+04
S96T004099	154:16	Lower half	2.19E+04	2.30E+04	2.24E+04
S96T004739	154:18	Lower half	1.24E+04	1.35E+04	1.30E+04
S96T004740	154:19	Lower half	2.90E+04	2.64E+04	2.77E+04
S96T004597	156:1	Lower half	3.27E+04	3.19E+04	3.23E+04
S96T004598	156:3	Lower half	2.54E+04	2.44E+04	2.49E+04
S96T004610	156:3	Upper half	2.49E+04	2.50E+04	2.50E+04
S96T004611	156:4	Upper half	2.52E+04	2.57E+04	2.54E+04
S96T004634	156:4	Lower half	2.51E+04	2.60E+04	2.56E+04
S96T004612	156:5	Upper half	2.47E+04	2.48E+04	2.48E+04
S96T004635	156:5	Lower half	2.65E+04	2.52E+04	2.58E+04
S96T004613	156:6	Upper half	2.51E+04	2.45E+04	2.48E+04
S96T004636	156:6	Lower half	2.35E+04	2.53E+04	2.44E+04
S96T004599	156:7	Lower half	2.45E+04	2.44E+04	2.44E+04
S96T004614	156:7	Upper half	2.42E+04	2.47E+04	2.44E+04
S96T004615	156:8	Upper half	2.35E+04	2.32E+04	2.34E+04
S96T004637	156:8	Lower half	2.63E+04	2.50E+04	2.56E+04
S96T004616	156:10	Upper half	1.72E+04	1.62E+04	1.67E+04
S96T004638	156:10	Lower half	3.15E+04	3.26E+04	3.20E+04
S96T004639	156:11	Lower half	3.67E+04	3.76E+04	3.72E+04
S96T004640	156:12	Lower half	2.30E+04	2.18E+04	2.24E+04
S96T004285	156:13	Lower half	1.76E+04	1.63E+04	1.70E+04
S96T004641	156:14	Lower half	2.68E+04	3.35E+04	3.02E+04
S96T004642	156:15	Lower half	2.35E+04	1.73E+04	2.04E+04
S96T004643	156:17	Lower half	2.14E+04	2.20E+04	2.17E+04
S96T004286	156:18	Lower half	1.70E+04	2.20E+04	1.95E+04
S96T005246	154:Comp	Composite	3.14E+04	3.00E+04	3.07E+04

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Composite	2.66E+04	2.74E+04	2.70E+04
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	122	122	122
S96T004115	154:13	DL	5.50E+04	5.45E+04	5.48E+04[QC:d]
S96T004116	154:14	DL	5.08E+04	5.91E+04	5.50E+04
S96T004117	154:15	DL	5.58E+04	5.33E+04	5.46E+04[QC:d]
S96T004118	154:16	DL	5.92E+04	5.76E+04	5.84E+04
S96T004671	154:17	DL	59.1	60	59.55
S96T004669	154:18	DL	5.28E+04	4.44E+04	4.86E+04
S96T004672	154:19	DL	2.20E+03	2.20E+03	2.20E+03
S96T004582	156:10	DL	4.46E+04	6.63E+04	5.54E+04
S96T004583	156:11	DL	5.86E+04	6.22E+04	6.04E+04
S96T004584	156:11	DL	6.71E+04	6.59E+04	6.65E+04
S96T004289	156:13	DL	5.89E+04	5.29E+04	5.59E+04[QC:d]
S96T004585	156:14	DL	5.72E+04	5.50E+04	5.61E+04
S96T004586	156:15	DL	5.71E+04	4.86E+04	5.28E+04[QC:d]
S96T004587	156:17	DL	5.05E+04	4.55E+04	4.80E+04
S96T004290	156:18	DL	5.66E+04	5.49E+04	5.58E+04

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	<71.5	<70.4	n/a
S96T004707	154:1	Lower half	<72.0	<71.5	n/a
S96T004719	154:2	Upper half	84.6	<70.1	n/a
S96T004735	154:2	Lower half	<73.6	<72.3	n/a
S96T004718	154:3	Upper half	108	<71.3	n/a
S96T004708	154:3	Lower half	28.3	28.2	28.3
S96T004720	154:4	Upper half	29.8	26.4	28.1

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004736	154:4	Lower half	40.1	45.4	42.8
S96T004721	154:6	Upper half	37.2	23.4	30.3
S96T004737	154:6	Lower half	25.2	26.4	25.8
S96T004070	154:7	Upper half	43.4	50.4	46.9
S96T004093	154:7	Lower half	42.6	48.3	45.5
S96T004722	154:9	Upper half	<74.2	<73.9	n/a
S96T004738	154:9	Lower half	103	104	104
S96T004094	154:10	Upper half	46.4	52.0	49.2
S96T004095	154:10	Lower half	41.1	44.6	42.9
S96T004096	154:13	Lower half	101	116	109
S96T004097	154:14	Lower half	122	104	113
S96T004098	154:15	Lower half	131	117	124
S96T004099	154:16	Lower half	124	121	123
S96T004739	154:18	Lower half	106	92.5	99.3
S96T004740	154:19	Lower half	84.6	93	88.8
S96T004597	156:1	Lower half	133	147	140
S96T004598	156:3	Lower half	131	139	135
S96T004610	156:3	Upper half	127	117	122
S96T004611	156:4	Upper half	132	n/a	n/a
S96T004634	156:4	Lower half	132	137	135
S96T004612	156:5	Upper half	140	125	133
S96T004635	156:5	Lower half	134	142	138
S96T004613	156:6	Upper half	128	134	131
S96T004636	156:6	Lower half	138	140	139
S96T004599	156:7	Lower half	129	133	131
S96T004614	156:7	Upper half	133	126	130
S96T004615	156:8	Upper half	140	146	143
S96T004637	156:8	Lower half	131	114	123
S96T004616	156:10	Upper half	142	130	136

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			μg/g	μg/g	μg/g
S96T004638	156:10	Lower half	130	144	137
S96T004639	156:11	Lower half	133	134	134
S96T004640	156:12	Lower half	95.6	133	114
S96T004285	156:13	Lower half	111	120	116
S96T004641	156:14	Lower half	132	145	139
S96T004642	156:15	Lower half	131	127	129
S96T004643	156:17	Lower half	134	134	134
S96T004286	156:18	Lower half	119	165	142
S96T005246	154:Comp	Comp	137	150	144
Solids: water digest			μg/g	μg/g	μg/g
S96T005248	154:Comp	Comp	364	474	419
Liquids			μg/mL	μg/mL	μg/mL
S96T004110	154:11	DL	11.8	11.8	11.8
S96T004115	154:13	DL	58	55	56.5
S96T004116	154:14	DL	51.1	64.2	57.7
S96T004117	154:15	DL	56.8	53.2	55.0
S96T004118	154:16	DL	60.3	56.8	58.6
S96T004671	154:17	DL	5.84	5.86	5.85
S96T004669	154:18	DL	52.1	47.3	49.7
S96T004672	154:19	DL	19.5	19.3	19.4
S96T004582	156:10	DL	37.5	63.5	50.5
S96T004583	156:11	DL	55.1	59.9	57.5
S96T004584	156:11	DL	64.1	64.4	64.3
S96T004289	156:13	DL	58.3	53.8	56.1
S96T004585	156:14	DL	55.3	53.8	54.6
S96T004586	156:15	DL	<60.10	<60.1	n/a
S96T004587	156:17	DL	46.4	47.3	46.9
S96T004290	156:18	DL	59.7	56.2	58.0

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	7.58	9.21	8.40
S96T004707	154:1	Lower half	12.4	11.8	12.1
S96T004719	154:2	Upper half	11.8	11.1	11.5
S96T004735	154:2	Lower half	9.41	20.4	14.9
S96T004718	154:3	Upper half	14.3	14.2	14.3
S96T004708	154:3	Lower half	14.4	14	14.2
S96T004720	154:4	Upper half	15.8	15.2	15.5
S96T004736	154:4	Lower half	12.6	12.8	12.7
S96T004721	154:6	Upper half	14	13.9	14.0
S96T004737	154:6	Lower half	15.8	16.7	16.3
S96T004070	154:7	Upper half	16.3	16.7	16.5
S96T004093	154:7	Lower half	13.5	14.7	14.1
S96T004722	154:9	Upper half	24.9	23.7	24.3
S96T004738	154:9	Lower half	16.2	17.5	16.9
S96T004094	154:10	Upper half	7.26	7.34	7.30
S96T004095	154:10	Lower half	2.97	3.78	3.38
S96T004096	154:13	Lower half	<2.48	<2.46	n/a
S96T004097	154:14	Lower half	<2.53	<2.35	n/a
S96T004098	154:15	Lower half	<2.48	<2.36	n/a
S96T004099	154:16	Lower half	<2.31	<2.28	n/a
S96T004739	154:18	Lower half	<7.11	<7.04	n/a
S96T004740	154:19	Lower half	<2.45	<2.11	n/a
S96T004597	156:1	Lower half	<6.99	<6.93	n/a
S96T004598	156:3	Lower half	13.3	14.7	14.0
S96T004610	156:3	Upper half	20.2	21	20.6
S96T004611	156:4	Upper half	23.8	n/a	n/a
S96T004634	156:4	Lower half	20.3	20.9	20.6
S96T004612	156:5	Upper half	18	18.7	18.4
S96T004635	156:5	Lower half	18.3	14.5	16.4

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			μg/g	μg/g	μg/g
S96T004613	156:6	Upper half	15	13.3	14.2
S96T004636	156:6	Lower half	15.8	16.2	16.0
S96T004599	156:7	Lower half	7.8	8.27	8.04
S96T004614	156:7	Upper half	12.9	11.6	12.3
S96T004615	156:8	Upper half	15.6	14.3	14.0
S96T004637	156:8	Lower half	12.4	11	11.7
S96T004616	156:10	Upper half	<6.96	<7.05	n/a
S96T004638	156:10	Lower half	<6.96	<6.89	n/a
S96T004639	156:11	Lower half	<6.77	<6.49	n/a
S96T004640	156:12	Lower half	<7.05	<7.01	n/a
S96T004285	156:13	Lower half	<3.05	<3.31	n/a
S96T004641	156:14	Lower half	<6.86	<6.83	n/a
S96T004642	156:15	Lower half	<7.24	<7.18	n/a
S96T004643	156:17	Lower half	<7.05	<6.96	n/a
S96T004286	156:18	Lower half	<3.08	<3.03	n/a
S96T005246	154:Comp	Comp	<9.23	<9.73	n/a
Solids: water digest			μg/g	μg/g	μg/g
S96T005248	154:Comp	Comp	<2.86	<3.02	n/a
Liquids			μg/mL	μg/mL	μg/mL
S96T004110	154:11	DL	<0.205	<0.205	n/a
S96T004115	154:13	DL	<3.00	<3.00	n/a
S96T004116	154:14	DL	<3.00	<3.00	n/a
S96T004117	154:15	DL	<3.00	<3.00	n/a
S96T004118	154:16	DL	<3.00	<3.00	n/a
S96T004671	154:17	DL	<0.205	<0.205	n/a
S96T004669	154:18	DL	<3.00	<3.00	n/a
S96T004672	154:19	DL	<1.01	<1.01	n/a
S96T004582	156:10	DL	<3.00	<3.00	n/a
S96T004583	156:11	DL	<3.00	<3.00	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004584	156:11	DL	<3.00	<3.00	n/a
S96T004289	156:13	DL	<3.00	<3.00	n/a
S96T004585	156:14	DL	<3.00	<3.00	n/a
S96T004586	156:15	DL	<6.00	<6.00	n/a
S96T004587	156:17	DL	<3.00	<3.00	n/a
S96T004290	156:18	DL	<3.00	<3.00	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	514	500	507
S96T004707	154:1	Lower half	335	316	325.5
S96T004094	154:10	Upper half	176	176	176
S96T004095	154:10	Lower half	89.1	109	99.1
S96T004096	154:13	Lower half	63.7	98.1	80.9
S96T004097	154:14	Lower half	124	241	182.5
S96T004098	154:15	Lower half	<49.60	76.4	n/a
S96T004099	154:16	Lower half	73.9	46.1	60.0
S96T004739	154:18	Lower half	<142	<141	n/a
S96T004740	154:19	Lower half	<42.3	<42.2	n/a
S96T004719	154:2	Upper half	342	344	343
S96T004735	154:2	Lower half	325	330	327.5
S96T004718	154:3	Upper half	384	368	376
S96T004708	154:3	Lower half	377	360	368.5
S96T004720	154:4	Upper half	388	386	387
S96T004736	154:4	Lower half	358	361	359.5
S96T004721	154:6	Upper half	276	252	264
S96T004737	154:6	Lower half	262	312	287

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004070	154:7	Upper half	257	342	299.5
S96T004093	154:7	Lower half	264	326	295
S96T004722	154:9	Upper half	285	304	294.5
S96T004738	154:9	Lower half	205	292	248.5
S96T005246	154:Comp	Comp	244	209	226.5
S96T004597	156:1	Lower half	820	776	798
S96T004616	156:10	Upper half	<139	<141	n/a
S96T004638	156:10	Lower half	166	142	154
S96T004639	156:11	Lower half	<135	135	n/a
S96T004640	156:12	Lower half	<141	<140	n/a
S96T004285	156:13	Lower half	<61.0	<66.2	n/a
S96T004641	156:14	Lower half	<137	<137	n/a
S96T004642	156:15	Lower half	<145	<144	n/a
S96T004643	156:17	Lower half	<141	<139	n/a
S96T004286	156:18	Lower half	<61.6	<60.6	n/a
S96T004598	156:3	Lower half	387	352	369.5
S96T004610	156:3	Upper half	355	364	359.5
S96T004611	156:4	Upper half	325	391	358
S96T004634	156:4	Lower half	373	371	372
S96T004612	156:5	Upper half	339	325	332
S96T004635	156:5	Lower half	303	298	300.5
S96T004613	156:6	Upper half	322	315	318.5
S96T004636	156:6	Lower half	293	301	297
S96T004599	156:7	Lower half	194	232	213
S96T004614	156:7	Upper half	275	251	263
S96T004615	156:8	Upper half	371	288	329.5
S96T004637	156:8	Lower half	325	294	309.5
S96T005248	154:Comp	Comp	<57.2	<60.4	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<4.10	<4.10	n/a
S96T004115	154:13	DL	<60.1	<60.1	n/a
S96T004116	154:14	DL	<60.1	<60.1	n/a
S96T004117	154:15	DL	<60.1	<60.1	n/a
S96T004118	154:16	DL	<60.1	<60.1	n/a
S96T004671	154:17	DL	<4.10	<4.10	n/a
S96T004669	154:18	DL	<60.1	<60.1	n/a
S96T004672	154:19	DL	<20.1	<20.1	n/a
S96T004582	156:10	DL	<60.1	<60.1	n/a
S96T004583	156:11	DL	<60.1	<60.1	n/a
S96T004584	156:11	DL	<60.1	<60.1	n/a
S96T004289	156:13	DL	<60.1	<60.1	n/a
S96T004585	156:14	DL	<60.1	<60.1	n/a
S96T004586	156:15	DL	<120	<120	n/a
S96T004587	156:17	DL	<60.1	<60.1	n/a
S96T004290	156:18	DL	<60.1	<60.1	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	1.51E+03	1.46E+03	1.48E+03
S96T004707	154:1	Lower half	1.89E+03	1.81E+03	1.85E+03
S96T004719	154:2	Upper half	3.61E+03	3.66E+03	3.64E+03
S96T004735	154:2	Lower half	2.48E+03	2.54E+03	2.51E+03
S96T004718	154:3	Upper half	3.00E+03	2.86E+03	2.93E+03
S96T004708	154:3	Lower half	3.29E+03	3.29E+03	3.29E+03
S96T004720	154:4	Upper half	3.79E+03	3.75E+03	3.77E+03
S96T004736	154:4	Lower half	3.64E+03	3.68E+03	3.66E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004721	154:6	Upper half	3.82E+03	3.79E+03	3.80E+03
S96T004737	154:6	Lower half	4.33E+03	4.42E+03	4.38E+03
S96T004070	154:7	Upper half	4.38E+03	4.45E+03	4.42E+03
S96T004093	154:7	Lower half	3.90E+03	4.03E+03	3.96E+03
S96T004722	154:9	Upper half	6.08E+03	6.33E+03	6.20E+03
S96T004738	154:9	Lower half	3.29E+03	3.28E+03	3.28E+03
S96T004094	154:10	Upper half	1.76E+03	1.81E+03	1.78E+03
S96T004095	154:10	Lower half	785	839	812
S96T004096	154:13	Lower half	24.1	20.8	22.45
S96T004097	154:14	Lower half	20.7	25	22.85
S96T004098	154:15	Lower half	27.6	24.4	26
S96T004099	154:16	Lower half	23.8	23.9	23.85
S96T004739	154:18	Lower half	26.1	25.8	25.95
S96T004740	154:19	Lower half	171	163	167
S96T004597	156:1	Lower half	920	919	919.5
S96T004598	156:3	Lower half	3.27E+03	3.21E+03	3.24E+03
S96T004610	156:3	Upper half	3.19E+03	3.30E+03	3.24E+03
S96T004611	156:4	Upper half	5.23E+03	5.64E+03	5.44E+03
S96T004634	156:4	Lower half	4.84E+03	4.93E+03	4.88E+03
S96T004612	156:5	Upper half	4.63E+03	4.48E+03	4.56E+03
S96T004635	156:5	Lower half	4.17E+03	3.91E+03	4.04E+03
S96T004613	156:6	Upper half	3.81E+03	3.54E+03	3.68E+03
S96T004636	156:6	Lower half	4.39E+03	4.61E+03	4.50E+03
S96T004599	156:7	Lower half	2.00E+03	2.13E+03	2.06E+03
S96T004614	156:7	Upper half	3.28E+03	3.24E+03	3.26E+03
S96T004615	156:8	Upper half	3.93E+03	3.53E+03	3.73E+03
S96T004637	156:8	Lower half	2.84E+03	2.64E+03	2.74E+03
S96T004616	156:10	Upper half	37.2	36.1	36.7
S96T004638	156:10	Lower half	465	509	487

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004639	156:11	Lower half	43.4	40.9	42.15
S96T004640	156:12	Lower half	28	28	28
S96T004285	156:13	Lower half	20.5	18.6	19.55
S96T004641	156:14	Lower half	26.9	31.7	29.3
S96T004642	156:15	Lower half	20.9	16.3	18.6
S96T004643	156:17	Lower half	20.9	19.9	20.4
S96T004286	156:18	Lower half	50.8	60.4	55.6
S96T005246	154:Comp	Comp	1.79E+03	1.84E+03	1.82E+03
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	207	217	212
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	6.14	6.09	6.12
S96T004115	154:13	DL	55.7	55.2	55.45
S96T004116	154:14	DL	52.2	60.7	56.45
S96T004117	154:15	DL	58	55.6	56.8
S96T004118	154:16	DL	60.6	59.5	60.05
S96T004671	154:17	DL	2.38	2.5	2.44
S96T004669	154:18	DL	60.4	50.6	55.5
S96T004672	154:19	DL	21.1	21.2	21.15
S96T004582	156:10	DL	65	93.3	79.15
S96T004583	156:11	DL	65.8	68.5	67.15
S96T004584	156:11	DL	70.2	68	69.1
S96T004289	156:13	DL	63.1	56.9	60
S96T004585	156:14	DL	61	59.3	60.15
S96T004586	156:15	DL	55.7	53.4	54.55
S96T004587	156:17	DL	54.1	51	52.55
S96T004290	156:18	DL	71.1	68.2	69.65

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	45.9	48.5	47.2
S96T004707	154:1	Lower half	57.6	51.1	54.35
S96T004719	154:2	Upper half	51.4	51.9	51.65
S96T004735	154:2	Lower half	56.5	54.2	55.35
S96T004718	154:3	Upper half	58.1	51	54.55
S96T004708	154:3	Lower half	<9.49	<9.45	n/a
S96T004720	154:4	Upper half	<8.83	<9.09	n/a
S96T004736	154:4	Lower half	<9.52	<9.29	n/a
S96T004721	154:6	Upper half	<8.79	<8.92	n/a
S96T004737	154:6	Lower half	<9.85	<9.85	n/a
S96T004070	154:7	Upper half	<9.96	<10.3	n/a
S96T004093	154:7	Lower half	<10.4	<10.4	n/a
S96T004722	154:9	Upper half	73.4	73.4	73.4
S96T004738	154:9	Lower half	67.2	64.7	65.95
S96T004094	154:10	Upper half	<9.64	<9.94	n/a
S96T004095	154:10	Lower half	<9.80	<9.85	n/a
S96T004096	154:13	Lower half	<9.90	<9.85	n/a
S96T004097	154:14	Lower half	<10.1	<9.41	n/a
S96T004098	154:15	Lower half	<9.92	<9.43	n/a
S96T004099	154:16	Lower half	<9.25	<9.13	n/a
S96T004739	154:18	Lower half	67.1	66.7	66.9
S96T004740	154:19	Lower half	20.2	19.7	19.95
S96T004597	156:1	Lower half	58.1	47.3	52.7
S96T004598	156:3	Lower half	51.1	54.1	52.6
S96T004610	156:3	Upper half	44.8	50.3	47.55
S96T004611	156:4	Upper half	60.2	57.4	58.8
S96T004634	156:4	Lower half	63.0	61.6	62.3
S96T004612	156:5	Upper half	56.7	52.7	54.7
S96T004635	156:5	Lower half	62.4	59.9	61.15

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004613	156:6	Upper half	<11.5	<11.5	n/a
S96T004636	156:6	Lower half	<11.7	<11.4	n/a
S96T004599	156:7	Lower half	<11.6	<11.3	n/a
S96T004614	156:7	Upper half	<11.2	<11.5	n/a
S96T004615	156:8	Upper half	<11.4	<11.2	n/a
S96T004637	156:8	Lower half	62.3	53	57.65
S96T004616	156:10	Upper half	61	52.6	56.8
S96T004638	156:10	Lower half	47.9	52.8	50.35
S96T004639	156:11	Lower half	43.7	40.4	42.05
S96T004640	156:12	Lower half	52.2	48.4	50.3
S96T004285	156:13	Lower half	<12.2	<13.2	n/a
S96T004641	156:14	Lower half	48.6	37.8	43.2
S96T004642	156:15	Lower half	49.2	50.7	49.95
S96T004643	156:17	Lower half	56.4	44.7	50.55
S96T004286	156:18	Lower half	<12.3	<12.1	n/a
S96T005246	154:Comp	Comp	<36.9	46.1	n/a
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	<11.40	<12.1	n/a
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<8.20E-01	<0.82	n/a
S96T004115	154:13	DL	<12.00	<12.0	n/a
S96T004116	154:14	DL	<12.00	<120	n/a
S96T004117	154:15	DL	<12.00	<12.0	n/a
S96T004118	154:16	DL	<12.00	<12.0	n/a
S96T004671	154:17	DL	<8.20E-01	<0.82	n/a
S96T004669	154:18	DL	<12.00	<12.0	n/a
S96T004672	154:19	DL	<4.020	<4.02	n/a
S96T004582	156:10	DL	<12.00	<12.0	n/a
S96T004583	156:11	DL	<12.00	<12.0	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			μg/mL	μg/mL	μg/mL
S96T004584	156:11	DL	<12.00	<12.0	n/a
S96T004289	156:13	DL	<12.00	<12.0	n/a
S96T004585	156:14	DL	<12.00	<12.0	n/a
S96T004586	156:15	DL	62.1	69.4	65.75
S96T004587	156:17	DL	<12.00	<12.0	n/a
S96T004290	156:18	DL	<12.00	<12.0	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			μg/g	μg/g	μg/g
S96T004717	154:1	Upper half	<14.30	<14.1	n/a
S96T004707	154:1	Lower half	<14.40	<14.3	n/a
S96T004094	154:10	Upper half	29.4	29.3	29.35
S96T004095	154:10	Lower half	<4.90	5.02	n/a
S96T004096	154:13	Lower half	<4.95	<4.93	n/a
S96T004097	154:14	Lower half	<5.06	<4.70	n/a
S96T004098	154:15	Lower half	<4.96	<4.72	n/a
S96T004099	154:16	Lower half	<4.63	<4.57	n/a
S96T004739	154:18	Lower half	<14.2	<14.1	n/a
S96T004740	154:19	Lower half	<4.23	<4.22	n/a
S96T004719	154:2	Upper half	<14.3	<14.0	n/a
S96T004735	154:2	Lower half	<14.7	<14.5	n/a
S96T004718	154:3	Upper half	<14.3	<14.3	n/a
S96T004708	154:3	Lower half	13.8	12.6	13.2
S96T004720	154:4	Upper half	9.12	9.13	9.125
S96T004736	154:4	Lower half	7.06	7.87	7.465
S96T004721	154:6	Upper half	4.74	<4.46	n/a
S96T004737	154:6	Lower half	5.02	6.34	5.68

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004070	154:7	Upper half	5.89	<5.13	n/a
S96T004093	154:7	Lower half	<5.18	<5.19	n/a
S96T004722	154:9	Upper half	<14.8	<14.8	n/a
S96T004738	154:9	Lower half	22.1	17.6	19.85
S96T005246	154:Comp	Comp	<18.5	<19.5	n/a
S96T004597	156:1	Lower half	<14.0	<13.9	n/a
S96T004616	156:10	Upper half	<13.9	<14.1	n/a
S96T004638	156:10	Lower half	<13.9	<13.8	n/a
S96T004639	156:11	Lower half	<13.5	<13.0	n/a
S96T004640	156:12	Lower half	<14.1	<14.0	n/a
S96T004285	156:13	Lower half	<6.10	9.03	n/a
S96T004641	156:14	Lower half	<13.7	<13.7	n/a
S96T004642	156:15	Lower half	<14.5	<14.4	n/a
S96T004643	156:17	Lower half	<14.1	<13.9	n/a
S96T004286	156:18	Lower half	<6.16	<6.06	n/a
S96T004598	156:3	Lower half	<14.5	<14.2	n/a
S96T004610	156:3	Upper half	<13.6	<13.4	n/a
S96T004611	156:4	Upper half	14.8	<14.1	n/a
S96T004634	156:4	Lower half	20.8	22.7	21.75
S96T004612	156:5	Upper half	17	20.4	18.7
S96T004635	156:5	Lower half	20.4	<14.4	n/a
S96T004613	156:6	Upper half	13.7	10.8	12.25
S96T004636	156:6	Lower half	7.62	10.5	9.06
S96T004599	156:7	Lower half	<5.820	<5.63	n/a
S96T004614	156:7	Upper half	7.4	8.05	7.725
S96T004615	156:8	Upper half	10.2	10.5	10.35
S96T004637	156:8	Lower half	29.2	19.3	24.25
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	<5.720	<6.04	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<0.41	<0.41	n/a
S96T004115	154:13	DL	<6.01	<6.01	n/a
S96T004116	154:14	DL	7.48	<6.01	n/a
S96T004117	154:15	DL	<6.01	<6.01	n/a
S96T004118	154:16	DL	<6.01	<6.01	n/a
S96T004671	154:17	DL	<0.41	<0.41	n/a
S96T004669	154:18	DL	<6.01	<6.01	n/a
S96T004672	154:19	DL	<2.01	<2.01	n/a
S96T004582	156:10	DL	<6.01	<6.01	n/a
S96T004583	156:11	DL	<6.01	<6.01	n/a
S96T004584	156:11	DL	10.4	<6.01	n/a
S96T004289	156:13	DL	<6.01	<6.01	n/a
S96T004585	156:14	DL	<6.01	<6.01	n/a
S96T004586	156:15	DL	<12.0	<12.0	n/a
S96T004587	156:17	DL	<6.01	<6.01	n/a
S96T004290	156:18	DL	<6.01	<6.01	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	2.62E+03	3.40E+03	3.01E+03
S96T004707	154:1	Lower half	164	158	161
S96T004719	154:2	Upper half	296	358	327
S96T004735	154:2	Lower half	165	160	162.5
S96T004718	154:3	Upper half	337	290	313.5
S96T004708	154:3	Lower half	354	335	344.5
S96T004720	154:4	Upper half	619	768	693.5
S96T004736	154:4	Lower half	280	279	279.5

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004721	154:6	Upper half	696	288	492
S96T004737	154:6	Lower half	314	635	474.5
S96T004070	154:7	Upper half	365	368	366.5
S96T004093	154:7	Lower half	285	330	307.5
S96T004722	154:9	Upper half	747	508	627.5
S96T004738	154:9	Lower half	190	189	189.5
S96T004094	154:10	Upper half	2.19E+03	1.39E+03	1.79E+03
S96T004095	154:10	Lower half	115	122	118.5
S96T004096	154:13	Lower half	62	56	59
S96T004097	154:14	Lower half	<25.3	<23.5	n/a
S96T004098	154:15	Lower half	<24.8	<23.6	n/a
S96T004099	154:16	Lower half	<23.1	<22.8	n/a
S96T004739	154:18	Lower half	<71.1	<70.4	n/a
S96T004740	154:19	Lower half	70.4	64.6	67.5
S96T004597	156:1	Lower half	1.12E+03	1.31E+03	1.22E+03
S96T004598	156:3	Lower half	216	205	210.5
S96T004610	156:3	Upper half	301	305	303
S96T004611	156:4	Upper half	268	307	287.5
S96T004634	156:4	Lower half	227	245	236
S96T004612	156:5	Upper half	380	394	387
S96T004635	156:5	Lower half	278	260	269
S96T004613	156:6	Upper half	426	351	388.5
S96T004636	156:6	Lower half	287	309	298
S96T004599	156:7	Lower half	148	153	150.5
S96T004614	156:7	Upper half	250	251	250.5
S96T004615	156:8	Upper half	451	446	448.5
S96T004637	156:8	Lower half	187	159	173
S96T004616	156:10	Upper half	<69.6	<70.5	n/a
S96T004638	156:10	Lower half	82.1	95.6	88.85

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004639	156:11	Lower half	<67.7	<64.9	n/a
S96T004640	156:12	Lower half	<70.5	<70.1	n/a
S96T004285	156:13	Lower half	<30.5	<33.1	n/a
S96T004641	156:14	Lower half	<68.6	<68.3	n/a
S96T004642	156:15	Lower half	<72.4	<71.8	n/a
S96T004643	156:17	Lower half	<70.5	<69.6	n/a
S96T004286	156:18	Lower half	<30.8	32.7	n/a
S96T005246	154:Comp	Comp	188	263	225.5
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	<28.60	<30.2	n/a
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<2.05	<2.05	n/a
S96T004115	154:13	DL	<30.1	<3.0.1	n/a
S96T004116	154:14	DL	<30.1	<30.1	n/a
S96T004117	154:15	DL	<30.1	<30.1	n/a
S96T004118	154:16	DL	<30.1	<30.1	n/a
S96T004671	154:17	DL	<2.05	<2.05	n/a
S96T004669	154:18	DL	<30.1	<30.1	n/a
S96T004672	154:19	DL	<10.1	<10.1	n/a
S96T004582	156:10	DL	<30.1	<30.1	n/a
S96T004583	156:11	DL	<30.1	<30.1	n/a
S96T004584	156:11	DL	<30.1	<30.1	n/a
S96T004289	156:13	DL	<30.1	<30.1	n/a
S96T004585	156:14	DL	<30.1	<30.1	n/a
S96T004586	156:15	DL	<60.1	<60.1	n/a
S96T004587	156:17	DL	<30.1	<30.1	n/a
S96T004290	156:18	DL	<30.1	<30.1	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	<143	<141	n/a
S96T004707	154:1	Lower half	<144	<143	n/a
S96T004719	154:2	Upper half	<143	<140	n/a
S96T004735	154:2	Lower half	<147	<145	n/a
S96T004718	154:3	Upper half	<143	<143	n/a
S96T004708	154:3	Lower half	113	78.4	95.7
S96T004720	154:4	Upper half	98.4	98.4	98.4
S96T004736	154:4	Lower half	78.4	72.1	75.25
S96T004721	154:6	Upper half	85.7	82.6	84.15
S96T004737	154:6	Lower half	83.7	94.8	89.25
S96T004070	154:7	Upper half	107	92.7	99.85
S96T004093	154:7	Lower half	87.5	91.9	89.7
S96T004722	154:9	Upper half	<148	<148	n/a
S96T004738	154:9	Lower half	<133	<132	n/a
S96T004094	154:10	Upper half	119	106	112.5
S96T004095	154:10	Lower half	78.9	78.6	78.75
S96T004096	154:13	Lower half	57.2	50.6	53.9
S96T004097	154:14	Lower half	<50.6	55.8	n/a
S96T004098	154:15	Lower half	63.1	48.9	56
S96T004099	154:16	Lower half	55.3	59.2	57.25
S96T004739	154:18	Lower half	<142	<141	n/a
S96T004740	154:19	Lower half	<42.30	<42.2	n/a
S96T004597	156:1	Lower half	<140	<139	n/a
S96T004598	156:3	Lower half	<145	<142	n/a
S96T004610	156:3	Upper half	<136	<134	n/a
S96T004611	156:4	Upper half	<142	n/a	n/a
S96T004634	156:4	Lower half	<144	<139	n/a
S96T004612	156:5	Upper half	<140	<139	n/a
S96T004635	156:5	Lower half	<141	<144	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004613	156:6	Upper half	98	93	95.5
S96T004636	156:6	Lower half	81.9	82.4	82.15
S96T004599	156:7	Lower half	80.6	73.5	77.05
S96T004614	156:7	Upper half	91.3	107	99.15
S96T004615	156:8	Upper half	122	88.5	105.2
S96T004637	156:8	Lower half	156	<143	n/a
S96T004616	156:10	Upper half	<139	<141	n/a
S96T004638	156:10	Lower half	<139	<138	n/a
S96T004639	156:11	Lower half	<135	<130	n/a
S96T004640	156:12	Lower half	<141	<140	n/a
S96T004285	156:13	Lower half	<61.0	<66.2	n/a
S96T004641	156:14	Lower half	<137	<137	n/a
S96T004642	156:15	Lower half	<145	<144	n/a
S96T004643	156:17	Lower half	<141	<139	n/a
S96T004286	156:18	Lower half	<61.60	64.7	n/a
S96T005246	154:Comp	Comp	<185	<195	n/a
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	<57.2	<60.4	n/a
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<4.10	<4.10	n/a
S96T004115	154:13	DL	133	124	128.5
S96T004116	154:14	DL	121	134	127.5
S96T004117	154:15	DL	129	130	129.5
S96T004118	154:16	DL	138	139	138.5
S96T004671	154:17	DL	<4.10	<4.10	n/a
S96T004669	154:18	DL	147	126	136.5
S96T004672	154:19	DL	22.5	26.5	24.5
S96T004582	156:10	DL	102	148	125
S96T004583	156:11	DL	130	137	133.5

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004584	156:11	DL	155	147	151
S96T004289	156:13	DL	146	125	135.5
S96T004585	156:14	DL	136	132	134
S96T004586	156:15	DL	<120	120	n/a
S96T004587	156:17	DL	120	123	121.5
S96T004290	156:18	DL	134	127	130.5

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	<14.30	<14.1	n/a
S96T004707	154:1	Lower half	<14.40	<14.3	n/a
S96T004719	154:2	Upper half	23.8	28.3	26.05
S96T004735	154:2	Lower half	<14.70	<14.5	n/a
S96T004718	154:3	Upper half	<14.30	<14.3	n/a
S96T004708	154:3	Lower half	<4.740	<4.73	n/a
S96T004720	154:4	Upper half	17.1	18	17.55
S96T004736	154:4	Lower half	<4.760	<4.64	n/a
S96T004721	154:6	Upper half	15.7	<4.46	n/a
S96T004737	154:6	Lower half	<4.930	19.2	n/a
S96T004070	154:7	Upper half	11.7	12.3	12
S96T004093	154:7	Lower half	<5.180	<5.19	n/a
S96T004722	154:9	Upper half	43.3	42.3	42.8
S96T004738	154:9	Lower half	<13.30	<13.2	n/a
S96T004094	154:10	Upper half	5.50E+02	558	554
S96T004095	154:10	Lower half	30	31.3	30.65
S96T004096	154:13	Lower half	1.12E+02	96.2	104.1
S96T004097	154:14	Lower half	12.1	14.9	13.5

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004098	154:15	Lower half	18.7	17.2	17.95
S96T004099	154:16	Lower half	5.87	7.0	6.435
S96T004739	154:18	Lower half	<14.20	<14.1	n/a
S96T004740	154:19	Lower half	3.32E+03	3.03E+03	3.18E+03
S96T004597	156:1	Lower half	<14.00	<13.9	n/a
S96T004598	156:3	Lower half	<14.50	<14.2	n/a
S96T004610	156:3	Upper half	18.8	22.7	20.75
S96T004611	156:4	Upper half	18.6	16.9	17.75
S96T004634	156:4	Lower half	<14.40	<13.9	n/a
S96T004612	156:5	Upper half	60	63.5	61.75
S96T004635	156:5	Lower half	<14.10	<14.4	n/a
S96T004613	156:6	Upper half	21.1	19.1	20.1
S96T004636	156:6	Lower half	<5.860	<5.69	n/a
S96T004599	156:7	Lower half	<5.820	<5.63	n/a
S96T004614	156:7	Upper half	25.8	33.6	29.7
S96T004615	156:8	Upper half	85.6	64.8	75.2
S96T004637	156:8	Lower half	<14.30	<14.3	n/a
S96T004616	156:10	Upper half	<13.90	<14.1	n/a
S96T004638	156:10	Lower half	127	134	130.5
S96T004639	156:11	Lower half	37.3	36.7	37
S96T004640	156:12	Lower half	18.8	18.6	18.7
S96T004285	156:13	Lower half	82.4	36.8	59.6
S96T004641	156:14	Lower half	72	91	81.5
S96T004642	156:15	Lower half	159	122	140.5
S96T004643	156:17	Lower half	44.1	43.5	43.8
S96T004286	156:18	Lower half	22.9	22.8	22.85
S96T005246	154:Comp	Comp	310	332	321
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	<5.72	<6.04	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	1.61E+03	1.62E+03	1.62E+03
S96T004115	154:13	DL	13.6	19.2	16.4
S96T004116	154:14	DL	64.9	19.3	42.1
S96T004117	154:15	DL	<6.01	<6.01	n/a
S96T004118	154:16	DL	6.39	<6.01	n/a
S96T004671	154:17	DL	1.64E+03	1.66E+03	1.65E+03
S96T004669	154:18	DL	<6.01	<6.01	n/a
S96T004672	154:19	DL	10.2	10.2	10.2
S96T004582	156:10	DL	6.4	<6.01	n/a
S96T004583	156:11	DL	<6.01	<6.01	n/a
S96T004584	156:11	DL	<6.01	<6.01	n/a
S96T004289	156:13	DL	<6.01	<6.01	n/a
S96T004585	156:14	DL	<6.01	<6.01	n/a
S96T004586	156:15	DL	<12.0	<12.0	n/a
S96T004587	156:17	DL	<6.01	<6.01	n/a
S96T004290	156:18	DL	9.94	9.25	9.595

