ENGINEERING CHANGE NOTICE

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14b. Justification Details

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

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

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

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N.W. Kirch	*(signature)*	6/11/97	DEPARTMENT OF ENERGY		
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			ADDITIONAL		

Tank Characterization Report for Single-Shell Tank 241-C-112

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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-C-112. This report supports the requirements of the Tri-Party Agreement Milestone M-44-05.

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Tank Characterization Report for Single-Shell Tank 241-C-112

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LIST OF TERMS

1C1	first cycle decontamination waste
AA	atomic absorption
ANOVA	analysis of variance
Btu/hr	British thermal units per hour
Ci	curie
Ci/L	curies per liter
CI	confidence interval
cm	centimeter
CVAA	cold vapor atomic absorption
CWP	PUREX cladding waste
CWP1	PUREX cladding waste (1956 to 1960)
CWP2	PUREX cladding waste (1961 to 1972)
DQO	data quality objective
DSC	differential scanning calorimetry
ft	feet
g	gram
g/gal	grams per gallon
g/L	grams per liter
g/mL	grams per milliliter
GEA	gamma energy analysis
HDW	Hanford defined waste
HTCE	historical tank content estimate
IC	ion chromatography
ICP	inductively coupled plasma spectroscopy
in.	inch
ISS	in situ sampling
IX	ion exchange waste
J/g	joules per gram
kg	kilogram
kg/L	kilograms per liter
kgal	kilogallon
kL	kiloliter
LF	laser fluorimetry
LFL	lower flammability limit
LL	lower limit
m	meter
M	moles per liter
mg/m^3	milligrams per cubic meter
mL	milliliter
mL/in.	milliliters per inch

LIST OF TERMS (Continued)

mm	millimeter
NA	not available
n/a	not applicable
n/d	not detected
n/r	not reported
PHMC	Project Hanford Management Contractor
ppm	parts per million
ppmv	parts per million by volume
PUREX	plutonium uranium extraction
QC	quality control
REML	restricted estimation maximum likelihood
RPD	relative percent difference
RSD	relative standard deviation
SMM	supernatant mixing model
SU	supernatant
SVOA	semivolatile organic analysis
TCR	tank characterization report
TGA	thermogravimetric analysis
TIC	total inorganic carbon
TLM	tank layer model
TOC	total organic carbon
TWRS	Tank Waste Remediation System
UR	uranium recovery
UL	upper limit
VOA	volatile organic analysis
VSS	vapor sampling system
W	watt
WSTRS	Waste Status and Transaction Record Summary
wt%	weight percent
°C	degrees Celsius
°F	degrees Fahrenheit
%	percent
μCi/g	microcuries per gram
μCi/gal	microcuries per gallon
μCi/mL	microcuries per milliliter
μeq/g	microequivalents per gram
μg C/g	micrograms of carbon per gram
μg/g	micrograms per gram
μg/mL	micrograms per milliliter
μm	micrometer
μg N/g	micrograms of nitrogen per gram

1.0 INTRODUCTION

One major function of the Tank Waste Remediation System (TWRS) is to characterize wastes in support of waste management and disposal activities at the Hanford Site. Analytical data from sampling and analysis and other available information about a tank are compiled and maintained in a tank characterization report (TCR). This report and its appendixes serve as the TCR for single-shell tank 241-C-112.

The objectives of this report are: 1) to use characterization data in response to technical issues associated with tank 241-C-112 waste, and 2) to provide a standard characterization of this waste in terms of a best-basis inventory estimate. Section 2.0 summarizes the response to technical issues, Section 3.0 shows the best-basis inventory estimate, and Section 4.0 makes recommendations regarding safety status and additional sampling needs. The appendixes contain supporting data and information. This report supports the requirements of the *Hanford Federal Facility Agreement and Consent Order*, Milestone M-44-05 (Ecology et al. 1996).

1.1 SCOPE

The characterization information in this report originated from sample analyses and known historical sources. The most recent sampling of tank 241-C-112 (March 1992) predates the existence of current data quality objectives (DQOs). An investigation of technical issues from currently applicable DQOs was made using the data from the 1992 sampling events. Appendix A provides historical information for tank 241-C-112, including surveillance information, records pertaining to waste transfers and tank operations, and expected tank contents derived from a process knowledge model.

Appendix B summarizes the sampling events listed in Table 1-1, the sample data obtained before 1989, and the sampling results. Tank 241-C-112 was push-mode core sampled through three risers between March 19 and March 26, 1992 (Bell 1993). The characterization and analysis requirements for tank 241-C-112 were outlined in the *Waste Characterization Plan for the Hanford Site Single-Shell Tanks* (Hill et al. 1991), as modified by Hill (1991); the results were originally reported in Bell (1993).

The tank headspace has been sampled twice. A June 1994 event was performed in accordance with *Safety Assessment for Gas Sampling All Ferrocyanide Tanks* (Farley 1991), and an August 1994 event was done according to *Data Quality Objectives for Generic In-Tank Health and Safety Issue Resolution* (Osborne et al. 1994). Results from both events are provided in *Tank 241-C-112 Headspace Gas and Vapor Characterization Results for Samples Collected in June and August 1994* (Huckaby and Bratzel 1995).

Appendix C reports on the statistical analysis and numerical manipulation of data used in issue resolution. Appendix D contains the evaluation to establish the best basis for the inventory estimate and the statistical analysis performed for this evaluation. Appendix E is a bibliography that resulted from an in-depth literature search of all known information sources applicable to tank 241-C-112 and its respective waste types. A majority of the reports listed in Appendix E are available in the Tank Characterization and Safety Resource Center.

Table 1-1. Summary of Tank 241-C-112 Sampling Events.

Sample (Date)[1]	Phase	Location	Segment	Percent Recovery
Core 34[2] (3/19/92)	Solids/liquid	Riser 2	1	87
			2	75
Core 35[2] (3/22/92)	Solids/liquid	Riser 7	1	0
			2	35
Core 36[2] (3/24/92)	Solids	Riser 8	1	65
			2	91
Vapor sample[3] (6/24/94)	Gas	Riser 4	n/a	n/a
Vapor sample[3] (8/11/94)	Gas	Riser 4	n/a	n/a

Notes:

n/a = not applicable

[1]Dates are in the mm/dd/yy format.
[2]Bell (1993)
[3]Huckaby and Bratzel (1995)

1.2 TANK BACKGROUND

Tank 241-C-112 is located in the 200 East Area C Farm on the Hanford Site. It is the last tank in a three-tank cascade that includes tanks 241-C-110 and 241-C-111. The first type of waste received by tank 241-C-112 was first-cycle decontamination waste (1C1) from the bismuth phosphate process (received from 1946 to 1947). This waste cascaded from tank 241-C-111. In 1952, the majority of the supernatant in tank 241-C-112 was transferred to tank 241-B-106 (Agnew et al. 1997b).

In 1953, unscavenged uranium recovery (UR) waste was added to tank 241-C-112. The supernatant was sent to tank 241-B-106 later in 1953. The tank received unscavenged UR waste from the UR process in 1954 (Agnew et al. 1997b). In late 1955, tank 241-C-112 began to be used for settling scavenged ferrocyanide waste. The scavenged supernatant was decanted and sent to several cribs, and the ferrocyanide sludge was retained in the tank. The tank was used in this way until the first quarter of 1958 when in-farm scavenging was completed (General Electric 1958).

Small transfers of flush water and cladding waste were received from 1958 through the second quarter of 1961. A small amount of waste from the strontium semiworks/hot semiworks was added to the tank in late 1961 and early 1962. In 1970 and 1975, B Plant ion-exchange waste from tank 241-C-110 and drainage to the C-301 catch tank was added to tank 241-C-112. Tank 241-C-112 was suspected of leaking and was emptied of pumpable liquid to tank 241-C-103 in 1975 and 1976 (Anderson 1990); later surveillance never confirmed the suspected leak, and the tank is considered sound. The tank was removed from service in 1976. Salt well pumping was completed in 1983, and the tank was administratively interim stabilized in 1990.

Table 1-2 describes tank 241-C-112. The tank has a nominal operating capacity of 2,010 kL (530 kgal) and contains an estimated 394 kL (104 kgal) of noncomplexed waste (Hanlon 1997). The tank was removed from the Ferrocyanide Watch List on June 25, 1996 (Kinzer 1996), and is not on any other Watch List (Public Law 101-510).

Table 1-2. Description of Tank 241-C-112.

TANK DESCRIPTION	
Type	Single-shell
Constructed	1943 to 1944
In service	1946
Diameter	22.9 m (75 ft)
Operating depth	5.2 m (17 ft)
Capacity	2,010 kL (530 kgal)
Bottom shape	Dish
Ventilation	Passive
TANK STATUS	
Waste classification	Noncomplexed
Total waste volume[1]	394 kL (104 kgal)
Supernatant volume[1]	0 kL (0 kgal)
Saltcake volume[1]	0 kL (0 kgal)
Sludge volume[1]	394 kL (104 kgal)
Drainable interstitial liquid volume[1]	121 kL (32 kgal)
Waste surface level (September 18, 1990)[2]	85.37 cm (33.61 in.)
Temperature (March 1994 to January 1997)	13 to 31.0 °C (56 to 87.8 °F)
Integrity	Sound
Watch list[3]	Ferrocyanide (1991 to 1996)
SAMPLING DATE	
Core samples	March 1992
Vapor samples	June 1994
Vapor samples	August 1994
SERVICE STATUS	
Removed from service	1976
Interim stabilization	1990
Intrusion prevention[4]	Partially completed 1982

Notes:

[1]Hanlon (1997)
[2]ENRAF[1] measurement
[3]Removed from Ferrocyanide Watch List in June 1996 (Kinzer 1996)
[4]Brevick et al. (1997)

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

2.0 RESPONSE TO TECHNICAL ISSUES

The following technical issues were identified for tank 241-C-112 (Brown et al. 1996).

- **Safety screening**: Does the waste pose or contribute to any recognized potential safety problems?
- **Vapor screening**: Is there a potential for worker hazards associated with the toxicity of constituents in fugitive vapor emissions from the tank?
- **Pretreatment**: Is it feasible to use sludge washing or liquid treatment to separate low-level waste and high-level waste streams?

Although the 1992 core sampling event predated DQOs, results from the event were used to address the safety screening DQO. Vapor screening is addressed in *Tank 241-C-112 Headspace Gas and Vapor Characterization Results for Samples Collected in June and August 1994* (Huckaby and Bratzel 1995) through the 1994 vapor sampling. The ferrocyanide issue substantially impacted the data gathering and analysis protocols applied to this tank. For this reason, the data relating to the closed ferrocyanide safety issue are shown for completeness. Appendix B shows analytical results from core and vapor sampling events.

2.1 SAFETY SCREENING

The data needed to screen the waste in tank 241-C-112 for potential safety problems are documented in *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995). The potential safety problems are exothermic conditions in the waste, flammable gases in the waste and/or tank headspace, and criticality conditions in the waste. Each condition is addressed separately below as applicable to the safety screening DQO. Because the 1992 core sampling and analysis predate the current DQOs, this evaluation is provided for information only.

2.1.1 Exothermic Conditions (Energetics)

The first requirement outlined in the safety screening DQO (Dukelow et al. 1995) is to ensure there are not sufficient exothermic constituents (organic or ferrocyanide) in tank 241-C-112 to pose a safety hazard. Because of this requirement, energetics in tank 241-C-112 waste were evaluated. The safety screening DQO required the waste sample profile be tested for energetics every 24 cm (9.5 in.), and the ferrocyanide DQO required the core segments be tested every 12 cm (4.7 in.) to determine whether the exothermic energetics exceed the safety threshold. The safety threshold for exothermic energetics is 480 J/g on a dry weight basis.

Differential scanning calorimetry (DSC) analyses revealed exotherms in samples originating from cores 34, 35, and 36. All observed exotherms were well below the safety screening criterion of 480 J/g on a dry weight basis (Dukelow et al. 1995). For many samples, DSC was not performed in duplicate; 95 percent confidence limits were calculated only for DSC results with sample and duplicate values.

The exotherms associated with core 34 were observed at onset temperatures of approximately 280 °C (536 °F) and 350 to 360 °C (662 to 680 °F). On a wet weight basis, the first exotherm observed released a maximum of 16.9 J/g, and the second exotherm released a maximum of 75 J/g. On a dry sample basis, this is equivalent to 25.4 J/g and 114.7 J/g, respectively.

Core 35 had an exotherm with an onset temperature in the 289 to 292 °C (552 to 558 °F) range with a maximum energy release of 53 J/g (wet weight basis). This is equivalent to a dry weight value of 88 J/g.

Core 36 had exotherms with onset temperatures in the 265 to 300 °C (509 to 572 °F) range with a maximum of 21.6 J/g energy release on a wet weight basis for the core composite. This is equivalent to a dry weight value of 38.4 J/g.

As the results indicate, the probability of a propagating exothermic reaction is quite small, considering the tank waste is approximately 30 percent water. Experiments have shown that bulk runaway reactions are not possible under current tank storage conditions (Fauske 1996).

Based on process data and waste management information, tank 241-C-112 waste might be expected to exhibit exothermic properties because of the presence of ferrocyanide. However, recent studies (Babad et al. 1993 and Lilga et al. 1996) and analytical data from ferrocyanide tanks 241-BY-104 (Benar et al. 1996), 241-BY-106 (Bell et al. 1996), 241-BY-108 (Baldwin 1996), and 241-BY-110 (Simpson et al. 1996) have shown that a large degree of ferrocyanide decomposition probably occurs because of the combined effects of radiation, temperature, and pH in the harsh environments of the high-level waste tanks. The lack of exothermic behavior in tank 241-C-112 sludge appears to support the conclusions of the ferrocyanide decomposition studies and parallels the evidence for ferrocyanide decomposition observed in other ferrocyanide tanks.

2.1.2 Flammable Gas

Vapor phase measurements, taken in the tank headspace in June and August 1994, indicated that concentrations of the principal flammable headspace gases (H_2 and NH_3) were present at less than one percent of their respective lower flammability limits (LFL), well below the safety screening threshold of 25 percent of the LFL (Huckaby and Bratzel 1995). Appendix B provides data from these measurements.

2.1.3 Criticality

The safety screening DQO threshold, based on total alpha activity, is 1 g/L. Because total alpha activity is measured in μCi/mL instead of g/L, 1 g/L limit is converted into units of μCi/mL by assuming that all alpha decay originates from ^{239}Pu. Assuming that all alpha activity is from ^{239}Pu and using the maximum solids density of 2.0 g/mL (core 35), 1 g/L of ^{239}Pu is equivalent to 30.8 μCi/g of alpha activity. For the liquids, a limit of 61.5 μCi/mL was computed.

The total alpha activity in all samples was well below these limits. The highest activity measured was 1.18 μCi/g for the solids and 0.0036 μCi/mL for the liquids. The DQO also required the calculation of a 95 percent confidence interval on each sample. For tank 241-C-112, the upper 95 percent confidence interval on the mean for liquids was 1.06E-03 μCi/mL; for solids, the highest upper 95 percent confidence interval on the mean was 1.37 μCi/g.

2.2 FERROCYANIDE ISSUE

Tank 241-C-112 was classified as a Hanford Site Ferrocyanide Watch List tank until its removal from the Watch List in June 1996 (Kinzer 1996). Analyses of materials obtained from tank 241-C-112 during March 1992 were conducted to support the resolution of the Ferrocyanide Unreviewed Safety Question. Obtaining measurements to determine overall waste energetics was a key step in resolving the Ferrocyanide Unreviewed Safety Question and the safety issue.

The ferrocyanide safety issue was resolved for tank 241-C-112; the tank was removed from the Ferrocyanide Watch List on June 25, 1996 (Kinzer 1996). Section 2.5 compares the 1992 analytical results and the requirements of the ferrocyanide DQO (Meacham et al. 1995). This comparison is for completeness because the requirements are no longer applicable.

2.3 VAPOR SCREENING

Tank 241-C-112 headspace was sampled in June 1994 in accordance with the *Safety Assessment for Gas Sampling All Ferrocyanide Tanks* (Farley 1991) and in August 1994 in accordance with *Data Quality Objectives for Generic In-Tank Health and Safety Issue Resolution* (Osborne et al. 1994). The samplings addressed the following two problems: 1) the potential flammable levels of gases and vapors generated or released in waste storage tank headspace and, 2) the potential for worker hazards associated with the toxicity of constituents in any fugitive vapor emissions from these tanks.

2.3.1 Flammable Gas

This is the same requirement as the safety screening flammability requirement except the limit in Osborne et al. (1994) is 20 percent of the LFL instead of 25 percent. (See Section 2.1.2 for a treatment of the flammability issue.) All results from the June and August 1994 vapor sampling events were well below the established DQO threshold (H_2 = 0.5 percent of the LFL; NH_3 = 0.02 percent of the LFL), and it was determined that no organic or inorganic vapor posed a flammability hazard (Huckaby and Bratzel 1995).

2.3.2 Toxicity

The governing sampling documentation required the analysis of ammonia, carbon dioxide, carbon monoxide, hydrogen, hydrogen cyanide, nitric oxide, nitrous oxide, nitrogen dioxide, tritium, and water vapor from tank headspace samples. Huckaby and Bratzel (1995) compared the concentrations of these inorganic gases with toxicity limits listed in the *Vapor Sampling and Analysis Plan* (Homi 1995).

Aside from water vapor and carbon dioxide, the most abundant waste constituents in the tank 241-C-112 headspace were nitrous oxide (544 ppmv), hydrogen (204 ppmv), and ammonia (22.7 ppmv). However, the concentrations of these species were below limits listed in Homi (1995) as were the concentrations for all other analytes. Note that the concentration of nitrous oxide exceeds the 25 ppmv limit of the current vapor DQO (Osborne and Buckley 1995). In addition to the inorganic vapors, the analysis of organics were required from both SUMMA[2] canisters and triple sorbent traps. No target analyte or tentatively identified organic analyte were at or above levels of concern (Huckaby and Bratzel 1995). No further sampling is necessary to address vapor toxicity issues (Hewitt 1996).

2.3.3 Organic Solvents

One purpose of the vapor screening DQO is to screen for the potential existence in the tank of a solvent pool that could support a fire. The potential existence of a solvent pool in the tank may be indicated by the presence of the semivolatile species tributyl phosphate, n-dodecane, and n-tridecane in the tank headspace. The analytical results from the 1994 vapor samples were 0.00043 ppmv n-dodecane, 0.0006 ppmv n-tridecane, and 3.4 mg/m^3 total nonmethane organic carbon (Huckaby and Bratzel 1995). These data have yet to be evaluated as an indicator for the existence of a solvent pool in tank 241-C-112.

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

2.4 PRETREATMENT ISSUES

Lumetta et al. (1994) report the results of sludge treatment and extraction studies performed on the tank 241-C-112 core 36 composite sample. The sample was subjected to a 0.1*M* sodium hydroxide caustic wash, followed by a caustic leach at 100 °C (212 °F) in 3*M* sodium hydroxide. The caustic wash removed 34 percent of the aluminum, 48 percent of the chromium, 81 percent of the sodium, 48 percent of the phosphorous, and about 97 percent of the ^{99}Tc. The caustic leach removed an additional 51 percent of the aluminum, 40 percent of the chromium, 36 percent of the phosphorous, and 89 percent of the ^{137}Cs. Almost 90 percent or greater amounts of boron, calcium, iron, silicon, strontium, uranium, and total alpha activity remained in the composite sample after the caustic wash and leach steps.

A separate 1.05 g aliquot of the core 36 composite was used for acid dissolution testing (Lumetta et al. 1994). The sample was at 100 °C (212 °F) to successive washes consisting of 0.1*M* HNO_3, 2*M* HNO_3, 1.8*M* HNO_3/0.9*M* HF, and 1*M* oxalic acid. After acid dissolution testing, 0.43 g of residue remained. The residue contained 37 percent of the aluminum, 13 percent of the calcium, 47 percent of the iron, 9 percent of the sodium, 53 percent of the silicon, and 8 percent of the total alpha activity found in the original aliquot.

2.5 OTHER TECHNICAL ISSUES

A factor in assessing tank safety is the heat generation and temperature of the waste. Heat is generated in the tanks from radioactive decay. An estimate of the tank heat load based on 1993 radionuclide analyses gives a value of 9,920 W (33,800 Btu/hr). Table 2-1 gives the heat load estimate. A second heat load estimate of 2,780 W (9,510 Btu/hr), based on process history, was available from Agnew et al. (1997a). A third estimate based on tank headspace temperatures was 2,210 W (7,542 Btu/hr) (Kummerer 1995). All heat load estimates are below the 11,700-W (40,000-Btu/hr) limit that separates high- and low-heat load tanks (Bergmann 1991).

Table 2-1. Tank 241-C-112 Projected Heat Load.

Radionuclide	Ci	W
^{137}Cs	2.57E+05	1,210
^{90}Sr	1.30E+06	8,710
Total		9,920

Notes:

Ci = curies
W = watts

2.6 SUMMARY

This section summarizes the analytical results for tank 241-C-112 waste issues. Table 2-2 summarizes the results for safety and vapor screenings. All safety screening primary analytes were well below the established threshold, and all vapor screening requirements were met. Finally, most analytical results were within ferrocyanide DQO specifications.

Table 2-2. Summary of Safety Screening, Vapor Screening, and Ferrocyanide Evaluation Results.

Issue	Sub-Issue	Result
Safety screening	Energetics	Exotherms were observed in most tank waste samples. All were less than 115 J/g (dry basis), well below the 480 J/g limit.
	Flammable gas	All flammable gas concentrations in the tank headspace were less than 25 percent of the LFL.
	Criticality	All total alpha activity results were less than 2 μCi/g, well below the DQO thresholds of 30.8 μCi/g (solids) or 61.5 μCi/mL (liquids).
Vapor screening	Flammability	All flammable gas concentrations in the tank headspace were less than 20 percent of the LFL.
	Toxicity	All analytes were within the toxicity threshold limits of Osborne et al. (1994)[1].
	Organic solvents	Evaluation to be done for the possible existence of a solvent pool.
Ferrocyanide[2]	Energetics	All observed exotherms were well below 480 J/g limit.
	Moisture	The mean moisture concentration of the tank was 41.6 wt%, higher than the 17 wt% needed to quench propagating reactions.
	Nickel	Acid digestion[3] of all cores had nickel concentrations higher than the 8,000 μg/g limit.
	Cyanide	The mean cyanide concentration for the tank waste solids was 1,630 μg/g, far below the 39,000 μg/g limit.
Pretreatment	Sludge washing	Core 36 composite samples have been subjected to sludge washing studies (Lumetta et al. 1994)

Notes:

[1]If the vapor results were evaluated against the current vapor DQO (Osborne and Buckley 1995), the nitrous oxide concentrations would exceed toxicity limits.

[2]Tank 241-C-112 has been removed from the Ferrocyanide Watch List; comparison to the ferrocyanide DQO is for information only.

[3]Acid digestion values were used to make the comparison and for overall inventory calculations because fusion digestion was performed in a nickel crucible; therefore, those concentrations are biased.

3.0 BEST-BASIS INVENTORY ESTIMATE

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

Chemical inventory information generally is derived using two approaches: 1) component inventories are estimated using the results of sample analyses, and 2) component inventories are predicted using a model based on process knowledge and historical information. The most recent model was developed by Los Alamos National Laboratory (Agnew et al. 1997a). Information derived from the two approaches is often inconsistent.

An effort is underway to provide waste inventory estimates that will serve as standard characterization information for the various waste management activities (Hodgson and LeClair 1996). Appendix D contains the complete narrative regarding the derivation of the inventory estimates shown in Tables 3-1 and 3-2.

Table 3-1. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-C-112.

Analyte	Total Inventory (kg)	Basis (S, M, or E)[1]	Comment
Al	11,800	S	
Bi	740	M	
Ca	16,000	S	
Cl^-	736	S	
TIC as CO_3^{-2}	22,600	S	
Cr	187	M	
F^-	469	S	
Fe	16,200	S	
Hg	39.6	M	
K	406	M	
La	38	S	
Mn	192	M	
Na	76,700	S	
Ni	9,190	S	
NO_2^-	36,200	S	
NO_3^-	48,300	S	
OH^-	29,000	E	From charge balance
Pb	1,420	S	
P as PO_4^{-3}	58,400	S	
Si	1,650	S	
SO_4^{-2}	9,310	S	
Sr	207	S	
TOC	1,450	S	
U_{TOTAL}	36,400	S	
Zr	18.9	SM	

Notes:

TIC = total inorganic carbon
TOC = total organic carbon

[1]S = sample-based (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-C-112.

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[1]	Comment
^{3}H	28.1	S	
^{14}C	2.73	S	
^{59}Ni	9.4	S	
^{63}Ni	921	S	
^{79}Se	0.239	S	
^{90}Sr	1,300,000	S	
^{90}Y	1,300,000	S	From ^{90}Sr
^{99}Tc	79.7	S	
^{137}Cs	257,000	S	
^{137m}Ba	257,000	S	From ^{137}Cs
^{154}Eu	630	S	
^{155}Eu	456	S	
$^{239/240}Pu$	69.5	S	
^{237}Np	0.347	S	
^{241}Am	219	S	

Note:

[1]S = sample-based (see Appendix B), M = HDW model-based, and E = engineering assessment-based

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4.0 RECOMMENDATIONS

As discussed in Section 2.0, the 1992 core sampling predated the existence of current DQOs. However, analytical results from this event were evaluated against the requirements of the safety screening DQO (Dukelow et al 1995). All results were well within the safety notification limits. In addition to analytical requirements, the safety screening DQO also specifies the sampling conditions that must be met for a proper safety assessment. Full vertical profiles of the waste are required from two risers separated radially to the maximum extent possible. The sampling risers for tank 241-C-112 met this requirement because the sampling risers were located on opposite sides of the tank. However, complete vertical profiles may not have been obtained because of the moderate recoveries experienced by some segments.

The 1994 vapor sampling events provided sufficient information to address the needs of the vapor DQO (Osborne et al. 1994). No further vapor sampling efforts are necessary. The results satisfied the governing vapor DQO revision (Rev. 0). However, comparison to the current vapor DQO (Rev. 2) reveals that one analyte, nitrous oxide, would exceed the presently specified toxicity limits.

Although the ferrocyanide DQO was no longer applicable, an evaluation was made between the DQO and the results. All requirements were satisfied. Results from the two 1994 vapor sampling events were also within relevant limits. The sampling and analysis activities performed for tank 241-C-112 have met requirements for all applicable DQO documents. Furthermore, a characterization best-basis inventory was developed for the tank contents.

Table 4-1 summarizes the status of Project Hanford Management Contractor (PHMC) TWRS Program review and acceptance of the sampling and analysis results reported in this TCR. All applicable DQOs are listed in column 1. Column 2 indicates whether the requirements of the DQO were met by the sampling and analysis activities performed and is answered with a "yes" or "no." Column 3 indicates concurrence and acceptance by the program in PHMC 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 3 indicates acceptance or disapproval of the sampling and analysis information in the TCR.

Table 4-1. Acceptance of Tank 241-C-112 Sampling and Analysis.

Issue	Sampling and Analysis Performed	Program[1] Acceptance
Safety screening DQO	Yes	Yes
Vapor DQO	Yes	Yes

Note:
[1]PHMC TWRS

Table 4-2 summarizes the status of PHMC TWRS Program review and acceptance of the evaluations and other characterization information in this report. The evaluations outlined in this report are the assessment of headspace gas flammability and worker hazards caused by contact with tank headspace vapors and the evaluation to determine whether the tank is safe, conditionally safe, or unsafe. Column 1 lists the evaluations performed in this report. Columns 2 and 3 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 4-2. Acceptance of Evaluation of Characterization Data and Information for Tank 241-C-112.

Issue	Evaluation Performed	Program[1] Acceptance
Safety categorization: tank is safe	Yes	Yes
Tank headspace vapors do not pose a safety concern	Yes	Yes

Note:
[1]PHMC TWRS

Because the March 1992 tank waste sampling and the 1994 vapor samples met the requirements of the safety screening and tank vapor DQOs, no further sampling and analysis of the waste in tank 241-C-112 is required.

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APPENDIX A

HISTORICAL TANK INFORMATION

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APPENDIX A

HISTORICAL TANK INFORMATION

Appendix A describes tank 241-C-112 based on historical information. For this report, historical information includes information about the fill history, waste types, surveillance, or modeling data about the tank. This information is useful for supporting or challenging conclusions based on sampling and analysis.

Appendix A contains the following information.

- **Section A1.0**: Current status of the tank, including the current waste levels and the stabilization and isolation status of the tank.
- **Section A2.0**: Information about the tank design.
- **Section A3.0**: Process knowledge of the tank, that is, the waste transfer history and the estimated contents of the tank based on modeling data.
- **Section A4.0**: Surveillance data for tank 241-C-112, including surface-level readings, temperatures, and a description of the waste surface based on photographs.
- **Section A5**: References for Appendix A.

Historical sampling results are included in Appendix B.

A1.0 CURRENT TANK STATUS

As of February 28, 1997, tank 241-C-112 contained an estimated 394 kL (104 kgal) of noncomplexed waste (Hanlon 1997). The waste volumes were estimated using photographss and surface-level measurements obtained on September 18, 1990. Table A1-1 shows the volumes of the waste phases found in the tank.

The tank was removed from service in the first quarter of 1976 and declared inactive in the fourth quarter of 1977. Intrusion prevention was partially completed in 1982. The tank was declared administratively interim stabilized in September 1990 (Swaney 1994). The tank is passively ventilated, and all monitoring systems were in compliance with documented standards as of February 28, 1997. Tank 241-C-112 is no longer on a Watch List having been removed from the Ferrocyanide Watch List on June 25, 1996 (Kinzer 1996).

Table A1-1. Tank 241-C-112 Contents Status Summary.[1]

Waste Type	kL (kgal)
Total waste	394 (104)
Supernatant	0
Sludge	394 (104)
Saltcake	0
Drainable interstitial liquid	121 (32)
Drainable liquid remaining	121 (32)
Pumpable liquid remaining	98 (26)

Note:

[1]Hanlon (1997)

A2.0 TANK DESIGN AND BACKGROUND

The C Tank Farm was constructed between 1943 and 1944 in the 200 East Area. The tank farm contains four 200-series and twelve 100-series single-shell tanks. Tank 241-C-112 has a capacity of 2,010 kL (530 kgal), a diameter of 22.9 m (75.0 ft), and an operating depth of 5.18 m (17.0 ft). These tanks were designed to hold concentrated, nonboiling supernatant. The maximum design temperature for liquid storage is 104 °C (220 °F) (Brevick et al. 1997).

Tank 241-C-112 entered service during the second quarter of 1948 and is the last tank in a cascade that includes tanks 241-C-110 and 241-C-111. These 100-series single-shell tanks are constructed of 30-cm (1.0-ft) thick reinforced concrete with a 6.35-mm (0.25-in.) mild carbon steel liner, and a 38-cm (1.25-ft) thick-domed concrete top. These tanks have a dished bottom with a 1.2-m (4-ft) radius knuckle. The tanks are set on a reinforced concrete foundation (Brevick et al. 1997).

The surface level of tank 241-C-112 is monitored through riser 5 with an ENRAF™ gauge. The tank has two thermocouple trees, one located in riser 1 and the other in riser 8. A salt well pump is located in riser 13. Tank 241-C-112 has nine risers. Risers 2, 3, 4, 6, and 7 are tentatively available for sampling (Lipnicki 1997). Risers 2, 3, 6, and 7 are 30 cm (12in.) in diameter. Riser 4 is 10 cm (4 in.) in diameter. Table A2-1 lists tank 241-C-112 risers showing their sizes and general use.

Table A2-1. Tank 241-C-112 Risers.[1, 2, 3]

Number	Diameter		Description and Comments
	cm	in.	
1	10	4	Thermocouple tree
2[4]	30	12	Capped [bench mark CEO-37538 12/11/86[5]]
3[4]	30	12	Capped
4[4]	10	4	Breather filter [vapor assembly/breather filter offset adapter ECN-618483 01/10/95] [vapor probe removed and replaced w/ blind flange ECN-618481 06/09/95]
5	10	4	ENRAF™ surface level gauge
6[4]	30	12	Spare
7	30	12	B-222 observation port
8	10	4	Thermocouple tree
13	30	12	Salt well pump pit, weather covered
B	7.6	3	Cascade inlet from tank 241-C-111
C1	7.6	3	Spare process inlet nozzle, capped
C2	7.6	3	Spare process inlet nozzle, capped
C3	7.6	3	Spare process inlet nozzle, capped
C4	7.6	3	Spare process inlet nozzle, capped

Notes:

CEO = change engineering order
ECN = engineering change notice

[1]Alstad (1993)
[2]Tran (1993)
[3]Vitro Engineering Corporation (1988)
[4]Identifies risers tentatively available for sampling (Lipnicki 1997).
[5]Dates are in the mm/dd/yy format.

Figure A2-1 is a plan view of the riser configuration. Figure A2-2 iss a tank cross section showing the approximate waste level and a schematic of tank equipment. Tank 241-C-109 has four process inlet nozzles and one cascade overflow inlet. The figure also shows that tank 241-C-112 has four process inlet nozzles and one cascade inlet.

Figure A2-1. Riser and Nozzle Configuration for Tank 241-C-112.

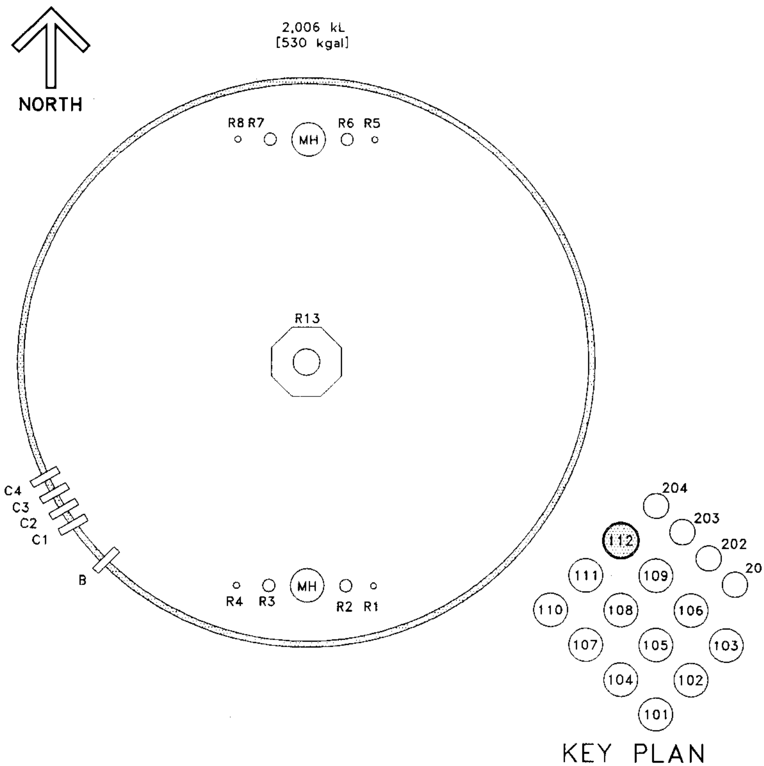
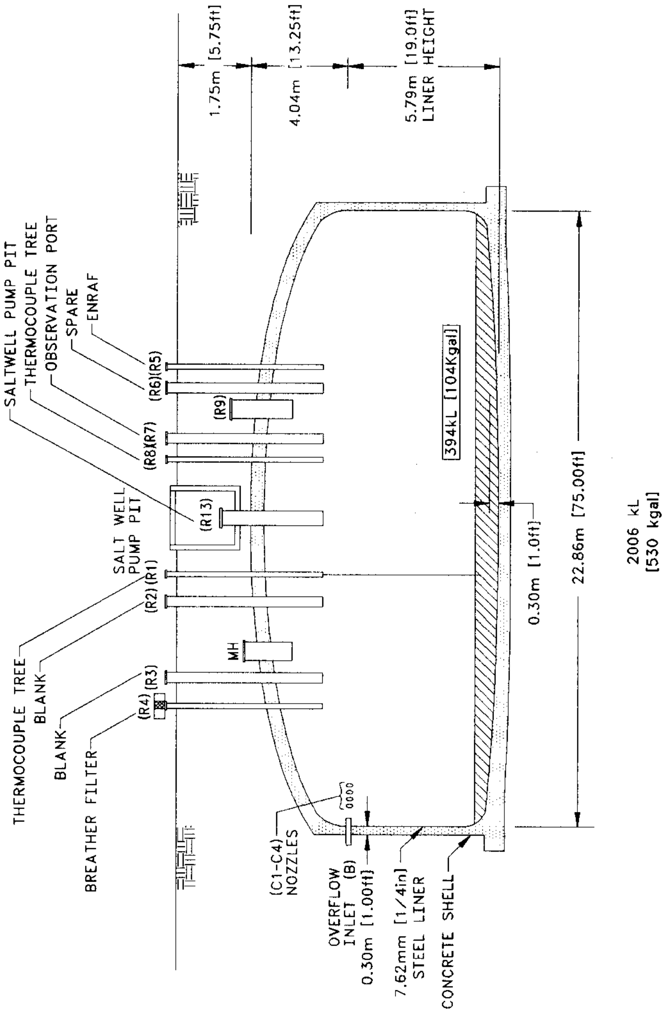


Figure A2-2. Tank 241-C-112 Cross Section and Schematic.



A3.0 PROCESS KNOWLEDGE

The sections below 1) provide information about the transfer history of tank 241-C-112, 2) describe the process wastes that made up the transfers, and 3) estimate of the current tank contents based on transfer history.

A3.1 WASTE TRANSFER HISTORY

The first type of waste that tank 241-C-112 received was 1C1 from the bismuth phosphate process cascaded from tank 241-C-111 from the fourth quarter of 1946 to the second quarter of 1947. Tank 241-C-112 is the last tank in a "cascade" that includes tanks 241-C-110 and 241-C-111. All supernatant was transferred from tank 241-C-112 to tank 241-B-106 in 1952, leaving only a 64 kL (17 kgal) heel (comprised of 57 kL [15 kgal] of solids and 8 kL [2 kgal] of supernatant). In 1953, UR and tributyl phosphate wastes were transferred to tank 241-C-112. A large portion of the supernatant was again transferred from tank 241-C-112 to tank 241-B-106 during the third and fourth quarters of 1953. In 1954, UR waste from the UR process was transferred to the tank (Agnew et al. 1997b).

Beginning in May 1955, unscavenged UR waste already stored in 200 East Area underground tanks at the Hanford Site was routed to the 244-CR vault for scavenging. The 244-CR vault facility contained stainless steel tanks with chemical addition, agitation, and sampling capabilities. The pH was adjusted with HNO_3 and/or NaOH to pH 9.3 $\pm$ 0.7, and $Fe(CN)_6^{-4}$ and Ni^{+2} ion were added (generally to 0.005*M* each) to precipitate ^{137}Cs. If laboratory analysis of the feed tank indicated additional ^{90}Sr decontamination was necessary, calcium nitrate was also added (Sloat 1955). There was also an effort to scavenge ^{60}Co with Na_2S. Further information on the scavenging process can be found in Sloat (1954) and Schmidt and Stedwell (1954). The scavenged waste was routed to another tank for settling, sampling, and decantation of supernatant to a crib.

From late 1955 until 1958, tank 241-C-112 was used for settling scavenged ferrocyanide waste. Waste treated in the ferrocyanide scavenging process came from tanks 241-C-101, 241-C-102, 241-C-103, 241-C-105, 241-C-106, 241-C-109, 241-C-111, 241-B-102, 241-B-106, 241-BX-108 and 241-BY-101. After the ferrocyanide scavenging process, the ferrocyanide waste slurries were transferred directly from the process vessels to tank 241-C-112 (General Electric 1958). During this period, the scavenged waste was settled, sampled, and sometimes transferred to another tank before disposal. Disposal of the scavenged supernatant consisted of decantation to a crib (Borsheim and Simpson 1991 and General Electric 1958).

A total of 17,180 kL (4,539 kgal) of ferrocyanide waste was received by tank 241-C-112, and 18,800 kL (4,966 kgal) of supernatant (including one transfer in the first quarter of 1958) were removed. The settling tanks for this in-farm scavenged waste were tanks 241-C-108, 241-C-109, 241-C-111, and 241-C-112 (Agnew et al. 1997b).

Tank 241-C-112 received a total of 443 kL (117 kgal) of flush water during the fourth quarter of 1958 and the third and fourth quarters of 1960. The tank also received 960 kL (254 kgal) of PUREX cladding waste between third quarter of 1960 and second quarter of 1961. Between the fourth quarter of 1961 and the second quarter of 1962, 201 kL (53 kgal) of waste from the strontium semiworks/hot semiworks was added to the tank.

No further transfer activity was recorded until 1970. During the first quarter of 1970 and the first quarter of 1975, a total of 151 kL (40 kgal) of water from unknown sources was received by tank 241-C-112. Also during the first quarter of 1970, 1,290 kL (340 kgal) of supernatant was sent to tank 241-C-104. During the second quarter of 1970 and the third quarter of 1975, a total of 1,650 kL (436 kgal) of supernatant was transferred to tank 241-C-110. Also in 1975, 2,090 kL (551 kgal) of supernatant was transferred from tank 241-C-112 to tank 241-C-103.

Tank 241-C-112 was removed from service in 1976, and the remaining supernatant (15 kL [4 kgal]) was sent to tank 241-C-103. Finally in 1983, 19 kL (5 kgal) of waste (from salt well pumping) was transferred from tank 241-C-112 to double-shell tank 241-AN-103. Table A3-1 summarizes the waste transfer history of tank 241-C-112 (Agnew et al. 1997b).

Table A3-1. Tank 241-C-112 Major Transfers.[1, 2] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume	
				kL	kgal
241-C-111	---	1C1	1946 to 1947	2,002	529
---	241-B-106	SU	1952 to 1953	-3,330	-880
241-C-111	---	TBP	1953	1,900	502
UR process	---	UR	1954	1,210	321
241-C-109	---	TFeCN	1955	1,750	463
---	241-C-104	SU	1955	-1,590	-420
241-C-111	---	TFeCN	1956	1,840	485
---	241-C-108	SU	1956	-1,640	-433
241-C-105	---	TFeCN	1956	1,640	434
241-C-101	---	TFeCN	1956	1,620	429
---	Various cribs	SU	1956	-5,200	-1,373
241-C-102	---	TFeCN	1957	1,400	370

Table A3-1. Tank 241-C-112 Major Transfers.[1,2] (2 sheets)

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Waste Volume	
				kL	kgal
241-C-103	---	TFeCN	1957	219	58
241-C-106	---	TFeCN	1957	1,920	506
---	241-BY-102	SU	1957	-1,780	-471
---	241-BY-108	SU	1957	-1,880	-496
241-BY-101	---	TFeCN	1957	1,790	474
241-B-102	---	TFeCN	1957	1,690	446
---	Various cribs	SU	1957 to 1958	-6,711	-1,773
241-B-106	---	TFeCN	1957	1,740	461
241-BX-108	---	TFeCN	1957	1,560	413
Miscellaneous sources	---	Water	1958 to 1960	443	117
PUREX	---	PUREX cladding waste	1960 to 1961	961	254
PUREX	---	Hot semiworks	1961 to 1962	2,010	53
---	241-C-104	SU	1970	-1,290	-340
241-C-110	---	SU	1970 and 1975	1,650	436
Miscellaneous sources	---	Water	1970 and 1975	151	40
---	241-C-103	SU	1975 To 1976	-2,100	-555
---	241-AN-103	Salt well liquor	1983	-19	-5

Notes:

PUREX = plutonium uranium extraction
TBP = tributyl phosphate
SU = supernatant
TFeCN = ferrocyanide sludge produced by in-tank or in-farm scavenging

[1]Agnew et al. (1997b)

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

A3.2 HISTORICAL ESTIMATION OF TANK CONTENTS

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

- *Waste Status and Transaction Record Summary: WSTRS, Rev. 4* (Agnew et al. 1997b). The 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 Hanford defined waste list, the supernatant mixing model, the tank layer model, and the historical tank contents estimates [HTCE]).

- Hanford defined waste (HDW) list. The HDW list is comprised of approximately 50 waste types defined by major waste constituent concentrations for both sludges and supernates.

- Tank layer model (TLM). The TLM defines the sludge and saltcake layers in each tank using waste composition and waste transfer information.

- Supernatant mixing model (SMM). This is a subroutine within the HDW model that calculates the volume and composition of certain supernatant blends and concentrates.

The TLM defines the sludge and saltcake layers in each tank. The SMM uses information from the WSTRS, HDW list, and the TLM to describe the supernatants and concentrates in each tank. Together the WSTRS, HDW list, TLM, and SMM 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-C-112 contains a total volume of 394 kL (104 kgal). This volume is broken down into five separate layers. The volumes and waste types of the five layers are (in order from the bottom of the waste to the top): 57 kL (15 kgal) of 1C1, 272 kL (72 kgal) of ferrocyanide sludge (TFeCN), 49 kL (13 kgal) of PUREX cladding waste produced from 1956 to 1960 (CWP1), 11 kL (3 kgal) of PUREX cladding waste produced from 1961 to 1972 (CWP2), and 4 kL (1 kgal) of strontium hot semiworks waste.

First cycle decontamination waste is estimated to contain greater than 1 weight percent bismuth, phosphate, sodium, iron, hydroxide, nitrate, uranium, and aluminum. The UR waste solids are estimated to be comparatively high in uranium and iron with less than 0.1 weight percent bismuth and aluminum. Neither waste type is estimated to contain any significant fuel content or heat-generating radionuclides (^{137}Cs or ^{90}Sr).

In-tank ferrocyanide sludge (TFeCN) comprises 20 to 25 percent of the total ferrocyanide material in the Hanford Site tank farms. The TFeCN waste is estimated to contain greater than 1 weight percent sodium, iron, nitrite, carbonate, nickel, and calcium, and elevated levels of ^{137}Cs. The interactive effects of radiation and high pH conditions from later waste additions to the waste matrix appear to have degraded the ferrocyanide (Scheele et al. 1991). Laboratory results confirming that hypothesis have been documented (Lilga et al. 1992, 1993, 1994, 1995, and 1996 and Babad et al. 1993).

The last major waste type is PUREX cladding waste (CWP1 and CWP2). This waste type is estimated to contain greater than one weight percent aluminum, sodium, nitrate, lead, hydroxide, carbonate, and uranium. The CWP1 waste type is also estimated to contain large amounts of nitrite, and the CWP2 waste type is estimated to contain large amounts of iron.

A small volume of strontium semiworks waste also was added to the tank. This waste type is estimated to contain greater than one weight percent sodium, iron, lead, hydroxide, nitrite, EDTA, and acetate. The waste is also expected to contain a significant ^{90}Sr content from strontium recovery and purification waste losses.

Figure A3-1 is a graph of the estimated waste types and volumes. Table A3-2 shows the historical tank inventory estimate of the expected waste constituents and concentrations for tank 241-C-112.

Figure A3-1. Tank 241-C-112 Tank Layer Model.

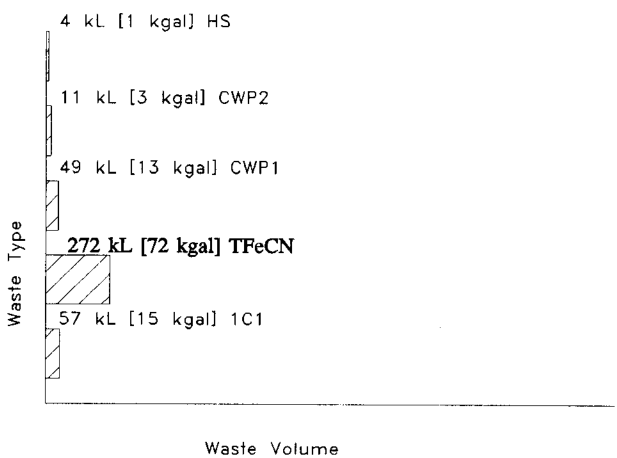


Table A3-2. Historical Tank Inventory Estimate.[1, 2, 3] (4 sheets)

Total Inventory Estimate					
Physical Properties				**-95 CI**	**+95 CI**
Total waste	5.38E+05 kg; 104 kgal				
Heat load	2,780 W (9,510 Btu/hr)			2,770	2,800
Bulk density[4]	1.37 g/mL			1.35	1.57
Water wt%[4]	65.2			47.1	66.1
TOC wt% C[4] (wet)	1.32			1.15	1.33
Chemical Constituents	***M***	**µg/g**	**kg**	**-95 CI (*M*)**	**+95 CI (*M*)**
Na^{+}	3.43	57,667	31,021	3.15	7.54
Al^{3+}	0.900	17,759	9,553	0.883	0.916
Fe^{3+} (total Fe)	0.386	15,787	8,492	0.381	0.388
Cr^{3+}	0.0012	43.8	23.6	0.0010	0.0013
Bi^{3+}	0.009	1,376	740	0.0071	0.01
La^{3+}	0	0	0	0	0
Hg^{2+}	0.0005	73.6	39.6	0.00048	0.00051
Zr (as $ZrO(OH)_2$)	3.45E-05	2.30	1.24	2.74E-05	4.18E-05
Pb^{2+}	0.02556	3,875	2,084	0.02156	0.0266
Ni^{2+}	0.453	19,475	10,476	0.449	0.458
Sr^{2+}	0	0	0	0	0
Mn^{4+}	0	0	0	0	0
Ca^{2+}	0.585	17,167	9,235	0.415	0.757
K^{+}	0.00919	263	141	0.00714	0.00942
OH^{-}	4.01	49,888	26,837	3.92	4.09
NO_3^{-}	0.243	11,042	5,940	0.218	4.93
NO_2^{-}	1.70	57,159	30,748	1.22	1.75
CO_3^{2-}	0.586	25,731	13,842	0.415	0.757
PO_4^{3-}	0.247	17,171	9,237	0.178	0.388
SO_4^{2-}	0.01962	1,379	742	0.01682	0.0212
Si (as SiO_3^{2-})	0.03435	706	380	0.01863	0.0496
F^{-}	0.02004	279	150	0.01592	0.0466
Cl^{-}	0.03941	1,022	550	0.03	0.0405

Table A3-2. Historical Tank Inventory Estimate.[1, 2, 3] (4 sheets)

Total Inventory Estimate					
Chemical Constituents	***M***	**ppm**	**kg**	**-95 CI (*M*)**	**+95 CI (*M*)**
citrate^{3-}	0.00032	43.8	23.6	0.00026	0.00038
EDTA^{4-}	0.00063	134	71.8	0.00051	0.00075
HEDTA^{3-}	0	0	0	0	0
glycolate^{-}	0	0	0	0	0
acetate^{-}	0.00404	174	93.8	0.00328	0.00480
oxalate^{2-}	0	0	0	0	0
DBP	0	0	0	0	0
butanol	0	0	0	0	0
NH_3	0.176	2,185	1,175	0.158	0.437
$Fe(CN)_6^{4-}$	0.247	48,960	26,338	0.247	0.247
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci**	**-95 CI (Ci/L)**	**+95 CI (Ci/L)**
H-3	2.58E-06	0.00189	1.01	1.86E-06	2.65E-06
C-14	4.65E-07	0.00034	0.183	3.44E-07	4.79E-07
Ni-59	9.07E-06	0.00664	3.57	8.87E-06	9.25E-06
Ni-63	0.00083	0.605	325	0.00081	0.00084
Co-60	1.16E-07	8.52E-05	0.04582	8.88E-08	1.34E-07
Se-79	1.10E-07	8.05E-05	0.04330	8.45E-08	1.85E-06
Sr-90	0.624	456	2.45E+05	0.617	0.629
Y-90	0.624	456	2.46E+05	0.617	0.629
Zr-93	5.18E-07	0.00038	0.204	3.97E-07	8.49E-06
Nb-93m	4.36E-07	0.00032	0.172	3.34E-07	6.81E-06
Tc-99	3.23E-06	0.00236	1.27	2.39E-06	3.32E-06
Ru-106	2.95E-11	2.16E-08	1.16E-05	2.41E-11	1.82E-09
Cd-113m	1.29E-06	0.00095	0.509	9.98E-07	2.76E-05
Sb-125	1.42E-07	0.00010	0.05605	1.17E-07	1.55E-07
Sn-126	1.67E-07	0.00012	0.06564	1.28E-07	2.90E-06
I-129	6.09E-09	4.45E-06	0.00240	4.51E-09	6.27E-09
Cs-134	5.16E-08	3.78E-05	0.02033	5.08E-08	5.25E-08
Cs-137	0.613	449	2.41E+05	0.613	0.613
Ba-137m	0.580	424	2.28E+05	0.580	0.580

Table A3-2. Historical Tank Inventory Estimate.[1, 2, 3] (4 sheets)

Total Inventory Estimate					
Radiological Constituents	Ci/L	μCi/g	Ci	-95 CI (Ci/L)	+95 CI (Ci/L)
Sm-151	0.00041	0.300	161	0.00031	0.00682
Eu-152	1.88E-06	1.37E-03	0.738	1.87E-06	1.88E-06
Eu-154	2.57E-06	0.00188	1.01	2.07E-06	2.99E-05
Eu-155	0.00013	0.0969	52.1	0.00013	0.00013
Ra-226	1.20E-10	8.75E-08	4.71E-05	5.54E-11	1.18E-09
Ra-228	1.55E-09	1.14E-06	0.00061	1.53E-09	1.58E-09
Ac-227	5.35E-09	3.91E-06	0.00210	4.45E-09	1.01E-08
Pa-231	7.35E-09	5.38E-06	0.00289	2.35E-09	9.07E-09
Th-229	7.04E-10	5.15E-07	0.00028	6.93E-10	7.14E-10
Th-232	7.24E-11	5.30E-08	2.85E-05	2.18E-11	1.22E-10
U-232	8.02E-08	5.87E-05	0.03155	1.05E-09	1.07E-07
U-233	3.11E-07	0.00023	0.122	3.71E-09	4.15E-07
U-234	4.15E-06	0.00303	1.63	3.73E-06	4.29E-06
U-235	1.82E-07	0.00013	0.07152	1.65E-07	1.87E-07
U-236	5.13E-08	3.76E-05	0.02021	3.89E-08	5.55E-08
U-238	2.39E-05	0.01748	9.41	1.83E-05	2.45E-05
Np-237	1.99E-08	1.46E-05	0.00783	1.47E-08	2.05E-08
Pu-238	5.62E-06	0.00411	2.21	5.09E-06	6.69E-06
Pu-239	0.00030	0.223	120	0.00028	0.00047
Pu-240	4.84E-05	0.03541	19.1	4.45E-05	6.24E-05
Pu-241	0.00042	0.308	165	0.00038	0.00046
Pu-242	1.53E-09	1.12E-06	0.00060	1.41E-09	1.72E-09
Am-241	1.30E-05	0.00955	5.14	1.12E-06	4.41E-05
Am-243	2.98E-10	2.18E-07	0.00012	1.29E-11	9.30E-10
Cm-242	3.88E-08	2.84E-05	0.01526	3.87E-08	3.88E-08
Cm-243	1.47E-09	1.08E-06	0.00058	1.47E-09	1.47E-09
Cm-244	6.90E-10	5.05E-07	0.00027	5.82E-10	4.08E-08

Table A3-2. Historical Tank Inventory Estimate.[1, 2, 3] (4 sheets)

Total Inventory Estimate					
Totals	***M***	**µg/g**	**kg**	**-95 CI (*M* or g/L)**	**+95 CI (*M* or g/L)**
Pu	0.00512 (g/L)	----	2.02	0.00475	0.00781
U	0.05268	9,174	4,935	0.04777	0.05434

Notes:

[1]Agnew et al. (1997a)

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

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

[4]Volume average for density, mass average water weight percent, and TOC wt% C.

A4.0 SURVEILLANCE DATA

Tank 241-C-112 surveillance consists of surface-level measurements (liquid and solid), temperature monitoring inside the tank (waste and headspace), and leak detection well (dry well) monitoring for radioactivity outside the tank. Surveillance data provide the basis for determining tank integrity.

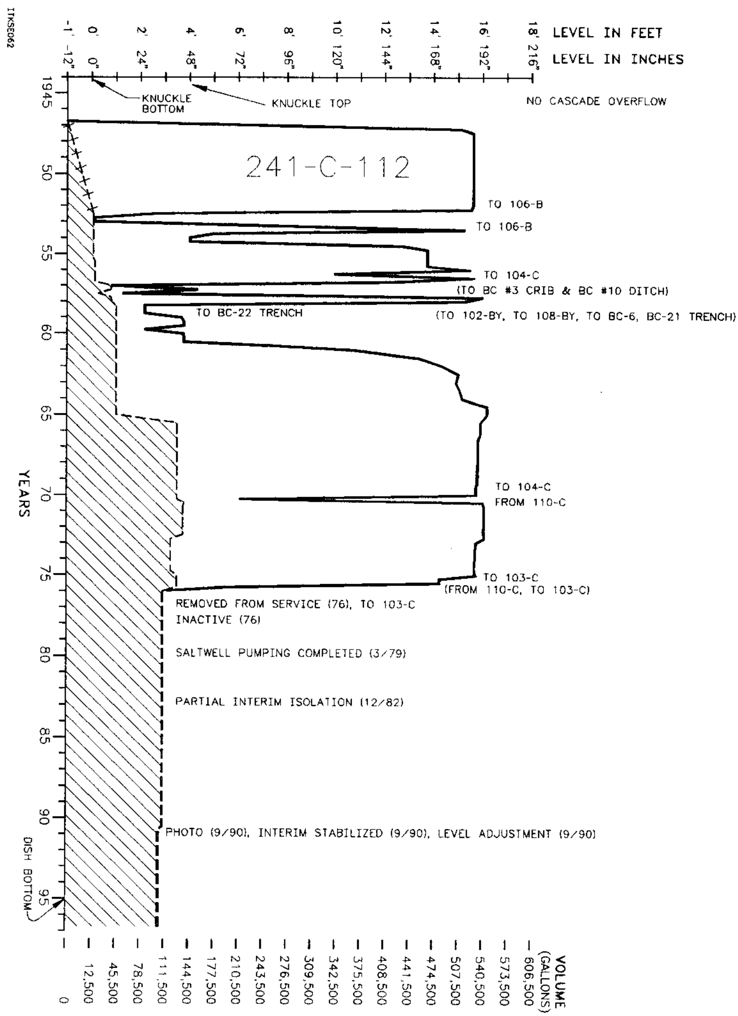
Liquid-level measurements can indicate whether the tank has a major leak. Solid surface-level measurements indicate physical changes in and consistencies of the solid layers of a tank. Dry wells located around the tank perimeter may show increased radioactivity caused by leaks.

A4.1 SURFACE-LEVEL READINGS

An ENRAF™ surface level gauge was installed through riser 5 in March 1996. Surface-level measurements before this date were made by a manual tape. Surface-level readings are manually entered into the Surveillance Analysis Computer System. The intrusion criterion for the tank is a 5.1-cm (2-in.) increase from the baseline value.

Figure A4-1 shows the level history data. The waste surface level on January 6, 1997, was 85.37 cm (33.61 in.). Waste level determination during the interim stabilization of tank 241-C-112 included photograph reviews for verification. The *Single-Shell Tank Stabilization Record* (Swaney 1994) reported a waste level of about 84.46 cm (33.25 in.) which is comparable to recent measurements.

Figure A4-1. Tank 241-C-112 Level History.



A4.2 INTERNAL TANK TEMPERATURES

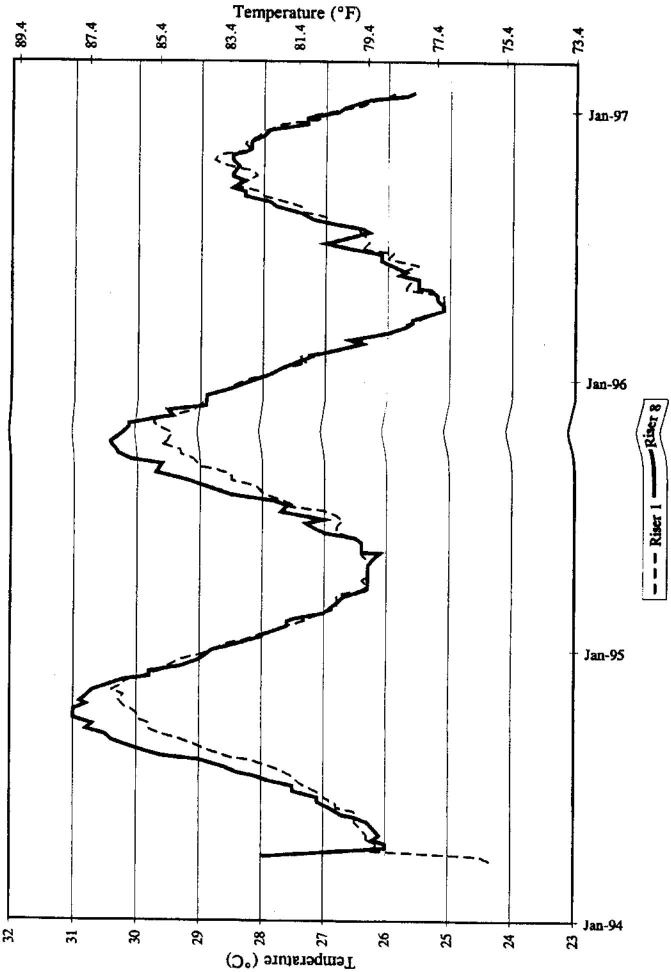
Interior tank temperature data for tank 241-C-112 are recorded by two thermocouple trees, located in riser 1 and riser 8. The thermocouple tree located in riser 1 has 11 thermocouples; however, current readings are only available from thermocouples 1, 3, 4, and 8. The thermocouple tree located in riser 8 has 10 thermocouples; current readings are available only from thermocouples 1 through 5 and 10.

Historical readings from January 1975 to March 1994 ranged from 14.8 °C (58.6 °F) to 42.8 C° (109 °F) with an average temperature of 26.2 °C (79.2 °F). The temperature measured by the thermocouples in riser 1 from March 1994 to January 1997 ranged from 13 °C (56 °F) to 30.4 °C (86.7 °F) with an average of 26.7 °C (80 °F). During the same period, temperatures measured by the thermocouples in riser 8 ranged from 17.8 °C (64.1 °F) to 31.0 °C (87.8 °F) with an average of 26.6 °C (79.9 °F). On January 26, 1997, the thermocouples in riser 1 measured a high temperature of 25.9 °C (78.62°F) and a low of 23.5 °C (74.3 °F). On the same day, the thermocouples in riser 8 measured a high temperature of 25.6 °C (78.1°F) at thermocouple 1 and a low of 22.8 °C (73.0 °F) at thermocouple 10. For plots of individual thermocouple readings, refer to Brevick et al. (1997). Figure A4-2 is a graph of weekly high temperatures.

A4.3 TANK 241-C-112 PHOTOGRAPHS

The most recent set of interior tank photographs was taken on September 18, 1990. The quality of the photographs is poor, and few observations can be made about the waste. Based on these photographs, Swaney (1994) described the waste surface as brown in color and pockmarked. The sludge was defined as a fine material with small puddles of liquid throughout. The montage formed from these photographs has labels identifying some tank monitoring equipment. The montage can be viewed in Brevick et al. (1997).

Figure A4-2. Tank 241-C-112 High Temperature Plot.



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APPENDIX B

SAMPLING OF TANK 241-C-112

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APPENDIX B

SAMPLING OF TANK 241-C-112

Appendix B provides sampling and analysis information for each known sampling event for tank 241-C-112, and it assesses core sampling results.

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

Future sampling of tank 241-C-112 will be appended to the above list.

B1.0 TANK SAMPLING OVERVIEW

This section describes the March 1992 sampling and analysis events for tank 241-C-112. The characterization and analysis requirements for tank 241-C-112 are outlined in the *Waste Characterization Plan* for single-shell tanks (Hill et al. 1991), as modified by Hill (1991). The results of these analyses will provide support for Tank Farm Operations and safety programs. Analyses of materials obtained from the tank were also used to support the *Hanford Federal Facility Agreement and Consent Order*, Milestone M-44-05.

Because the 1992 sampling events predated current DQOs, no DQOs were applicable. An effort has been made to evaluate these results against the safety screening (Dukelow et al. 1995) and ferrocyanide DQO (Osborne et al. 1994) requirements. The data package (Bell 1993) originally published the analytical results.

To support the safety screening DQO and the vapor DQO, vapor phase measurements were made. The vapor phase screening was taken for flammability and toxicity issues. The results were reported in *Tank 241-C-112 Headspace Gas and Vapor Characterization Results for Samples Collected in June and August 1994* (Huckaby and Bratzel 1995).

Safety screening analyses included the following: total alpha to determine criticality, DSC to ascertain the fuel energy value, and thermogravimetric analysis (TGA) to obtain the total moisture content. In addition, combustible gas meter readings in the tank headspace were performed to measure flammability. Table B1-1 summarizes sampling and analytical requirements from the safety screening, vapor, and ferrocyanide DQOs.

Table B1-1. Integrated Data Quality Objective Requirements for Tank 241-C-112.[1]

Sampling Event	Applicable DQOs	Sampling Requirements	Analytical Requirements
1992 core sampling	Safety screening[2]	Core samples from a minimum of two risers separated radially to the maximum extent possible.	▸ Energetics ▸ Moisture content ▸ Total alpha ▸ Bulk density
	Ferrocyanide[2,3]	A minimum of two cores. Efforts should be made to obtain good sample recovery and quarter segment analyses for primary analytes.	▸ Energetics ▸ Moisture content ▸ Metals ▸ Anions ▸ Radionuclides
1994 vapor phase measurements	Vapor[4]	Measurement in a minimum of one location within tank headspace.	▸ Vapor flammability ▸ Gases (NH_3, H_2, CH_4, H_2O, CO_2, CO, NO, NO_2, N_2O, tritium, and organics)

Notes:

[1]Homi (1995)
[2]DQO did not exist at the time of sampling.
[3]Removed from Ferrocyanide Watch List and no longer applicable
[4]Osborne et al. (1994)

B2.0 SAMPLING EVENTS

B2.1 CORE SAMPLING EVENT NOVEMBER 1992

This section describes the core sampling and analysis event for tank 241-C-112 that occurred during March 1992.

B2.1.1 Description of Sampling Event

Tank 241-C-112 was push-mode core sampled through three risers from March 19, 1992, to March 26, 1992 (Bell 1993). Two segments were expected from each core sample. Core 34 was obtained from riser 2 from March 19, 1992 to March 22, 1992. Core 35 was obtained from riser 7 on March 22, 1992 and March 23, 1992. Core 36 was obtained from riser 8 on March 24, 1992 to March 26, 1992.

The sampler was constructed of stainless steel and was 48 cm (19 in.) long, with a 2.2-cm (7/8-in.) inside diameter, and had a volume of 187 mL (0.05 gallon). Tank Farm Operations determined that sampling events of one or two segments did not require hydrostatic head balance fluid; therefore, none was used eliminating potential problems with sample contamination. When a segment was captured by the sampler, the sampler was sealed within a stainless steel liner, and the liner was placed within a shipping cask. This degree of containment protected workers from excessive radiological exposure and prevented liquids from the sample (or the sample itself) from being lost in transport.

B2.1.2 Tank 241-C-112 Core Sample Recovery

The location of the risers, the dished bottom of the tank, and the safety margins in the sampling protocol precluded obtaining samples from the entire waste depth in the tank. Segment recoveries were based on the maximum recoverable volume for the segment, regardless of solid/liquid ratio. In the upper segments of tank 241-C-112 (92-001, -003, and -005), the maximum recoverable amount of waste was 33.8 cm (13.3 in. or 131 mL) and 48.3 cm (19 in. or 187 mL) for the lower segments (92-002, -004, and -006). Tables B2-1 and B2-2 show initial measurements and the observation basis.

Table B2-1. Tank 241-C-112 Core Sample Description Summary.[1] (2 sheets)

Core Number	Segment	Core Recovery (Volume Basis)	Total Mass (g)	Comments
Core 34 Upper	92-001	87.0%	136.9	Liquid contained suspended solids. Solids portion was 1.3 cm (0.5 in.) long.
Core 34 Lower	92-002	74.9%	211.8	Gray/white streak at edge of solids. Solid segment was 36.1 cm (14.2 in.) long.
Core 35 Upper	92-003	0%	N/A	No sample recovered; valve remained open.
Core 35 Lower	92-004	34.8%	109.1	Liquid contained suspended solids. Solid segment was 7.6 cm (3 in.) long.
Core 36 Upper	92-005	64.9%	105.8	Medium brown color; no drainable liquid. Solid segment was 21.8 cm (8.6 in.) long.

Table B2-1. Tank 241-C-112 Core Sample Description Summary.[1] (2 sheets)

Core Number	Segment	Core Recovery (Volume Basis)	Total Mass (g)	Comments
Core 36 Lower	92-006	90.9%	263.7	Thin brown sludge at bottom of segment with the material gaining consistency and gradually changing color to gray/white moving up the core. Solid segment was 43.9 cm (17.3 in.) long.

Note:
[1]Bell (1993)

Table B2-2. Tank 241-C-112 Core Sample Physical Characteristics Summary.[1]

Core Number	Segment Sample Number	Solids[2] Mass (g)	Liquid[3] Mass (g)	Solids Volume (mL)	Liquid Volume (mL)	Solids Density (g/mL)	Liquids Density (g/mL)
34	92-001	20.99	115.89	14	100	1.5	1.2
34	92-002	175.75	36.07	110	30	1.6	1.2
35	92-003	n/a	n/a	0	0	n/a	n/a
35	92-004	58.7	50.35	30	35	2.0	1.4
36	92-005	105.8	0.0	85	0	1.2	None
36	92-006	263.7	0.0	170	0	1.6	None

Note:
[1]Bell (1993)
[2]Solids: wet solids
[3]Liquid: drainable (free) liquid

The general characteristics of tank 241-C-112 waste materials were as follows.

- Drainable liquids were rust to dark brown in color and contained significant amounts of suspended solids. After filtering, the liquids were dark yellow.

- Core samples ranged from gray/white to tan/dark brown in color. No sharp boundaries were observed in the samples. The changes in color occurred gradually over the sample length.

- The samples ranged in consistency from a thin slurry to a very thick, chunky sludge. They appeared to be saturated with liquid.
- The samples slumped somewhat but held their shape relatively well (high viscosity, non-Newtonian fluids).

B2.1.3 Sample Handling

The casks were transported to the 324 Shielded Materials Facility for gamma scanning, then to the 325 Analytical Chemistry Laboratory for characterization analysis. Both facilities are operated by the Battelle-Pacific Northwest Laboratory in the 300 Area of the Hanford Site. Cores 34 and 35 arrived at the 324 Facility on March 25, 1992, and core 36 arrived on March 26, 1992.

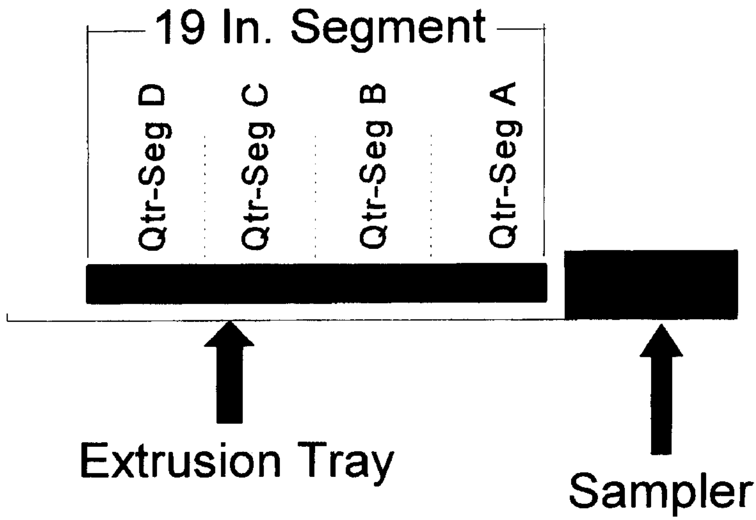
A chain-of-custody record was kept during the sampling event for each segment that was sampled. The chain-of-custody form is a one-page record that is used to ensure that 1) the sample is safely and properly transported from the field to the laboratory, and 2) the correct personnel are involved in the sampling operation and transportation of the sample to the laboratory.

Copies of the chain-of-custody forms are available in the full data package (Bell 1993). From inspecting chain-of-custody records, no irregularities appeared in the sampling or transport of tank 241-C-112 samples from the field that would merit a safety or sample integrity concern (that is, sample containment was not breached).

B2.1.3.1 Sample Breakdown Procedure. The sampler was removed from the shipping cask directly into the hot cell. The sampler was placed into a horizontal position; therefore, any free liquid at the top of the sampler has an opportunity to drain to the liner. The sample was loaded into the mechanical extruder and removed by pushing it out from the back of the sampler with a piston.

The material nearest the valve was from a deeper part of the tank, and the material near the piston was closer to the surface. The sample and liquids were collected on a metal tray. Next, the mass of the segment and the approximate length were recorded. From this information, the bulk densities of the segments were estimated. The sample volume was determined by measuring the length of the extruded sample using a linear unit volume of 9.85 mL/in. Each segment was divided into 12-cm (4.75-in.) subsegments. Figure B2-1 shows how the segment sample was extruded and divided into subsegments. A video record was made of the extrusions of each segment from tank 241-C-112, and color photographs were taken to document the extruded segments.

Figure B2-1. Typical Single-Shell Tank Segment Extrusion.



B2.1.3.2 Homogenization Tests. Subsegment and core composite samples were homogenized with a mechanical mixer before analysis. This was done so that aliquots removed for analysis would represent the entire subsegment or core composite. Aliquots of the homogenized tank waste from core 34-2C and 2D, core 35-2D, and core 36-1C and 2D were taken to determine the efficacy of the homogenization procedure.

The samples were split into duplicates, acid digested, and assayed by inductively coupled plasma (ICP) atomic emission spectroscopy and gamma energy analysis (GEA). This procedure determined whether the degree of mixing by the as-planned homogenization procedure was sufficient for the remaining samples to be homogenized and prepared for analysis. If the analytes from the aliquots were within a relative percent difference (RPD) of 10 percent, the samples were considered homogenized. If several analytes were not within the specified RPD, the samples were mixed again and re-assayed. Once homogenization was indicated, the remaining samples were homogenized and prepared for analysis.

Investigators reported that samples from tank 241-C-112 exhibited substantial resistance to homogenization. Generally, the samples had to be blended twice before ICP results were considered satisfactory. The GEA never showed satisfactory homogenization; it indicated the distribution of radionuclides remained irregular even after the second homogenization. However, this behavior was not unexpected because the simulant materials were very resistant to dissolution. The acid digestion preparation was probably insufficient to completely dissolve the sample, and ^{137}Cs was associated with the insoluble materials.

B2.1.3.3 Subsegment-Level Analyses. The objectives of subsegment-level analyses are to provide 1) information as a function of depth pertaining to the overall waste energetics, 2) distribution of ^{137}Cs and ^{90}Sr, 3) the concentration and solubility of the CN^- present in the sample, and 4) a higher resolution for determining bulk tank composition for certain analytes. To accomplish these goals, the limited suite of analyses listed in Table B2-3 were performed on each homogenized subsegment. These analyses were conducted using the analytical procedures identified in Tables 15-1 and 15-2 of WHC-EP-0210, Rev. 3 (Hill et al. 1991) and as amended in Hill (1991). Brief descriptions of sample preparation and assay methods are shown.

Table B2-3. Subsegment-Level Analysis.[1]

Direct	Fusion Dissolution	Water Leach
TOC/TIC	ICP (Metals)	IC (Anions)
TGA	GEA (^{137}Cs)	CN^-
DSC	^{90}Sr	pH
Total CN^-		GEA
Wt% H_2O		

Notes:

IC = ion chromatography

[1]Bell (1993)

B2.1.3.4 Core Composite Level Analysis. One composite from each core was built and analyzed in accordance with the complete baseline case core composite scenario detailed in Section 6.1 of WHC-EP-0210 (Hill et al. 1991) and as amended by Hill (1991). The type and number of analytical tests performed were similar to the suite done on the subsegments but were much more extensive. The free liquid from the segments in core 34 was combined and analyzed as a separate liquid core composite. The free liquid from the segment in core 35 was also analyzed as a liquid core composite.

B2.1.3.5 Sample Preparation Methods. The characterization plan (Hill et al. 1991) required that anions, metals, and several radionuclides be determined. Metals were determined by three sample treatments: 1) water digestion, 2) acid digestion, and (3) potassium hydroxide fusion. Anions were prepared by water extraction. Radionuclides were determined after water digestion or fusion digestion.

Water digestion (or water leach) sample preparation subjected the sample matrix to digestion in distilled/deionized water; then the water was analyzed for soluble analytes. The soluble anions were determined by IC. The primary anions quantitated in this manner were fluoride, chloride, nitrate, nitrite, phosphate, and sulfate. In addition, free cyanide and pH were also measured in water digestion samples.

Selected radionuclides were measured on some water digestion samples to determine the type and number of water soluble radionuclides. Atomic absorption (AA) and ICP spectroscopy were also performed on some water digestion samples. These assays were performed to determine the amount of soluble metal cations (ICP) or arsenic, mercury, or selenium (AA). In most cases, these analytes were below the detection limits in the water digestion samples, suggesting that most analytes were not water soluble.

In the acid digestion preparation method, the sample was dissolved in a mixture of nitric and hydrochloric acids. This preparation solubilized most water-insoluble metals with a minimum amount of dilution and was usually best for detecting trace and some major metals. These properties were the reason that acid digestion was generally used as the sample preparation for the homogenization tests. The analyses performed on this preparation were ICP, GEA, and AA (the AA analysis used nitric acid only). The IC analysis was not performed with acid digestion sample preparation.

The analyses performed on fusion-prepared samples were ICP and GEA. Fusion dissolution analyses were performed by fusing the sample matrix with potassium hydroxide in a nickel crucible and dissolving the fused material in acid. This preparation dissolved the entire sample, where other sample preparation procedures may not have completely dissolved the sample matrix.

However, when compared to other sample preparation methods, there were three significant disadvantages of fusion preparation.

1. Large amounts of potassium hydroxide are required to bring a sample into solution. Because of the high dilution factor, trace elements are less likely to be correctly quantified if even detected.

2. The sample fusion introduces high blank values for a number of elements commonly found in the tank waste matrix, for example calcium, iron, nickel, potassium, and sodium.

3. Volatile radionuclides such as tritium and ^{14}C may be lost during the sample fusion.

Water digestion was the sample preparation specified in the test instructions for ^{14}C determinations. Considering the difficulty with dissolving the sample with a water leach and the volatility associated with a fusion preparation, the ^{14}C results may be biased low for both sample preparations. An adequate sample preparation method for ^{14}C is not available for this sample matrix; however, ^{14}C is not expected to be a significant contributor to the radionuclide content of the waste.

A zirconium crucible was recommended for use with the assays to eliminate any potential nickel bias, but the sample matrix reacted with the zirconium during the fusion procedure. Potassium results from the ICP fusion are not reported because potassium hydroxide was used to dissolve the sample, and the potassium results are not important to characterizing the waste. Some primary radionuclides measured using this sample preparation included neptunium, plutonium, strontium, cesium, and technetium. A total alpha and total beta count also were performed on the fusion dissolution samples.

Direct analyses were assays performed on the sample matrix with little or no sample preparation. The following direct analyses were performed relating to the energetic properties of the waste: TOC, TGA, DSC, cyanide, and gravimetric weight percent water.

B2.2 ANALYTICAL RESULTS

Table B2-4 summarizes segment and subsegment analyses. Sample analysis was performed at the Pacific Northwest Laboratory Analytical Chemistry Laboratory facility in the 300 Area of the Hanford Site. Bell (1993) contains the full data package.

Table B2-4. Tank 241-C-112 Sample Analysis Summary.[1] (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
2	Core 34	Core composite	---	Extractible organic halides, physical properties, mass spectrometry, beta
			92-06740	Percent solids, DSC
			92-06740-A1	ICP
			92-06740-B1	Mass spectrometry, alpha, ICP, GEA, LF, $^{59/63}Ni$
			92-06740-C	IC, CN

Table B2-4. Tank 241-C-112 Sample Analysis Summary.[1] (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
2 (Cont'd)	Core 34 (Cont'd)	Core composite (Cont'd)	92-06740-C1	TIC/TOC/TC, liquid scintillation, ammonia, alpha, beta, ICP, GEA, pH
			92-06747	$^{59/63}Ni$
			92-06747-A1	AA, ICP
			92-06747-B1	Alpha, beta, AA, GEA, LF
			92-06747-B6	Alpha, beta, GEA
			92-06747-C	CN
			92-06747-C1	Chromium VI, TIC/TOC/TC, liquid scintillation, ammonia, alpha, ICP, IC
			92-06747-D1	CVAA (Hg)
			92-06747-E1	SVOA
			S9206747C1	ICP
		Whole		Physical properties
			92-06733	Percent solids
			92-06733-A1	Beta, ICP, GEA
			92-06733-B	IC, CN
			92-06733-B1	GEA
			92-06733-C1	Persulfate oxidation (TOC), pH
		Subsegment C Top	92-06729-A	ICP, GEA
		Bottom	92-06730-A	ICP, GEA
		Subsegment D Top	92-06731-A	ICP, GEA
		Bottom	92-06732-A	ICP, GEA
		Subsegment B	92-06734	Persulfate oxidation (TOC), percent solids
			92-06734-A1	Beta, ICP, GEA
			92-06734-B	IC, CN
			92-06734-B1	GEA
			92-06734-C1	pH

Table B2-4. Tank 241-C-112 Sample Analysis Summary.[1] (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
2 (Cont'd)	Core 34 (Cont'd)	Subsegment C	92-06735	Percent solids
			92-06735-A1	Beta, ICP, GEA
			92-06735-B	IC, CN
			92-06735-B1	GEA
			92-06735-C1	Persulfate oxidation (TOC), pH
		Subsegment D	92-06736	Persulfate oxidation (TOC), percent solids
			92-06736-A1	Beta, ICP, GEA
			92-06736-B	IC, CN
			92-06736-B1	GEA
			92-06736-C1	pH
		Subsegment B	92-06741	DSC
		Subsegment C	92-06742	DSC
		Subsegment D	92-06743	DSC
7	Core 35	Core composite		Extractible organic halides, physical properties, ammonia, alpha
			92-06674-B1	GEA
			92-06674-C1	ICP
			92-06674-E3	SVOA
			92-06674-G1	Liquid scintillation
			92-06774	Physical properties
			92-06774-A1	AA, ICP
			92-06774-B1	Liquid scintillation, beta, $^{59/63}$Ni, LF
			92-06774-B6	AA
			92-06774-C	CN
			92-06774-C1	Chromium VI, TIC/TOC/TC, mass spectrometry, liquid scintillation, alpha, LF, IC
			92-06774-D1	CVAA (Hg)

Table B2-4. Tank 241-C-112 Sample Analysis Summary.[1] (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
7 (Cont'd)	Core 35 (Cont'd)	Whole		Physical properties, liquid scintillation, alpha
			92-08169-A1	Mass spectrometry, alpha, beta, ICP, GEA, LF, Ni
			92-08169-B	CN
			92-08169-B1	TIC/TOC/TC, liquid scintillation, ammonia, beta, ICP, GEA, pH, IC
			92-08169-C1	Persulfate oxidation (TOC)
			92-08169-D1	Percent solids
			92-08169-F1	ICP
			92-08169-J1	Liquid scintillation
			92-08170	TGA, DSC
		Upper sample	92-08167-A	ICP, GEA
		Lower sample	92-08168-A	ICP, GEA
8	Core 36	Core composite		pH, SVOA, LF, $^{59/63}$Ni
			92-0676	Alpha
			92-06767	Percent solids, TIC/TOC/TC, mass spectrometry, liquid scintillation, ammonia, alpha, beta, AA, TGA, DSC
			92-06767-A1	ICP
			92-06767-A1J	ICP
			92-06767-C	CN
			92-06767-C1J	ICP
			92-06767-D1	CVAA (Hg)
			92-06767-F1	Extractible organic halides
			92-06767-H1	ICP, GEA
			92-06767-J1	Persulfate oxidation (TOC), liquid scintillation

Table B2-4. Tank 241-C-112 Sample Analysis Summary.[1] (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
8 (Cont'd)	Core 36 (Cont'd)	Core composite (Cont'd)	92-06774	IC
			92-6750-A1	VOA
			92-6750-A5	VOA
			92-6767	Chromium VI
			BLANK	VOA
		Whole		Physical properties
		Subsegment D		Persulfate oxidation (TOC), percent solids, TGA
		Subsegment C	92-0671A-1	GEA
		Subsegment C Top	92-06757-A	GEA
			92-06757-AJ	ICP
		Bottom	92-06758-A	GEA
		Bottom	92-06758-AJ	ICP
		Subsegment D Top	92-06759-A	GEA
			92-06759-AJ	ICP
		Bottom	92-06760-A	GEA
		Bottom	92-06760-AJ	ICP
		Subsegment C	92-06761	Percent solids, TGA, DSC
			92-06761-A1	Beta, ICP
			92-06761-B	IC, CN
			92-06761-B1	GEA, pH
			92-06761-C1	Persulfate oxidation (TOC)
		Subsegment D	92-06762	Persulfate oxidation (TOC), percent solids, TGA, DSC
			92-06762-A1	Beta, ICP, GEA
			92-06762-B	IC, CN
			92-06762-B1	GEA, pH

Table B2-4. Tank 241-C-112 Sample Analysis Summary.[1] (6 sheets)

Riser	Sample Identification	Sample Portion	Sample Number	Analyses
8 (Cont'd)	Core 36 (Cont'd)	Subsegment A	92-06763	Percent solids, TGA, DSC
			92-06763-A1	Beta, ICP, GEA
			92-06763-B	CN
			92-06763-B1	GEA, pH, IC
			92-06763-C1	Persulfate oxidation (TOC)
		Subsegment B	92-06764	Percent solids, TGA, DSC
			92-06764-A1	Beta, GEA
			92-06764-A1J	ICP
			92-06764-B	CN
			92-06764-B1	GEA, pH, IC
			92-06764-C1	Persulfate oxidation (TOC)
		Subsegment C	92-06765	Percent solids, TGA, DSC
			92-06765-A1	Beta, GEA
			92-06765-A1J	ICP
			92-06765-B	CN
			92-06765-B1	GEA, pH, IC
			92-06765-C1	Persulfate oxidation (TOC)
		Subsegment D	92-06766	DSC
			92-06766-A1	ICP, GEA
			92-06766-B	CN
			92-06766-B1	GEA, pH, IC

Notes:

CVAA = cold vapor atomic absorption
LF = laser fluroimetry
SVOA = semivolatile organic analysis
TC = total carbon
VOA = volatile organic analysis

[1]Bell (1993)

All reported analyses were performed in accordance with approved laboratory procedures. Tables B2-5 and B2-6 list available procedure numbers and applicable analyses.

Table B2-5. Analytical Methods For Organic Analyses.

Analysis	Method	Procedure Number
Semivolatile organics	Extraction/gas chromatography/mass spectrometry	PNL-ALO-345
Volatile organics	Extraction/gas chromatography/mass spectrometry	PNL-ALO-335
Total organic halides	Extraction/total organic halide analyzer	PNL-ALO-320

Table B2-6. Analytical Methods for Chemical and Radionuclide Analyses.

Analyte	Method	Procedure Number
Hg	CVAA	PNL-ALO-213
As Se Sb	Graphite furnace atomic absorption	PNL-ALO-214 PNL-ALO-215 PNL-ALO-219
F^-, Cl^-, NO_3^-, NO_2^-,PO_4^{3-}, SO_4^{2-}, CN^-	IC	PNL-ALO-212
Free CN^-	IC	PNL-ALO-271
U	LF	PNL-ALO-445
NH_3	Ion-selective electrode	PNL-ALO-226
Total Alpha, ^{238}Pu, $^{239,240}Pu$, ^{241}Am, ^{237}Np, ^{242}Cm, $^{243/244}Cm$,	Alpha spectrometry	PNL-ALO-421
Total Beta	Proportional counting	PNL-ALO-431
Total Metals	ICP	PNL-ALO-211
^{90}Sr, ^{99}Tc	Beta counting following separation	PNL-ALO-431
^{79}Se, ^{3}H, ^{14}C	Liquid scintillation	PNL-ALO-474
$^{59/63}Ni$	Gamma analysis	PNL-ALO-473 PNL-ALO-464 PNL-ALO-474
pH	pH electrode	PNL-ALO-501
^{154}Eu, ^{155}Eu, ^{241}Am, ^{134}Cs, ^{137}Cs, ^{60}Co,^{125}Sb, ^{40}K	GEA	PNL-ALO-451
TOC, TIC, TC	Persulfate oxidation	PNL-ALO-381
Chromium (VI)	Colorimetry	PNL-ALO-227
Pu and U Isotopic	Fusion mass spectrometry	PNL-ALO-455
Exotherms	DSC	RDS-TA-1

B2.2.1 Overview

This section summarizes the sampling and analytical results associated with the March 1992 sampling and analysis events of tank 241-C-112. Table B2-7 lists the chemical, physical, rheological, and thermodynamic results. A discussion of the analytical procedures is followed by the data tables.

Table B2-7. Analytical Data Presentation Tables.

Analysis	Table Number
Metals by atomic absorption spectroscopy	B2-11 to B2-16
Mercury by cold vapor atomic absorption spectroscopy	B2-17
Metals by inductively coupled plasma spectroscopy	B2-18 to B2-97
Uranium by laser fluorimetry	B2-98
Hexavalent chromium by colorimetry	B2-99
Ammonia by ion-selective electrode	B2-100
Free cyanide by ion chromatography	B2-101
Anions by ion chromatography	B2-102 to B2-107
pH	B2-108
TC/TOC/TIC by hot persulfate oxidation	B2-109 to B2-111
Semivolatile organics	B2-112
Volatile organics	B2-113
Extractable organic halides	B2-114
Uranium and plutonium isotopic ratios by mass spectroscopy	B2-115 to B2-116
Radionuclides by alpha spectroscopy	B2-117 to B2-123
Radionuclides by beta proportional counting	B2-124 to B2-126
Radionuclides by gamma energy analysis	B2-127 to B2-134
Radionuclides by liquid scintillation counting	B2-135 to B2-137
$^{59/63}Ni$	B2-138 to B2-139
Differential scanning calorimetry	B2-140
Physical properties	B2-141 to B2-142
Thermogravimetric analysis	B2-143

A complete quality assurance validation was performed on the data. Many quality control (QC) and quality assurance parameters were investigated including standard recoveries, spike recoveries, duplicate analyses, and blanks. Bell (1993) provides complete data validation information.

For most analytes (except for organic analytes, DSC, TGA, and rheological measurements), the data tables consist of 6 columns. Column 1 shows the sample number. Column 2 delineates the core and/or segment from which the samples were derived. An entry of "34:2" means core 34, segment 2. Column 3 outlines the sample portion from which the aliquots were taken. For ICP analytes, no distinction was made between the duplicate analyses for some segments which were performed for homogenization tests. The final 3 columns show primary and duplicate analytical values and a mean for each sample/duplicate pair.

The data tables have been footnoted when the standard recoveries, spike recoveries, or duplicate analyses (RPDs) were outside the QC criteria. The QC criteria specified for sample analysis for ICP is as follows: 75 to 125 percent recovery for spikes, 80 to 120 percent recovery for standards, and ±20 percent for RPDs. For the remaining analytes, the QC criteria is 80 to 120 percent recovery for spikes and standards and ±20 percent for RPDs. Sample and duplicate pairs in which the QC parameters were outside these limits are footnoted in the sample mean column of the following data summary tables with an a, b, c, d, e, or g as follows:

- a indicates the standard recovery was below the QC limit.
- b indicates the standard recovery was above the QC limit.
- c indicates the spike recovery was below the QC limit.
- d indicates the spike recovery was above the QC limit.
- e indicates the RPD was above the QC limit.
- g indicates a tentatively identified compound for which the QC criteria for standard recovery, spike recovery, and RPD limits do not apply.

B2.3 INORGANIC ANALYSES

A full suite of metals were determined by ICP. Arsenic, antimony, and selenium were determined by AA spectroscopy, mercury was analyzed by CVAA spectroscopy, and uranium was measured by LF. Chromium (VI) was measured in the water digested samples using colorimetry.

B2.3.1 Graphite Furnace Atomic Absorption Spectroscopy

In addition to ICP, arsenic, antimony, and selenium were determined by graphite furnace atomic absorption spectroscopy according to procedures PNL-ALO-214, PNL-ALO-219, and PNL-ALO-215, respectively. Concentrations of these analytes were below the instrument detection limits.

B2.3.2 Cold Vapor Atomic Absorption Spectroscopy

Mercury concentration in the samples was measured using CVAA spectroscopy according to procedure PNL-ALO-213. Mercury analysis was performed on the solids composites and drainable liquid. Mercury concentrations ranged from 1.5 to 5 μg/g.

B2.3.3 Inductively Coupled Plasma

The following analytes were evaluated by ICP according to procedure PNL-ALO-211: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, cerium, chromium, cobalt, copper, dysprosium, iron, lanthanum, lead, lithium, magnesium, manganese, molybdenum, neodymium, nickel, potassium, phosphorus, rhenium, rhodium, ruthenium, silicon, silver, sodium, strontium, tellurium, thallium, thorium, titanium, uranium, vanadium, zinc, and zirconium. Samples were prepared by acid digestion, water digestion, or KOH fusion digestion.

Major metals, which were well quantified with fusion ICP analysis for tank 241-C-109, included aluminum, calcium, iron, lead, sodium, and uranium. Phosphorous and silicon were nonmetallic analytes detected by ICP. In the case of these elements, the value from the fusion sample preparation is the more accepted quantity. Aluminum, iron, phosphorus, and sodium were the most abundant metals in tank 241-C-112.

B2.3.4 Laser Fluorimetry

Uranium was determined by LF on fusion digestions of the solids and directly on the drainable liquids according to procedure PNL-ALO-445. Uranium concentrations ranged from 7,700 to 99,200 μg/g in the solids and from 900 to 1200 μg/g in the liquids.

B2.3.5 Chromium (VI) by Colorimetry

Hexavalent chromium was determined by colorimetry according to procedure PNL-ALO-227 after a water leach on the solids and on the drainable liquid. Concentrations ranged from 60 to 136 μg/g.