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	75.5	80.8	78.15
S96T004707	154:1	Lower half	42.6	40.4	41.5
S96T004719	154:2	Upper half	50.6	52.3	51.45
S96T004735	154:2	Lower half	38.7	39.2	38.95
S96T004718	154:3	Upper half	59.7	58.2	58.95
S96T004708	154:3	Lower half	61.4	62.2	61.8
S96T004720	154:4	Upper half	73.4	73.4	73.4
S96T004736	154:4	Lower half	55	54.8	54.9

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004721	154:6	Upper half	59.9	52.6	56.25
S96T004737	154:6	Lower half	59.9	67.4	63.65
S96T004070	154:7	Upper half	66.5	67.8	67.15
S96T004093	154:7	Lower half	54.1	56.3	55.2
S96T004722	154:9	Upper half	76.7	76.3	76.5
S96T004738	154:9	Lower half	51.1	52.5	51.8
S96T004094	154:10	Upper half	45.7	40.7	43.2
S96T004095	154:10	Lower half	15.3	15.6	15.45
S96T004096	154:13	Lower half	<4.950	<4.93	n/a
S96T004097	154:14	Lower half	<5.060	<4.70	n/a
S96T004098	154:15	Lower half	<4.960	<4.72	n/a
S96T004099	154:16	Lower half	<4.630	<4.57	n/a
S96T004739	154:18	Lower half	<14.20	<14.1	n/a
S96T004740	154:19	Lower half	6.54	5.93	6.235
S96T004597	156:1	Lower half	33.7	36.1	34.9
S96T004598	156:3	Lower half	46.6	45.6	46.1
S96T004610	156:3	Upper half	64.3	66.4	65.35
S96T004611	156:4	Upper half	52.9	n/a	n/a
S96T004634	156:4	Lower half	55.2	56.1	55.65
S96T004612	156:5	Upper half	67.3	64.9	66.1
S96T004635	156:5	Lower half	66.4	62.3	64.35
S96T004613	156:6	Upper half	93.6	85.6	89.6
S96T004636	156:6	Lower half	54.4	57.4	55.9
S96T004599	156:7	Lower half	24	25.9	24.95
S96T004614	156:7	Upper half	38.6	38.2	38.4
S96T004615	156:8	Upper half	58.4	54	56.2
S96T004637	156:8	Lower half	45.5	42	43.75
S96T004616	156:10	Upper half	<13.9	<14.1	n/a
S96T004638	156:10	Lower half	<13.9	<13.8	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004639	156:11	Lower half	<13.5	<13.0	n/a
S96T004640	156:12	Lower half	<14.1	<14.0	n/a
S96T004285	156:13	Lower half	<6.10	<6.62	n/a
S96T004641	156:14	Lower half	<13.7	<13.7	n/a
S96T004642	156:15	Lower half	<14.5	<14.4	n/a
S96T004643	156:17	Lower half	<14.1	<13.9	n/a
S96T004286	156:18	Lower half	<6.16	<6.06	n/a
S96T005246	154:Comp	Comp	30.2	33.4	31.8
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	<5.72	<6.04	n/a
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<0.41	<0.41	n/a
S96T004115	154:13	DL	<6.01	<6.01	n/a
S96T004116	154:14	DL	<6.01	<6.01	n/a
S96T004117	154:15	DL	<6.01	<6.01	n/a
S96T004118	154:16	DL	<6.01	<6.01	n/a
S96T004671	154:17	DL	<0.41	<0.41	n/a
S96T004669	154:18	DL	<6.01	<6.01	n/a
S96T004672	154:19	DL	<2.01	<2.01	n/a
S96T004582	156:10	DL	<6.01	<6.01	n/a
S96T004583	156:11	DL	<6.010	<6.01	n/a
S96T004584	156:11	DL	<6.010	<6.01	n/a
S96T004289	156:13	DL	<6.010	<6.01	n/a
S96T004585	156:14	DL	<6.010	<6.01	n/a
S96T004586	156:15	DL	<12.00	<12.0	n/a
S96T004587	156:17	DL	<6.010	<6.01	n/a
S96T004290	156:18	DL	<6.010	<6.01	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	<71.50	<70.4	n/a
S96T004707	154:1	Lower half	<72.00	<71.5	n/a
S96T004719	154:2	Upper half	<71.50	<70.1	n/a
S96T004735	154:2	Lower half	<73.60	<72.3	n/a
S96T004718	154:3	Upper half	<71.40	<71.3	n/a
S96T004708	154:3	Lower half	65.7	66.9	66.3
S96T004720	154:4	Upper half	65.6	65.6	65.6
S96T004736	154:4	Lower half	65.4	66	65.7
S96T004721	154:6	Upper half	52.3	49.5	50.9
S96T004737	154:6	Lower half	56.2	61.2	58.7
S96T004070	154:7	Upper half	57.9	56	56.95
S96T004093	154:7	Lower half	56.4	56.9	56.65
S96T004722	154:9	Upper half	<74.20	<73.9	n/a
S96T004738	154:9	Lower half	<66.70	<66.1	n/a
S96T004094	154:10	Upper half	68.9	70.5	69.7
S96T004095	154:10	Lower half	71.6	73.7	72.65
S96T004096	154:13	Lower half	57.3	50.3	53.8
S96T004097	154:14	Lower half	42.5	57.8	50.15
S96T004098	154:15	Lower half	64	55.2	59.6
S96T004099	154:16	Lower half	56.3	59.6	57.95
S96T004739	154:18	Lower half	<71.10	<70.4	n/a
S96T004740	154:19	Lower half	26.8	27.2	27
S96T004597	156:1	Lower half	<69.90	<69.3	n/a
S96T004598	156:3	Lower half	<72.30	<71.0	n/a
S96T004610	156:3	Upper half	<68.20	<66.9	n/a
S96T004611	156:4	Upper half	<71.10	n/a	n/a
S96T004634	156:4	Lower half	<71.90	<69.5	n/a
S96T004612	156:5	Upper half	<69.90	<69.3	n/a
S96T004635	156:5	Lower half	71.8	<71.8	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T004613	156:6	Upper half	68.1	65.6	66.85
S96T004636	156:6	Lower half	61.4	64.1	62.75
S96T004599	156:7	Lower half	63.4	61.8	62.6
S96T004614	156:7	Upper half	62.8	64.6	63.7
S96T004615	156:8	Upper half	60	58	59
S96T004637	156:8	Lower half	<71.3	<71.7	n/a
S96T004616	156:10	Upper half	<69.6	<70.5	n/a
S96T004638	156:10	Lower half	77.5	81.4	79.45
S96T004639	156:11	Lower half	93.9	91.1	92.5
S96T004640	156:12	Lower half	<70.5	<70.1	n/a
S96T004285	156:13	Lower half	43.9	41.7	42.8
S96T004641	156:14	Lower half	<68.6	76.1	n/a
S96T004642	156:15	Lower half	<72.4	<71.8	n/a
S96T004643	156:17	Lower half	<70.5	<69.6	n/a
S96T004286	156:18	Lower half	44.7	59	51.85
S96T005246	154:Comp	Comp	<92.3	<97.3	n/a
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T005248	154:Comp	Comp	69.5	71.6	70.55
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T004110	154:11	DL	6.37	6.36	6.365
S96T004115	154:13	DL	140	137	138.5
S96T004116	154:14	DL	132	151	141.5
S96T004117	154:15	DL	143	136	139.5
S96T004118	154:16	DL	150	147	148.5
S96T004671	154:17	DL	6.36	6.37	6.365
S96T004669	154:18	DL	156	134	145
S96T004672	154:19	DL	36.6	37.9	37.25
S96T004582	156:10	DL	116	169	142.5
S96T004583	156:11	DL	150	156	153

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			μg/mL	μg/mL	μg/mL
S96T004584	156:11	DL	171	169	170
S96T004289	156:13	DL	155	140	147.5
S96T004585	156:14	DL	154	146	150
S96T004586	156:15	DL	141	126	133.5
S96T004587	156:17	DL	137	130	133.5
S96T004290	156:18	DL	149	143	146

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			μg/g	μg/g	μg/g
S96T004717	154:1	Upper half	80.8	71.5	76.15
S96T004707	154:1	Lower half	75.3	64.2	69.75
S96T004719	154:2	Upper half	70.8	66.4	68.6
S96T004735	154:2	Lower half	56.5	61.9	59.2
S96T004718	154:3	Upper half	131	116	123.5
S96T004708	154:3	Lower half	136	117	126.5
S96T004720	154:4	Upper half	115	113	114
S96T004736	154:4	Lower half	103	105	104
S96T004721	154:6	Upper half	102	101	101.5
S96T004737	154:6	Lower half	113	121	117
S96T004070	154:7	Upper half	112	108	110
S96T004093	154:7	Lower half	97.6	98	97.8
S96T004722	154:9	Upper half	160	160	160
S96T004738	154:9	Lower half	103	105	104
S96T004094	154:10	Upper half	60.7	61.3	61
S96T004095	154:10	Lower half	27	30.1	28.55
S96T004096	154:13	Lower half	<9.90	<9.85	n/a
S96T004097	154:14	Lower half	<10.1	<9.41	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004098	154:15	Lower half	<9.92	<9.43	n/a
S96T004099	154:16	Lower half	<9.25	<9.13	n/a
S96T004739	154:18	Lower half	<28.4	<28.2	n/a
S96T004740	154:19	Lower half	15.2	13.5	14.35
S96T004597	156:1	Lower half	48.3	53.8	51.05
S96T004598	156:3	Lower half	117	112	114.5
S96T004610	156:3	Upper half	105	112	108.5
S96T004611	156:4	Upper half	191	215	203
S96T004634	156:4	Lower half	183	183	183
S96T004612	156:5	Upper half	154	144	149
S96T004635	156:5	Lower half	122	116	119
S96T004613	156:6	Upper half	103	94.8	98.9
S96T004636	156:6	Lower half	110	115	112.5
S96T004599	156:7	Lower half	52.6	52.7	52.65
S96T004614	156:7	Upper half	88.2	82.8	85.5
S96T004615	156:8	Upper half	112	103	107.5
S96T004637	156:8	Lower half	97.3	95.1	96.2
S96T004616	156:10	Upper half	31.5	<28.2	n/a
S96T004638	156:10	Lower half	33	34	33.5
S96T004639	156:11	Lower half	<27.1	<25.9	n/a
S96T004640	156:12	Lower half	<28.2	<28.1	n/a
S96T004285	156:13	Lower half	<12.2	<13.2	n/a
S96T004641	156:14	Lower half	<27.5	<27.3	n/a
S96T004642	156:15	Lower half	<29.0	<28.7	n/a
S96T004643	156:17	Lower half	<28.2	<27.8	n/a
S96T004286	156:18	Lower half	61	62.8	61.9
S96T005246	154:Comp	Comp	57.5	55.9	56.7
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	<11.40	<12.1	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<0.82	<0.82	n/a
S96T004115	154:13	DL	<12.0	<12.0	n/a
S96T004116	154:14	DL	<12.0	<12.0	n/a
S96T004117	154:15	DL	<12.0	<12.0	n/a
S96T004118	154:16	DL	<12.0	<12.0	n/a
S96T004671	154:17	DL	<0.82	<0.82	n/a
S96T004669	154:18	DL	<12.0	<12.0	n/a
S96T004672	154:19	DL	<4.02	<4.02	n/a
S96T004582	156:10	DL	<12.0	<12.0	n/a
S96T004583	156:11	DL	<12.0	<12.0	n/a
S96T004584	156:11	DL	<12.0	<12.0	n/a
S96T004289	156:13	DL	<12.0	<12.0	n/a
S96T004585	156:14	DL	<12.0	<12.0	n/a
S96T004586	156:15	DL	<24.0	<24.0	n/a
S96T004587	156:17	DL	<12.0	<12.0	n/a
S96T004290	156:18	DL	<12.0	<12.0	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	1.43E+03	2.61E+03	2.02E+03
S96T004707	154:1	Lower half	1.72E+03	1.46E+03	1.59E+03
S96T004719	154:2	Upper half	1.83E+03	1.32E+03	1.58E+03
S96T004735	154:2	Lower half	1.32E+03	1.31E+03	1.32E+03
S96T004718	154:3	Upper half	1.24E+03	1.30E+03	1.27E+03
S96T004708	154:3	Lower half	1.33E+03	1.36E+03	1.34E+03
S96T004720	154:4	Upper half	1.61E+03	1.61E+03	1.61E+03
S96T004736	154:4	Lower half	1.92E+03	1.90E+03	1.91E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004721	154:6	Upper half	1.61E+03	1.52E+03	1.56E+03
S96T004737	154:6	Lower half	1.70E+03	2.07E+03	1.88E+03
S96T004070	154:7	Upper half	1.70E+03	1.92E+03	1.81E+03
S96T004093	154:7	Lower half	1.76E+03	1.85E+03	1.80E+03
S96T004722	154:9	Upper half	1.84E+03	1.89E+03	1.86E+03
S96T004738	154:9	Lower half	1.76E+03	1.83E+03	1.80E+03
S96T004094	154:10	Upper half	1.95E+03	2.18E+03	2.06E+03
S96T004095	154:10	Lower half	1.94E+03	2.03E+03	1.98E+03
S96T004096	154:13	Lower half	3.68E+03	3.37E+03	3.52E+03
S96T004097	154:14	Lower half	2.42E+03	2.84E+03	2.63E+03
S96T004098	154:15	Lower half	2.77E+03	2.43E+03	2.60E+03
S96T004099	154:16	Lower half	2.30E+03	2.24E+03	2.27E+03
S96T004739	154:18	Lower half	3.04E+03	3.22E+03	3.13E+03
S96T004740	154:19	Lower half	809	786	797.5
S96T004597	156:1	Lower half	1.98E+03	1.90E+03	1.94E+03
S96T004598	156:3	Lower half	1.50E+03	1.39E+03	1.44E+03
S96T004610	156:3	Upper half	1.27E+03	1.36E+03	1.32E+03
S96T004611	156:4	Upper half	1.55E+03	n/a	n/a
S96T004634	156:4	Lower half	1.69E+03	1.67E+03	1.68E+03
S96T004612	156:5	Upper half	1.55E+03	1.64E+03	1.60E+03
S96T004635	156:5	Lower half	1.68E+03	1.60E+03	1.64E+03
S96T004613	156:6	Upper half	1.52E+03	1.63E+03	1.58E+03
S96T004636	156:6	Lower half	1.63E+03	1.64E+03	1.64E+03
S96T004599	156:7	Lower half	1.75E+03	1.65E+03	1.70E+03
S96T004614	156:7	Upper half	1.63E+03	1.63E+03	1.63E+03
S96T004615	156:8	Upper half	1.71E+03	1.73E+03	1.72E+03
S96T004637	156:8	Lower half	1.89E+03	1.82E+03	1.86E+03
S96T004616	156:10	Upper half	2.46E+03	2.30E+03	2.38E+03
S96T004638	156:10	Lower half	1.80E+03	1.93E+03	1.86E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004639	156:11	Lower half	4.00E+03	3.91E+03	3.96E+03
S96T004640	156:12	Lower half	2.60E+03	2.55E+03	2.58E+03
S96T004285	156:13	Lower half	1.94E+03	1.90E+03	1.92E+03
S96T004641	156:14	Lower half	2.39E+03	3.84E+03	3.12E+03
S96T004642	156:15	Lower half	2.74E+03	2.39E+03	2.56E+03
S96T004643	156:17	Lower half	3.27E+03	3.39E+03	3.33E+03
S96T004286	156:18	Lower half	1.96E+03	2.04E+03	2.00E+03
S96T005246	154:Comp	Comp	2.38E+03	2.37E+03	2.38E+03
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	2.67E+03	2.58E+03	2.62E+03
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	24.6	24.9	24.75
S96T004115	154:13	DL	1.19E+03	1.16E+03	1.18E+03
S96T004116	154:14	DL	1.41E+03	1.34E+03	1.38E+03
S96T004117	154:15	DL	1.17E+03	1.07E+03	1.12E+03
S96T004118	154:16	DL	1.20E+03	1.21E+03	1.20E+03
S96T004671	154:17	DL	12.8	11.8	12.3
S96T004669	154:18	DL	1.16E+03	1.01E+03	1.08E+03
S96T004672	154:19	DL	789	794	791.5
S96T004582	156:10	DL	1.79E+03	1.93E+03	1.86E+03
S96T004583	156:11	DL	1.11E+03	1.13E+03	1.12E+03
S96T004584	156:11	DL	2.16E+03	1.69E+03	1.92E+03
S96T004289	156:13	DL	1.20E+03	1.14E+03	1.17E+03
S96T004585	156:14	DL	1.22E+03	1.19E+03	1.20E+03
S96T004586	156:15	DL	1.25E+03	1.06E+03	1.16E+03
S96T004587	156:17	DL	998	916	957
S96T004290	156:18	DL	1.24E+03	1.18E+03	1.21E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	3.12E+03	2.86E+03	2.99E+03
S96T004707	154:1	Lower half	1.74E+05	3.47E+03	8.87E+04
S96T004719	154:2	Upper half	3.30E+03	3.32E+03	3.31E+03
S96T004735	154:2	Lower half	3.64E+03	3.53E+03	3.58E+03
S96T004718	154:3	Upper half	3.39E+03	3.47E+03	3.43E+03
S96T004708	154:3	Lower half	3.57E+03	3.72E+03	3.64E+03
S96T004720	154:4	Upper half	3.44E+03	3.36E+03	3.40E+03
S96T004736	154:4	Lower half	3.65E+03	3.56E+03	3.60E+03
S96T004721	154:6	Upper half	2.91E+03	2.70E+03	2.80E+03
S96T004737	154:6	Lower half	3.11E+03	3.39E+03	3.25E+03
S96T004070	154:7	Upper half	3.00E+03	3.10E+03	3.05E+03
S96T004093	154:7	Lower half	3.00E+03	3.06E+03	3.03E+03
S96T004722	154:9	Upper half	3.20E+03	3.54E+03	3.37E+03
S96T004738	154:9	Lower half	3.15E+03	3.21E+03	3.18E+03
S96T004094	154:10	Upper half	3.70E+03	3.70E+03	3.70E+03
S96T004095	154:10	Lower half	3.76E+03	3.99E+03	3.88E+03
S96T004096	154:13	Lower half	3.16E+03	2.75E+03	2.96E+03
S96T004097	154:14	Lower half	2.48E+03	3.12E+03	2.80E+03
S96T004098	154:15	Lower half	3.54E+03	3.10E+03	3.32E+03
S96T004099	154:16	Lower half	3.07E+03	3.18E+03	3.12E+03
S96T004739	154:18	Lower half	1.79E+03	1.80E+03	1.80E+03
S96T004740	154:19	Lower half	1.44E+03	1.45E+03	1.44E+03
S96T004597	156:1	Lower half	3.30E+03	3.27E+03	3.28E+03
S96T004598	156:3	Lower half	3.33E+03	3.27E+03	3.30E+03
S96T004610	156:3	Upper half	3.31E+03	3.29E+03	3.30E+03
S96T004611	156:4	Upper half	3.36E+03	n/a	n/a
S96T004634	156:4	Lower half	3.32E+03	3.58E+03	3.45E+03
S96T004612	156:5	Upper half	3.41E+03	3.28E+03	3.34E+03
S96T004635	156:5	Lower half	3.74E+03	3.41E+03	3.58E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004613	156:6	Upper half	3.37E+03	3.36E+03	3.36E+03
S96T004636	156:6	Lower half	3.18E+03	3.58E+03	3.38E+03
S96T004599	156:7	Lower half	3.36E+03	3.27E+03	3.32E+03
S96T004614	156:7	Upper half	3.29E+03	3.19E+03	3.24E+03
S96T004615	156:8	Upper half	3.04E+03	3.06E+03	3.05E+03
S96T004637	156:8	Lower half	3.50E+03	3.16E+03	3.33E+03
S96T004616	156:10	Upper half	2.50E+03	2.33E+03	2.42E+03
S96T004638	156:10	Lower half	4.01E+03	4.28E+03	4.14E+03
S96T004639	156:11	Lower half	4.89E+03	4.84E+03	4.86E+03
S96T004640	156:12	Lower half	2.96E+03	2.88E+03	2.92E+03
S96T004285	156:13	Lower half	2.52E+03	2.52E+03	2.52E+03
S96T004641	156:14	Lower half	3.68E+03	4.51E+03	4.10E+03
S96T004642	156:15	Lower half	3.05E+03	2.36E+03	2.70E+03
S96T004643	156:17	Lower half	3.08E+03	3.02E+03	3.05E+03
S96T004286	156:18	Lower half	2.55E+03	3.29E+03	2.92E+03
S96T005246	154:Comp	Comp	4.02E+03	3.89E+03	3.96E+03
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	4.02E+03	4.04E+03	4.03E+03
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	339	339	339
S96T004115	154:13	DL	7.78E+03	7.56E+03	7.67E+03
S96T004116	154:14	DL	7.27E+03	8.49E+03	7.88E+03
S96T004117	154:15	DL	7.80E+03	7.41E+03	7.60E+03
S96T004118	154:16	DL	8.40E+03	8.13E+03	8.26E+03
S96T004671	154:17	DL	325	339	332
S96T004669	154:18	DL	8.34E+03	8.12E+03	8.23E+03
S96T004672	154:19	DL	2.03E+03	2.01E+03	2.02E+03
S96T004582	156:10	DL	6.42E+03	9.44E+03	7.93E+03
S96T004583	156:11	DL	8.34E+03	8.80E+03	8.57E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			μg/mL	μg/mL	μg/mL
S96T004584	156:11	DL	9.35E+03	9.35E+03	9.35E+03
S96T004289	156:13	DL	8.64E+03	7.64E+03	8.14E+03[QC:e]
S96T004585	156:14	DL	7.85E+03	7.65E+03	7.75E+03
S96T004586	156:15	DL	7.26E+03	7.15E+03	7.20E+03
S96T004587	156:17	DL	7.27E+03	7.61E+03	7.44E+03[QC:e]
S96T004290	156:18	DL	8.33E+03	7.73E+03	8.03E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			μg/g	μg/g	μg/g
S96T004717	154:1	Upper half	241	250	245.5
S96T004707	154:1	Lower half	504	414	459
S96T004719	154:2	Upper half	285	279	282
S96T004735	154:2	Lower half	537	613	575
S96T004718	154:3	Upper half	275	249	262
S96T004708	154:3	Lower half	355	361	358
S96T004720	154:4	Upper half	230	270	250
S96T004736	154:4	Lower half	461	491	476
S96T004721	154:6	Upper half	324	223	273.5
S96T004737	154:6	Lower half	345	233	289
S96T004070	154:7	Upper half	178	193	185.5
S96T004093	154:7	Lower half	185	196	190.5
S96T004722	154:9	Upper half	274	260	267
S96T004738	154:9	Lower half	303	300	301.5
S96T004094	154:10	Upper half	136	137	136.5
S96T004095	154:10	Lower half	112	125	118.5
S96T004096	154:13	Lower half	98.1	212	155.1
S96T004097	154:14	Lower half	161	88.5	124.8

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004098	154:15	Lower half	177	137	157
S96T004099	154:16	Lower half	165	134	149.5
S96T004739	154:18	Lower half	184	96.3	140.2
S96T004740	154:19	Lower half	232	189	210.5
S96T004597	156:1	Lower half	898	924	911
S96T004598	156:3	Lower half	545	518	531.5
S96T004610	156:3	Upper half	403	351	377
S96T004611	156:4	Upper half	422	504	463
S96T004634	156:4	Lower half	601	468	534.5
S96T004612	156:5	Upper half	529	420	474.5
S96T004635	156:5	Lower half	480	527	503.5
S96T004613	156:6	Upper half	471	482	476.5
S96T004636	156:6	Lower half	536	595	565.5
S96T004599	156:7	Lower half	454	512	483
S96T004614	156:7	Upper half	398	416	407
S96T004615	156:8	Upper half	537	506	521.5
S96T004637	156:8	Lower half	487	386	436.5
S96T004616	156:10	Upper half	358	280	319
S96T004638	156:10	Lower half	244	341	292.5
S96T004639	156:11	Lower half	668	652	660
S96T004640	156:12	Lower half	400	436	418
S96T004285	156:13	Lower half	413	334	373.5
S96T004641	156:14	Lower half	448	451	449.5
S96T004642	156:15	Lower half	514	520	517
S96T004643	156:17	Lower half	455	551	503
S96T004286	156:18	Lower half	312	478	395
S96T005246	154:Comp	Comp	295	503	399
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	321	393	357

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	158	160	159
S96T004115	154:13	DL	196	173	184.5
S96T004116	154:14	DL	182	148	165
S96T004117	154:15	DL	154	147	150.5
S96T004118	154:16	DL	135	127	131
S96T004671	154:17	DL	76.7	78.2	77.45
S96T004669	154:18	DL	95.3	83.7	89.5
S96T004672	154:19	DL	115	116	115.5
S96T004582	156:10	DL	136	201	168.5
S96T004583	156:11	DL	166	157	161.5
S96T004584	156:11	DL	177	168	172.5
S96T004289	156:13	DL	148	126	137
S96T004585	156:14	DL	142	134	138
S96T004586	156:15	DL	120	92	106
S96T004587	156:17	DL	106	104	105
S96T004290	156:18	DL	139	130	134.5

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	<14.30	<14.1	n/a
S96T004707	154:1	Lower half	<14.40	<14.3	n/a
S96T004719	154:2	Upper half	<14.30	<14.0	n/a
S96T004735	154:2	Lower half	<14.70	<14.5	n/a
S96T004718	154:3	Upper half	<14.30	<14.3	n/a
S96T004708	154:3	Lower half	21.9	21.6	21.75
S96T004720	154:4	Upper half	29.8	31.8	30.8
S96T004736	154:4	Lower half	21.8	22.1	21.95

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004721	154:6	Upper half	22.7	22.7	22.7
S96T004737	154:6	Lower half	24.3	25.8	25.05
S96T004070	154:7	Upper half	25	25.2	25.1
S96T004093	154:7	Lower half	24.4	24.1	24.25
S96T004722	154:9	Upper half	< 14.80	< 14.8	n/a
S96T004738	154:9	Lower half	< 13.30	< 13.2	n/a
S96T004094	154:10	Upper half	17.2	17.5	17.35
S96T004095	154:10	Lower half	15.2	15.5	15.35
S96T004096	154:13	Lower half	13.6	14.8	14.2
S96T004097	154:14	Lower half	15.7	14.6	15.15
S96T004098	154:15	Lower half	13.8	14.6	14.2
S96T004099	154:16	Lower half	14.9	13.9	14.4
S96T004739	154:18	Lower half	< 14.2	< 14.1	n/a
S96T004740	154:19	Lower half	<4.23	<4.22	n/a
S96T004597	156:1	Lower half	< 14.0	< 13.9	n/a
S96T004598	156:3	Lower half	< 14.5	< 14.2	n/a
S96T004610	156:3	Upper half	< 13.6	< 13.4	n/a
S96T004611	156:4	Upper half	< 14.2	n/a	n/a
S96T004634	156:4	Lower half	< 14.4	< 13.9	n/a
S96T004612	156:5	Upper half	< 14.0	< 13.9	n/a
S96T004635	156:5	Lower half	< 14.1	< 14.4	n/a
S96T004613	156:6	Upper half	25.9	25.3	25.6
S96T004636	156:6	Lower half	22.4	22.9	22.65
S96T004599	156:7	Lower half	20.9	19.5	20.2
S96T004614	156:7	Upper half	22	22.8	22.4
S96T004615	156:8	Upper half	25.1	23.8	24.45
S96T004637	156:8	Lower half	< 14.3	< 14.3	n/a
S96T004616	156:10	Upper half	< 13.9	< 14.1	n/a
S96T004638	156:10	Lower half	< 13.9	< 13.8	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004639	156:11	Lower half	<13.5	<13.0	n/a
S96T004640	156:12	Lower half	<14.1	<14.0	n/a
S96T004285	156:13	Lower half	14.2	14.6	14.4
S96T004641	156:14	Lower half	<13.7	<13.7	n/a
S96T004642	156:15	Lower half	<14.5	<14.4	n/a
S96T004643	156:17	Lower half	<14.1	<13.9	n/a
S96T004286	156:18	Lower half	14.7	12.9	13.8
S96T005246	154:Comp	Comp	<18.5	<19.5	n/a
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	12.6	12.1	12.35
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	1.13	1.12	1.125
S96T004115	154:13	DL	17.9	17.6	17.75
S96T004116	154:14	DL	17.3	19.1	18.2
S96T004117	154:15	DL	18.2	17	17.6
S96T004118	154:16	DL	20.3	19.5	19.9
S96T004671	154:17	DL	0.93	0.91	9.61E-01
S96T004669	154:18	DL	19.4	19.0	19.2
S96T004672	154:19	DL	6.31	6.14	6.225
S96T004582	156:10	DL	14.6	21.9	18.25
S96T004583	156:11	DL	19.5	19.5	19.5
S96T004584	156:11	DL	21.4	21.3	21.35
S96T004289	156:13	DL	20.1	17.3	18.7
S96T004585	156:14	DL	18.7	19	18.85
S96T004586	156:15	DL	<12.0	<12.0	n/a
S96T004587	156:17	DL	18.3	18.4	18.35
S96T004290	156:18	DL	19.5	18.2	18.85

Table B2-28. Tank 241-A-101 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	2.22E+05	2.19E+05	2.20E+05
S96T004707	154:1	Lower half	2.16E+05	2.12E+05	2.14E+05
S96T004719	154:2	Upper half	2.13E+05	2.15E+05	2.14E+05
S96T004735	154:2	Lower half	2.06E+05	2.08E+05	2.07E+05
S96T004718	154:3	Upper half	2.09E+05	2.06E+05	2.08E+05
S96T004708	154:3	Lower half	2.24E+05	2.21E+05	2.22E+05
S96T004720	154:4	Upper half	2.17E+05	2.15E+05	2.16E+05
S96T004736	154:4	Lower half	2.24E+05	2.24E+05	2.24E+05
S96T004721	154:6	Upper half	2.24E+05	1.99E+05	2.12E+05
S96T004737	154:6	Lower half	2.19E+05	2.45E+05	2.32E+05
S96T004070	154:7	Upper half	2.12E+05	2.13E+05	2.12E+05
S96T004093	154:7	Lower half	2.18E+05	2.20E+05	2.19E+05
S96T004722	154:9	Upper half	2.28E+05	2.26E+05	2.27E+05
S96T004738	154:9	Lower half	2.27E+05	2.17E+05	2.22E+05
S96T004094	154:10	Upper half	1.81E+05	1.86E+05	1.84E+05
S96T004095	154:10	Lower half	1.86E+05	1.90E+05	1.88E+05
S96T004096	154:13	Lower half	1.98E+05	2.13E+05	2.06E+05
S96T004097	154:14	Lower half	2.21E+05	2.05E+05	2.13E+05
S96T004098	154:15	Lower half	1.98E+05	2.03E+05	2.00E+05
S96T004099	154:16	Lower half	2.07E+05	2.02E+05	2.04E+05
S96T004739	154:18	Lower half	2.30E+05	2.28E+05	2.29E+05
S96T004740	154:19	Lower half	6.27E+04	6.33E+04	6.30E+04
S96T004597	156:1	Lower half	2.14E+05	2.08E+05	2.11E+05
S96T004598	156:3	Lower half	2.18E+05	2.15E+05	2.16E+05
S96T004610	156:3	Upper half	2.13E+05	2.14E+05	2.14E+05
S96T004611	156:4	Upper half	2.18E+05	n/a	n/a
S96T004634	156:4	Lower half	2.23E+05	2.18E+05	2.20E+05
S96T004612	156:5	Upper half	2.15E+05	2.20E+05	2.18E+05
S96T004635	156:5	Lower half	2.20E+05	2.27E+05	2.24E+05

Table B2-28. Tank 241-A-101 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004613	156:6	Upper half	2.26E+05	2.26E+05	2.26E+05
S96T004636	156:6	Lower half	2.27E+05	2.23E+05	2.25E+05
S96T004599	156:7	Lower half	2.17E+05	2.21E+05	2.19E+05
S96T004614	156:7	Upper half	2.21E+05	2.25E+05	2.23E+05
S96T004615	156:8	Upper half	2.26E+05	2.29E+05	2.28E+05
S96T004637	156:8	Lower half	2.25E+05	2.20E+05	2.22E+05
S96T004616	156:10	Upper half	2.46E+05	2.22E+05	2.34E+05
S96T004638	156:10	Lower half	1.86E+05	1.84E+05	1.85E+05
S96T004639	156:11	Lower half	1.75E+05	1.76E+05	1.76E+05
S96T004640	156:12	Lower half	2.12E+05	2.03E+05	2.08E+05
S96T004285	156:13	Lower half	2.07E+05	2.07E+05	2.07E+05
S96T004641	156:14	Lower half	1.90E+05	1.74E+05	1.82E+05
S96T004642	156:15	Lower half	2.05E+05	2.03E+05	2.04E+05
S96T004643	156:17	Lower half	2.03E+05	2.03E+05	2.03E+05
S96T004286	156:18	Lower half	2.09E+05	1.86E+05	1.98E+05
S96T005246	154:Comp	Comp	1.83E+05	1.79E+05	1.81E+05
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	1.91E+05	1.91E+05	1.91E+05
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	1.58E+04	1.59E+04	1.58E+04
S96T004115	154:13	DL	2.53E+05	2.49E+05	2.51E+05
S96T004116	154:14	DL	2.33E+05	2.67E+05	2.50E+05
S96T004117	154:15	DL	2.55E+05	2.43E+05	2.49E+05[QC:c]
S96T004118	154:16	DL	2.68E+05	2.60E+05	2.64E+05
S96T004671	154:17	DL	1.36E+04	1.37E+04	1.36E+04[QC:d]
S96T004669	154:18	DL	2.75E+05	2.67E+05	2.71E+05
S96T004672	154:19	DL	8.61E+04	8.57E+04	8.59E+04
S96T004582	156:10	DL	2.05E+05	2.96E+05	2.50E+05[QC:c]
S96T004583	156:11	DL	2.62E+05	2.77E+05	2.70E+05

Table B2-28. Tank 241-A-101 Analytical Results: Sodium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004584	156:11	DL	2.96E+05	2.91E+05	2.94E+05
S96T004289	156:13	DL	2.87E+05	2.57E+05	2.72E+05
S96T004585	156:14	DL	2.71E+05	2.62E+05	2.66E+05
S96T004586	156:15	DL	2.46E+05	2.43E+05	2.44E+05[QC:c]
S96T004587	156:17	DL	2.46E+05	2.54E+05	2.50E+05[QC:c]
S96T004290	156:18	DL	2.66E+05	2.56E+05	2.61E+05

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	7.78E+03	7.50E+03	7.64E+03
S96T004707	154:1	Lower half	6.77E+03	6.23E+03	6.50E+03
S96T004719	154:2	Upper half	8.19E+03	8.39E+03	8.29E+03
S96T004735	154:2	Lower half	7.14E+03	7.19E+03	7.16E+03
S96T004718	154:3	Upper half	7.40E+03	7.31E+03	7.36E+03
S96T004708	154:3	Lower half	8.20E+03	7.94E+03	8.07E+03
S96T004720	154:4	Upper half	8.23E+03	8.37E+03	8.30E+03
S96T004736	154:4	Lower half	8.29E+03	8.08E+03	8.18E+03
S96T004721	154:6	Upper half	9.43E+03	8.96E+03	9.20E+03
S96T004737	154:6	Lower half	1.00E+04	9.96E+03	9.98E+03
S96T004070	154:7	Upper half	9.12E+03	9.53E+03	9.32E+03
S96T004093	154:7	Lower half	1.10E+04	1.14E+04	1.12E+04
S96T004722	154:9	Upper half	9.47E+03	9.53E+03	9.50E+03
S96T004738	154:9	Lower half	7.07E+03	6.69E+03	6.88E+03
S96T004094	154:10	Upper half	2.48E+03	2.73E+03	2.60E+03
S96T004095	154:10	Lower half	1.97E+03	1.89E+03	1.93E+03
S96T004096	154:13	Lower half	235	205	220
S96T004097	154:14	Lower half	184	238	211

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004098	154:15	Lower half	262	230	246
S96T004099	154:16	Lower half	233	251	242
S96T004739	154:18	Lower half	149	159	154
S96T004740	154:19	Lower half	270	267	268.5
S96T004597	156:1	Lower half	4.93E+03	4.75E+03	4.84E+03
S96T004598	156:3	Lower half	7.01E+03	6.87E+03	6.94E+03
S96T004610	156:3	Upper half	7.02E+03	6.93E+03	6.98E+03
S96T004611	156:4	Upper half	7.24E+03	n/a	n/a
S96T004634	156:4	Lower half	8.29E+03	8.08E+03	8.18E+03
S96T004612	156:5	Upper half	9.40E+03	8.96E+03	9.18E+03
S96T004635	156:5	Lower half	9.74E+03	8.93E+03	9.34E+03
S96T004613	156:6	Upper half	8.95E+03	9.89E+03	9.42E+03
S96T004636	156:6	Lower half	9.76E+03	9.34E+03	9.55E+03
S96T004599	156:7	Lower half	8.26E+03	8.44E+03	8.35E+03
S96T004614	156:7	Upper half	1.06E+04	1.07E+04	1.06E+04
S96T004615	156:8	Upper half	9.80E+03	9.12E+03	9.46E+03
S96T004637	156:8	Lower half	7.38E+03	7.55E+03	7.46E+03
S96T004616	156:10	Upper half	197	186	192
S96T004638	156:10	Lower half	1.47E+03	1.54E+03	1.50E+03
S96T004639	156:11	Lower half	367	387	377
S96T004640	156:12	Lower half	229	227	228
S96T004285	156:13	Lower half	181	179	180
S96T004641	156:14	Lower half	263	326	295
S96T004642	156:15	Lower half	216	170	193
S96T004643	156:17	Lower half	211	216	214
S96T004286	156:18	Lower half	238	298	268
S96T005246	154:Comp	Comp	3.98E+03	4.09E+03	4.04E+03
Solids: water digest			µg/g	µg/g	µg/g
S96T005248	154:Comp	Comp	4.48E+03	4.43E+03	4.46E+03

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			μg/mL	μg/mL	μg/mL
S96T004110	154:11	DL	178	182	180
S96T004115	154:13	DL	529	549	539
S96T004116	154:14	DL	416	518	467
S96T004117	154:15	DL	456	455	455.5
S96T004118	154:16	DL	512	515	513.5
S96T004671	154:17	DL	99.7	108	103.8[QC:d]
S96T004669	154:18	DL	420	315	367.5
S96T004672	154:19	DL	366	364	365
S96T004582	156:10	DL	386	664	525
S96T004583	156:11	DL	540	563	551.5
S96T004584	156:11	DL	683	673	678
S96T004289	156:13	DL	507	469	488
S96T004585	156:14	DL	514	495	504.5
S96T004586	156:15	DL	560	344	452[QC:e]
S96T004587	156:17	DL	379	308	343.5
S96T004290	156:18	DL	491	465	478

Table B2-30. Tank 241-A-101 Analytical Results: Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest			μg/g	μg/g	μg/g
S96T004717	154:1	Upper half	<715	<704	n/a
S96T004707	154:1	Lower half	<720	<715	n/a
S96T004719	154:2	Upper half	728	723	725.5
S96T004735	154:2	Lower half	<736	<723	n/a
S96T004718	154:3	Upper half	<714	720	n/a
S96T004708	154:3	Lower half	608	619	613.5
S96T004720	154:4	Upper half	785	823	804
S96T004736	154:4	Lower half	649	648	648.5

Table B2-30. Tank 241-A-101 Analytical Results: Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			µg/g	µg/g	µg/g
S96T004721	154:6	Upper half	713	775	744
S96T004737	154:6	Lower half	880	834	857
S96T004070	154:7	Upper half	892	907	899.5
S96T004093	154:7	Lower half	912	950	931
S96T004722	154:9	Upper half	925	1.06E+03	992.5
S96T004738	154:9	Lower half	854	982	918
S96T004094	154:10	Upper half	440	450	445
S96T004095	154:10	Lower half	<245	<246	n/a
S96T004096	154:13	Lower half	<248	<246	n/a
S96T004097	154:14	Lower half	<253	<235	n/a
S96T004098	154:15	Lower half	<248	<236	n/a
S96T004099	154:16	Lower half	<231	<228	n/a
S96T004739	154:18	Lower half	<711	<704	n/a
S96T004740	154:19	Lower half	339	280	309.5
S96T004597	156:1	Lower half	<699	<693	n/a
S96T004598	156:3	Lower half	<723	<710	n/a
S96T004610	156:3	Upper half	846	785	815.5
S96T004611	156:4	Upper half	<711	<703	n/a
S96T004634	156:4	Lower half	<719	<695	n/a
S96T004612	156:5	Upper half	1.00E+03	845	922.5
S96T004635	156:5	Lower half	977	812	894.5
S96T004613	156:6	Upper half	1.01E+03	939	974.5
S96T004636	156:6	Lower half	785	860	822.5
S96T004599	156:7	Lower half	579	595	587
S96T004614	156:7	Upper half	724	754	739
S96T004615	156:8	Upper half	914	864	889
S96T004637	156:8	Lower half	945	951	948
S96T004616	156:10	Upper half	<696	<705	n/a
S96T004638	156:10	Lower half	<696	<689	n/a

Table B2-30. Tank 241-A-101 Analytical Results: Uranium (ICP). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: acid digest (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T004639	156:11	Lower half	<677	<649	n/a
S96T004640	156:12	Lower half	<705	<701	n/a
S96T004285	156:13	Lower half	<305	<331	n/a
S96T004641	156:14	Lower half	<686	<683	n/a
S96T004642	156:15	Lower half	<724	<718	n/a
S96T004643	156:17	Lower half	<705	<696	n/a
S96T004286	156:18	Lower half	<308	<303	n/a
S96T005246	154:Comp	Comp	<923	<973	n/a
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
S96T005248	154:Comp	Comp	<286	<302	n/a
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T004110	154:11	DL	<20.5	<20.5	n/a
S96T004115	154:13	DL	<300	<300	n/a
S96T004116	154:14	DL	<300	<300	n/a
S96T004117	154:15	DL	<300	<300	n/a
S96T004118	154:16	DL	<300	<300	n/a
S96T004671	154:17	DL	<20.5	<20.5	n/a
S96T004669	154:18	DL	<300	<300	n/a
S96T004672	154:19	DL	<100	<100	n/a
S96T004582	156:10	DL	<300	<300	n/a
S96T004583	156:11	DL	<300	<300	n/a
S96T004584	156:11	DL	<300	<300	n/a
S96T004289	156:13	DL	<300	<300	n/a
S96T004585	156:14	DL	<300	<300	n/a
S96T004586	156:15	DL	<600	<600	n/a
S96T004587	156:17	DL	<300	<300	n/a
S96T004290	156:18	DL	<300	<300	n/a

Table B2-31. Tank 241-A-101 Analytical Results: Uranium by Phosphorescence.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			μg/g	μg/g	μg/g
S96T004730	154:4	Lower half	781	878	820
S96T004090	154:14	Lower half	5.22	4.23	4.725
S96T004734	154:19	Lower half	354	344	349
S96T005245	154:Comp	Comp	395	429	412

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			μg/g	μg/g	μg/g
S96T004717	154:1	Upper half	<14.3	15.1	n/a
S96T004707	154:1	Lower half	<14.4	<14.3	n/a
S96T004719	154:2	Upper half	<14.3	<14.0	n/a
S96T004735	154:2	Lower half	<14.7	<14.5	n/a
S96T004718	154:3	Upper half	<14.3	<14.3	n/a
S96T004708	154:3	Lower half	10.1	10.2	10.15
S96T004720	154:4	Upper half	13.3	13.2	13.25
S96T004736	154:4	Lower half	8.78	10.5	9.64
S96T004721	154:6	Upper half	14.5	11.4	12.95
S96T004737	154:6	Lower half	16.8	16	16.4
S96T004070	154:7	Upper half	16.2	16.2	16.2
S96T004093	154:7	Lower half	10.7	12.6	11.65
S96T004722	154:9	Upper half	30.4	31.3	30.85
S96T004738	154:9	Lower half	<13.3	<13.2	n/a
S96T004094	154:10	Upper half	160	162	161
S96T004095	154:10	Lower half	9.46	10.5	9.98
S96T004096	154:13	Lower half	8.18	8.58	8.38
S96T004097	154:14	Lower half	7.06	7.08	7.07
S96T004098	154:15	Lower half	<4.96	<4.72	n/a
S96T004099	154:16	Lower half	<4.63	<4.57	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			μg/g	μg/g	μg/g
S96T004739	154:18	Lower half	<14.2	<14.1	n/a
S96T004740	154:19	Lower half	20.8	19.6	20.2
S96T004597	156:1	Lower half	17.7	<13.9	n/a
S96T004598	156:3	Lower half	35.3	18.9	27.1
S96T004610	156:3	Upper half	<13.60	<13.4	n/a
S96T004611	156:4	Upper half	19.7	36.2	27.95
S96T004634	156:4	Lower half	16.4	35.1	25.75
S96T004612	156:5	Upper half	35.9	38	36.95
S96T004635	156:5	Lower half	49.9	21.6	35.75
S96T004613	156:6	Upper half	17.3	14.7	16
S96T004636	156:6	Lower half	13.2	14.9	14.05
S96T004599	156:7	Lower half	7.5	8.26	7.88
S96T004614	156:7	Upper half	15.3	14.4	14.85
S96T004615	156:8	Upper half	36.9	30.1	33.5
S96T004637	156:8	Lower half	<14.3	<14.3	n/a
S96T004616	156:10	Upper half	14.1	<14.1	n/a
S96T004638	156:10	Lower half	27.5	28.4	27.95
S96T004639	156:11	Lower half	<13.5	<13.0	n/a
S96T004640	156:12	Lower half	15.8	<14.0	n/a
S96T004285	156:13	Lower half	9.77	14.7	12.23
S96T004641	156:14	Lower half	<13.7	14.1	n/a
S96T004642	156:15	Lower half	<14.5	<14.4	n/a
S96T004643	156:17	Lower half	<14.1	<13.9	n/a
S96T004286	156:18	Lower half	13.3	13.9	13.6
S96T005246	154:Comp	Comp	61.5	66.3	63.9
Solids: water digest			μg/g	μg/g	μg/g
S96T005248	154:Comp	Comp	<5.72	<6.04	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	1.9	1.93	1.915
S96T004115	154:13	DL	<6.01	<6.01	n/a
S96T004116	154:14	DL	<6.01	<6.01	n/a
S96T004117	154:15	DL	<6.01	<6.01	n/a
S96T004118	154:16	DL	<6.01	<6.01	n/a
S96T004671	154:17	DL	5.19	5.2	5.195
S96T004669	154:18	DL	6.82	6.32	6.57
S96T004672	154:19	DL	8.82	9.18	9
S96T004582	156:10	DL	18.5	26.4	22.45
S96T004583	156:11	DL	14.5	7.62	11.06
S96T004584	156:11	DL	25.2	20.8	23
S96T004289	156:13	DL	<6.01	<6.01	n/a
S96T004585	156:14	DL	7.72	7.09	7.405
S96T004586	156:15	DL	<12.0	<12.0	n/a
S96T004587	156:17	DL	<6.01	6.43	n/a
S96T004290	156:18	DL	<6.01	<6.01	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004717	154:1	Upper half	29.1	29	29.05
S96T004707	154:1	Lower half	25.9	20.2	23.05
S96T004719	154:2	Upper half	31.8	33.5	32.65
S96T004735	154:2	Lower half	22.8	25.4	24.1
S96T004718	154:3	Upper half	31.3	35	33.15
S96T004708	154:3	Lower half	32.6	35	33.8
S96T004720	154:4	Upper half	52.1	50	51.05
S96T004736	154:4	Lower half	37.6	35.8	36.7

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004721	154:6	Upper half	45.2	47.6	46.4
S96T004737	154:6	Lower half	54.4	51.1	52.75
S96T004070	154:7	Upper half	60.4	59.6	60
S96T004093	154:7	Lower half	57.9	59.8	58.85
S96T004722	154:9	Upper half	60.6	66.4	63.5
S96T004738	154:9	Lower half	50.8	53.2	52
S96T004094	154:10	Upper half	31.1	32.4	31.75
S96T004095	154:10	Lower half	17.9	17.8	17.85
S96T004096	154:13	Lower half	5.13	10.9	8.015
S96T004097	154:14	Lower half	6.33	8.42	7.375
S96T004098	154:15	Lower half	<4.960	<4.72	n/a
S96T004099	154:16	Lower half	5.08	<4.57	n/a
S96T004739	154:18	Lower half	<14.20	<14.1	n/a
S96T004740	154:19	Lower half	10.8	9.08	9.94
S96T004597	156:1	Lower half	18.8	22.4	20.6
S96T004598	156:3	Lower half	30.3	24.8	27.55
S96T004610	156:3	Upper half	36.3	36.7	36.5
S96T004611	156:4	Upper half	29.6	35.8	32.7
S96T004634	156:4	Lower half	39.1	33.7	36.4
S96T004612	156:5	Upper half	52.8	47.6	50.2
S96T004635	156:5	Lower half	56.4	47.7	52.05
S96T004613	156:6	Upper half	71.2	64.1	67.65
S96T004636	156:6	Lower half	50.8	53.4	52.1
S96T004599	156:7	Lower half	34.5	36.5	35.5
S96T004614	156:7	Upper half	45.9	47.4	46.65
S96T004615	156:8	Upper half	53.7	53.6	53.65
S96T004637	156:8	Lower half	49.3	49.4	49.35
S96T004616	156:10	Upper half	<13.9	<14.1	n/a
S96T004638	156:10	Lower half	<13.9	<13.8	n/a

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

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			μg/g	μg/g	μg/g
S96T004639	156:11	Lower half	<13.5	<13.0	n/a
S96T004640	156:12	Lower half	<14.1	<14.0	n/a
S96T004285	156:13	Lower half	<6.10	<6.62	n/a
S96T004641	156:14	Lower half	<13.7	<13.7	n/a
S96T004642	156:15	Lower half	<14.5	<14.4	n/a
S96T004643	156:17	Lower half	<14.1	<13.9	n/a
S96T004286	156:18	Lower half	<6.16	6.6	n/a
S96T005246	154:Comp	Comp	28.6	28	28.3
Solids: water digest			μg/g	μg/g	μg/g
S96T005248	154:Comp	Comp	<5.72	<6.04	n/a
Liquids			μg/mL	μg/mL	μg/mL
S96T004110	154:11	DL	<0.41	<0.41	n/a
S96T004115	154:13	DL	<6.01	<6.01	n/a
S96T004116	154:14	DL	<6.01	<6.01	n/a
S96T004117	154:15	DL	<6.01	<6.01	n/a
S96T004118	154:16	DL	<6.01	<6.01	n/a
S96T004671	154:17	DL	<0.41	<0.4	n/a
S96T004669	154:18	DL	<6.01	<6.01	n/a
S96T004672	154:19	DL	<2.01	<2.01	n/a
S96T004582	156:10	DL	9.07	7.53	8.3
S96T004583	156:11	DL	<6.01	<6.01	n/a
S96T004584	156:11	DL	8.55	<6.01	n/a
S96T004289	156:13	DL	<6.01	<6.01	n/a
S96T004585	156:14	DL	<6.01	<6.01	n/a
S96T004586	156:15	DL	<12.0	<12.0	n/a
S96T004587	156:17	DL	<6.01	<6.01	n/a
S96T004290	156:18	DL	<6.01	<6.01	n/a

Table B2-34. Tank 241-A-101 Analytical Results: Bromide (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest			μg/g	μg/g	μg/g
S96T004723	154:1	Upper half	<534	<519	n/a
S96T004709	154:1	Lower half	<532	<517	n/a
S96T004725	154:2	Upper half	613	561	586.9
S96T004741	154:2	Lower half	<361	<360	n/a
S96T004724	154:3	Upper half	<523	<516	n/a
S96T004710	154:3	Lower half	<518	<518	n/a
S96T004726	154:4	Upper half	550	529	527
S96T004742	154:4	Lower half	<393	<398	n/a
S96T004727	154:6	Upper half	514E	503	508.6
S96T004743	154:6	Lower half	667	658	662.7
S96T004071	154:7	Upper half	<1.16E+03	<1.16E+03	n/a
S96T004100	154:7	Lower half	<1.32E+03	<1.27E+03	n/a
S96T004728	154:9	Upper half	459	469	464.2
S96T004744	154:9	Lower half	<281	<277	n/a
S96T004101	154:10	Upper half	<1.27E+03	<1.28E+03	n/a
S96T004102	154:10	Lower half	<1.34E+03	<1.35E+03	n/a
S96T004103	154:13	Lower half	<1.09E+03	<2.63E+03	n/a
S96T004104	154:14	Lower half	<2.68E+03	<2.75E+03	n/a
S96T004105	154:15	Lower half	<2.59E+03	<2.48E+03	n/a
S96T004106	154:16	Lower half	<2.63E+03	<2.73E+03	n/a
S96T004745	154:18	Lower half	<1.29E+03	<1.28E+03	n/a
S96T004746	154:19	Lower half	1.36E+04	1.42E+04	1.39E+04
S96T004600	156:1	Lower half	<526	<518	n/a
S96T004601	156:3	Lower half	<970	<953	n/a
S96T004617	156:3	Upper half	673	645	658.8
S96T004618	156:4	Upper half	1.06E+03	1.09E+03	1.07E+03
S96T004644	156:4	Lower half	<1.01E+03	<1.01E+03	n/a
S96T004619	156:5	Upper half	1.50E+03	1.43E+03	1.46E+03
S96T004645	156:5	Lower half	<1.03E+03	<1.04E+03	n/a

Table B2-34. Tank 241-A-101 Analytical Results: Bromide (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: water digest (Cont'd)			µg/g	µg/g	µg/g
S96T004620	156:6	Upper half	1.08E+03	1.08E+03	1.08E+03
S96T004646	156:6	Lower half	<1.02E+03	<1.01E+03	n/a
S96T004602	156:7	Lower half	<1.02E+03	<1.02E+03	n/a
S96T004621	156:7	Upper half	1.04E+03	1.10E+03	1.07E+03
S96T004622	156:8	Upper half	7.60E+02	872	815.9
S97T000006	156:8	Lower half	<2.55E+03	<2.56E+03	n/a
S97T000003	156:10	Lower half	1.99E+03	1.97E+03	1.98E+03
S97T000005	156:10	Upper half	<9.54E+02	<953	n/a
S97T000004	156:11	Lower half	1.30E+03	1.30E+03	1.30E+03
S96T004650	156:12	Lower half	<9.42E+02	<936	n/a
S96T004287	156:13	Lower half	1.06E+03	1.07E+03	1.07E+03
S96T004651	156:14	Lower half	1.11E+03	1.25E+03	1.18E+03
S96T004652	156:15	Lower half	6.57E+02	658	657.5
S96T004653	156:17	Lower half	<5.28E+02	<528	n/a
S96T004288	156:18	Lower half	<1.02E+03	<1.02E+03	n/a
S96T005247	154:Comp	Comp	1.66E+03	2.00E+03	1.83E+03
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	6.91E+04	6.48E+04	6.69E+04
S96T004115	154:13	DL	1.30E+03	1.27E+03	1.28E+03
S96T004116	154:14	DL	8.54E+02	873	863.5
S96T004117	154:15	DL	8.88E+02	959	923.6
S96T004118	154:16	DL	6.88E+02	715	701.5
S96T004671	154:17	DL	2.52E+02	255	253.3
S96T004669	154:18	DL	<5.18E+02	<518	n/a
S96T004672	154:19	DL	1.80E+04	1.76E+04	1.78E+04
S96T004582	156:10	DL	<6.44E+02	<644	n/a
S96T004583	156:11	DL	1.48E+03	1.52E+03	1.50E+03
S96T004584	156:11	DL	1.70E+03	1.66E+03	1.68E+03
S96T004289	156:13	DL	1.63E+03	1.75E+03	1.69E+03

Table B2-34. Tank 241-A-101 Analytical Results: Bromide (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004585	156:14	DL	<1.28E+03	1.29E+03	n/a
S96T004586	156:15	DL	1.57E+03	1.55E+03	1.56E+03
S96T004587	156:17	DL	<518	<518	n/a
S96T004290	156:18	DL	974	931	952.5

Table B2-35. Tank 241-A-101 Analytical Results: Chloride (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004723	154:1	Upper half	3.98E+03	3.74E+03	3.86E+03
S96T004709	154:1	Lower half	4.79E+03	4.87E+03	4.83E+03
S96T004725	154:2	Upper half	4.68E+03	4.58E+03	4.63E+03
S96T004741	154:2	Lower half	4.95E+03	4.59E+03	4.77E+03
S96T004724	154:3	Upper half	4.51E+03	4.41E+03	4.46E+03
S96T004710	154:3	Lower half	4.70E+03	4.41E+03	4.56E+03
S96T004726	154:4	Upper half	4.22E+03	4.28E+03	4.25E+03
S96T004742	154:4	Lower half	4.36E+03	4.33E+03	4.34E+03
S96T004727	154:6	Upper half	3.82E+03	4.21E+03	4.01E+03
S96T004743	154:6	Lower half	3.92E+03	3.95E+03	3.94E+03
S96T004071	154:7	Upper half	4.32E+03	4.21E+03	4.26E+03
S96T004100	154:7	Lower half	4.30E+03	4.10E+03	4.20E+03
S96T004728	154:9	Upper half	4.26E+03	4.04E+03	4.15E+03
S96T004744	154:9	Lower half	4.32E+03	4.18E+03	4.25E+03
S96T004101	154:10	Upper half	6.08E+03	5.00E+03	5.54E+03
S96T004102	154:10	Lower half	5.40E+03	5.14E+03	5.27E+03
S96T004103	154:13	Lower half	3.01E+03	3.46E+03	3.24E+03
S96T004104	154:14	Lower half	3.63E+03	3.42E+03	3.53E+03
S96T004105	154:15	Lower half	4.31E+03	4.05E+03	4.18E+03
S96T004106	154:16	Lower half	4.28E+03	4.40E+03	4.34E+03

Table B2-35. Tank 241-A-101 Analytical Results: Chloride (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004745	154:18	Lower half	2.19E+03	1.82E+03	2.01E+03
S96T004746	154:19	Lower half	1.76E+03	1.75E+03	1.76E+03
S96T004600	156:1	Lower half	3.89E+03	3.78E+03	3.83E+03
S96T004601	156:3	Lower half	4.04E+03	4.01E+03	4.02E+03
S96T004617	156:3	Upper half	4.09E+03	3.79E+03	3.94E+03
S96T004618	156:4	Upper half	4.15E+03	4.25E+03	4.20E+03
S96T004644	156:4	Lower half	4.20E+03	4.42E+03	4.31E+03
S96T004619	156:5	Upper half	4.20E+03	4.11E+03	4.15E+03
S96T004645	156:5	Lower half	4.30E+03	4.32E+03	4.31E+03
S96T004620	156:6	Upper half	4.46E+03	4.13E+03	4.29E+03
S96T004646	156:6	Lower half	4.24E+03	4.07E+03	4.15E+03
S96T004602	156:7	Lower half	4.49E+03	4.04E+03	4.27E+03
S96T004621	156:7	Upper half	3.37E+03	4.05E+03	3.71E+03
S96T004622	156:8	Upper half	3.78E+03	3.97E+03	3.87E+03
S97T000006	156:8	Lower half	4.22E+03	3.78E+03	4.00E+03
S97T000003	156:10	Lower half	4.89E+03	5.09E+03	4.99E+03
S97T000005	156:10	Upper half	2.37E+03	2.18E+03	2.28E+03
S97T000004	156:11	Lower half	6.01E+03	6.04E+03	6.02E+03
S96T004650	156:12	Lower half	3.34E+03	3.48E+03	3.41E+03
S96T004287	156:13	Lower half	2.83E+03	2.66E+03	2.74E+03
S96T004651	156:14	Lower half	3.97E+03	5.42E+03	4.70E+03
S96T004652	156:15	Lower half	1.82E+03	1.77E+03	1.79E+03
S96T004653	156:17	Lower half	1.85E+03	1.98E+03	1.91E+03
S96T004288	156:18	Lower half	4.28E+03	4.01E+03	4.14E+03
S96T005247	154:Comp	Comp	5.22E+03	5.02E+03	5.12E+03
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	1.48E+03	1.45E+03	1.46E+03
S96T004115	154:13	DL	9.69E+03	9.70E+03	9.69E+03
S96T004116	154:14	DL	9.44E+03	9.23E+03	9.33E+03

Table B2-35. Tank 241-A-101 Analytical Results: Chloride (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004117	154:15	DL	1.00E+04	1.03E+04	1.02E+04
S96T004118	154:16	DL	9.14E+03	9.10E+03	9.12E+03
S96T004671	154:17	DL	4.049+03	4.12+03	4.085+03
S96T004669	154:18	DL	1.11E+04	1.12E+04	1.12E+04
S96T004672	154:19	DL	2.34E+03	2.38E+03	2.36E+03
S96T004582	156:10	DL	7.01E+03	6.82E+03	6.92E+03
S96T004583	156:11	DL	8.86E+03	8.68E+03	8.77E+03
S96T004584	156:11	DL	9.21E+03	9.00E+03	9.10E+03
S96T004289	156:13	DL	9.22E+03	9.23E+03	9.22E+03
S96T004585	156:14	DL	8.33E+03	8.11E+03	8.22E+03
S96T004586	156:15	DL	9.04E+03	9.15E+03	9.10E+03
S96T004587	156:17	DL	1.37E+04	1.36E+04	1.36E+04
S96T004290	156:18	DL	9.64E+03	9.64E+03	9.64E+03

Table B2-36. Tank 241-A-101 Analytical Results: Fluoride (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004723	154:1	Upper half	307	186	246.6
S96T004709	154:1	Lower half	225	264	244.6
S96T004725	154:2	Upper half	328	316	321.9
S96T004741	154:2	Lower half	<36.6	<34.5	n/a
S96T004724	154:3	Upper half	323	309	315.9
S96T004710	154:3	Lower half	534	499	516.3
S96T004726	154:4	Upper half	498	463	480.2
S96T004742	154:4	Lower half	488	459	473.5
S96T004727	154:6	Upper half	529	523	526
S96T004743	154:6	Lower half	677	689	683
S96T004071	154:7	Upper half	1.02E+03	971	995.5

Table B2-36. Tank 241-A-101 Analytical Results: Fluoride (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004100	154:7	Lower half	1.11E+03	880	993
S96T004728	154:9	Upper half	467	541	504.1
S96T004744	154:9	Lower half	319	297	307.9
S96T004101	154:10	Upper half	<122	<123	n/a
S96T004102	154:10	Lower half	<129	<129	n/a
S96T004103	154:13	Lower half	<258	<252	n/a
S96T004104	154:14	Lower half	480	<264	n/a
S96T004105	154:15	Lower half	<248	<238	n/a
S96T004106	154:16	Lower half	<252	<262	n/a
S96T004745	154:18	Lower half	500	503	537
S96T004746	154:19	Lower half	<124	<123	n/a
S96T004600	156:1	Lower half	<50.5	<49.7	n/a
S96T004601	156:3	Lower half	<93.1	<91.5	n/a
S96T004617	156:3	Upper half	<51.3	<51.5	n/a
S96T004618	156:4	Upper half	<97.6	<97.0	n/a
S96T004644	156:4	Lower half	539	534	536.5
S96T004619	156:5	Upper half	844	1.02E+03	932
S96T004645	156:5	Lower half	1.01E+03	1.00E+03	1.01E+03
S96T004620	156:6	Upper half	904	880	892
S96T004646	156:6	Lower half	954	913	933.5
S96T004602	156:7	Lower half	1.81E+03	1.33E+03	1.57E+03
S96T004621	156:7	Upper half	899	1.07E+03	985
S96T004622	156:8	Upper half	646	608	627
S97T000006	156:8	Lower half	467	457	462
S97T000003	156:10	Lower half	361	355	358
S97T000005	156:10	Upper half	579	560	569.5
S97T000004	156:11	Lower half	614	693	653.5
S96T004650	156:12	Lower half	<90.5	732	n/a
S96T004287	156:13	Lower half	1.27E+03	1.25E+03	1.26E+03

Table B2-36. Tank 241-A-101 Analytical Results: Fluoride (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004651	156:14	Lower half	<94.4	<92.2	n/a
S96T004652	156:15	Lower half	368	369	368.5
S96T004653	156:17	Lower half	369	379	374
S96T004288	156:18	Lower half	1.47E+03	<242	n/a
S96T005247	154:Comp	Comp	<225	<238	n/a
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	<122	<122	n/a
S96T004115	154:13	DL	<67.0	<67.0	n/a[QC:c]
S96T004116	154:14	DL	<53.8	<53.8	n/a
S96T004117	154:15	DL	<67.0	<67.0	n/a
S96T004118	154:16	DL	<53.8	<53.8	n/a
S96T004671	154:17	DL	0.406	0.255	0.331[QC:e]
S96T004669	154:18	DL	<49.7	<49.7	n/a
S96T004672	154:19	DL	1.89E+02	179	184
S96T004582	156:10	DL	<61.8	<61.8	n/a
S96T004583	156:11	DL	<122	<122	n/a
S96T004584	156:11	DL	<122	<122	n/a
S96T004289	156:13	DL	<67.0	<67.0	n/a[QC:c]
S96T004585	156:14	DL	<122	<122	n/a
S96T004586	156:15	DL	<49.7	<49.7	n/a[QC:c]
S96T004587	156:17	DL	<49.7	<49.7	n/a[QC:c]
S96T004290	156:18	DL	<67.0	<67.0	n/a

Table B2-37. Tank 241-A-101 Analytical Results: Nitrate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004723	154:1	Upper half	2.04E+05	1.68E+05	1.86E+05
S96T004709	154:1	Lower half	1.69E+05	1.63E+05	1.66E+05
S96T004725	154:2	Upper half	1.49E+05	1.32E+05	1.41E+05
S96T004741	154:2	Lower half	1.35E+05	1.59E+05	1.47E+05
S96T004724	154:3	Upper half	1.40E+05	1.60E+05	1.50E+05
S96T004710	154:3	Lower half	1.26E+05	1.46E+05	1.36E+05
S96T004726	154:4	Upper half	1.45E+05	1.51E+05	1.48E+05
S96T004742	154:4	Lower half	1.61E+05	1.37E+05	1.49E+05
S96T004727	154:6	Upper half	8.53E+04	6.59E+04	7.56E+04
S96T004743	154:6	Lower half	1.44E+05	1.43E+05	1.43E+05
S96T004071	154:7	Upper half	1.32E+05	1.27E+05	1.30E+05
S96T004100	154:7	Lower half	1.35E+05	1.23E+05	1.29E+05
S96T004728	154:9	Upper half	1.23E+05	1.05E+05	1.14E+05
S96T004744	154:9	Lower half	1.52E+05	1.46E+05	1.49E+05
S96T004101	154:10	Upper half	1.17E+05	1.35E+05	1.26E+05
S96T004102	154:10	Lower half	1.65E+05	1.69E+05	1.67E+05
S96T004103	154:13	Lower half	3.82E+05	3.51E+05	3.66E+05
S96T004104	154:14	Lower half	3.30E+05	3.66E+05	3.48E+05
S96T004105	154:15	Lower half	2.83E+05	3.07E+05	2.95E+05
S96T004106	154:16	Lower half	3.05E+05	3.03E+05	3.04E+05
S96T004745	154:18	Lower half	4.63E+05	5.04E+05	4.83E+05
S96T004746	154:19	Lower half	5.57E+04	5.62E+04	5.60E+04
S96T004600	156:1	Lower half	1.66E+05	1.56E+05	1.61E+05
S96T004601	156:3	Lower half	1.53E+05	1.71E+05	1.62E+05
S96T004617	156:3	Upper half	1.62E+05	1.57E+05	1.59E+05
S96T004618	156:4	Upper half	1.64E+05	1.50E+05	1.57E+05
S96T004644	156:4	Lower half	1.46E+05	1.55E+05	1.50E+05
S96T004619	156:5	Upper half	1.27E+05	1.39E+05	1.33E+05
S96T004645	156:5	Lower half	1.24E+05	1.48E+05	1.36E+05

Table B2-37. Tank 241-A-101 Analytical Results: Nitrate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004620	156:6	Upper half	1.29E+05	1.46E+05	1.38E+05
S96T004646	156:6	Lower half	1.32E+05	1.36E+05	1.34E+05
S96T004602	156:7	Lower half	1.23E+05	1.15E+05	1.19E+05
S96T004621	156:7	Upper half	9.98E+04	1.25E+05	1.12E+05
S96T004622	156:8	Upper half	1.47E+05	1.28E+05	1.38E+05
S97T000006	156:8	Lower half	1.39E+05	1.49E+05	1.44E+05
S97T000003	156:10	Lower half	1.58E+05	1.22E+05	1.40E+05
S97T000005	156:10	Upper half	5.28E+05	5.01E+05	5.14E+05
S97T000004	156:11	Lower half	1.04E+05	1.06E+05	1.05E+05
S96T004650	156:12	Lower half	3.26E+05	3.37E+05	3.32E+05
S96T004287	156:13	Lower half	4.72E+05	4.68E+05	4.70E+05
S96T004651	156:14	Lower half	2.84E+05	1.29E+05	2.07E+05
S96T004652	156:15	Lower half	1.73E+05	1.75E+05	1.74E+05
S96T004653	156:17	Lower half	1.66E+05	1.66E+05	1.66E+05
S96T004288	156:18	Lower half	3.83E+05	3.15E+05	3.49E+05
S96T005247	154:Comp	Comp	1.09E+05	9.51E+04	1.02E+05
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	3.78E+04	3.60E+04	3.69E+04
S96T004115	154:13	DL	1.64E+05	1.62E+05	1.63E+05
S96T004116	154:14	DL	1.48E+05	1.48E+05	1.48E+05
S96T004117	154:15	DL	1.68E+05	1.68E+05	1.68E+05
S96T004118	154:16	DL	1.49E+05	1.50E+05	1.50E+05
S96T004671	154:17	DL	142	140	141
S96T004669	154:18	DL	1.56E+05	1.58E+05	1.57E+05
S96T004672	154:19	DL	7.73E+04	7.74E+04	7.74E+04
S96T004582	156:10	DL	1.18E+05	1.17E+05	1.18E+05
S96T004583	156:11	DL	1.42E+05	1.43E+05	1.43E+05
S96T004584	156:11	DL	1.59E+05	1.58E+05	1.58E+05
S96T004289	156:13	DL	1.70E+05	1.69E+05	1.70E+05

Table B2-37. Tank 241-A-101 Analytical Results: Nitrate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004585	156:14	DL	1.35E+05	1.36E+05	1.36E+05
S96T004586	156:15	DL	1.65E+05	1.66E+05	1.65E+05
S96T004587	156:17	DL	2.18E+05	2.16E+05	2.17E+05
S96T004290	156:18	DL	1.65E+05	1.64E+05	1.65E+05

Table B2-38. Tank 241-A-101 Analytical Results: Nitrite (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004723	154:1	Upper half	6.41E+04	6.13E+04	6.27E+04
S96T004709	154:1	Lower half	8.02E+04	8.24E+04	8.13E+04
S96T004725	154:2	Upper half	7.50E+04	7.94E+04	7.72E+04
S96T004741	154:2	Lower half	8.29E+04	7.97E+04	8.13E+04
S96T004724	154:3	Upper half	8.01E+04	8.00E+04	8.00E+04
S96T004710	154:3	Lower half	8.63E+04	8.55E+04	8.59E+04
S96T004726	154:4	Upper half	8.25E+04	7.84E+04	8.05E+04
S96T004742	154:4	Lower half	8.55E+04	8.29E+04	8.42E+04
S96T004727	154:6	Upper half	7.29E+04	7.74E+04	7.51E+04
S96T004743	154:6	Lower half	7.44E+04	7.59E+04	7.52E+04
S96T004071	154:7	Upper half	7.34E+04	7.25E+04	7.30E+04
S96T004100	154:7	Lower half	7.30E+04	7.00E+04	7.15E+04
S96T004728	154:9	Upper half	7.70E+04	7.78E+04	7.74E+04
S96T004744	154:9	Lower half	8.40E+04	8.24E+04	8.32E+04
S96T004101	154:10	Upper half	6.86E+04	8.75E+04	7.80E+04
S96T004102	154:10	Lower half	9.67E+04	9.62E+04	9.65E+04
S96T004103	154:13	Lower half	9.76E+04	9.51E+04	9.63E+04
S96T004104	154:14	Lower half	9.48E+04	1.11E+05	1.03E+05
S96T004105	154:15	Lower half	9.43E+04	9.46E+04	9.44E+04
S96T004106	154:16	Lower half	9.82E+04	9.62E+04	9.72E+04

Table B2-38. Tank 241-A-101 Analytical Results: Nitrite (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004745	154:18	Lower half	8.37E+04	6.84E+04	7.60E+04
S96T004746	154:19	Lower half	3.05E+04	3.17E+04	3.11E+04
S96T004600	156:1	Lower half	7.60E+04	7.01E+04	7.30E+04
S96T004601	156:3	Lower half	7.88E+04	7.84E+04	7.86E+04
S96T004617	156:3	Upper half	7.93E+04	7.50E+04	7.72E+04
S96T004618	156:4	Upper half	8.25E+04	8.34E+04	8.29E+04
S96T004644	156:4	Lower half	8.39E+04	8.31E+04	8.35E+04
S96T004619	156:5	Upper half	7.78E+04	7.54E+04	7.66E+04
S96T004645	156:5	Lower half	8.74E+04	8.93E+04	8.83E+04
S96T004620	156:6	Upper half	8.54E+04	8.38E+04	8.46E+04
S96T004646	156:6	Lower half	8.42E+04	8.24E+04	8.33E+04
S96T004602	156:7	Lower half	8.08E+04	8.05E+04	8.06E+04
S96T004621	156:7	Upper half	6.25E+04	7.84E+04	7.04E+04
S96T004622	156:8	Upper half	7.86E+04	7.38E+04	7.62E+04
S97T000006	156:8	Lower half	8.47E+04	8.40E+04	8.44E+04
S97T000003	156:10	Lower half	1.05E+05	1.08E+05	1.07E+05
S97T000005	156:10	Upper half	8.03E+04	7.85E+04	7.94E+04
S97T000004	156:11	Lower half	1.26E+05	1.27E+05	1.26E+05
S96T004650	156:12	Lower half	9.83E+04	1.00E+05	9.91E+04
S96T004287	156:13	Lower half	8.34E+04	8.24E+04	8.29E+04
S96T004651	156:14	Lower half	9.79E+04	1.11E+05	1.04E+05
S96T004652	156:15	Lower half	5.22E+04	5.83E+04	5.52E+04
S96T004653	156:17	Lower half	6.48E+04	6.10E+04	6.29E+04
S96T004288	156:18	Lower half	7.61E+04	8.10E+04	7.86E+04
S96T005247	154:Comp	Comp	9.21E+04	8.84E+04	9.03E+04
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	1.97E+04	1.91E+04	1.94E+04
S96T004115	154:13	DL	1.71E+05	1.72E+05	1.72E+05
S96T004116	154:14	DL	1.54E+05	1.56E+05	1.55E+05

Table B2-38. Tank 241-A-101 Analytical Results: Nitrite (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004117	154:15	DL	1.81E+05	1.83E+05	1.82E+05
S96T004118	154:16	DL	1.60E+05	1.61E+05	1.61E+05
S96T004671	154:17	DL	79.6	77.3	78.5
S96T004669	154:18	DL	1.67E+05	1.66E+05	1.67E+05
S96T004672	154:19	DL	4.48E+04	4.52E+04	4.50E+04
S96T004582	156:10	DL	1.21E+05	1.23E+05	1.22E+05
S96T004583	156:11	DL	1.59E+05	1.58E+05	1.58E+05
S96T004584	156:11	DL	1.70E+05	1.67E+05	1.69E+05
S96T004289	156:13	DL	1.70E+05	1.69E+05	1.70E+05
S96T004585	156:14	DL	1.46E+05	1.41E+05	1.43E+05
S96T004586	156:15	DL	1.58E+05	1.59E+05	1.59E+05
S96T004587	156:17	DL	2.15E+05	2.15E+05	2.15E+05
S96T004290	156:18	DL	1.75E+05	1.73E+05	1.74E+05