B2.3.6 Ammonia by Ion-Selective Electrode

Analysis of the tank 241-C-112 samples for ammonia was performed according to procedure PNL-ALO-226. The analysis was performed on drainable liquids and core homogenizations. Most ammonia concentrations were below the instrument detection limits although the core 34 drainable liquid had an ammonia concentration of 23 μg/g.

B2.3.7 Free Cyanide by Ion Chromatography

Free cyanide determinations were performed on water digestions of tank samples according to IC procedure PNL-ALO-271. The results ranged from 730 to 2,050 μg/g.

B2.3.8 Ion Chromatography

The following anions were determined by IC according to procedure PNL-ALO-212: chloride, fluoride, nitrate, nitrite, phosphate, and sulfate. Anions were determined on a water digestion of the solids samples and the drainable liquid. The most abundant anions in tank 241-C-112 waste were nitrite and nitrate. Sulfate, cyanide, phosphate, chloride, and fluoride were present to a lesser extent.

B2.3.9 pH

The pH measurement of tank 241-C-112 samples was performed according to procedure PNL-ALO-501 for liquid samples. The pH was measured on drainable liquids from cores 34 and 35. The results ranged from 8.77 to 10.47.

B2.4 CARBON ANALYSES

The required analytes for the 1992 samples included the following: TOC, TIC, TC, total extractable organic halides, and semivolatile organic constituents.

B2.4.1 Total Organic Carbon/Total Inorganic Carbon/Total Carbon

Total organic carbon, TIC, and TC were determined using the hot persulfate method PNL-ALO-381. A sample is dissolved in a sulfuric acid solution (90+ °C) to liberate inorganic carbon (carbonate). Potassium persulfate ($K_2S_2O_8$) is added, and organic carbon is converted to CO_2, which is measured coulometrically. Total carbon is the sum of the total organic and total inorganic carbon values. The total organic and inorganic carbon assays are not considered capable of reliably detecting carbon contained in cyanide compounds for these waste matrices.

The TOC results ranged from 2,200 to 8,600 μg/g for the solids and from 1,200 to 2,100 μg/g for the liquids. The TIC results ranged from 2,500 to 6,700 μg/g for the solids and from 4,600 to 8,850 μg/g for the liquids.

B2.4.2 Semivolatile and Volatile Organics

A U.S. Environmental Protection Agency Contract Laboratory Procedure type organic constituent analysis was performed on the core composites. No contract laboratory procedure target compounds or tentatively identified compounds were detected in levels above accepted quantitation limits (Bell 1993), and they were not expected to contribute significantly to the sample matrix.

Samples from tank 241-C-112 were analyzed for semivolatile and volatile organic content according to procedures PNL-ALO-345 and PNL-ALO-335, respectively. A large number of semivolatile organics were below instrument detection limits. A large number of volatile organic compounds were also below the detection limit. Detected semivolatile organics and volatile organics included tributyl phosphate and normal paraffin hydrocarbons.

B2.4.3 Total Extractable Organic Halides

Total extractable organic halides were determined according to procedure PNL-ALO-345. The mean result for the core 36 sample was 5.3 μg/g. The drainable liquid results ranged from 0.8 to 3.0 μg/mL.

B2.5 RADIONUCLIDE ANALYSES

A variety of analytical methods were used to analyze the radionuclide content of the tank waste. Gamma energy analysis was used to measure the activities of ^{241}Am, ^{134}Cs, ^{137}Cs, ^{60}Co, ^{154}Eu, ^{40}K, ^{125}Sb, and ^{155}Eu. The liquid scintillation counting procedure was used to determine ^{79}Se, ^{14}C, and ^{3}H. Americium-241, ^{238}Pu, $^{239/240}$Pu, ^{237}Np and $^{242/243/244}$Cm were measured by alpha spectroscopy. Chemical separation and beta counting were used to measure ^{90}Sr and ^{99}Tc. Mass spectroscopy was used to determine the uranium and plutonium isotopic mass ratios.

B2.5.1 Gamma Energy Analysis

The GEA were performed according to procedure PNL-ALO-451 to determine the activities of ^{241}Am, ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{60}Co, ^{154}Eu, ^{155}Eu, and ^{40}K. The GEA were performed on fusion, water, or acid digestions of the original samples.

B2.5.2 Liquid Scintillation Counting

Selenium-79, ^{3}H, and ^{14}C determinations were performed by means of liquid scintillation counting according to procedures PNL-ALO-442, PNL-ALO-443, and PNL-ALO-444, respectively. The analyses were performed on the water and/or fusion digestates of the solids. Selenium-79 activities were about 3.7E-04 μCi/g for the solids and about 1E-04 μCi/g for the drainable liquid. Most of the tritium determinations exhibited blank contamination. The ^{14}C activities were approximately 0.005 μCi/g for the solids and ranged from 0.0013 to 0.0042 μCi/mL for the drainable liquid.

B2.5.3 Total Alpha and Alpha Emitters

Total alpha ^{241}Am, ^{238}Pu, $^{239/240}Pu$ ^{237}Np, ^{242}Cm, and $^{243/244}Cm$ activities were measured on the solids and liquids using alpha spectroscopy. The analyses were performed according to procedure PNL-ALO-421. Total alpha activities ranged from 0.946 to 1.18 μCi/g for the solids and from 8.20E-04 to 0.00361 μCi/g for the liquids. The ^{241}Am results ranged from 0.0612 to 0.763 μCi/g for the solids with a value of 6E-06 μCi/g for the liquid. The ^{238}Pu results were 0.0137 μCi/g for the solids and 5.5E-05 μCi/g for the liquid. The ^{237}Np results ranged from 6.62E-04 to 0.00120 μCi/g for the solids; ^{237}Np was not detected in the liquid. The ^{242}Cm result was 2E-04 μCi/g for the solids; no results were reported for the liquid. The $^{243/244}Cm$ solids result suffered from blank contamination.

B2.5.4 Total Beta Activity

Total beta activity was measured using beta proportional counting according to procedure PNL-ALO-431. Measurements were performed on water and fusion digestions of the original samples. Strontium-90 and ^{99}Tc were determined after chemical separation from the digestates. Total beta activity ranged from 1,710 to 7,070 μCi/g for the solids and from 0.478 to 0.739 μCi/g for the drainable liquid. Strontium-90 activities ranged from 15.0 to 4,860 μCi/g for the solids and 0.230 to 0.354 μCi/g for the drainable liquid. Technetium-99 activities ranged from 0.097 to 0.139 μCi/g for the solids and 0.0837 to 0.173 μCi/g for the drainable liquid.

B2.5.5 Mass Spectroscopy

Uranium and plutonium isotopic mass ratios were determined using mass spectroscopy (according to PNL-ALO-455) on the fused sample. Greater than 94 mass percent of the plutonium was ^{239}Pu and greater than 99 mass percent of the uranium was ^{238}U.

B2.6 RHEOLOGICAL AND PHYSICAL MEASUREMENTS

Only one 25-mL aliquot (from the second segment of core 36) was used for rheological and physical measurements. Viscosity, settling properties, fluid behavior, and shear strength were among the primary characteristics investigated. The sample tested for these properties was not homogenized before analysis.

B2.6.1 Shear Strength

The shear strength of tank 241-C-112 core 36 was measured on a combined, unhomogenized sample obtained from both core segments. The shear strength measurements were made at the ambient temperature using a shear vane connected to a viscometer and rotated at 0.3 revolutions per minute. Shear strength (τ_s) is a semiquantitative measurement of the force required to move the sample. Because shear strength is dependent on sample handling, the measurement was taken without any sample homogenization. The rheology sample was generated by taking small aliquots from the bottom segment of core 36 at various positions. Shear strength for the sample was found to be 16,000 dyne per square centimeter. The RPD between initial and duplicate measurements of the sample was less than one percent.

B2.6.2 Viscosity as a Function of Shear Rate

Viscosity measurements (as a function of shear rate) were performed on the composite sample and a 1:1 sample:water dilution of the sample at the ambient hot cell temperatures 29 to 32 °C (84 to 90 °F) and at 95 °C (203 °F). At 95 °C, the undiluted core composite sample dried too quickly to obtain an accurate viscosity measurement; therefore, no data are provided for the undiluted sample at that temperature.

Viscosity of the undiluted sample at low shear ranged from 160,000 to 220,000 centipoise. The 1:1 dilution of the composite sample exhibited yield-pseudoplastic behavior. Plots of the measurements are available in the validated data packages (Bell 1993). Viscosities as a function of shear rate for the 1:1 dilutions ranged from 400 centipoise (at low shear rates) to 50 centipoise (at high shear rates). The data from the rheograms for the 1:1 dilution were fit to a nonlinear yield power-law model. Sample and duplicate measurements were run at ambient temperatures and 95 °C.

$$S_\tau = \alpha + \beta\gamma^n$$

where

S_τ = shear stress

α = yield stress (not a fit parameter)

β = consistency factor

γ = shear rate (0 to 468 s^{-1})

n = flow behavior index. The flow behavior index indicates the degree of deviation from Newtonian behavior. For values less than 1, the behavior is considered pseudoplastic (Bird et al. 1960).

Table B2-8 shows the power law model parameters for the 1:1 sample dilutions at 29 and 95 °C.

Table B2-8. Power-Law Model Parameters for Tank 241-C-112 Material.

Sample	Temperature (°C)	Trial	α, Yield Stress (Pa)	β, Consistency Factor (Pa•s)	n, Flow Behavior Index
1:1 Dilution	29	S	6.8	0.279	0.576
1:1 Dilution	29	D	5.8	0.302	0.534
1:1 Dilution	95	S	3.6	0.079	0.68
1:1 Dilution	95	D	4	0.097	0.648

Notes:

S = sample
D = duplicate

Further measurements of the shear stress as a function of shear rate were made on the 1:3 sample: water dilution samples at the ambient temperature and at 95 °C (203 °F). The ambient samples were run in duplicate. Because of sample drying, only a single measurement could be performed at 95 °C (203 °F). All 1:3 diluted samples had viscosities near the detection limit of the apparatus (2 centipoise). The diluted samples also exhibit yield-pseudoplastic behavior, but, at viscosities near the detection limit, accurate modeling of the flow properties with this data becomes difficult. The viscosity of the sample was observed to decrease significantly as the temperature increased.

B2.6.3 Slurry Flow Properties

Characteristics necessary for turbulent flow were calculated for the 1:1 dilution slurry using the parameters determined from measurement and a curve-fitted rheological model (see Table B2-9). Turbulent flow is necessary to keep particles in suspension and prevent the accumulation of the waste in a retrieval and/or pretreatment process.

Table B2-9. Turbulent Flow Model Calculations.

Sample	Temp. (°C)	Trial	Pipe Dia. (in.)	Velocity (m/s)	Critical Flow Rate (L/min)	Reynolds Number
1:1 Dilution	29	S	2	1.9	246	4,425
1:1 Dilution	29	D	2	1.7	220	4,470
1:1 Dilution	29	S	3	1.7	496	4,920
1:1 Dilution	29	D	3	1.6	447	4,908
1:1 Dilution	95	S	2	1.3	163	5,190
1:1 Dilution	95	D	2	1.3	170	5,214
1:1 Dilution	95	S	3	1.2	329	6,002
1:1 Dilution	95	D	3	1.2	344	5,997

Notes:

D = duplicate
Dia. = diameter
L/min = meters per liter
m/s = meters per second
S = sample
Temp. = temperature

B2.6.4 Particle Size Measurement

Particle size analysis was performed by placing a small amount of sample in a dispersant (which is the liquid used to disperse and suspend the particles from the solid sample). The prepared sample was placed in a particle size analyzer, which measures particle size by passing a thin beam of laser light through the dispersant.

The mean particle size in the number distribution ranged from 0.83 microns to 0.95 microns in diameter for the tank core samples. Table B2-10 shows the summary results of the measurements. Figures B2-2 and B2-3 show the plots of the distributions. The first figure is the probability number density. The number density figure is plotted over the acquisition range of the device (from 0.5 to 150 microns).

The numbers of particles in each size range (shown as a percent of the whole) are graphed against their respective size ranges to form a distribution curve. Figure B2-2 shows that the most common occurrences (modes) for particle size range between 0.5 and 1.0 microns. Over 90 percent of the measured particles fit within the narrow band of 0.4 to 1.5 microns, and over 97 percent of the particles have a diameter less than 2 microns.

Table B2-10. Particle Size Distribution by Number: 97 Percent $<2\mu m$ (Both Cores).

Sample	Mean (μm)	Median (μm)
Core 34, Subsegment 2D, Initial	0.83	0.76
Core 34, Subsegment 2D, Duplicate	0.94	0.83
Core 36, 92-005 (random sample)	0.95	0.84

Figure B2-2. Core 34, Particle Size Number Density.

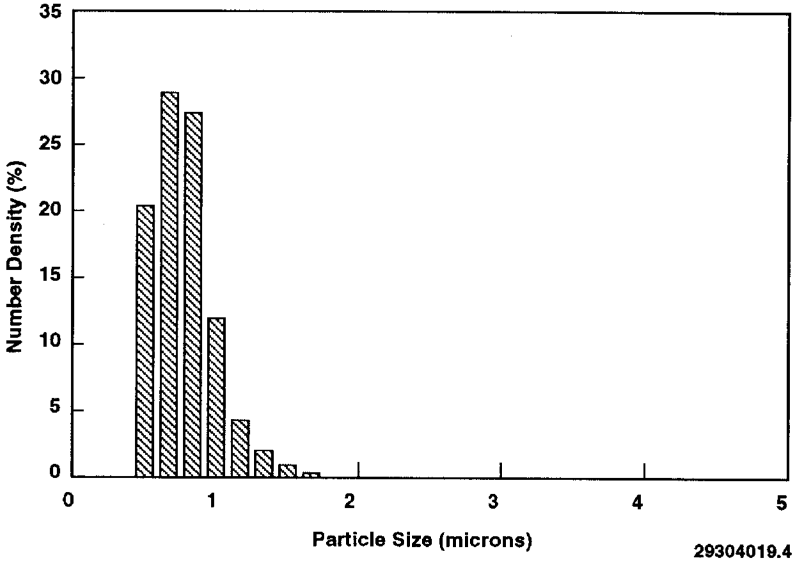
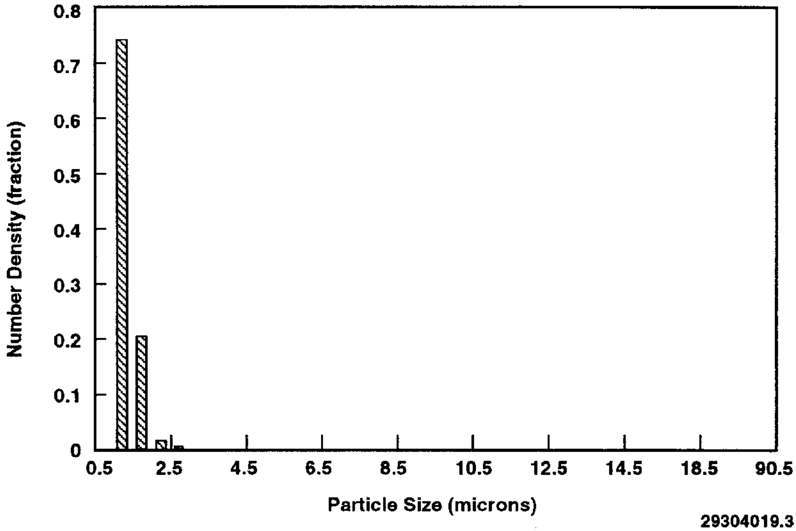


Figure B2-3. Core 36, Particle Size Number Density.



The particle size in the volume distribution ranged from 0.4 microns to 80 microns in diameter between the two cores. Table B2-11 shows the summary results of the measurements. Under the assumption that the density of the solid material within the tank is constant, the volume distribution is the best estimation of the mass particle size distribution of the tank. The analyzer calculates particle volume as the cube of the diameter. Figure B2-4 shows these distributions.

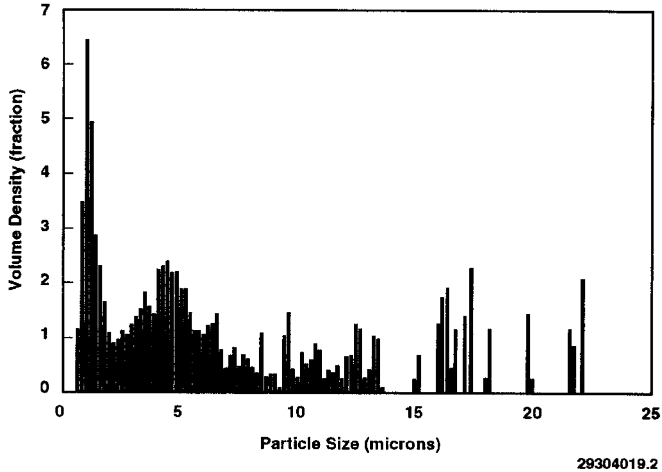
As with the number distribution, the volume distribution is represented by a probability volume density graph. The average particle size in the volume distribution is considerably larger than that of the number distribution. In core 34, most particles are within the 2.0 to 20 micron range. In core 36, most particles are much larger, with particle volumes widely dispersed in the 20 to 80 micron range.

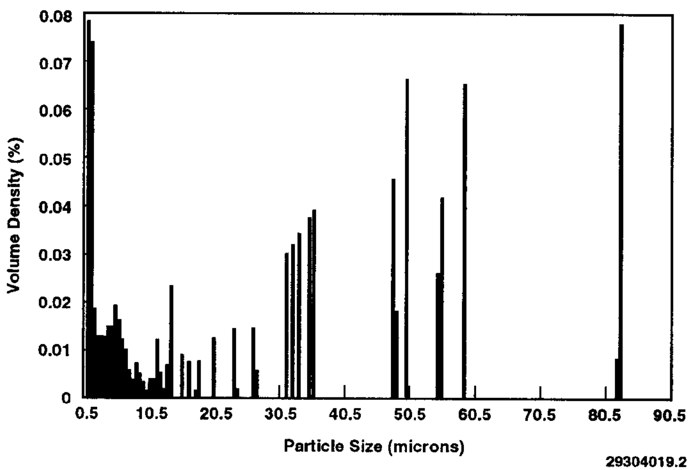
The disparity between the two core sample measurements may indicate a difference in waste type. In core 34-2D, more than 50 percent of the particles in the sample have a diameter of less than six microns, with close agreement from the duplicate measurement. In the core 36 sample, more than 50 percent of the particles have a diameter less than 33 microns. In the retrieval and subsequent treatment of the tank wastes, it may be desirable to design pumping or filtration systems for the tank particulate. Therefore, the volume distribution of the particles should not be neglected (that is, particles with diameters over 33 microns should be considered in these designs).

Table B2-11. Particle Size Distribution by Volume: 100 Percent <30μm (34-2D), 100 Percent <85μm (36).

Sample	Mean (μm)	Median (μm)
Core 34, Subsegment 2D, Initial	8.68	6.05
Core 34, Subsegment 2D, Duplicate	9.60	6.32
Core 36, 92-005 (random sample)	33.77	33.26

Figure B2-4. Single-Shell Tank Core 34 (top) and Core 36 (bottom), Particle Size Volume Density.





B2.6.5 Settling Behavior of Diluted Samples

This section analyzes the settling behavior for the 1:1 and 3:1 water/sample dilutions and viscosity as a function of shear rate on the 3:1 dilution. All results for the as-received material and the viscosity for the 1:1 dilution have been previously reported (Bell 1993). The physical properties reported here include settling rates and volume percent settled solids and weight percent and volume percent centrifuged solids for the 3:1 dilution and settling rates and volume percent settled solids for the 1:1 dilution. The experimental procedures used to perform these measurements were reported previously (Bell 1993).

Table B2-12 summarizes the physical properties of the 1:1 and 3:1 dilutions.

Table B2-12. Physical Properties Summary.[1]

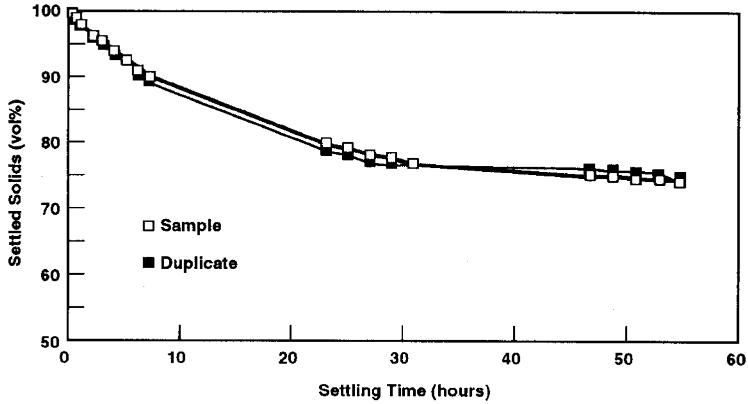
Property	Segment	
	1:1 Dilution	3:1 Dilution
Settled solids (volume percent)	74.4	72.4
Centrifuged solids		
Volume percent	No measurement	21.1
Weight percent	No measurement	27.0
Density (g/mL)		
Sample	No measurement	1.11
Centrifuged supernatant	No measurement	1.01
Centrifuged solid	No measurement	1.39

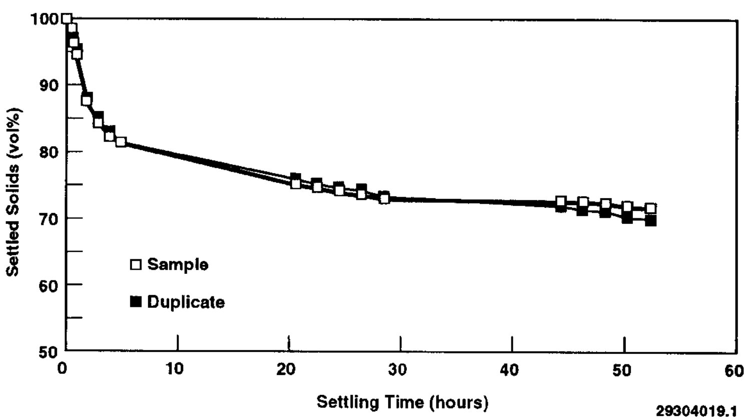
Note:
[1]Bell (1993)

No settling was observed in the as-received segment samples over a period of 3 days. Two dilutions (1:1 and 3:1 water to sample) were prepared, and the volume percent settled solids for each dilution was plotted as a function of settling time (see Figure B2-5).

The 1:1 dilution reached a final volume percent settled solids of 74.4 percent. Settling was observed throughout the 3-day period, but the majority of the settling was observed in the first 30 hours. The 3:1 dilution reaches a final volume percent settled solids of 72.4 percent. The majority of solids settling is complete within 24 hours. Figure B2-5 shows the setting behavior over time.

Figure B2-5. Settling Rate Data for Tank 241-C-112 Core 36, 1:1 Dilution (Top) and 3:1 Dilution (Bottom).





B2.7 THERMODYNAMIC ANALYSES

The following subsections discuss the thermodynamic analyses performed on tank 241-C-112 waste. The analyses include DSC and TGA.

B2.7.1 Differential Scanning Calorimetry

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

The DSC analyses for tank 241-C-112 were performed using procedure RDS-TA-1. For core 34, small exotherms were observed in the second and third transitions. The second transition occurred over the temperature range 265 to 300 °C (509 to 572 °F) with an onset temperature of 275 °C (572 °F). The energy released was 10.8 J/g for the composite sample and 13.1 to 16.9 J/g for the various subsegments. The results are on a wet basis. The safety screening DQO (Dukelow et al. 1995) limit for the energetics is 480 J/g on a dry weight basis. Converting the above results to a dry weight basis gives energy releases of 16.5 J/g for the core composite and 23.8 to 25.4 J/g for the subsegments. The third transition, which occurred between 300 and 425 °C (572 and 797 °F), released 75 J/g from the core composite sample (on a wet basis). The subsegments released between 35 and 47 J/g on a wet basis. Converting to a dry weight, the results are 114.7 J/g for the core composite and between 63.6 and 131.8 J/g for the subsegments. All values are well below the safety screening DQO threshold.

For core 35, several transitions were observed in the DSC scans. However, the only identifiable exotherm occurred in the temperature range 290 to 350 °C (554 to 662 °F) with an average release of approximately 45 J/g (on a wet basis). This is equivalent to a release of about 74 J/g on a dry weight basis, which is below the safety screening DQO limit.

For core 36, an exothermic transition was observed over the temperature range 260 to 330 °C (500 to 626 °F) with an average onset temperature of about 280 °C (536 °F). For the core composite, the average energy released on a wet basis was 18.9 J/g. For the subsegments, the energy release varied between 6.9 and 15.6 J/g (on a wet basis). The average results on a dry weight basis were 33.8 J/g for the core composite and 13 to 32.3 J/g for individual subsegments. These results are below the safety screening DQO limit. Tables B2-126 through B2-128 show the DSC results.

B2.7.2 Thermogravimetric Analyses

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

For core 34, the first weight loss transition occurred from about 47 to 103 °C (117 to 217 °F). The TGA results varied between 33.4 and 52.2 weight percent loss for the subsegments and 34.6 weight percent loss for the core composite. The weight percent change was less than expected based on gravimetry measurements, which ranged from 52.3 to 57.9 for the subsegments and was 34.15 for the core composite. This was probably caused by the drying of the TGA sample before the analysis (Bell 1993).

For the core 35 TGA analysis, the first weight loss transition ranged from the ambient temperature to 130 °C (266 °F). The weight percent changes measured by TGA were about 40 percent. The TGA results are about 17 percent greater than those measured by gravimetry. The TGA analyses were performed approximately six weeks before the gravimetric analyses. The difference in weight percent change may be caused by the drying of the sample in the hot-cell before the gravimetric analysis and/or the higher temperatures achieved in the TGA experiment (Bell 1993).

The first TGA weight percent loss transition in core 36 was observed over the temperature range from the ambient temperature to 170 °C (338 °F). The TGA results averaged about 44 percent for the core composite and between 38 and 52 percent for the subsegments. These results are about five percent less than those measured by gravimetry. The difference is probably caused by the drying of the sample before TGA analysis. A larger difference was observed between the gravimetric measurement and TGA results for segment 2C (approximately 35 percent). Significant drying of the TGA sample may have occurred before the analysis (Bell 1993).

B2.8 TANK HEADSPACE VAPOR SAMPLING EVENTS

One historical sampling of the headspace vapor of tank 241-C-112 occurred in March 1992; Pingel et al. (1992) present the sampling methodology and results for this sampling.

The headspace vapor of tank 241-C-112 was sampled in June and August 1994. The June event was driven by the *Safety Assessment for Gas Sampling All Ferrocyanide Tanks* (Farley 1991) and was performed using the in situ sampling (ISS) system. The August event was in response to the safety screening DQO (Dukelow et al. 1995) and the vapor DQO (Osborne et al. 1994) and was performed using the vapor sampling system (VSS). The August event was performed to cover tank headspace flammability and industrial hygiene (toxicity) issues. Huckaby and Bratzel (1995) provide the results of both sampling events. Huckaby and Babad (1995) provide a general description of the vapor sampling and analysis methods used in these two events.

No headspace vapor constituents exceeded the flammability or industrial hygiene notification limits specified in the *Vapor Sampling and Analysis Plan* (Homi 1995).

B2.8.1 June 1994 Tank Headspace Vapor Samples

On June 24, 1994, the Westinghouse Hanford Company Sampling and Mobile Laboratories sampled the headspace vapor of tank 241-C-112 using the ISS system. Huckaby and Babad (1995) provide a general description of the ISS equipment. Pingel (1995) provides field sampling information for this event, and Caprio (1995) provides revised sample volume measurements.

Huckaby and Babad (1995) indicate that the ISS vapor flow measurements were less accurate than those obtained with the VSS; therefore, the results from the associated sorbent trap samples are considered less accurate than those from the VSS sampling in August. Therefore, only the results from the August event are provided in this discussion. However, the hydrogen cyanide result from the June sampling and analysis event is included because hydrogen cyanide was not determined during the August event (Huckaby and Babad 1995). McVeety et al. (1995) provide the sample preparation and analysis results for selected organic and inorganic constituents found in the June samples.

B2.8.2 August 1994 Tank Headspace Vapor Samples

B2.8.2.1 Description of Sampling Event. In August 1994, the Westinghouse Hanford Company Sampling and Mobile Laboratories sampled the headspace vapor of tank 241-C-112 using the VSS. Tank vapor headspace samples were pulled through a 7.9-m (18-ft) long heated sampling probe mounted in riser 4 of the tank. The probe was in turn connected by heated transfer tubing to the VSS sampling manifold.

B2.8.2.2 Sample Handling. Sampling devices and media included sorbent trains for inorganic analytes and SUMMA™ for organic analytes. The Pacific Northwest Laboratory, the Oak Ridge National Laboratory, and the Oregon Graduate Institute of Science and Technology prepared the sampling devices and media and performed the subsequent analyses on the collected samples. Details of the sampling event and sample handling are given in Caprio (1995).

B2.8.2.3 Sample Analysis and Analytical Results. Designated holding times of less than 60 days before analysis were met. Sample analysis is covered in depth in Huckaby and Bratzel (1995). It was determined that no headspace constituents exceeded the flammability or industrial hygiene notification limits specified in the *Vapor sampling and Analysis Plan* of Homi (1995) and Huckaby and Bratzel (1995). Table B2-13 summarizes the results. For the complete list of tentatively and positively identified organic compounds, refer to Huckaby and Bratzel (1995).

Table B2-13. Summary Results of Vapor Samples Collected from the Headspace of Tank 241-C-112 on August 1994.[1]

Category	Analyte	Vapor Concentration	Units
Inorganic	Hydrogen	204	ppm (volumetric)
	NH_3	22.7	ppm (volumetric)
	CO	0.92	ppm (volumetric)
	CO_2	102	ppm (volumetric)
	NO	0.62	ppm (volumetric)
	NO_2	<0.02	ppm (volumetric)
	N_2O	544	ppm (volumetric)
	H_2O	22.3	mg/L
	HCN[2]	<0.01	ppm (volumetric)
Organic[3]	Ethanenitrile (acetonitrile)	3.0	ppm (volumetric)
	Propanone (acetone)	0.078	ppm (volumetric)
	1-Butanol	0.0044	ppm (volumetric)
	n-Dodecane	0.00043	ppm (volumetric)
	n-Tridecane	0.0006	ppm (volumetric)
	Total nonmethane organic compounds by EPA TO-12 method	3.4	mg/m^3
Flammability	Overall headspace gas flammability	No overall result given in Huckaby and Bratzel (1995). Document does state that concentrations of all target flammable gases were below vapor DQO limit (20% of LFL).	

Notes:

[1]Huckaby and Bratzel (1995)

[2]The hydrogen cyanide result is from the June 1994 sampling campaign.

[3]The result is for the highest concentration found; a complete list is in Huckaby and Bratzel (1995).

B2.9 ANALYTICAL DATA TABLES

This section includes analytical results for tank 241-C-112.

Table B2-14. Tank 241-C-112 Analytical Results: Arsenic (AA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06767-B1	Core 36	Solid composite	<0.9	<0.9	<0.9[QC:c]
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-B1	Core 34	Liquid composite	<0.5	<0.5	<0.5
92-06774-B6	Core 35	Liquid composite	<0.5	<0.6	<0.6[QC:a,c]

Table B2-15. Tank 241-C-112 Analytical Results: Antimony (AA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06767-A1	Core 36	Solid composite	<3.6	<3.6	<3.6
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<1.0	<1.0	<1.0
92-06774-A1	Core 35	Liquid composite	<0.3	<0.3	<0.3

Table B2-16. Tank 241-C-112 Analytical Results: Selenium (AA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06767-B1	Core 36	Solid composite	<13	<13	<13[QC:c]
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-B1	Core 34	Liquid composite	<0.4	<0.3	<0.4[QC:c]
92-06774-B6	Core 35	Liquid composite	<0.5	<0.7	<0.6[QC:c]

Table B2-17. Tank 241-C-112 Analytical Results: Mercury (CVAA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**µg/g**	**µg/g**	**µg/g**
92-06767-D1	Core 36	Solid composite	5	3.8	4.4[QC:e]
Drainable Liquid			**µg/g**	**µg/g**	**µg/g**
92-06747-D1	Core 34	Liquid composite	3.60	3.45	3.53
92-06774-D1	Core 35	Liquid composite	1.3	1.4	1.4

Table B2-18. Tank 241-C-112 Analytical Results: Aluminum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	11,920	12,234.1	12,077
92-06730-A		Subsegment C Lower half	11,418.4	10,535.5	10,977
92-06731-A		Subsegment D Upper half	34,578.4	22,443.7	28,511.1[QC:e]
92-06732-A		Subsegment D Lower half	27,790.5	23,400.1	25,595.3
92-08167-A	35: 2	Upper half	35,097.2	35,750.5	35,423.8
92-08168-A		Lower half	30,843.2	31,431.3	31,137.2
92-08169-F1		Whole	37,836.1	51,344.5	44,590.3[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	10,519.9	10,423.3	10,471.6
92-06758-A		Subsegment C Lower half	11,612.6	10,400.8	11,006.7
92-06759-A	36: 2	Subsegment D Upper half	2,781.6	2,825.9	2,803.75
92-06760-A		Subsegment D Lower half	3,307	3,666.9	3,486.95
92-06740-A1	Core 34	Solid composite	24,173.3	22,378.4	23,275.8
92-06767-A1	Core 36	Solid composite	5,384.5	5,667	5,525.75[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	19,074.2	16,222.2	17,648.2
92-06734-A1	34: 2	Subsegment B	32,483.9	32,241.4	32,362.7
92-06735-A1		Subsegment C	14,143.1	20,495	17,319[QC:e]
92-06736-A1		Subsegment D	26,417.7	27,318.2	26,868
92-08169-A1	35: 2	Whole	45,790.5	44,288.8	45,039.7
92-06761-A1	36: 1	Subsegment C	13,562.5	49,776.2	31,669.3[QC:e]
92-06762-A1		Subsegment D	4,013	3,898	3,955.5

Table B2-18. Tank 241-C-112 Analytical Results: Aluminum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	2,998.9	2,857.4	2,928.15
92-06764-A1		Subsegment B	3,040.4	3,087.6	3,064
92-06765-A1		Subsegment C	2,110.6	2,039.3	2,074.95
92-06766-A1		Subsegment D	2,944.2	3,023.4	2,983.8
92-06740-B1	Core 34	Solid composite	29,798.4	n/a	29,798.4
92-06767-H1	Core 36	Solid composite	6,356.2	6,464	6,410.1
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	333.1	327.5	330.3
92-06740-C1	Core 34	Solid composite	315.4	n/a	315.4
92-06767-C1	Core 36	Solid composite	988.6	639.6	814.1[QC:e]

Table B2-19. Tank 241-C-112 Analytical Results: Antimony (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	25.2	20.5	22.85[QC:e]
92-06730-A		Subsegment C Lower half	20.2	15.5	17.85[QC:e]
92-06731-A		Subsegment D Upper half	43.8	45.2	44.5
92-06732-A		Subsegment D Lower half	53.7	48.1	50.9
92-08167-A	35: 2	Upper half	206.6	200.2	203.4
92-08168-A		Lower half	180	186.4	183.2
92-08169-F1		Whole	200.7	150.8	175.75[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	26.5	22	24.25
92-06758-A		Subsegment C Lower half	28.2	21.6	24.9[QC:e]
92-06759-A	36: 2	Subsegment D Upper half	136.9	137.3	137.1
92-06760-A		Subsegment D Lower half	132.9	158.1	145.5
92-06740-A1	Core 34	Solid composite	34.1	39.5	36.8
92-06767-A1	Core 36	Solid composite	193.9	171.8	182.85
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<248.9	<252.1	<250.5
92-06734-A1	34: 2	Subsegment B	<196	<278.5	<237.25[QC:e]
92-06735-A1		Subsegment C	<276.3	<219.8	<248.05[QC:e]
92-06736-A1		Subsegment D	<233.8	<237.7	<235.75

Table B2-19. Tank 241-C-112 Analytical Results: Antimony (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-08169-A1	35: 2	Whole	<261.1	<262.4	<261.75
92-06761-A1	36: 1	Subsegment C	<236.3	<199.3	<217.8
92-06762-A1		Subsegment D	<198	<221.8	<209.9
92-06763-A1	36: 2	Subsegment A	<209.6	<219.9	<214.8
92-06764-A1		Subsegment B	405.9	424.5	415.2
92-06765-A1		Subsegment C	288.9	282.2	285.55
92-06766-A1		Subsegment D	153.2	156.5	154.85
92-06740-B1	Core 34	Solid composite	<148.2	n/a	<148.2
92-06767-H1	Core 36	Solid composite	247.5	222.6	235.05
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<9.315	<9.638	<9.4765
92-06740-C1	Core 34	Solid composite	<15.76	n/a	<15.76
92-06767-C1	Core 36	Solid composite	19.9	<9.429	<14.6645[QC:e]

Table B2-20. Tank 241-C-112 Analytical Results: Arsenic (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	30.4	32.5	31.45
92-06730-A		Subsegment C Lower half	32.7	28.4	30.55
92-06731-A		Subsegment D Upper half	24.4	32.7	28.55[QC:e]
92-06732-A		Subsegment D Lower half	33	46.6	39.8[QC:e]
92-08167-A	35: 2	Upper half	46.4	35.9	41.15[QC:e]
92-08168-A		Lower half	44.3	44.7	44.5
92-08169-F1		Whole	73.1	51.3	62.2[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	36.7	73.2	54.95[QC:e]
92-06758-A		Subsegment C Lower half	67.6	66.5	67.05
92-06759-A	36: 2	Subsegment D Upper half	82.7	96.5	89.6
92-06760-A		Subsegment D Lower half	713.3	765.1	739.2
92-06740-A1	Core 34	Solid composite	57.2	66.7	61.95
92-06767-A1	Core 36	Solid composite	121.7	114	117.85
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<531.2	<538.1	<534.65
92-06734-A1	34: 2	Subsegment B	<418.4	<594.6	<506.5[QC:e]
92-06735-A1		Subsegment C	<589.9	<469.3	<529.6[QC:e]
92-06736-A1		Subsegment D	<499.1	<507.5	<503.3

Table B2-20. Tank 241-C-112 Analytical Results: Arsenic (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**μg/g**	**μg/g**	**μg/g**
92-08169-A1	35: 2	Whole	<557.4	<560.1	<558.75
92-06761-A1	36: 1	Subsegment C	<504.5	<425.5	<465
92-06762-A1		Subsegment D	<422.6	<473.4	<448
92-06763-A1	36: 2	Subsegment A	<447.4	<469.4	<458.4
92-06764-A1		Subsegment B	<240.7	<205.3	<223
92-06765-A1		Subsegment C	<190.8	<205.8	<198.3
92-06766-A1		Subsegment D	<211.4	<193.9	<202.65
92-06740-B1	Core 34	Solid composite	<316.4	n/a	<316.4
92-06767-H1	Core 36	Solid composite	<228	<224.4	<226.2
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
92-08169-B1	35: 2	Whole	<19.88	<20.57	<20.225
92-06740-C1	Core 34	Solid composite	<33.64	n/a	<33.64
92-06767-C1	Core 36	Solid composite	<19.75	<20.13	<19.94

Table B2-21. Tank 241-C-112 Analytical Results: Barium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-06729-A	34: 2	Subsegment C Upper half	37	33.7	35.35
92-06730-A		Subsegment C Lower half	33.3	32.4	32.85
92-06731-A		Subsegment D Upper half	48.8	49	48.9
92-06732-A		Subsegment D Lower half	50	52.6	51.3
92-08167-A	35: 2	Upper half	98.7	95	96.85
92-08168-A		Lower half	87.4	93.2	90.3
92-08169-F1		Whole	102	92.1	97.05
92-06757-A	36: 1	Subsegment C Upper half	55.1	57.4	56.25
92-06758-A		Subsegment C Lower half	58	53.7	55.85
92-06759-A	36: 2	Subsegment D Upper half	33.9	34.1	34
92-06760-A		Subsegment D Lower half	<1.616	<1.642	<1.629
92-06740-A1	Core 34	Solid composite	58.1	50.5	54.3
92-06767-A1	Core 36	Solid composite	43.1	42.7	42.9
Solids: fusion			μg/g	μg/g	μg/g
92-06733-A1	34: 1	Whole	82.7	79.9	81.3[QC:f]
92-06734-A1	34: 2	Subsegment B	103	136.7	119.85[QC:e,f]
92-06735-A1		Subsegment C	99.1	90	94.55[QC:f]
92-06736-A1		Subsegment D	114.2	111.9	113.05[QC:f]
92-08169-A1	35: 2	Whole	136.4	135.9	136.15
92-06761-A1	36: 1	Subsegment C	115.8	134.3	125.05[QC:f]
92-06762-A1		Subsegment D	70.5	70.8	70.65

Table B2-21. Tank 241-C-112 Analytical Results: Barium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	72.5	74.6	73.55[QC:f]
92-06764-A1		Subsegment B	251.3	26	138.65[QC:e]
92-06765-A1		Subsegment C	32.9	31.6	32.25
92-06766-A1		Subsegment D	39.4	37	38.2
92-06740-B1	Core 34	Solid composite	96.8	n/a	96.8[QC:f]
92-06767-H1	Core 36	Solid composite	77.3	76.5	76.9[QC:f]
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<1.569	<1.623	<1.596
92-06740-C1	Core 34	Solid composite	<2.654	n/a	<2.654
92-06767-C1	Core 36	Solid composite	<1.558	<1.588	<1.573

Table B2-22. Tank 241-C-112 Analytical Results: Beryllium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	<0.897	0.6	<0.7485[QC:e]
92-06730-A		Subsegment C Lower half	<0.6675	0.6	<0.63375
92-06731-A		Subsegment D Upper half	2	2	2
92-06732-A		Subsegment D Lower half	2	2.2	2.1
92-08167-A	35: 2	Upper half	7.3	7.1	7.2
92-08168-A		Lower half	6.5	6.9	6.7
92-08169-F1		Whole	7.4	5.9	6.65[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	<0.5184	<0.5818	<0.5501
92-06758-A		Subsegment C Lower half	<0.6406	<0.585	<0.6128
92-06759-A	36: 2	Subsegment D Upper half	5	5.1	5.05
92-06760-A		Subsegment D Lower half	5	5.5	5.25
92-06740-A1	Core 34	Solid composite	1.3	1.2	1.25
92-06767-A1	Core 36	Solid composite	8.3	6.9	7.6
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<16.77	<16.98	<16.875
92-06734-A1	34: 2	Subsegment B	<13.2	<18.76	<15.98[QC:e]
92-06735-A1		Subsegment C	<18.62	<14.81	<16.715[QC:e]
92-06736-A1		Subsegment D	<15.75	<16.02	<15.885
92-08169-A1	35: 2	Whole	<17.59	<17.68	<17.635
92-06761-A1	36: 1	Subsegment C	<15.92	<13.43	<14.675
92-06762-A1		Subsegment D	<13.34	<14.94	<14.14

Table B2-22. Tank 241-C-112 Analytical Results: Beryllium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	< 14.12	< 14.81	< 14.47
92-06764-A1		Subsegment B	15.2	16	15.6
92-06765-A1		Subsegment C	10.2	9.5	9.85
92-06766-A1		Subsegment D	< 6.672	< 6.118	< 6.395
92-06740-B1	Core 34	Solid composite	< 9.985	n/a	< 9.985
92-06767-H1	Core 36	Solid composite	9.7	8.6	9.15
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	< 0.6275	< 0.6493	< 0.6384
92-06740-C1	Core 34	Solid composite	< 1.062	n/a	< 1.062
92-06767-C1	Core 36	Solid composite	< 0.6234	< 0.6352	< 0.6293

Table B2-23. Tank 241-C-112 Analytical Results: Boron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	100.3	62.5	81.4[QC:e,f]
92-06730-A		Subsegment C Lower half	65.4	70.1	67.75[QC:f]
92-06731-A		Subsegment D Upper half	94.8	74.8	84.8[QC:e,f]
92-06732-A		Subsegment D Lower half	78.7	64.3	71.5[QC:e,f]
92-08167-A	35: 2	Upper half	123.3	105.1	114.2[QC:f]
92-08168-A		Lower half	83.5	112.2	97.85[QC:e,f]
92-08169-F1		Whole	106.4	102.7	104.55[QC:f]
92-06757-A	36: 1	Subsegment C Upper half	<9.655	56.7	<33.1775[QC:e,f]
92-06758-A		Subsegment C Lower half	90.5	67	78.75[QC:e,f]
92-06759-A	36: 2	Subsegment D Upper half	68.1	90.9	79.5[QC:e,f]
92-06760-A		Subsegment D Lower half	139.2	120.5	129.85[QC:f]
92-06740-A1	Core 34	Solid composite	100.7	93.3	97[QC:f]
92-06767-A1	Core 36	Solid composite	150.4	135.5	142.95[QC:f]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<312.3	<316.3	<314.3
92-06734-A1	34: 2	Subsegment B	<245.9	<349.5	<297.7[QC:e]
92-06735-A1		Subsegment C	<346.7	<275.9	<311.3[QC:e]
92-06736-A1		Subsegment D	<293.3	<298.3	<295.8
92-08169-A1	35: 2	Whole	<327.6	<329.2	<328.4
92-06761-A1	36: 1	Subsegment C	<296.5	<250.1	<273.3
92-06762-A1		Subsegment D	<248.4	<278.3	<263.35

Table B2-23. Tank 241-C-112 Analytical Results: Boron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<2,63.3	<275.9	<269.6
92-06764-A1		Subsegment B	<141.5	<120.7	<131.1
92-06765-A1		Subsegment C	<112.1	<121	<116.55
92-06766-A1		Subsegment D	<124.3	<113.9	<119.1
92-06740-B1	Core 34	Solid composite	<186	n/a	<186
92-06767-H1	Core 36	Solid composite	<134	140.3	<137.15
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	15.3	19.1	17.2[QC:e]
92-06740-C1	Core 34	Solid composite	38.9	n/a	38.9
92-06767-C1	Core 36	Solid composite	36.9	22.4	29.65[QC:e]

Table B2-24. Tank 241-C-112 Analytical Results: Cadmium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	7.5	6.4	6.95
92-06730-A		Subsegment C Lower half	6.7	6.1	6.4
92-06731-A		Subsegment D Upper half	11.3	11.2	11.25
92-06732-A		Subsegment D Lower half	14.6	11.9	13.25[QC:e]
92-08167-A	35: 2	Upper half	29.3	28.7	29
92-08168-A		Lower half	26.1	27.7	26.9
92-08169-F1		Whole	29.7	25.3	27.5
92-06757-A	36: 1	Subsegment C Upper half	9.7	9.5	9.6
92-06758-A		Subsegment C Lower half	10.5	9.3	9.9
92-06759-A	36: 2	Subsegment D Upper half	19.4	20.2	19.8
92-06760-A		Subsegment D Lower half	20	22.3	21.15
92-06740-A1	Core 34	Solid composite	12	10.1	11.05
92-06767-A1	Core 36	Solid composite	26.5	23.8	25.15
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<39.29	<39.8	<39.545
92-06734-A1	34: 2	Subsegment B	<30.94	<43.98	<37.46[QC:e]
92-06735-A1		Subsegment C	<43.63	<34.71	<39.17[QC:e]
92-06736-A1		Subsegment D	<36.91	<37.54	<37.225
92-08169-A1	35: 2	Whole	<41.23	<41.43	<41.33
92-06761-A1	36: 1	Subsegment C	<37.31	<31.48	<34.395
92-06762-A1		Subsegment D	<31.26	<35.02	<33.14

Table B2-24. Tank 241-C-112 Analytical Results: Cadmium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<33.14	<34.72	<33.93
92-06764-A1		Subsegment B	34.9	41.1	38
92-06765-A1		Subsegment C	26.7	24	25.35
92-06766-A1		Subsegment D	16.7	14.7	15.7
92-06740-B1	Core 34	Solid composite	23.4	n/a	23.4
92-06767-H1	Core 36	Solid composite	23.6	22.8	23.2
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<1.471	<1.522	<1.4965
92-06740-C1	Core 34	Solid composite	<2.489	n/a	<2.489
92-06767-C1	Core 36	Solid composite	1.9	<1.489	<1.6945[QC:e]

Table B2-25. Tank 241-C-112 Analytical Results: Calcium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	28,197.1	26,114.2	27,155.7
92-06730-A		Subsegment C Lower half	26,701.8	25,982.2	26,342
92-06731-A1		Subsegment D Upper half	19,478.7	21,847.9	20,663.3
92-06732-A1		Subsegment D Lower half	21,935.7	23,332.4	22,634.1
92-08167-A	35: 2	Upper half	12,161.8	11,797.7	11,979.8
92-08168-A		Lower half	10,915.8	11,641.2	11,278.5
92-08169-F1		Whole	12,422	10,673.4	11,547.7[QC:f]
92-06758-A	36: 1	Subsegment C Lower half	<0.3203	<0.2925	<0.3064[QC:f]
92-06759-A	36: 2	Subsegment D Upper half	2,122.8	2,071.2	2,097[QC:f]
92-06760-A		Subsegment D Lower half	2,510.2	2,743.2	2,626.7[QC:f]
92-06740-A1	Core 34	Solid composite	22,462.4	20,837.9	21,650.2
92-06767-A1	Core 36	Solid composite	16,174.2	17,888	17,031.1[QC:c]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	26,041.3	30,356.8	28,199
92-06734-A1	34: 2	Subsegment B	21,619.8	21,786.8	21,703.3
92-06735-A1		Subsegment C	30,637.8	29,141.6	29,889.7
92-06736-A1		Subsegment D	23,631.2	23,936	23,783.6
92-08169-A1	35: 2	Whole	14,675.8	15,309.8	14,992.8
92-06761-A1	36: 1	Subsegment C	27,396.7	17,379.3	22,388[QC:e]
92-06762-A1		Subsegment D	28,896.5	28,245.6	28,571

Table B2-25. Tank 241-C-112 Analytical Results: Calcium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	22,411.3	20,289.3	21,350.3
92-06764-A1		Subsegment B	8,709.9	9,113	8,911.45
92-06765-A1		Subsegment C	3,000.7	3,020.1	3,010.4
92-06766-A1		Subsegment D	2,122.7	2,134.1	2,128.4[QC:f]
92-06740-B1	Core 34	Solid composite	28,983.6	n/a	28,983.6
92-06767-H1	Core 36	Solid composite	20,155	20,626.1	20,390.5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	303.8	373.7	338.75[QC:e,f]
92-06740-C1	Core 34	Solid composite	240	n/a	240[QC:f]
92-06767-C1	Core 36	Solid composite	194.1	576.6	385.35[QC:e]

Table B2-26. Tank 241-C-112 Analytical Results: Cerium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	60.6	54.4	57.5
92-06730-A		Subsegment C Lower half	47.9	55.9	51.9
92-06731-A		Subsegment D Upper half	110.2	93.5	101.85
92-06732-A		Subsegment D Lower half	103.6	103	103.3
92-08167-A	35: 2	Upper half	214.5	208.8	211.65
92-08168-A		Lower half	194	204.7	199.35
92-08169-F1		Whole	214.3	224.2	219.25
92-06757-A	36: 1	Subsegment C Upper half	52.3	42.8	47.55
92-06758-A		Subsegment C Lower half	46.4	44.1	45.25
92-06759-A	36: 2	Subsegment D Upper half	70.2	77.9	74.05
92-06760-A		Subsegment D Lower half	440.6	475.1	457.85
92-06740-A1	Core 34	Solid composite	129.8	139.6	134.7
92-06767-A1	Core 36	Solid composite	84.2	69.9	77.05
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<533.9	<540.8	<537.35
92-06734-A1	34: 2	Subsegment B	<420.4	<597.5	<508.95[QC:e]
92-06735-A1		Subsegment C	<592.8	<471.6	<532.2[QC:e]
92-06736-A1		Subsegment D	<501.5	<510	<505.75
92-08169-A1	35: 2	Whole	<560.2	<562.9	<561.55
92-06761-A1	36: 1	Subsegment C	<506.9	<427.6	<467.25
92-06762-A1		Subsegment D	<424.7	<475.8	<450.25

Table B2-26. Tank 241-C-112 Analytical Results: Cerium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<450.2	<471.7	<466.0
92-06764-A1		Subsegment B	<241.9	<206.3	<224.1
92-06765-A1		Subsegment C	<191.7	<206.8	<199.25
92-06766-A1		Subsegment D	<212.5	<194.8	<203.65
92-06740-B1	Core 34	Solid composite	<317.9	n/a	<317.9
92-06767-H1	Core 36	Solid composite	<229.1	<225.5	<227.3
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<19.98	<20.68	<20.33
92-06740-C1	Core 34	Solid composite	<33.81	n/a	<33.81
92-06767-C1	Core 36	Solid composite	<19.85	<20.23	<20.04

Table B2-27. Tank 241-C-112 Analytical Results: Chromium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	232.7	217.2	224.95
92-06730-A		Subsegment C Lower half	210	218.4	214.2
92-06731-A		Subsegment D Upper half	184.6	202.3	193.45
92-06732-A		Subsegment D Lower half	214.7	214.8	214.75
92-08167-A	35: 2	Upper half	185.5	188.2	186.85
92-08168-A		Lower half	177.1	192.2	184.65
92-08169-F1		Whole	200	211.8	205.9
92-06757-A	36: 1	Subsegment C Upper half	212	219	215.5
92-06758-A		Subsegment C Lower half	211.1	213.3	212.2
92-06759-A	36: 2	Subsegment D Upper half	185.8	188.5	187.15
92-06760-A		Subsegment D Lower half	374	409.7	391.85
92-06740-A1	Core 34	Solid composite	245.9	228.3	237.1
92-06767-A1	Core 36	Solid composite	211.7	221.3	216.5
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	191.3	188.6	189.95
92-06734-A1	34: 2	Subsegment B	209.3	202.3	205.8
92-06735-A1		Subsegment C	235.5	278.4	256.95
92-06736-A1		Subsegment D	224.8	231.2	228
92-08169-A1	35: 2	Whole	257.8	264.2	261
92-06761-A1	36: 1	Subsegment C	225.3	154.2	189.75[QC:e]
92-06762-A1		Subsegment D	211	282.5	246.75[QC:e]

Table B2-27. Tank 241-C-112 Analytical Results: Chromium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	197.4	190.9	194.15
92-06764-A1		Subsegment B	155.1	178.7	166.9
92-06765-A1		Subsegment C	160.7	152	156.35
92-06766-A1		Subsegment D	210.2	212.3	211.25
92-06740-B1	Core 34	Solid composite	320.4	n/a	320.4
92-06767-H1	Core 36	Solid composite	253	261.1	257.05
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	131.9	131.5	131.7
92-06740-C1	Core 34	Solid composite	206.7	n/a	206.7
92-06767-C1	Core 36	Solid composite	224.8	147	185.9[QC:e]

Table B2-28. Tank 241-C-112 Analytical Results: Cobalt (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	<52.28	<	<52.28
92-06730-A		Subsegment C Lower half	<38.9	<31.57	<35.235[QC:e]
92-06731-A		Subsegment D Upper half	<31.78	<34.89	<33.335
92-06732-A		Subsegment D Lower half	<36.4	<34.6	<35.5
92-08167-A	35: 2	Upper half	81.9	81.7	81.8
92-08168-A		Lower half	77	80.7	78.85
92-08169-F1		Whole	86.2	83.4	84.8
92-06757-A	36: 1	Subsegment C Upper half	<30.21	<33.91	<32.06
92-06758-A		Subsegment C Lower half	<37.34	<34.09	<35.715
92-06759-A	36: 2	Subsegment D Upper half	51.1	60.9	56
92-06760-A		Subsegment D Lower half	306.3	338.4	322.35
92-06740-A1	Core 34	Solid composite	<40.19	65.8	<52.995[QC:e]
92-06767-A1	Core 36	Solid composite	71	64.6	67.8
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<977.1	<989.7	<983.4
92-06734-A1	34: 2	Subsegment B	<769.5	<1,094	<931.75[QC:e]
92-06735-A1		Subsegment C	<1,085	1,071.5	<1,078.25
92-06736-A1		Subsegment D	1,226.3	1,138.8	1,182.55[QC:f]
92-08169-A1	35: 2	Whole	<1,025	<1,030	<1,027.5
92-06761-A1	36: 1	Subsegment C	<927.8	<782.7	<855.25
92-06762-A1		Subsegment D	<777.4	<870.8	<824.1

Table B2-28. Tank 241-C-112 Analytical Results: Cobalt (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<824.0	<863.3	<843.7
92-06764-A1		Subsegment B	<442.8	<377.6	<410.2
92-06765-A1		Subsegment C	<350.9	<378.6	<364.75
92-06766-A1		Subsegment D	<388.8	<356.6	<372.7
92-06740-B1	Core 34	Solid composite	<581.9	n/a	<581.9
92-06767-H1	Core 36	Solid composite	<419.4	<412.6	<416
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<36.57	<37.84	<37.205
92-06740-C1	Core 34	Solid composite	<61.88	n/a	<61.88
92-06767-C1	Core 36	Solid composite	<36.33	<37.02	<36.675

Table B2-29. Tank 241-C-112 Analytical Results: Copper (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06729-A	34: 2	Subsegment C Upper half	16.4	8.2	12.3[QC:e]
92-06730-A		Subsegment C Lower half	6.3	6.5	6.4
92-06731-A		Subsegment D Upper half	12.6	12.3	12.45
92-06732-A		Subsegment D Lower half	12.8	12.1	12.45
92-08167-A	35: 2	Upper half	47.1	46.1	46.6
92-08168-A		Lower half	42.9	42.8	42.85
92-08169-F1		Whole	45.4	45.3	45.35[QC:f]
92-06757-A	36: 1	Subsegment C Upper half	13.8	14.1	13.95
92-06758-A		Subsegment C Lower half	20	14.4	17.2[QC:e]
92-06759-A	36: 2	Subsegment D Upper half	9.9	14	11.95[QC:e,f]
92-06760-A		Subsegment D Lower half	102.2	116.4	109.3
92-06740-A1	Core 34	Solid composite	15.9	13.6	14.75
92-06767-A1	Core 36	Solid composite	8.4	9.6	9
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06733-A1	34: 1	Whole	<46.1	<46.7	<46.4
92-06734-A1	34: 2	Subsegment B	<36.31	<51.6	<43.955[QC:e]
92-06735-A1		Subsegment C	<51.2	<40.73	<45.965[QC:e]
92-06736-A1		Subsegment D	<43.31	<44.04	<43.675
92-08169-A1	35: 2	Whole	240.7	248.1	244.4[QC:f]
92-06761-A1	36: 1	Subsegment C	72.3	78.2	75.25[QC:f]
92-06762-A1		Subsegment D	<36.68	71	<53.84[QC:e]

Table B2-29. Tank 241-C-112 Analytical Results: Copper (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	370.9	<40.73	<205.815[QC:e,f]
92-06764-A1		Subsegment B	78.2	27.2	52.7[QC:e,f]
92-06765-A1		Subsegment C	20.9	22.3	21.6
92-06766-A1		Subsegment D	90.9	29.7	60.3[QC:e,f]
92-06740-B1	Core 34	Solid composite	64.4	n/a	64.4[QC:f]
92-06767-H1	Core 36	Solid composite	54.9	45.3	50.1[QC:f]
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<1.726	<1.786	<1.756
92-06740-C1	Core 34	Solid composite	<2.92	n/a	<2.92
92-06767-C1	Core 36	Solid composite	<1.714	<1.747	<1.7305

Table B2-30. Tank 241-C-112 Analytical Results: Dysprosium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	<1.486	1.4	<1.443
92-06730-A		Subsegment C Lower half	<1.106	1	<1.053
92-06731-A		Subsegment D Upper half	1.6	1.1	1.35[QC:e]
92-06732-A		Subsegment D Lower half	1.6	1.4	1.5
92-08167-A	35: 2	Upper half	2.3	2.6	2.45
92-08168-A		Lower half	2.6	2.6	2.6
92-08169-F1		Whole	1.9	2	1.95
92-06757-A	36: 1	Subsegment C Upper half	1.2	1	1.1
92-06758-A		Subsegment C Lower half	<1.061	<0.9688	<1.0149
92-06759-A	36: 2	Subsegment D Upper half	<1.138	<0.8846	<1.0113[QC:e]
92-06760-A		Subsegment D Lower half	38	42	40
92-06740-A1	Core 34	Solid composite	1.9	3.1	2.5[QC:e]
92-06767-A1	Core 36	Solid composite	<1.06	<1.056	<1.058

Table B2-30. Tank 241-C-112 Analytical Results: Dysprosium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06733-A1	34: 1	Whole	<27.77	<28.13	<27.95
92-06734-A1	34: 2	Subsegment B	<21.87	<31.08	<26.475[QC:e]
92-06735-A1		Subsegment C	<30.83	<24.53	<27.68[QC:e]
92-06736-A1		Subsegment D	<26.09	<26.53	<26.31
92-08169-A1	35: 2	Whole	<29.14	<29.28	<29.21
92-06761-A1	36: 1	Subsegment C	<26.37	<22.24	<24.305
92-06762-A1		Subsegment D	<22.09	<24.75	<23.42
92-06763-A1	36: 2	Subsegment A	<23.42	<24.53	<23.98
92-06764-A1		Subsegment B	<12.58	<10.73	<11.655
92-06765-A1		Subsegment C	<9.971	<10.76	<10.3655
92-06766-A1		Subsegment D	<11.05	<10.13	<10.59
92-06740-B1	Core 34	Solid composite	<16.54	n/a	<16.54
92-06767-H1	Core 36	Solid composite	<11.92	<11.73	<11.825
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<1.039	<1.075	<1.057
92-06740-C1	Core 34	Solid composite	<1.759	n/a	<1.759
92-06767-C1	Core 36	Solid composite	<1.032	<1.052	<1.042

Table B2-31. Tank 241-C-112 Analytical Results: Iron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	12,426	7,063.5	9,744.75[QC:e]
92-06730-A		Subsegment C Lower half	9,983.6	6,236.1	8,109.85[QC:e]
92-06731-A		Subsegment D Upper half	15,054.5	14,867.1	14,960.8
92-06732-A		Subsegment D Lower half	30,158.6	15,229.7	22,694.2[QC:e]
92-08167-A	35: 2	Upper half	28,603.2	25,805.9	27,204.6
92-08168-A		Lower half	23,399.2	25,480.8	24,440
92-08169-F1		Whole	27,892.5	24,166.2	26,029.3
92-06757-A	36: 1	Subsegment C Upper half	24,342.9	19,250.7	21,796.8[QC:e]
92-06758-A		Subsegment C Lower half	27,042.8	19,226.5	23,134.7[QC:e]
92-06759-A	36: 2	Subsegment D Upper half	29,670.9	30,209.7	29,940.3
92-06760-A		Subsegment D Lower half	29,655.7	32,875.4	31,265.6
92-06740-A1	Core 34	Solid composite	26,227.4	13,920	20,073.7[QC:e]
92-06767-A1	Core 36	Solid composite	19,599.6	19,314.7	19,457.2[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	8,742.8	8,297.1	8,519.95
92-06734-A1	34: 2	Subsegment B	14,862.2	14,591.6	14,726.9
92-06735-A1		Subsegment C	9,797.9	10,701.3	10,249.6
92-06736-A1		Subsegment D	18,482.6	20,886.7	19,684.7
92-08169-A1	35: 2	Whole	29,941.3	34,763.5	32,352.4
92-06761-A1	36: 1	Subsegment C	32,309	56,783.6	44,546.3[QC:e]
92-06762-A1		Subsegment D	7,363.5	7,656.1	7,509.8

Table B2-31. Tank 241-C-112 Analytical Results: Iron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	11,750.4	10,847.1	11,298.8
92-06764-A1		Subsegment B	8,880.5	8,940	8,910.25
92-06765-A1		Subsegment C	15,654.6	14,605	15,129.8
92-06766-A1		Subsegment D	30,859.2	31,572.1	31,215.7
92-06740-B1	Core 34	Solid composite	<22,847.4	n/a	<22,847.4[QC:f]
92-06767-H1	Core 36	Solid composite	28,011.1	24,012	26,011.5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	702.5	721.7	712.1
92-06740-C1	Core 34	Solid composite	1,630	n/a	1,630
92-06767-C1	Core 36	Solid composite	1,451.6	1,336	1,393.8

Table B2-32. Tank 241-C-112 Analytical Results: Lanthanum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	45.4	43.8	44.6
92-06730-A		Subsegment C Lower half	40.1	40.1	40.1
92-06731-A		Subsegment D Upper half	92.8	76.8	84.8
92-06732-A		Subsegment D Lower half	76.5	79.7	78.1
92-08167-A	35: 2	Upper half	132.5	130.5	131.5
92-08168-A		Lower half	117.5	124.9	121.2
92-08169-F1		Whole	140	155.4	147.7
92-06757-A	36: 1	Subsegment C Upper half	32	31.7	31.85
92-06758-A		Subsegment C Lower half	33.4	32.1	32.75
92-06759-A	36: 2	Subsegment D Upper half	11.2	11.6	11.4
92-06760-A		Subsegment D Lower half	61.5	68.6	65.05
92-06740-A1	Core 34	Solid composite	104.1	98.5	101.3
92-06767-A1	Core 36	Solid composite	17.3	17.7	17.5
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<64.96	<65.8	<65.38
92-06734-A1	34: 2	Subsegment B	84.5	<72.71	<78.605
92-06735-A1		Subsegment C	<72.14	<57.39	<64.765[QC:e]
92-06736-A1		Subsegment D	75.7	77.4	76.55
92-08169-A1	35: 2	Whole	144.5	146.3	145.4
92-06761-A1	36: 1	Subsegment C	<61.69	<52.04	<56.865
92-06762-A1		Subsegment D	<51.68	<57.9	<54.79

Table B2-32. Tank 241-C-112 Analytical Results: Lanthanum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<54.8	<57.4	<56.1
92-06764-A1		Subsegment B	<29.44	<25.1	<27.27
92-06765-A1		Subsegment C	<23.33	<25.17	<24.25
92-06766-A1		Subsegment D	<25.85	<23.71	<24.78
92-06740-B1	Core 34	Solid composite	113.2	n/a	113.2
92-06767-H1	Core 36	Solid composite	<27.88	<27.44	<27.66
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<2.432	<2.516	<2.474
92-06740-C1	Core 34	Solid composite	<4.114	n/a	<4.114
92-06767-C1	Core 36	Solid composite	<2.416	<2.461	<2.4385

Table B2-33. Tank 241-C-112 Analytical Results: Lead (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	1,320.9	1,140.4	1,230.65
92-06730-A		Subsegment C Lower half	1,166.1	1,065.6	1,115.85
92-06731-A		Subsegment D Upper half	2,594.4	2,479.7	2,537.05
92-06732-A		Subsegment D Lower half	3,129.6	2,661.4	2,895.5
92-08167-A	35: 2	Upper half	3,865.3	3,795.6	3,830.45
92-08168-A		Lower half	3,460.8	3,977.9	3,719.35
92-08169-F1		Whole	3,904.3	3,738.9	3,821.6
92-06757-A	36: 1	Subsegment C Upper half	2,196.2	2,168.2	2,182.2
92-06758-A		Subsegment C Lower half	2,356	2,134.8	2,245.4
92-06759-A	36: 2	Subsegment D Upper half	965.9	962.8	964.35
92-06760-A		Subsegment D Lower half	1,236.8	1,337.4	1,287.1
92-06740-A1	Core 34	Solid composite	3,127.5	2,792.7	2,960.1
92-06767-A1	Core 36	Solid composite	840.2	912.5	876.35
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	1,494.5	1,073.3	1,283.9[QC:e]
92-06734-A1	34: 2	Subsegment B	3,768.3	3,476.7	3,622.5
92-06735-A1		Subsegment C	1,113.3	1,185.2	1,149.25
92-06736-A1		Subsegment D	2,791.1	2,842	2,816.55
92-08169-A1	35: 2	Whole	4,260.5	5,000.7	4,630.6
92-06761-A1	36: 1	Subsegment C	2,780	3,043.1	2,911.55
92-06762-A1		Subsegment D	<346.4	<388	<367.2

Table B2-33. Tank 241-C-112 Analytical Results: Lead (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<367.1	<384.7	< 375.9
92-06764-A1		Subsegment B	<197.3	<168.2	<182.75
92-06765-A1		Subsegment C	340.7	359.9	350.3
92-06766-A1		Subsegment D	771	816.8	793.9
92-06740-B1	Core 34	Solid composite	3,325.6	n/a	3,325.6
92-06767-H1	Core 36	Solid composite	1,150.8	947.3	1,049.05
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	17.5	22.9	20.2[QC:e]
92-06740-C1	Core 34	Solid composite	<27.57	n/a	<27.57
92-06767-C1	Core 36	Solid composite	<16.19	<16.5	<16.345

Table B2-34. Tank 241-C-112 Analytical Results: Lithium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	4.9	3.9	4.4[QC:e]
92-06730-A		Subsegment C Lower half	4.3	4.4	4.35
92-06731-A		Subsegment D Upper half	3.7	3.7	3.7
92-06732-A		Subsegment D Lower half	3.4	4.1	3.75
92-08167-A	35: 2	Upper half	8.5	8.2	8.35
92-08168-A		Lower half	7.5	8.2	7.85
92-08169-F1		Whole	8.4	6.9	7.65
92-06757-A	36: 1	Subsegment C Upper half	4.3	3.8	4.05
92-06758-A		Subsegment C Lower half	3.6	3.8	3.7
92-06759-A	36: 2	Subsegment D Upper half	5.8	5.8	5.8
92-06760-A		Subsegment D Lower half	5.9	6.1	6
92-06740-A1	Core 34	Solid composite	4.3	5.3	4.8[QC:e]
92-06767-A1	Core 36	Solid composite	7.8	7.5	7.65
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<38.77	<39.27	<39.02
92-06734-A1	34: 2	Subsegment B	<30.53	<43.39	<36.96[QC:e]
92-06735-A1		Subsegment C	<43.05	<34.25	<38.65[QC:e]
92-06736-A1		Subsegment D	<36.42	<37.04	<36.73
92-08169-A1	35: 2	Whole	<40.68	<40.87	<40.775
92-06761-A1	36: 1	Subsegment C	<36.81	<31.06	<33.935
92-06762-A1		Subsegment D	<30.84	<34.55	<32.695

Table B2-34. Tank 241-C-112 Analytical Results: Lithium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<32.69	<34.25	<33.47
92-06764-A1		Subsegment B	<17.57	18	<17.785
92-06765-A1		Subsegment C	<13.92	<15.02	<14.47
92-06766-A1		Subsegment D	<15.43	<14.15	<14.79
92-06740-B1	Core 34	Solid composite	<23.09	n/a	<23.09
92-06767-H1	Core 36	Solid composite	<16.64	<16.37	<16.505
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<1.451	<1.501	<1.476
92-06740-C1	Core 34	Solid composite	<2.455	n/a	<2.455
92-06767-C1	Core 36	Solid composite	<1.442	<1.469	<1.4555

Table B2-35. Tank 241-C-112 Analytical Results: Magnesium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-06729-A	34: 2	Subsegment C Upper half	421.2	368.1	394.65[QC:f]
92-06730-A		Subsegment C Lower half	377.6	366.5	372.05[QC:f]
92-06731-A		Subsegment D Upper half	354.4	379.3	366.85[QC:f]
92-06732-A		Subsegment D Lower half	385.4	413.4	399.4[QC:f]
92-08167-A	35: 2	Upper half	776.1	746.1	761.1[QC:f]
92-08168-A		Lower half	689.4	731.6	710.5[QC:f]
92-08169-F1		Whole	794.2	763.3	778.75[QC:f]
92-06757-A	36: 1	Subsegment C Upper half	475.5	484.6	480.05[QC:f]
92-06758-A		Subsegment C Lower half	494.9	482.5	488.7[QC:f]
92-06759-A	36: 2	Subsegment D Upper half	493	486.9	489.95[QC:f]
92-06760-A		Subsegment D Lower half	503.9	551.9	527.9[QC:f]
92-06740-A1	Core 34	Solid composite	453.9	412.8	433.35[QC:f]
92-06767-A1	Core 36	Solid composite	548.8	533.5	541.15[QC:f]
Solids: fusion			μg/g	μg/g	μg/g
92-06733-A1	34: 1	Whole	446.8	494.9	470.85[QC:f]
92-06734-A1	34: 2	Subsegment B	441.5	486.7	464.1[QC:f]
92-06735-A1		Subsegment C	440.3	457.9	449.1[QC:f]
92-06736-A1		Subsegment D	475.5	478.4	476.95[QC:f]
92-08169-A1	35: 2	Whole	959.9	983.8	971.85[QC:f]
92-06761-A1	36: 1	Subsegment C	634	514.5	574.25[QC:e,f]
92-06762-A1		Subsegment D	403	400.8	401.9

Table B2-35. Tank 241-C-112 Analytical Results: Magnesium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	505.7	457.6	481.65QC:f
92-06764-A1		Subsegment B	288	279.2	283.6QC:f
92-06765-A1		Subsegment C	259.2	295.3	277.25
92-06766-A1		Subsegment D	398.4	452.3	425.35
92-06740-B1	Core 34	Solid composite	514.8	n/a	514.8QC:f
92-06767-H1	Core 36	Solid composite	613.9	606.5	610.2QC:f
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	31.4	32.1	31.75QC:f
92-06740-C1	Core 34	Solid composite	44.6	n/a	44.6QC:f
92-06767-C1	Core 36	Solid composite	44.3	13.1	28.7QC:e

Table B2-36. Tank 241-C-112 Analytical Results: Manganese (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	121.6	85.1	103.35[QC:e]
92-06730-A		Subsegment C Lower half	99.5	76.1	87.8[QC:e]
92-06731-A		Subsegment D Upper half	202.2	169.3	185.75
92-06732-A		Subsegment D Lower half	237.9	174.3	206.1[QC:e]
92-08167-A	35: 2	Upper half	301.8	287.3	294.55
92-08168-A		Lower half	257.4	277.4	267.4
92-08169-F1		Whole	303.8	298.8	301.3
92-06757-A	36: 1	Subsegment C Upper half	153.7	156.4	155.05
92-06758-A		Subsegment C Lower half	173.6	142.5	158.05
92-06759-A	36: 2	Subsegment D Upper half	190.6	193	191.8
92-06760-A		Subsegment D Lower half	189	207.1	198.05
92-06740-A1	Core 34	Solid composite	241.2	177.1	209.15[QC:e]
92-06767-A1	Core 36	Solid composite	147.3	142.6	144.95
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	169.2	173.5	171.35[QC:f]
92-06734-A1	34: 2	Subsegment B	302	317.2	309.6
92-06735-A1		Subsegment C	161.7	170.3	166[QC:f]
92-06736-A1		Subsegment D	238.7	248.7	243.7[QC:f]
92-08169-A1	35: 2	Whole	388.1	437.5	412.8[QC:f]
92-06761-A1	36: 1	Subsegment C	277.1	408.3	342.7[QC:e,f]
92-06762-A1		Subsegment D	91.3	135.4	113.35[QC:e]

Table B2-36. Tank 241-C-112 Analytical Results: Manganese (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	109.1	98.6	103.85[QC:f]
92-06764-A1		Subsegment B	160	135.4	147.7[QC:f]
92-06765-A1		Subsegment C	276.4	236.1	256.25
92-06766-A1		Subsegment D	292.3	239.4	265.85[QC:f]
92-06740-B1	Core 34	Solid composite	327	n/a	327[QC:f]
92-06767-H1	Core 36	Solid composite	254.3	277.2	265.75[QC:f]
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	0.8	1	0.9[QC:e]
92-06740-C1	Core 34	Solid composite	0.6	n/a	0.6
92-06767-C1	Core 36	Solid composite	2.2	4	3.1[QC:e]

Table B2-37. Tank 241-C-112 Analytical Results: Molybdenum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	29.3	28.7	29
92-06730-A		Subsegment C Lower half	26.5	27.8	27.15
92-06731-A		Subsegment D Upper half	32.9	31.2	32.05
92-06732-A		Subsegment D Lower half	32.5	32.8	32.65
92-08167-A	35: 2	Upper half	37.3	36.6	36.95
92-08168-A		Lower half	34.3	38	36.15
92-08169-F1		Whole	38.6	37.4	38
92-06757-A	36: 1	Subsegment C Upper half	25.9	25.3	25.6
92-06758-A		Subsegment C Lower half	25.6	24.4	25
92-06759-A	36: 2	Subsegment D Upper half	26.8	27.6	27.2
92-06760-A		Subsegment D Lower half	27.1	29.4	28.25
92-06740-A1	Core 34	Solid composite	35.9	34.2	35.05
92-06767-A1	Core 36	Solid composite	37.4	37.5	37.45
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<67.06	<67.93	<67.495
92-06734-A1	34: 2	Subsegment B	<52.81	<75.05	<63.93[QC:e]
92-06735-A1		Subsegment C	<74.47	<59.24	<66.855[QC:e]
92-06736-A1		Subsegment D	<63	<64.06	<63.53
92-08169-A1	35: 2	Whole	<70.36	<70.7	<70.53
92-06761-A1	36: 1	Subsegment C	<63.68	<53.72	<58.7
92-06762-A1		Subsegment D	<53.35	<59.76	<56.555

Table B2-37. Tank 241-C-112 Analytical Results: Molybdenum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<56.55	<59.25	<57.9
92-06764-A1		Subsegment B	44.9	39.1	42
92-06765-A1		Subsegment C	34.6	34.1	34.35
92-06766-A1		Subsegment D	<26.69	<24.47	<25.58
92-06740-B1	Core 34	Solid composite	44.3	n/a	44.3
92-06767-H1	Core 36	Solid composite	43.4	44.7	44.05
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	16	15.6	15.8
92-06740-C1	Core 34	Solid composite	33.2	n/a	33.2
92-06767-C1	Core 36	Solid composite	33.1	22.3	27.7[QC:e]

Table B2-38. Tank 241-C-112 Analytical Results: Neodymium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	101.6	106.3	103.95
92-06730-A		Subsegment C Lower half	101.2	101.4	101.3
92-06731-A		Subsegment D Upper half	188.1	157.4	172.75
92-06732-A		Subsegment D Lower half	161.3	169.6	165.45
92-08167-A	35: 2	Upper half	247.4	248.9	248.15
92-08168-A		Lower half	226	238.3	232.15
92-08169-F1		Whole	261.5	272.5	267
92-06757-A	36: 1	Subsegment C Upper half	93	89.4	91.2
92-06758-A		Subsegment C Lower half	89.8	89.2	89.5
92-06759-A	36: 2	Subsegment D Upper half	36	36.6	36.3
92-06760-A		Subsegment D Lower half	229.2	250.7	239.95
92-06740-A1	Core 34	Solid composite	211	201.5	206.25
92-06767-A1	Core 36	Solid composite	62.1	56.3	59.2
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<259.9	<263.2	<261.55
92-06734-A1	34: 2	Subsegment B	<204.6	<290.8	<247.7[QC:e]
92-06735-A1		Subsegment C	<288.6	<229.6	<259.1[QC:e]
92-06736-A1		Subsegment D	<244.1	<248.2	<246.15
92-08169-A1	35: 2	Whole	<272.7	<274	<273.35
92-06761-A1	36: 1	Subsegment C	<246.8	<208.2	<227.5
92-06762-A1		Subsegment D	<206.7	<231.6	<219.15

Table B2-38. Tank 241-C-112 Analytical Results: Neodymium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<219.1	<229.6	<224.4
92-06764-A1		Subsegment B	<117.8	<100.4	<109.1
92-06765-A1		Subsegment C	<93.31	<100.7	<97.005
92-06766-A1		Subsegment D	<103.4	<94.83	<99.115
92-06740-B1	Core 34	Solid composite	254.6	n/a	254.6
92-06767-H1	Core 36	Solid composite	<111.5	<109.7	<110.6
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<9.727	<10.06	<9.8935
92-06740-C1	Core 34	Solid composite	<16.46	n/a	<16.46
92-06767-C1	Core 36	Solid composite	<9.662	<9.846	<9.754

Table B2-39. Tank 241-C-112 Analytical Results: Nickel (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	18,605.1	16,777.7	17,691.4
92-06730-A		Subsegment C Lower half	17,283.4	16,830.2	17,056.8
92-06731-A		Subsegment D Upper half	14,072.4	15,580.4	14,826.4
92-06732-A		Subsegment D Lower half	15,501.1	16,406.2	15,953.7
92-08167-A	35: 2	Upper half	11,286.7	10,978.3	11,132.5
92-08168-A		Lower half	10,211.3	10,757.5	10,484.4
92-08169-F1		Whole	11,707.1	10,397.1	11,052.1
92-06757-A	36: 1	Subsegment C Upper half	18,370.5	18,404.4	18,387.5
92-06758-A		Subsegment C Lower half	17,504.6	18,540.1	18,022.3
92-06759-A	36: 2	Subsegment D Upper half	751.2	768.7	759.95
92-06760-A		Subsegment D Lower half	776.5	854	815.25
92-06740-A1	Core 34	Solid composite	18,241.8	17,202	17,721.9
92-06767-A1	Core 36	Solid composite	9,619.8	11,511.4	10,565.6[QC:c]
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	402.6	410.6	406.6
92-06740-C1	Core 34	Solid composite	999.4	n/a	999.4
92-06767-C1	Core 36	Solid composite	827.4	756.1	791.75

Table B2-40. Tank 241-C-112 Analytical Results: Phosphorus (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-06729-A	34: 2	Subsegment C Upper half	17,980.3	17,803.4	17,891.8
92-06730-A		Subsegment C Lower half	17,574	17,487.7	17,530.8
92-06731-A		Subsegment D Upper half	16,581.3	18,482.6	17,531.9
92-06732-A		Subsegment D Lower half	18,355.2	19,544	18,949.6
92-08167-A	35: 2	Upper half	19,290.2	18,971.5	19,130.8
92-08168-A		Lower half	17,637.9	18,878.7	18,258.3
92-08169-F1		Whole	20,995.7	16,621.5	18,808.6[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	18,505.3	18,560.5	18,532.9
92-06758-A		Subsegment C Lower half	17,331.7	18,109.3	17,720.5
92-06759-A	36: 2	Subsegment D Upper half	28,234.4	28,989.4	28,611.9
92-06760-A		Subsegment D Lower half	28,721	31,131	29,926
92-06740-A1	Core 34	Solid composite	19,318.7	18,877.9	19,098.3
92-06767-A1	Core 36	Solid composite	31,795.8	29,882.1	30,838.9
Solids: fusion			μg/g	μg/g	μg/g
92-06733-A1	34: 1	Whole	11,987.3	13,523.3	12,755.3
92-06734-A1	34: 2	Subsegment B	11,551.1	10,696.3	11,123.7
92-06735-A1		Subsegment C	19,737.8	19,752	19,744.9
92-06736-A1		Subsegment D	19,808.9	19,101	19,455
92-08169-A1	35: 2	Whole	21,854.1	22,525.9	22,190
92-06761-A1	36: 1	Subsegment C	17,587.6	10,932.3	14,259.9[QC:e]
92-06762-A1		Subsegment D	19,479.6	19,154.9	19,317.2

Table B2-40. Tank 241-C-112 Analytical Results: Phosphorus (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	22,299.6	20,053.4	21,176.5
92-06764-A1		Subsegment B	24,748	25,720.5	25,234.2
92-06765-A1		Subsegment C	34,516.6	32,602.4	33,559.5
92-06766-A1		Subsegment D	29,587.3	30,127.2	29,857.2
92-06740-B1	Core 34	Solid composite	21,955.9	n/a	21,955.9
92-06767-H1	Core 36	Solid composite	36,604.2	36,917.1	36,760.6
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	5,704.6	5,555.6	5,630.1
92-06740-C1	Core 34	Solid composite	6,380.1	n/a	6,380.1
92-06767-C1	Core 36	Solid composite	19,807.2	13,093.4	16,450.3[QC:e]

Table B2-41. Tank 241-C-112 Analytical Results: Potassium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06729-A	34: 2	Subsegment C Upper half	500.8	503.6	502.2
92-06730-A		Subsegment C Lower half	470.8	495.2	483
92-06731-A		Subsegment D Upper half	457.3	484.2	470.75
92-06732-A		Subsegment D Lower half	474.1	501.8	487.95
92-08167-A	35: 2	Upper half	497.9	497.7	497.8
92-08168-A		Lower half	443	462.4	452.7
92-08169-F1		Whole	476.3	412.5	444.4
92-06757-A	36: 1	Subsegment C Upper half	506.8	473.6	490.2
92-06758-A		Subsegment C Lower half	491.2	474.4	482.8
92-06759-A	36: 2	Subsegment D Upper half	447.2	466.5	456.85
92-06760-A		Subsegment D Lower half	466.7	478.2	472.45
92-06740-A1	Core 34	Solid composite	589.1	621.2	605.15
92-06767-A1	Core 36	Solid composite	646.1	644.1	645.1[QC:f]
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	352.2	343.2	347.7
92-06740-C1	Core 34	Solid composite	581.6	n/a	581.6
92-06767-C1	Core 36	Solid composite	620.8	385	502.9[QC:e]

Table B2-42. Tank 241-C-112 Analytical Results: Rhenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-06729-A	34: 2	Subsegment C Upper half	12	12	12
92-06730-A		Subsegment C Lower half	11.8	12.4	12.1
92-06731-A		Subsegment D Upper half	9.8	10.1	9.95
92-06732-A		Subsegment D Lower half	10.5	11.1	10.8
92-08167-A	35: 2	Upper half	4.4	4.4	4.4
92-08168-A		Lower half	4.3	3.7	4
92-08169-F1		Whole	4.2	3.6	3.9
92-06757-A	36: 1	Subsegment C Upper half	10.7	12.2	11.45
92-06758-A		Subsegment C Lower half	11.2	11.7	11.45
92-06759-A	36: 2	Subsegment D Upper half	<3.716	<2.887	<3.3015[QC:e]
92-06760-A		Subsegment D Lower half	34.2	37.7	35.95
92-06740-A1	Core 34	Solid composite	11.7	13	12.35
92-06767-A1	Core 36	Solid composite	4.6	6.7	5.65[QC:e]
Solids: fusion			μg/g	μg/g	μg/g
92-06733-A1	34: 1	Whole	<90.64	<91.81	<91.225
92-06734-A1	34: 2	Subsegment B	<71.38	<101.4	<86.39[QC:e]
92-06735-A1		Subsegment C	<100.6	<80.07	<90.335[QC:e]
92-06736-A1		Subsegment D	<85.15	<86.59	<85.87
92-08169-A1	35: 2	Whole	<95.1	<95.56	<95.33
92-06761-A1	36: 1	Subsegment C	<86.07	<72.6	<79.335
92-06762-A1		Subsegment D	<72.11	<80.78	<76.445

Table B2-42. Tank 241-C-112 Analytical Results: Rhenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<76.43	<80.08	<78.26
92-06764-A1		Subsegment B	<41.07	<35.02	<38.045
92-06765-A1		Subsegment C	<32.55	<35.12	<33.835
92-06766-A1		Subsegment D	<36.07	<33.07	<34.57
92-06740-B1	Core 34	Solid composite	<53.98	n/a	<53.98
92-06767-H1	Core 36	Solid composite	<38.9	<38.28	<38.59
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<3.393	<3.51	<3.4515
92-06740-C1	Core 34	Solid composite	<5.74	n/a	<5.74
92-06767-C1	Core 36	Solid composite	<3.37	<3.434	<3.402

Table B2-43. Tank 241-C-112 Analytical Results: Rhodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	<23.01	<	<23.01
92-06730-A		Subsegment C Lower half	<17.13	<13.9	<15.515[QC:e]
92-06731-A		Subsegment D Upper half	<13.99	<15.36	<14.675
92-06732-A		Subsegment D Lower half	<16.03	<15.23	<15.63
92-08167-A	35: 2	Upper half	28.3	32.2	30.25
92-08168-A		Lower half	32	31.7	31.85
92-08169-F1		Whole	24.6	16.7	20.65[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	<13.3	<14.93	<14.115
92-06758-A		Subsegment C Lower half	<16.44	<15.01	<15.725
92-06759-A	36: 2	Subsegment D Upper half	<17.64	<13.7	<15.67[QC:e]
92-06760-A		Subsegment D Lower half	324	358.7	341.35
92-06740-A1	Core 34	Solid composite	<17.69	<14.55	<16.12
92-06767-A1	Core 36	Solid composite	<16.41	<16.36	<16.385
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<430.1	<435.7	<432.9
92-06734-A1	34: 2	Subsegment B	<338.7	<481.4	<410.05[QC:e]
92-06735-A1		Subsegment C	<477.6	<380	<428.8[QC:e]
92-06736-A1		Subsegment D	<404.1	<410.9	<407.5
92-08169-A1	35: 2	Whole	<451.3	<453.5	<452.4
92-06761-A1	36: 1	Subsegment C	<408.4	<344.5	<376.45
92-06762-A1		Subsegment D	<342.2	<383.3	<362.75

Table B2-43. Tank 241-C-112 Analytical Results: Rhodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<362.7	<380	<371
92-06764-A1		Subsegment B	<194.9	<166.2	<180.55
92-06765-A1		Subsegment C	<154.5	<166.6	<160.55
92-06766-A1		Subsegment D	<171.2	<157	<164.1
92-06740-B1	Core 34	Solid composite	<256.2	n/a	<256.2
92-06767-H1	Core 36	Solid composite	<184.6	<181.7	<183.15
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<16.1	<16.66	<16.38
92-06740-C1	Core 34	Solid composite	<27.24	n/a	<27.24
92-06767-C1	Core 36	Solid composite	<15.99	<16.3	<16.145

Table B2-44. Tank 241-C-112 Analytical Results: Ruthenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	<9.811	<	<9.811
92-06730-A		Subsegment C Lower half	<7.301	<5.926	<6.6135[QC:e]
92-06731-A		Subsegment D Upper half	<5.964	<6.549	<6.2565
92-06732-A		Subsegment D Lower half	<6.832	<6.493	<6.6625
92-08167-A	35: 2	Upper half	50.8	50.8	50.8
92-08168-A		Lower half	46.8	47.9	47.35
92-08169-F1		Whole	49.4	37.5	43.45[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	<5.67	<6.363	<6.0165
92-06758-A		Subsegment C Lower half	<7.007	<6.398	<6.7025
92-06759-A	36: 2	Subsegment D Upper half	17.8	22.7	20.25[QC:e]
92-06760-A		Subsegment D Lower half	386.1	426.3	406.2
92-06740-A1	Core 34	Solid composite	<7.543	<6.202	<6.8725
92-06767-A1	Core 36	Solid composite	55.6	45.7	50.65
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<183.4	<185.7	<184.55
92-06734-A1	34: 2	Subsegment B	<144.4	<205.2	<174.8[QC:e]
92-06735-A1		Subsegment C	<203.6	<162	<182.8[QC:e]
92-06736-A1		Subsegment D	<172.3	<175.2	<173.75
92-08169-A1	35: 2	Whole	<192.4	<193.3	<192.85
92-06761-A1	36: 1	Subsegment C	<174.1	<146.9	<160.5
92-06762-A1		Subsegment D	<145.9	<163.4	<154.65

Table B2-44. Tank 241-C-112 Analytical Results: Ruthenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<154.6	<162	<158.0
92-06764-A1		Subsegment B	<83.1	<70.86	<76.98
92-06765-A1		Subsegment C	<65.85	<71.04	<68.445
92-06766-A1		Subsegment D	<72.97	<66.91	<69.94
92-06740-B1	Core 34	Solid composite	<109.2	n/a	<109.2
92-06767-H1	Core 36	Solid composite	<78.7	<77.44	<78.07
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<6.864	<7.102	<6.983
92-06740-C1	Core 34	Solid composite	<11.61	n/a	<11.61
92-06767-C1	Core 36	Solid composite	<6.818	<6.948	<6.883

Table B2-45. Tank 241-C-112 Analytical Results: Selenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	59.1	51.9	55.5
92-06730-A		Subsegment C Lower half	50.7	48.8	49.75
92-06731-A		Subsegment D Upper half	134.4	98.7	116.55[QC:e]
92-06732-A		Subsegment D Lower half	108.5	111.5	110
92-08167-A	35: 2	Upper half	116.8	113.5	115.15
92-08168-A		Lower half	107	98.4	102.7
92-08169-F1		Whole	114.3	176.7	145.5[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	50.5	39	44.75[QC:e]
92-06758-A		Subsegment C Lower half	50.6	45.5	48.05
92-06759-A	36: 2	Subsegment D Upper half	<32.54	42.8	<37.67[QC:e]
92-06760-A		Subsegment D Lower half	662.6	733.9	698.25
92-06740-A1	Core 34	Solid composite	91.8	117.3	104.55[QC:e]
92-06767-A1	Core 36	Solid composite	43.8	61.5	52.65[QC:c,e]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<793.7	<804	<798.85
92-06734-A1	34: 2	Subsegment B	<625.1	<888.3	<756.7[QC:e]
92-06735-A1		Subsegment C	<881.4	<701.2	<791.3[QC:e]
92-06736-A1		Subsegment D	<745.7	<758.3	<752
92-08169-A1	35: 2	Whole	<832.8	<836.8	<834.8
92-06761-A1	36: 1	Subsegment C	<753.7	<635.8	<694.75
92-06762-A1		Subsegment D	<631.5	<707.4	<669.45

Table B2-45. Tank 241-C-112 Analytical Results: Selenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<669.3	<701.3	<685.3
92-06764-A1		Subsegment B	<359.7	<306.7	<333.2
92-06765-A1		Subsegment C	<285	<307.5	<296.25
92-06766-A1		Subsegment D	<315.9	<289.6	<302.75
92-06740-B1	Core 34	Solid composite	<472.7	n/a	<472.7
92-06767-H1	Core 36	Solid composite	<340.7	<335.2	<337.95
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<29.71	<30.74	<30.225
92-06740-C1	Core 34	Solid composite	<50.27	n/a	<50.27
92-06767-C1	Core 36	Solid composite	<29.51	<30.07	<29.79