Table B2-39. Tank 241-A-101 Analytical Results: Oxalate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004723	154:1	Upper half	7.12E+03	6.40E+03	6.76E+03
S96T004709	154:1	Lower half	1.00E+04	1.02E+04	1.01E+04
S96T004725	154:2	Upper half	9.79E+03	9.81E+03	9.80E+03
S96T004741	154:2	Lower half	1.00E+04	9.76E+03	9.88E+03
S96T004724	154:3	Upper half	1.06E+04	9.81E+03	1.02E+04
S96T004710	154:3	Lower half	1.45E+04	1.16E+04	1.30E+04
S96T004726	154:4	Upper half	1.18E+04	1.34E+04	1.26E+04
S96T004742	154:4	Lower half	1.30E+04	1.25E+04	1.27E+04
S96T004727	154:6	Upper half	1.27E+04	1.65E+04	1.46E+04
S96T004743	154:6	Lower half	1.58E+04	1.56E+04	1.57E+04
S96T004071	154:7	Upper half	1.37E+04	1.35E+04	1.36E+04

Table B2-39. Tank 241-A-101 Analytical Results: Oxalate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004100	154:7	Lower half	1.37E+04	1.52E+04	1.45E+04
S96T004728	154:9	Upper half	2.25E+04	2.34E+04	2.30E+04
S96T004744	154:9	Lower half	2.63E+04	2.46E+04	2.55E+04
S96T004101	154:10	Upper half	2.81E+04	3.32E+04	3.07E+04
S96T004102	154:10	Lower half	2.77E+04	2.60E+04	2.68E+04
S96T004103	154:13	Lower half	<2.26e+03	<2.21E+03	n/a
S96T004104	154:14	Lower half	2.36E+03	<2.31E+03	n/a
S96T004105	154:15	Lower half	<2.17e+03	<2.08E+03	n/a
S96T004106	154:16	Lower half	<2.21e+03	<2.30E+03	n/a
S96T004745	154:18	Lower half	<1.09e+03	<1.07E+03	n/a
S96T004746	154:19	Lower half	<1.08e+03	<1.08E+03	n/a
S96T004600	156:1	Lower half	4.74E+03	4.60E+03	4.67E+03
S96T004601	156:3	Lower half	1.16E+04	1.11E+04	1.13E+04
S96T004617	156:3	Upper half	1.15E+04	1.06E+04	1.10E+04
S96T004618	156:4	Upper half	1.41E+04	1.48E+04	1.44E+04
S96T004644	156:4	Lower half	1.59E+04	1.76E+04	1.67E+04
S96T004619	156:5	Upper half	1.61E+04	1.45E+04	1.53E+04
S96T004645	156:5	Lower half	1.48E+04	1.51E+04	1.49E+04
S96T004620	156:6	Upper half	1.48E+04	1.46E+04	1.47E+04
S96T004646	156:6	Lower half	2.01E+04	1.99E+04	2.00E+04
S96T004602	156:7	Lower half	1.22E+04	1.38E+04	1.30E+04
S96T004621	156:7	Upper half	1.42E+04	1.41E+04	1.41E+04
S96T004622	156:8	Upper half	2.62E+04	2.74E+04	2.68E+04
S97T000006	156:8	Lower half	2.55E+04	2.96E+04	2.75E+04
S97T000003	156:10	Lower half	3.52E+04	3.44E+04	3.48E+04
S97T000005	156:10	Upper half	4.74E+03	4.36E+03	4.55E+03
S97T000004	156:11	Lower half	<860	<870	n/a
S96T004650	156:12	Lower half	<792	<786	n/a
S96T004287	156:13	Lower half	<2.10e+03	<2.09E+03	n/a

Table B2-39. Tank 241-A-101 Analytical Results: Oxalate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004651	156:14	Lower half	<826	<806	n/a
S96T004652	156:15	Lower half	<424	<421	n/a
S96T004653	156:17	Lower half	<444	<444	n/a
S96T004288	156:18	Lower half	1.09E+04	1.07E+04	1.08E+04
S96T005247	154:Comp	Comp	9.87E+03	1.03E+04	1.01E+04
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	4.41E+03	<1.07E+03	n/a
S96T004115	154:13	DL	<541	<541	n/a
S96T004116	154:14	DL	<435	<435	n/a
S96T004117	154:15	DL	<541	<541	n/a
S96T004118	154:16	DL	<435	<435	n/a
S96T004671	154:17	DL	<0.630	<0.630	n/a
S96T004669	154:18	DL	<435	<483	n/a
S96T004672	154:19	DL	<541	<541	n/a
S96T004582	156:10	DL	<541	<541	n/a
S96T004583	156:11	DL	<1.07E+03	<1.07E+03	n/a
S96T004584	156:11	DL	<1.07E+03	<1.07E+03	n/a
S96T004289	156:13	DL	<541	<541	n/a
S96T004585	156:14	DL	<1.07E+03	1.51E+03	n/a
S96T004586	156:15	DL	<435	<435	n/a
S96T004587	156:17	DL	682	666	674.2
S96T004290	156:18	DL	<541	<541	n/a

Table B2-40. Tank 241-A-101 Analytical Results: Phosphate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004723	154:1	Upper half	5.73E+03	4.26E+03	5.00E+03
S96T004709	154:1	Lower half	4.30E+03	4.98E+03	4.64E+03
S96T004725	154:2	Upper half	3.54E+03	3.22E+03	3.38E+03
S96T004741	154:2	Lower half	3.65E+03	3.39E+03	3.52E+03
S96T004724	154:3	Upper half	3.84E+03	3.44E+03	3.64E+03
S96T004710	154:3	Lower half	4.09E+03	4.35E+03	4.22E+03
S96T004726	154:4	Upper half	4.64E+03	4.40E+03	4.52E+03
S96T004742	154:4	Lower half	5.13E+03	4.64E+03	4.89E+03
S96T004727	154:6	Upper half	4.51E+03	5.18E+03	4.84E+03
S96T004743	154:6	Lower half	4.82E+03	4.63E+03	4.72E+03
S96T004071	154:7	Upper half	3.28E+03	3.53E+03	3.41E+03
S96T004100	154:7	Lower half	3.48E+03	1.58E+03	2.53E+03
S96T004728	154:9	Upper half	4.95E+03	4.94E+03	4.95E+03
S96T004744	154:9	Lower half	5.50E+03	4.71E+03	5.11E+03
S96T004101	154:10	Upper half	4.97E+03	5.81E+03	5.39E+03
S96T004102	154:10	Lower half	6.15E+03	5.69E+03	5.92E+03
S96T004103	154:13	Lower half	6.72E+03	7.22E+03	6.97E+03
S96T004104	154:14	Lower half	4.76E+03	5.20E+03	4.98E+03
S96T004105	154:15	Lower half	7.53E+03	4.67E+03	6.10E+03
S96T004106	154:16	Lower half	5.06E+03	3.93E+03	4.49E+03
S96T004745	154:18	Lower half	9.08E+03	7.90E+03	8.49E+03
S96T004746	154:19	Lower half	<1.24E+03	1.23E+03	n/a
S96T004600	156:1	Lower half	5.75E+03	5.91E+03	5.83E+03
S96T004601	156:3	Lower half	4.29E+03	4.37E+03	4.33E+03
S96T004617	156:3	Upper half	4.30E+03	3.57E+03	3.93E+03
S96T004618	156:4	Upper half	5.18E+03	5.89E+03	5.54E+03
S96T004644	156:4	Lower half	5.14E+03	4.66E+03	4.90E+03
S96T004619	156:5	Upper half	4.98E+03	4.66E+03	4.82E+03
S96T004645	156:5	Lower half	4.83E+03	4.89E+03	4.86E+03

Table B2-40. Tank 241-A-101 Analytical Results: Phosphate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			**µg/g**	**µg/g**	**µg/g**
S96T004620	156:6	Upper half	4.89E+03	4.67E+03	4.78E+03
S96T004646	156:6	Lower half	4.98E+03	4.92E+03	4.95E+03
S96T004602	156:7	Lower half	5.27E+03	4.35E+03	4.81E+03
S96T004621	156:7	Upper half	3.96E+03	4.60E+03	4.28E+03
S96T004622	156:8	Upper half	4.70E+03	4.60E+03	4.65E+03
S97T000006	156:8	Lower half	5.22E+03	5.26E+03	5.24E+03
S97T000003	156:10	Lower half	5.32E+03	5.38E+03	5.35E+03
S97T000005	156:10	Upper half	6.41E+03	6.45E+03	6.43E+03
S97T000004	156:11	Lower half	7.63E+03	8.41E+03	8.02E+03
S96T004650	156:12	Lower half	7.21E+03	7.82E+03	7.51E+03
S96T004287	156:13	Lower half	9.73E+03	8.06E+03	8.89E+03
S96T004651	156:14	Lower half	7.62E+03	6.31E+03	6.96E+03
S96T004652	156:15	Lower half	4.55E+03	4.41E+03	4.48E+03
S96T004653	156:17	Lower half	5.68E+03	6.23E+03	5.96E+03
S96T004288	156:18	Lower half	8.26E+03	9.76E+03	9.01E+03
S96T005247	154:Comp	Comp	1.03E+04	8.39E+03	9.36E+03
Liquids			**µg/mL**	**µg/mL**	**µg/mL**
S96T004110	154:11	DL	<1.22e+03	<1.22E+03	n/a
S96T004115	154:13	DL	2.96E+03	2.95E+03	2.95E+03
S96T004116	154:14	DL	3.23E+03	3.21E+03	3.22E+03
S96T004117	154:15	DL	3.80E+03	3.74E+03	3.77E+03
S96T004118	154:16	DL	3.20E+03	3.13E+03	3.16E+03
S96T004671	154:17	DL	<0.720	<0.720	n/a
S96T004669	154:18	DL	3.06E+03	3.18E+03	3.12E+03
S96T004672	154:19	DL	2.08E+03	1.95E+03	2.02E+03
S96T004582	156:10	DL	3.86E+03	3.98E+03	3.92E+03
S96T004583	156:11	DL	3.45E+03	3.42E+03	3.44E+03
S96T004584	156:11	DL	3.20E+03	3.60E+03	3.40E+03
S96T004289	156:13	DL	3.48E+03	2.84E+03	3.16E+03[QC:e]

Table B2-40. Tank 241-A-101 Analytical Results: Phosphate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004585	156:14	DL	3.10E+03	3.19E+03	3.14E+03
S96T004586	156:15	DL	3.11E+03	3.08E+03	3.10E+03
S96T004587	156:17	DL	2.27E+03	2.55E+03	2.41E+03
S96T004290	156:18	DL	3.43E+03	3.31E+03	3.37E+03

Table B2-41. Tank 241-A-101 Analytical Results: Sulfate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004723	154:1	Upper half	2.56E+04	2.40E+04	2.48E+04
S96T004709	154:1	Lower half	2.03E+04	2.07E+04	2.05E+04
S96T004725	154:2	Upper half	2.78E+04	2.80E+04	2.79E+04
S96T004741	154:2	Lower half	2.46E+04	2.41E+04	2.44E+04
S96T004724	154:3	Upper half	2.54E+04	2.48E+04	2.51E+04
S96T004710	154:3	Lower half	2.66E+04	2.65E+04	2.66E+04
S96T004726	154:4	Upper half	2.77E+04	2.81E+04	2.79E+04
S96T004742	154:4	Lower half	2.61E+04	2.56E+04	2.59E+04
S96T004727	154:6	Upper half	2.78E+04	2.93E+04	2.85E+04
S96T004743	154:6	Lower half	3.25E+04	3.25E+04	3.25E+04
S96T004071	154:7	Upper half	2.95E+04	2.79E+04	2.87E+04
S96T004100	154:7	Lower half	3.20E+04	4.72E+04	3.96E+04
S96T004728	154:9	Upper half	3.02E+04	3.69E+04	3.35E+04
S96T004744	154:9	Lower half	2.33E+04	2.28E+04	2.31E+04
S96T004101	154:10	Upper half	6.96E+03	6.83E+03	6.90E+03
S96T004102	154:10	Lower half	5.06E+03	6.37E+03	5.72E+03
S96T004103	154:13	Lower half	<2.97E+03	<2.90E+03	n/a
S96T004104	154:14	Lower half	4.59E+03	<3.04E+03	n/a
S96T004105	154:15	Lower half	<2.86E+03	<2.73E+03	n/a
S96T004106	154:16	Lower half	<2.90E+03	<3.02E+03	n/a
S96T004745	154:18	Lower half	<1.43E+03	<1.41E+03	n/a

Table B2-41. Tank 241-A-101 Analytical Results: Sulfate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004746	154:19	Lower half	<1.42E+03	<1.41E+03	n/a
S96T004600	156:1	Lower half	1.57E+04	1.47E+04	1.52E+04
S96T004601	156:3	Lower half	2.33E+04	2.25E+04	2.29E+04
S96T004617	156:3	Upper half	2.38E+04	2.14E+04	2.26E+04
S96T004618	156:4	Upper half	2.20E+04	2.33E+04	2.26E+04
S96T004644	156:4	Lower half	2.87E+04	2.99E+04	2.93E+04
S96T004619	156:5	Upper half	2.99E+04	3.05E+04	3.02E+04
S96T004645	156:5	Lower half	3.00E+04	3.04E+04	3.02E+04
S96T004620	156:6	Upper half	2.71E+04	2.62E+04	2.66E+04
S96T004646	156:6	Lower half	3.11E+04	3.06E+04	3.08E+04
S96T004602	156:7	Lower half	2.58E+04	3.44E+04	3.01E+04
S96T004621	156:7	Upper half	2.54E+04	3.29E+04	2.92E+04
S96T004622	156:8	Upper half	2.99E+04	3.14E+04	3.07E+04
S97T000006	156:8	Lower half	2.30E+04	2.20E+04	2.25E+04
S97T000003	156:10	Lower half	6.10E+03	5.89E+03	6.00E+03
S97T000005	156:10	Upper half	<1.05E+03	<1.05E+03	n/a
S97T000004	156:11	Lower half	1.24E+03	1.25E+03	1.24E+03
S96T004650	156:12	Lower half	<1.04E+03	1.04E+03	n/a
S96T004287	156:13	Lower half	<2.76E+03	3.45E+03	n/a
S96T004651	156:14	Lower half	1.45E+03	1.42E+03	1.44E+03
S96T004652	156:15	Lower half	<5.57E+02	<5.54E+02	n/a
S96T004653	156:17	Lower half	<5.83E+02	<5.83E+02	n/a
S96T004288	156:18	Lower half	<2.77E+03	<2.79E+03	n/a
S96T005247	154:Comp	Comp	1.55E+04	1.55E+04	1.55E+04
Liquids			µg/mL	µg/mL	µg/mL
S96T004110	154:11	DL	1.91E+03	1.93E+03	1.92E+03
S96T004115	154:13	DL	1.22E+03	1.75E+03	1.48E+03
S96T004116	154:14	DL	1.29E+03	1.25E+03	1.27E+03
S96T004117	154:15	DL	1.32E+03	1.49E+03	1.40E+03

Table B2-41. Tank 241-A-101 Analytical Results: Sulfate (IC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004118	154:16	DL	1.29E+03	1.13E+03	1.21E+03
S96T004671	154:17	DL	1.067	1.41	1.24[QC:e]
S96T004669	154:18	DL	1.44E+03	1.50E+03	1.47E+03
S96T004672	154:19	DL	1.03E+03	1.18E+03	1.11E+03
S96T004582	156:10	DL	1.14E+03	1.43E+03	1.29E+03
S96T004583	156:11	DL	1.58E+03	1.70E+03	1.64E+03
S96T004584	156:11	DL	<1.41E+03	<1.41E+03	n/a
S96T004289	156:13	DL	1.36E+03	1.24E+03	1.30E+03
S96T004585	156:14	DL	<1.41E+03	<1.41E+03	n/a
S96T004586	156:15	DL	1.30E+03	1.22E+03	1.26E+03
S96T004587	156:17	DL	1.59E+03	1.61E+03	1.60E+03
S96T004290	156:18	DL	1.53E+03	1.43E+03	1.48E+03

Table B2-42. Tank 241-A-101 Analytical Results: Hydroxide (OH Direct).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			µg/mL	µg/mL	µg/mL
S96T005327	154:13	DL	4.57E+04	4.54E+04	4.56E+04
S96T005328	154:15	DL	4.84E+04	4.68E+04	4.76E+04
S96T005329	154:17	DL	3.18E+04	3.27E+03	1.75E+04
S96T005330	156:13	DL	4.14E+04	4.00E+04	4.07E+04
S96T005331	156:15	DL	3.95E+04	4.16E+04	4.06E+04
S96T005332	156:17	DL	5.09E+04	4.84E+04	4.96E+04

Table B2-43. Tank 241-A-101 Analytical Results: Total Inorganic Carbon. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µg/g	µg/g	µg/g
S96T004691	154:1	Upper half	2.27E+04	2.31E+04	2.29E+04
S96T004689	154:1	Lower half	1.58E+04	1.51E+04	1.54E+04
S96T004693	154:2	Upper half	2.14E+04	2.16E+04	2.15E+04
S96T004697	154:2	Lower half	1.95E+04	2.08E+04	2.02E+04
S96T004692	154:3	Upper half	1.87E+04	1.78E+04	1.82E+04
S96T004690	154:3	Lower half	1.44E+04	1.45E+04	1.44E+04
S96T004694	154:4	Upper half	2.07E+04	1.93E+04	2.00E+04
S96T004698	154:4	Lower half	1.85E+04	1.59E+04	1.72E+04
S96T004695	154:6	Upper half	2.40E+04	2.63E+04	2.52E+04
S96T004699	154:6	Lower half	2.25E+04	1.85E+04	2.05E+04
S96T004067	154:7	Upper half	1.99E+04	2.35E+04	2.17E+04
S96T004074	154:7	Lower half	1.70E+04	1.86E+04	1.78E+04
S96T004696	154:9	Upper half	1.86E+04	2.01E+04	1.94E+04
S96T004700	154:9	Lower half	1.45E+04	1.49E+04	1.47E+04
S96T004072	154:10	Upper half	5.88E+03	6.35E+03	6.12E+03
S96T004073	154:10	Lower half	2.47E+03	1.86E+03	2.16E+03
S96T004075	154:13	Lower half	1.19E+03	1.25E+03	1.22E+03
S96T004076	154:14	Lower half	7.57E+02	7.64E+02	7.61E+02
S96T004077	154:15	Lower half	1.08E+03	1.11E+03	1.10E+03
S96T004078	154:16	Lower half	1.24E+03	1.11E+03	1.18E+03
S96T004702	154:18	Lower half	502	566	534
S96T004701	154:19	Lower half	971	1.13E+03	1.05E+03
S96T004533	156:1	Lower half	2.10E+04	2.41E+04	2.26E+04
S96T004534	156:3	Lower half	1.78E+04	1.61E+04	1.70E+04
S96T004536	156:3	Upper half	1.75E+04	1.79E+04	1.77E+04
S96T004537	156:4	Upper half	1.86E+04	1.80E+04	1.83E+04
S96T004538	156:4	Lower half	1.96E+04	1.56E+04	1.76E+04
S96T004539	156:5	Upper half	1.95E+04	1.99E+04	1.97E+04

Table B2-43. Tank 241-A-101 Analytical Results: Total Inorganic Carbon. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µg/g	µg/g	µg/g
S96T004540	156:5	Lower half	2.03E+04	1.95E+04	1.99E+04
S96T004541	156:6	Upper half	1.85E+04	1.81E+04	1.83E+04
S96T004542	156:6	Lower half	1.84E+04	1.64E+04	1.74E+04
S96T004535	156:7	Lower half	1.80E+04	1.92E+04	1.86E+04
S96T004543	156:7	Upper half	2.09E+04	1.75E+04	1.92E+04
S96T004544	156:8	Upper half	2.22E+04	1.97E+04	2.10E+04
S96T004545	156:8	Lower half	1.66E+04	1.62E+04	1.64E+04
S96T004547	156:10	Lower half	4.28E+03	4.28E+03	4.28E+03
S96T004546	156:10	Upper half	989	798	894
S96T004548	156:11	Lower half	161E+03	1.43E+03	1.52E+03
S96T004549	156:12	Lower half	807	951	879
S96T004279	156:13	Lower half	827	693	760
S96T004550	156:14	Lower half	584	582	583
S96T004551	156:15	Lower half	817	802	809.5
S96T004552	156:17	Lower half	975	842	908.5
S96T004280	156:18	Lower half		n/a	n/a
S96T005243	154:Comp	Comp	9.31E+03	1.09E+04	1.01E+04
Liquids			µg/mL	µg/mL	µg/mL
S96T004582	156:10	DL	2.34E+03	2.00E+03	2.17E+03
S96T004584	156:11	DL	3.22E+03	4.29E+03	3.76E+03
S96T004110	154:11	DL	952	1.22E+03	1.09E+03
S96T004115	154:13	DL	3.17E+03	3.33E+03	3.25E+03
S96T004585	156:14	DL	3.48E+03	3.93E+03	3.70E+03
S96T004116	154:14	DL	1.69E+03	1.70E+03	1.70E+03
S96T004586	156:15	DL	1.95E+03	2.11E+03	2.03E+03
S96T004117	154:15	DL	3.34E+03	3.43E+03	3.38E+03
S96T004118	154:16	DL	4.23E+03	3.62E+03	3.92E+03
S96T004671	154:17	DL	131	156	144

Table B2-43. Tank 241-A-101 Analytical Results: Total Inorganic Carbon. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µg/mL	µg/mL	µg/mL
S96T004587	156:17	DL	4.56E+03	4.62E+03	4.59E+03
S96T004669	154:18	DL	1.86E+03	1.76E+03	1.81E+03
S96T004290	156:18	DL	2.73E+03	2.87E+03	2.80E+03
S96T004672	154:19	DL	1.77E+03	2.32E+03	2.04E+03
S96T004583	156:11	DL	2.14E+03	2.29E+03	2.22E+03
S96T004289	156:13	DL	1.87E+03	2.17E+03	2.02E+03[QC:d]

Table B2-44. Tank 241-A-101 Analytical Results: Total Organic Carbon. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			µgC/g	µgC/g	µgC/g
S96T004691	154:1	Upper half	3.56E+03	3.78E+03	3.67E+03
S96T004689	154:1	Lower half	5.55E+03	5.43E+03	5.49E+03
S96T004693	154:2	Upper half	5.74E+03	5.65E+03	5.70E+03
S96T004697	154:2	Lower half	5.99E+03	6.44E+03	6.22E+03
S96T004692	154:3	Upper half	5.63E+03	7.75E+03	6.69E+03
S96T004690	154:3	Lower half	4.19E+03	5.48E+03	4.84E+03
S96T004694	154:4	Upper half	6.72E+03	6.71E+03	6.72E+03
S96T004698	154:4	Lower half	6.42E+03	5.94E+03	6.18E+03
S96T004695	154:6	Upper half	5.09E+03	7.07E+03	6.08E+03
S96T004699	154:6	Lower half	3.88E+03	5.60E+03	4.74E+03
S96T004067	154:7	Upper half	5.61E+03	5.92E+03	5.76E+03
S96T004074	154:7	Lower half	3.56E+03	5.47E+03	4.52E+03
S96T004696	154:9	Upper half	8.08E+03	9.31E+03	8.70E+03
S96T004700	154:9	Lower half	9.26E+03	1.52E+04	1.22E+04
S96T004072	154:10	Upper half	1.22E+04	1.28E+04	1.25E+04
S96T004073	154:10	Lower half	1.01E+04	1.01E+04	1.01E+04

Table B2-44. Tank 241-A-101 Analytical Results: Total Organic Carbon. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			µgC/g	µgC/g	µgC/g
S96T004075	154:13	Lower half	1.95E+03	2.12E+03	2.04E+03
S96T004076	154:14	Lower half	1.58E+03	1.62E+03	1.60E+03
S96T004077	154:15	Lower half	1.46E+03	1.68E+03	1.57E+03
S96T004078	154:16	Lower half	2.76E+03	2.44E+03	2.60E+03
S96T004702	154:18	Lower half	79	974	526.5
S96T004701	154:19	Lower half	1.30E+03	1.17E+03	1.24E+03
S96T004533	156:1	Lower half	3.76E+03	3.63E+03	3.70E+03
S96T004534	156:3	Lower half	6.77E+03	5.37E+03	6.07E+03
S96T004536	156:3	Upper half	4.09E+03	5.42E+03	4.76E+03
S96T004537	156:4	Upper half	6.40E+03	6.74E+03	6.57E+03
S96T004538	156:4	Lower half	5.41E+03	5.46E+03	5.44E+03
S96T004539	156:5	Upper half	7.65E+03	7.26E+03	7.46E+03
S96T004540	156:5	Lower half	6.90E+03	7.11E+03	7.00E+03
S96T004541	156:6	Upper half	7.16E+03	7.15E+03	7.16E+03
S96T004542	156:6	Lower half	6.57E+03	1.16E+04	9.08E+03
S96T004535	156:7	Lower half	5.87E+03	5.57E+03	5.72E+03
S96T004543	156:7	Upper half	6.65E+03	5.76E+03	6.20E+03
S96T004544	156:8	Upper half	1.02E+04	9.37E+03	9.78E+03
S96T004545	156:8	Lower half	9.73E+03	9.96E+03	9.84E+03
S96T004547	156:10	Lower half	1.07E+04	1.06E+04	1.06E+04
S96T004546	156:10	Upper half	2.54E+03	2.71E+03	2.62E+03
S96T004548	156:11	Lower half	3.49E+03	2.90E+03	3.20E+03
S96T004549	156:12	Lower half	2.03E+03	1.94E+03	1.98E+03
S96T004279	156:13	Lower half	1.84E+03	1.52E+03	1.68E+03
S96T004550	156:14	Lower half	1.24E+03	1.26E+03	1.25E+03
S96T004551	156:15	Lower half	1.68E+03	1.71E+03	1.70E+03
S96T004552	156:17	Lower half	1.86E+03	1.64E+03	1.75E+03
S96T004280	156:18	Lower half	3.75E+03	3.49E+03	3.61E+03
S96T005243	154:Comp	Comp	4.47E+03	4.79E+03	4.63E+03

Table B2-44. Tank 241-A-101 Analytical Results: Total Organic Carbon. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			μgC/mL	μgC/mL	μgC/mL
S96T004110	154:11	DL	1.05E+03	1.42E+03	1.24E+03
S96T004115	154:13	DL	3.82E+03	3.86E+03	3.84E+03
S96T004116	154:14	DL	3.60E+03	3.55E+03	3.58E+03
S96T004117	154:15	DL	3.99E+03	3.97E+03	3.98E+03
S96T004118	154:16	DL	3.36E+03	2.98E+03	3.17E+03
S96T004671	154:17	DL	4.03E+02	1.60E+03	1.00E+03
S96T004669	154:18	DL		n/a	n/a
S96T004672	154:19	DL	1.93E+03	2.18E+03	2.06E+03
S96T004582	156:10	DL	3.36E+03	2.94E+03	3.15E+03
S96T004583	156:11	DL	2.40E+03	4.12E+03	3.26E+03
S96T004584	156:11	DL	4.35E+03	4.31E+03	4.33E+03
S96T004289	156:13	DL	3.70E+03	3.86E+03	3.78E+03
S96T004585	156:14	DL	4.06E+03	4.28E+03	4.17E+03
S96T004586	156:15	DL	3.59E+03	3.73E+03	3.66E+03
S96T004587	156:17	DL	4.58E+03	4.61E+03	4.60E+03
S96T004290	156:18	DL	3.79E+03	3.81E+03	3.80E+03

Table B2-45. Tank 241-A-101 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			μCi/g	μCi/g	μCi/g
S96T004705	154:1	Lower half	1.18E-01	1.07E-01	1.12E-01
S96T004729	154:2	Lower half	7.62E-02	9.75E-02	8.69E-02
S96T004706	154:3	Lower half	1.17E-01	1.20E-01	1.18E-01
S96T004730	154:4	Lower half	9.93E-02	1.11E-01	1.05E-01
S96T004731	154:6	Lower half	1.01E-01	1.23E-01	1.12E-01
S96T004086	154:7	Lower half	7.76E-02	7.11E-02	7.43E-02[QC:c]
S96T004732	154:9	Lower half	7.24E-02	6.16E-02	6.70E-02

Table B2-45. Tank 241-A-101 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			µCi/g	µCi/g	µCi/g
S96T004088	154:10	Lower half	2.02E-02	2.15E-02	2.09E-02
S96T004089	154:13	Lower half	<1.55E-03	<3.29E-03	n/a[QC:c]
S96T004090	154:14	Lower half	<1.55E-03	<1.54e-03	n/a
S96T004091	154:15	Lower half	<1.21E-03	<1.31E-03	n/a
S96T004092	154:16	Lower half	<1.07E-03	<1.79E-03	n/a
S96T004733	154:18	Lower half	<8.84E-03	<1.25E-02	n/a
S96T004734	154:19	Lower half	1.18E-02	1.11E-02	1.15E-02
S96T005245	154:Comp	Comp	4.57E-02	4.84E-02	4.70E-02
S96T004594	156:1	Lower half	6.59E-02	7.62E-02	7.11E-02
S96T004595	156:3	Lower half	7.35E-02	7.22E-02	7.28E-02
S96T004624	156:4	Lower half	9.17E-02	1.11E-01	1.01E-01
S96T004625	156:5	Lower half	1.26E-01	1.29E-01	1.28E-01
S96T004626	156:6	Lower half	9.97E-02	9.84E-02	9.90E-02
S96T004596	156:7	Lower half	6.01E-02	4.68E-02	5.34E-02[QC:e]
S96T004627	156:8	Lower half	7.37E-02	7.69E-02	7.53E-02
S96T004628	156:10	Lower half	1.54E-02	6.68E-03	1.10E-02
S96T004629	156:11	Lower half	3.42E-03	4.90E-03	4.16E-03[QC:e,c]
S96T004630	156:12	Lower half	1.07E-02	9.61E-03	1.02E-02
S96T004283	156:13	Lower half	1.61E-02	1.06E-02	1.34E-02[QC:e]
S96T004631	156:14	Lower half	1.11E-02	7.19E-03	9.15E-03[QC:e]
S96T004632	156:15	Lower half	<9.62E-03	<9.63E-03	n/a
S96T004633	156:17	Lower half	<4.73E-03	<9.56E-03	n/a
S96T004284	156:18	Lower half	1.24E-02	6.35E-03	9.37E-03
Liquids			µCi/mL	µCi/mL	µCi/mL
S96T004110	154:11	DL	<2.94E-04	<2.94E-04	n/a
S96T004115	154:13	DL	<2.86E-02	<2.50E-02	n/a
S96T004116	154:14	DL	<2.10E-02	<1.56E-02	n/a
S96T004117	154:15	DL	<1.29E-02	<9.89E-03	n/a
S96T004118	154:16	DL	<9.89E-03	<9.89E-03	n/a

Table B2-45. Tank 241-A-101 Analytical Results: Total Alpha. (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			µCi/mL	µCi/mL	µCi/mL
S96T004671	154:17	DL	<1.27E-03	1.67E-03	n/a
S96T004669	154:18	DL	<2.70E-02	<2.70E-02	n/a
S96T004672	154:19	DL	6.95E-03	8.41E-03	7.68E-03
S96T004582	156:10	DL	<2.35E-02	<2.35E-02	n/a
S96T004583	156:11	DL	<2.35E-02	<2.35E-02	n/a
S96T004584	156:11	DL	<2.35E-02	<2.35E-02	n/a
S96T004289	156:13	DL	<7.10E-03	<1.20E-02	n/a
S96T004585	156:14	DL	<2.35E-02	<2.35E-02	n/a
S96T004586	156:15	DL	<7.23E-03	<7.23E-03	n/a
S96T004587	156:17	DL	<2.35E-02	<2.35E-02	n/a
S96T004290	156:18	DL	<1.03E-02	<7.10E-03	n/a

Table B2-46. Tank 241-A-101 Analytical Results: Total Beta.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			µCi/g	µCi/g	µCi/g
S96T004730	154:4	Lower half	303	317	310
S96T004090	154:14	Lower half	151	152	151.5
S96T004734	154:19	Lower half	91	91.6	91.3
S96T005245	154:Comp	Comp	253	262	257.5

Table B2-47. Nondetected Radionuclides.

Analyte	Maximum Nondetected Value (µCi/g)	Analyte	Maximum Nondetected Value (µCi/g)
Am-241	<3.55	Eu-154	<0.31
Eu-155	<1.34	Pu-239/240	<3.14E-04

Table B2-48. Tank 241-A-101 Analytical Results: Cesium-137 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			µCi/g	µCi/g	µCi/g
S96T004711	154:1	Upper half	185	203	193.9
S96T004705	154:1	Lower half	234	224	229.2
S96T004713	154:2	Upper half	227	231	228.8
S96T004729	154:2	Lower half	235	243	239.1
S96T004712	154:3	Upper half	228	227	227.7
S96T004706	154:3	Lower half	229	239	233.9
S96T004714	154:4	Upper half	224	223	223.6
S96T004730	154:4	Lower half	232	226	228.9
S96T004715	154:6	Upper half	206	209	207.8
S96T004731	154:6	Lower half	200	201	200.5
S96T004069	154:7	Upper half	207	215	210.9
S96T004086	154:7	Lower half	208	213	210.8
S96T004716	154:9	Upper half	178	214	196.2
S96T004732	154:9	Lower half	228	221	224.4
S96T004087	154:10	Upper half	245	248	246.3
S96T004088	154:10	Lower half	247	256	251.4
S96T004089	154:13	Lower half	245	207	225.9
S96T004090	154:14	Lower half	161	158	159.4
S96T004091	154:15	Lower half	208	219	213.5
S96T004092	154:16	Lower half	202	195	198.4
S96T004733	154:18	Lower half	98.49	103	100.7
S96T004734	154:19	Lower half	92.98	93.5	93.24
S96T004594	156:1	Lower half	203	180	191.3
S96T004595	156:3	Lower half	227	202	214.7
S96T004603	156:3	Upper half	196	190	192.8
S96T004604	156:4	Upper half	216	221	218.7
S96T004624	156:4	Lower half	92.17	162	127.1
S96T004605	156:5	Upper half	210	202	205.9
S96T004625	156:5	Lower half	209	203	205.8

Table B2-48. Tank 241-A-101 Analytical Results: Cesium-137 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			µCi/g	µCi/g	µCi/g
S96T004606	156:6	Upper half	205	213	208.9
S96T004626	156:6	Lower half	211	205	208.2
S96T004596	156:7	Lower half	202	206	203.8
S96T004607	156:7	Upper half	204	209	206.5
S96T004608	156:8	Upper half	191	194	192.6
S96T004627	156:8	Lower half	208	212	209.9
S96T004609	156:10	Upper half	92.7	120	106.3
S96T004628	156:10	Lower half	259	268	263.5
S96T004629	156:11	Lower half	275	269	271.9
S96T004630	156:12	Lower half	188	168	178.2
S96T004283	156:13	Lower half	145	169	157
S96T004631	156:14	Lower half	277	291	283.8
S96T004632	156:15	Lower half	158	142	149.9
S96T004633	156:17	Lower half	175	166	170.7
S96T004284	156:18	Lower half	168	185	176.7
S96T005245	154:Comp	Comp	259	258	258.5
Liquids			µCi/mL	µCi/mL	µCi/mL
S96T005327	154:13	DL	442	439	440.5
S96T005328	154:15	DL	435	433	434
S96T005329	154:17	DL	20	19.6	19.8
S96T005330	156:13	DL	422	423	422.5
S96T005331	156:15	DL	433	433	433
S96T005332	156:17	DL	440	441	440.5

Table B2-49. Tank 241-A-101 Analytical Results: Cobalt-60 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			μCi/g	μCi/g	μCi/g
S96T004711	154:1	Upper half	<3.92E-02	<3.57E-02	n/a
S96T004705	154:1	Lower half	<2.04E-02	<2.06E-02	n/a
S96T004713	154:2	Upper half	<3.94E-02	<3.94E-02	n/a
S96T004729	154:2	Lower half	<4.30E-02	<4.94E-02	n/a
S96T004706	154:3	Lower half	<5.82E-02	<5.93E-02	n/a
S96T004712	154:3	Upper half	<6.16E-02	<5.63E-02	n/a
S96T004714	154:4	Upper half	3.24E-02	4.06E-02	3.65E-02
S96T004730	154:4	Lower half	<4.34E-02	<4.38E-02	n/a
S96T004715	154:6	Upper half	<2.47E-02	3.80E-02	n/a
S96T004731	154:6	Lower half	<3.99E-02	<4.07E-02	n/a
S96T004069	154:7	Upper half	5.67E-02	<5.32E-02	n/a
S96T004086	154:7	Lower half	<6.79E-02	<5.25E-02	n/a
S96T004716	154:9	Upper half	<5.78E-02	<6.28E-02	n/a
S96T004732	154:9	Lower half	<5.26E-02	<5.84E-02	n/a
S96T004087	154:10	Upper half	<5.77E-02	<4.69E-02	n/a
S96T004088	154:10	Lower half	<2.80E-02	<2.10E-02	n/a
S96T004089	154:13	Lower half	<2.38E-02	<2.16E-02	n/a
S96T004090	154:14	Lower half	<1.77E-02	<2.13E-02	n/a
S96T004091	154:15	Lower half	<1.14E-02	<1.26E-02	n/a
S96T004092	154:16	Lower half	<1.06E-02	<8.78E-03	n/a
S96T004733	154:18	Lower half	<2.13E-02	<1.96E-02	n/a
S96T004734	154:19	Lower half	<2.61E-02	<2.08E-02	n/a
S96T004594	156:1	Lower half	<1.93E-02	3.22E-02	n/a
S96T004595	156:3	Lower half	<2.81E-02	<2.95E-02	n/a
S96T004603	156:3	Upper half	<2.84E-02	<2.60E-02	n/a
S96T004604	156:4	Upper half	<6.90E-02	<5.99E-02	n/a
S96T004624	156:4	Lower half	<7.35E-02	<6.76E-02	n/a
S96T004605	156:5	Upper half	<6.26E-02	<5.59E-02	n/a
S96T004625	156:5	Lower half	<4.46E-02	5.02E-02	n/a