Table B2-46. Tank 241-C-112 Analytical Results: Silicon (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06729-A	34: 2	Subsegment C Upper half	703.2	695.9	699.55[QC:f]
92-06730-A		Subsegment C Lower half	579.9	679.2	629.55[QC:f]
92-06731-A		Subsegment D Upper half	1,055.5	1,053.4	1,054.45[QC:f]
92-06732-A		Subsegment D Lower half	1,101.3	1,114.9	1,108.1[QC:f]
92-08167-A	35: 2	Upper half	2,854.9	2,005.2	2,430.05[QC:e]
92-08168-A		Lower half	1,819.7	2,634.9	2,227.3[QC:e]
92-08169-F1		Whole	2,409.4	2,588.3	2,498.85
92-06757-A	36: 1	Subsegment C Upper half	632.7	678	655.35[QC:f]
92-06758-A		Subsegment C Lower half	640.4	585.6	613[QC:f]
92-06759-A	36: 2	Subsegment D Upper half	1,112.7	1,176.3	1,144.5[QC:f]
92-06760-A		Subsegment D Lower half	1,679.4	1,903.6	1,791.5[QC:f]
92-06740-A1	Core 34	Solid composite	1,570.4	1,336.9	1,453.65
92-06767-A1	Core 36	Solid composite	882.5	803.3	842.9[QC:e,f]
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06733-A1	34: 1	Whole	1,357.8	1,132.6	1,245.2
92-06734-A1	34: 2	Subsegment B	3,138.8	3,276.5	3,207.65
92-06735-A1		Subsegment C	1,305.8	1,583.2	1,444.5
92-06736-A1		Subsegment D	2,755.9	3,044.3	2,900.1
92-08169-A1	35: 2	Whole	8,626.1	8,900	8,763.05
92-06761-A1	36: 1	Subsegment C	4,703	3,013.4	3,858.2[QC:e,f]
92-06762-A1		Subsegment D	893.9	666.4	780.15[QC:e]

Table B2-46. Tank 241-C-112 Analytical Results: Silicon (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	1,338.7	1,371.8	1,355.25[QC:f]
92-06764-A1		Subsegment B	1,324.7	1,233.5	1,279.1
92-06765-A1		Subsegment C	880.2	842.3	861.25
92-06766-A1		Subsegment D	1,402.8	1,400.4	1,401.6
92-06740-B1	Core 34	Solid composite	3,157.1	n/a	3,157.1
92-06767-H1	Core 36	Solid composite	1,950.3	1,911.1	1,930.7[QC:f]
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	58	63.7	60.85
92-06740-C1	Core 34	Solid composite	76.4	n/a	76.4
92-06767-C1	Core 36	Solid composite	99.6	39.9	69.75[QC:e]

Table B2-47. Tank 241-C-112 Analytical Results: Silver (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	<2.186	<	<2.186
92-06730-A		Subsegment C Lower half	<1.627	<1.321	<1.474[QC:e]
92-06731-A		Subsegment D Upper half	<1.329	<1.459	<1.394
92-06732-A		Subsegment D Lower half	<1.523	<1.447	<1.485
92-08167-A	35: 2	Upper half	<1.569	<1.514	<1.5415
92-08168-A		Lower half	<1.447	<1.574	<1.5105
92-08169-F1		Whole	<1.37	<1.471	<1.4205
92-06757-A	36: 1	Subsegment C Upper half	<1.264	<1.418	<1.341
92-06758-A		Subsegment C Lower half	<1.562	<1.426	<1.494
92-06759-A	36: 2	Subsegment D Upper half	<1.675	<1.302	<1.4885[QC:e]
92-06760-A		Subsegment D Lower half	<1.576	<1.601	<1.5885
92-06740-A1	Core 34	Solid composite	<1.681	<1.382	<1.5315
92-06767-A1	Core 36	Solid composite	<1.559	<1.554	<1.5565[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<40.86	<41.39	<41.125
92-06734-A1	34: 2	Subsegment B	<32.18	<45.74	<38.96[QC:e]
92-06735-A1		Subsegment C	<45.38	<36.1	<40.74[QC:e]
92-06736-A1		Subsegment D	<38.39	<39.04	<38.715
92-08169-A1	35: 2	Whole	<42.88	<43.08	<42.98
92-06761-A1	36: 1	Subsegment C	<38.8	<32.73	<35.765
92-06762-A1		Subsegment D	<32.51	<36.42	<34.465

Table B2-47. Tank 241-C-112 Analytical Results: Silver (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<34.5	<36.1	<35.3
92-06764-A1		Subsegment B	<18.52	<15.79	<17.155
92-06765-A1		Subsegment C	<14.67	<15.83	<15.25
92-06766-A1		Subsegment D	<16.26	<14.91	<15.585
92-06740-B1	Core 34	Solid composite	<24.34	n/a	<24.34
92-06767-H1	Core 36	Solid composite	<17.54	<17.26	<17.4
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<1.53	<1.583	<1.5565
92-06740-C1	Core 34	Solid composite	<2.588	n/a	<2.588
92-06767-C1	Core 36	Solid composite	<1.519	<1.548	<1.5335

Table B2-48. Tank 241-C-112 Analytical Results: Sodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	85,165.4	83,679.5	84,422.4
92-06730-A		Subsegment C Lower half	80,118.9	83,401.6	81,760.2
92-06731-A		Subsegment D Upper half	74,795.1	82,802.4	78,798.8
92-06732-A		Subsegment D Lower half	79,291.4	84,930	82,110.7
92-08167-A	35: 2	Upper half	68,701	69,415.6	69,058.3
92-08168-A		Lower half	66,796.5	71,331.7	69,064.1
92-08169-F1		Whole	76,361.6	65,282.8	70,822.2
92-06757-A	36: 1	Subsegment C Upper half	74,657.4	75,027.3	74,842.4
92-06758-A		Subsegment C Lower half	73,044.7	71,706.4	72,375.5
92-06759-A	36: 2	Subsegment D Upper half	95,604.7	97,629.4	96,617
92-06760-A		Subsegment D Lower half	93,803.1	99,336	96,569.6
92-06740-A1	Core 34	Solid composite	97,347	92,815.4	95,081.2
92-06767-A1	Core 36	Solid composite	1.027E+05	1.029E+05	1.028E+05[QC:d]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	90,862.3	91,100.8	90,981.6
92-06734-A1	34: 2	Subsegment B	86,858	91,136.4	88,997.2
92-06735-A1		Subsegment C	79,271.9	1.007E+05	89,976.2[QC:e]
92-06736-A1		Subsegment D	78,902.4	78,213.4	78,557.9
92-08169-A1	35: 2	Whole	81,973.9	81,141.5	81,557.7
92-06761-A1	36: 1	Subsegment C	68,898.1	42,587.8	55,743[QC:e]
92-06762-A1		Subsegment D	82,798.7	80,602.5	81,700.6

Table B2-48. Tank 241-C-112 Analytical Results: Sodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	91,675	91,998.5	91,836.8
92-06764-A1		Subsegment B	90,050.9	91,137.9	90,594.4
92-06765-A1		Subsegment C	1.055E+05	1.059E+05	1.057E+05
92-06766-A1		Subsegment D	1.043E+05	1.059E+05	1.051E+05
92-06740-B1	Core 34	Solid composite	1.149E+05	n/a	1.149E+05
92-06767-H1	Core 36	Solid composite	1.188E+05	1.227E+05	1.207E+05
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	60,688.5	60,363.5	60,526
92-06740-C1	Core 34	Solid composite	1.049E+05	n/a	1.049E+05
92-06767-C1	Core 36	Solid composite	1.310E+05	85,753	1.084E+05[QC:e]

Table B2-49. Tank 241-C-112 Analytical Results: Strontium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	149.6	142.3	145.95
92-06730-A		Subsegment C Lower half	141.6	138.8	140.2
92-06731-A		Subsegment D Upper half	209.8	175.6	192.7
92-06732-A		Subsegment D Lower half	177.1	187.8	182.45
92-08167-A	35: 2	Upper half	395.1	383.8	389.45
92-08168-A		Lower half	351.9	374.9	363.4
92-08169-F1		Whole	413	356.5	384.75
92-06757-A	36: 1	Subsegment C Upper half	152.9	151	151.95
92-06758-A		Subsegment C Lower half	149.1	152	150.55
92-06759-A	36: 2	Subsegment D Upper half	606.5	629.3	617.9
92-06760-A		Subsegment D Lower half	614.8	713	663.9
92-06740-A1	Core 34	Solid composite	219.1	205.7	212.4
92-06767-A1	Core 36	Solid composite	349.8	293.7	321.75
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	166.6	137	151.8
92-06734-A1	34: 2	Subsegment B	274.5	271.5	273
92-06735-A1		Subsegment C	150.9	147.1	149
92-06736-A1		Subsegment D	185.9	189.1	187.5
92-08169-A1	35: 2	Whole	429.6	450.5	440.05
92-06761-A1	36: 1	Subsegment C	160.5	128.4	144.45[QC:e]
92-06762-A1		Subsegment D	119	115.6	117.3

Table B2-49. Tank 241-C-112 Analytical Results: Strontium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	236.7	218.3	227.5
92-06764-A1		Subsegment B	168.6	168	168.3
92-06765-A1		Subsegment C	319.6	298.8	309.2
92-06766-A1		Subsegment D	609.6	625.9	617.75
92-06740-B1	Core 34	Solid composite	241.3	n/a	241.3
92-06767-H1	Core 36	Solid composite	396.9	394.5	395.7
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	4.5	5.8	5.15[QC:e,f]
92-06740-C1	Core 34	Solid composite	1.3	n/a	1.3[QC:f]
92-06767-C1	Core 36	Solid composite	2.2	9.7	5.95[QC:e]

Table B2-50. Tank 241-C-112 Analytical Results: Tellurium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	<26.63	14.7	<20.665[QC:e]
92-06730-A		Subsegment C Lower half	<19.82	<16.08	<17.95[QC:e]
92-06731-A		Subsegment D Upper half	27.3	<17.77	<22.535[QC:e]
92-06732-A		Subsegment D Lower half	21.5	<17.62	<19.56
92-08167-A	35: 2	Upper half	26.1	23.6	24.85
92-08168-A		Lower half	23.4	23.2	23.3
92-08169-F1		Whole	22.2	31.6	26.9[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	<15.39	<17.27	<16.33
92-06758-A		Subsegment C Lower half	<19.02	<17.37	<18.195
92-06759-A	36: 2	Subsegment D Upper half	<20.41	<15.86	<18.135[QC:e]
92-06760-A		Subsegment D Lower half	111.2	122.8	117
92-06740-A1	Core 34	Solid composite	<20.47	21.8	<21.135
92-06767-A1	Core 36	Solid composite	<18.99	<18.93	<18.96
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<497.7	<504.1	<500.9
92-06734-A1	34: 2	Subsegment B	<392	<557	<474.5[QC:e]
92-06735-A1		Subsegment C	<552.7	<439.7	<496.2[QC:e]
92-06736-A1		Subsegment D	<467.6	<475.5	<471.55
92-08169-A1	35: 2	Whole	<522.2	<524.7	<523.45
92-06761-A1	36: 1	Subsegment C	<472.6	<398.7	<435.65
92-06762-A1		Subsegment D	<396	<443.6	<419.8

Table B2-50. Tank 241-C-112 Analytical Results: Tellurium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<419.7	<439.7	<420.0
92-06764-A1		Subsegment B	<225.5	<192.3	<208.9
92-06765-A1		Subsegment C	<178.7	<192.8	<185.75
92-06766-A1		Subsegment D	<198.1	<181.6	<189.85
92-06740-B1	Core 34	Solid composite	<296.4	n/a	<296.4
92-06767-H1	Core 36	Solid composite	<213.6	<210.2	<211.9
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<18.63	<19.28	<18.955
92-06740-C1	Core 34	Solid composite	<31.52	n/a	<31.52
92-06767-C1	Core 36	Solid composite	<18.51	<18.86	<18.685

Table B2-51. Tank 241-C-112 Analytical Results: Thallium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-06729-A	34: 2	Subsegment C Upper half	<153.9	<	<153.9
92-06730-A		Subsegment C Lower half	<114.6	<92.98	<103.79[QC:e]
92-06731-A		Subsegment D Upper half	<93.58	<102.8	<98.19
92-06732-A		Subsegment D Lower half	<107.2	<101.9	<104.55
92-08167-A	35: 2	Upper half	495.3	531.9	513.6
92-08168-A		Lower half	496.4	569.3	532.85
92-08169-F1		Whole	859.2	689.7	774.45[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	<88.97	<99.84	<94.405
92-06758-A		Subsegment C Lower half	<109.9	<100.4	<105.15
92-06759-A	36: 2	Subsegment D Upper half	308.2	177.7	242.95[QC:e]
92-06760-A		Subsegment D Lower half	2,907.3	3,150.7	3,029
92-06740-A1	Core 34	Solid composite	<118.4	106.6	<112.5
92-06767-A1	Core 36	Solid composite	316.8	306.6	311.7
Solids: fusion			μg/g	μg/g	μg/g
92-06733-A1	34: 1	Whole	<2,877	<2,914	<2,895.5
92-06734-A1	34: 2	Subsegment B	<2,266	<3,220	<2,743[QC:e]
92-06735-A1		Subsegment C	<3,195	<2,542	<2,868.5[QC:e]
92-06736-A1		Subsegment D	<2,703	<2,749	<2,726
92-08169-A1	35: 2	Whole	<3,019	<3,034	<3,026.5
92-06761-A1	36: 1	Subsegment C	<2,732	<2,305	<2,518.5
92-06762-A1		Subsegment D	<2,289	<2,564	<2,426.5

Table B2-51. Tank 241-C-112 Analytical Results: Thallium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<2,426	<2,542	<2,484
92-06764-A1		Subsegment B	<1,304	<1,112	<1,208
92-06765-A1		Subsegment C	<1,033	<1,115	<1,074
92-06766-A1		Subsegment D	<1,145	<1,050	<1,097.5
92-06740-B1	Core 34	Solid composite	<1,714	n/a	<1,714
92-06767-H1	Core 36	Solid composite	<1,235	<1,215	<1,225
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<107.7	<111.4	<109.55
92-06740-C1	Core 34	Solid composite	<182.2	n/a	<182.2
92-06767-C1	Core 36	Solid composite	<107	<109	<108

Table B2-52. Tank 241-C-112 Analytical Results: Thorium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	44.2	43.2	43.7
92-06730-A		Subsegment C Lower half	28.1	40.5	34.3[QC:e]
92-06731-A		Subsegment D Upper half	74.6	82.4	78.5
92-06732-A		Subsegment D Lower half	81.4	88.7	85.05
92-08167-A	35: 2	Upper half	178.4	176.3	177.35
92-08168-A		Lower half	164	170.1	167.05
92-08169-F1		Whole	189.8	155.9	172.85
92-06757-A	36: 1	Subsegment C Upper half	59.3	52.1	55.7
92-06758-A		Subsegment C Lower half	54.5	50.9	52.7
92-06759-A	36: 2	Subsegment D Upper half	17.1	21	19.05[QC:e]
92-06760-A		Subsegment D Lower half	1,392	1,540.1	1,466.05
92-06740-A1	Core 34	Solid composite	99.7	106.1	102.9
92-06767-A1	Core 36	Solid composite	97.6	91.8	94.7
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<384.5	<389.5	<387
92-06734-A1	34: 2	Subsegment B	<302.8	<430.4	<366.6[QC:e]
92-06735-A1		Subsegment C	<427	<339.7	<383.35[QC:e]
92-06736-A1		Subsegment D	<361.3	<367.4	<364.35
92-08169-A1	35: 2	Whole	<403.5	<405.4	<404.45
92-06761-A1	36: 1	Subsegment C	<365.2	<308	<336.6
92-06762-A1		Subsegment D	<305.9	<342.7	<324.3

Table B2-52. Tank 241-C-112 Analytical Results: Thorium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	<324.2	<339.8	<332.0
92-06764-A1		Subsegment B	226.4	169.9	198.15[QC:e]
92-06765-A1		Subsegment C	<138.1	<149	<143.55
92-06766-A1		Subsegment D	<153	<140.3	<146.65
92-06740-B1	Core 34	Solid composite	<229	n/a	<229
92-06767-H1	Core 36	Solid composite	<165	<162.4	<163.7
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	<14.39	<14.89	<14.64
92-06740-C1	Core 34	Solid composite	<24.35	n/a	<24.35
92-06767-C1	Core 36	Solid composite	<14.3	<14.57	<14.435

Table B2-53. Tank 241-C-112 Analytical Results: Titanium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	25.6	22.8	24.2[QC:f]
92-06730-A		Subsegment C Lower half	22	20.2	21.1[QC:f]
92-06731-A		Subsegment D Upper half	41.4	40.9	41.15
92-06732-A		Subsegment D Lower half	41.2	48.3	44.75
92-08167-A	35: 2	Upper half	79.5	78.8	79.15
92-08168-A		Lower half	69.6	75.1	72.35
92-08169-F1		Whole	82.5	82.3	82.4[QC:f]
92-06757-A	36: 1	Subsegment C Upper half	45.4	51.7	48.55
92-06758-A		Subsegment C Lower half	41.9	38.3	40.1[QC:f]
92-06759-A	36: 2	Subsegment D Upper half	20.6	21.2	20.9[QC:f]
92-06760-A		Subsegment D Lower half	37.3	40.6	38.95
92-06740-A1	Core 34	Solid composite	46.7	43.8	45.25
92-06767-A1	Core 36	Solid composite	26.5	24.5	25.5[QC:f]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	54.9	128.8	91.85[QC:e]
92-06734-A1	34: 2	Subsegment B	57.3	<31.66	<44.48[QC:e]
92-06735-A1		Subsegment C	56.8	79.6	68.2[QC:e]
92-06736-A1		Subsegment D	98.4	106.4	102.4
92-08169-A1	35: 2	Whole	195.4	216	205.7
92-06761-A1	36: 1	Subsegment C	222.3	151.7	187[QC:e]
92-06762-A1		Subsegment D	<22.51	<25.21	<23.86

Table B2-53. Tank 241-C-112 Analytical Results: Titanium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<23.85	<25	<24.4
92-06764-A1		Subsegment B	27.3	35.8	31.55[QC:e]
92-06765-A1		Subsegment C	42.8	34.5	38.65[QC:e]
92-06766-A1		Subsegment D	34.1	26.3	30.2[QC:e]
92-06740-B1	Core 34	Solid composite	99.4	n/a	99.4
92-06767-H1	Core 36	Solid composite	79.8	81.5	80.65
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<1.059	<1.096	<1.0775
92-06740-C1	Core 34	Solid composite	<1.792	n/a	<1.792
92-06767-C1	Core 36	Solid composite	<1.052	1.51	<1.28[QC:e]

Table B2-54. Tank 241-C-112 Analytical Results: Total Uranium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	5,978.1	5,796.4	5,887.25
92-06730-A		Subsegment C Lower half	6,248.4	5,659.8	5,954.1
92-06731-A		Subsegment D Upper half	18,947.1	20,338.6	19,642.8
92-06732-A		Subsegment D Lower half	20,285	22,038.4	21,161.7
92-08167-A	35: 2	Upper half	86,499.1	84,818.5	85,658.8
92-08168-A		Lower half	77,991.1	81,652.5	79,821.8
92-08169-F1		Whole	89,548.5	68,789.6	79,169.1[QC:e]
92-06757-A	36: 1	Subsegment C Upper half	4,519	4,497.9	4,508.45
92-06758-A		Subsegment C Lower half	4,275.8	4,449.3	4,362.55
92-06759-A	36: 2	Subsegment D Upper half	56,633	57,462.1	57,047.6
92-06760-A		Subsegment D Lower half	55,873.4	61,866.8	58,870.1
92-06740-A1	Core 34	Solid composite	12,412.3	11,808.8	12,110.5
92-06767-A1	Core 36	Solid composite	91,473.4	76,301.3	83,887.4[QC:d]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<2,817	<2,853	<2,835
92-06734-A1	34: 2	Subsegment B	2,963.6	<3,152	<3,057.8
92-06735-A1		Subsegment C	4,856.6	6,459.8	5,658.2[QC:e]
92-06736-A1		Subsegment D	20,463.6	19,732.3	20,097.9
92-08169-A1	35: 2	Whole	86,289.1	93,171.9	89,730.5
92-06761-A1	36: 1	Subsegment C	2,845.4	<2,256	<2,550.7[QC:e]
92-06762-A1		Subsegment D	3,495.5	2,722.3	3,108.9[QC:e]

Table B2-54. Tank 241-C-112 Analytical Results: Total Uranium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	41,400.1	38,267.3	39,833.7
92-06764-A1		Subsegment B	1.718E+05	1.776E+05	1.747E+05
92-06765-A1		Subsegment C	1.159E+05	1.085E+05	1.122E+05
92-06766-A1		Subsegment D	57,961.1	59,671.6	58,816.3
92-06740-B1	Core 34	Solid composite	14,369	n/a	14,369
92-06767-H1	Core 36	Solid composite	1.070E+05	1.028E+05	1.049E+05
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	476.4	443.9	460.15
92-06740-C1	Core 34	Solid composite	715.3	n/a	715.3
92-06767-C1	Core 36	Solid composite	6,207.4	2,985.6	4,596.5[QC:e]

Table B2-55. Tank 241-C-112 Analytical Results: Vanadium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	10.8	9.2	10
92-06730-A		Subsegment C Lower half	8.3	9	8.65
92-06731-A		Subsegment D Upper half	16.6	16.6	16.6
92-06732-A		Subsegment D Lower half	20.8	17.7	19.25
92-08167-A	35: 2	Upper half	26.3	25.5	25.9
92-08168-A		Lower half	23.3	25.1	24.2
92-08169-F1		Whole	25.9	23.7	24.8
92-06757-A	36: 1	Subsegment C Upper half	12.8	12.7	12.75
92-06758-A		Subsegment C Lower half	13.6	12.2	12.9
92-06759-A	36: 2	Subsegment D Upper half	8	8.5	8.25
92-06760-A		Subsegment D Lower half	75.6	83.7	79.65
92-06740-A1	Core 34	Solid composite	22.5	18.9	20.7
92-06767-A1	Core 36	Solid composite	10.2	10.5	10.35
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<47.15	<47.76	<47.455
92-06734-A1	34: 2	Subsegment B	<37.13	<52.77	<44.95[QC:e]
92-06735-A1		Subsegment C	<52.36	<41.66	<47.01[QC:e]
92-06736-A1		Subsegment D	<44.3	<45.04	<44.67
92-08169-A1	35: 2	Whole	<49.47	<49.71	<49.59
92-06761-A1	36: 1	Subsegment C	<44.77	<37.77	<41.27
92-06762-A1		Subsegment D	<37.51	<42.02	<39.765

Table B2-55. Tank 241-C-112 Analytical Results: Vanadium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<39.76	<41.66	<43.66
92-06764-A1		Subsegment B	<21.37	<18.22	<19.795
92-06765-A1		Subsegment C	<16.93	<18.27	<17.6
92-06766-A1		Subsegment D	<18.76	<17.21	<17.985
92-06740-B1	Core 34	Solid composite	33	n/a	33
92-06767-H1	Core 36	Solid composite	<20.24	<19.91	<20.075
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	2.5	2.7	2.6
92-06740-C1	Core 34	Solid composite	<2.986	n/a	<2.986
92-06767-C1	Core 36	Solid composite	<1.753	<1.786	<1.7695

Table B2-56. Tank 241-C-112 Analytical Results: Zinc (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06729-A	34: 2	Subsegment C Upper half	189.3	119.2	154.25[QC:e]
92-06730-A		Subsegment C Lower half	134.7	114.4	124.55
92-06731-A		Subsegment D Upper half	188.9	177.5	183.2
92-06732-A		Subsegment D Lower half	215.1	191.2	203.15
92-08167-A	35: 2	Upper half	307.6	294.5	301.05
92-08168-A		Lower half	293.8	289.4	291.6
92-08169-F1		Whole	312	293.7	302.85
92-06757-A	36: 1	Subsegment C Upper half	328.5	324.1	326.3
92-06758-A		Subsegment C Lower half	355.1	313.3	334.2
92-06759-A	36: 2	Subsegment D Upper half	188.7	196	192.35
92-06760-A		Subsegment D Lower half	191.4	212.8	202.1
92-06740-A1	Core 34	Solid composite	255.9	169.2	212.55[QC:e]
92-06767-A1	Core 36	Solid composite	191.5	206	198.75
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-06733-A1	34: 1	Whole	211.7	174.6	193.15[QC:f]
92-06734-A1	34: 2	Subsegment B	238.5	287.9	263.2[QC:f]
92-06735-A1		Subsegment C	241.4	233.3	237.35[QC:f]
92-06736-A1		Subsegment D	281.5	342.8	312.15[QC:f]
92-08169-A1	35: 2	Whole	496.4	494.4	495.4[QC:f]
92-06761-A1	36: 1	Subsegment C	538.5	632.6	585.55[QC:f]
92-06762-A1		Subsegment D	199	231.4	215.2

Table B2-56. Tank 241-C-112 Analytical Results: Zinc (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			**µg/g**	**µg/g**	**µg/g**
92-06763-A1	36: 2	Subsegment A	979.7	172	575.85[QC:e,f]
92-06764-A1		Subsegment B	120.4	103.5	111.95[QC:f]
92-06765-A1		Subsegment C	117.4	122.2	119.8
92-06766-A1		Subsegment D	248.1	222.9	235.5[QC:f]
92-06740-B1	Core 34	Solid composite	293.9	n/a	293.9[QC:f]
92-06767-H1	Core 36	Solid composite	328.7	296.7	312.7[QC:f]
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-08169-B1	35: 2	Whole	3	3.5	3.25
92-06740-C1	Core 34	Solid composite	5.6	n/a	5.6[QC:f]
92-06767-C1	Core 36	Solid composite	4.3	7.3	5.8[QC:e]

Table B2-57. Tank 241-C-112 Analytical Results: Zirconium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-06729-A	34: 2	Subsegment C Upper half	18.4	5.5	11.95[QC:e]
92-06730-A		Subsegment C Lower half	8.2	7.7	7.95
92-06731-A		Subsegment D Upper half	9	12.9	10.95[QC:e]
92-06732-A		Subsegment D Lower half	11.2	10.9	11.05
92-08167-A	35: 2	Upper half	11.9	11	11.45
92-08168-A		Lower half	9.8	12.2	11[QC:e]
92-08169-F1		Whole	11	10.4	10.7
92-06757-A	36: 1	Subsegment C Upper half	14.6	14.8	14.7
92-06758-A		Subsegment C Lower half	19.5	<1.389	<10.4445[QC:e]
92-06759-A	36: 2	Subsegment D Upper half	18.4	16.5	17.45
92-06760-A		Subsegment D Lower half	49.4	53.1	51.25
92-06740-A1	Core 34	Solid composite	21	14.4	17.7[QC:e]
92-06767-A1	Core 36	Solid composite	31.6	28.2	29.9[QC:e]
Solids: fusion			µg/g	µg/g	µg/g
92-06733-A1	34: 1	Whole	<39.82	<40.33	<40.075
92-06734-A1	34: 2	Subsegment B	<31.36	<44.56	<37.96[QC:e]
92-06735-A1		Subsegment C	<44.21	<35.18	<39.695[QC:e]
92-06736-A1		Subsegment D	67	53.7	60.35[QC:e]
92-08169-A1	35: 2	Whole	67.4	80.8	74.1
92-06761-A1	36: 1	Subsegment C	<37.81	<31.89	<34.85
92-06762-A1		Subsegment D	<31.68	<35.49	<33.585

Table B2-57. Tank 241-C-112 Analytical Results: Zirconium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion (Cont'd)			µg/g	µg/g	µg/g
92-06763-A1	36: 2	Subsegment A	<33.58	<35.18	<34.38
92-06764-A1		Subsegment B	31.6	15.7	23.65[QC:e]
92-06765-A1		Subsegment C	20	<15.43	<17.715[QC:e]
92-06766-A1		Subsegment D	<15.85	<14.53	<15.19
92-06740-B1	Core 34	Solid composite	<23.71	n/a	<23.71
92-06767-H1	Core 36	Solid composite	36.7	30.6	33.65
Solids: water digest			µg/g	µg/g	µg/g
92-08169-B1	35: 2	Whole	<1.49	<1.542	<1.516
92-06740-C1	Core 34	Solid composite	<2.522	n/a	<2.522
92-06767-C1	Core 36	Solid composite	<1.48	<1.509	<1.4945

Table B2-58. Tank 241-C-112 Analytical Results: Aluminum (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<30.77	<30.23	<30.5
92-06774-A1	Core 35	Liquid composite	<30.91	<30.81	<30.86
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<30.93	<31.5	<31.215
92-06774-C1	Core 35	Liquid composite	<34.75	<33.93	<34.34

Table B2-59. Tank 241-C-112 Analytical Results: Antimony (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<7.991	<7.85	<7.9205
92-06774-A1	Core 35	Liquid composite	<8.027	<8.001	<8.014
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	9.1	10.5	9.8
92-06774-C1	Core 35	Liquid composite	<9.025	<8.811	<8.918

Table B2-60. Tank 241-C-112 Analytical Results: Arsenic (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**μg/g**	**μg/g**	**μg/g**
92-06747-A1	Core 34	Liquid composite	<17.06	<16.76	<16.91
92-06774-A1	Core 35	Liquid composite	<17.14	<17.08	<17.11
Drainable Liquid: water digest			**μg/g**	**μg/g**	**μg/g**
92-06747-C1	Core 34	Liquid composite	<17.15	<17.46	<17.305
92-06774-C1	Core 35	Liquid composite	<19.27	<18.81	<19.04

Table B2-61. Tank 241-C-112 Analytical Results: Barium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**μg/g**	**μg/g**	**μg/g**
92-06747-A1	Core 34	Liquid composite	<1.346	<1.322	<1.334
92-06774-A1	Core 35	Liquid composite	<1.352	1.4	<1.376
Drainable Liquid: water digest			**μg/g**	**μg/g**	**μg/g**
92-06747-C1	Core 34	Liquid composite	<1.353	<1.378	<1.3655
92-06774-C1	Core 35	Liquid composite	<1.52	<1.484	<1.502

Table B2-62. Tank 241-C-112 Analytical Results: Beryllium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<0.5384	<0.5288	<0.5336
92-06774-A1	Core 35	Liquid composite	<0.5408	<0.539	<0.5399
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<0.5411	<0.551	<0.54605
92-06774-C1	Core 35	Liquid composite	<0.608	<0.5936	<0.6008

Table B2-63. Tank 241-C-112 Analytical Results: Boron (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<10.03	<9.849	<9.9395[QC:f]
92-06774-A1	Core 35	Liquid composite	98	88	93[QC:f]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	22.6	23.1	22.85
92-06774-C1	Core 35	Liquid composite	20.2	17.8	19

Table B2-64. Tank 241-C-112 Analytical Results: Cadmium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<1.262	<1.239	<1.2505
92-06774-A1	Core 35	Liquid composite	<1.267	<1.263	<1.265
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<1.268	<1.291	<1.2795
92-06774-C1	Core 35	Liquid composite	<1.425	<1.391	<1.408

Table B2-65. Tank 241-C-112 Analytical Results: Calcium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<0.2692	<0.2644	<0.2668[QC:f]
92-06774-A1	Core 35	Liquid composite	394.1	433.1	413.6[QC:f]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<0.2706	<0.2755	<0.27305[QC:f]
92-06774-C1	Core 35	Liquid composite	43.7	36.8	40.25[QC:f]

Table B2-66. Tank 241-C-112 Analytical Results: Cerium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**μg/g**	**μg/g**	**μg/g**
92-06747-A1	Core 34	Liquid composite	<17.14	<16.84	<16.99
92-06774-A1	Core 35	Liquid composite	<17.22	<17.16	<17.19
Drainable Liquid: water digest			**μg/g**	**μg/g**	**μg/g**
92-06747-C1	Core 34	Liquid composite	<17.23	<17.55	<17.39
92-06774-C1	Core 35	Liquid composite	<19.36	<18.9	<19.13

Table B2-67. Tank 241-C-112 Analytical Results: Chromium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**μg/g**	**μg/g**	**μg/g**
92-06747-A1	Core 34	Liquid composite	162.3	160.7	161.5
92-06774-A1	Core 35	Liquid composite	152.2	151.6	151.9
Drainable Liquid: water digest			**μg/g**	**μg/g**	**μg/g**
92-06747-C1	Core 34	Liquid composite	171.3	169.4	170.35
92-06774-C1	Core 35	Liquid composite	154.2	155	154.6

Table B2-68. Tank 241-C-112 Analytical Results: Cobalt (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	<31.38	<30.82	<31.1
92-06774-A1	Core 35	Liquid composite	<31.52	<31.41	<31.465
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<31.54	<32.12	<31.83
92-06774-C1	Core 35	Liquid composite	<35.44	<34.6	<35.02

Table B2-69. Tank 241-C-112 Analytical Results: Copper (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	1.9	2.1	2
92-06774-A1	Core 35	Liquid composite	2.2	4	3.1[QC:e,f]
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<1.488	<1.515	<1.5015
92-06774-C1	Core 35	Liquid composite	<1.672	<1.632	<1.652

Table B2-70. Tank 241-C-112 Analytical Results: Dysprosium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	<0.8917	<0.8759	<0.8838
92-06774-A1	Core 35	Liquid composite	<0.8957	<0.8927	<0.8942
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<0.8962	<0.9127	<0.90445
92-06774-C1	Core 35	Liquid composite	<1.007	<0.9832	<0.9951

Table B2-71. Tank 241-C-112 Analytical Results: Iron (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	1,042	1,046.6	1,044.3[QC:d]
92-06774-A1	Core 35	Liquid composite	741	750.4	745.7
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	1,210.3	1,196.4	1,203.35
92-06774-C1	Core 35	Liquid composite	787.7	791.2	789.45

Table B2-72. Tank 241-C-112 Analytical Results: Lanthanum (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<2.086	<2.049	<2.0675
92-06774-A1	Core 35	Liquid composite	<2.096	<2.089	<2.0925
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<2.097	<2.135	<2.116
92-06774-C1	Core 35	Liquid composite	<2.356	<2.3	<2.328

Table B2-73. Tank 241-C-112 Analytical Results: Lead (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<13.98	<13.73	<13.855
92-06774-A1	Core 35	Liquid composite	<14.04	<14	<14.02
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<14.05	<14.31	<14.18
92-06774-C1	Core 35	Liquid composite	<15.79	<15.42	<15.605

Table B2-74. Tank 241-C-112 Analytical Results: Lithium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<1.245	<1.223	<1.234
92-06774-A1	Core 35	Liquid composite	<1.251	<1.246	<1.2485
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<1.251	<1.274	<1.2625
92-06774-C1	Core 35	Liquid composite	<1.406	<1.373	<1.3895

Table B2-75. Tank 241-C-112 Analytical Results: Magnesium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<2	0.5	<1.25[QC:e,f]
92-06774-A1	Core 35	Liquid composite	53.3	58.8	56.05[QC:f]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	1	0.9	0.95[QC:f]
92-06774-C1	Core 35	Liquid composite	24	21.5	22.75[QC:f]

Table B2-76. Tank 241-C-112 Analytical Results: Manganese (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	1.2	0.5	0.85[QC:e,f]
92-06774-A1	Core 35	Liquid composite	1	1.2	1.1[QC:f]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	0.4	0.4	0.4
92-06774-C1	Core 35	Liquid composite	0.3	0.3	0.3

Table B2-77. Tank 241-C-112 Analytical Results: Molybdenum (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	26.6	27.6	27.1
92-06774-A1	Core 35	Liquid composite	21.4	20.5	20.95
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	27.9	27.9	27.9
92-06774-C1	Core 35	Liquid composite	21	21.4	21.2

Table B2-78. Tank 241-C-112 Analytical Results: Neodymium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**μg/g**	**μg/g**	**μg/g**
92-06747-A1	Core 34	Liquid composite	<8.345	<8.197	<8.271
92-06774-A1	Core 35	Liquid composite	<8.382	<8.355	<8.3685
Drainable Liquid: water digest			**μg/g**	**μg/g**	**μg/g**
92-06747-C1	Core 34	Liquid composite	<8.387	<8.541	<8.464
92-06774-C1	Core 35	Liquid composite	<9.424	<9.201	<9.3125

Table B2-79. Tank 241-C-112 Analytical Results: Nickel (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**μg/g**	**μg/g**	**μg/g**
92-06747-A1	Core 34	Liquid composite	634.6	633.8	634.2[QC:d]
92-06774-A1	Core 35	Liquid composite	437.2	446.8	442
Drainable Liquid: water digest			**μg/g**	**μg/g**	**μg/g**
92-06747-C1	Core 34	Liquid composite	792.8	784.4	788.6
92-06774-C1	Core 35	Liquid composite	491.3	492.7	492

Table B2-80. Tank 241-C-112 Analytical Results: Phosphorus (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	3,649.9	3,654.3	3,652.1
92-06774-A1	Core 35	Liquid composite	3,977.2	3,941.3	3,959.25
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	3,795.6	3,720.1	3,757.85
92-06774-C1	Core 35	Liquid composite	3,986.3	4,110.8	4,048.55

Table B2-81. Tank 241-C-112 Analytical Results: Potassium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	518.9	509.8	514.35
92-06774-A1	Core 35	Liquid composite	512.7	502.1	507.4
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	492.3	501.1	496.7
92-06774-C1	Core 35	Liquid composite	457.2	465.8	461.5

Table B2-82. Tank 241-C-112 Analytical Results: Rhenium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<2.911	<2.859	<2.885
92-06774-A1	Core 35	Liquid composite	<2.924	<2.914	<2.919
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<2.925	<2.979	<2.952
92-06774-C1	Core 35	Liquid composite	<3.287	<3.209	<3.248

Table B2-83. Tank 241-C-112 Analytical Results: Rhodium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<13.81	<13.57	<13.69
92-06774-A1	Core 35	Liquid composite	<13.87	<13.83	<13.85
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<13.88	<14.14	<14.01
92-06774-C1	Core 35	Liquid composite	<15.6	<15.23	<15.415

Table B2-84. Tank 241-C-112 Analytical Results: Ruthenium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	<5.888	<5.784	<5.836
92-06774-A1	Core 35	Liquid composite	<5.915	<5.895	<5.905
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<5.919	<6.027	<5.973
92-06774-C1	Core 35	Liquid composite	<6.65	<6.493	<6.5715

Table B2-85. Tank 241-C-112 Analytical Results: Selenium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	<25.49	<25.04	<25.265[QC: c]
92-06774-A1	Core 35	Liquid composite	<25.6	<25.52	<25.56
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<25.62	<26.09	<25.855
92-06774-C1	Core 35	Liquid composite	<28.78	<28.1	<28.44

Table B2-86. Tank 241-C-112 Analytical Results: Silicon (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	21	<38.3	<29.65[QC:d,e,f]
92-06774-A1	Core 35	Liquid composite	109.1	116.3	112.7[QC:f]
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<9.284	<9.454	<9.369
92-06774-C1	Core 35	Liquid composite	28.6	22	25.3[QC:e]

Table B2-87. Tank 241-C-112 Analytical Results: Silver (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	<1.312	<1.289	<1.3005
92-06774-A1	Core 35	Liquid composite	<1.318	<1.314	<1.316
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<1.319	<1.343	<1.331
92-06774-C1	Core 35	Liquid composite	<1.482	1.7	<1.591

Table B2-88. Tank 241-C-112 Analytical Results: Sodium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	82,110.9	82,620.6	82,365.8
92-06774-A1	Core 35	Liquid composite	70,212.9	69,612.6	69,912.8[QC:c]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	86,016.1	85,326.4	85,671.2
92-06774-C1	Core 35	Liquid composite	71,151.7	71,499.5	71,325.6

Table B2-89. Tank 241-C-112 Analytical Results: Strontium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<0.0673	<0.0661	<0.0667[QC:f]
92-06774-A1	Core 35	Liquid composite	1.4	1.5	1.45[QC:f]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<0.06764	<0.06888	<0.06826
92-06774-C1	Core 35	Liquid composite	0.3	0.3	0.3[QC:f]

Table B2-90. Tank 241-C-112 Analytical Results: Tellurium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<15.98	<15.7	<15.84
92-06774-A1	Core 35	Liquid composite	<16.05	<16	<16.025
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<16.06	<16.36	<16.21
92-06774-C1	Core 35	Liquid composite	<18.05	<17.62	<17.835

Table B2-91. Tank 241-C-112 Analytical Results: Thallium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	228.6	180.7	204.65[QC:e]
92-06774-A1	Core 35	Liquid composite	<92.81	<92.51	<92.66
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<92.87	<94.57	<93.72
92-06774-C1	Core 35	Liquid composite	<104.3	<101.9	<103.1

Table B2-92. Tank 241-C-112 Analytical Results: Thorium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<12.35	<12.13	<12.24
92-06774-A1	Core 35	Liquid composite	<12.4	<12.36	<12.38
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<12.41	<12.64	<12.525
92-06774-C1	Core 35	Liquid composite	<13.95	<13.62	<13.785

Table B2-93. Tank 241-C-112 Analytical Results: Titanium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<0.9085	<0.8924	<0.90045[QC:f]
92-06774-A1	Core 35	Liquid composite	2.4	2.7	2.55[QC:f]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<0.9131	<0.9299	<0.9215
92-06774-C1	Core 35	Liquid composite	<1.026	<1.002	<1.014

Table B2-94. Tank 241-C-112 Analytical Results: Total Uranium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	1,129.4	1,125.2	1,127.3
92-06774-A1	Core 35	Liquid composite	931.9	924.3	928.1
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	1,148.3	1,123.3	1,135.8
92-06774-C1	Core 35	Liquid composite	977.9	980.9	979.4

Table B2-95. Tank 241-C-112 Analytical Results: Vanadium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-A1	Core 34	Liquid composite	<1.514	<1.487	<1.5005
92-06774-A1	Core 35	Liquid composite	<1.521	<1.516	<1.5185
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	<1.522	<1.55	<1.536
92-06774-C1	Core 35	Liquid composite	<1.71	<1.67	<1.69

Table B2-96. Tank 241-C-112 Analytical Results: Zinc (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	2.7	2.2	2.45[QC:e,f]
92-06774-A1	Core 35	Liquid composite	3.8	4.7	4.25[QC:e,f]
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	3.9	3.8	3.85[QC:f]
92-06774-C1	Core 35	Liquid composite	2.6	2.7	2.65

Table B2-97. Tank 241-C-112 Analytical Results: Zirconium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µg/g	µg/g	µg/g
92-06747-A1	Core 34	Liquid composite	<1.279	<1.256	<1.2675[QC:f]
92-06774-A1	Core 35	Liquid composite	<1.284	<1.28	<1.282
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	<1.285	<1.309	<1.297
92-06774-C1	Core 35	Liquid composite	<1.444	<1.41	<1.427

Table B2-98. Tank 241-C-112 Analytical Results: Total Uranium (LF).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µg/g**	**µg/g**	**µg/g**
92-08169-A1	35: 2	WHOLE	43,100	45,500	44,300
92-06740-B1	Core 34	Solid composite	17,700	n/a	17,700
92-06767-H1	Core 36	Solid composite	88,900	99,200	94,050
Drainable Liquid: acid digest			**µg/g**	**µg/g**	**µg/g**
92-06747-B1	Core 34	Liquid composite	1,180	1,200	1,190
92-06774-B1	Core 35	Liquid composite	1,010	896	953
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	1,020	1,120	1,070
92-06774-C1	Core 35	Liquid composite	885	1,060	973

Table B2-99. Tank 241-C-112 Analytical Results: Hexavalent Chromium (Colorimetric).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-06767-C1	Core 36	Solid composite	60	90	75[QC:e]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	125	136	131
92-06774-C1	Core 35	Liquid composite	93	93	93

Table B2-100. Tank 241-C-112 Analytical Results: Ammonia (Nitrogen) (Ion-Selective Electrode).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg N/g	µg N/g	µg N/g
92-08169-B1	35: 2	Whole	5.1	<5.1	<5.1[QC:d]
92-06740-C1	Core 34	Solid composite	17	<5	<11[QC:e,f]
92-06767-C1	Core 36	Solid composite	<5	6.9	<5.95[QC:e]
Drainable Liquid: water digest			µg N/g	µg N/g	µg N/g
92-06747-C1	Core 34	Liquid composite	23	23	23[QC:f]
92-06774-C1	Core 35	Liquid composite	<5.0	<5.0	<5.0[QC:d]

Table B2-101. Tank 241-C-112 Analytical Results: Cyanide. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-06733-B1	34: 1	Whole	1,870	1,840	1,860
92-06734-B1	34: 2	Subsegment B	1,620	1,540	1,580
92-06735-B1		Subsegment C	1,440	1,440	1,440
92-06736-B1		Subsegment D	1,150	1,330	1,240
92-08169-B1	35: 2	Whole	770	790	780
92-06761-B1	36: 1	Subsegment C	1,150	1,020	1,090
92-06762-B1		Subsegment D	1,140	1,200	1,170
92-06763-B1	36: 2	Subsegment A	1,220	1,130	1,180
92-06764-B1		Subsegment B	730	740	740
92-06765-B1		Subsegment C	860	780	820
92-06766-B1		Subsegment D	880	920	900
92-06740-C1	Core 34	Solid composite	2,050	1,790	1,920
92-06767-C1	Core 36	Solid composite	1,590	1,040	1,320[QC:e]

Table B2-101. Tank 241-C-112 Analytical Results: Cyanide. (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	1,640	1,550	1,600
92-06774-C1	Core 35	Liquid composite	1,030	1,020	1,030

Table B2-102. Tank 241-C-112 Analytical Results: Chloride (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-06733-B1	34: 1	Whole	1,100	1,100	1,100
92-06734-B1	34: 2	Subsegment B	1,000	1,000	1,000
92-06735-B1		Subsegment C	900	900	900
92-06736-B1		Subsegment D	800	900	850
92-08169-B1	35: 2	Whole	800	700	750[QC:b]
92-06761-B1	36: 1	Subsegment C	900	900	900
92-06762-B1		Subsegment D	900	1,000	950
92-06763-B1	36: 2	Subsegment A	900	900	900
92-06764-B1		Subsegment B	600	600	600
92-06765-B1		Subsegment C	700	600	650
92-06766-B1		Subsegment D	700	700	700
92-06740-C1	Core 34	Solid composite	1,300	1,200	1,250
92-06767-C1	Core 36	Solid composite	1,200	900	1,050[QC:c,e]
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	1,000	1,000	1,000
92-06774-C1	Core 35	Liquid composite	900	900	900

Table B2-103. Tank 241-C-112 Analytical Results: Fluoride (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-06733-B1	34: 1	Whole	1,000	1,000	1,000
92-06734-B1	34: 2	Subsegment B	900	900	900
92-06735-B1		Subsegment C	900	900	900
92-06736-B1		Subsegment D	900	1,000	950
92-08169-B1	35: 2	Whole	300	300	300[QC:c]
92-06761-B1	36: 1	Subsegment C	500	400	450[QC:c,e,f]
92-06762-B1		Subsegment D	500	500	500
92-06763-B1	36: 2	Subsegment A	500	500	500
92-06764-B1		Subsegment B	400	400	400
92-06765-B1		Subsegment C	400	400	400
92-06766-B1		Subsegment D	1,100	1,200	1,150
92-06740-C1	Core 34	Solid composite	1,000	600	800[QC:e]
92-06767-C1	Core 36	Solid composite	500	400	450[QC:e]
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	600	600	600[QC:c]
92-06774-C1	Core 35	Liquid composite	300	300	300

Table B2-104. Tank 241-C-112 Analytical Results: Nitrate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-06733-B1	34: 1	Whole	80,000	78,000	79,000
92-06734-B1	34: 2	Subsegment B	69,000	70,000	69,500
92-06735-B1		Subsegment C	64,000	65,000	64,500
92-06736-B1		Subsegment D	58,000	61,000	59,500[QC:d]
92-08169-B1	35: 2	Whole	43,000	44,000	43,500[QC:d]
92-06761-B1	36: 1	Subsegment C	64,000	60,000	62,000
92-06762-B1		Subsegment D	64,000	69,000	66,500
92-06763-B1	36: 2	Subsegment A	66,000	66,000	66,000
92-06764-B1		Subsegment B	43,000	42,000	42,500
92-06765-B1		Subsegment C	48,000	44,000	46,000
92-06766-B1		Subsegment D	51,000	51,000	51,000
92-06740-C1	Core 34	Solid composite	80,000	82,000	81,000
92-06767-C1	Core 36	Solid composite	87,000	56,000	71,500[QC:c,e]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	72,000	72,000	72,000
92-06774-C1	Core 35	Liquid composite	58,000	59,000	58,500

Table B2-105. Tank 241-C-112 Analytical Results: Nitrite (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-06733-B1	34: 1	Whole	61,000	59,000	60,000
92-06734-B1	34: 2	Subsegment B	53,000	54,000	53,500
92-06735-B1		Subsegment C	48,000	49,000	48,500
92-06736-B1		Subsegment D	44,000	47,000	45,500[QC:d]
92-08169-B1	35: 2	Whole	34,000	35,000	34,500
92-06761-B1	36: 1	Subsegment C	50,000	46,000	48,000
92-06762-B1		Subsegment D	49,000	53,000	51,000
92-06763-B1	36: 2	Subsegment A	48,000	49,000	48,500
92-06764-B1		Subsegment B	31,000	29,000	30,000
92-06765-B1		Subsegment C	33,000	31,000	32,000
92-06766-B1		Subsegment D	35,000	35,000	35,000
92-06740-C1	Core 34	Solid composite	62,000	65,000	63,500
92-06767-C1	Core 36	Solid composite	64,000	41,000	52,500[QC:c,e]
Drainable Liquid: water digest			µg/g	µg/g	µg/g
92-06747-C1	Core 34	Liquid composite	55,000	55,000	55,000
92-06774-C1	Core 35	Liquid composite	46,000	46,000	46,000

Table B2-106. Tank 241-C-112 Analytical Results: Phosphate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
92-06733-B1	34: 1	Whole	10,800	12,500	11,700
92-06734-B1	34: 2	Subsegment B	12,000	12,200	12,100
92-06735-B1		Subsegment C	11,200	11,900	11,600
92-06736-B1		Subsegment D	16,500	18,500	17,500
92-08169-B1	35: 2	Whole	18,100	17,600	17,900[QC:d]
92-06761-B1	36: 1	Subsegment C	17,700	15,500	16,600
92-06762-B1		Subsegment D	16,600	19,000	17,800
92-06763-B1	36: 2	Subsegment A	23,300	22,400	22,900
92-06764-B1		Subsegment B	20,400	20,400	20,400
92-06765-B1		Subsegment C	38,000	43,000	40,500
92-06766-B1		Subsegment D	54,000	56,000	55,000
92-06740-C1	Core 34	Solid composite	19,100	19,200	19,200
92-06767-C1	Core 36	Solid composite	60,000	39,000	49,500[QC:c,e]
Drainable Liquid: water digest			**μg/g**	**μg/g**	**μg/g**
92-06747-C1	Core 34	Liquid composite	11,700	11,600	11,700
92-06774-C1	Core 35	Liquid composite	12,900	13,000	13,000

Table B2-107. Tank 241-C-112 Analytical Results: Sulfate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-06733-B1	34: 1	Whole	14,200	14,600	14,400
92-06734-B1	34: 2	Subsegment B	13,100	13,000	13,100
92-06735-B1		Subsegment C	11,600	11,900	11,800
92-06736-B1		Subsegment D	10,700	11,600	11,200[QC:d]
92-08169-B1	35: 2	Whole	8,600	8,600	8,600
92-06761-B1	36: 1	Subsegment C	12,600	11,500	12,100
92-06762-B1		Subsegment D	12,500	13,500	13,000
92-06763-B1	36: 2	Subsegment A	12,500	12,300	12,400
92-06764-B1		Subsegment B	8,300	7,800	8,100
92-06765-B1		Subsegment C	8,900	8,300	8,600
92-06766-B1		Subsegment D	9,500	9,500	9,500
92-06740-C1	Core 34	Solid composite	15,600	15,700	15,700
92-06767-C1	Core 36	Solid composite	16,200	11,200	13,700[QC:c,e]
Drainable Liquid: water digest			**µg/g**	**µg/g**	**µg/g**
92-06747-C1	Core 34	Liquid composite	11,700	11,600	11,700
92-06774-C1	Core 35	Liquid composite	10,900	10,900	10,900

Table B2-108. Tank 241-C-112 Analytical Results: pH Measurement.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**pH**	**pH**	**pH**
92-06733-B1	34: 1	Whole	9.66	9.88	9.77
92-06734-B1	34: 2	Subsegment B	9.95	9.82	9.89
92-06735-B1		Subsegment C	8.75	9.86	9.31
92-06736-B1		Subsegment D	9.91	9.52	9.72
92-08169-B1	35: 2	Whole	9.47	10.06	9.77
92-06761-B1	36: 1	Subsegment C	9.19	9.04	9.12
92-06762-B1		Subsegment D	9.52	9.47	9.50
92-06763-B1	36: 2	Subsegment A	9.54	9.53	9.54
92-06764-B1		Subsegment B	8.77	9.06	8.92
92-06765-B1		Subsegment C	9.28	9.29	9.29
92-06766-B1		Subsegment D	9.42	9.29	9.36
92-06740-C1	Core 34	Solid composite	10.33	NA	10.33
92-06767-C1	Core 36	Solid composite	9.36	9.03	9.20
Drainable Liquid			**pH**	**pH**	**pH**
92-06747	Core 34	Liquid composite	10.3	NA	10.3
92-06774	Core 35	Liquid composite	10.47	NA	10.47

Note:

NA = not available; duplicate sample not analyzed

Table B2-109. Tank 241-C-112 Analytical Results: Total Carbon (Persulfate Oxidation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: direct			µg C/g	µg C/g	µg C/g
92-06733-C1	34: 1	Whole	10,200	14,900	12,600[QC:e,f]
92-06734-C1	34: 2	Subsegment B	8,200	8,500	8,400[QC:f]
92-06735-C1		Subsegment C	8,300	8,200	8,300[QC:f]
92-06736-C1		Subsegment D	10,800	10,300	10,600[QC:f]
92-08169-C1	35: 2	Whole	6,000	6,500	6,300
92-06761-C1	36: 1	Subsegment C	11,200	13,000	12,100
92-06762-C1		Subsegment D	10,200	10,400	10,300
92-06763-C1	36: 2	Subsegment A	8,100	8,600	8,400
92-06764-C1		Subsegment B	5,200	5,200	5,200
92-06765-C1		Subsegment C	6,500	6,000	6,300
92-06766-C1		Subsegment D	5,000	5,400	5,200
92-06767-J1	Core 36	Solid composite	6,900	7,100	7,000
Solids: water digest			µg C/g	µg C/g	µg C/g
92-08169-B1	35: 2	Whole	6,200	5,900	6,100
92-06740-C1	Core 34	Solid composite	11,900	11,500	11,700[QC:f]
92-06767-C1	Core 36	Solid composite	7,000	6,300	6,700
Drainable Liquid: water digest			µg C/g	µg C/g	µg C/g
92-06747-C1	Core 34	Liquid composite	8,000	5,100	6,600[QC:e]
92-06774-C1	Core 35	Liquid composite	6,100	6,100	6,100

Table B2-110. Tank 241-C-112 Analytical Results: Total Inorganic Carbon (Persulfate Oxidation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: direct			µg C/g	µg C/g	µg C/g
92-06733-C1	34: 1	Whole	6,300	9,000	7,700[QC:e]
92-06734-C1	34: 2	Subsegment B	5,400	5,300	5,400
92-06735-C1		Subsegment C	5,300	5,000	5,200[QC:f]
92-06736-C1		Subsegment D	6,700	6,500	6,600[QC:f]
92-08169-C1	35: 2	Whole	3,800	3,600	3,700
92-06761-C1	36: 1	Subsegment C	3,500	4,400	4,000[QC:e]
92-06762-C1		Subsegment D	5,400	5,400	5,400
92-06763-C1	36: 2	Subsegment A	4,200	4,800	4,500
92-06764-C1		Subsegment B	2,500	2,500	2,500
92-06765-C1		Subsegment C	3,500	3,200	3,400
92-06766-C1		Subsegment D	2,900	2,900	2,900
92-06767-J1	Core 36	Solid composite	3,800	4,100	4,000
Solids: water digest			µg C/g	µg C/g	µg C/g
92-08169-B1	35: 2	Whole	5,200	4,600	4,900[QC:f]
92-06740-C1	Core 34	Solid composite	8,850	8,300	8,580
92-06767-C1	Core 36	Solid composite	5,900	4,700	5,300[QC:e]
Drainable Liquid: water digest			µg C/g	µg C/g	µg C/g
92-06747-C1	Core 34	Liquid composite	6,100	5,000	5,600
92-06774-C1	Core 35	Liquid composite	4,900	4,500	4,700[QC:f]

Table B2-111. Tank 241-C-112 Analytical Results: Total Organic Carbon (Persulfate Oxidation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: direct			**µg C/g**	**µg C/g**	**µg C/g**
92-06733-C1	34: 1	Whole	3,900	5,900	4,900QC:e,f
92-06734-C1	34: 2	Subsegment B	2,800	3,200	3,000QC:f
92-06735-C1		Subsegment C	3,000	3,200	3,100QC:f
92-06736-C1		Subsegment D	4,100	3,800	4,000QC:f
92-08169-C1	35: 2	Whole	2,200	2,900	2,600QC:e
92-06761-C1	36: 1	Subsegment C	7,700	8,600	8,200
92-06762-C1		Subsegment D	4,800	5,000	4,900
92-06763-C1	36: 2	Subsegment A	3,900	3,800	3,900
92-06764-C1		Subsegment B	2,700	2,700	2,700
92-06765-C1		Subsegment C	3,000	2,800	2,900
92-06766-C1		Subsegment D	2,100	2,500	2,300
92-06767-J1	Core 36	Solid composite	3,100	3,000	3,100
Solids: water digest			**µg C/g**	**µg C/g**	**µg C/g**
92-08169-B1	35: 2	Whole	1,000	1,300	1,150QC:e
92-06740-C1	Core 34	Solid composite	3,050	3,200	3,130QC:f
92-06767-C1	Core 36	Solid composite	1,100	1,600	1,350QC:e,f
Drainable Liquid: water digest			**µg C/g**	**µg C/g**	**µg C/g**
92-06747-C1	Core 34	Liquid composite	1,900	2,100	2,000QC:f
92-06774-C1	Core 35	Liquid composite	1,200	1,600	1,400QC:e

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Solids: Core 36, Solid Composite, Sample Number 92-06767-E1			
Acenaphthene	<18	<22	<20
Acenaphthylene	<18	<22	<20
Anthracene	<18	<22	<20
Benzo(a)anthracene	<18	<22	<20
Benzo(a)pyrene	<18	<22	<20
Benzo(b)fluoranthene	<18	<22	<20
Benzo(g,h,i)perylene	<18	<22	<20
Benzo(k)fluoranthene	<18	<22	<20
Benzoic acid	<90	<110	<100
Benzyl alcohol	<18	<22	<20
Bis(2-Chloroethoxy)methane	<18	<22	<20
Bis(2-chloroethyl) ether	<18	<22	<20
Bis(2-Chloroisopropyl) ether	<18	<22	<20
Bis(2-ethylhexyl) phthalate	6.4	6.1	6.3
4-Bromophenylphenyl ether	<18	<22	<20
Butylbenzylphthalate	<18	<22	<20
4-Chloro-3-methylphenol	<18	<22	<20
4-Chloroaniline	<18	<22	<20
2-Chloronaphthalene	<18	<22	<20
2-Chlorophenol	<18	<22	<20
4-Chlorophenylphenyl ether	<18	<22	<20
Chrysene	<18	<22	<20
Di-n-butylphthalate	<1.3	<1.4	<1.4
Di-n-octylphthalate	<18	<22	<20
Dibenz[a,h]anthracene	<18	<22	<20
Dibenzofuran	<18	<22	<20
2,6-Dibromophenol	7.6	8.9	8.3[QC:g]
1,2-Dichlorobenzene	<18	<22	<20
1,3-Dichlorobenzene	<18	<22	<20
1,4-Dichlorobenzene	<18	<22	<20
3,3'-Dichlorobenzidine	<36	<44	<40

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Solids: Core 36, Solid Composite, Sample Number 92-06767-E1 (Continued)			
2,4-Dichlorophenol	<18	<22	<20
Diethylphthalate	<18	<22	<20
Dimethyl phthalate	<18	<22	<20
2,4-Dimethylphenol	<18	<22	<20
4,6-Dinitro-o-cresol	<90	<110	<100
2,4-Dinitrophenol	<90	<110	<100
2,4-Dinitrotoluene	<18	<22	<20
2,6-Dinitrotoluene	<18	<22	<20
Dodecane	32	32	32[QC:g]
Fluoranthene	<18	<22	<20
Fluorene	<18	<22	<20
Hexachlorobenzene	<18	<22	<20
Hexachlorobutadiene	<18	<22	<20
Hexachlorocyclopentadiene	<18	<22	<20
Hexachloroethane	<18	<22	<20
Indeno(1,2,3-cd)pyrene	<18	<22	<20
Isophorone	<18	<22	<20
2-Methylnaphthalene	<18	<22	<20
2-Methylphenol	<18	<22	<20
4-Methylphenol	<18	<22	<20
Naphthalene	<18	<22	<20
2-Nitroaniline	<90	<110	<100
3-Nitroaniline	<90	<110	<100
4-Nitroaniline	<90	<110	<100
Nitrobenzene	<18	<22	<20
2-Nitrophenol	<18	<22	<20
4-Nitrophenol	<90	<110	<100
N-Nitroso-di-n-dipropylamine	<18	<22	<20
N-Nitrosodiphenylamine	<18	<22	<20
Pentachlorophenol	<90	<110	<100
Pentadecane	23	27	25[QC:g]

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Solids: Core 36, Solid Composite, Sample Number 92-06767-E1 (Continued)			
Phenanthrene	<18	<22	<20
Phenol	<18	<22	<20
Pyrene	<18	<22	<20
Tetradecane	45	45	45[QC:g]
Tributyl Phosphate	200	210	210[QC:g]
1,2,4-Trichlorobenzene	<18	<22	<20
2,4,5-Trichlorophenol	<90	<110	<100
2,4,6-Trichlorophenol	<18	<22	<20
Tridecane	48	48	48[QC:g]
Undecane	13	11	12[QC:g]
Drainable Liquid: Core 34, Liquid Composite, Sample Number 92-06747-E1[2]			
Acenaphthene	<17	<22	<20
Acenaphthylene	<17	<22	<20
Anthracene	<17	<22	<20
Benzo(a)anthracene	<17	<22	<20
Benzo(a)pyrene	<17	<22	<20
Benzo(b)fluoranthene	<17	<22	<20
Benzo(ghi)perylene	<17	<22	<20
Benzo(k)fluoranthene	<17	<22	<20
Benzoic acid	<87	<110	<99
Benzyl alcohol	<17	<22	<20
2,6-Bis(1,1-dimethylethyl)-4-methylphenol	19	20	20[QC:g]
Bis(2-Chloroethoxy)methane	<17	<22	<20
Bis(2-chloroethyl) ether	<17	<22	<20
Bis(2-Chloroisopropyl) ether	<17	<22	<20
Bis(2-ethylhexyl) phthalate	<17	<22	<20
4-Bromophenylphenyl ether	<17	<22	<20
Butylbenzylphthalate	<17	<22	<20
4-Chloro-3-methylphenol	<17	<22	<20[QC:c]
4-Chloroaniline	<17	<22	<20
2-Chloronaphthalene	<17	<22	<20

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Drainable Liquid: Core 34, Liquid Composite, Sample Number 92-06747-E1[2] (Continued)			
2-Chlorophenol	<17	<22	<20[QC:c]
4-Chlorophenylphenyl ether	<17	<22	<20
Chrysene	<17	<22	<20
Di-n-butylphthalate	<17	<22	<20
Di-n-octylphthalate	<0.61	<22	<11
Dibenz[a,h]anthracene	<17	<22	<20
Dibenzofuran	<17	<22	<20
2,6-Dibromo-4-nitrophenol	17	36	27[QC:g]
1,2-Dichlorobenzene	<17	<22	<20
1,3-Dichlorobenzene	<17	<22	<20
1,4-Dichlorobenzene	<17	<22	<20[QC:c]
3,3'-Dichlorobenzidine	<35	<44	<40
Dichlorohexane	10	22	16[QC:g]
2,4-Dichlorophenol	<17	<22	<20
Diethylphthalate	<17	<22	<20
Dimethyl phthalate	<17	<22	<20
2,4-Dimethylphenol	<17	<22	<20
4,6-Dinitro-o-cresol	<87	<110	<99
2,4-Dinitrophenol	<87	<110	<99
2,4-Dinitrotoluene	<17	<22	<20[QC:c]
2,6-Dinitrotoluene	<17	<22	<20
Fluoranthene	<17	<22	<20
Fluorene	<17	<22	<20
Hexachlorobenzene	<17	<22	<20
Hexachlorobutadiene	<17	<22	<20
Hexachlorocyclopentadiene	<17	<22	<20
Hexachloroethane	<17	<22	<20
Indeno(1,2,3-cd)pyrene	<17	<22	<20
Isophorone	<17	<22	<20
2-Methylnaphthalene	<17	<22	<20

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Drainable Liquid: Core 34, Liquid Composite, Sample Number 92-06747-E1[2] (Continued)			
2-Methylphenol	<17	<22	<20
4-Methylphenol	<17	<22	<20
Naphthalene	<17	<22	<20
2-Nitroaniline	<87	<110	<99
3-Nitroaniline	<87	<110	<99
4-Nitroaniline	<87	<110	<99
Nitrobenzene	<17	<22	<20
1-Nitrocyclohexene	13	14	14[QC:g]
2-Nitrophenol	<17	<22	<20
4-Nitrophenol	<87	<110	<99[QC:d]
N-Nitroso-di-n-dipropylamine	<17	<22	<20
N-Nitrosodiphenylamine	<17	<22	<20
Pentachlorophenol	<87	<110	<99
Phenanthrene	<17	<22	<20
Phenol	<17	<22	<20[QC:c]
Pyrene	<17	<22	<20
1,2,4-Trichlorobenzene	<17	<22	<20[QC:c]
2,4,5-Trichlorophenol	<87	<110	<99
2,4,6-Trichlorophenol	<17	<22	<20
Drainable Liquid: Core 35, Liquid Composite, Sample Number 92-06774-E1[3]			
Acenaphthene	<22	<21	<22
Acenaphthylene	<22	<21	<22
Anthracene	<22	<21	<22
Benzo(a)anthracene	<22	<21	<22
Benzo(a)pyrene	<22	<21	<22
Benzo(b)fluoranthene	<22	<21	<22
Benzo(ghi)perylene	<22	<21	<22
Benzo(k)fluoranthene	<22	<21	<22
Benzoic acid	<110	<100	<110
Benzyl alcohol	<22	<21	<22

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Drainable Liquid: Core 35, Liquid Composite, Sample Number 92-06774-E1[3] (Continued)			
Bis(2-Chloroethoxy)methane	<22	<21	<22
Bis(2-chloroethyl) ether	<22	<21	<22
Bis(2-Chloroisopropyl) ether	<22	<21	<22
Bis(2-ethylhexyl) phthalate	<22	<21	<22
4-Bromophenylphenyl ether	<22	<21	<22
Butylbenzylphthalate	<22	<21	<22
4-Chloro-3-methylphenol	<22	<21	<22
4-Chloroaniline	<22	<21	<22
Chlorocyclohexene	n/d	12	12[QC:g]
2-Chloronaphthalene	<22	<21	<22
2-Chlorophenol	<22	<21	<22
4-Chlorophenylphenyl ether	<22	<21	<22
Chrysene	<22	<21	<22
Di-n-butylphthalate	<22	<21	<22
Di-n-octylphthalate	<22	<21	<22
Dibenz[a,h]anthracene	<22	<21	<22
Dibenzofuran	<22	<21	<22
2,6-Dibromo-4-nitrophenol	n/d	38	38[QC:g]
1,2-Dichlorobenzene	<22	<21	<22
1,3-Dichlorobenzene	<22	<21	<22
1,4-Dichlorobenzene	<22	<21	<22
3,3'-Dichlorobenzidine	<43	<41	<42
Dichlorocyclohexane	n/d	64	64[QC:g]
2,4-Dichlorophenol	<22	<21	<22
Diethylphthalate	<22	<21	<22
Dimethyl phthalate	<22	<21	<22
2,4-Dimethylphenol	<22	<21	<22
4,6-Dinitro-o-cresol	<110	<100	<110
2,4-Dinitrophenol	<110	<100	<110
2,4-Dinitrotoluene	<22	<21	<22

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Drainable Liquid: Core 35, Liquid Composite, Sample Number 92-06774-E1[3] (Continued)			
2,6-Dinitrotoluene	<22	<21	<22
Fluoranthene	<22	<21	<22
Fluorene	<22	<21	<22
Hexachlorobenzene	<22	<21	<22
Hexachlorobutadiene	<22	<21	<22
Hexachlorocyclopentadiene	<22	<21	<22
Hexachloroethane	<22	<21	<22
Indeno(1,2,3-cd)pyrene	<22	<21	<22
Isophorone	<22	<21	<22
2-Methylnaphthalene	<22	<21	<22
2-Methylphenol	<22	<21	<22
4-Methylphenol	<22	<21	<22
Naphthalene	<22	<21	<22
2-Nitroaniline	<110	<100	<110
3-Nitroaniline	<110	<100	<110
4-Nitroaniline	<110	<100	<110
Nitrobenzene	<22	<21	<22
2-Nitrophenol	<22	<21	<22
4-Nitrophenol	<110	<100	<110
N-Nitroso-di-n-dipropylamine	<22	<21	<22
N-Nitrosodiphenylamine	<22	<21	<22
Pentachlorophenol	<110	<100	<110
Phenanthrene	<22	<21	<22
Phenol	<22	<21	<22
Pyrene	<22	<21	<22

Table B2-112. Tank 241-C-112 Analytical Results: Semivolatile Organic Analysis. (8 sheets)

Semivolatile Organic Compound	Result µg/g	Duplicate µg/g	Mean[1] µg/g
Drainable Liquid: Core 35, Liquid Composite, Sample Number 92-06774-E1[3] (Continued)			
1,2,4-Trichlorobenzene	<22	<21	<22
2,4,5-Trichlorophenol	<110	<100	<110
2,4,6-Trichlorophenol	<22	<21	<22

Notes:

n/d = compound not detected; no detection limit given

[1]Results with a QC flag of "g" indicate a tentatively identified compound based on the nearest library match to the compound's mass spectrum. The compound may or may not actually be present in the original tank waste. The compound's concentration was estimated using the response factor of the nearest-eluting internal standard.

[2]The tentatively identified compound 2-fluoro-4-nitrophenol was found in this sample but is not reported in this table. The compound is a nitration adduct of the surrogate compound 2-fluorophenol that was added to the sample to assess analyte recovery during sample extraction.

[3]The tentatively identified compounds 2-fluoro-4-nitrophenol, 2-nitrophenol-d4, and 4-nitrophenol-d4 were found in this sample but are not reported in this table. These compounds are nitration adducts of surrogate compounds that were added to the sample to assess analyte recovery during sample extraction.

Table B2-113. Tank 241-C-112 Analytical Results: Volatile Organic Analysis. (2 sheets)

Volatile Organic Compound	Result µg/g	Duplicate µg/g	Mean µg/g
Solids: Core 36, Solid Composite, Sample Number 92-06750-A1			
Acetone	<6.8	<6.1	<6.5
Benzene	<3.4	<3.1	<3.3
Bromodichloromethane	<3.4	<3.1	<3.3
Bromoform	<3.4	<3.1	<3.3
Bromomethane	<6.8	<6.1	<6.5
2-Butanone	<6.8	<6.1	<6.5
Carbon disulfide	<3.4	<3.1	<3.3
Carbon tetrachloride	<3.4	<3.1	<3.3
Chlorobenzene	<3.4	<3.1	<3.3
Chloroethane	<6.8	<6.1	<6.5
Chloroform	<3.4	<3.1	<3.3
Chloromethane	<6.8	0.68	<3.7[QC:e]
Dibromochloromethane	<3.4	<3.1	<3.3
1,1-Dichloroethane	<3.4	<3.1	<3.3
1,2-Dichloroethane	<3.4	<3.1	<3.3
1,1-Dichloroethene	<3.4	<3.1	<3.3
1,2-Dichloroethene	<3.4	<3.1	<3.3
1,2-Dichloropropane	<3.4	<3.1	<3.3
cis-1,3-Dichloropropene	<3.4	<3.1	<3.3
trans-1,3-Dichloropropene	<3.4	<3.1	<3.3
Ethylbenzene	<3.4	<3.1	<3.3
2-Hexanone	<6.8	<6.1	<6.5
Hexone	<6.8	<6.1	<6.5
Methylene chloride	<3.4	<3.1	<3.3
Styrene	<3.4	<3.1	<3.3
1,1,2,2-Tetrachloroethane	<3.4	<3.1	<3.3
Tetrachloroethene	<3.4	<3.1	<3.3
Toluene	<3.4	<3.1	<3.3
1,1,1-Trichloroethane	4.5	16	10[QC:e]

Table B2-113. Tank 241-C-112 Analytical Results: Volatile Organic Analysis. (2 sheets)

Volatile Organic Compound	Result µg/g	Duplicate µg/g	Mean µg/g
Solids: Core 36, Solid Composite, Sample Number 92-06750-A1			
1,1,2-Trichloroethane	<3.4	<3.1	<3.3
Trichloroethene	<3.4	<3.1	<3.3
Vinyl acetate	<6.8	<6.1	<6.5
Vinyl chloride	<6.8	<6.1	<6.5
Xylenes (total)	<3.4	<3.1	<3.3

Table B2-114. Tank 241-C-112 Analytical Results: ETOX (Extractible Organic Halides).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
92-06767-F1	Core 36	Solid composite	7.0	3.6	5.3[QC:c,e,f]
Drainable Liquid			µg/g	µg/g	µg/g
92-06774-F1	Core 35	Liquid composite	3.0	3.0	3.0
Drainable Liquid			µg/mL	µg/mL	µg/mL
92-06747-F1	Core 34	Liquid composite	1.6	0.8	1.2[QC:e,f]

Table B2-115. Tank 241-C-112 Analytical Results: Plutonium Isotopic Mass Percent (Mass Spectrometry).

Run	Pu-238[1] Mass %	Pu-239 Mass %	Pu-240 Mass %	Pu-241 Mass %	Pu-242 Mass %
Core 34, Solid Composite, Sample Number 92-06740-B1: fusion[2]					
Result	0.037	93.885	5.846	0.154	0.078
Duplicate	NA	NA	NA	NA	NA
Mean	0.037	93.885	5.846	0.154	0.078
Core 36, Solid Composite, Sample Number 92-06767-H1: fusion					
Result	0.021	95.982	3.895	0.076	0.026
Duplicate	0.025	95.792	3.990	0.129	0.065
Mean	0.023	95.887	3.943	0.103[QC:e]	0.046[QC:e]
Core 34, Drainable Liquid Composite, Sample Number 92-06747-C1[2]					
Result	0.028	93.936	5.790	0.173	0.073
Duplicate	NA	NA	NA	NA	NA
Mean	0.028	93.936	5.790	0.173	0.073

Notes:

NA = not available

[1]Because of isobaric contamination from uranium-238, the plutonium-238 content was determined by alpha energy analysis.

[2]The sample (result) was analyzed July 8, 1992; the duplicate was not analyzed.

Table B2-116. Tank 241-C-112 Analytical Results: Uranium Isotopic Mass Percent (Mass Spectrometry).

Run	U-234 Mass %	U-235 Mass %	U-236 Mass %	U-238 Mass %
Core 34, Solid Composite, Sample Number 92-06740-B1: fusion[1]				
Result	0.0075	0.6715	0.103	99.3107
Duplicate	NA	NA	NA	NA
Mean	0.0075	0.6715	0.103	99.3107
Core 35: 2, Whole, Sample Number 92-08169-A1: fusion				
Result	0.0060	0.6832	0.0059	99.3048
Duplicate	0.0054	0.6803	0.0059	99.3084
Mean	0.0057	0.6818	0.0059	99.3066
Core 36, Solid Composite, Sample Number 92-06767-H1: fusion				
Result	0.0058	0.6789	0.0073	99.308
Duplicate	0.0050	0.6769	0.0073	99.311
Mean	0.0054	0.6779	0.0073	99.310
Core 34, Drainable Liquid Composite, Sample Number 92-06747-C1[2]				
Result	0.0055	0.6656	0.0094	99.3194
Duplicate	0.0053	0.6688	0.0092	99.3168
Mean	0.0054	0.6672	0.0093	99.3181
Core 35, Drainable Liquid Composite, Sample Number 92-06774-C1				
Result	0.0052	0.6726	0.0087	99.3135
Duplicate	0.0061	0.6682	0.0078	99.3179
Mean	0.0057	0.6704	0.0083	99.3157

Notes:

NA = not available

[1]The sample (result) was analyzed June 29, 1992; the duplicate was not analyzed.

[2]The sample (result) and duplicate were analyzed June 29, 1992.

Table B2-117. Tank 241-C-112 Analytical Results: Total Alpha (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	35: 2	Whole	1.15	1.21	1.18
92-06740-B1[1]	Core 34	Solid composite	0.946	NA	0.946
92-06767-H1	Core 36	Solid composite	0.149	0.179	0.164[QC:f]
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-B1	35: 2	Whole	0.00734	0.00958	0.00846[QC:e]
92-06740-C1[2]	Core 34	Solid composite	0.0102	0.00698	0.00859[QC:e]
92-06767-C1	Core 36	Solid composite	0.00459	0.00748	0.00604[QC:e]
Drainable Liquid: acid digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-B1[3]	Core 34	Liquid composite	0.00386	0.00335	0.00361[QC:f]
92-06747-B6[4]		Liquid composite	0.00199	0.00178	0.00189
Drainable Liquid: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	Core 35	Liquid composite	7.82E-04	8.58E-04	8.20E-04

Notes:

NA = not available; replicate sample not analyzed

[1]The sample (result) was counted June 17, 1992.
[2]The sample (result) was counted June 10, 1992; the duplicate was counted July 13, 1992.
[3]The sample (result) and duplicate were counted July 24, 1992.
[4]The sample (result) and duplicate were counted June 9, 1992.

Table B2-118. Tank 241-C-112 Analytical Results: Americium-241 (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	35: 2	Whole	0.719	0.806	0.763
92-06740-B1[1]	Core 34	Solid composite	0.613	NA	0.613
92-06767-H1	Core 36	Solid composite	0.0606	0.0618	0.0612
Drainable Liquid: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-C1[2]	Core 34	Liquid composite	<1E-04	<1E-04	<1E-04
92-06774-C1	Core 35	Liquid composite	4E-06	8E-06	6E-06[QC:e]

Notes:

NA = not available; replicate sample not analyzed

[1]The sample was counted June 17, 1992.

[2]The sample and duplicate were counted June 4, 1992.

Table B2-119. Tank 241-C-112 Analytical Results: Neptunium-237 (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	35: 2	Whole	0.00105	0.00134	0.00120[QC:e]
92-06740-B1[1]	Core 34	Solid composite	6.62E-04	NA	6.62E-04
92-06767-H1	Core 36	Solid composite	4.33E-04	3.84E-04	4.09E-04[QC:f]
Drainable Liquid: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-C1[2]	Core 34	Liquid composite	<1E-05	<1E-05	<1E-05[QC:f]
92-06774-C1	Core 35	Liquid composite	<2E-06	<2E-06	<2E-06[QC:f]

Notes:

NA = not available; replicate sample not analyzed

[1]The sample was counted July 8, 1992.

[2]The sample and duplicate were counted June 2, 1992.

Table B2-120. Tank 241-C-112 Analytical Results: Plutonium-238 (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	35: 2	Whole	0.0130	0.0143	0.0137
92-06740-B1[1]	Core 34	Solid composite	0.0137	NA	0.0137
92-06767-H1	Core 36	Solid composite	0.00333	0.00338	0.00336[QC:f]
Drainable Liquid: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-C1[2]	Core 34	Liquid composite	4.7E-05	6.2E-05	5.5E-05[QC:e]

Notes:

NA = not available; duplicate sample not analyzed

[1]The sample was counted July 2, 1992.

[2]The sample and duplicate were counted June 11, 1992.

Table B2-121. Tank 241-C-112 Analytical Results: Plutonium-239/240 (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			μCi/g	μCi/g	μCi/g
92-08169-A1	35: 2	Whole	0.147	0.155	0.151
92-06740-B1[1]	Core 34	Solid composite	0.155	NA	0.155
92-06767-H1	Core 36	Solid composite	0.0644	0.0541	0.0593
Drainable Liquid: water digest			μCi/g	μCi/g	μCi/g
92-06747-C1[2]	Core 34	Liquid composite	7.93E-04	8.06E-04	8.00E-04

Notes:

NA = not available; duplicate sample not analyzed

[1]The sample was counted July 2, 1992.

[2]The sample and duplicate were counted June 11, 1992.

Table B2-122. Tank 241-C-112 Analytical Results: Curium-242 (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			μCi/g	μCi/g	μCi/g
92-06767-H1[1]	Core 36	Solid composite	1E-04	2E-04	2E-04[QC:e]

Note:

[1]The sample and duplicate were counted June 11, 1992

Table B2-123. Tank 241-C-112 Analytical Results: Curium-243/244 (Alpha).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µCi/g	µCi/g	µCi/g
92-06767-H1[1]	Core 36	Solid composite	0.0012	0.0015	0.0014[QC:e,f]

Note:

[1]Sample (result) and duplicate counted, June 11, 1992

Table B2-124. Tank 241-C-112 Analytical Results: Strontium-90 (Beta). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			µCi/g	µCi/g	µCi/g
92-06733-A1	34: 1	Whole	1,640	991	1,320[QC:e]
92-06734-A1	34: 2	Subsegment B	4,950	4,770	4,860
92-06735-A1		Subsegment C	1,130	1,150	1,140
92-06736-A1		Subsegment D	2,450	2,570	2,510
92-08169-A1	35: 2	Whole	3,220	3,200	3,210
92-06761-A1	36: 1	Subsegment C	457	342	400[QC:e]
92-06762-A1		Subsegment D	14.3	15.7	15.0
92-06763-A1	36: 2	Subsegment A	14.9	23.8	19.4[QC:e]
92-06764-A1		Subsegment B	70.9	70.3	70.6
92-06765-A1		Subsegment C	148	139	144
92-06766-A1		Subsegment D	195	203	199
92-06740-B1	Core 34	Solid composite	3,510	NA	3,510
92-06767-H1	Core 36	Solid composite	543	472	508

Table B2-124. Tank 241-C-112 Analytical Results: Strontium-90 (Beta). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			**μCi/g**	**μCi/g**	**μCi/g**
92-06747-B1	Core 34	Liquid composite	0.341	0.367	0.354[QC:f]
92-06747-B6		Liquid composite	0.332	0.338	0.335
92-06774-B1	Core 35	Liquid composite	0.227	0.232	0.230

Notes:
NA = not available; replicate sample not analyzed

Table B2-125. Tank 241-C-112 Analytical Results: Technetium-99 (Beta).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**μCi/g**	**μCi/g**	**μCi/g**
92-08169-A1	35: 2	Whole	0.100	0.0942	0.097
92-06740-B1	Core 34	Solid composite	0.139	NA	0.139
92-06767-H1	Core 36	Solid composite	0.104	0.109	0.107
Drainable Liquid: acid digest			**μCi/g**	**μCi/g**	**μCi/g**
92-06747-B1	Core 34	Liquid composite	0.225	0.121	0.173[QC:e,f]
92-06747-B6		Liquid composite	0.111	0.113	0.112
92-06774-B1	Core 35	Liquid composite	0.0829	0.0844	0.0837

Notes:
NA = not available; duplicate sample not analyzed

Table B2-126. Tank 241-C-112 Analytical Results: Total Beta (Beta).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			μCi/g	μCi/g	μCi/g
92-08169-A1	35: 2	Whole	7,080	6,870	6,980
92-06740-B1	Core 34	Solid composite	7,070	NA	7,070
92-06767-H1	Core 36	Solid composite	1,660	1,750	1,710
Solids: water digest			μCi/g	μCi/g	μCi/g
92-08169-B1	35: 2	Whole	50.2	62.6	56.4[QC:e]
92-06740-C1	Core 34	Solid composite	65.8	45.7	55.8[QC:e]
92-06767-C1	Core 36	Solid composite	20.3	26.9	23.6[QC:e,f]
Drainable Liquid: acid digest			μCi/g	μCi/g	μCi/g
92-06747-B1	Core 34	Liquid composite	0.748	0.730	0.739[QC:f]
92-06747-B6		Liquid composite	0.625	0.632	0.629
92-06774-B1	Core 35	Liquid composite	0.483	0.472	0.478

Notes:

NA = not available; replicate sample not analyzed

Table B2-127. Tank 241-C-112 Analytical Results: Americium-241 (GEA).[1] (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µCi/g	µCi/g	µCi/g
92-06729-A	34: 2	Subsegment C Upper 1/2	0.286	0.299	0.293
92-06730-A		Subsegment C Lower 1/2	0.251	0.241	0.246
92-06731-A		Subsegment D Upper 1/2	1.84	0.556	1.20[QC:e]
92-06732-A		Subsegment D Lower 1/2	0.543	0.538	0.541
92-08167-A	35: 2	Upper 1/2	0.848	0.939	0.894
92-08168-A		Lower 1/2	0.822	0.869	0.846
92-06757-A	36: 1	Subsegment C Upper 1/2	0.318	0.272	0.295
92-06758-A		Subsegment C Lower 1/2	0.285	0.281	0.283
92-06759-A	36: 2	Subsegment D Upper 1/2	0.0219	0.0266	0.0243[QC:f]
92-06760-A		Subsegment D Lower 1/2	NA	0.0258	0.0258
Solids: fusion			µCi/g	µCi/g	µCi/g
92-06733-A1	34: 1	Whole	0.385	0.282	0.334[QC:e]
92-06734-A1	34: 2	Subsegment B	1.13	0.999	1.06
92-06735-A1		Subsegment C	0.330	0.352	0.341
92-06736-A1		Subsegment D	0.686	0.745	0.716
92-08169-A1	35: 2	Whole	1.06	1.03	1.05
92-06761-A1	36: 1	Subsegment C	0.292	0.289	0.291
92-06762-A1		Subsegment D	0.273	NA	0.273
92-06765-A1	36: 2	Subsegment C	0.0270	0.0485	0.0378[QC:e]
92-06766-A1		Subsegment D	NA	0.0254	0.0254
92-06740-B1	Core 34	Solid composite	0.758	NA	0.758

Table B2-127. Tank 241-C-112 Analytical Results: Americium-241 (GEA).[1] (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**μCi/g**	**μCi/g**	**μCi/g**
92-06736-B1	34: 2	Subsegment D	0.00692	0.00737	0.00715
92-08169-B1	35: 2	Whole	0.00616	0.0114	0.00878[QC:e,f]
92-06740-C1	Core 34	Solid composite	0.00906	NA	0.00906

Notes:

NA = not available; replicate sample not analyzed

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-128. Tank 241-C-112 Analytical Results: Antimony-125 (GEA).[1]

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**μCi/g**	**μCi/g**	**μCi/g**
92-06733-B1	34: 1	Whole	0.00361	NA	0.00361
92-06734-B1	34: 2	Subsegment B	0.00662	0.00532	0.00597[QC:e]
Drainable Liquid: acid digest			**μCi/g**	**μCi/g**	**μCi/g**
92-06747-B6	Core 34	Liquid composite	NA	0.00208	0.00208

Notes:

NA = not available; replicate sample not analyzed

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-129. Tank 241-C-112 Analytical Results: Cesium-134 (GEA).[1]

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-06766-A1	36: 2	Subsegment D	NA	0.00731	0.00731
Drainable Liquid: acid digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-B1	Core 34	Liquid composite	8.53E-04	NA	8.53E-04[QC:f]

Notes:

NA = not available; replicate sample not analyzed

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-130. Tank 241-C-112 Analytical Results: Cesium-137 (GEA).[1] (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06729-A	34: 2	Subsegment C Upper 1/2	8.09	3.08	5.59[QC:e]
92-06730-A		Subsegment C Lower 1/2	4.34	9.73	7.04[QC:e]
92-06731-A		Subsegment D Upper 1/2	3.55	22.1	12.8[QC:e]
92-06732-A		Subsegment D Lower 1/2	5.76	8.27	7.02[QC:e]
92-08167-A	35: 2	Upper 1/2	18.7	18.6	18.7
92-08168-A		Lower 1/2	16.3	17.7	17.0
92-06757-A	36: 1	Subsegment C Upper 1/2	5.26	49.6	27.4[QC:e]
92-06758-A		Subsegment C Lower 1/2	37.3	49.8	43.6[QC:e]
92-06759-A	36: 2	Subsegment D Upper 1/2	1.75	1.65	1.70[QC:f]
92-06760-A		Subsegment D Lower 1/2	1.94	2.31	2.13

Table B2-130. Tank 241-C-112 Analytical Results: Cesium-137 (GEA).[1] (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-06733-A1	34: 1	Whole	169	316	243[QC:e]
92-06734-A1	34: 2	Subsegment B	613	611	612
92-06735-A1		Subsegment C	801	788	795
92-06736-A1		Subsegment D	513	502	508
92-08169-A1	35: 2	Whole	686	716	701
92-06761-A1	36: 1	Subsegment C	492	328	410[QC:e]
92-06762-A1		Subsegment D	1,250	1,230	1,240
92-06763-A1	36: 2	Subsegment A	933	835	884
92-06764-A1		Subsegment B	529	535	532
92-06765-A1		Subsegment C	105	99.9	102
92-06766-A1		Subsegment D	34.6	35.4	35.0
92-06740-B1	Core 34	Solid composite	0.075	NA	0.075[QC:f]
92-06767-H1	Core 36	Solid composite	795	790	793
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06733-B1	34: 1	Whole	0.220	0.851	0.536[QC:e]
92-06734-B1	34: 2	Subsegment B	0.818	0.949	0.884
92-06735-B1		Subsegment C	1.08	1.48	1.28[QC:e]
92-06736-B1		Subsegment D	6.79	13.1	9.95[QC:e]
92-08169-B1	35: 2	Whole	4.77	5.61	5.19
92-06761-B1	36: 1	Subsegment C	1.67	2.12	1.90[QC:e]
92-06762-B1		Subsegment D	4.03	5.17	4.60[QC:e]
92-06763-B1	36: 2	Subsegment A	13.4	10.0	11.7[QC:e]
92-06764-B1		Subsegment B	8.51	6.63	7.57[QC:e]
92-06765-B1		Subsegment C	5.00	3.87	4.44[QC:e]
92-06766-B1		Subsegment D	1.12	0.913	1.02[QC:e]
92-06740-C1	Core 34	Solid composite	8.66	3.65	6.16[QC:e]

Table B2-130. Tank 241-C-112 Analytical Results: Cesium-137 (GEA).[1] (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			µCi/g	µCi/g	µCi/g
92-06747-B1	Core 34	Liquid composite	0.0419	0.0454	0.0437[QC:f]
92-06747-B6		Liquid composite	0.0129	0.0140	0.0135
92-06774-B1	Core 35	Liquid composite	0.00777	0.00705	0.00741[QC:f]

Notes:

NA = not available; replicate sample not analyzed

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-131. Tank 241-C-112 Analytical Results: Cobalt-60 (GEA).[1] (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µCi/g	µCi/g	µCi/g
92-06729-A	34: 2	Subsegment C Upper 1/2	0.0138	0.00991	0.0119[QC:e,f]
92-06730-A		Subsegment C Lower 1/2	0.00767	0.00588	0.00678[QC:e]
92-06731-A		Subsegment D Upper 1/2	0.00745	0.0133	0.0104[QC:e]
92-06732-A		Subsegment D Lower 1/2	NA	0.0122	0.0122[QC:f]
92-06758-A	36: 1	Subsegment C Lower 1/2	NA	0.00792	0.00792[QC:f]
92-06759-A	36: 2	Subsegment D Upper 1/2	0.0101	0.00535	0.00773[QC:e,f]
92-06760-A		Subsegment D Lower 1/2	0.00796	0.00468	0.00632[QC:e,f]

Table B2-131. Tank 241-C-112 Analytical Results: Cobalt-60 (GEA).[1] (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-06733-A1	34: 1	Whole	0.0346	0.0470	0.0408[QC:e]
92-06734-A1	34: 2	Subsegment B	0.0327	0.0431	0.0379[QC:e]
92-06761-A1	36: 1	Subsegment C	0.0286	0.0173	0.0230[QC:e,f]
92-06764-A1	36: 2	Subsegment B	0.00817	NA	0.00817
92-06765-A1		Subsegment C	0.00465	0.0113	0.00798[QC:e]
92-06766-A1		Subsegment D	0.00660	0.00824	0.00742[QC:e]
92-06740-B1	Core 34	Solid composite	0.0298	NA	0.0298
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06733-B1	34: 1	Whole	0.00370	0.00415	0.00393
92-06734-B1	34: 2	Subsegment B	0.00366	0.00358	0.00362
92-06735-B1		Subsegment C	0.00351	0.00319	0.00335
92-06736-B1		Subsegment D	0.00317	0.00364	0.00341
92-08169-B1	35: 2	Whole	0.00271	0.00265	0.00268[QC:f]
92-06761-B1	36: 1	Subsegment C	0.00358	0.00327	0.00343
92-06762-B1		Subsegment D	0.00332	0.00354	0.00343
92-06763-B1	36: 2	Subsegment A	0.00343	0.00347	0.00345
92-06764-B1		Subsegment B	0.00269	0.00173	0.00221[QC:e]
92-06765-B1		Subsegment C	0.00236	0.00234	0.00235
92-06766-B1		Subsegment D	0.00439	0.00242	0.00341[QC:e]
92-06740-C1	Core 34	Solid composite	0.00435	0.00417	0.00426

Table B2-131. Tank 241-C-112 Analytical Results: Cobalt-60 (GEA).[1] (3 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Drainable Liquid: acid digest			μCi/g	μCi/g	μCi/g
92-06747-B1	Core 34	Liquid composite	0.00123	7.31E-04	9.81E-04[QC:e,f]
92-06747-B6		Liquid composite	0.00412	0.00432	0.00422
92-06774-B1	Core 35	Liquid composite	0.00323	0.00267	0.00295

Notes:

NA = not available; replicate sample was not analyzed

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-132. Tank 241-C-112 Analytical Results: Europium-154 (GEA).[1] (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μCi/g	μCi/g	μCi/g
92-06729-A	34: 2	Subsegment C Upper 1/2	0.476	0.478	0.477
92-06730-A		Subsegment C Lower 1/2	0.426	0.400	0.413
92-06731-A		Subsegment D Upper 1/2	1.07	0.864	0.967[QC:e]
92-06732-A		Subsegment D Lower 1/2	0.826	0.896	0.861
92-08167-A	35: 2	Upper 1/2	1.76	1.75	1.76
92-08168-A		Lower 1/2	1.53	1.64	1.59
92-06757-A	36: 1	Subsegment C Upper 1/2	0.423	0.412	0.418
92-06758-A		Subsegment C Lower 1/2	0.435	0.410	0.423
92-06759-A	36: 2	Subsegment D Upper 1/2	0.0321	0.0312	0.0317[QC:f]
92-06760-A		Subsegment D Lower 1/2	0.0358	0.0324	0.0341

Table B2-132. Tank 241-C-112 Analytical Results: Europium-154 (GEA).[1] (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-06733-A1	34: 1	Whole	0.587	0.373	0.480[QC:e]
92-06734-A1	34: 2	Subsegment B	1.78	1.84	1.81
92-06735-A1		Subsegment C	0.467	0.519	0.493
92-06736-A1		Subsegment D	0.926	0.921	0.924
92-08169-A1	35: 2	Whole	2.02	2.00	2.01
92-06761-A1	36: 1	Subsegment C	0.504	0.480	0.492
92-06765-A1	36: 2	Subsegment C	NA	0.0342	0.0342
92-06766-A1		Subsegment D	0.0319	0.0311	0.0315
92-06740-B1	Core 34	Solid composite	1.25	NA	1.25
92-06767-H1	Core 36	Solid composite	0.146	0.165	0.156
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06734-B1	34: 2	Subsegment B	0.00174	NA	0.00174
92-06736-B1		Subsegment D	0.0093	0.0110	0.0102
92-08169-B1	35: 2	Whole	0.0144	0.0175	0.0160
92-06740-C1	Core 34	Solid composite	0.0125	0.00863	0.0106[QC:e]

Notes:

NA = not available; replicate sample not analyzed

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-133. Tank 241-C-112 Analytical Results: Europium-155 (GEA).[1] (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µCi/g	µCi/g	µCi/g
92-06729-A	34: 2	Subsegment C Upper 1/2	0.558	0.554	0.556
92-06730-A		Subsegment C Lower 1/2	0.508	0.439	0.474
92-06731-A		Subsegment D Upper 1/2	1.21	0.980	1.10[QC:e]
92-06732-A		Subsegment D Lower 1/2	0.907	1.02	0.964
92-08167-A	35: 2	Upper 1/2	1.98	2.05	2.02
92-08168-A		Lower 1/2	1.76	1.93	1.85
92-06757-A	36: 1	Subsegment C Upper 1/2	0.493	0.443	0.468
92-06758-A		Subsegment C Lower 1/2	0.475	0.500	0.488
92-06759-A	36: 2	Subsegment D Upper 1/2	0.0402	0.0395	0.0399
92-06760-A		Subsegment D Lower 1/2	0.0417	0.0401	0.0409
Solids: fusion			µCi/g	µCi/g	µCi/g
92-06733-A1	34: 1	Whole	0.656	0.426	0.541[QC:e]
92-06734-A1	34: 2	Subsegment B	1.85	1.94	1.90
92-06735-A1		Subsegment C	0.428	0.466	0.447
92-06736-A1		Subsegment D	1.03	0.972	1.00
92-08169-A1	35: 2	Whole	2.26	2.18	2.22
92-06761-A1	36: 1	Subsegment C	0.503	0.386	0.445[QC:e]
92-06766-A1	36: 2	Subsegment D	0.0353	0.0355	0.0354
92-06740-B1	Core 34	Solid composite	1.27	NA	1.27

Table B2-133. Tank 241-C-112 Analytical Results: Europium-155 (GEA).[1] (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06736-B1	34: 2	Subsegment D	0.0121	0.0124	0.0123
92-08169-B1	35: 2	Whole	0.0140	0.0188	0.0164[QC:e]
92-06740-C1	Core 34	Solid composite	0.0115	0.00928	0.0104[QC:e]

Notes:

NA = not available; replicate sample not analyzed

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-134. Tank 241-C-112 Analytical Results: Potassium-40 (GEA).[1]

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	35: 2	Whole	n/d	0.0851	0.0851
92-06766-A1	36: 2	Subsegment D	NA	0.00525	0.00525
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06733-B1	34: 1	Whole	9.97E-04	NA	9.97E-04
92-06761-B1	36: 1	Subsegment C	0.00137	0.00101	0.00119[QC:e,f]
92-06762-B1		Subsegment D	NA	9.480E-04	9.480E-04
92-06763-B1	36: 2	Subsegment A	0.00156	0.00160	0.00158
Drainable Liquid: acid digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-B6	Core 34	Liquid composite	0.00290	NA	0.00290[QC:f]
92-06774-B1	Core 35	Liquid composite	n/d	0.0034	0.0034[QC:f]

Notes:

NA = not available; replicate sample not analyzed
n/d = not detected; no detection limit given

[1]All GEA results were decay corrected to January 1, 1992.