Table B2-49. Tank 241-A-101 Analytical Results: Cobalt-60 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion (Cont'd)			µCi/g	µCi/g	µCi/g
S96T004606	156:6	Upper half	<6.67E-02	<5.64E-02	n/a
S96T004626	156:6	Lower half	<3.72E-02	<4.12E-02	n/a
S96T004596	156:7	Lower half	<2.11E-02	<2.39E-02	n/a
S96T004607	156:7	Upper half	<5.88E-02	<5.14E-02	n/a
S96T004608	156:8	Upper half	<2.27E-02	<3.18E-02	n/a
S96T004627	156:8	Lower half	<5.81E-02	<6.55E-02	n/a
S96T004609	156:10	Upper half	<2.17E-01	<2.28E-01	n/a
S96T004628	156:10	Lower half	<5.20E-02	<4.67E-02	n/a
S96T004629	156:11	Lower half	<5.32E-02	<4.31E-02	n/a
S96T004630	156:12	Lower half	<1.57E-02	<1.22E-02	n/a
S96T004283	156:13	Lower half	<1.33E-02	<1.19E-02	n/a
S96T004631	156:14	Lower half	<1.82E-02	<1.80E-02	n/a
S96T004632	156:15	Lower half	<1.35E-02	<1.60E-02	n/a
S96T004633	156:17	Lower half	<1.12E-02	<1.88E-02	n/a
S96T004284	156:18	Lower half	<1.53E-02	<1.80E-02	n/a
S96T005245	154:Comp	Comp	<1.47E-01	<1.23E-01	n/a
Liquids			µCi/mL	µCi/mL	µCi/mL
S96T005327	154:13	DL	<1.32E-02	<1.26E-02	n/a
S96T005328	154:15	DL	<1.27E-02	<1.19E-02	n/a
S96T005329	154:17	DL	<5.66E-04	<5.33E-04	n/a
S96T005330	156:13	DL	<1.09E-02	<1.13E-02	n/a
S96T005331	156:15	DL	<1.20E-02	<1.21E-02	n/a
S96T005332	156:17	DL	<1.18E-02	<1.26E-02	n/a

Table B2-50. Tank 241-A-101 Analytical Results: Strontium-89/90.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: fusion			µCi/g	µCi/g	µCi/g
S96T004730	154:4	Lower half	36.9	39.1	38
S96T004090	154:14	Lower half	3.70E-02	3.67E-02	3.69E-02
S96T004734	154:19	Lower half	4.57	4.42	4.495
S96T005245	154:Comp	Comp	19.3	19.8	19.55
Liquids			µCi/mL	µCi/mL	µCi/mL
S96T005327	154:13	DL	8.03E-02	8.74E-02	8.39E-02
S96T005328	154:15	DL	8.31E-02	8.27E-02	8.29E-02
S96T005329	154:17	DL	1.43E-02	1.67E-02	1.55E-02
S96T005330	156:13	DL	8.74E-02	7.85E-02	8.29E-02
S96T005331	156:15	DL	9.18E-02	9.28E-02	9.23E-02
S96T005332	156:17	DL	1.01E-01	8.80E-02	9.45E-02

Table B2-51. Tank 241-A-101 Analytical Results: Percent Water (TGA). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			%	%	%
S96T004691	154:1	Upper half	29.94	28.36	29.15
S96T004689	154:1	Lower half	31.89	32.93	32.41
S96T004697	154:2	Lower half	26.61	37.05	31.83[QC:e]
S96T004693	154:2	Upper half	32.42	32.64	32.53
S96T004697	154:2	Lower half	30.15	30.7	30.42
S96T004692	154:3	Upper half	32.98	30.59	31.78
S96T004690	154:3	Lower half	33.48	33.86	33.67
S96T004698	154:4	Lower half	36.88	22.39	29.64[QC:e]
S96T004694	154:4	Upper half	35.61	33.4	34.5
S96T004698	154:4	Lower half	33.13	34.3	33.72
S96T004695	154:6	Upper half	33.51	34.52	34.02
S96T004699	154:6	Lower half	31.39	24.75	28.07
S96T004074	154:7	Lower half	36.35	35.7	36.03

Table B2-51. Tank 241-A-101 Analytical Results: Percent Water (TGA). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids (Cont'd)			%	%	%
S96T004067	154:7	Upper half	33.37	41.54	37.45
S96T004696	154:9	Upper half	30.94	29.07	30.01
S96T004700	154:9	Lower half	26.43	27.84	27.13
S96T004073	154:10	Lower half	38.81	38.5	38.66
S96T004072	154:10	Upper half	37.34	38.62	37.98 (34.6)
S96T004075	154:13	Lower half	42.71	43.61	43.16
S96T004076	154:14	Lower half	45.7	42.98	44.34
S96T004077	154:15	Lower half	44.13	41.5	42.81
S96T004078	154:16	Lower half	46.36	45.81	46.09
S96T004702 1	154:18	Lower half	11.66	17.68	14.67
S96T004702	154:18	Lower half	15.66	22.63	19.14[QC:e]
S96T004701	154:19	Lower half	72.15	68.73	70.44 (31.2)
S96T005243	154:Comp	Comp	40.31	39.73	40.02
S96T004533	156:1	Lower half	38.69	37.71	38.2
S96T004534	156:3	Lower half	34.1	35.61	34.86
S96T004536	156:3	Upper half	29.49	31.37	30.43
S96T004537	156:4	Upper half	29.72	35.83	32.77
S96T004538	156:4	Lower half	25.83	28.81	27.32
S96T004539	156:5	Upper half	37.2	34.4	35.8
S96T004540	156:5	Lower half	30.65	30.36	30.5
S96T004541	156:6	Upper half	31.18	36.23	33.7
S96T004542	156:6	Lower half	33.74	34.5	34.12
S96T004535	156:7	Lower half	36.06	31.05	33.55
S96T004543	156:7	Upper half	31.5	34.4	32.95
S96T004544	156:8	Upper half	26.34	32.32	29.33
S96T004545	156:8	Lower half	40.81	29.55	35.18
S96T004545	156:8	Lower half	31.66	32.22	31.94
S96T004546	156:10	Upper half	21.13	16.53	18.83
S96T004547	156:10	Lower half	43.08	42.48	42.78 (38.1)

Table B2-51. Tank 241-A-101 Analytical Results: Percent Water (TGA). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids (Cont'd)			%	%	%
S96T004548	156:11	Lower half	46.61	46.57	46.59
S96T004549	156:12	Lower half	45.89	44.06	44.98
S96T004279	156:13	Lower half	47.48	47	47.24
S96T004550	156:14	Lower half	41.33	44.21	42.77
S96T004551	156:15	Lower half	45.26	42.98	44.12
S96T004552	156:17	Lower half	44.1	41.92	43.01
S96T004280	156:18	Lower half	42.11	47.08	44.59
Liquids			%	%	%
S96T004110	154:11	DL	93.67	93.07	93.37 (81.9)
S96T004115	154:13	DL	48.17	48.14	48.16
S96T004116	154:14	DL	52.91	52.87	52.89
S96T004117	154:15	DL	45.54	46.69	46.11
S96T004118	154:16	DL	47.47	47.95	47.71
S96T004671	154:17	DL	93.44	93.54	93.49
S96T004669	154:18	DL	45.44	46.4	45.92
S96T004672	154:19	DL	76.59	72.84	74.72 (47.9)
S96T004582	156:10	DL	47.02	46.95	46.98
S96T004584	156:11	DL	47	46.6	46.8
S96T004583	156:11	DL	46.75	46.87	46.81
S96T004289	156:13	DL	47.09	46.98	47.03
S96T004585	156:14	DL	46.02	46.25	46.14
S96T004586	156:15	DL	46.82	47.53	47.17
S96T004587	156:17	DL	46.46	46.41	46.44
S96T004290	156:18	DL	47.29	47.63	47.46

Table B2-52. Tank 241-A-101 Analytical Results: pH Measurement.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			unitless	unitless	unitless
S96T005327	154:13	DL	13.49	13.48	13.48
S96T005328	154:15	DL	13.73	13.74	13.73
S96T005329	154:17	DL	12.76	12.76	12.76
S96T005330	156:13	DL	13.71	13.73	13.72
S96T005331	156:15	DL	13.63	13.64	13.64
S96T005332	156:17	DL	13.6	13.59	13.59

Table B2-53. Tank 241-A-101 Analytical Results: Bulk Density[1]. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: direct			g/mL	g/mL	g/mL
S96T004663	154:1	Upper half	1.7	n/a	n/a
S96T004656	154:1	Lower half	1.69	n/a	n/a
S96T004664	154:2	Upper half	1.73	n/a	n/a
S96T004657	154:2	Lower half	1.68	n/a	n/a
S96T004665	154:3	Upper half	1.7	n/a	n/a
S96T004658	154:3	Lower half	1.69	n/a	n/a
S96T004666	154:4	Upper half	1.69	n/a	n/a
S96T004659	154:4	Lower half	1.7	n/a	n/a
S96T004667	154:6	Upper half	1.71	n/a	n/a
S96T004660	154:6	Lower half	1.7	n/a	n/a
S96T004053	154:7	Upper half	1.71	n/a	n/a
S96T004051	154:7	Lower half	1.73	n/a	n/a
S96T004668	154:9	Upper half	1.69	n/a	n/a
S96T004661	154:9	Lower half	1.7	n/a	n/a
S96T004054	154:10	Upper half	1.57	n/a	n/a
S96T004055	154:10	Lower half	1.54	n/a	n/a
S96T004056	154:13	Lower half	1.75	n/a	n/a
S96T004057	154:14	Lower half	1.74	n/a	n/a

Table B2-53. Tank 241-A-101 Analytical Results: Bulk Density[1]. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids: direct (Cont'd)			g/mL	g/mL	g/mL
S96T004058	154:15	Lower half	1.72	n/a	n/a
S96T004059	154:16	Lower half	1.65	n/a	n/a
S96T004662	154:18	Lower half	1.72	n/a	n/a
S96T004522	154:19	Lower half	1.31	n/a	n/a
S96T004453	156:3	Lower half	1.68	n/a	n/a
S96T004454	156:3	Upper half	1.72	n/a	n/a
S96T004523	156:4	Lower half	1.74	n/a	n/a
S96T004524	156:4	Upper half	1.7	n/a	n/a
S96T004455	156:5	Upper half	1.67	n/a	n/a
S96T004456	156:5	Lower half	1.75	n/a	n/a
S96T004525	156:6	Lower half	1.66	n/a	n/a
S96T004526	156:6	Upper half	1.7	n/a	n/a
S96T004457	156:7	Lower half	1.67	n/a	n/a
S96T004458	156:7	Upper half	1.67	n/a	n/a
S96T004459	156:8	Upper half	1.63	n/a	n/a
S96T004460	156:8	Lower half	1.62	n/a	n/a
S96T004528	156:10	Upper half	1.58	n/a	n/a
S96T004462	156:12	Lower half	1.67	n/a	n/a
S96T004277	156:13	Lower half	1.61	n/a	n/a
S96T004529	156:14	Lower half	1.58	n/a	n/a
S96T004464	156:15	Lower half	1.74	n/a	n/a
S96T004465	156:17	Lower half	1.7	n/a	n/a
S96T004278	156:18	Lower half	1.6	n/a	n/a
S96T005242	154:Comp	Comp	1.73	n/a	n/a

Note:

[1]The bulk density of solids in the tank was lower than analytical values shown here because of the presence of gas that was released before analysis.

Table B2-54. Tank 241-A-101 Analytical Results: Specific Gravity.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids			unitless	unitless	unitless
S96T004110	154:11	DL	1.458	1.419	1.438
S96T004115	154:13	DL	1.413	1.453	1.433
S96T004116	154:14	DL	1.465	1.433	1.449
S96T004117	154:15	DL	1.427	1.448	1.438
S96T004118	154:16	DL	1.425	1.453	1.439
S96T004671	154:17	DL	1.029	1.028	1.028
S96T004669	154:18	DL	1.438	1.405	1.421
S96T004672	154:19	DL	1.158	1.158	1.158
S96T004582	156:10	DL	1.454	1.449	1.452
S96T004583	156:11	DL	1.41	1.402	1.406
S96T004584	156:11	DL	1.417	1.439	1.428
S96T004289	156:13	DL	1.506	1.494	1.5
S96T004585	156:14	DL	1.45	1.429	1.44
S96T004586	156:15	DL	1.467	1.465	1.466
S96T004587	156:17	DL	1.434	1.486	1.46
S96T004290	156:18	DL	1.367	1.359	1.363

Table B2-55. Tank 241-A-101 Analytical Results: Exotherm (DSC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids			J/g	J/g	J/g
S96T004689	154:1	Lower half	44.5	51.3	47.9
S96T004693	154:2	Upper half	41.4	35.9	38.65
S96T004697	154:2	Lower half	74.8	103.3	89.05
S96T004690	154:3	Lower half	59.4	43.7	51.55
S96T004694	154:4	Upper half	60	47	53.5
S96T004698	154:4	Lower half	64.2	58.4	61.3
S96T004695	154:6	Upper half	70.7	71.3	71
S96T004699	154:6	Lower half	70.6	70.6	70.6

Table B2-55. Tank 241-A-101 Analytical Results: Exotherm (DSC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Solids (Cont'd)			J/g	J/g	J/g
S96T004067	154:7	Upper half	52.6	63.3	57.95
S96T004696	154:9	Upper half	68.9	74.4	71.65
S96T004700	154:9	Lower half	98.7	50.9	74.8
S96T004072	154:10	Upper half	115	137	126
S96T004075	154:13	Lower half	16	22.1	19.05[QC:e]
S96T004076	154:14	Lower half	19.2	21.6	20.4
S96T004077	154:15	Lower half	30.55	31.91	31.23
S96T004078	154:16	Lower half	20.95	19.34	20.14
S96T004533	156:1	Lower half	65.7	0	32.85[QC:e]
S96T004536	156:3	Upper half	62.4	62.3	62.35
S96T004539	156:5	Upper half	43.5	41.8	42.65
S96T004540	156:5	Lower half	61.7	51.9	56.8
S96T004541	156:6	Upper half	84.3	71.9	78.1
S96T004542	156:6	Lower half	67.9	74.8	71.35
S96T004535	156:7	Lower half	55.3	56.5	55.9
S96T004543	156:7	Upper half	57.8	64	60.9
S96T004545	156:8	Lower half	129	0	64.5[QC:e]
S96T004545	156:8	Lower half	114	100.9	107.3
S96T004547	156:10	Lower half	73.1	112	92.55[QC:e]
S96T004548	156:11	Lower half	22.9	59.9	41.4[QC:e]
S96T004549	156:12	Lower half	22.3	10.3	16.3[QC:e]
S96T004279	156:13	Lower half	70.1	62.7	66.4
S96T004550	156:14	Lower half	16.3	29.5	22.9[QC:e]
S96T004280	156:18	Lower half	51.7	43.9	47.8
S96T005243	154:Comp	Comp	92.5	94.7	93.6
Liquids			J/g	J/g	J/g
S96T004115	154:13	DL	26.1	25.5	25.8
S96T004116	154:14	DL	29.7	30.8	30.25
S96T004117	154:15	DL	34.9	30.2	32.55

Table B2-55. Tank 241-A-101 Analytical Results: Exotherm (DSC). (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Average
Liquids (Cont'd)			J/g	J/g	J/g
S96T004118	154:16	DL	29.5	29.4	29.45
S96T004669	154:18	DL	38.4	44.9	41.65
S96T004672	154:19	DL	17.2	31.4	24.3[QC:e]
S96T004582	156:10	DL	28.5	27.8	28.15
S96T004584	156:11	DL	66.2	39.2	52.7[QC:e]
S96T004583	156:11	DL	26.1	45.2	35.65[QC:e]
S96004585	156:14	DL	0	70.4	35.2[QC:e]
S96T004586	156:15	DL	25.5	27.3	26.4
S96T004587	156:17	DL	42.12	0	21.06[QC:e]

1996 Retained Gas Sample Results

Table B2-56. Concentration of Insoluble Constituents in Tank 241-A-101 (Without Entrainment Correction). (μmoles/L of waste)

Core: Segment	N_2	H_2	N_2O	O_2	CH_4	Ar	Other Nit. Ox	C_2H_x	C_3H_x	Other Hyd.
15:5	1,200±40	5,200±140	410±20	39±2	49±7	16±2	3.2±1.2	7.0±1.4	4.1±1.2	8.4±1.8
15:8	1,490±60	6,300±200	450±20	42±2	56±5	10±1	7.5±1.4	8.1±1.4	3.7±1.4	6.0±1.4
15:12	420±20	43±2	82±6	55±3	10±3	200±10	3.0±1.4	0.28±0.12	1.0±0.5	3.2±1.0
24:2	9,170±230	3,400±100	400±10	2,070±60	23±6	111±4	4.0±2.3	8.1±1.5	5.0±1.8	6.9±1.8
24:9	2,070±60	6,230±150	440±10	11±1	76±9	290±10	1.0±0.5	12.0±1.4	3.2±1.5	5.8±1.8
24:16	320±20	55±2	79±4	26±2	3.0±0.6	310±20	1.9±0.7	0.58±0.21	0.72±0.35	3.1±0.9
24:19	690±30	112±4	103±4	82±3	4.1±0.5	300±10	1.9±0.8	0.91±0.46	0.87±0.42	2.7±1.0

Table B2-57. Total Ammonia Concentrations in Tank 241-A-101.[1]

Core:Segment	NH_3 (μmole/L)
15:5	7,000±600
15:8	7,600±2,200
15:12	16,000±6,000
24:2[2]	3,200±400
24:9	33,000±29,000
24:16	11,000±1,900
24:19	13,000±2,000

Notes:

[1]These values do not account for ammonia in the condensate in the collector side of the RGS system and should be considered a lower bound on the concentration.

[2]Segment 2 data are suspect because of air contamination.

Table B2-58. Nonconvective Layer Gas Inventory in Tank 241-A-101 at Standard Temperature and Pressure.

Gas	Mole % in Total Inventory	Mole % in Vapor	Mole % in Dissolved
Ammonia	50±25	5,200±140	410±20
Nitrogen	8.3±1.9	6,300±200	450±20
Hydrogen	38±9.0	43±2	82±6
Nitrous oxide	2.9±0.7	3,400±100	400±10
Methane	0.4±0.1	2.1±0.3	0
C_2H_x[1]	0.1±0.02	0.3±0.1	---
C_3H_x[1]	0.03±0.01	0.2±0.05	---
Other[1]	0.1±0.0	0.5±0.1	---
Total		290 m^3	

Note:

[1]These gases were assumed to be entirely insoluble.

1996 Grab Sample Data Tables

Table B2-59. Nondetected Inductively Coupled Plasma Analytes.

Analyte	Maximum Nondetected Value (μg/g)	Analyte	Maximum Nondetected Value (μg/g)
Antimony	<36	Arsenic	<59.9
Barium	<30	Beryllium	<3
Bismuth	<59.9	Cerium	<59.9
Cobalt	<12	Lanthanum	<30
Lithium	<5.99	Neodymium	<59.9
Samarium	<59.9	Selenium	<59.9
Strontium	<5.99	Thallium	<120
Vanadium	<30	Bromide	<2,490
Fluoride	<256		

Table B2-60. Tank 241-A-101 Analytical Results: Aluminum (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	μg/g	μg/g	μg/g
S96T002239	Riser 4	1,387	22,800	22,500	22,650
Liquids		cm	μg/mL	μg/mL	μg/mL
S96T002012	Riser 4	518	14,900	14,700	14,800
S96T002013		1,163	64,300	58,600	61,450

Table B2-61. Tank 241-A-101 Analytical Results: Boron (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	μg/g	μg/g	μg/g
S96T002239	Riser 4	1,387	70.7	81.5	76.1

Table B2-62. Tank 241-A-101 Analytical Results: Cadmium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	15.2	19.8	17.5

Table B2-63. Tank 241-A-101 Analytical Results: Calcium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	537	556	546.5

Table B2-64. Tank 241-A-101 Analytical Results: Chromium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	2,380	3,470	2,925

Table B2-65. Tank 241-A-101 Analytical Results: Copper (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	19.6	18	18.8

Table B2-66. Tank 241-A-101 Analytical Results: Iron (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	1,410	1,780	1,595
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	<20.1	<20.1	<20.1
S96T002013		1,163	<30.1	<30.1	<30.1

Table B2-67. Tank 241-A-101 Analytical Results: Lead (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	103	110	106.5

Table B2-68. Tank 241-A-101 Analytical Results: Magnesium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	112	205	158.5

Table B2-69. Tank 241-A-101 Analytical Results: Manganese (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	44	68.6	56.3

Table B2-70. Tank 241-A-101 Analytical Results: Molybdenum (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	52	48.1	50.05

Table B2-71. Tank 241-A-101 Analytical Results: Nickel (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	103	134	118.5

Table B2-72. Tank 241-A-101 Analytical Results: Phosphorus (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	1,740	1,640	1,690

Table B2-73. Tank 241-A-101 Analytical Results: Potassium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	2,970	2,730	2,850

Table B2-74. Tank 241-A-101 Analytical Results: Silicon (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	1,710	2,880	2,295

Table B2-75. Tank 241-A-101 Analytical Results: Silver (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	19.2	19.7	19.45

Table B2-76. Tank 241-A-101 Analytical Results: Sodium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	µg/g	µg/g	µg/g
S96T002239	Riser 4	1,387	2.120E+05	2.150E+05	2.135E+05
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	1.680E+05	1.650E+05	1.665E+05
S96T002013		1,163	2.920E+05	2.650E+05	2.785E+05

Table B2-77. Tank 241-A-101 Analytical Results: Sulfur (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	μg/g	μg/g	μg/g
S96T002239	Riser 4	1,387	6,480	8,070	7,275

Table B2-78. Tank 241-A-101 Analytical Results: Titanium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	μg/g	μg/g	μg/g
S96T002239	Riser 4	1,387	124	96.6	110.3

Table B2-79. Tank 241-A-101 Analytical Results: Total Uranium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	μg/g	μg/g	μg/g
S96T002239	Riser 4	1,387	406	542	474

Table B2-80. Tank 241-A-101 Analytical Results: Zinc (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	μg/g	μg/g	μg/g
S96T002239	Riser 4	1,387	21.6	23.4	22.5

Table B2-81. Tank 241-A-101 Analytical Results: Zirconium (ICP).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: acid digest		cm	μg/g	μg/g	μg/g
S96T002239	Riser 4	1,387	21.5	32.5	27

Table B2-82. Tank 241-A-101 Analytical Results: Chloride (IC).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: water digest		cm	µg/g	µg/g	µg/g
S96T002240	Riser 4	1,387	3,904	3,720	3,812
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	2,457	2,400	2,428.5
S96T002013		1,163	9,217	9,060	9,138.5
S96T002014		1,387	10,640	10,800	10,720

Table B2-83. Tank 241-A-101 Analytical Results: Nitrate (IC).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: water digest		cm	µg/g	µg/g	µg/g
S96T002240	Riser 4	1,387	1.281E+05	1.410E+05	1.346E+05
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	Grab Sample	2.993E+05	2.990E+05	2.992E+05
S96T002013		Grab Sample	1.435E+05	1.440E+05	1.438E+05
S96T002014		Grab Sample	1.694E+05	1.700E+05	1.697E+05

Table B2-84. Tank 241-A-101 Analytical Results: Nitrite (IC).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: water digest		cm	µg/g	µg/g	µg/g
S96T002240	Riser 4	1,387	63,660	68,800	66,230
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	45,450	44,700	45,075
S96T002013		1,163	1.637E+05	1.590E+05	1.614E+05
S96T002014		1,387	1.665E+05	1.680E+05	1.673E+05

Table B2-85. Tank 241-A-101 Analytical Results: Phosphate (IC).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: water digest		cm	µg/g	µg/g	µg/g
S96T002240	Riser 4	1,387	4,453	4,780	4,616.5
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	2,953	2,800	2,876.5
S96T002013		1,163	3,512	3,400	3,456
S96T002014		1,387	4,234	4,220	4,227

Table B2-86. Tank 241-A-101 Analytical Results: Sulfate (IC).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: water digest		cm	µg/g	µg/g	µg/g
S96T002240	Riser 4	1,387	20,000	19,900	19,950
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	<1,386	1,840	<1,613
S96T002013		1,163	2,124	2,210	2,167
S96T002014		1,387	1,625	1,590	1,607.5

Table B2-87. Tank 241-A-101 Analytical Results: Hydroxide (OH Direct).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	14,500	14,000	14,250
S96T002013		1,163	55,100	54,800	54,950
S96T002014		1,387	59,700	55,800	57,750

Table B2-88. Tank 241-A-101 Analytical Results: Oxalate (IC).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Solids: water digest		cm	µg/g	µg/g	µg/g
S96T002240	Riser 4	1,387	19,050	16,800	17,925
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	<1,071	<1,070	n/a
S96T002013		1,163	<1,071	<1,070	n/a
S96T002014		1,387	<434.8	<435	n/a

Table B2-89. Tank 241-A-101 Analytical Results: Exotherm (DSC).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	J/g	J/g	J/g
S96T002012	Riser 4	518	85.9	78.9	82.4
S96T002013		1,163	99.6	108.2	103.9
S96T002014		1,387	47.7	45.0	46.3

Table B2-90. Tank 241-A-101 Analytical Results: pH Measurement.

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	unitless	unitless	unitless
S96T002012	Riser 4	518	13.51	13.46	13.485
S96T002013		1,163	13.24	13.21	13.225

Table B2-91. Tank 241-A-101 Analytical Results: Specific Gravity.

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	unitless	unitless	unitless
S96T002012	Riser 4	518	1.355	1.354	1.3545
S96T002013		1,163	1.354	1.338	1.346

Table B2-92. Tank 241-A-101 Analytical Results: Percent Water (TGA).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	%	%	%
S96T002012	Riser 4	518	42.77	44.78	43.775
S96T002013		1,163	46.72	47.22	46.97
S96T002014		1,387	47.15	46.88	47.015

Table B2-93. Tank 241-A-101 Analytical Results: Americium-241.

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µCi/mL	µCi/mL	µCi/mL
S96T002015	Riser 4	518	<3.740E-05	<4.000E-05	<3.870E-05
S96T002016		1,163	1.120E-04	1.120E-04	1.120E-04

Table B2-94. Tank 241-A-101 Analytical Results: Cesium-137 (GEA).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µCi/mL	µCi/mL	µCi/mL
S96T002015	Riser 4	518	125	125	125
S96T002016		1,163	531	488	509.5

Table B2-95. Tank 241-A-101 Analytical Results: Plutonium-239/240.

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µCi/mL	µCi/mL	µCi/mL
S96T002014	Riser 4	518	<3.090E-04	<3.080E-04	<3.085E-04
S96T002015		1,163	<3.100E-04	<3.960E-04	<3.530E-04
S96T002016		1,387	<3.010E-04	<3.000E-04	<3.005E-04

Table B2-96. Tank 241-A-101 Analytical Results: Strontium-89/90.

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µCi/mL	µCi/mL	µCi/mL
S96T002015	Riser 4	518	0.0132	0.0129	0.01305[QC:f]
S96T002016		1,163	0.084	0.0776	0.0808[QC:f]

Table B2-97. Tank 241-A-101 Analytical Results: Total Organic Carbon (Furnace Oxidation).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	2,120	2,040	2,080[QC:f]
S96T002013		1,163	5,230	5,450	5,340[QC:f]
S96T002014		1,387	4,580	4,960	4,770

Table B2-98. Tank 241-A-101 Analytical Results: Ammonium (Ion Selective Electrode [NH_3]).

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	134	122	128[QC:f,e]
S96T002013		1,163	486	531	508.5[QC:f]

Table B2-99. Tank 241-A-101 Analytical Results: Total Inorganic Carbon.

Sample Number	Sample Location	Sample Depth	Result	Duplicate	Mean
Liquids		cm	µg/mL	µg/mL	µg/mL
S96T002012	Riser 4	518	543	549	546[QC:f]
S96T002013		1,163	1,760	1,770	1,765[QC:f]

Historical Data Tables

Table B2-100. October, 1983 Slurry Sample.[1,2]

Sample #7879			
Physical Data			
Specific Gravity			
Slurry	1.3597		
Supernatant	1.3617		
Centrifuged Solids***	1.3307		
Chemical Analysis			
Component	**Concentration (*M*)**		**Solids**
	Slurry	**Supernatant**	**wt%**
Al	1.09	0.9	33
OH	*	1.43	---
NO_2	0.01	1.57	---
NO_3	4.11	2.59	---
CO_4	*	NA	---
PO_4	0.13	0.02	---
SO_4	0.20	0.05	23
TOC (g/L)	7.02	5.23	44
Radiological Analysis			
^{137}Cs (μCi/L)	**	**	---
^{90}Sr (μCi/L)	3.49×10^4	2.30×10^3	---
Pu (g/L)	1.88×10^{-5}	7.22×10^{-5}	---

Notes:

NA = not available

[1]Jansky (1984)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

* Dissolved in acid
** Below detection limits
*** Includes entrained interstitial liquor, but excess supernatant removed

Table B2-101. October, 1983 Slurry Sample.[1,2]

Sample #7898			
Physical Data			
Specific Gravity			
Slurry	1.6400		
Supernatant	1.6847		
Centrifuged Solids***	1.6253		
Chemical Analysis			
Component	**Concentration (*M*)**		**Solids**
	Slurry	**Supernatant**	**wt%**
Al	1.59	2.27	27
OH	*	3.86	---
NO_2	0.01	2.53	---
NO_3	5.08	3.26	62
CO_3	*	NA	---
PO_4	**	**	---
SO_4	**	0.19	---
TOC (g/L)	9.78	11	11
Radiological Analysis			
^{137}Cs (μCi/L)	**	**	---
^{90}Sr (μCi/L)	6.11×10^4	8.11×10^4	---
Pu (g/L)	6.52×10^{-4}	NA	---

Notes:

[1]Jansky (1984)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

* Dissolved in acid
** Below detection limits
*** Includes entrained interstitial liquor, but excess supernatant removed

Table B2-102. November 10, 1980, Supernatant Sample.[1,2]

1.2 m (4 ft) Below Waste Surface					
Physical Data					
Component	Total Slurry[3]		Filtrate[3]		Solids
	M	wt%	*M*	wt%	wt%
SpG	1.65		1.47		---
%H_2O	---	41.34	---	45.47	---
Chemical Analysis					
$NaAlO_2$	1.59	7.9	1.67	9.32	---
NaOH	2.45	5.94	2.51	6.84	---
$NaNO_2$	2.28	9.53	2.4	11.26	---
$NaNO_3$	3.07	15.82	3.24	18.71	---
Na_2CO_3	1.5	9.64	0.34	2.42	90
Na_3PO_4	0.09	0.89	0.08	0.94	---
Na_2SO_4	0.15	1.29	---	---	6
TOC (g/L)	9.51	1.71	7.51	1.52	---
Radiological Analysis					
^{137}Cs (μCi/L)	5.19×10^5		7.69×10^5		
^{90}Sr (μCi/L)	1.97×10^4		4.80×10^3		
Pu (g/L)	1.99×10^{-4}		1.34×10^{-5}		
^{106}Ru (μCi/L)	343				
^{60}Co (μCi/L)	91				
^{134}Cs (μCi/L)	479				
^{239}Pu (μCi/L)	12.2				
^{241}Am (μCi/L)	1.70E-04				
^{99}Tc (μCi/L)	308				

Notes:

[1]Jansky (1980f, 1980d)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

[3]Weight percent does not include ^{137}Cs, ^{90}Sr, or Pu.

Table B2-103. November 10, 1980, Supernatant Sample.[1,2]

0.6 m (2 ft) Below Waste Surface					
Physical Data					
Component	Total Slurry[3]		Filtrate[3]		Solids
	M	wt%	*M*	wt%	wt%
SpG	1.58		1.43		---
%H_2O	---	42.37	---	48.26	---
Chemical Analysis					
$NaAlO_2$	1.51	7.84	1.21	6.96	4
NaOH	2.45	6.20	2.31	6.46	---
$NaNO_2$	2.22	9.69	2.22	10.4	---
$NaNO_3$	2.77	14.9	2.57	15.3	---
Na_2CO_3	1.33	8.92	0.31	2.3	94
Na_3PO_4	0.08	0.83	0.09	1.02	1
Na_2SO_4	0.13	1.17	0.01	0.13	---
TOC (g/L)	3.98	0.75	6.86	1.43	---
Radiological Analysis					
^{137}Cs (μCi/L)	1.17×10^5		4.55×10^5		---
^{90}Sr (μCi/L)	1.23×10^4		4.28×10^3		---
Pu (g/L)	5.67×10^{-5}		1.08×10^{-5}		---

Notes:

[1]Jansky (1980f)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

[3]Weight percent does not include ^{137}Cs, ^{90}Sr, or Pu.

Table B2-104. November 11, 1980, Supernatant Sample.[1,2]

1.2 m (4 ft) Below Waste Surface					
Physical Data					
Component	Total Slurry[3]		Filtrate[3]		Solids
	M	wt%	*M*	wt%	wt%
VIS-OTR	Quite viscous; solids precipitate when allowed to cool				
SpG	1.85		1.45		---
%H_2O	---	34.19	---	34.86	---
Chemical Analysis					
$NaAlO_2$	1.95	8.64	2.08	11.8	---
NaOH	3.51	7.59	3.12	8.64	---
$NaNO_2$	3.01	11.23	2.94	14.02	---
$NaNO_3$	3.66	16.82	3.48	20.45	---
Na_2CO_3	2.31	13.24	0.13	0.93	95
Na_3PO_4	0.12	1.06	0.13	1.53	---
Na_2SO_4	Analysis not available				
TOC (g/L)	15.61	2.51	9.94	2.04	---
Radiological Analysis					
^{137}Cs (µCi/L)	5.95×10^5		6.22×10^5		
^{90}Sr (µCi/L)	9.55×10^4		4.19×10^3		
Pu (g/L)	5.19×10^{-4}		3.96×10^{-5}		
^{106}Ru (µCi/L)	593				
^{60}Co (µCi/L)	202				
^{134}Cs (µCi/L)	839				
^{239}Pu (µCi/L)	31.8				
^{241}Am (µCi/L)	not detected				
^{99}Tc (µCi/L)	416				

Notes:

VIS-OTR = visual - over top reading

[1]Jansky (1980f, 1981)
[2]Pre-1989 analytical data have not been validated and should be used with caution.
[3]Weight percent does not include ^{137}Cs, ^{90}Sr, or Pu.

Table B2-105. Report Dated November 13, 1980 for October 1980 Supernatant Sample.[1,2]

Physical Data			
SpG	1.445		
%H_2O	46.10 wt%		
Chemical Analysis			
Component	Filtrate		Solids
	M	wt%	wt%
$NaAlO_2$	1.53	8.68	---
NaOH	3.51	13.46	16
$NaNO_2$	1.11	14.85	4
$NaNO_3$	1.89	11.12	52
Na_2CO_3	0.16	1.17	24
Na_3PO_4	0.05	0.57	---
TOC (g/L)	19.10	3.93	---

Notes:

[1]Jansky (1980b)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-106. October 13, 1980 Supernatant Sample.[1,2]

0.3 m (1 ft) Below Waste Surface			
Physical Data			
SpG	1.306		
H_2O (wt%)	45.42		
Chemical Analysis			
	Supernatant		**Solids[3]**
Component	***M***	**wt%**	**wt%**
$NaAlO_2$	2.54	15.95	0
NaOH	4.2	22.96	0
$NaNO_2$	3.79	19.34	0
$NaNO_3$	2.11	13.73	50.7
Na_2CO_3	0.24	1.95	26.1
Na_3PO_4	0.08	1	23.4
TOC (g/L)	10.71	2.44	0

Notes:

[1]Jansky (1980c)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

[3]Analytical results indicated that complexants (measured by TOC) had precipitated. This gave weight percents of: $NaNO_3$/45.9, Na_2CO_3/21.3, Na_3PO_4/18.6, and TOC/14.3.

Table B2-107. October 13, 1980 Supernatant Sample.[1,2]

1.8 m (6 ft) Below Waste Surface			
Physical Data			
SpG	1.277		
H_2O (wt%)	45.49		
Chemical Analysis			
Component	Supernatant		Solids[3]
	M	wt%	wt%
$NaAlO_2$	2.185	14.03	0
NaOH	3.51	13.46	0
$NaNO_2$	3.26	17.61	0
$NaNO_3$	2.02	13.47	46.8
Na_2CO_3	0.06	0.77	17.7
Na_3PO_4	0.23	1.87	35.4
TOC (g/L)	11.52	2.68	0

Notes:

[1]Jansky (1980c)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

[3]Analytical results indicated that complexants (measured by TOC) had precipitated. This gave weight percents of: $NaNO_3$/45.9, Na_2CO_3/21.3, Na_3PO_4/18.6, and TOC/14.3.

Table B2-108. September 22, 1980 Supernatant Sample.[1,2]

Near Waste Surface Sample #4218			
Physical Data			
Component	Supernatant		Solids
	M	wt%	wt%
SpG	1.344		
wt% H_2O	---	50.56	---
Chemical Analysis			
Al	1.364	8.32	0
OH	3.06	9.11	0
NO_2	2.04	10.47	0
NO_3	2.72	17.2	0
CO_3	0.98	7.72	68
PO4	0.016	0.2	9
TOC	16.24 (g/L)	3.59	23
Total		107.17	100

Notes:

[1]Jansky (1980e)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-109. September 22, 1980 Supernatant Sample.[1,2]

Near Sludge Waste Sample #4378			
Physical Data			
Component	Supernatant		Solids
	M	wt%	wt%
SpG	1.144		
wt% H_2O	---	41.56	---
Chemical Analysis			
Al	1.758	12.6	0
OH	3.15	11.01	0
NO_2	2.565	15.47	0
NO_3	2.298	17.07	45
CO_3	0.156	1.45	45
PO_4	0.33	4.73	0
TOC	10.14 (g/L)	2.63	10
Total		106.52	100

Notes:

[1]Jansky (1980e)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-110. September 22, 1980 Sludge Sample.[1,2]

Sample #4493			
Physical Data			
Component	Supernatant		Solids
	M	wt%	wt%
SpG	1.449		
wt% H_2O	---	42.34	---
Chemical Analysis			
Al	1.36	7.69	14
OH	3.874	10.7	0
NO_2	1.438	6.85	0
NO_3	2.53	14.84	33
CO_3	0.089	0.65	43
PO_4	0.125	1.42	0
TOC	11.025 (g/L)	2.26	9
Total		88.75	100

Notes:

[1]Jansky (1980e)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-111. August 22, 1980 Hot Boildown Supernatant Sample.[1,2]

Samples T-2691 and T-2692			
Physical Data			
Component	Lab Value		Lab Unit
	T-2691	T-2692	
SpG	1.2814	1.3017	---
H_2O	63.92	65.86	%
Chemical Analysis			
Al	0.374	0.383	*M*
OH	0.603	0.612	*M*
NO_3	2.41	2.54	*M*
NO_2	0.956	0.947	*M*
CO_3	0.57	0.462	*M*
PO_4	0.045	0.045	*M*
TOC	35.16	43.79	g/L
Radiological Analysis			
Pu	1.01×10^{-4}	1.24×10^{-4}	g/L
^{137}Cs	2.73×10^{5}	7.75×10^{5}	μCi/L
$^{89/90}Sr$	4.85×10^{4}	4.27×10^{4}	μCi/L

Notes:

[1]Jansky (1980a)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-112. October 2, 1979 Feed and Product Slurry Sample.[1,2]

Physical Data, Sample #T3971				
Component	Feed *M*	Product Liquor		Product Solid Weight Percent
		M	Weight Percent	
VIS-OTR	Light green sample, 300 mR/hr			
Vol% solids	<5.0%			
SpG (g/mL)	1.052	1.378	---	---
Chemical Analysis				
$NaAlO_2$	0.274	1.26	7.5	0
NaOH	0.518	2.31	6.7	0
$NaNO_2$	0.0772	1.56	7.82	104.5
$NaNO_3$	0.421	2.27	14	0
Na_2CO_3 (H_2O)	0.061	0.75	6.75	0
Na_3PO_4 ($12H_2O$)	0.02117	0.037	0.98	0
TOC (g/L)	---	20	1.45	0
H_2O (wt%)	96.7	---	50.25	0
Total	---	---	95.45	104.5
Radiological Analysis				
$^{239/240}Pu$	1.27E-05 (g/L)			
$^{89/90}Sr$	1.59E+04 (μCi/L)			
^{137}Cs	2.08E+05 (μCi/L)			

Notes:

[1]Delegard (1979)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-113. October 2, 1979 Hot Boildown Supernatant Sample.[1,2]

Sample #T-3970		
Physical Data		
Component	**Lab Value**	**Lab Unit**
SpG	0.9952	---
% H_2O	98.25	%
Vol % Solids	<1.0	%
Chemical Analysis		
Al	0.0256	*M*
OH	0.126	*M*
NO_3	0.042	*M*
NO_2	0.0479	*M*
CO_3	0.061	*M*
PO_4	0.0014	*M*
Radiological Analysis		
Pu	9.68×10^{-6}	g/L
^{137}Cs	4.44×10^{4}	μCi/L
$^{89/90}Sr$	8.06×10^{3}	μCi/L

Notes:

[1]Delegard (1979)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-114. April 30, 1976 Residual Sludge Sample.[1,2]

Radiological Analysis							
	Lab Value						
	Source Sample Number						
Component	Reference Letter 3901	Riser 19 North 4355	Sluice Pit 01B 4365	Riser 19 South Side 4364	Riser 19 4554	Riser 20 4555	Lab Unit
$^{89/90}Sr$	1.85	26	23	*	5.9	15.6	Ci/L
$^{89/90}Sr$	0.013	0.178	0.16	*	0.04	0.11	W/L
^{137}Cs	0.22	0.31	0.35	*	0.22	0.26	Ci/L
^{137}Cs	0.0013	0.0015	0.0017	*	0.001	0.0013	W/L

Notes:

[1]Horton (1976b)
[2]Pre-1989 analytical data have not been validated and should be used with caution.

* Not enough solids available in sample to analyze.

Table B2-115. April 9, 1976 Sludge Sample.[1,2]

Sample #3901		
Physical Data		
VIS-OTR	Course granular-like crystals "like sand" intermixed with small particles and hard chunks about the size of a quarter. The course granular crystals were grayish in color, while the small particles were reddish brown.	
Bulk density	1.36 g/mL	
Particle density	2.78 g/mL	
H_2O	9.10%	
Chemical Analysis		
Component	Lab Value	Lab Unit
Al	9.95	*M*
Fe	0.5	*M*
Si	3.95	*M*
Radiological Analysis		
$^{89/90}Sr$	1.85×10^6	μCi/L
^{137}Cs	2.68×10^5	μCi/L

Notes:

[1]Horton (1976a)
[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-116. October 17, 1974 Supernatant Sample.[1,2]

Sample T-8936		
Physical Data		
VIS-OTR	Reddish brown; 5 Rad/hr	
pH	>9.8	
SpG	1.289	
H_2O	69.31%	
Chemical Analysis		
Component	**Lab Value**	**Lab Unit**
OH	0.526	*M*
Al	2.52×10^{-2}	*M*
Na	2.4	*M*
NO_2	0.252	*M*
NO_3	2.86	*M*
PO_4	1.72×10^{-2}	*M*
F	1.65×10^{-3}	*M*
CO_3	0.402	*M*
NH_4	$<7.15 \times 10^{-3}$	*M*
Radiological Analysis		
Pu	4.36×10^{-3}	g/L
^{134}Cs	7.61×10^{2}	μCi/L
^{137}Cs	7.32×10^{4}	μCi/L
$^{89/90}Sr$	2.64×10^{5}	μCi/L

Notes:

[1]Wheeler (1974a)

[2]Pre-1989 analytical data have not been validated and should be used with caution.

Table B2-117. June 25, 1974 Slurry Sample.[1,2]

Sample T-5315		
Physical Data		
VIS-OTR	Dark brown; 5% solids; 3,500 mR/hr	
pH	11.15	
Chemical Analysis		
Component	**Lab Value**	**Lab Unit**
Na	3.6	*M*
Radiological Analysis		
^{60}Co	8.67×10^2	µCi/L
^{125}Sb	2.15×10^3	µCi/L
^{134}Cs	1.92×10^3	µCi/L
^{137}Cs	1.86×10^5	µCi/L
^{154}Eu	1.24×10^3	µCi/L

Notes:

[1]Wheeler (1974b)

[2]**Pre-1989 analytical data have not been validated and should be used with caution.**

B3.0 ASSESSMENT OF CHARACTERIZATION RESULTS

The purpose of this chapter is to discuss the overall quality and consistency of the current sampling results for tank 241-A-101, and to present the results of the calculation of an analytical-based inventory.

This section also evaluates sampling and analysis factors that may affect how the data are interpreted. These factors are used to assess the overall data quality and consistency and to identify limitations in the use of the data.

B3.1 FIELD OBSERVATIONS

The safety screening DQO requirement (Dukelow et al. 1995) that at least two widely spaced risers be sampled was met. Retained gas samples were selected in order to obtain RGS results for at least one segment from each of the three tank layers. Sample X-rays were taken for retained gas samples. Sample recovery was 94 percent for each of the cores. However, sampling problems were encountered that resulted in HHF intrusion for core 154, segments 11, 17 and 19.

B3.2 QUALITY CONTROL ASSESSMENT

The quality control assessment included an evaluation of the four quality control checks (blanks, duplicates, spikes, and standards) performed in conjunction with the chemical analyses. A general evaluation and a summary of some key safety and characterization areas are provided in this section. Additional detail is provided in Steen (1997). The SAP (Field 1996b) establishes accuracy and precision criteria for the four quality control checks. Samples with one or more quality control results outside of the criteria are identified in Tables B2-1 and B2-2.

The precision is estimated by the relative percent difference (RPD), defined as the absolute value of the difference between the primary and duplicate samples, divided by their mean, times one hundred. The degree of variability in this waste does not necessarily reflect on the laboratory procedures or equipment, but may be intrinsic to the sample. Behavior may result from the very small samples (10 to 20 mg) used in this analysis, which imposes the need for a high degree of homogeneity in the sample to achieve reproducible results. The requisite degree of homogeneity may not have been achievable with the procedures and equipment in place at the time of analysis. Difficulties in producing a highly homogeneous subsample are probably responsible for most of the RPD values exceeding 20 percent.

The analytes exhibited high RPDs most frequently at concentration levels less than 10,000 μg/g. Sample preparation also appears to influence this behavior.

Preparation blanks are used to identify any sample contamination that was introduced in the laboratory during the process of sample breakdown, digestion and dilution. The blank results indicated that contamination was not a problem.

Quality control results are identified in Appendix B, Sections B.1 and B.2 tables. Although some samples did have quality control results outside the SAP boundaries, the vast majority of the quality control results were within the boundaries specified in the SAP (Field 1996b). No impact to the validity or use of the data was found.

B3.3 DATA CONSISTENCY CHECKS

Comparing different analytical methods helps in assessing data consistency and quality. Data consistency checks included comparing phosphorus and sulfur as analyzed by ICP with phosphate and sulfate as analyzed by IC, comparing total alpha with the sum of alpha radionuclides, comparing total beta with the sum of beta radionuclides, and calculating a mass and charge balance.

B3.3.1 Comparison of Results from Different Analytical Methods

The following data consistency checks compare the results from IC and ICP analytical methods for sulphate and phosphate. Agreement between the two methods strengthens the credibility of both results. All segment analytical mean results were taken from Table B3-4.

The analytical phosphorus mean result in the saltcake as determined by inductively coupled plasma - acid prepared sample result (ICP:A) was 2,130 μg/g, which converts to 6,530 μg/g of phosphate (assuming that all the phosphorous is present as phosphate). This result compares relatively well with the IC phosphate mean result of 5,440 μg/g. The ratio of IC to ICP results indicates the phosphate was about 83 percent soluble. The RPD between these two phosphate estimates was 16.7 percent (see Table B3-1).

The ICP sulfur value 4,230 μg/g converts to 12,570 μg/g of sulfate (assuming all the sulfur is present as sulfate). This compares favorably with the IC sulfate result of 14,400 μg/g. The RPD between the two sulfate estimates was 14.5 percent. In this case, the IC results were considered the authoritative result, and sulfate solubility was considered 100 percent.

B3.3.2 Mass and Charge Balance

The principal objective in performing a mass and charge balance was to determine whether the measurements were consistent. In calculating the balances, only analytes that were detected at a concentration of 1,000 μg/g or greater were considered (see Table B3-2). A mass and charge balance was calculated independently for solids and drainable liquids sample results.

Table B3-1. Comparison of Phosphate/Phosphorous and Sulfate/Sulfur Concentrations by Different Methods.

Saltcake		
ICP:A	IC	
PO_4^{3-} (µg/g)	PO_4^{3-} (µg/g)	Solubility (IC/ICP)
6,530	5,440	0.83
SO_4^{2-} (µg/g)	SO_4^{2-}(µg/g)	Solubility (IC/ICP)
12,570	14,400	1.13

The cations listed in Table B3-2 were assumed to be in the oxide/hydroxide form shown. The concentrations of the assumed species were calculated stoichiometrically. $Al(OH)_4^-$ was determined to be the species for aluminum because of the high concentrations of aluminum in the solids and drainable liquids. Chromium was assumed to be present as a hydroxide. All positive charge was attributed to sodium. Acetate species were assumed for the TOC analysis. Phosphate and sulfate were assumed to be completely water soluble, and appeared only in the anion mass and charge calculations. The concentrations of the cationic species (Table B3-2), the anionic species (Table B3-3), and the percent water were used to calculate the mass balance.

Table B3-2. Cation Mass and Charge Data.

Analyte	Concentration[1] (µg/g)	Assumed Species	Concentration of Assumed Species (µg/g)	Charge (µeq/g)
Solids				
Chromium	1,790	$Cr(OH)_3$	3,546	0
Sodium	206,000	Na^+	206,000	8,956
Total			209,546	8,956
Drainable Liquids				
Sodium	217,000	Na^+	217,000	9,435
Total	NA	NA	217,000	9,435

Note:

[1]Mean values shown in Tables B3-4 and B3-5.

Table B3-3. Anion Mass and Charge Data.

Analyte	Concentration	Charge
Solids	(μg/g)	(μeq/g)
$Al(OH)_4$	86,900	915
Acetate (TOC)	14,180	240
Nitrate	203,000	3,274
Nitrite	82,200	1,787
Carbonate (TIC)	50,000	833
Phosphate	5,440	172
Sulfate	14,400	299
Total	456,120	7,520
Drainable Liquids	(μg/mL)	(μeq/mL)
$Al(OH)_4^-$	156,900	1,650
Chloride	7,980	225
Nitrate	136,000	2,194
Nitrite	137,000	2,878
Hydroxide	40,300	2,370
Phosphate	2,810	89
Sulfate	1,320	27
Acetate (TOC)	8,998	153
Carbonate (TIC)	12,900	215
Total	504,208	9,801

The mass balance was calculated from the formula below. The factor 0.0001 is the conversion factor from μg/g to weight percent. For drainable liquids the concentration in μg/ml is divided by the specific gravity (1.4) for mass balance calculations.

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

The total analyte concentration for solids was 605,700 μg/g or 66.6 percent (Tables B3-2 and B3-3). Mean weight percent water obtained from solids thermogravimetric analysis was 37.5 percent (Table B3-4). The mass balance resulting from adding the percent water to the total analyte concentration is 104.1 percent (Table B3-4).

The total analyte concentration for drainable liquids was 721,200 μg/mL, 515,140 μg/g or 51.5 percent (Tables B3-2 and B3-3). Mean weight percent water obtained from solids thermogravimetric analysis was 55 percent (see Table B3-5). The mass balance resulting from adding the percent water to the total analyte concentration is 106.5 percent (Table B3-5).

Table B3-4. Mass and Charge Balance Totals for Solids.

	Concentrations (μg/g)	Charge (μeq/g)
Total from Table B3-2 (cations)	209,546	+8,956
Total from Table B3-3 (anions)	456,120	-7,520
Water %	37.5	NA
Total	104.1	+1,436

Table B3-5. Mass and Charge Balance Totals for Drainable Liquids.

	Concentrations (μg/mL)	Charge (μeq/g)
Total from Table B3-2 (cations)	217,000	+9,435
Total from Table B3-3 (anions)	504,208	-9,801
Water %	55.0	NA
Total	106.5%	-366

Cation and anion microequivalent values were determined by dividing the concentration of each analyte species by the atomic mass for that species and multiplying by the species valence. Results are included in Tables B3-4 and B3-5. The charge balance is the ratio of positive charge and negative charge microequivalents. The charge balance for solids was 1.19. The higher positive charge indicates that some anions may not be fully accounted for by the analyses. Based on drainable liquid results, this may be due to the presence of hydroxide, not analyzed for in the solids. The charge balance for the drainable liquids was 0.96.

In summary, the mass and charge balance calculations yield a reasonable mass balance for solids and drainable liquids, indicating that the mean analytical results for the tank provide a relatively complete description of the tank waste. Perfect agreement is 1,000,000 μg/g for the mass balance and 1.00 for the charge balance with no net charge remaining.

B3.4 MEAN CONCENTRATIONS AND CONFIDENCE INTERVALS

The following evaluation was performed on the analytical data from the samples from tank 241-A-101.

Because an inventory estimate was needed without comparing it to a threshold value, two-sided 95 percent confidence intervals on the mean inventory were computed. The computations were made with segment-level data. Liquid sample data and solid sample data were analyzed separately. Because a composite sample was taken from only one core, no statistics were reported using composite-level data.

The lower and upper limits (LL and UL) to a two-sided 95 percent confidence interval for the mean are

$$\hat{\mu} \pm t_{(df,0.025)} \times \hat{\sigma}_{\hat{\mu}}.$$

In this equation, $\hat{\mu}$ is the estimate of the mean concentration, $\hat{\sigma}_{\hat{\mu}}$ is the estimate of the standard deviation of the mean concentration, and $t_{(df,0.025)}$ is the quantile from Student's t distribution with "df" degrees of freedom for a two-sided 95 percent confidence interval.

The mean, $\hat{\mu}$, and the standard deviation, $\hat{\sigma}_{\hat{\mu}}$, were estimated using restricted maximum likelihood estimation (REML) methods. The degrees of freedom (df) for tank 241-A-101, is the number of cores sampled minus one.

B3.4.1 Solid and Liquid Segment Means

The statistics in this section were based on analytical data from the most recent sampling event of tank 241-A-101. Analysis of variance (ANOVA) techniques were used to estimate the mean and to calculate confidence limits on the mean for all analytes that had at least 50 percent of reported values above the detection limit. If at least 50 percent of the reported values were above the detection limit, all the data were used in the computations. The detection limit was used as the value for nondetected results. No ANOVA estimates were computed for analytes with less than 50 percent detected values. Only arithmetic means were computed for these analytes.

The results given below are ANOVA estimates based on the core segment data from core 154 and core 156 for tank 241-A-101. Estimates of the mean concentration and confidence interval on the mean concentration are given in Table B3-4 for the solid segment sample data and Table B3-5 for the liquid segment sample data. The lower limit to a 95 percent confidence interval can be negative. Because an actual concentration of less than zero is not possible, the lower limit is reported as zero, whenever this occurred.

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Segment Sample Data. (2 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Bulk density	g/mL	1.66E+00	1.68E-02	1	1.45E+00	1.88E+00
DSC-dry	J/g	5.89E+01	7.96E+00	1	0.00E+00	1.60E+02
Percent water	%	3.75E+01	1.72E+00	1	1.57E+01	5.94E+01
Alpha[1]	μCi/g	4.83E-02	8.37E-03	1	0.00E+00	1.55E-01
Beta	μCi/g	1.84E+02	6.52E+01	1	0.00E+00	4.65E+02
Cs-137	μCi/g	2.02E+02	6.24E+00	1	1.23E+02	2.81E+02
Sr-89/90	μCi/g	1.42E+01	1.20E+01	1	0.00E+00	6.57E+01
$Al_{ICP.a}$	μg/g	2.47E+04	6.37E+02	1	1.66E+04	3.28E+04
$B_{ICP.a}$[1]	μg/g	1.04E+02	2.76E+01	1	0.00E+00	4.55E+02
$Cd_{ICP.a}$[1]	μg/g	9.77E+00	1.10E+00	1	0.00E+00	2.38E+01
$Ca_{ICP.a}$[1]	μg/g	2.33E+02	2.93E+01	1	0.00E+00	6.06E+02
Chloride	μg/g	3.89E+03	1.75E+02	1	1.66E+03	6.11E+03
$Cr_{ICP.a}$	μg/g	1.79E+03	3.49E+02	1	0.00E+00	6.23E+03
$Co_{ICP.a}$[1]	μg/g	3.32E+01	6.39E+00	1	0.00E+00	1.14E+02
Fluoride[1]	μg/g	4.79E+02	1.01E+02	1	0.00E+00	1.76E+03
$Fe_{ICP.a}$[1]	μg/g	3.43E+02	1.08E+02	1	0.00E+00	1.71E+03
$Mn_{ICP.a}$[1]	μg/g	3.40E+01	4.57E+00	1	0.00E+00	9.22E+01
$Mo_{ICP.a}$[1]	μg/g	6.45E+01	3.58E+00	1	1.91E+01	1.10E+02
$Ni_{ICP.a}$[1]	μg/g	6.49E+01	9.16E+00	1	0.00E+00	1.81E+02
Nitrate	μg/g	2.03E+05	1.96E+04	1	0.00E+00	4.53E+05
Nitrite	μg/g	8.22E+04	2.96E+03	1	4.46E+04	1.20E+05
Oxalate[1]	μg/g	1.03E+04	1.60E+03	1	0.00E+00	3.06E+04
Phosphate[1]	μg/g	5.44E+03	6.18E+02	1	0.00E+00	1.33E+04
$P_{ICP.a}$	μg/g	2.13E+03	1.34E+02	1	4.21E+02	3.83E+03
$K_{ICP.a}$	μg/g	5.19E+03	1.97E+03	1	0.00E+00	3.02E+04
$Si_{ICP.a}$	μg/g	3.67E+02	1.22E+02	1	0.00E+00	1.92E+03
$Na_{ICP.a}$	μg/g	2.06E+05	5.47E+03	1	1.36E+05	2.75E+05
Sulfate[1]	μg/g	1.44E+04	2.38E+03	1	0.00E+00	4.46E+04
$S_{ICP.a}$	μg/g	4.23E+03	7.62E+02	1	0.00E+00	1.39E+04
TIC	μg/g	1.00E+04	1.70E+03	1	0.00E+00	3.17E+04

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Segment Sample Data. (2 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
TOC[2]	μg/g	4.80E+03	5.54E+02	1	0.00E+00	1.18E+04
Uranium	μg/g	3.94E+02	2.39E+02	1	0.00E+00	1.42E+03
$Zn_{ICP.a}$[1]	μg/g	1.95E+01	3.49E+00	1	0.00E+00	6.39E+01
$Zr_{ICP.a}$[1]	μg/g	2.66E+01	3.43E+00	1	0.00E+00	7.02E+01

Notes:

[1]Some "less-than" values are in the analytical results.
[2]Wet basis

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Segment Sample Data. (2 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
DSC-dry	J/g	4.70E+01	8.37E+00	1	0.00E+00	1.53E+02
pH	pH	1.35E+01	1.62E-01	1	1.14E+01	1.55E+01
SpG	SpG	1.40E+00	4.59E-02	1	8.12E-01	1.98E+00
Percent water	%	5.50E+01	7.97E+00	1	0.00E+00	1.56E+02
Cs-137	μCi/mL	3.65E+02	6.91E+01	1	0.00E+00	1.24E+03
Sr-89/90	μCi/mL	7.53E-02	1.46E-02	1	0.00E+00	2.61E-01
$Al_{ICP.a}$	μg/mL	4.46E+04	1.06E+04	1	0.00E+00	1.79E+05
$B_{ICP.a}$[1]	μg/mL	4.71E+01	8.00E+00	1	0.00E+00	1.49E+02
Chloride	μg/mL	7.98E+03	1.36E+03	1	0.00E+00	2.53E+04
$Cr_{ICP.a}$	μg/mL	5.12E+01	1.21E+01	1	0.00E+00	2.05E+02
$Pb_{ICP.a}$[1]	μg/mL	1.08E+02	2.16E+01	1	0.00E+00	3.82E+02
$Mo_{ICP.a}$	μg/mL	1.20E+02	2.48E+01	1	0.00E+00	4.35E+02
Nitrate	μg/mL	1.36E+05	2.37E+04	1	0.00E+00	4.37E+05
Nitrite	μg/mL	1.37E+05	2.56E+04	1	0.00E+00	4.63E+05
OH^-	μg/mL	4.03E+04	4.78E+03	1	0.00E+00	1.01E+05
Phosphate[1]	μg/mL	2.81E+03	3.92E+02	1	0.00E+00	7.79E+03
$P_{ICP.a}$	μg/mL	1.09E+03	2.38E+02	1	0.00E+00	4.12E+03
$K_{ICP.a}$	μg/mL	6.58E+03	1.32E+03	1	0.00E+00	2.33E+04

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Segment Sample Data. (2 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
$Si_{ICP.a}$	μg/mL	1.35E+02	8.12E+00	1	3.21E+01	2.39E+02
$Ag_{ICP.a}$ [1]	μg/mL	1.52E+01	2.65E+00	1	0.00E+00	4.89E+01
$Na_{ICP.a}$	μg/mL	2.17E+05	4.29E+04	1	0.00E+00	7.63E+05
Sulfate[1]	μg/mL	1.32E+03	1.06E+02	1	0.00E+00	2.66E+03
$S_{ICP.a}$	μg/mL	4.32E+02	5.85E+01	1	0.00E+00	1.18E+03
TIC	μg/mL	2.54E+03	3.12E+02	1	0.00E+00	7.26E+03
TOC[2]	μg/mL	3.34E+03	5.07E+02	1	0.00E+00	1.18E+04
$Zn_{ICP.a}$ [1]	μg/mL	8.79E+00	2.95E+00	1	0.00E+00	4.63E+01

Notes:

[1]Some "less-than" values are in the analytical results.
[2]Wet basis

B3.4.2 Analysis of Variance Models

A statistical model is needed to account for the spatial and measurement variability in $\hat{\sigma}_{\hat{\mu}}$. This cannot be done using an ordinary standard deviation of the data (Snedecor and Cochran 1980).

The statistical model fit to the solid sample data for beta, Sr-89/90, and uranium is

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

$$i=1,\ldots,a,\ j= 1,\ldots,b_i,$$

where

Y_{ij} = laboratory results from the j^{th} duplicate from the i^{th} core in the tank

μ = the grand mean

C_i = the effect of the i^{th} core

A_{ij} = the effect of the j^{th} analytical result from the i^{th} core

a = the number of cores

b_i = the number of analytical results from the i^{th} core.

The variable C_i is assumed to be a random effect. This variable and A_{ij} are assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(C)$ and $\sigma^2(A)$, respectively. Estimates of $\sigma^2(C)$ and $\sigma^2(A)$ were obtained using REML techniques. The REML technique, applied to variance component estimation, is described in Harville (1977). The statistical results were obtained using the statistical analysis package S-PLUS[3] (StatSci 1993).

The statistical model fit to the liquid segment sample data for pH, Cs-137 GEA, Sr-89/90, and OH^- and fit to the solid segment sample data for alpha is

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

$$i=1,...,a,\ j=1,...,b_i,\ k=1,...c_{ij}$$

where

Y_{ijk} = laboratory results from the k^{th} duplicate from the j^{th} segment in the i^{th} core in the tank

μ = the grand mean

C_i = the effect of the i^{th} core

S_{ij} = the effect of the j^{th} segment in the i^{th} core

A_{ijk} = the effect of the k^{th} analytical result from the j^{th} segment in the i^{th} core

a = the number of cores

b_i = the number of segments from the i^{th} core

c_{ij} = the number of analytical results from the j^{th} segment in the i^{th} core.

The variables C_i and S_{ij} are assumed to be random effects. These variable and A_{ijk} are assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(C)$, $\sigma^2(S)$, and $\sigma^2(A)$, respectively. Estimates of $\hat{\sigma}^2(C)$, $\sigma^2(S)$, and $\sigma^2(A)$ were obtained using REML techniques. The REML technique, applied to variance component estimation, is described in Harville (1977). The statistical results were obtained using the statistical analysis package S-PLUS™ (StatSci 1993).

[3]Trademark of Statistical Sciences, Seattle, Washington.

The statistical model fit to the remaining liquid and solid segment sample data is

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

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

where

Y_{ijkm}	=	laboratory results from the m[th] duplicate in the k[th] location in the j[th] segment in the i[th] core in the tank,
μ	=	the grand mean
C_i	=	the effect of the i[th] core
S_{ij}	=	the effect of the j[th] segment from the i[th] core
L_{ijk}	=	the effect of the k[th] location in the j[th] segment in the i[th] core
A_{ijkm}	=	the effect of the m[th] analytical result from the k[th] location in the j[th] segment in the i[th] core
a	=	the number of cores
b_i	=	the number of segments in the i[th] core
c_{ij}	=	the number of locations from the j[th] segment in the i[th] core
d_{ijk}	=	the number of analytical results from the k[th] location in the j[th] segment in the i[th] core.

The variables C_i, S_{ij}, and L_{ijk} are assumed to be random effects. These variables and A_{ijkm} are assumed to be uncorrelated and normally distributed with means zero and variances $\sigma^2(C)$, $\sigma^2(S)$, $\sigma^2(L)$, and $\sigma^2(A)$, respectively. Estimates of $\sigma^2(C)$, $\sigma^2(S)$, $\sigma^2(L)$, and $\sigma^2(A)$ were obtained using REML techniques. The REML technique, applied to variance component estimation, is described in Harville (1977). The statistical results were obtained using statistical analysis package S-PLUS™ (StatSci 1993).

After the sample means are calculated for the tank for each analyte, the sampling based inventory may be calculated. Sample based inventories and explanations for how they were determined are presented in Appendix D.

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

In Appendix C, the results of the analyses required for the applicable DQO reports for tank 241-A-101 are reported. Specifically, statistical manipulations required in the DQO reports are documented in this appendix as follows.

- **Section C1**: Statistical analysis supporting the Safety Screening DQO (Dukelow et al. 1995). Specifically, confidence intervals were needed to support the plutonium (criticality) threshold limit.
- **Section C2**: Statistical analysis supporting the Organic DQO (Turner et al. 1995).
- **Section C3**: Gateway analysis supporting the *Historical Model Evaluation Data Requirements* DQO (Simpson and McCain 1996).
- **Section C4**: Analysis for hydrostatic head fluid contamination.
- **Section C5**: References for Appendix C.

C1.0 STATISTICS FOR SAFETY SCREENING DATA QUALITY OBJECTIVE

The safety screening DQO (Dukelow et al. 1995) defines acceptable decision confidence limits in terms of one-sided 95 percent confidence intervals. In this appendix, the results of calculating one-sided confidence limits supporting the safety screening DQO are reported for tank 241-A-101. All data in this section are from the final laboratory data package for the 1996 core sampling event for tank 241-A-101 (Steen 1997).

Confidence intervals were computed for each sample number from tank 241-A-101 analytical data. The sample numbers and confidence intervals are provided in Table C1-1 for alpha and Table C1-2 for DSC.

The upper limit (UL) 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 for a one-sided 95 percent confidence interval.

For the tank 241-A-101 data (per sample number), df equals the number of observations minus one.

The upper limit of the 95 percent confidence interval for each sample number based on alpha data is listed 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 one would 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. The maximum upper limit to a 95 percent CI on the mean for alpha was 0.181 μCi/g, for core 154 segment 9, lower half. This is well below the threshold limit of 36.1 μCi/g.

The upper limit of the 95 percent confidence interval for each sample number based on DSC data is listed in Table C1-2. Each confidence interval can be used to make the following statement. If the upper limit is less than 480 J/g, then one would 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 CI on the mean for DSC was 317 J/g, for core 154, segment 10, upper half. This is below the threshold limit of 480 J/g.

Table C1-1. 95 Percent Confidence Interval Upper Limits for Alpha for Tank 241-A-101 (Units are μCi/g or μCi/mL). (2 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
S96T004705	154:1, lower half	1.13E-01	5.50E-03	1.47E-01
S96T004729	154:2, lower half	8.69E-02	1.07E-02	1.54E-01
S96T004706	154:3, lower half	1.19E-01	1.50E-03	1.28E-01
S96T004730	154:4, lower half	1.05E-01	5.85E-03	1.42E-01
S96T004731	154:6, lower half	1.12E-01	1.10E-02	1.81E-01
S96T004086	154:7, lower half	7.44E-02	3.25E-03	9.49E-02
S96T004732	154:9, lower half	6.70E-02	5.40E-03	1.01E-01
S96T004088	154:10, lower half	2.09E-02	6.50E-04	2.50E-02
S96T004672	154:19, drainable liquid	7.68E-03	7.30E-04	1.23E-02
S96T004734	154:19, lower half	1.15E-02	3.50E-04	1.37E-02
S96T004594	156:1, lower half	7.11E-02	5.15E-03	1.04E-01
S96T004595	156:3, lower half	7.29E-02	6.50E-04	7.70E-02
S96T004624	156:4, lower half	1.01E-01	9.65E-03	1.62E-01

Table C1-1. 95 Percent Confidence Interval Upper Limits for Alpha for Tank 241-A-101 (Units are µCi/g or µCi/mL). (2 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
S96T004625	156:5, lower half	1.28E-01	1.50E-03	1.37E-01
S96T004626	156:6, lower half	9.91E-02	6.50E-04	1.03E-01
S96T004596	156:7, lower half	5.35E-02	6.65E-03	9.54E-02
S96T004627	156:8, lower half	7.53E-02	1.60E-03	8.54E-02
S96T004628	156:10, lower half	1.10E-02	4.36E-03	3.86E-02
S96T004629	156:11, lower half	4.16E-03	7.40E-04	8.83E-03
S96T004630	156:12, lower half	1.02E-02	5.45E-04	1.36E-02
S96T004283	156:13, lower half	1.34E-02	2.75E-03	3.07E-02
S96T004631	156:14, lower half	9.15E-03	1.96E-03	2.15E-02
S96T004284	156:18, lower half	9.38E-03	3.03E-03	2.85E-02

Table C1-2. 95 Percent Confidence Interval Upper Limits for Differential Scanning Calorimetry for Tank 241-A-101 (Units are Joules/g-Dry). (2 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
S96T004689	154:1, lower half	7.09E+01	5.05E+00	1.03E+02
S96T004693	154:2, upper half	5.73E+01	4.10E+00	8.32E+01
S96T004697	154:2, lower half	1.29E+02	2.05E+01	2.58E+02
S96T004690	154:3, lower half	7.83E+01	1.14E+01	1.50E+02
S96T004694	154:4, upper half	8.17E+01	9.90E+00	1.44E+02
S96T004698	154:4, lower half	9.25E+01	4.40E+00	1.20E+02
S96T004695	154:6, upper half	1.08E+02	5.00E-01	1.11E+02
S96T004067	154:7, upper half	9.26E+01	8.45E+00	1.46E+02
S96T004696	154:9, upper half	1.02E+02	3.95E+00	1.27E+02
S96T004072	154:10, upper half	2.03E+02	1.80E+01	3.17E+02
S96T004115	154:13, drainable liquid	4.98E+01	6.00E-01	5.36E+01
S96T004075	154:13, lower half	3.36E+01	5.35E+00	6.73E+01
S96T004116	154:14, drainable liquid	6.42E+01	1.20E+00	7.18E+01
S96T004076	154:14, lower half	3.67E+01	2.15E+00	5.02E+01

Table C1-2. 95 Percent Confidence Interval Upper Limits for Differential Scanning Calorimetry for Tank 241-A-101 (Units are Joules/g-Dry). (2 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
S96T004117	154:15, drainable liquid	6.05E+01	4.35E+00	8.79E+01
S96T004077	154:15, lower half	5.46E+01	1.20E+00	6.22E+01
S96T004118	154:16, drainable liquid	5.63E+01	1.00E-01	5.69E+01
S96T004078	154:16, lower half	3.74E+01	1.50E+00	4.69E+01
S96T004669	154:18, drainable liquid	7.70E+01	6.00E+00	1.15E+02
S96T004672	154:19, drainable liquid	9.60E+01	2.80E+01	2.73E+02
S96T004536	156:3, upper half	8.97E+01	5.00E-02	9.00E+01
S96T004539	156:5, upper half	6.65E+01	1.35E+00	7.50E+01
S96T004540	156:5, lower half	8.18E+01	7.05E+00	1.26E+02
S96T004541	156:6, upper half	1.18E+02	9.00E+00	1.75E+02
S96T004542	156:6, lower half	1.09E+02	5.50E+00	1.43E+02
S96T004543	156:7, upper half	9.09E+01	4.65E+00	1.20E+02
S96T004535	156:7, lower half	8.41E+01	9.00E-01	8.98E+01
S96T004545	156:8, lower half	1.29E+02	4.39E+01	2.33E+02
S96T004582	156:10, drainable liquid	5.31E+01	7.00E-01	5.75E+01
S96T004547	156:10, lower half	1.62E+02	3.40E+01	3.77E+02
S96T004583	156:11, drainable liquid	6.71E+01	1.80E+01	1.80E+02
S96T004548	156:11, lower half	7.75E+01	3.46E+01	2.96E+02
S96T004584	156:12, drainable liquid	9.89E+01	2.52E+01	2.58E+02
S96T004549	156:12, lower half	2.96E+01	1.09E+01	9.84E+01
S96T004279	156:13, lower half	1.26E+02	7.00E+00	1.70E+02
S96T004550	156:14, lower half	4.01E+01	1.16E+01	1.13E+02
S96T004586	156:15, drainable liquid	5.00E+01	1.70E+00	6.07E+01
S96T004587	156:17, drainable liquid	3.93E+01	n/a[1]	n/a
S96T004280	156:18, lower half	8.63E+01	7.05E+00	1.31E+02

C2.0 STATISTICS FOR THE ORGANIC DATA QUALITY OBJECTIVE

The organic DQO (Turner et al. 1995) defines acceptable decision confidence limits in terms of one-sided 95 percent confidence intervals. In this appendix, the results of calculating one-sided confidence limits supporting the organic DQO are reported for tank 241-A-101. All data considered in this section are taken from the final laboratory data package for the 1996 core sampling event for tank 241-A-101 (Steen 1997).

Confidence intervals were computed for each sample number from tank 241-A-101 analytical data. The sample numbers and confidence intervals are provided in Table C2-1 for percent water and Table C2-2 for TOC.

For percent water, the lower limit (LL) to a one-sided 95 percent confidence interval on the mean is

$$\hat{\mu} - t_{(df,0.05)} * \hat{\sigma}_{\hat{\mu}},$$

and for TOC, the upper limit (UL) to a one-sided 95 percent confidence interval on the mean is

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

For these equations, $\hat{\mu}$ 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 for a one-sided 95 percent confidence interval.

For the tank 241-A-101 data (per sample number), df equals the number of observations minus one.

The lower limit of the 95 percent confidence interval for each sample number based on percent water data is listed in Table C1-3. After reruns, the lower limit to a 95 percent CI on the mean was less than 17 percent for 4 of the samples (core 154: segment 7 upper half and 18 lower half; and core 156: segments 4 upper half and 8 upper half). However, only core 154, segment 18 was measured at less than 17 percent (11.7 percent) and this sample contained mostly drainable liquid with 42.9 percent water. Therefore, percent water is not a concern for this tank.

The upper limit of the 95 percent confidence interval for each sample number based on TOC data is listed in Table C1-4. The units for TOC drainable liquid samples were converted from μg/mL to μg/g using the specific gravity results for each sample number. The upper limit exceeded 30,000 μg/g for three of the samples (core 154: segment 9 lower half, core 154: segment 17 drainable liquid, and core 156: segment 6 lower half). However, the result and duplicate results for these samples were below 30,000 μg/g, and water content was 93.5 percent and 33.7 percent, respectively, for the two samples. Therefore, TOC is not a concern for this tank.