Table B2-135. Tank 241-C-112 Analytical Results: Carbon-14 (Liquid Scintillation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-J1	35: 2	Whole	0.0080	0.0035	0.0058[QC:e]
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-06767-J1	Core 36	Solid composite	0.0066	0.0018	0.0042[QC:e,f]
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06740-C1[1]	Core 34	Solid composite	2.20E-05	1.70E-05	1.95E-05[QC:e,f]
Drainable Liquid			**µCi/mL**	**µCi/mL**	**µCi/mL**
92-06774-G1	Core 35	Liquid composite	0.0013	0.0013	0.0013
Drainable Liquid: water digest			**µCi/mL**	**µCi/mL**	**µCi/mL**
92-06747-C1[1]	Core 34	Liquid composite	0.0044	0.0040	0.0042

Notes:

[1]The sample (result) and duplicate were counted on July 1, 1992.

Table B2-136. Tank 241-C-112 Analytical Results: Selenium-79 (Liquid Scintillation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	35: 2	Whole	<9.0E-04	8.7E-04	<8.9E-04[QC:f]
92-06740-B1[1]	Core 34	Solid composite	3.37E-04	NA	3.37E-04
92-06767-H1	Core 36	Solid composite	4.11E-04	3.69E-04	3.90E-04
Drainable Liquid: acid digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-B1[2]	Core 34	Liquid composite	8.3E-05	7.2E-05	7.8E-05
92-06774-B1	Core 35	Liquid composite	2.06E-04	2.21E-04	2.14E-04[QC:f]

Notes:

NA = not available; duplicate sample not analyzed

[1]The sample (result) was counted July 9, 1992.

[2]The sample (result) and duplicate were counted June 11, 1992.

Table B2-137. Tank 241-C-112 Analytical Results: Tritium (Liquid Scintillation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-B1	35: 2	Whole	0.0194	0.0176	0.0185[QC:f]
92-06740-C1[1]	Core 34	Solid composite	0.0707	NA	0.0707[QC:f]
92-06767-C1	Core 36	Solid composite	0.0159	0.0156	0.0158[QC:f]
Drainable Liquid: water digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06747-C1[2]	Core 34	Liquid composite	0.234	0.230	0.232
92-06774-C1	Core 35	Liquid composite	0.00209	0.00204	0.00207[QC:f]

Notes:

NA = not available; replicate sample not analyzed

[1]The sample (result) was counted June 10, 1992.

[2]The sample (result) and duplicate were counted June 10, 1992.

Table B2-138. Tank 241-C-112 Analytical Results: Nickel-59 (Ni).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**µCi/g**	**µCi/g**	**µCi/g**
92-08169-A1	35: 2	Whole	0.0144	0.0122	0.0133
92-06740-B1[1]	Core 34	Solid composite	0.0258	NA	0.0258
92-06767-H1	Core 36	Solid composite	0.00286	0.00344	0.00315
Drainable Liquid			**µCi/mL**	**µCi/mL**	**µCi/mL**
92-06747[1]	Core 34	Liquid composite	1.7E-04	NA	1.7E-04
Drainable Liquid: acid digest			**µCi/g**	**µCi/g**	**µCi/g**
92-06774-B1	Core 35	Liquid composite	0.127	NA	0.127

Notes:

NA = not available; replicate sample not analyzed

[1]The sample (result) counted July 8, 1992.

Table B2-139. Tank 241-C-112 Analytical Results: Nickel-63 (Ni).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**μCi/g**	**μCi/g**	**μCi/g**
92-08169-A1	35: 2	Whole	1.28	1.29	1.29[QC:f]
92-06740-B1[1]	Core 34	Solid composite	2.52	NA	2.52
92-06767-H1	Core 36	Solid composite	0.298	0.334	0.316
Drainable Liquid			**μCi/mL**	**μCi/mL**	**μCi/mL**
92-06747[1]	Core 34	Liquid composite	0.0195	NA	0.0195
Drainable Liquid: acid digest			**μCi/g**	**μCi/g**	**μCi/g**
92-06774-B1	Core 35	Liquid composite	13.7	NA	13.7[QC:f]

Notes:

NA = not available; replicate sample not analyzed

[1]The sample (result) was counted July 8, 1992.

Table B2-140. Tank 241-C-112 Analytical Results: Differential Scanning Calorimetry. (4 sheets)

Transition Number	Run	Temp. Range °C	Onset Temp. °C	Peak Temp. °C	Enthalpy J/g	Mean J/g
Solids: Core 34: 2, Subsegment B, Sample Number 92-06741						
1	Result	NA	47	91	847	847
	Duplicate	NA	NA	NA	NA	
2	Result	NA	276	283	-11.7	-11.7
	Duplicate	NA	NA	NA	NA	
3	Result	NA	349	373	-63	-63
	Duplicate	NA	NA	NA	NA	
Solids: Core 34: 2, Subsegment C, Sample Number 92-06742						
1	Result	NA	43	81	795	795
	Duplicate	NA	NA	NA	NA	
2	Result	NA	267	280	-13.1	-13.1
	Duplicate	NA	NA	NA	NA	
3	Result	NA	360	390	-35	-35
	Duplicate	NA	NA	NA	NA	
Solids: Core 34: 2, Subsegment D, Sample Number 92-06743						
1	Result	NA	49	91	930	930
	Duplicate	NA	NA	NA	NA	
2	Result	NA	289	307	-16.9	-16.9
	Duplicate	NA	NA	NA	NA	
3	Result	NA	347	376	-47	-47
	Duplicate	NA	NA	NA	NA	
Solids: Core 34, Solid Composite, Sample Number 92-06740						
1	Result	NA	58	103	734	734
	Duplicate	NA	NA	NA	NA	
2	Result	NA	276	287	-10.8	-10.8
	Duplicate	NA	NA	NA	NA	
3	Result	NA	357	387	-75	-75
	Duplicate	NA	NA	NA	NA	

Table B2-140. Tank 241-C-112 Analytical Results: Differential Scanning Calorimetry. (4 sheets)

Transition Number	Run	Temp. Range °C	Onset Temp. °C	Peak Temp. °C	Enthalpy J/g	Mean J/g
Solids: Core 35: 2, Whole, Sample Number 92-08170						
1	Result	34-195	34	115	847	780
	Duplicate	34-162	334	107	713	
2	Result	225-291	230	275	56	48[QC:e]
	Duplicate	222-289	228	245	40	
3	Result	291-402	292	300	-53	-45[QC:e]
	Duplicate	288-350	289	296	-36	
Solids: Core 36: 1, Subsegment C, Sample Number 92-06761						
1	Result	30-147	34	NA	1,062	1,059
	Duplicate	34-177	34	NA	1,056	
2	Result	173-192	173	NA	2.6	1.9[QC:e]
	Duplicate	174-189	178	NA	1.2	
3	Result	192-238	200	NA	8.9	7.7[QC:e]
	Duplicate	198-229	200	NA	6.5	
4	Result	260-300	267	NA	-11.2	-6.85[QC:e]
	Duplicate	262-289	265	NA	-2.5	
5	Result	295-380	299	NA	37.0	30.8[QC:e]
	Duplicate	303-386	303	NA	24.5	
Solids: Core 36: 1, Subsegment D, Sample Number 92-06762						
1	Result	32-167	32	NA	1,278	1,309
	Duplicate	33-194	33	NA	1,339	
2	Result	171-230	NA	NA	10.5	10.5
	Duplicate	NA	NA	NA	NA	
3	Result	NA	NA	NA	NA	12.9
	Duplicate	193-231	205	NA	12.9	
4	Result	259-310	276	NA	-18.6	-15.6[QC:e]
	Duplicate	275-317	278	NA	-12.6	

Table B2-140. Tank 241-C-112 Analytical Results: Differential Scanning Calorimetry. (4 sheets)

Transition Number	Run	Temp. Range	Onset Temp.	Peak Temp.	Enthalpy	Mean
		°C	°C	°C	J/g	J/g
Solids: Core 36: 2, Subsegment A, Sample Number 92-06763						
1	Result	35-150	35	NA	973	1,103
	Duplicate	30-161	30	NA	1,232	
2	Result	162-200	173	NA	5.6	4.2[QC:e]
	Duplicate	171-198	179	NA	2.8	
3	Result	199-230	212	NA	8.6	7.7
	Duplicate	200-232	200	NA	6.7	
4	Result	277-302	279	NA	-13.2	-10.4[QC:e]
	Duplicate	277-300	281	NA	-7.5	
5	Result	301-370	310	NA	26.6	35.3[QC:e]
	Duplicate	300-400	300	NA	43.9	
Solids: Core 36: 2, Subsegment B, Sample Number 92-06764						
1	Result	34-205	30	NA	814	865
	Duplicate	33-197	33	NA	915	
2	Result	217-235	220	NA	1.4	1.3
	Duplicate	202-235	220	NA	1.1	
3	Result	294-326	298	NA	-6.9	-9.3[QC:e]
	Duplicate	260-324	297	NA	-11.7	
4	Result	325-400	331	NA	5.1	16.4[QC:e]
	Duplicate	323-402	326	NA	27.6	
Solids: Core 36: 2, Subsegment C, Sample Number 92-06765						
1	Result	32-177	32	NA	688	839[QC:e]
	Duplicate	34-197	34	NA	990	
2	Result	NA	NA	NA	NA	1.8
	Duplicate	217-239	221	NA	1.8	
3	Result	NA	NA	NA	NA	36.1
	Duplicate	305-407	320	NA	36.1	

Table B2-140. Tank 241-C-112 Analytical Results: Differential Scanning Calorimetry. (4 sheets)

Transition Number	Run	Temp. Range °C	Onset Temp. °C	Peak Temp. °C	Enthalpy J/g	Mean J/g
Solids: Core 36: 2, Subsegment D, Sample Number 92-06766						
1	Result	34-172	34	NA	1,056	1,056
	Duplicate	NA	NA	NA	NA	
2	Result	300-395	328	NA	45.1	45.1
	Duplicate	NA	NA	NA	NA	
Solids: Core 36, Solid Composite, Sample Number 92-06767						
1	Result	34-176	34	NA	866	879
	Duplicate	34-168	34	NA	892	
2	Result	NA	NA	NA	NA	2.9
	Duplicate	168-182	177	NA	2.9	
3	Result	197-243	201	NA	15.8	10.1[QC:e]
	Duplicate	196-234	211	NA	4.4	
4	Result	272-332	292	NA	-21.6	-18.9[QC:e]
	Duplicate	268-319	284	NA	-16.1	

Note:

NA = not available; Either a replicate sample was not run, or the information was not reported.

Table B2-141. Tank 241-C-112 Analytical Results: Weight Percent Solids (Gravimetric).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			wt%	wt%	wt%
92-06733-D1	34: 1	Whole	55.13	54.94	55.04
92-06734-D1	34: 2	Subsegment B	47.31	46.84	47.08
92-06735-D1		Subsegment C	41.54	42.73	42.14
92-06736-D1		Subsegment D	47.33	48.12	47.73
92-08169-D1	35: 2	Whole	65.5	66.2	65.85
92-06761-D1	36: 1	Subsegment C	52.10	50.98	51.54
92-06762-D1		Subsegment D	39.17	44.30	41.74
92-06763-D1	36: 2	Subsegment A	41.72	43.76	42.74
92-06764-D1		Subsegment B	59.53	58.50	59.02
92-06765-D1		Subsegment C	35.95	35.75	35.85
92-06766-D1		Subsegment D	44.67	43.73	44.20
92-06740-D1	Core 34	Solid composite	61.22	62.62	61.92
92-06767-K1	Core 36	Solid composite	55.26	54.68	54.97

Table B2-142. Tank 241-C-112 Analytical Results: Density (Physical Properties).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**g/mL**	**g/mL**	**g/mL**
92-06733	34: 1	Whole	1.5	NA	1.5
92-06740[1]	34: 2	Whole	1.6	NA	1.6
92-08169	35: 2	Whole	2.0	NA	2.0
92-06750	36: 1	Whole	1.3	NA	1.3
92-09725	36: 2	Whole	1.6	NA	1.6
Drainable Liquid			**g/mL**	**g/mL**	**g/mL**
92-06747[2]	34: 1	Drainable Liquid	1.2	NA	1.2
92-06747[2]	34: 2	Drainable Liquid	1.2	NA	1.2
92-06774	Core 35	Liquid composite	1.4	NA	1.4

Notes:

NA = not available; duplicate measurement not performed

[1]The sample number given is for the core 34 composite solids because unique sample numbers were not assigned to the individual segments before subsampling and compositing. Separate density estimates were obtained on the solids from each segment before compositing the solids.

[2]The sample number given is for the core 34 composite drainable liquid because sample numbers were not assigned to the individual segment drainable liquid. Separate density estimates were obtained on the drainable liquid from each segment before compositing the drainable liquids into a single sample.

Table B2-143. Tank 241-C-112 Analytical Results: Thermogravimetric Analysis. (3 sheets)

Transition Number	Run	Temp. Range °C	Weight Loss[1] wt%	Mean wt%
Solids: Core 34: 2, Subsegment B, Sample Number 92-06741				
1	Result	47-91	52.2	52.2
	Duplicate	NA	NA	
2	Result	276-283	5.4	5.4
	Duplicate	NA	NA	
3	Result	349-373	-0.6	-0.6
	Duplicate	NA	NA	
Solids: Core 34: 2, Subsegment C, Sample Number 92-06742				
1	Result	43-81	45.0	45.0
	Duplicate	NA	NA	
2	Result	267-280	4.0	4.0
	Duplicate	NA	NA	
3	Result	360-390	-0.3	-0.3
	Duplicate	NA	NA	
Solids: Core 34: 2, Subsegment D, Sample Number 92-06743				
1	Result	49-91	33.4	33.4
	Duplicate	NA	NA	
2	Result	289-307	6.3	6.3
	Duplicate	NA	NA	
3	Result	347-376	0	0
	Duplicate	NA	NA	
Solids: Core 34, Solid Composite, Sample Number 92-06740				
1	Result	58-103	34.6	34.6
	Duplicate	NA	NA	
2	Result	276-287	6.1	6.1
	Duplicate	NA	NA	
3	Result	357-387	-0.6	-0.6
	Duplicate	NA	NA	

Table B2-143. Tank 241-C-112 Analytical Results: Thermogravimetric Analysis. (3 sheets)

Transition Number	Run	Temp. Range °C	Weight Loss[1] wt%	Mean wt%
Solids: Core 35: 2, Whole, Sample Number 92-08170				
1	Result	30-120	40.0	40.2
	Duplicate	30-130	40.4	
2	Result	120-172	1.6	1.7
	Duplicate	130-181	1.7	
3	Result	174-355	6.1	6.0
	Duplicate	173-360	5.9	
Solids: Core 36: 1, Subsegment C, Sample Number 92-06761				
1	Result	30-147	47.9	45.6
	Duplicate	30-153	43.3	
2	Result	198-342	3.7	4.5[QC:e]
	Duplicate	207-328	5.2	
Solids: Core 36: 1, Subsegment D, Sample Number 92-06762				
1	Result	30-163	51.2	51.8
	Duplicate	30-160	52.4	
2	Result	187-340	2.2	2.0
	Duplicate	215-381	1.8	
Solids: Core 36: 2, Subsegment A, Sample Number 92-06763				
1	Result	30-164	51.6	52.5
	Duplicate	30-181	53.3	
2	Result	213-346	1.9	1.9
	Duplicate	209-347	1.9	
Solids: Core 36: 2, Subsegment B, Sample Number 92-06764				
1	Result	30-166	39.1	38.2
	Duplicate	30-164	37.2	
2	Result	167-380	3.3	3.1
	Duplicate	198-358	2.9	

Table B2-143. Tank 241-C-112 Analytical Results: Thermogravimetric Analysis. (3 sheets)

Transition Number	Run	Temp. Range °C	Weight Loss[1] wt%	Mean wt%
Solids: Core 36: 2, Subsegment C, Sample Number 92-06765				
1	Result	30-204	42.8	41.4
	Duplicate	30-180	39.9	
2	Result	204-381	3.9	3.8
	Duplicate	217-382	3.7	
Solids: Core 36: 2, Subsegment D, Sample Number 92-06766				
1	Result	30-162	46.2	47.3
	Duplicate	30-180	48.3	
2	Result	162-387	3.6	3.5
	Duplicate	180-392	3.4	
Solids: Core 36, Solid Composite, Sample Number 92-06767				
1	Result	30-186	43.8	44.4
	Duplicate	30-187	44.9	
2	Result	211-370	2.9	2.9
	Duplicate	210-363	2.8	

Notes:

NA = not available; replicate sample not analyzed

[1]Positive values indicate mass loss from sample; negative values indicate mass gain by sample.

B2.10 HISTORICAL SAMPLE RESULTS

This section describes supernatant samples collected November 1974 and October 1975.

B2.10.1 November, 1974 - Supernatant Sample

Analysis of a liquid sample from tank 241-C-112 was reported in Wheeler (1974). Table B2-144 shows the results. No information was available regarding sample handling or analytical methods, and no QC information was provided with the results.

Cooling curve measurements showed no solids formation down to 5 °C. Differential thermal analysis showed no exotherms below 200 °C.

Table B2-144. Grab Sample Results from November 20, 1974, for Tank 241-C-112.[1]

Component	Lab Value[2]	Lab Unit
Physical Data		
Visual examination-over-the-top (dose rate) reading	Clear, yellow, no solids. 1.5 Rads.	
Percent water	78.49	%
Specific gravity	1.2054	---
pH	12.05	---
Differential thermal analysis	No exotherm	---
Chemical Analysis		
OH^-	0.668	*M*
Al	3.01E-02	*M*
Na	3.75	*M*
NO_2^-	1.63	*M*
NO_3^-	0.915	*M*
SO_4^{-2}	Result deleted	*M*
PO_4^{-3}	2.59E-02	*M*
F^-	7.13E-02	*M*
CO_3^{-2}	0.514	*M*
Radiological Analysis		
Pu	3.20E-05	g/gal
^{134}Cs	4.84E+02	μCi/gal
^{137}Cs	6.21E+05	μCi/gal

Notes:
[1]Wheeler (1974)
[2]Data may not be reliable because no QC information is available.

B2.10.2 October, 1975 - Supernatant Sample

Analysis of a liquid sample from tank 241-C-112, received at the laboratory on June 26, 1975, was reported in Wheeler (1975). The results are provided in Table B2-145. No information was available regarding sample handling or analytical methods. Also, no QC information was provided with the results.

Cooling curve measurements showed no solids formation down to 5 °C. Differential thermal analysis showed no exotherms below 200 °C.

Table B2-145. Grab Sample Results from October 1975 for Tank 241-C-112.[1]

Component	Lab Value[2]	Lab Unit
Physical Data		
Visual examination-over-the-top (dose rate) reading	Clear, light yellow, no solids. 90 mrad/hr.	
Percent water	82.66	%
Specific gravity	1.1222	---
pH	11.9	---
Differential thermal analysis	No exotherm below 200 °C	---
Chemical Analysis		
OH^-	0.492	*M*
Al	1.58E-02	*M*
Na	2.68	*M*
NO_2^-	1.40	*M*
NO_3^-	1.80	*M*
SO_4^{-2}	Canceled	*M*
PO_4^{-3}	2.60E-02	*M*
F^-	2.46E-03	*M*
Cl^-	2.57E-02	*M*
CO_3^{-2}	0.528	*M*
Radiological Analysis		
$^{89/90}Sr$	4.90E+03	µCi/gal
Pu	1.18E-05	g/gal
^{134}Cs	8.32E+02	µCi/gal
^{137}Cs	4.74E+05	µCi/gal

Notes:

mrad/hr = millirads per hour

[1]Wheeler (1975)

[2]Data may not be reliable because no QC information is available.

B3.0 ASSESSMENT OF CHARACTERIZATION RESULTS

B3.1 GENERAL OBSERVATIONS

All three cores removed from tank 241-C-112 were expected to contain two segments. Because of the waste level, the upper segment was expected to contain a maximum of 33.8 cm (13.3 in.). The poorest recoveries were found in this segment. For core 35, segment 1 was completely empty, probably because the sampler valve remained open. Although an 87 percent recovery was obtained in segment 1 of core 34, approximately 85 percent of the recovered waste was liquid. According to Hanlon (1997), no supernate is expected to exist in the tank although the latest (1990) in-tank photographs show puddles of liquid on the waste surface. Hanlon (1997) does estimate that 121 kL (32 kgal) of interstitial liquid remains in the tank. The large amount of liquid recovered was not influenced by the sampling procedure because a hydrostatic head fluid was not used during sampling.

Recoveries were better for segment 2, although only a 35 percent recovery was obtained for core 35, half of which was liquid. About 20 percent of the waste recovered from segment 2 of core 34 was liquid. Over a 90 percent recovery (all solids) was obtained for core 36.

Based on sample recoveries, it appears that core 36 probably most represents the tank waste. Core 34 may be biased because of the large amount of liquid recovered. Because of the poor recoveries, core 35 does not represent the full waste column.

No other sampling anomalies were found which could potentially bias the analytical results. The chain-of-custody forms did not note any irregularities in the sampling or transport of the tank 241-C-112 samples.

B3.2 QUALITY CONTROL ASSESSMENT

The section discusses the overall quality and consistency of the current sampling results for tank 241-C-112. This section also evaluates sampling and analysis factors that may impact data interpretation. These factors are used to assess overall data quality and consistency and to identify any data limitations. The QC assessment from the 1992 core sampling event follows.

The usual QC assessment includes an evaluation of the appropriate standard recoveries, spike recoveries, duplicate analyses, and blanks that are performed in conjunction with the chemical analyses. All pertinent quality control tests were conducted on 1992 core samples, enabling a full assessment about data accuracy and precision. However, under the proscribed sampling and analysis plan (Hill et al. 1991 and Hill 1991), there were no specific QC acceptance criteria. The specific criteria for all QC checks applied in this assessment were given in DOE-RL (1995). Sample and duplicate pairs with one or more QC results outside the specified criteria or with pairs deemed unacceptable because of protocol failures were identified by subscripts in the data summary tables.

The standard and spike recovery results provide an estimate of analysis accuracy. If a standard or spike recovery is above or below the given criterion, the analytical results may be biased high or low, respectively. All standard recoveries were within defined limits. Spike recoveries outside the limits for ICP analytes were probably caused by the high dilutions required. These high dilution factors can cause poor or meaningless spike recoveries and RPDs for those ICP elements that had either very high concentrations or were close to the detection limit. All fusion digested results require high dilutions, which affect all analytes. Low recoveries for many analytes were caused by matrix effects.

The precision is estimated by the RPD, which is defined as the absolute value of the difference between the primary and duplicate samples, divided by their mean, times 100. The RPDs were exceeded for many analytes with concentrations near the detection limit because this adversely impacts the reproducibility of the results. Some high RPDs may be attributed to sample heterogeneity problems.

In summary, the majority of the QC results for the core samples were within the boundaries specified in DOE-RL (1995). The discrepancies mentioned here and footnoted in the data summary tables should not impact data validity or use.

B3.3 DATA CONSISTENCY CHECKS

Comparisons of different analytical methods can help to assess data consistency and quality. Several comparisons were possible with the data set provided by the two core samples. Comparisons were made between total alpha and the sum of the alpha emitters, total beta and the sum of the beta emitters, and phosphorus by ICP and phosphate by IC. No comparisons were possible for sulfur and sulfate data. In addition, mass and charge balances were calculated to help assess the overall data consistency.

B3.3.1 Comparison of Results from Different Analytical Methods

The following data consistency checks compare the results from two analytical methods. Close comparisons between the two methods strengthens the credibility of both results, but poor comparisons brings the reliability of the data into question. All analytical mean results were taken from the core composite data shown (see Section 3.4).

The analytical phosphorus mean of samples prepared by fusion digestion and analyzed by ICP was 29,400 μg/g, which represents total phosphorus. This amount of phosphorus converts to 90,000 μg/g of phosphate. In a check of soluble phosphate, samples prepared by water digestion and analyzed by ICP produced a phosphorus mean of 12,000 μg/g, which converts to 36,700 μg/g of phosphate. The ICP result agrees well with the IC phosphate result of 36,100 μg/g, and approximately 40 percent appears present in a soluble form.

Total alpha and total beta were compared to the sum of the alpha and beta emitters in Table B3-1. As shown, the sum of all analyzed alpha emitters accounts for 81.6 percent of the total alpha result, while the sum of beta emitters accounts for 100.7 percent of the total beta result. This degree of consistency suggests reasonable agreement of the data between the separate methods. Note that the ^{90}Sr activity must be multiplied by 2 to account for the activity of its daughter product, ^{90}Y.

Table B3-1. Comparison of Alpha and Beta Emitters with Total Alpha and Total Beta Results.

Analytes for Alpha Comparison	Mean μCi/g	Analytes for Beta Comparison	Mean μCi/g
^{241}Am	0.337	^{137}Cs	396
Total Pu	0.116	2 x ^{90}Sr	4,020
Sum of alpha emitters	0.453	Sum of beta emitters	4,420
Total alpha activity	0.555	Total beta activity	4,390
RPD	5.1%	RPD	0.60%
Sum of alpha emitters as a percent of the total	81.6%	Sum of beta emitters as a percent of the total	100.7%

There are discrepancies in the results between both methods for total alpha. Total alpha results were difficult to obtain because of interference from the high salts resulting from the fusion preparation. Therefore, small sample sizes were used to minimize the amount of salts on the mount. Normally, plutonium and americium account for >95 percent of the total alpha results. The results appear to show a lower total alpha concentration than the sum of the representative isotopes ($^{239/240}$Pu and ^{241}Am).

The higher total alpha concentration may caused by: 1) high counting error and 2) interference from ^{137}Cs and ^{90}Sr/^{90}Y present in the samples. (The total beta activity present was 5,000 times greater than total alpha for these samples.) A small amount of the β-emissions may have confounded the detector (the activity of the samples is so low that the offset used to discriminate between alpha and beta plateaus was not sufficient to provide accurate readings). This particular issue of interference between alpha and beta emitters has been resolved.

B3.3.2 Mass and Charge Balances

The principal objective in performing mass and charge balances is to determine whether the measurements are consistent. Table B3-2 and B3-3 show cation and anion mass and charge calculations. In calculating the balances, only analytes from the core composite data listed in Section B3.4 detected at a concentration of 2,000 μg/g or greater were considered. In the case of multiple ICP digestions for a given analyte, the method which produced the largest result was used. Analytes such as phosphate, carbonate, and silicate were combined with cations to form precipitates. Other analytes were assumed to be present in their common hydroxide form.

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

Mass balance = percent water + 0.0001 x {total analyte concentration} =
percent water + 0.0001 x {$Ca_3(PO_4)_2$ + $Ca(OH)_2$ + $FeSiO_3$ +
$Fe(OH)_2$ + $Al(OH)_3$ + $Pb(OH)_2$ + Na_3PO_4 + $Ni(OH)_2$ + UO_3 +
Na^+ + NO_2^- + NO_3^- + PO_4^{3-} + SO_4^{2-} + CO_3^{2-} + $C_2H_3O_2^-$}

The total analyte concentrations from the above equation is 598,000 μg/g. The mean weight percent water obtained from thermogravimetric analysis was 41.6 percent, or 416,000 μg/g. The mass balance resulting from adding the percent water to the total analyte concentration is 100.5 percent (see Table B3-4).

The following equations demonstrate the derivation of total cations and total anions, and the charge balance is the ratio of these two values. When performing the charge balance, the uncombined (or free) concentration was used in the calculation. To derive the results as shown in the equations, all concentrations must first be converted to a μg/g basis.

Total cations (μeq/g) = $[Na^+]/23.0$ = 4,650 μeq/g
Total anions (μeq/g) = $[NO_2^-]/46.0 + [NO_3^-]/62.0 + [PO_4^{3-}]/31.7 + [SO_4^{2-}]/48.0$
$+ [C_2H_3O_2^-]/59.0 + [CO_3^{2-}]/30.0$= 5,200 μeq/g

Table B3-2. Cation Mass and Charge Data.

Analyte	Concentration µg/g	Assumed Species	Concentration of Assumed Species µg/g	Charge µeq/g
Aluminum	18,100	$Al(OH)_3$	52,300	0
Calcium	24,700	$Ca_3(PO_4)_2$	63,800	0
Iron	25,000	$FePO_4$	17,000	0
		$Fe(OH)_2$	4,660	0
		$FeSiO_3$	12,000	0
Lead	2,190	$Pb(OH)_2$	2,550	0
Nickel	14,100	$Ni(OH)_2$	22,300	0
Phosphorus	29,400	Na_3PO_4		
		$Ca_3(PO_4)_2$		
Sodium	118,000	Na^+	107,000	4,650
		Na_3PO_4	15,100	0
Silicon	2,540	SiO_3^{-2}		
Uranium	59,700	UO_3	71,700	0
Total			368,410	4,650

Table B3-3. Anion Mass and Charge Data.

Analyte	Concentration µg/g	Assumed Species	Assumed Species Concentration µg/g	Charge µeq/g
Nitrite	74,300	NO_2^-	74,300	1,615
Nitrate	55,700	NO_3^-	55,700	898
Phosphate	36,100	PO_4^{3-}	36,100	1,140
Sulfate	14,300	SO_4^{2-}	14,300	298
TIC	6,940	CO_3^{2-}	34,700	1,157
TOC	2,240	$C_2H_3O_2^-$	5,510	93
Total			220,610	5,200

Table B3-4. Mass Balance Totals.

Totals	Concentrations $\mu g/g$	Charges $\mu eq/g$
Total from Table B3-2	368,400	4,650
Total from Table B3-3	220,600	-5,200
Percent water	416,000	0
Grand total	1,005,000	net charge = (550)

In summary, the above calculations yield very good mass and charge balance values (100.5 percent for mass balance and 0.89 for charge balance with an anionic net charge of 550 microequivalents), indicating that the analytical results are consistent.

B3.4 MEAN CONCENTRATIONS AND CONFIDENCE INTERVALS

The following evaluation was performed on the analytical data from the samples from tank 241-C-112.

Because an inventory estimate is needed without comparing it to a threshold value, two-sided 95 percent confidence intervals on the mean inventory are computed. This was done with both the composite-level and segment-level data. The liquid and solid composite-level data were analyzed separately.

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 these equations, $\hat{\mu}$ 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 estimation maximum likelihood (REML) methods. The degrees of freedom (df) for tank 241-C-112 is the number of cores sampled minus one for analytes with measurements from multiple cores. The df is the number of segments sampled minus one for analytes with measurements from multiple segments but from only one core. The df is the number of observations minus one for analytes with measurements from only one sample.

B3.4.1 Composite and Segment Means

The statistics in this section were based on analytical data from the most recent sampling event of tank 241-C-112. Analysis of variance (ANOVA) techniques were used to estimate the mean and to calculate confidence limits on the mean for all analytes that had more than one observation and 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 data was 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 core composite data from cores 34, 35, and 36 for tank 241-C-112. Tables B3-5 and B3-6 provide estimates of the mean concentration and confidence interval on the mean concentration for solid composite data and liquid composite data, respectively. The LL to a 95 percent confidence interval can be negative. Because a concentration of less than zero is not possible, the LL is reported as zero, whenever this occurred.

There were different statistical models that were fit to the data based on the availability of the data for each analyte. Analytes are divided into five groups (Groups I-V). There is a statistical model fit to the data that is associated with each analyte group. These groups are listed in the concentration and inventory tables. For further discussion on the statistical models, see Section B3.4.2.

Note that for Groups II and V, analytical measurements were obtained for only one core. Multiple core samples are needed to estimate spatial variability. Typically, spatial variability is the greatest source of variability in the tank. Because spatial variability for analytes in these two groups cannot be estimated, the mean concentration for the whole tank for those analytes cannot be estimated unless it is assumed that spatial variability is negligible.

Table B3-5. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Composite Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Group I						
Pu-238	%	2.99E-02	7.00E-03	1	0.00E+00	1.19E-01
Pu-239	%	9.49E+01	1.00E+00	1	8.22E+01	1.00E+02
Pu-240	%	4.89E+00	9.52E-01	1	0.00E+00	1.70E+01
Pu-241	%	1.21E-01	2.43E-02	1	0.00E+00	4.29E-01
Pu-242	%	5.60E-02	1.54E-02	1	0.00E+00	2.52E-01
U-234	%	6.41E-03	1.05E-03	1	0.00E+00	1.97E-02
U-235	%	6.75E-01	3.20E-03	1	6.34E-01	7.15E-01
U-236	%	8.80E-03	1.50E-03	1	0.00E+00	2.79E-02
U-238	%	9.93E+01	9.54E-04	1	9.93E+01	9.93E+01
pH	pH	8.91E+00	7.18E-01	1	0.00E+00	1.80E+01
Wt.%.solids	%	5.84E+01	3.45E+00	1	1.46E+01	1.00E+02
Uranium	mg/g	5.60E+01	3.82E+01	1	0.00E+00	5.41E+02
Alpha.f.Am-241	µCi/g	3.37E-01	2.76E-01	1	0.00E+00	3.84E+00
Alpha.f.Np-237	µCi/g	5.34E-04	1.27E-04	1	0.00E+00	2.14E-03
Alpha.f.Pu-238	µCi/g	8.53E-03	5.17E-03	1	0.00E+00	7.43E-02
Alpha.f.Pu-239/40	µCi/g	1.07E-01	4.79E-02	1	0.00E+00	7.15E-01
Beta.f.Se-79	µCi/g	3.68E-04	2.62E-05	1	3.51E-05	7.00E-04
Beta.f.Sr-90	µCi/g	2.01E+03	1.50E+03	1	0.00E+00	2.11E+04
Beta.f.Tc-99	µCi/g	1.23E-01	1.62E-02	1	0.00E+00	3.29E-01
f.Alpha	µCi/g	5.55E-01	3.91E-01	1	0.00E+00	5.52E+00
f.Beta	µCi/g	4.39E+03	2.68E+03	1	0.00E+00	3.85E+04
GEA.f.Cs-137	µCi/g	3.96E+02	3.96E+02	1	0.00E+00	5.43E+03
GEA.f.Eu-154	µCi/g	7.03E-01	5.47E-01	1	0.00E+00	7.66E+00
Ni-59	µCi/g	1.45E-02	1.13E-02	1	0.00E+00	1.58E-01
Ni-63	µCi/g	1.42E+00	1.10E+00	1	0.00E+00	1.54E+01
Tritium	µCi/g	4.32E-02	2.75E-02	1	0.00E+00	3.92E-01
w.Alpha	µCi/g	7.31E-03	1.28E-03	1	0.00E+00	2.35E-02
w.Beta	µCi/g	3.97E+01	1.61E+01	1	0.00E+00	2.44E+02
Ammonia[1]	µg/g	8.48E+00	2.88E+00	1	0.00E+00	4.50E+01
Chloride	µg/g	1.13E+03	1.20E+02	1	0.00E+00	2.66E+03
Cyanide	µg/g	1.63E+03	3.64E+02	1	0.00E+00	6.25E+03

Table B3-5. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Composite Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Fluoride	μg/g	7.23E+02	2.75E+02	1	0.00E+00	4.22E+03
ICP.a.Al	μg/g	1.44E+04	8.88E+03	1	0.00E+00	1.27E+05
ICP.a.As	μg/g	8.99E+01	2.80E+01	1	0.00E+00	4.45E+02
ICP.a.B	μg/g	1.20E+02	2.30E+01	1	0.00E+00	4.12E+02
ICP.a.Ba	μg/g	4.86E+01	5.70E+00	1	0.00E+00	1.21E+02
ICP.a.Be	μg/g	4.43E+00	3.17E+00	1	0.00E+00	4.48E+01
ICP.a.Ca	μg/g	1.93E+04	2.31E+03	1	0.00E+00	4.87E+04
ICP.a.Cd	μg/g	1.81E+01	7.05E+00	1	0.00E+00	1.08E+02
ICP.a.Ce	μg/g	1.06E+02	2.88E+01	1	0.00E+00	4.72E+02
ICP.a.Co[1]	μg/g	6.04E+01	7.40E+00	1	0.00E+00	1.54E+02
ICP.a.Cr	μg/g	2.27E+02	1.03E+01	1	9.59E+01	3.58E+02
ICP.a.Cu	μg/g	1.19E+01	2.88E+00	1	0.00E+00	4.84E+01
ICP.a.Dy[1]	μg/g	1.78E+00	7.21E-01	1	0.00E+00	1.09E+01
ICP.a.Fe	μg/g	1.98E+04	2.52E+03	1	0.00E+00	5.18E+04
ICP.a.K	μg/g	6.25E+02	2.00E+01	1	3.71E+02	8.79E+02
ICP.a.La	μg/g	5.94E+01	4.19E+01	1	0.00E+00	5.92E+02
ICP.a.Li	μg/g	6.22E+00	1.42E+00	1	0.00E+00	2.43E+01
ICP.a.Mg	μg/g	4.87E+02	5.39E+01	1	0.00E+00	1.17E+03
ICP.a.Mn	μg/g	1.77E+02	3.21E+01	1	0.00E+00	5.85E+02
ICP.a.Mo	μg/g	3.63E+01	1.20E+00	1	2.10E+01	5.15E+01
ICP.a.Na	μg/g	9.89E+04	3.86E+03	1	4.99E+04	1.48E+05
ICP.a.Nd	μg/g	1.33E+02	7.35E+01	1	0.00E+00	1.07E+03
ICP.a.Ni	μg/g	1.41E+04	3.58E+03	1	0.00E+00	5.96E+04
ICP.a.P	μg/g	2.50E+04	5.87E+03	1	0.00E+00	9.96E+04
ICP.a.Pb	μg/g	1.92E+03	1.04E+03	1	0.00E+00	1.52E+04
ICP.a.Re	μg/g	9.00E+00	3.35E+00	1	0.00E+00	5.16E+01
ICP.a.Ru[1]	μg/g	2.88E+01	2.19E+01	1	0.00E+00	3.07E+02
ICP.a.Sb	μg/g	1.10E+02	7.30E+01	1	0.00E+00	1.04E+03
ICP.a.Se	μg/g	7.86E+01	2.60E+01	1	0.00E+00	4.08E+02
ICP.a.Si	μg/g	1.15E+03	3.05E+02	1	0.00E+00	5.03E+03
ICP.a.Sr	μg/g	2.67E+02	5.47E+01	1	0.00E+00	9.62E+02
ICP.a.Th	μg/g	9.88E+01	4.10E+00	1	4.67E+01	1.51E+02

Table B3-5. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Composite Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.a.Ti	µg/g	3.54E+01	9.87E+00	1	0.00E+00	1.61E+02
ICP.a.Tl[1]	µg/g	2.12E+02	9.96E+01	1	0.00E+00	1.48E+03
ICP.a.U	µg/g	4.80E+04	3.59E+04	1	0.00E+00	5.04E+05
ICP.a.V	µg/g	1.55E+01	5.18E+00	1	0.00E+00	8.13E+01
ICP.a.Zn	µg/g	2.06E+02	1.84E+01	1	0.00E+00	4.39E+02
ICP.a.Zr	µg/g	2.38E+01	6.10E+00	1	0.00E+00	1.01E+02
ICP.f.Al	µg/g	1.81E+04	1.17E+04	1	0.00E+00	1.67E+05
ICP.f.Ba	µg/g	8.68E+01	9.95E+00	1	0.00E+00	2.13E+02
ICP.f.Be[1]	µg/g	9.43E+00	4.22E-01	1	4.06E+00	1.48E+01
ICP.f.Ca	µg/g	2.47E+04	4.30E+03	1	0.00E+00	7.93E+04
ICP.f.Cd	µg/g	2.33E+01	2.40E-01	1	2.02E+01	2.63E+01
ICP.f.Cr	µg/g	2.89E+02	3.17E+01	1	0.00E+00	6.91E+02
ICP.f.Cu	µg/g	5.64E+01	7.10E+00	1	0.00E+00	1.47E+02
ICP.f.Fe[1]	µg/g	2.50E+04	1.56E+03	1	5.09E+03	4.48E+04
ICP.f.Mg	µg/g	5.63E+02	4.77E+01	1	0.00E+00	1.17E+03
ICP.f.Mn	µg/g	2.95E+02	3.06E+01	1	0.00E+00	6.84E+02
ICP.f.Mo	µg/g	4.41E+01	3.84E-01	1	3.92E+01	4.90E+01
ICP.f.Na	µg/g	1.18E+05	2.90E+03	1	8.13E+04	1.55E+05
ICP.f.P	µg/g	2.94E+04	7.40E+03	1	0.00E+00	1.23E+05
ICP.f.Pb	µg/g	2.19E+03	1.14E+03	1	0.00E+00	1.66E+04
ICP.f.Sb[1]	µg/g	1.93E+02	4.34E+01	1	0.00E+00	7.44E+02
ICP.f.Si	µg/g	2.54E+03	6.13E+02	1	0.00E+00	1.03E+04
ICP.f.Sr	µg/g	3.19E+02	7.72E+01	1	0.00E+00	1.30E+03
ICP.f.Ti	µg/g	9.00E+01	9.37E+00	1	0.00E+00	2.09E+02
ICP.f.U	µg/g	5.97E+04	4.53E+04	1	0.00E+00	6.35E+05
ICP.f.Zn	µg/g	3.06E+02	1.12E+01	1	1.65E+02	4.48E+02
ICP.f.Zr[1]	µg/g	2.91E+01	4.95E+00	1	0.00E+00	9.20E+01
ICP.w.Al	µg/g	5.95E+02	2.47E+02	1	0.00E+00	3.74E+03
ICP.w.B	µg/g	3.27E+01	5.20E+00	1	0.00E+00	9.88E+01
ICP.w.Ca	µg/g	3.37E+02	1.21E+02	1	0.00E+00	1.87E+03
ICP.w.Cr	µg/g	1.93E+02	2.35E+01	1	0.00E+00	4.91E+02
ICP.w.Fe	µg/g	1.50E+03	1.18E+02	1	6.92E+00	3.00E+03