Table C2-1. 95 Percent Confidence Interval Lower Limits for Percent Water for Tank 241-A-101 (Units are in percent). (2 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	LL
S96T004691	154:1, upper half	2.92E+01	7.90E-01	2.42E+01
S96T004689	154:1, lower half	3.24E+01	5.20E-01	2.91E+01
S96T004693	154:2, upper half	3.25E+01	1.10E-01	3.18E+01
S96T004697	154:2, lower half	3.04E+01	2.75E-01	2.87E+01
S96T004692	154:3, upper half	3.18E+01	1.20E+00	2.42E+01
S96T004690	154:3, lower half	3.37E+01	1.90E-01	3.25E+01
S96T004694	154:4, upper half	3.45E+01	1.11E+00	2.75E+01
S96T004698	154:4, lower half	3.37E+01	5.85E-01	3.00E+01
S96T004695	154:6, upper half	3.40E+01	5.05E-01	3.08E+01
S96T004699	154:6, lower half	2.81E+01	3.32E+00	7.11E+00
S96T004067	154:7, upper half	3.75E+01	4.09E+00	1.17E+01
S96T004074	154:7, lower half	3.60E+01	3.25E-01	3.40E+01
S96T004696	154:9, upper half	3.00E+01	9.35E-01	2.41E+01
S96T004700	154:9, lower half	2.71E+01	7.05E-01	2.27E+01
S96T004072	154:10, upper half	3.80E+01	6.40E-01	3.39E+01
S96T004073	154:10, lower half	3.87E+01	1.55E-01	3.77E+01
S96T004110	154:11, drainable liquid	9.34E+01	3.00E-01	9.15E+01
S96T004115	154:13, drainable liquid	4.82E+01	1.50E-02	4.81E+01
S96T004075	154:13, lower half	4.32E+01	4.50E-01	4.03E+01
S96T004116	154:14, drainable liquid	5.29E+01	2.00E-02	5.28E+01
S96T004076	154:14, lower half	4.43E+01	1.36E+00	3.58E+01
S96T004117	154:15, drainable liquid	4.61E+01	5.75E-01	4.25E+01
S96T004077	154:15, lower half	4.28E+01	1.32E+00	3.45E+01
S96T004118	154:16, drainable liquid	4.77E+01	2.40E-01	4.62E+01
S96T004078	154:16, lower half	4.61E+01	2.75E-01	4.43E+01
S96T004671	154:17, drainable liquid	9.35E+01	5.00E-02	9.32E+01
S96T004669	154:18, drainable liquid	4.59E+01	4.80E-01	4.29E+01
S96T004702	154:18, lower half	1.69E+01	2.28E+00	1.15E+01
S96T004672	154:19, drainable liquid	7.47E+01	1.88E+00	6.29E+01
S96T004701	154:19, lower half	7.04E+01	1.71E+00	5.96E+01
S96T004533	156:1, lower half	3.82E+01	4.90E-01	3.51E+01
S96T004536	156:3, upper half	3.04E+01	9.40E-01	2.45E+01
S96T004534	156:3, lower half	3.49E+01	7.55E-01	3.01E+01
S96T004537	156:4, upper half	3.28E+01	3.06E+00	1.35E+01
S96T004538	156:4, lower half	2.73E+01	1.49E+00	1.79E+01
S96T004539	156:5, upper half	3.58E+01	1.40E+00	2.70E+01

Table C2-1. 95 Percent Confidence Interval Lower Limits for Percent Water for Tank 241-A-101 (Units are in percent). (2 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	LL
S96T004540	156:5, lower half	3.05E+01	1.45E-01	2.96E+01
S96T004541	156:6, upper half	3.37E+01	2.53E+00	1.78E+01
S96T004542	156:6, lower half	3.41E+01	3.80E-01	3.17E+01
S96T004543	156:7, upper half	3.30E+01	1.45E+00	2.38E+01
S96T004535	156:7, lower half	3.36E+01	2.51E+00	1.77E+01
S96T004544	156:8, upper half	2.93E+01	2.99E+00	1.05E+01
S96T004545	156:8, lower half	3.19E+01	2.80E-01	3.02E+01
S96T004582	156:10, drainable liquid	4.70E+01	3.50E-02	4.68E+01
S96T004546	156:10, upper half	1.88E+01	2.30E+00	4.31E+00
S96T004547	156:10, lower half	4.28E+01	3.00E-01	4.09E+01
S96T004583	156:11, drainable liquid	4.68E+01	6.00E-02	4.64E+01
S96T004548	156:11, lower half	4.66E+01	2.00E-02	4.65E+01
S96T004584	156:12, drainable liquid	4.68E+01	2.00E-01	4.55E+01
S96T004549	156:12, lower half	4.50E+01	9.15E-01	3.92E+01
S96T004289	156:13, drainable liquid	4.70E+01	5.50E-02	4.67E+01
S96T004279	156:13, lower half	4.72E+01	2.40E-01	4.57E+01
S96T004585	156:14, drainable liquid	4.61E+01	1.15E-01	4.54E+01
S96T004550	156:14, lower half	4.28E+01	1.44E+00	3.37E+01
S96T004586	156:15, drainable liquid	4.72E+01	3.55E-01	4.49E+01
S96T004551	156:15, lower half	4.41E+01	1.14E+00	3.69E+01
S96T004587	156:17, drainable liquid	4.64E+01	2.50E-02	4.63E+01
S96T004552	156:17, lower half	4.30E+01	1.09E+00	3.61E+01
S96T004290	156:18, drainable liquid	4.75E+01	1.70E-01	4.64E+01
S96T004280	156:18, lower half	4.46E+01	2.49E+00	2.89E+01

Table C2-2. 95 Percent Confidence Interval Upper Limits for Total Organic Carbon for Tank 241-A-101 (Units are in μg/g-Dry). (3 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
S96T004691	154:1, upper half	5.18E+03	1.55E+02	6.16E+03
S96T004689	154:1, lower half	8.12E+03	8.88E+01	8.68E+03
S96T004693	154:2, upper half	8.44E+03	6.67E+01	8.86E+03
S96T004692	154:3, upper half	9.81E+03	1.55E+03	1.96E+04
S96T004690	154:3, lower half	7.29E+03	9.72E+02	1.34E+04
S96T004694	154:4, upper half	1.03E+04	7.63E+00	1.03E+04

Table C2-2. 95 Percent Confidence Interval Upper Limits for Total Organic Carbon for Tank 241-A-101 (Units are in μg/g-Dry). (3 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
S96T004698	154:4, lower half	9.05E+03	3.51E+02	1.13E+04
S96T004695	154:6, upper half	9.21E+03	1.50E+03	1.87E+04
S96T004699	154:6, lower half	6.59E+03	1.20E+03	1.41E+04
S96T004067	154:7, upper half	9.22E+03	2.48E+02	1.08E+04
S96T004074	154:7, lower half	7.06E+03	1.49E+03	1.65E+04
S96T004696	154:9, upper half	1.24E+04	8.79E+02	1.80E+04
S96T004700	154:9, lower half	1.68E+04	4.08E+03	4.25E+04
S96T004072	154:10, upper half	2.02E+04	4.84E+02	2.32E+04
S96T004073	154:10, lower half	1.65E+04	0.00E+00	1.65E+04
S96T004110	154:11, drainable liquid	1.30E+04	1.94E+03	2.52E+04
S96T004115	154:13, drainable liquid	5.17E+03	2.69E+01	5.34E+03
S96T004075	154:13, lower half	3.58E+03	1.50E+02	4.52E+03
S96T004116	154:14, drainable liquid	5.24E+03	3.66E+01	5.47E+03
S96T004076	154:14, lower half	2.87E+03	3.59E+01	3.10E+03
S96T004117	154:15, drainable liquid	5.14E+03	1.29E+01	5.22E+03
S96T004077	154:15, lower half	2.75E+03	1.92E+02	3.96E+03
S96T004118	154:16, drainable liquid	4.21E+03	2.53E+02	5.81E+03
S96T004078	154:16, lower half	4.82E+03	2.97E+02	6.70E+03
S96T004671	154:17, drainable liquid	1.50E+04	8.94E+03	7.14E+04
S96T004702	154:18, lower half	6.34E+02	5.39E+02	4.03E+03
S96T004672	154:19, drainable liquid	7.02E+03	4.27E+02	9.72E+03
S96T004701	154:19, lower half	4.18E+03	2.20E+02	5.57E+03
S96T004533	156:1, lower half	5.98E+03	1.05E+02	6.64E+03
S96T004536	156:3, upper half	6.83E+03	9.56E+02	1.29E+04
S96T004534	156:3, lower half	9.32E+03	1.07E+03	1.61E+04
S96T004537	156:4, upper half	9.77E+03	2.53E+02	1.14E+04
S96T004538	156:4, lower half	7.48E+03	3.44E+01	7.70E+03
S96T004539	156:5, upper half	1.16E+04	3.04E+02	1.35E+04
S96T004540	156:5, lower half	1.01E+04	1.51E+02	1.10E+04
S96T004541	156:6, upper half	1.08E+04	7.54E+00	1.08E+04

Table C2-2. 95 Percent Confidence Interval Upper Limits for Total Organic Carbon for Tank 241-A-101 (Units are in μg/g-Dry). (3 sheets)

Sample Number	Core:Segment, Portion	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
S96T004542	156:6, lower half	1.38E+04	3.82E+03	3.79E+04
S96T004535	156:7, lower half	8.61E+03	2.26E+02	1.00E+04
S96T004544	156:8, upper half	1.38E+04	5.87E+02	1.76E+04
S96T004545	156:8, lower half	1.48E+04	1.73E+02	1.59E+04
S96T004582	156:10, drainable liquid	4.09E+03	2.73E+02	5.81E+03
S96T004546	156:10, upper half	3.23E+03	1.05E+02	3.90E+03
S96T004547	156:10, lower half	1.86E+04	8.74E+01	1.92E+04
S96T004584	156:11, drainable liquid	5.70E+03	2.63E+01	5.87E+03
S96T004583	156:11, drainable liquid	4.36E+03	1.15E+03	1.16E+04
S96T004549	156:12, lower half	3.61E+03	8.18E+01	4.12E+03
S96T004289	156:13, drainable liquid	4.76E+03	1.01E+02	5.39E+03
S96T004585	156:14, drainable liquid	5.38E+03	1.42E+02	6.27E+03
S96T004586	156:15, drainable liquid	4.73E+03	9.04E+01	5.30E+03
S96T004587	156:17, drainable liquid	5.88E+03	1.92E+01	6.00E+03
S96T004552	156:17, lower half	3.07E+03	1.93E+02	4.29E+03
S96T004290	156:18, drainable liquid	5.31E+03	1.40E+01	5.39E+03

C3.0 GATEWAY ANALYSIS FOR HISTORICAL MODEL DATA QUALITY OBJECTIVE

The *Historical Model Evaluation Data Requirements* (Simpson and McCain 1996) requires that a gateway analysis be performed on the analytical data obtained from tank 241-A-101. The purpose of the gateway analysis is to provide a quick screening check of the analytical data before a more thorough set of analyses is performed on the tank. If the gateway analysis fails, then the remainder of the analyses in the historical DQO will not be performed. Tank 241-A-101 was selected for historical evaluation because it was expected to contain a thick SMMA1 layer (Agnew et al. 1997). The indicator analytes for SMMA1 are sodium, aluminum, chromium, percent water, nitrite, nitrate, carbonate, phosphate, sulfate, ^{137}Cs and ^{90}Sr. Segment 4 (lower half) samples were selected to represent the non-convective saltcake layer and segment 14 (lower half) to represent the convective layer for historical gateway analyses comparisons. Segment 19 was of interest because historical transfer records indicate that there is a thin layer of sludge at the bottom of the tank. However, observation during extrusions and analytical results for segment 19 samples indicates that, if the sludge layer exists, it was probably not sampled.

The historical gateway analysis consists of two parts, both of which are described below.

The first part of the gateway analysis was to check if the sum of the mass of a set group of analytes (indicator analytes) contributed over 85 percent of the total tank waste mass. The second part was to compare measured analyte concentrations with DQO-defined concentrations for selected "fingerprint analytes." This comparison ensures that a predicted waste type is in the tank at the predicted location within the waste matrix. If the analytical results are ≥ 10 percent of the DQO levels, the waste type and layer identification are considered acceptable (Simpson and McCain 1996).

Fingerprint analytes accounted for greater than 95 percent of the waste mass for segment 4 and segment 14. Table C2-1 compares analytical results with DQO-defined concentrations for fingerprint analytes. All analytical values for selected segments 4 (lower half) and 14 (lower half) were ≥ to 10 percent of the DQO values for fingerprint analytes, except chromium and ^{90}Sr for segment 14. Therefore, segment 4 passed the gateway analysis and segment 14 did not. As noted previously, segment 14 was mostly drainable liquid, and is clearly part of a waste layer separate from segment 4.

Table C3-1. Comparison of SMMA1 Fingerprint Analytes with Analytical Results.

Fingerprint Analyte	Units	Mean Analytical Results		Historical DQO Concentration Level[1]
		Segment 4 Lower Half	Segment 14 Lower Half	
Sodium	μg/g	222,000	197,500	205,000
Aluminum	μg/g	25,500	24,900	37,000
Chromium	μg/g	4,270	26	1,800
Nitrate	μg/g	149,500	277,500	68,000
Nitrite	μg/g	83,850	103,500	220,000
Carbonate (TIC x 5)	μg/g	17,400	3,802	19,000
Phosphate	μg/g	4,895	5,970	23,000
Sulfate	μg/g	27,600	3,015	21,000
^{137}Cs	μCi/g	178	222	168
^{90}Sr	μCi/g	38	0.037	75
Percent water	percent	30.9	43.6	32.1

Note:

[1]Simpson and McCain (1996)

The final test was to compare core composite analyses with historical modeling estimates (Agnew et al. 1997) for the indicator analytes. Composite samples were obtained only for core 154. Values for each of the core 154 composite analytes were ≥ to 10 percent of historical model estimates. Table C2-2 summarizes the results of this analysis.

Table C3-2. Part 2 of Gateway Analysis.

Analyte	Units	Historical Predicted Value[1]	10% of Predicted Value	Core Sample Average
Sodium	µg/g	1.50E+05	150,000	181,000
Aluminum	µg/g	24,900	2,490	30,700
Chromium	µg/g	1,440	144	1,820
Nitrite	µg/g	61,900	6,190	90,300
Nitrate	µg/g	1.56E+05	15,600	102,000
Carbonate	µg/g	17,300	1,730	23,150
Phosphate	µg/g	4,920	492	9,360
Sulfate	µg/g	15,100	1,510	15,500
^{137}Cs	µCi/g	155	15.5	259
^{90}Sr	µCi/g	79.8	7.98	19.6
Percent water	Percent	45.9	4.59	40.0

Note:

[1]Agnew et al. (1997)

In summary, the upper layer comprising segments 1 through 10 agrees with historical predictions for the SMMA1. The lower half of the tank is a salt slurry with a few solids that appear to have settled after waste was removed from the tank. The HDW model does not account for this separate layer in the tank.

C4.0 ANALYSIS FOR HYDROSTATIC HEAD FLUID CONTAMINATION

Water was used as a hydrostatic head fluid (HHF) in the acquisition of cores 154 and 156. Lithium bromide was added to the HHF to act as a tracer. Composite and segment analyses for lithium and bromide were performed in accordance with the sampling and analysis plan (Field 1996) to detect contamination of the waste samples with HHF. Analytical results for lithium and bromide are shown in Table B2-20 and B2-34, respectively.

C4.1 LITHIUM

Lithium was analyzed by ICP using procedures LA-505-151 and LA-505-161. Samples were prepared in accordance with procedure LA-505-151. Sample results shown in Table C3-1 are for samples that had lithium results that exceeded 100 µg/g. Because probable incursion of HHF into these samples, bromide was requested as a secondary analysis.

Table C4-1. Tank 241-A-101 Lithium Results.

Sample Number	Core:Segment, Portion	Average Li
Solids		**(µg/g)**
S96T004094	154:10, upper half	554
S96T004740	154:19, lower half	3,180
S96T004638	156:10, lower half	130.5
S96T004642	156:15, lower half	140.5
Drainable liquid		**(µg/mL)**
S96T004110	154:11	1,620
S96T004671	154:17	1,650
S96T004672	154:19[1]	10.2

Note:

[1]Although the lithium result for this sample was low, it was included because bromide was high.

C4.2 BROMIDE

Bromide was analyzed by IC using procedure LA-533-105. Bromide analyses were reported for all samples shown in Table C3-1. Bromide results are shown in Table C3-2.

For the bromium concentrations observed, water content caused by HHF intrusion was determined using the approach outlined in Winkelman (1996). Corrected water content for each of these samples is shown in Table C3-2. The results indicate that drainable liquid segments 11 and 19 of core 154 are mostly HHF.

Table C4-2. Tank 241-A-101 Bromide Results

Sample Number	Core:Segment, Portion	Average Br
Solids		(μg/g)
S96T004101	154:10, upper half	<1,280
S96T004746	154:19, lower half	13,900
S96T000003	156:10, lower half	1,980
S96T004652	156:15, lower half	658
Drainable liquid		(μg/mL)
S96T004110	154:11	66,900
S96T004671	154:17	253
S96T004672	154:19[1]	17,800

Note:

[1]Although the lithium result for this sample was low, it was included because bromide was high.

Table C4-3. Correction to Thermogravimetric Analysis Results as a Result of Hydrostatic Head Fluid Contamination.

Core:Segment, Portion	TGA Result (%)	Corrected TGA Result (%) (based on Br)
Solids		
154:10, upper half	38	34.6
154:19, lower half	70.4	31.2
156:10, lower half	42.8	38.1
156:15, lower half	44.1	41.3
Drainable liquids		
154:11	93.4	81.9
154:17	93.54	93.5
154:19	74.7	47.9

C5.0 APPENDIX C REFERENCES

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR TANK 241-A-101

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-A-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 tank 241-A-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.

D1.0 CHEMICAL INFORMATION RESOURCES

Available chemical and radiological inventory estimates for tank 241-A-101 consist of the inventory estimate generated by the Hanford defined waste (HDW) model (Agnew et al. 1997a) and an inventory based on two core samples taken from tank 241-A-101 in July 1996 (Steen 1997). The best-basis inventory is primarily sample-based, augmented with radionuclide and chemical component data from the HDW model.

D2.0 COMPARISON OF COMPONENT INVENTORY VALUES

The tank 241-A-101 chemical and radionuclide inventory predicted from the core sample data and the HDW model (Agnew et al. 1997a) is provided in Table D2-1. The chemical species are reported without charge designation per the best-basis inventory convention. The total tank 241-A-101 waste volume is 3,607 kL (953 kgal), of which 11 kL (3 kgal) is sludge and the remainder is saltcake or salt solution (Hanlon 1997). Derivation of the tank 241-A-101 inventory based on core sample analyses is discussed in Sections D3.3 and D3.4.

Table D2-1. Tank 241-A-101 Inventory Estimates. (2 Sheets)

Analyte	Calculated Inventory Tank 241-A-101 Core Samples (kg)	HDW Model Inventory (kg)
Ag	<73.8	n/r
Al	146,600	136,000
As	<377	n/r
B	386	n/r
Ba	<189	n/r
Be	<18.8	n/r
Bi	<378	767
Ca	<782	3,580
Cd	<33.5	n/r
Ce	<377	n/r
Cl	24,100	24,700
Co	<120	n/r
CO_3	169,400	91,300
Cr	5,430	18,400
Cu	<44.4	n/r
F	<1,560	3,780
Fe	1,390	3,230
K	25,800	7,580
La	<189	9.78
Mg	<377	n/r
Mn	<110	746
Mo	380	n/r
Na	954,800	927,000
Nd	<378	n/r
Ni	<211	978
NO_2	461,200	338,000
NO_3	820,700	798,000
OH	63,000	483,000
Oxalate	<31,900	8.12
Pb	<502	817
P as PO_4	24,700	26,200
S as SO_4	39,900	81,100
Sb	<226	n/r
Se	<379	n/r
Si	2,570	6,530

Table D2-1. Tank 241-A-101 Inventory Estimates. (2 Sheets)

Analyte	Calculated Inventory Tank 241-A-101 Core Samples (kg)	HDW Model Inventory (kg)
Sm	<377	n/r
Sr	<37.8	0.00
Ti	<37.7	n/r
Tl	<754	n/r
TOC	19,600	63,900
U	<1,600	5,860
V	<189	n/r
Zn	72.1	n/r
Zr	<88.4	42.3
Radionuclide[1]	**Calculated Inventory Tank 241-A-101 Core Samples (Ci)[2]**	**HDW Model Inventory (Ci)**
^{241}Am	<1,380	197
^{137}Cs	993,900	866,000
^{60}Co	<127	145
^{154}Eu	<466	2,270
^{155}Eu	<1,700	961
^{90}Sr	135,100	481,000
Total alpha	<111	n/r
Total beta	331,100	n/r

Notes:

n/r = not reported

[1]Revision 4 of the HDW model (Agnew et al. 1997a) contains estimates for 46 radionuclides. Only those with corresponding sample-based inventory estimates are listed in this table.

[2]Radionuclides (with the exception of total alpha and total beta) are decayed to January 1, 1994 to be consistent with the HDW model.

D3.0 COMPONENT INVENTORY EVALUATION

D3.1 CONTRIBUTING WASTE TYPES

The HDW model (Agnew et al. 1997a), the sort on radioactive waste type (SORWT) model (Hill et al. 1995), and the waste tank summary report (Hanlon 1997) agree as to the waste types present in tank 241-A-101.

The HDW model (Agnew et al. 1997a) predicts that the tank contains a small volume of sludge (11 kL [3 kgal]) and a large quantity of salt slurry, (3,596 kL [950 kgal] defined SMMA1 waste). The SORWT model (Hill et al. 1995) lists double-shell slurry feed, non-complexed waste, and post-1976 evaporator feed as the primary, secondary and tertiary waste types, respectively, and credits 3,956 kL (950 kgal) to saltcake and 11 kL (3 kgal) to sludge, with 1,563 kL (413 kgal) of interstitial liquid. The SORWT model waste volumes are identical to those reported in the waste tank summary report (Hanlon 1997).

D3.2 EVALUATION OF WASTE TRANSACTIONS/TANK OPERATING HISTORY

Waste transaction records (Agnew et al. 1997b) show that tank 241-A-101 was initially filled with a combination of PUREX HLW and OWW. Total volumetric inputs were 18,001 kL (4,756 kgal) of HLW and 7,771 kL (2,053 kgal) of OWW. Condensates from this self-boiling waste tank were routed to cribs. The remaining supernatant was removed from the tank in the first quarter of 1968, after which the tank was sluiced for the first time. Approximately 284 kL (75 kgal) of sludge was retrieved from the tank in 1968 and 1969 (Rodenhizer 1987).

Following this first sluicing, the tank received primarily strontium recovery supernatant (SRR) from B Plant and supernatants from the sluicing of other high-level waste tanks in A and AX Tank Farms. The tank was re-sluiced in 1975 and 1976 and an additional 121 kL (32 kgal) of sludge was removed (Rodenhizer 1987). Rodenhizer (1987) assumed that the sludge level had been reduced to 2.54 to 5.08 cm (1 to 2 in.) because the tank was approved for saltcake storage. This amount is equivalent to 11 to 23 kL (3 to 6 kgal) of sludge. A sludge map prepared in February 1976 (ARHCO 1976) indicates that the sludge was non-uniformly distributed across the bottom of the tank, and confirms the conclusion that the sludge volume was approximately 11 kL (3 kgal) as reported by Hanlon (1997).

Tank 241-A-101 was to used to stage feed for the 242-A Evaporator and to interim store the first-pass evaporator salt slurries starting in the third quarter of 1976. Some of these feeds/slurries contained dilute concentrations of complexants. Approximately 1,196 kL (316 kgal) of salt accumulated in the tank as the result of the storage of these solutions (Anderson 1990). In the fourth quarter of 1980, the tank was filled with evaporator slurry in two campaigns (campaigns 80-10 and 81-1, numbered by fiscal year).

The feeds for evaporator campaigns 80-10 and 81-1 were non-complexed waste, reported in the 242-A Evaporator campaign reports as dilute double-shell slurry feed (Teats 1982a and 1982b). The TOC concentration for tank 241-A-101 supernatant was 10.7 g/L following evaporator campaign 80-1 and 6.75 g/L following evaporator campaign 81-1. Solid material included with samples taken 0.6 m and 1.2 m (2 and 4 ft) below the surface following evaporator campaign 81-1 was approximately 95 weight percent sodium carbonate (Jansky 1980). Hydrates of sodium carbonate have relatively low particle densities that may have led to an initial formation of a surface crust in tank 241-A-101. No significant waste transactions involving tank 241-A-101 have taken place since 1980 (Agnew et al. 1997b).

D3.3 COMPOSITION OF TANK 241-A-101 WASTE

D3.3.1 Waste Volumes

Tank 241-A-101 is unusual in that the saltcake is located above the free liquid. Two cores, each containing 19 segments 48.3 cm (19 in.) long were recovered during sampling in July 1996. Only 28 cm (11 in.) of saltcake was recovered from the top segment of core 154 and 2.5 cm (1 in.) from the top segment of core 156. This equates to an average waste height of 884 cm (348 in.) and a total waste volume of 3,622 kL (957 kgal). This confirms the waste volume of 3,607 kL (953 kgal) reported by Hanlon (1997).

The solid/liquid interface can be estimated from three data sources: 1) a March 16, 1996 gamma scan; 2) the location of the highest temperature in the tank (expected to be located near the solids liquid interface due to the insulating effect of the saltcake); and 3) the core segments that contained any drainable liquid and the color difference between solids extruded from core samplers. The estimates are summarized in Table D3-1. The predicted average interface is predicted to be 4.72 m (15.5 ft) from the bottom of the tank, equivalent to 1,925 kL (508.5 kgal) of liquid waste after subtracting the 11 kL (3 kgal) sludge heel.

Table D3-1. Determination of Solid/Liquid Interface in Tank 241-A-101.

Method	Estimated Interface Location (from Bottom of Tank)
1996 gamma scan - riser 19	4.57 - 8.87 m (15 - 16 ft)
Temperature - thermocouple 9	4.67 - 5.28 m (15.33 - 17.33 ft)
Core sample 154, segment 10	4.34 - 4.82 m (14.25 - 15.82 ft)
Core sample 156, segment 10	4.34 - 4.82 m (14.25 - 15.83 ft)
Predicted average interface	4.72 m (15.5 ft)

This calculated liquid volume should not be used with the mean drainable liquid concentrations calculated in Appendix B because the samples were extruded at 23.3 to 25.6 °C [74 to 78 °F] and the temperature in the tank bottom averaged 62.8 °C [145 °F].

Much of the solid material extruded with the lower cores likely crystallized in the sampler. The solids in the lower cores were noted to be white rather than the gray color seen in the saltcake layer (Steen 1997). The retained gas samples taken from the bottom of the tank were X-rayed immediately after removal from the tank and were found to be homogeneous (Shekarriz et al. 1996); however, this testing does not rule out the presence of small particles. The tank waste represented by the bottom 9 core segments likely does not contain a large fraction of solid material at the actual waste temperatures.

The pumpable liquid volume reported by Hanlon (1997) does not agree with the volumes calculated from the interface location. The Hanlon (1997) pumpable liquid fraction for tank 241-A-101 was updated to 1,669 kL (441 kgal) in June 1996 based on the new liquid fraction estimates (50 percent, Brown 1996). The pumpable liquid in tank 241-A-101 would be at least 15 percent higher than calculated by Brown (1996) based on the volume of liquid below the interface (1,925 kL [508.5 kgal]). Additional pumpable liquid is likely present in the saltcake layer as at the actual tank waste temperatures (as drainable interstitial liquid). The Hanlon (1997) interstitial liquid volume of 1,563 kL (413 kgal) is also incorrect because the volume of the saltcake layer is only 1,671 kL (441.5 kgal).

The liquid fraction corresponding to the temperature of the sample extrusion and sample analyses can be calculated from the core sample extrusion data (see Table D3-2).

Table D3-2. Extrusion Data for Tank 241-A-101 Core Samples. (2 Sheets)

Core	Segment	Solid Material (g)	Drained Liquid (g)	Total Sample (g)
154	1 (top)	256.7	0.0	256.7
154	2	388.9	0.0	388.9
154	3	427.5	0.0	427.5
154	4	422.3	0.0	422.3
154	5	RGS Sample		
154	6	406.2	0.0	406.2
154	7	410.5	0.0	410.5
154	8	RGS Sample		
154	9	387.3	0.0	387.3
154	10	256.4	0.0	256.4

Table D3-2. Extrusion Data for Tank 241-A-101 Core Samples. (2 Sheets)

Core	Segment	Solid Material (g)	Drained Liquid (g)	Total Sample (g)
154	11	Sampling Problems		
154	12	RGS Sample		
154	13	90.5	314.0	404.5
154	14	RGS Sample		
154	15	134.8	286.5	421.3
154	16	133.3	297.6	430.9
154	17	49.9	239.4	289.3
154	18	113.8	342.2	456.0
154	19 (bottom)	Sampling Problems		
Core 154	Total	3,478	1,480	4,958
156	1 (top)	33.3	0.0	33.3
156	2	RGS Sample		
156	3	426.7	0.0	426.7
156	4	420.5	0.0	420.5
156	5	408.8	0.0	408.8
156	6	420.4	0.0	420.4
156	7	354.8	0.0	354.8
156	8	368.8	0.0	368.8
156	9	RGS Sample		
156	10	152.1	163.9	316.0
156	11	96.3	322.5	418.8
156	12	101.4	305.9	407.3
156	13	69.9	350.5	420.4
156	14	82.7	348.0	430.7
156	15	81.2	335.8	417.0
156	16	RGS Sample		
156	17	65.6	345.0	410.6
156	18	118.4	282.9	401.3
156	19 (bottom)	RGS Sample		
Core 156	Total	3,201	2,455	5,655
Total of two cores		6,679	3,934	10,613

Note:

Retained gas samples (RGS) were not available for chemical analyses.

The fraction of drained liquid indicated by the extrusion data (Table D3-2) was 37.1 weight percent (3,934 g liquid per 10,613 g total sample). This fraction does not account for missing segments (segments 5, 8 12 and 14 of core 154 and segments 2, 9, 16, and 19 of core 156) or segments 11 and 19 of core 154, where sampling problems were encountered and the liquids were mostly tracer fluid. The average recoveries for full segments in the same half of the tank can be substituted for the missing values. For example, the average recoveries for segments 3 through 8 in core 156 were 400 g of solid and no drainable liquid. The 400 g of solids and 0 g of liquid are substituted for the missing data in segments 2 and 9 prior to recalculating the liquid fraction. The corrected drained liquid fraction is 39.4 weight percent (5,772 g liquid per 14,659 g total sample). The weight fraction can be converted to volume fraction using the mean bulk density for the solids phase (1.66 g/mL, Table B3-4 in Appendix B) and the mean specific gravity for the drained liquid (1.40, Table B3-5 in Appendix B). The calculated volume fraction drainable liquid is 43.5 volume percent. This corresponds to 1,565 kL (413.5 kgal) in the tank (the liquid volume calculated for the tank if it were cooled to 23.3 to 25.6 °C [74 to 78 °F). This value will be used with the mean analytical concentration results (Appendix B, Table B3-5) for determining the drained liquid chemical and radionuclide inventories.

The saltcake volume also requires an adjustment to account for the retained gases contained in the solid layer (Shekarriz et al. 1996). This adjustment is needed because the bulk density measurements were made after the gas had been released from the sample. Shekarriz et al. (1996) estimates that 14 percent by volume (in situ) of the nonconvective layer was filled with retained free gases. The saltcake volume will be reduced by 234 kL (61.8 kgal) for purposes of calculating the tank inventory (14 percent of the 1,671 kL [441.5 kgal] of saltcake physically present in the tank). The resulting volume of 1,797 kL (474.7 kgal) corresponds to the volume of saltcake calculated to result if the tank were cooled to 23.3 to 25.6 °C (74 to 78 °F) and the retained gases were removed. This value will be used with the mean analytical concentration results (Appendix B, Table B3-4) for determining the chemical and radionuclide inventories in the saltcake.

D3.3.2 Waste Composition Based on Core Sampling

Two core samples were taken in tank 241-A-101 in July 1996 (Steen 1997). The analytical results and statistical analyses are provided in Appendix B. The waste is very unusual in that a very thick saltcake layer (approximately 4 m [13 ft]) is located above a saturated salt solution or slurry. The mean values are provided in Table D3-3. The composition of the A1SltCk (saltcake waste generated from the 242-A Evaporator from 1977 to 1980) in tanks 241-A-102 and 241-A-103 from 1988 core samples and the HDW model A1SltCk defined waste is also provided in Table D3-3 for comparison.

The tank 241-A-103 saltcake composition is similar to the mean analytical results for the tank 241-A-101 solid material. The more significant differences between tanks 241-A-101 and 241-A-103 appear to be in the nitrate and aluminum concentrations, although the concentrations of several minor components (Ca, Mg, Mn, Si, U, Zn and Zr) are higher in

241-A-103. Except for sodium, the saltcake in tank 241-A-102 contains higher concentrations of corrosion products and other metallic analytes, possibly because the relatively small saltcake inventory (129 kL [34 kgal]) is located on top of a sludge heel.

The HDW model A1SltCk is a global average of all A1 saltcakes. The tank 241-A-101 inventory calculated by the HDW model is actually based on tank-specific calculations performed by the supernatant mixing model (SMMA1). A comparison of the HDW model and sample-based inventory estimates is made in Section D3.5.

Table D3-3. Composition of Tank 241-A-101 Waste. (2 Sheets)

Analyte	241-A-101 Drainable Liquid - Mean Concentration (μg/mL)	241-A-101 Solid (Salt) Mean Concentration (μg/g)	241-A-102 Core Sample Composite (μg/g)[1]	241-A-103 Core Sample Composite (μg/g)[2]	HDW Model A1SltCk (μg/g)
Ag	15.2	<16.7	241	22.8	n/r
Al	44,600	24,700	23,250	16,600	31,657
As	<54.3	<97.6	n/r	n/r	n/r
B	47.1	104	14.2	22.3	n/r
Ba	<27.2	<48.8	879	573	n/r
Be	<2.71	<4.88	n/r	n/r	n/r
Bi	<54.3	<98.1	1,670	90.3	790
Ca	<54.3	233	2,590	1,715	1,197
Cd	<2.71	9.77	49.5	7.20	n/r
Ce	<54.3	<97.6	n/r	n/r	n/r
Cl	7,980	3,890	n/r	n/r	2,158
Co	<13.5	33.2	20.7	1.74	n/r
CO_3	12,700	50,000	n/r	n/r	19,289
Cr	51.2	1,790	5,795	1,530	3,826
Cu	<5.62	<11.9	80.8	12.3	n/r
F	<78.7	479	n/r	n/r	1,141
Fe	<27.2	343	13,930	349	456
K	6,580	5,190	2,815	2,535	2,186
La	<27.2	<49.0	n/r	n/r	0
Mg	<54.3	<97.6	1,385	796	n/r
Mn	<5.43	34.0	2,028	95.9	159
Mo	120	64.5	n/r	n/r	n/r
Na	217,000	206,000	187,000	208,500	232,562
Nd	<54.3	<98.1	n/r	n/r	n/r
Ni	<10.9	64.9	526	93.2	316

Table D3-3. Composition of Tank 241-A-101 Waste. (2 Sheets)

Analyte	241-A-101 Drainable Liquid - Mean Concentration (μg/mL)	241-A-101 Solid (Salt) Mean Concentration (μg/g)	241-A-102 Core Sample Composite (μg/g)[1]	241-A-103 Core Sample Composite (μg/g)[2]	HDW Model A1SltCk (μg/g)
NO_2	137,000	82,200	n/r	n/r	75,169
NO_3	136,000	203,000	178,500	113,500	263,183
OH	40,300	n/r	n/r	n/r	101,369
Oxalate	<741	10,300	n/r	n/r	0
Pb	108	<111	1,136	105	114
P as PO_4	3,330	6,520	16,046	6,645	21,059
S as SO_4	1,290	12,700	n/r	n/r	20,813
Sb	<32.6	<58.5	n/r	n/r	n/r
Se	<54.3	<98.4	n/r	n/r	n/r
Si	135	367	16,550	11,050	2,566
Sm	<54.3	<97.6	n/r	n/r	n/r
Sr	<5.43	<9.81	97.2	12.0	0
Ti	<5.43	<9.76	n/r	n/r	n/r
Tl	<109	<195	n/r	n/r	n/r
TOC	3,340	4,800	7,570	7,885	7,788
U	<271	394	9,540	1,435	2,269
V	<27.2	<48.8	n/r	n/r	n/r
Zn	8.79	19.5	52.5	54.0	n/r
Zr	<5.66	26.6	1,402	195	105
^{241}Am	<3.86E-04	<0.763	0	0.118	0.0304
^{137}Cs	365	202	140	202	151
^{60}Co	<0.0102	<0.0416	0	0.0750	0.0367
^{154}Eu	<0.0716	<0.148	n/r	n/r	0.557
^{155}Eu	<0.264	<0.430	n/r	n/r	0.232
$^{239/240}Pu$	<2.14E-04	n/r	2.01	0.130	0.0561
$^{89/90}Sr$	0.0753	14.2	604	48.7	88.4
Total alpha	<0.0154	0.0483	n/r	n/r	n/r
Total beta	n/r	184	n/r	n/r	n/r

Notes:

[1]Weiss and Schull (1988a)

[2]Weiss and Schull (1988b)

[3]Radionuclide concentrations reported as of the date analyzed.

D3.3.3 Composition of Tank 241-A-101 Sludge

Neither of the two core samples retrieved the sludge material on the tank bottom. The bottom segment of core 154 (segment 19) was taken from riser 15. A map of the sludge distribution remaining in the tank on February 20, 1976 (ARHCO 1976) indicates that there was no sludge at this location. Additionally, the recovery for this segment was poor. The bottom segment of core 156 (also segment 19) was an RGS. No chemical analyses were made on this material.

The sludge remaining in tank 241-A-101 after sluicing in 1976 was sampled and analyzed (Horton 1976a and 1976b). The analytical results and projected sludge inventories are provided in Table D3-4. A sludge volume of 11 kL (3 kgal) was used in calculating the sludge inventory. Inclusion of the small volume of sludge in the tank inventory significantly affects the iron, silicon and ^{90}Sr inventories.

Table D3-4. Tank 241-A-101 Sludge Heel.

Analysis	Result	A-101 Inventory
Bulk density	1.36 g/cm^3	n/a
Particle density	2.78 g/cm^3	n/a
Percent water	9.1 wt%	n/a
Aluminum	9.95*M*	3,048 kg
Iron	0.5*M*	317 kg
Silicon	3.95*M*	1,260 kg
$^{89,90}Sr$	14.5 Ci/L[1]	3,090 Ci
^{137}Cs	0.272 Ci/L[1]	164,300 Ci

Notes:
[1]Average for five sludge samples.

The solids were subjected to X-ray analysis (Burch 1976) and found to contain the following species: $AlPO_4$, SiO_2, $FeAl_2SiO_5(OH)_2$, $Al(NO_3)_3{\bullet}9H_2O$ and $KAlSiO_4$.

D3.4 PREDICTED INVENTORY FOR TANK 241-A-101

The chemical and radionuclide inventory of tank 241-A-101 can be estimated from the mean laboratory analyses for the two core samples, the total waste volume (3,607 kL [953 kgal]), the volume of the sludge heel remaining after sluicing (11 kL [3 kgal]) and the calculated volumes of solid/liquid material corresponding to the temperature of the core sample extrusion/analyses (1,565 kL [413.5 kgal] of drainable liquid and 1,797 kL [474.7 kgal] of saltcake). The retained gas volume of 234 kL (61.8 kgal) was excluded from the inventory calculations. The tank inventory is the sum of the components in the sludge, liquid and saltcake. The resulting inventories are provided in Table D3-5. The inventories estimated by the HDW model (Agnew et al. 1997a) are included in the table for comparison.

Table D3-5. Estimated Chemical and Radionuclide Inventory for Tank 241-A-101. (3 Sheets)

Analyte	Sludge Layer Inventory (kg)[1]	Drainable Liquid Inventory (kg)[2]	Saltcake Inventory (kg)[2]	Sample-Based 241-A-101 Inventory (kg)	HDW Model Inventory (kg)
Ag	n/r	23.8	<50.0	<73.8	n/r
Al	3048	69,800	73,800	146,600	136,000
As	n/r	<85.1	<292	<377	n/r
B	n/r	73.8	312	386	n/r
Ba	n/r	<42.6	<146	<189	n/r
Be	n/r	<4.25	<14.6	<18.8	n/r
Bi	n/r	<85.1	<293	<378	767
Ca	n/r	<85.1	697	<782	3,580
Cd	n/r	<4.25	29.2	<33.5	n/r
Ce	n/r	<85.1	<292	<377	n/r
Cl	n/r	12,500	11,600	24,100	24,700
Co	n/r	<21.1	99	<120	n/r
CO_3	n/r	19,900	149,600	169,400	91,300
Cr	n/r	80.2	5,350	5,430	18,400
Cu	n/r	<8.79	<35.6	<44.4	n/r
F	n/r	<123	1,430	<1,560	3,780
Fe	317	<42.6	1,030	<1,390	3,230
K	n/r	10,300	15,500	25,800	7,580
La	n/r	<42.6	<147	<189	9.78
Mg	n/r	<85.1	<292	<377	n/r

Table D3-5. Estimated Chemical and Radionuclide Inventory for Tank 241-A-101. (3 Sheets)

Analyte	Sludge Layer Inventory (kg)[1]	Drainable Liquid Inventory (kg)[2]	Saltcake Inventory (kg)[2]	Sample-Based 241-A-101 Inventory (kg)	HDW Model Inventory (kg)
Mn	n/r	<8.51	102	<110	746
Mo	n/r	187	193	380	n/r
Na	n/r	340,000	614,800	954,800	927,000
Nd	n/r	<85.1	<293	<378	n/r
Ni	n/r	<17.0	194	<211	978
NO_2	n/r	215,200	246,000	461,200	338,000
NO_3	n/r	212,400	608,200	820,700	798,000
OH	n/r	63,000	n/r	63,000	483,000
Oxalate	n/r	<1,160	30,700	<31,900	8.12
Pb	n/r	169	<333	<502	817
P as PO_4	n/r	5,210	19,500	24,700	26,200
S as SO_4	n/r	2,020	37,900	39,900	81,100
Sb	n/r	<51.1	<175	<226	n/r
Se	n/r	<85.1	<294	<379	n/r
Si	1,260	212	1,100	2,570	6,530
Sm	n/r	<85.1	<292	<377	n/r
Sr	n/r	<8.51	<29.3	<37.8	0.0
Ti	n/r	<8.51	<29.2	<37.7	n/r
Tl	n/r	<170	<584	<754	n/r
TOC	n/r	5,230	14,400	19,600	63,903
U	n/r	<425	1,180	<1,600	5,860
V	n/r	<42.6	<146	<189	n/r
Zn	n/r	13.8	58.4	72.1	n/r
Zr	n/r	<8.85	79.6	<88.4	42.3

Table D3-5. Estimated Chemical and Radionuclide Inventory for Tank 241-A-101. (3 Sheets)

Analyte	Sludge Layer Inventory (kg)[1]	Drainable Liquid Inventory (kg)[2]	Saltcake Inventory (kg)[2]	Sample-Based 241-A-101 Inventory (kg)	HDW Model Inventory (kg)
^{241}Am	n/r	<0.606	<1,380	<1,380	197
^{137}Cs	2,050	606,600	385,300	993,900	866,000
^{60}Co	n/r	<22.4	<105	<127	145
^{154}Eu	n/r	<138	<328	<466	2,270
^{155}Eu	n/r	<592	<1,110	<1,700	961
$^{239/240}Pu$	n/r	<0.336	n/r	n/a	n/r
^{90}Sr	107,900	125	27,100	135,100	481,000

Notes:

[1]Based on the sludge composition in Table D3-4

[2]Based on the saltcake/drainable liquid compositions in Table D3-3

[3]Radionuclides decayed to January 1, 1994

D3.5 COMPARISON OF TANK 241-A-101 INVENTORY ESTIMATES

The tank 241-A-101 inventories predicted by the HDW model and the inventories based on core sample analyses are in excellent agreement for the major components (Al, Na and NO_3), and reasonably good for most other species.

Aluminum. The HDW model predicts an aluminum inventory which is only 8 percent less than that predicted from the analytical data.

Carbonate. The sample-based tank 241-A-101 carbonate inventory is 1.9 times the HDW model inventory. The hydroxide ion in Hanford Site waste tanks is converted to carbonate by the absorption of carbon dioxide from the ambient air. The one mole of absorbed carbon dioxide will react with two moles of hydroxide ion to form one mole of carbonate ion. The rate is difficult to model at best, and is accelerated by use of the airlift circulators that were installed in many Hanford Site underground storage tanks. The hydroxide concentration was not measured for the solids materials in the tank 241-A-101 core samples, so an overall hydroxide/carbonate comparison is not possible. However, conversion of the 44,300 kg of the hydroxide predicted by the HDW model to carbonate would account for differences in the carbonate inventories.

Fluoride. The HDW model fluoride inventory is 2.4 times that determined from the sample results. This may be the result of assuming too high a fluoride solubility in the tanks originally receiving wastes containing fluorides. Consequently, the fluoride concentration in the supernatants (which became evaporator feed) is overestimated by the HDW model.

Iron. The HDW model iron inventory is much higher than the inventory based on the 241-A-101 core samples. Part of this difference is the result of the HDW model assumption that the sludge heel after tank sluicing in 1976 was equivalent to PUREX HLW. The sludge heel was sampled in 1976 (Burch 1976) and the heel was found to include insoluble minerals that had formed in the tank waste.

Nitrate. The nitrate inventory predicted by the HDW model is only 3 percent less than the sample-based nitrate inventory.

Oxalate. The HDW model predicts essentially no oxalate in tank 241-A-101. The core sample analyses indicate that about 42 percent of the TOC inventory is actually present as oxalate. The oxalate was likely created by degradation of higher molecular-weight organic materials (radiolysis or hydrolysis), processes that are apparently not adequately accounted for in the HDW model.

Phosphate. The HDW model inventory for phosphate is only 6 percent higher than that determined from the core samples.

Sodium. The predicted HDW sodium inventory is only 3 percent lower than that calculated from the tank 241-A-101 core samples.

Sulfate. The HDW model sulfate inventory is twice that determined from the core sample analyses. The HDW model assumes a sodium sulfate solubility of 0.35*M*, which is not unreasonable for solutions with high sodium ion concentrations. The HDW model global sulfate inventory is less than that predicted by the standard inventory task (Kupfer et al. 1997). The HDW model has apparently incorrectly distributed sulfate to the evaporator feed during the production of the tank 241-A-101 salt slurry.

Total Hydroxide. Once the best-basis inventories were determined, the hydroxide inventory was calculated by performing a charge balance with the valences of other analytes. In some cases, this approach requires that other analyte (e.g., sodium or nitrate) inventories be adjusted to achieve the charge balance. During such adjustments, the number of significant figures is not increased. This charge balance approach is consistent with that used by Agnew et al. (1997). The revised total hydroxide inventory based on core sample analyses is 451,000 kg, which is 7% less than the HDW model estimate. Most of this difference results from the fact that the carbonate inventory calculated from the core sample analyses is significantly higher than the HDW model prediction.

Cesium-137 and Strontium-90. The heat load for tank 241-A-101 has been estimated at 18,379 Btu/hr (Chaffee 1995). This corresponds to a maximum of 806,000 Ci ^{90}Sr (0.0228 Btu/Ci ^{90}Sr) or a maximum of 1,141,000 Ci ^{137}Cs (0.0161 Btu/Ci ^{137}Cs). About 87 percent of the heat load appears to be the result of ^{137}Cs based on the sample-based ^{137}Cs inventory. The sample-based ^{90}Sr inventory would contribute an additional 3,080 Btu/hr. The combined best-basis ^{90}Sr and ^{137}Cs inventories would produce only 4 percent more heat than estimated by Chaffee (1995).

The HDW model ^{90}Sr inventory is 3.6 times the sample-based inventory. The HDW model predicts that 73 percent of the ^{90}Sr is included in the salt slurry, so the HDW model assumption that the initial tank sludge heel was PUREX HLW does not account for this difference. One possible explanation is that the tank supernatants were often pumped out a few days after slurry receipt, and the solids containing ^{90}Sr may not have had time to settle. Another possibility is that the strontium was held in solution by dilute complexant concentrations, and similarly was pumped out with the supernatants.

The HDW model ^{137}Cs inventory is 13 percent lower than the sample-based inventory, which is reasonably good agreement.

Analytical Methods. All chemical analyses for the solid material in the two core samples were made on acid digested samples. Caustic fusion sample preparations were performed only for radionuclides. Caustic fusion sample preparation generally dissolves a larger fraction of relatively insoluble materials. The comparison of tank 241-A-101 analytical results with tank 241-A-103 (which included caustic fusion sample preparation) suggests that some minor components (Ca, Mg, Mn, Si, U, Zn and Zr) may be under-reported because the less rigorous acid digestion was used for sample preparation.

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

Information about chemical, radiological, and/or physical properties is used to perform safety analyses, 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 analyses; 2) component inventories are predicted using the HDW model based on process knowledge and historical information; or 3) a tank-specific process estimate is made based on process flowsheets, reactor fuel data, essential material usage, and other operating data.

An effort is underway to provide waste inventory estimates that will serve as the standard characterization for the various waste management activities (Hodgson and LeClair 1996). As part of this effort, an evaluation of available information for tank 241-A-101 was performed using:

- Two core samples taken in July 1996 (Steen 1997).
- Waste transactions and operating data to confirm expected waste types.
- Comparison with composition data from two waste tanks (241-A-102 and 241-A-103) that are expected to have a similar SMMA1 salt compositions.
- An inventory estimate generated by the HDW model (Agnew et al. 1997a).

Based on this evaluation, a best-basis inventory was developed. The sample-based inventories were preferred in all cases. The HDW model inventories were used when analytical data was not available.

The waste in tank 241-A-101 consists primarily of saltcake and saturated liquid produced by the 241-A Evaporator (3,596 kL [950 kgal]). A small layer of sludge (approximately 11 kL [3 kgal]) with higher concentrations of silicon, iron and ^{90}Sr is also present. The best-basis inventory for tank 241-A-101 is presented in Tables D4-1 and D4-2.

Table D4-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-A-101, Effective May 31, 1997. (2 Sheets)

Analyte	Total Inventory (kg)	Basis (S, M, or E)[1]	Comment
Al	147,000	S	
Bi	<378	S	
Ca	<782	S	The saltcake inventory is 697 kg. Drainable liquid concentrations were less than detection limits.
Cl	24,100	S	
CO_3	169,000	S	
Cr	5,430	S	
F	<1,560	S	The saltcake inventory is 1,430 kg. Drainable liquid concentrations were less than detection limits.
Fe	1,390	S	
Hg	5.9	M	
K	25,800	S	
La	10	M/E	
Mn	<110	S	The saltcake inventory is 102 kg. Drainable liquid concentrations were less than detection limits.
Na	955,000	S	
Ni	<211	S	The saltcake inventory is 194 kg. Drainable liquid concentrations were less than detection limits.
NO_2	461,000	S	
NO_3	821,000	S	
OH_{TOTAL}	451,000	C	Total hydroxide estimated by charge balance.
Pb	<502	S	
P as PO_4	24,700	S	

Table D4-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-A-101, Effective May 31, 1997. (2 Sheets)

Analyte	Total Inventory (kg)	Basis (S, M, or E)[1]	Comment
Si	2,570	S	
S as SO_4	39,900	S	
Sr	<37.8	S	
TOC	19,600	S	
U_{TOTAL}	<1,600	S	The saltcake inventory is 1,180 kg. Drainable liquid concentrations were less than detection limits.
Zr	<88.4	S	The saltcake inventory is 79.6 kg. Drainable liquid concentrations were less than detection limits.

Notes:

[1]S = Sample-based (based on 1996 core samples, see Appendix B), M = HDW model-based, C = Calculated by charge balance, includes oxides as hydroxides, not including CO_3, NO_2, NO_3, PO_4, SO_4, and SiO_3, and E = Engineering assessment-based

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-A-101 Effective May 31, 1997 and Decayed to January 1, 1994. (2 Sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	731	M	
^{14}C	115	M	
^{59}Ni	7.16	M	
^{60}Co	<127	S	
^{63}Ni	703	M	
^{79}Se	11.9	M	
^{90}Sr	135,000	S	
^{90}Y	135,000	S/E	Based on ^{90}Sr analysis.
^{93}Zr	58.1	M	
^{93m}Nb	42.3	M	
^{99}Tc	869	M	
^{106}Ru	0.0256	M	
^{113m}Cd	308	M	
^{125}Sb	651	M	
^{126}Sn	18.0	M	
^{129}I	1.68	M	
^{134}Cs	12.6	M	
^{137}Cs	994,000	S	
^{137m}Ba	940,000	S/E	Based on ^{137}Cs analysis.
^{151}Sm	41,900	M	
^{152}Eu	16.1	M	
^{154}Eu	<466	S	
^{155}Eu	<1,700	S	
^{226}Ra	5.2E-04	M	
^{227}Ac	0.0032	M	
^{228}Ra	1.11	M	
^{229}Th	0.026	M	
^{231}Pa	0.014	M	

Table D4-2. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-A-101 Effective May 31, 1997 and Decayed to January 1, 1994. (2 Sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{232}Th	0.12	M	
^{232}U	3.38	M	
^{233}U	13.0	M	
^{234}U	2.19	M	
^{235}U	0.087	M	
^{236}U	0.070	M	
^{237}Np	3.0	M	
^{238}Pu	5.05	M	
^{238}U	3.0	M	
^{239}Pu	181	M	
^{240}Pu	30.6	M	
^{241}Am	197	M/S	
^{241}Pu	352	M	
^{242}Cm	0.54	M	
^{242}Pu	0.0019	M	
^{243}Am	0.0073	M	
^{243}Cm	0.049	M	
^{244}Cm	0.40	M	

Notes:

[1]S = Sample-based (based on 1996 core samples, see Appendix B), M = HDW model-based, E = Engineering assessment-based

D5.0 APPENDIX D REFERENCES

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Kupfer, M. J., A. L. Boldt, B. A. Higley, L. W. Shelton, 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. 0, Lockheed Martin Hanford Corporation, Richland, Washington.

Rodenhizer, D. G., 1987, *Hanford Waste Tank Sluicing History*, SD-WM-TI-302 (revision number unknown), Rockwell Hanford Operations, Richland, Washington.

Shekarriz, A., D. R. Rector, L. A. Mahoney, M. A. Chieda, J. M. Bates, R. E. Bauer, N. S. Cannon, B. E. Hey, C. G. Linschooten, F. J. Reitz, and E. R. Siciliano, 1996, *Preliminary Retained Gas Sampler Measurement Results for Hanford Waste Tanks 241-AW-101, 241-A-101, 241-AN-105, 241-AN-104 and 241-AN-103*, PNNL-11450, Pacific Northwest National Laboratory, Richland, Washington.

Steen, F. H., 1997, *Tank 241-A-101, Cores 154 and 156 Analytical Results for the Final Report*, WHC-SD-WM-DP-200, Rev. 1, Lockheed Martin Hanford Company, Richland, Washington.

Teats, M. C., 1982a, *242-A Evaporator Campaign 80-10 Post Run Letter*, SD-WM-PE-006 (revision number unknown), Rockwell Hanford Operations, Richland, Washington.

Teats, M. C., 1982b, *242-A Evaporator Campaign 80-10 Post Run Letter*, SD-WM-PE-007 (revision number unknown), Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L., and K. E. Schull, 1988a, *Data Transmittal Package for 241-A-102 Waste Tank Characterization*, SD-RE-TI-201 (revision number unknown), Westinghouse Hanford Company, Richland, Washington.

Weiss, R. L., and K. E. Schull, 1988b, *Data Transmittal Package for 241-A-103 Waste Tank Characterization*, SD-RE-TI-198 (revision number unknown), Westinghouse Hanford Company, Richland, Washington.

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APPENDIX E

BIBLIOGRAPHY FOR TANK 241-A-101

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APPENDIX E

BIBLIOGRAPHY FOR TANK 241-A-101

Appendix E provides a bibliography of information that supports the characterization of tank 241-A-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-A-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-A-101
- IIb. Sampling of 242-A Evaporator Streams (1976 to 1980)
- IIc. Sampling of PUREX waste (1956 to 1976)

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 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.

General Electric, 1955, *PUREX Technical Manual*, HW-31000, General Electric Hanford Company, Richland Washington.

- Contains PUREX process data and operating information regarding sludge transferred to tank 241-A-101 in the 1950's.

Jungfleisch, F. M. and B. C. Simpson, 1993, *Preliminary Estimation of the Waste Inventories in Hanford Tanks Through 1980*, WHC-SD-WM-TI-057 Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

- A model based on process knowledge and radioactive decay estimations using ORIGEN software for different compositions of process waste streams assembled for total, solution, and solids compositions per tank. Assumptions about waste/waste types and solubility parameters/constraints are also given.

Schneider, K. J., 1951, *Flow Sheet and Flow Diagrams of Precipitation Separations Process*, HW-23043, General Electric Company, Richland, Washington.

- Contains compositions of first concentration cycle waste before transfer to Hanford Site 200 East Area waste tanks.

Ib. Fill History/Waste Transfer Records

Agnew, S. F., R. A. Corbin, T. B. Duran, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1996, *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 depicting all available data on tank additions/transfers.

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

- Contains single-shell tank fill history and primary campaign/waste type information up to 1981.

Ic. Surveillance/Tank Configuration

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

- Shows tank riser locations in relation to tank aerial view as well as a description of riser and its contents.

Lipnicki, J., 1995, *Waste Tank Risers Available for Sampling*, WHC-SD-RE-TI-710, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

- Gives an assessment of riser locations for each tank, however not all tanks are included/completed. Also included is an estimate of what risers are available for sampling.

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

- Contains riser and thermocouple information for Hanford Site waste tanks.

Id. Sample Planning/Tank Prioritization

Bates, J. M., 1996, *Sampling Plan for Tank 241-A-101 Retained Gas Sampler Deployment*, (internal letter 9601982 to R. Bauer, Westinghouse Hanford Company, June 17), Pacific Northwest National Laboratory, Richland, Washington.

- Contains methods and procedures for RGS extrusion and analysis.

Brown, T. M., S. J. Eberlein, J. W. Hunt, and T. J. Kunthara, 1996, *Tank Waste Characterization Basis*, WHC-SD-WM-TA-164, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Summarizes the technical basis for characterizing the waste in the tanks and assigns a priority number to each tank.

Conner, J. M., 1996, *Compatibility Grab Sampling and Analysis Plan*, WHC-SD-WM-TSAP-037, Rev. 1D, Westinghouse Hanford Company, Richland, Washington.

- Contains sampling and analysis requirements for 1996 grab samples from tank 241-A-101 based on the compatibility DQO.

DOE-RL, 1996, *Recommendation 93-5 Implementation Plan*, DOE/RL-94-0001, Rev. 1, U.S. Department of Energy, Richland, Washington.

- Contains a description of the organic solvents issue and other tank issues.

Field, J. G., 1996, *Tank 241-A-101 Push Mode Core Sampling and Analysis Plan*, WHC-SD-WM-TSAP-100, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains sampling and analysis requirements for tank 241-A-101 based on applicable DQOs.

Grimes, G. W., 1977, *Hanford Long-Term Defense High-Level Waste Management Program Waste Sampling and Characterization Plan*, RHO-CD-137, Rockwell Hanford Operations, Richland, Washington.

- Early characterization planning document.

Homi, C. S., 1996, *Vapor Sampling and Analysis Plan*, WHC-SD-WM-TP-335, Rev. 1G, Westinghouse Hanford Company, Richland, Washington.

- Vapor sampling and analysis procedure for 200 Area Tanks.

Jones, J. M., 1996, *Request for Supernatant and Sludge Samples from Tank 241-A-101*, (internal memorandum [number unknown] to Shift Managers, January 19), Westinghouse Hanford Company, Richland Washington.

- Requests compatibility samples from tank 241-A-101.

Winkelman, W. D., J. W. Hunt, L. Fergestrom, 1996, *FY 1997 Tank Waste Analysis Plan*, WHC-SD-WM-PLN-120, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains Tri-Party Agreement (see Ecology et al. 1994 listing in Section 5.0) requirement-driven TWRS Characterization Program information and a list of tanks addressed in fiscal year 1997.

Winkelman, W. D., 1996, *Tank 241-A-101 Tank Characterization Plan*, WHC-SD-WM-TP-331, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

- Discusses any and all relevant DQOs and how they will be met for tank 241-A-101.

Winters, W. I., L. Jensen, L. M. Sasaki, R. L. Weiss, J. F. Keller, A. J. Schmidt, and M. G. Woodruff, 1989, *Waste Characterization Plan for the Hanford Site Single-Shell Tanks*, WHC-EP-0210, Westinghouse Hanford Company, Richland, Washington.

- Early version of characterization planning document.

Ie. Data Quality Objectives (DQOs) and Customers of Characterization Data

Cash, R. J., 1996, *Application of "Flammable Gas Tank Safety Program Data Requirements for Core Sampling Analysis Developed through the Data Quality Objectives Process," Rev. 2*, (internal memorandum 79300-96-028 to S. J. Eberlein, July 12), Westinghouse Hanford Company, Richland, Washington.

- Contains flammable gas requirements for single-shell tanks

Cash, R. J., 1996, *Scope Increase of Data Quality Objectives 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.

- Contains requirements for the organic solvents issue.

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.

- DQO used to determine if tanks are under safe operating conditions.

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

- Documents compatibility requirements for tank transfers.

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

- Provides basis for selection of tanks for disposal needs.

Osborne, J. W. and L. L. Buckley, 1995, *Data Quality Objectives for Tank Hazardous Vapor Safety Screening*, WHC-SD-WM-DQO-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Contains requirement to address hazardous vapor issues.

Pasamehmetglu, K. O., 1996, *Submittal of a Calc Note Titled "Ammonia Mass Transfer from Waste Surface in Tank A-101,"* (external letter 9602025 to G. D. Johnson, Westinghouse Hanford Company, August 7), Los Alamos National Laboratory, Los Alamos, New Mexico.

- Calculates the ammonia release rate for tank 241-A-101 in the unlikely event of a rapid rollover.

Simpson, B. C., and D. J. McCain, 1996, *Historical Model Evaluation Data Requirements*, WHC-SD-WM-DQO-018, Rev. 1, Westinghouse, Hanford Company, Richland, Washington.

- Provides data needs for evaluating the LANL model for estimating tank waste compositions.

Slankas, T. J., M. J. Kupfer, and W. W. Schulz, 1995, *Data Needs and Attendant Data Quality Objectives for Tank Waste Pretreatment and Disposal*, WHC-SD-WM-DQO-022, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Documents the needs of the pretreatment function within TWRS.

Turner, D. A., H. Babad, L. L. Buckley, and J. E. Meacham, 1995, *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue*, WHC-SD-WM-DQO-006, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Contains requirements for the organic complexants DQO.

II. ANALYTICAL DATA - SAMPLING OF TANK WASTE AND WASTE TYPES

IIa. Sampling of Tank 241-A-101

Beck, M. A., 1996, *Heating/Cooling Tests of 241-A-101 Grab Samples*, (internal memorandum 75764-PCS96-051 to J. G. Field, May 29), Westinghouse Hanford Company, Richland, Washington.

- Documents results of grab sample heating/cooling tests.

Bratzel, D. R. 1995, *Tank 241-A-101 Headspace Gas and Vapor Characterization Results for Samples Collected in June 1995*, WHC-SD-WM-ER-505, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains analytical results for headspace vapor samples collected in June 1995.

Burch, G., 1976, *X-Ray Analysis of Sample 101A*, (internal memorandum 050576 to J. E. Horton, May 5), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains analytical information for a 1976 sample from tank 241-A-101.

Caprio, G. S., 1995, *Vapor and Gas Sampling of Single-Shell Tank 241-A-101 Using the Vapor Sampling System*, WHC-SD-WM-RPT-169, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains a description of vapor sampling system and field results for vapor samples taken.

Delegard, C. H., 1979, *Hot Boildown of Tank 101-A Waste Sample*, (internal letter 65124-79-005 to H. J. Eding, November 2), Rockwell Hanford Company, Richland, Washington.

- Hot boildown test results for samples 3970 and 3971 taken October 2, 1979.

Horton, J. E., 1976, *Analysis of Additional Residual Sludge Samples From Tank 101-A*, (internal letter [number unknown] to D. H. Miyasaki, April 30), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains strontium, cesium and heat generation rate for tank A-101 based on data from samples 3901, 4355, 4554 and 4555.

Horton, J. E., 1976, *Analysis of 101-A Tank Residual Sludge*, (internal letter to D. H. Miyasaki, April 19), Atlantic Richfield Hanford Company, Richland, Washington.

- Summary of data and description of sample #3901.

Huckaby, J. L. and D. R. Bratzel, 1995, *Tank 241-A-101 Headspace Gas and Vapor Characterization Results for samples Collected in June 1995*, WHC-SD-WM-ER-505, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains 1995 vapor characterization results.

Jansky, M. T., 1984, *Waste Samples from Tank 101A (7879 & 7898)*, (internal letter 654-84-003 to T.D. Kirkpatrick, January 3), Rockwell Hanford Company, Richland, Washington.

- Contains data for sample numbers #7879 and #7898, received January 3, 1984.

Jansky, M. T., 1981, *Pu and Am Analysis of Various Tank Farm Samples*, (internal letter to J. S. Schofield, June 16), Rockwell Hanford Company, Richland, Washington.

- Contains Pu and Am analytical results for tank 241-A-101 samples.

Jansky, M. T., 1981, *Technetium Content of Hanford Waste*, (internal memorandum 65453-81-076 to J. R. Wetch, January 29), Westinghouse Hanford Company, Richland, Washington.

- Contains ^{99}Tc results for samples taken in November, 1980.

Jansky, M. T., 1980, *101A Waste Sample Characteristics*, (internal letter 65453-80-337 to M.C. Teats, November 17), Rockwell Hanford Company, Richland, Washington.

- Contains analytical results for three samples received on November 10, 1984.

Jansky, M. T., 1980, *Radionuclide Content in Hanford Waste Tank 101A*, (internal letter 65453-80-383 to C. M. Walker, December 17), Rockwell Hanford Company, Richland, Washington.

- Contains analytical results for three samples received on November 10, 1984.

Jansky, M. T., 1980, *101A Waste Sample*, (internal letter 65453-80-336 to M. C. Teats, November 13), Rockwell Hanford Company, Richland, Washington.

- Contains results for October 1980 sample.

Jansky, M. T., 1980, *Composition of 101A Waste*, (internal letter 65453-80-302 to M. C. Teats, October 13), Rockwell Hanford Company, Richland, Washington.

- Contains a description and results for samples taken from two depths, September 22, 1980.

Jansky, M. T., 1980, *Solids in 101A Waste*, (internal letter 65453-80-267 to M. C. Teats, September 22), Rockwell Hanford Company, Richland, Washington.

- Contains analysis of solids in waste sample #4218

Jansky, M. T., 1980, *101A Hot Boildown*, (internal letter 65453-80-241 to M. C. Teats, August 22), Rockwell Hanford Company, Richland, Washington.

- Contains results of 1980 boildown tests for samples T-2691 and T-2692.

Rockwell, 1979, *Analysis of Tank Farm Samples, Serial No. T-3970, Tank 101-A 242-ABM*, (internal letter to Tank Shift Manager, October 2), Rockwell Hanford Company, Richland, Washington.

- Analytical data for October, 1979 sample #T-3970

Rockwell, 1979, Analysis of Tank Farm Samples, Serial No. T-3971, Tank 101-A 242-ABM, (internal letter [number unknown] to Tank Shift Manager, October 3), Rockwell Hanford Company, Richland, Washington.

- Analytical data for October, 1979 sample #T-3971

Shekarriz, A., D. R. Rector, L. A. Mahoney, M. A. Chieda, J. A. Bates, R. E. Bauer, N. S. Cannon, B. E. Hey, C. G. Linschooten, F. J. Reitz, and E. R. Siciliano, 1996, *Preliminary Retained Gas Sampler Measurement Results for Hanford Waste Tanks 241-AW-101, 241-A-101, 241-AN-105, 241-AN-104, and 241-AN-103*, PNNL-11450, Pacific Northwest National Laboratory, Richland, Washington.

- Contains RGS sampling and analytical results for tank 241-A-101.

Steen, F. H., 1996, *Waste Compatibility and Final Report for Tank 241-A-101, Grab Samples 1A-96-1, 1A-96-2, and 1A-96-3*, WHC-SD-WM-DP-186, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Memo contains results for 1996 grab sample compatibility analyses.

Steen, F., 1997, *Tank 241-A-101, Cores 154 and 156, Analytical Results for the Final Report*, WHC-SD-WM-DP-200, Rev. 1, Rust Federal Services Hanford Inc., Richland, Washington.

- Document contains sample analyses from 1996 tank 241-A-101 push core sampling event.

Steen, F. H., 1996, *Waste Compatibility Results for 241-A-101 Push Mode Core Samples*, (internal memorandum RFSH-9656251 to K. M. Hall, December 10), Rust Federal Services of Hanford Inc., Richland, Washington.

- Memo contains results for 1996 push core sample compatibility analyses.

Wheeler, R. E., 1974, *Analysis of Tank Farm Samples*, (internal letter [number unknown] to R. L. Walser, December 17), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains data for sample number T-8936.

Wheeler, R. E., 1974, *Tank Farm Samples*, (internal letter [number unknown] to R. L. Walser, June 25), Atlantic Richfield Hanford Company, Richland, Washington.

- Contains data for sample #T-5315.

IIb. Sampling of 242 A-Evaporator Waste Streams (1976 to 1980)

- Each of the following references contains analytical results for grab samples taken for the 241-A Evaporator-Crystallizer campaign specified in the document title. This waste was transferred to Tank 241-A-101 between 1976 and 1980.

Bendixsen, R. B., 1980, *Dilute Customer Waste Concentration First Pass 242-A Evaporator-Crystallizer Campaign 80-1, October 10 to October 20, 1979*, RHO-CD-80-1045-1, Rockwell Hanford Operations, Richland, Washington.

Bendixsen, R. B., 1980, *Dilute Waste Concentration 242-A Evaporator-Crystallizer Campaign 80-2, October 28 to November 11, 1979*, RHO-CD-80-1045-2, Rockwell Hanford Operations, Richland, Washington.

Bendixsen, R. B., 1980, *Customer Waste Concentration 242-A Evaporator-Crystallizer Campaign 80-3, November 15 to December 22*, 1979, RHO-CD-80-1045-3, Rockwell Hanford Operations, Richland, Washington.

Bendixsen, R. B., 1980, *Reconcentration of Second PN Campaign Wastes 242-A Evaporator-Crystallizer Campaign 80-5, March 12 to April 4, 1980*, RHO-CD-80-1045-5, Rockwell Hanford Operations, Richland, Washington.

Bendixsen, R. B., 1980, *Defense Waste Vitrification Demonstration Waste Concentration 242-A Evaporator-Crystallizer Campaign 80-4, February 21 to March 1, 1980*, RHO-CD-80-1045-3, Rockwell Hanford Operations, Richland, Washington.

Brown, G. E., 1979, *Hot Boildown of Cross-Site Transfer Waste*, (internal letter 60120-79-011 to K. G. Carothers, January 18), Rockwell Hanford Company, Richland, Washington.

Lane, T. A., 1979, *Hot Boildown 242-A Evaporator Feed: Tank 101-A*, (internal letter 65120-79-064 to K. G. Carothers, April 2), Rockwell Hanford Company, Richland, Washington.

Teats, M. C., 1981, *Dilute Complexed Waste Concentration 242-A Evaporator-Crystallizer Campaign 80-6, April 10 to April 27, 1980*, RHO-CD-80-1045-6, Rockwell Hanford Operations, Richland, Washington.

Teats, M. C., 1982, *242-A Evaporator Campaign 80-10 Post Run Letter*, SD-WM-PE-006 (revision number unknown), Rockwell Hanford Operations, Richland, Washington.

Teats, M. C., 1982, *242-A Evaporator Campaign 80-10 Post Run Letter*, SD-WM-PE-007 (revision number unknown), Rockwell Hanford Operations, Richland, Washington.

IIc. Sampling of PUREX Streams (1956 to 1976)

- Each of the following references contain analytical results for samples taken for the PUREX process. High-level PUREX waste was transferred to tank 241-A-101 between 1956 and 1976. A sludge heel remains at the bottom of the tank.

Anderson, T. D., 1975, *Insoluble Solids in PUREX Sludge*, (internal memorandum 072475 to J. F. Geiger, July 24), Atlantic Richfield Hanford Company, Richland, Washington.

Bruce, D. A., 1966, *Phase III Flowsheet Test, Iron & Aluminum Removal from PUREX Acid Sludge by Sulfate Precipitation*, (internal memorandum 121566 to O. V. Smiset, December 15), Atlantic Richfield Hanford Company, Richland, Washington.

Horton, J. E., 1976, *Leaching Strontium from PUREX Acid Insoluble Waste Solids*, (internal memorandum 061576 to R. E. Van Der Cook, June 15), Atlantic Richfield Hanford Company, Richland, Washington.

Womack, J. C., and G. L. Borsheim, 1972, *PUREX Sluicing Supernatant Disposition*, (internal memorandum 110272 to L. W. Roddy, November 2), Atlantic Richfield Hanford Company, Richland, Washington.

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

IIIa. Inventories from Campaign and Analytical Information

Agnew, S. F., J. Boyer, R. A. Corbin, T. B. Duran, J. R. Fitzpatrick, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1997, *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 4*, LA-UR-96-3860, Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains waste type summaries as well as primary chemical compound/analyte and radionuclide estimates for sludge, supernatant, and solids.

Allen, G. K., 1976, *Estimated Inventory of Chemicals Added to Underground Waste Tanks, 1944 - 1975*, ARH-CD-601B, Atlantic Richfield Hanford Company, Richland, Washington.

- Contains major components for waste types, and some assumptions. Purchase record are used to estimate chemical inventories.

Allen, G. K., 1975, *Hanford Liquid Waste Inventory As Of September 30, 1974*, ARH-CD-229, Atlantic Richfield Hanford Company, Richland, Washington.

- Contains major components for waste types, and some assumptions

Brevick, C. H., L. A. Gaddis, and E. D. Johnson, 1996, *Historical Tank Content Estimate for the Northeast Quadrant of the Hanford 200 Areas*, WHC-SD-MW-ER-349, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

- Contains summary information from the supporting document as well as in-tank photo collages and the solid composite inventory estimates Rev. 0 and Rev. 0A.

Schmittroth, F. A., 1995, *Inventories for Low-Level Tank Waste*, WHC-SD-WM-RPT-164, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains tank inventory information.

IIIb. Compendium of Data from Other Sources Physical and Chemical

Brevick, C. H., L. A. Gaddis, and W. W. Pickett, 1994, *Supporting Document for the Historical Tank Content Estimate for A Farm*, WHC-SD-WM-ER-308, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains historical data and solid inventory estimates. The appendixes contain the following information: Appendix C - Level History AutoCAD sketch; Appendix D - Temperature Graphs; Appendix E - Surface Level Graph; Appendix F, pg F-1 - Cascade/Dry Well Chart; Appendix G - Riser Configuration Drawing and Table; Appendix I - In-Tank Photos; and Appendix K - Tank Layer Model Bar Chart and Spreadsheet.

Brevick, C. H., L. A. Gaddis, and E. D. Johnson, 1995, *Tank Waste Source Term Inventory Validation, Vol I & II.*, WHC-SD-WM-ER-400, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains a quick reference to sampling information in spreadsheet or graphical form for 23 chemicals and 11 radionuclides for all the tanks.

Brevick, C. H., 1997, *Operational Logbook Data for Single-Shell Tank 241-A-101, E18675*, (internal memorandum FDNW-97-PROJ-015 to L. Stock, March 18), Flour Daniel Northwest, Inc., Richland, Washington.

- Contains daily tank transfer data from June 1, 1980 through November 30, 1980.

Field, J. G., 1996, *Tank 241-A-101 Composition*, (internal memorandum 79400-96-159 to Distribution, August 12), Westinghouse Hanford Company, Richland, Washington.

- Notice to inform programs and operators of the two distinct layers observed in push core samples (ie. the bottom half of the tank contains mostly liquids and top half contains solids.)

Hanlon, B. M., 1997, *Waste Tank Summary Report for Month Ending December 31, 1996*, HNF-EP-0182-105, Lockheed Martin Hanford Corporation, Richland, Washington.

- Contains a monthly summary of: fill volumes, Watch List tanks, occurrences, integrity information, equipment readings, equipment status, tank location, and other miscellaneous tank information.

Husa, E. I., 1993, *Hanford Site Waste Storage Tank Information Notebook*, WHC-EP-0625, Westinghouse Hanford Company, Richland, Washington.

- Contains in-tank photos as well as summaries on the tank description, leak detection system, and tank status.

Husa, E. I., 1995, *Hanford Waste Tank Preliminary Dryness Evaluation*, WHC-SD-WM-TI-703, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Gives assessment of relative dryness between tanks.

Ogden, D. M., 1996, *Thermal Hydraulic Behavior Evaluation of Tank A-101*, WHC-SD-WM-ER-555, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Document contains an evaluation of thermal-hydraulic behavior of tank A-101.

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.

VanVleet, R. J., 1993, *Radionuclide and Chemical Inventories*, WHC-SD-WM-TI-565, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Document contains tank inventory information.

DISTRIBUTION SHEET

To	From	Page 1 of 2
Distribution	Data Assessment and Interpretation	Date 05/08/97
Project Title/Work Order Tank Characterization Report for Single-Shell Tank 241-A-101, HNF-SD-WM-ER-673, Rev. 0		EDT No. EDT-617659 ECN No. N/A

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<u>Los Alamos Laboratory</u> CST-14 MS-J586 P. O. Box 1663 Los Alamos, NM 87545					
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