Table B3-5. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Composite Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.w.K	μg/g	5.29E+02	7.29E+01	1	0.00E+00	1.46E+03
ICP.w.Mg	μg/g	3.40E+01	1.05E+01	1	0.00E+00	1.67E+02
ICP.w.Mn	μg/g	2.01E+00	1.24E+00	1	0.00E+00	1.78E+01
ICP.w.Mo	μg/g	2.95E+01	3.62E+00	1	0.00E+00	7.55E+01
ICP.w.Na	μg/g	1.07E+05	1.31E+04	1	0.00E+00	2.74E+05
ICP.w.Ni	μg/g	8.93E+02	1.04E+02	1	0.00E+00	2.21E+03
ICP.w.P	μg/g	1.20E+04	5.00E+03	1	0.00E+00	7.56E+04
ICP.w.Si	μg/g	7.20E+01	1.74E+01	1	0.00E+00	2.93E+02
ICP.w.Sr	μg/g	4.40E+00	2.66E+00	1	0.00E+00	3.82E+01
ICP.w.U	μg/g	2.99E+03	1.91E+03	1	0.00E+00	2.73E+04
ICP.w.Zn	μg/g	5.73E+00	8.69E-01	1	0.00E+00	1.68E+01
Nitrate	μg/g	7.43E+04	9.39E+03	1	0.00E+00	1.94E+05
Nitrite	μg/g	5.57E+04	7.36E+03	1	0.00E+00	1.49E+05
Phosphate	μg/g	3.61E+04	1.51E+04	1	0.00E+00	2.28E+05
Sulfate	μg/g	1.43E+04	1.58E+03	1	0.00E+00	3.44E+04
TC (TIC/TOC/TC)	μg/g	9.17E+03	2.53E+03	1	0.00E+00	4.13E+04
TIC (Persulfate)	μg/g	6.94E+03	1.64E+03	1	0.00E+00	2.77E+04
TOC (Persulfate)[3]	μg/g	2.24E+03	8.88E+02	1	0.00E+00	1.35E+04
Group V						
Wt.loss.%/total	%	4.72E+01	5.00E-01	1	4.08E+01	5.36E+01
Wt.loss.%/trans 1	%	4.43E+01	5.50E-01	1	3.74E+01	5.13E+01
Alpha.f.Ce-242	μCi/g	1.50E-04	7.07E-05	1	0.00E+00	1.05E-03
Alpha.f.Ce-243/44	μCi/g	1.35E-03	2.12E-04	1	0.00E+00	4.05E-03
f.C-14	μCi/g	4.20E-03	3.39E-03	1	0.00E+00	4.73E-02
GEA.w.Co-60	μCi/g	4.26E-03	1.27E-04	1	2.64E-03	5.88E-03
GEA.w.Cs-137	μCi/g	6.16E+00	3.54E+00	1	0.00E+00	5.12E+01
GEA.w.Eu-154	μCi/g	1.06E-02	2.74E-03	1	0.00E+00	4.53E-02
GEA.w.Eu-155	μCi/g	1.04E-02	1.57E-03	1	0.00E+00	3.03E-02
w.C-14	μCi/g	1.95E-05	3.54E-06	1	0.00E+00	6.44E-05
Hexavalent chromium	μg/g	7.50E+01	2.12E+01	1	0.00E+00	3.45E+02
Mercury	μg/g	4.40E+00	8.49E-01	1	0.00E+00	1.52E+01
TC (Persulfate)	μg/g	7.00E+03	1.41E+02	1	5.20E+03	8.80E+03

Table B3-5. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Composite Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
TIC (TIC/TOC/TC)	µg/g	3.95E+03	2.12E+02	1	1.25E+03	6.65E+03
TOC(TIC/TOC/TC)[3]	µg/g	3.05E+03	7.07E+01	1	2.15E+03	3.95E+03
Total organic halides	µg/g	5.30E+00	2.40E+00	1	0.00E+00	3.58E+01
Analytes with only one observation.						
Wt.%.solids/TGA total	%	4.01E+01	n/a	n/a	n/a	n/a
Wt.%.solids/TGA trans 1	%	3.46E+01	n/a	n/a	n/a	n/a
GEA.f.Am-241	µCi/g	7.58E-01	n/a	n/a	n/a	n/a
GEA.f.Co-60	µCi/g	2.98E-02	n/a	n/a	n/a	n/a
GEA.f.Eu-155	µCi/g	1.27E+00	n/a	n/a	n/a	n/a
GEA.w.Am-241	µCi/g	9.06E-03	n/a	n/a	n/a	n/a
Analytes with more than 50% of the analytical results less than the detection values.						
Antimony (AA:A)[2]	µg/g	<3.60E+00	n/a	n/a	n/a	n/a
Arsenic (AA:A)[2]	µg/g	<9.00E-01	n/a	n/a	n/a	n/a
ICP.a.Ag[2]	µg/g	<1.54E+00	n/a	n/a	n/a	n/a
ICP.a.Rh[2]	µg/g	<1.63E+01	n/a	n/a	n/a	n/a
ICP.a.Te[2]	µg/g	<2.00E+01	n/a	n/a	n/a	n/a
ICP.f.Ag[2]	µg/g	<1.97E+01	n/a	n/a	n/a	n/a
ICP.f.As[2]	µg/g	<2.56E+02	n/a	n/a	n/a	n/a
ICP.f.B[2]	µg/g	<1.53E+02	n/a	n/a	n/a	n/a
ICP.f.Ce[2]	µg/g	<2.58E+02	n/a	n/a	n/a	n/a
ICP.f.Co[2]	µg/g	<4.71E+02	n/a	n/a	n/a	n/a
ICP.f.Dy[2]	µg/g	<1.34E+01	n/a	n/a	n/a	n/a
ICP.f.La[2]	µg/g	<5.62E+01	n/a	n/a	n/a	n/a
ICP.f.Li[2]	µg/g	<1.87E+01	n/a	n/a	n/a	n/a
ICP.f.Nd[2]	µg/g	<1.59E+02	n/a	n/a	n/a	n/a
ICP.f.Re[2]	µg/g	<4.37E+01	n/a	n/a	n/a	n/a
ICP.f.Rh[2]	µg/g	<2.08E+02	n/a	n/a	n/a	n/a
ICP.f.Ru[2]	µg/g	<8.84E+01	n/a	n/a	n/a	n/a
ICP.f.Se[2]	µg/g	<3.83E+02	n/a	n/a	n/a	n/a
ICP.f.Te[2]	µg/g	<2.40E+02	n/a	n/a	n/a	n/a
ICP.f.Th[2]	µg/g	<1.85E+02	n/a	n/a	n/a	n/a
ICP.f.Tl[2]	µg/g	<1.39E+03	n/a	n/a	n/a	n/a

Table B3-5. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Solid Composite Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.f.V[2]	μg/g	<2.44E+01	n/a	n/a	n/a	n/a
ICP.w.Ag[2]	μg/g	<1.89E+00	n/a	n/a	n/a	n/a
ICP.w.As[2]	μg/g	<2.45E+01	n/a	n/a	n/a	n/a
ICP.w.Ba[2]	μg/g	<1.93E+00	n/a	n/a	n/a	n/a
ICP.w.Be[2]	μg/g	<7.74E-01	n/a	n/a	n/a	n/a
ICP.w.Cd[2]	μg/g	<1.96E+00	n/a	n/a	n/a	n/a
ICP.w.Ce[2]	μg/g	<2.46E+01	n/a	n/a	n/a	n/a
ICP.w.Co[2]	μg/g	<4.51E+01	n/a	n/a	n/a	n/a
ICP.w.Cu[2]	μg/g	<2.13E+00	n/a	n/a	n/a	n/a
ICP.w.Dy[2]	μg/g	<1.28E+00	n/a	n/a	n/a	n/a
ICP.w.La[2]	μg/g	<3.00E+00	n/a	n/a	n/a	n/a
ICP.w.Li[2]	μg/g	<1.79E+00	n/a	n/a	n/a	n/a
ICP.w.Nd[2]	μg/g	<1.20E+01	n/a	n/a	n/a	n/a
ICP.w.Pb[2]	μg/g	<2.01E+01	n/a	n/a	n/a	n/a
ICP.w.Re[2]	μg/g	<4.18E+00	n/a	n/a	n/a	n/a
ICP.w.Rh[2]	μg/g	<1.98E+01	n/a	n/a	n/a	n/a
ICP.w.Ru[2]	μg/g	<8.46E+00	n/a	n/a	n/a	n/a
ICP.w.Sb[2]	μg/g	<1.50E+01	n/a	n/a	n/a	n/a
ICP.w.Se[2]	μg/g	<3.66E+01	n/a	n/a	n/a	n/a
ICP.w.Te[2]	μg/g	<2.30E+01	n/a	n/a	n/a	n/a
ICP.w.Th[2]	μg/g	<1.77E+01	n/a	n/a	n/a	n/a
ICP.w.Ti[2]	μg/g	<1.48E+00	n/a	n/a	n/a	n/a
ICP.w.Tl[2]	μg/g	<1.33E+02	n/a	n/a	n/a	n/a
ICP.w.V[2]	μg/g	<2.18E+00	n/a	n/a	n/a	n/a
ICP.w.Zr[2]	μg/g	<1.84E+00	n/a	n/a	n/a	n/a
Selenium (AA:A)[2]	μg/g	<1.30E+01	n/a	n/a	n/a	n/a

Notes:

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

[2]More than 50 percent of the analytical results were less than detection values; therefore, confidence intervals were not computed.

[3]Wet basis

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Composite Sample Data. (5 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Group I						
pH	pH	1.04E+01	8.50E-02	1	9.30E+00	1.15E+01
Uranium (LF:A)	µg/g	4.77E+02	4.76E+02	1	0.00E+00	6.52E+03
Uranium (LF:W)	µg/g	4.87E+02	4.86E+02	1	0.00E+00	6.66E+03
Alpha.w.Am-241[1]	µCi/g	5.30E-05	4.70E-05	1	0.00E+00	6.50E-04
GEA.a.K-40	µCi/g	3.15E-03	2.50E-04	1	0.00E+00	6.33E-03
Tritium	µCi/g	1.17E-01	1.15E-01	1	0.00E+00	1.58E+00
Cyanide	µg/g	1.31E+03	2.85E+02	1	0.00E+00	4.93E+03
Hexavalent chromium	µg/g	1.12E+02	1.88E+01	1	0.00E+00	3.50E+02
ICP.a.B[1]	µg/g	5.15E+01	4.15E+01	1	0.00E+00	5.79E+02
ICP.a.Ca[1]	µg/g	2.07E+02	2.07E+02	1	0.00E+00	2.83E+03
ICP.a.Cr	µg/g	1.57E+02	4.80E+00	1	9.57E+01	2.18E+02
ICP.a.Cu	µg/g	2.55E+00	5.50E-01	1	0.00E+00	9.54E+00
ICP.a.Fe	µg/g	8.95E+02	1.49E+02	1	0.00E+00	2.79E+03
ICP.a.K	µg/g	5.11E+02	3.49E+00	1	4.67E+02	5.55E+02
ICP.a.Mg[1]	µg/g	2.86E+01	2.74E+01	1	0.00E+00	3.77E+02
ICP.a.Mn	µg/g	9.75E-01	1.65E-01	1	0.00E+00	3.07E+00
ICP.a.Mo	µg/g	2.40E+01	3.07E+00	1	0.00E+00	6.31E+01
ICP.a.Na	µg/g	7.61E+04	6.23E+03	1	0.00E+00	1.55E+05
ICP.a.Ni	µg/g	5.38E+02	9.61E+01	1	0.00E+00	1.76E+03
ICP.a.P	µg/g	3.81E+03	1.54E+02	1	1.85E+03	5.76E+03
ICP.a.Si[1]	µg/g	7.12E+01	4.15E+01	1	0.00E+00	5.99E+02
ICP.a.Sr[1]	µg/g	7.58E-01	6.92E-01	1	0.00E+00	9.55E+00
ICP.a.Ti[1]	µg/g	1.73E+00	8.25E-01	1	0.00E+00	1.22E+01
ICP.a.Tl[1]	µg/g	1.49E+02	5.60E+01	1	0.00E+00	8.60E+02
ICP.a.U	µg/g	1.03E+03	9.96E+01	1	0.00E+00	2.29E+03
ICP.a.Zn	µg/g	3.35E+00	9.00E-01	1	0.00E+00	1.48E+01
ICP.w.B	µg/g	2.09E+01	1.93E+00	1	0.00E+00	4.54E+01
ICP.w.Ca[1]	µg/g	2.03E+01	2.00E+01	1	0.00E+00	2.74E+02
ICP.w.Cr	µg/g	1.62E+02	7.88E+00	1	6.24E+01	2.63E+02
ICP.w.Fe	µg/g	9.96E+02	2.07E+02	1	0.00E+00	3.63E+03
ICP.w.K	µg/g	4.79E+02	1.76E+01	1	2.55E+02	7.03E+02

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Composite Sample Data. (5 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.w.Mg	µg/g	1.19E+01	1.09E+01	1	0.00E+00	1.50E+02
ICP.w.Mo	µg/g	2.46E+01	3.35E+00	1	0.00E+00	6.71E+01
ICP.w.Mn	µg/g	3.50E-01	5.00E-02	1	0.00E+00	9.85E-01
ICP.w.Na	µg/g	7.85E+04	7.17E+03	1	0.00E+00	1.70E+05
ICP.w.Ni	µg/g	6.40E+02	1.48E+02	1	0.00E+00	2.52E+03
ICP.w.P	µg/g	3.90E+03	1.45E+02	1	2.06E+03	5.75E+03
ICP.w.Sb[1]	µg/g	9.36E+00	4.41E-01	1	3.76E+00	1.50E+01
ICP.w.Si[1]	µg/g	1.73E+01	7.97E+00	1	0.00E+00	1.19E+02
ICP.w.Sr[1]	µg/g	1.84E-01	1.16E-01	1	0.00E+00	1.66E+00
ICP.w.U	µg/g	1.06E+03	7.82E+01	1	6.40E+01	2.05E+03
ICP.w.Zn	µg/g	3.25E+00	6.00E-01	1	0.00E+00	1.09E+01
Mercury	µg/g	2.44E+00	1.09E+00	1	0.00E+00	1.63E+01
Chloride	µg/g	9.50E+02	5.00E+01	1	3.15E+02	1.59E+03
Fluoride	µg/g	4.50E+02	1.50E+02	1	0.00E+00	2.36E+03
Nitrate	µg/g	6.53E+04	6.75E+03	1	0.00E+00	1.51E+05
Nitrite	µg/g	5.05E+04	4.50E+03	1	0.00E+00	1.08E+05
Phosphate	µg/g	1.23E+04	6.50E+02	1	4.04E+03	2.06E+04
Sulfate	µg/g	1.13E+04	3.75E+02	1	6.51E+03	1.60E+04
TC (TIC/TOC/TC)	µg/g	6.33E+03	6.06E+02	1	0.00E+00	1.40E+04
TIC (TIC/TOC/TC)	µg/g	5.13E+03	4.25E+02	1	0.00E+00	1.05E+04
TOC (TIC/TOC/TC)[3]	µg/g	1.70E+03	3.00E+02	1	0.00E+00	5.51E+03
Total organic halides	µg/L	2.10E+03	9.00E+02	1	0.00E+00	1.35E+04
Group II						
a.Alpha	µCi/g	2.74E-03	8.60E-04	1	0.00E+00	1.37E-02
Group III						
a.Beta	µCi/g	5.88E-01	1.03E-01	1	0.00E+00	1.89E+00
Beta.a.Sr-90	µCi/g	2.87E-01	5.75E-02	1	0.00E+00	1.02E+00
Beta.a.Tc-99	µCi/g	1.21E-01	2.83E-02	1	0.00E+00	4.81E-01
GEA.a.Co-60	µCi/g	2.72E-03	9.42E-04	1	0.00E+00	1.47E-02
GEA.a.Cs-137	µCi/g	2.15E-02	1.12E-02	1	0.00E+00	1.64E-01

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Composite Sample Data. (5 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Group V						
U-234	%	5.40E-03	1.41E-04	1	3.60E-03	7.20E-03
U-235	%	6.67E-01	2.26E-03	1	6.38E-01	6.96E-01
U-236	%	9.30E-03	1.41E-04	1	7.50E-03	1.11E-02
U-238	%	9.93E+01	1.84E-03	1	9.93E+01	9.93E+01
w.U-234	%	5.65E-03	6.36E-04	1	0.00E+00	1.37E-02
w.U-235	%	6.70E-01	3.11E-03	1	6.31E-01	7.10E-01
w.U-236	%	8.25E-03	6.36E-04	1	1.64E-04	1.63E-02
w.U-238	%	9.93E+01	3.11E-03	1	9.93E+01	9.94E+01
a.Se-79	µCi/g	2.14E-04	1.06E-05	1	7.87E-05	3.48E-04
Alpha.w.Pu-238	µCi/g	5.45E-05	1.09E-05	1	0.00E+00	1.93E-04
Alpha.w.Pu-239/40	µCi/g	8.00E-04	9.19E-06	1	6.83E-04	9.16E-04
Beta.a.Se-79	µCi/g	7.75E-05	7.64E-06	1	0.00E+00	1.75E-04
C-14	µCi/g	1.30E-03	2.17E-19	1	1.30E-03	1.30E-03
f.Alpha	µCi/g	8.20E-04	5.37E-05	1	1.37E-04	1.50E-03
w.C-14	µCi/g	2.20E+03	3.11E+03	1	0.00E+00	4.17E+04
Ammonia	µg/g	2.30E+01	3.55E-15	1	2.30E+01	2.30E+01
Analytes with only one observation.						
Pu-238	%	2.80E-02	n/a	n/a	n/a	n/a
Pu-239	%	9.39E+01	n/a	n/a	n/a	n/a
Pu-240	%	5.79E+00	n/a	n/a	n/a	n/a
Pu-241	%	1.73E-01	n/a	n/a	n/a	n/a
Pu-242	%	7.30E-02	n/a	n/a	n/a	n/a
Density	g/mL	1.40E+00	n/a	n/a	n/a	n/a
a.Ni-59	µCi/g	1.27E-01	n/a	n/a	n/a	n/a
a.Ni-63	µCi/g	1.37E+01	n/a	n/a	n/a	n/a
GEA.a.Cs-134	µCi/g	8.53E-04	n/a	n/a	n/a	n/a
GEA.a.Sb-125	µCi/g	2.08E-03	n/a	n/a	n/a	n/a
Ni-59	µCi/g	1.70E-04	n/a	n/a	n/a	n/a
Ni-63	µCi/g	1.95E-02	n/a	n/a	n/a	n/a

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Composite Sample Data. (5 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Analytes with more than 50 percent of analytical results less than the detection values.						
Alpha.w.Np-237[2]	µCi/g	<6.00E-06	n/a	n/a	n/a	n/a
Antimony (AA:A)[2]	µg/g	<6.50E-01	n/a	n/a	n/a	n/a
Arsenic (AA:A)[2]	µg/g	<5.25E-01	n/a	n/a	n/a	n/a
ICP.a.Ag[2]	µg/g	<1.31E+00	n/a	n/a	n/a	n/a
ICP.a.Al[2]	µg/g	<3.07E+01	n/a	n/a	n/a	n/a
ICP.a.As[2]	µg/g	<1.70E+01	n/a	n/a	n/a	n/a
ICP.a.Ba[2]	µg/g	<1.36E+00	n/a	n/a	n/a	n/a
ICP.a.Be[2]	µg/g	<5.37E-01	n/a	n/a	n/a	n/a
ICP.a.Cd[2]	µg/g	<1.26E+00	n/a	n/a	n/a	n/a
ICP.a.Ce[2]	µg/g	<1.71E+01	n/a	n/a	n/a	n/a
ICP.a.Co[2]	µg/g	<3.13E+01	n/a	n/a	n/a	n/a
ICP.a.Dy[2]	µg/g	<8.89E-01	n/a	n/a	n/a	n/a
ICP.a.La[2]	µg/g	<2.08E+00	n/a	n/a	n/a	n/a
ICP.a.Li[2]	µg/g	<1.24E+00	n/a	n/a	n/a	n/a
ICP.a.Nd[2]	µg/g	<8.32E+00	n/a	n/a	n/a	n/a
ICP.a.Pb[2]	µg/g	<1.39E+01	n/a	n/a	n/a	n/a
ICP.a.Re[2]	µg/g	<2.90E+00	n/a	n/a	n/a	n/a
ICP.a.Rh[2]	µg/g	<1.38E+01	n/a	n/a	n/a	n/a
ICP.a.Ru[2]	µg/g	<5.87E+00	n/a	n/a	n/a	n/a
ICP.a.Sb[2]	µg/g	<7.97E+00	n/a	n/a	n/a	n/a
ICP.a.Se[2]	µg/g	<2.54E+01	n/a	n/a	n/a	n/a
ICP.a.Te[2]	µg/g	<1.59E+01	n/a	n/a	n/a	n/a
ICP.a.Th[2]	µg/g	<1.23E+01	n/a	n/a	n/a	n/a
ICP.a.V[2]	µg/g	<1.51E+00	n/a	n/a	n/a	n/a
ICP.a.Zr[2]	µg/g	<1.27E+00	n/a	n/a	n/a	n/a
ICP.w.Ag[2]	µg/g	<1.46E+00	n/a	n/a	n/a	n/a
ICP.w.Al[2]	µg/g	<3.28E+01	n/a	n/a	n/a	n/a
ICP.w.As[2]	µg/g	<1.82E+01	n/a	n/a	n/a	n/a
ICP.w.Ba[2]	µg/g	<1.43E+00	n/a	n/a	n/a	n/a
ICP.w.Be[2]	µg/g	<5.73E-01	n/a	n/a	n/a	n/a
ICP.w.Cd[2]	µg/g	<1.34E+00	n/a	n/a	n/a	n/a

Table B3-6. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Liquid Composite Sample Data. (5 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.w.Ce[2]	μg/g	<1.83E+01	n/a	n/a	n/a	n/a
ICP.w.Co[2]	μg/g	<3.34E+01	n/a	n/a	n/a	n/a
ICP.w.Cu[2]	μg/g	<1.58E+00	n/a	n/a	n/a	n/a
ICP.w.Dy[2]	μg/g	<9.50E-01	n/a	n/a	n/a	n/a
ICP.w.La[2]	μg/g	<2.22E+00	n/a	n/a	n/a	n/a
ICP.w.Li[2]	μg/g	<1.33E+00	n/a	n/a	n/a	n/a
ICP.w.Nd[2]	μg/g	<8.89E+00	n/a	n/a	n/a	n/a
ICP.w.Pb[2]	μg/g	<1.49E+01	n/a	n/a	n/a	n/a
ICP.w.Re[2]	μg/g	<3.10E+00	n/a	n/a	n/a	n/a
ICP.w.Rh[2]	μg/g	<1.47E+01	n/a	n/a	n/a	n/a
ICP.w.Ru[2]	μg/g	<6.27E+00	n/a	n/a	n/a	n/a
ICP.w.Se[2]	μg/g	<2.71E+01	n/a	n/a	n/a	n/a
ICP.w.Te[2]	μg/g	<1.70E+01	n/a	n/a	n/a	n/a
ICP.w.Th[2]	μg/g	<1.32E+01	n/a	n/a	n/a	n/a
ICP.w.Ti[2]	μg/g	<9.68E-01	n/a	n/a	n/a	n/a
ICP.w.Tl[2]	μg/g	<9.84E+01	n/a	n/a	n/a	n/a
ICP.w.V[2]	μg/g	<1.61E+00	n/a	n/a	n/a	n/a
ICP.w.Zr[2]	μg/g	<1.36E+00	n/a	n/a	n/a	n/a
Selenium (AA:A)[2]	μg/g	<5.00E-01	n/a	n/a	n/a	n/a

Notes:

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

[2]More than 50 percent of the analytical results were less than detection values; therefore, confidence intervals were not computed.

[3]Wet basis

In addition to core composite data, segment level data from tank 241-C-112 was also available from cores 34, 35, and 36. For sample data, Table B3-7 shows mean concentration estimates and 95 percent confidence intervals on the mean.

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Segment Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Group I						
Density (solids)	g/mL	1.65E+00	1.60E-01	2	9.61E-01	2.34E+00
GEA.f.K-40	µCi/g	4.52E-02	3.99E-02	1	0.00E+00	5.52E-01
GEA.w.Am-241	µCi/g	7.96E-03	1.17E-03	1	0.00E+00	2.29E-02
GEA.w.Eu-154	µCi/g	1.15E-02	4.30E-03	1	0.00E+00	6.61E-02
GEA.w.Eu-155	µCi/g	1.43E-02	2.08E-03	1	0.00E+00	4.07E-02
Group II						
GEA.w.Sb-125	µCi/g	4.88E-03	1.18E-03	1	0.00E+00	1.98E-02
Group IV						
Wt.%.solids	%	5.14E+01	5.30E+00	2	2.86E+01	7.42E+01
Wt.loss.%/total	%	4.70E+01	3.38E+00	1	4.06E+00	9.00E+01
Wt.loss.%/transition 1	%	4.53E+01	2.13E+00	1	1.82E+01	7.23E+01
pH	pH	9.53E+00	1.56E-01	2	8.86E+00	1.02E+01
f.Sr-90	µCi/g	1.79E+03	9.38E+02	2	0.00E+00	5.83E+03
GEA.a.Am-241	µCi/g	4.53E-01	1.54E-01	2	0.00E+00	1.12E+00
GEA.a.Co-60	µCi/g	8.70E-03	1.41E-03	1	0.00E+00	2.66E-02
GEA.a.Cs-137	µCi/g	1.57E+01	7.26E+00	2	0.00E+00	4.69E+01
GEA.a.Eu-154	µCi/g	8.43E-01	4.25E-01	2	0.00E+00	2.67E+00
GEA.a.Eu-155	µCi/g	9.70E-01	4.93E-01	2	0.00E+00	3.09E+00
GEA.f.Am-241	µCi/g	5.59E-01	2.44E-01	2	0.00E+00	1.61E+00
GEA.f.Co-60	µCi/g	2.70E-02	1.23E-02	1	0.00E+00	1.83E-01
GEA.f.Cs-137	µCi/g	5.51E+02	1.07E+02	2	9.13E+01	1.01E+03
GEA.f.Eu-154	µCi/g	9.69E-01	4.95E-01	2	0.00E+00	3.10E+00
GEA.f.Eu-155	µCi/g	1.07E+00	5.26E-01	2	0.00E+00	3.33E+00
GEA.w.Co-60	µCi/g	3.21E-03	2.32E-04	2	2.21E-03	4.20E-03
GEA.w.Cs-137	µCi/g	4.46E+00	1.17E+00	2	0.00E+00	9.47E+00
GEA.w.K-40	µCi/g	1.24E-03	1.78E-04	1	0.00E+00	3.49E-03
Chloride	µg/g	8.68E+02	7.27E+01	2	5.55E+02	1.18E+03
Cyanide	µg/g	1.15E+03	2.42E+02	2	1.11E+02	2.19E+03
Fluoride	µg/g	6.37E+02	1.74E+02	2	0.00E+00	1.38E+03
ICP.a.Al	µg/g	2.10E+04	8.71E+03	2	0.00E+00	5.84E+04
ICP.a.As	µg/g	1.28E+02	8.57E+01	2	0.00E+00	4.97E+02

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Segment Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.a.B[1]	μg/g	8.58E+01	1.16E+01	2	3.61E+01	1.35E+02
ICP.a.Ba[1]	μg/g	5.48E+01	1.75E+01	2	0.00E+00	1.30E+02
ICP.a.Be[1]	μg/g	3.49E+00	1.50E+00	2	0.00E+00	9.94E+00
ICP.a.Ca[1]	μg/g	1.25E+04	6.55E+03	2	0.00E+00	4.06E+04
ICP.a.Cd	μg/g	1.69E+01	4.46E+00	2	0.00E+00	3.61E+01
ICP.a.Ce	μg/g	1.48E+02	5.00E+01	2	0.00E+00	3.63E+02
ICP.a.Cr	μg/g	2.21E+02	1.79E+01	2	1.44E+02	2.98E+02
ICP.a.Cu	μg/g	3.18E+01	1.18E+01	2	0.00E+00	8.24E+01
ICP.a.Dy[1]	μg/g	5.54E+00	4.20E+00	2	0.00E+00	2.36E+01
ICP.a.Fe	μg/g	2.25E+04	3.98E+03	2	5.40E+03	3.96E+04
ICP.a.K	μg/g	4.76E+02	6.30E+00	2	4.49E+02	5.03E+02
ICP.a.La	μg/g	7.66E+01	2.92E+01	2	0.00E+00	2.02E+02
ICP.a.Li	μg/g	5.53E+00	1.06E+00	2	9.51E-01	1.01E+01
ICP.a.Mg	μg/g	5.43E+02	1.08E+02	2	7.68E+01	1.01E+03
ICP.a.Mn	μg/g	2.02E+02	4.29E+01	2	1.78E+01	3.87E+02
ICP.a.Mo	μg/g	3.12E+01	3.08E+00	2	1.80E+01	4.44E+01
ICP.a.Na	μg/g	8.04E+04	5.94E+03	2	5.48E+04	1.06E+05
ICP.a.Nd	μg/g	1.65E+02	4.10E+01	2	0.00E+00	3.41E+02
ICP.a.Ni	μg/g	1.16E+04	3.91E+03	2	0.00E+00	2.84E+04
ICP.a.P	μg/g	2.10E+04	2.75E+03	2	9.19E+03	3.28E+04
ICP.a.Pb	μg/g	2.41E+03	6.50E+02	2	0.00E+00	5.21E+03
ICP.a.Re[1]	μg/g	1.07E+01	3.16E+00	2	0.00E+00	2.43E+01
ICP.a.Sb	μg/g	9.68E+01	4.02E+01	2	0.00E+00	2.70E+02
ICP.a.Se[1]	μg/g	1.40E+02	5.94E+01	2	0.00E+00	3.96E+02
ICP.a.Si	μg/g	1.39E+03	4.40E+02	2	0.00E+00	3.28E+03
ICP.a.Sr	μg/g	3.34E+02	1.15E+02	2	0.00E+00	8.28E+02
ICP.a.Te[1]	μg/g	3.06E+01	1.03E+01	2	0.00E+00	7.48E+01
ICP.a.Th	μg/g	2.26E+02	1.43E+02	2	0.00E+00	8.41E+02
ICP.a.Ti	μg/g	4.90E+01	1.42E+01	2	0.00E+00	1.10E+02
ICP.a.U	μg/g	3.93E+04	1.83E+04	2	0.00E+00	1.18E+05
ICP.a.V	μg/g	2.23E+01	6.37E+00	2	0.00E+00	4.97E+01
ICP.a.Zn	μg/g	2.48E+02	3.94E+01	2	7.84E+01	4.17E+02

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Segment Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.a.Zr[1]	μg/g	1.66E+01	5.51E+00	2	0.00E+00	4.04E+01
ICP.f.Al	μg/g	2.38E+04	9.70E+03	2	0.00E+00	6.55E+04
ICP.f.Ba	μg/g	9.38E+01	1.19E+01	2	4.27E+01	1.45E+02
ICP.f.Ca	μg/g	2.01E+04	3.96E+03	2	3.06E+03	3.71E+04
ICP.f.Cr	μg/g	2.14E+02	1.35E+01	2	1.55E+02	2.72E+02
ICP.f.Cu[1]	μg/g	1.15E+02	5.72E+01	2	0.00E+00	3.61E+02
ICP.f.Fe	μg/g	1.86E+04	3.68E+03	2	2.72E+03	3.44E+04
ICP.f.Mg	μg/g	6.09E+02	1.73E+02	2	0.00E+00	1.36E+03
ICP.f.Mn	μg/g	2.30E+02	2.99E+01	2	1.02E+02	3.59E+02
ICP.f.Na	μg/g	8.55E+04	5.44E+03	2	6.21E+04	1.09E+05
ICP.f.P	μg/g	1.97E+04	2.82E+03	2	7.54E+03	3.18E+04
ICP.f.Pb[1]	μg/g	2.41E+03	9.35E+02	2	0.00E+00	6.43E+03
ICP.f.Si	μg/g	4.09E+03	2.25E+03	2	0.00E+00	1.38E+04
ICP.f.Sr	μg/g	2.51E+02	4.99E+01	2	3.62E+01	4.66E+02
ICP.f.Ti[1]	μg/g	8.69E+01	1.93E+01	2	3.67E+00	1.70E+02
ICP.f.U[1]	μg/g	4.13E+04	2.25E+04	2	0.00E+00	1.38E+05
ICP.f.Zn	μg/g	3.04E+02	5.15E+01	2	8.25E+01	5.26E+02
Nitrate	μg/g	5.87E+04	6.88E+03	2	2.91E+04	8.83E+04
Nitrite	μg/g	4.50E+04	5.09E+03	2	2.31E+04	6.69E+04
Phosphate	μg/g	2.03E+04	5.45E+03	2	0.00E+00	4.38E+04
Sulfate	μg/g	1.13E+04	1.05E+03	2	6.76E+03	1.58E+04
TC (Persulfate)	μg/g	9.00E+03	1.24E+03	2	3.67E+03	1.43E+04
TIC (Persulfate)	μg/g	4.80E+03	9.23E+02	2	8.25E+02	8.77E+03
TOC (Persulfate)[3]	μg/g	4.04E+03	7.41E+02	2	8.49E+02	7.22E+03
Group V						
Density (liquid)	g/mL	1.20E+00	2.22E-16	1	1.20E+00	1.20E+00
U-234	%	5.70E-03	4.24E-04	1	3.09E-04	1.11E-02
U-235	%	6.82E-01	2.05E-03	1	6.56E-01	7.08E-01
U-236	%	5.90E-03	0.00E+00	1	5.90E-03	5.90E-03
U-238	%	9.93E+01	2.55E-03	1	9.93E+01	9.93E+01
Wt.%.solids/TGA total	%	4.85E+01	5.00E+00	2	2.70E+01	7.00E+01

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Segment Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
Wt.%.solids/TGA trans 1	%	4.35E+01	5.48E+00	2	2.00E+01	6.71E+01
Alpha.f.Am-241	μCi/g	7.63E-01	6.15E-02	1	0.00E+00	1.54E+00
C-14	μCi/g	5.75E-03	3.18E-03	1	0.00E+00	4.62E-02
f.alpha	μCi/g	1.18E+00	4.24E-02	1	6.41E-01	1.72E+00
f.beta	μCi/g	6.98E+03	1.48E+02	1	5.09E+03	8.86E+03
f.Np-237	μCi/g	1.20E-03	2.05E-04	1	0.00E+00	3.80E-03
f.Pu-238	μCi/g	1.37E-02	9.19E-04	1	1.97E-03	2.53E-02
f.Pu-239/40	μCi/g	1.51E-01	5.66E-03	1	7.91E-02	2.23E-01
f.Tc-99	μCi/g	9.71E-02	4.10E-03	1	4.50E-02	1.49E-01
Ni-59	μCi/g	1.33E-02	1.56E-03	1	0.00E+00	3.31E-02
Ni-63	μCi/g	1.29E+00	7.07E-03	1	1.20E+00	1.37E+00
Se-79[1]	μCi/g	8.85E-04	2.12E-05	1	6.15E-04	1.15E-03
Tritium[1]	μCi/g	1.85E-02	1.27E-03	1	2.33E-03	3.47E-02
w.alpha	μCi/g	8.46E-03	1.58E-03	1	0.00E+00	2.86E-02
w.beta	μCi/g	5.64E+01	8.77E+00	1	0.00E+00	1.68E+02
Ammonia[1]	μg/g	5.10E+00	0.00E+00	1	5.10E+00	5.10E+00
ICP.w.Al	μg/g	3.30E+02	3.96E+00	1	2.80E+02	3.81E+02
ICP.w.B	μg/g	1.72E+01	2.69E+00	1	0.00E+00	5.13E+01
ICP.w.Ca	μg/g	3.39E+02	4.94E+01	1	0.00E+00	9.67E+02
ICP.w.Cr	μg/g	1.32E+02	2.83E-01	1	1.28E+02	1.35E+02
ICP.w.Fe	μg/g	7.12E+02	1.36E+01	1	5.40E+02	8.85E+02
ICP.w.K	μg/g	3.48E+02	6.36E+00	1	2.67E+02	4.29E+02
ICP.w.Mg	μg/g	3.18E+01	4.95E-01	1	2.55E+01	3.80E+01
ICP.w.Mn	μg/g	9.00E-01	1.41E-01	1	0.00E+00	2.70E+00
ICP.w.Mo	μg/g	1.58E+01	2.83E-01	1	1.22E+01	1.94E+01
ICP.w.Na	μg/g	6.05E+04	2.30E+02	1	5.76E+04	6.34E+04
ICP.w.Ni	μg/g	4.07E+02	5.66E+00	1	3.35E+02	4.78E+02
ICP.w.P	μg/g	5.63E+03	1.05E+02	1	4.29E+03	6.97E+03
ICP.w.Pb	μg/g	2.02E+01	3.82E+00	1	0.00E+00	6.87E+01
ICP.w.Si	μg/g	6.09E+01	4.03E+00	1	9.64E+00	1.12E+02
ICP.w.Sr	μg/g	5.15E+00	9.19E-01	1	0.00E+00	1.68E+01
ICP.w.U	μg/g	4.60E+02	2.30E+01	1	1.68E+02	7.52E+02

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Segment Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.w.V	µg/g	2.60E+00	1.41E-01	1	8.03E-01	4.40E+00
ICP.w.Zn	µg/g	3.25E+00	3.54E-01	1	0.00E+00	7.74E+00
TC (TIC/TOC/TC)	µg/g	6.05E+03	2.12E+02	1	3.35E+03	8.75E+03
TIC (TIC/TOC/TC)	µg/g	4.90E+03	4.24E+02	1	0.00E+00	1.03E+04
TOC (TIC/TOC/TC)[3]	µg/g	1.15E+03	2.12E+02	1	0.00E+00	3.85E+03
Uranium (LF:F)	µg/g	4.43E+04	1.70E+03	1	2.27E+04	6.59E+04
Analyte with only one observation.						
GEA.f.Cs-134	µCi/g	7.31E-03	n/a	n/a	n/a	n/a
Analytes with more than 50 percent of analytical results less than the detection values.						
ICP.a.Ag[2]	µg/g	<1.51E+00	n/a	n/a	n/a	n/a
ICP.a.Co[2]	µg/g	<7.83E+01	n/a	n/a	n/a	n/a
ICP.a.Rh[2]	µg/g	<5.02E+01	n/a	n/a	n/a	n/a
ICP.a.Ru[2]	µg/g	<5.76E+01	n/a	n/a	n/a	n/a
ICP.a.Tl[2]	µg/g	<5.41E+02	n/a	n/a	n/a	n/a
ICP.f.Ag[2]	µg/g	<4.64E+01	n/a	n/a	n/a	n/a
ICP.f.As[2]	µg/g	<6.04E+02	n/a	n/a	n/a	n/a
ICP.f.B[2]	µg/g	<3.55E+02	n/a	n/a	n/a	n/a
ICP.f.Be[2]	µg/g	<2.02E+01	n/a	n/a	n/a	n/a
ICP.f.Cd[2]	µg/g	<4.76E+01	n/a	n/a	n/a	n/a
ICP.f.Ce[2]	µg/g	<6.07E+02	n/a	n/a	n/a	n/a
ICP.f.Co[2]	µg/g	<1.14E+03	n/a	n/a	n/a	n/a
ICP.f.Dy[2]	µg/g	<3.16E+01	n/a	n/a	n/a	n/a
ICP.f.La[2]	µg/g	<8.37E+01	n/a	n/a	n/a	n/a
ICP.f.Li[2]	µg/g	<4.42E+01	n/a	n/a	n/a	n/a
ICP.f.Mo[2]	µg/g	<7.83E+01	n/a	n/a	n/a	n/a
ICP.f.Nd[2]	µg/g	<2.95E+02	n/a	n/a	n/a	n/a
ICP.f.Re[2]	µg/g	<1.03E+02	n/a	n/a	n/a	n/a
ICP.f.Rh[2]	µg/g	<4.89E+02	n/a	n/a	n/a	n/a
ICP.f.Ru[2]	µg/g	<2.08E+02	n/a	n/a	n/a	n/a
ICP.f.Sb[2]	µg/g	<3.34E+02	n/a	n/a	n/a	n/a
ICP.f.Se[2]	µg/g	<9.02E+02	n/a	n/a	n/a	n/a
ICP.f.Te[2]	µg/g	<5.66E+02	n/a	n/a	n/a	n/a

Table B3-7. 95 Percent Two-Sided Confidence Interval for the Mean Concentration for Segment Sample Data. (6 sheets)

Analyte	Units	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	df	LL	UL
ICP.f.Th[2]	μg/g	<4.40E+02	n/a	n/a	n/a	n/a
ICP.f.Tl[2]	μg/g	<3.27E+03	n/a	n/a	n/a	n/a
ICP.f.V[2]	μg/g	<5.36E+01	n/a	n/a	n/a	n/a
ICP.f.Zr[2]	μg/g	<5.11E+01	n/a	n/a	n/a	n/a
ICP.w.Ag[2]	μg/g	<1.56E+00	n/a	n/a	n/a	n/a
ICP.w.As[2]	μg/g	<2.02E+01	n/a	n/a	n/a	n/a
ICP.w.Ba[2]	μg/g	<1.60E+00	n/a	n/a	n/a	n/a
ICP.w.Be[2]	μg/g	<6.38E-01	n/a	n/a	n/a	n/a
ICP.w.Cd[2]	μg/g	<1.50E+00	n/a	n/a	n/a	n/a
ICP.w.Ce[2]	μg/g	<2.03E+01	n/a	n/a	n/a	n/a
ICP.w.Co[2]	μg/g	<3.72E+01	n/a	n/a	n/a	n/a
ICP.w.Cu[2]	μg/g	<1.76E+00	n/a	n/a	n/a	n/a
ICP.w.Dy[2]	μg/g	<1.06E+00	n/a	n/a	n/a	n/a
ICP.w.La[2]	μg/g	<2.47E+00	n/a	n/a	n/a	n/a
ICP.w.Li[2]	μg/g	<1.48E+00	n/a	n/a	n/a	n/a
ICP.w.Nd[2]	μg/g	<9.89E+00	n/a	n/a	n/a	n/a
ICP.w.Re[2]	μg/g	<3.45E+00	n/a	n/a	n/a	n/a
ICP.w.Rh[2]	μg/g	<1.64E+01	n/a	n/a	n/a	n/a
ICP.w.Ru[2]	μg/g	<6.98E+00	n/a	n/a	n/a	n/a
ICP.w.Sb[2]	μg/g	<9.48E+00	n/a	n/a	n/a	n/a
ICP.w.Se[2]	μg/g	<3.02E+01	n/a	n/a	n/a	n/a
ICP.w.Te[2]	μg/g	<1.90E+01	n/a	n/a	n/a	n/a
ICP.w.Th[2]	μg/g	<1.46E+01	n/a	n/a	n/a	n/a
ICP.w.Ti[2]	μg/g	<1.08E+00	n/a	n/a	n/a	n/a
ICP.w.Tl[2]	μg/g	<1.10E+02	n/a	n/a	n/a	n/a
ICP.w.Zr[2]	μg/g	<1.52E+00	n/a	n/a	n/a	n/a

Notes:

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

[2]More than 50 percent of the analytical results were less than detection values; therefore, confidence intervals were not computed.

[3]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 data for the Group I analytes is as follows.

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

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

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 methods. This method, applied to variance component estimation, is described in Harville 1977. The statistical results were obtained using the statistical analysis package S-PLUS[1] (Statistical Sciences 1993).

The statistical model fit to the data for the Group II analytes is as follows.

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

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

where

Y_{ij}	=	laboratory results from the j[th] duplicate from the i[th] segment in the core
μ	=	the grand mean
S_i	=	the effect of the i[th] segment
A_{ij}	=	the effect of the j[th] analytical result from the i[th] segment
a	=	the number of segments
b_i	=	the number of analytical results from the i[th] segment

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

The variable S_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 $\sigma^2(S)$ and $\sigma^2(A)$, respectively. Estimates of $\sigma^2(S)$ and $\sigma^2(A)$ were obtained using REML methods. This method, applied to variance component estimation, is described in Harville 1977. The statistical results were obtained using the statistical analysis package S-PLUS™ (Statistical Sciences 1993).

The statistical model fit to the data for Group III analytes is as follows.

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

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

where

Y_{ijk}	=	laboratory results from the k[th] duplicate in the j[th] sample in the i[th] core in the tank
μ	=	the grand mean
C_i	=	the effect of the i[th] core
L_{ij}	=	the effect of the j[th] sample in the i[th] core
A_{ijk}	=	the effect of the k[th] analytical result in the j[th] sample in the i[th] core
a	=	the number of cores
b_i	=	the number of samples in the i[th] core
c_{ij}	=	the number of analytical results from the j[th] sample in the i[th] core

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

The statistical model fit to the data for Group IV analytes is as follows.

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

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

where

Y_{ijkm}	=	laboratory results from the m^{th} duplicate from the k^{th} sample 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} sample from the j^{th} segment from the i^{th} core
A_{ijkm}	=	the effect of the m^{th} analytical result from the k^{th} sample from the j^{th} segment from 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 samples from the j^{th} segment from the i^{th} core
d_{ijk}	=	the number of analytical results from the k^{th} sample from the j^{th} segment from the i^{th} core

The variables C_i, S_{ij}, and L_{ijk} are assumed to be a random effect. 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 method. This method, applied to variance component estimation, is described in Harville (1977). The statistical results were obtained using the statistical analysis package S-PLUS™ (Statistical Sciences 1993).

A statistical model was not fit to the Group V analytes because measurements existed from only one sample for these analytes. Only the arithmetic mean, the standard deviation of the arithmetic mean, and the LL and UL of the 95 percent confidence interval of the arithmetic mean were computed.

B3.4.3 Inventory

After sample means are calculated for the tank for each analyte, the sampling based inventory can be calculated. The total mass of waste is derived from the tank waste volume (from surveillance) and the estimated tank solids density (from analytical data). The tank waste volume for solids is 394 kL (Hanlon 1997). The density used for the estimate was 1.65 g/mL obtained from sample data. Tables B3-8 and B3-9 show the inventory of each analyte for solid composite sample data and for solid segment sample data, respectively. No inventories were computed for liquid composite sample data because the liquid contribution to the tank is negligible.

Table B3-8. Analytical-Based Inventory for Solid Composite Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
Group I			
Wt.%.solids	3.80E+05	9.49E+04	6.50E+05
Uranium	3.64E+04	0.00E+00	3.51E+05
Alpha.f.Am-241	2.19E+02	0.00E+00	2.50E+03
Alpha.f.Np-237	3.47E-01	0.00E+00	1.39E+00
Alpha.f.Pu-238	5.54E+00	0.00E+00	4.82E+01
Alpha.f.Pu-239/40	6.95E+01	0.00E+00	4.65E+02
Beta.f.Se-79	2.39E-01	2.28E-02	4.55E-01
Beta.f.Sr-90	1.30E+06	0.00E+00	1.37E+07
Beta.f.Tc-99	7.97E+01	0.00E+00	2.14E+02
f.Alpha	3.60E+02	0.00E+00	3.59E+03
f.Beta	2.85E+06	0.00E+00	2.50E+07
GEA.f.Cs-137	2.57E+05	0.00E+00	3.53E+06
GEA.f.Eu-154	4.56E+02	0.00E+00	4.97E+03
Ni-59	9.40E+00	0.00E+00	1.03E+02
Ni-63	9.21E+02	0.00E+00	1.00E+04
Tritium	2.81E+01	0.00E+00	2.55E+02
w.Alpha	4.75E+00	0.00E+00	1.53E+01
w.Beta	2.58E+04	0.00E+00	1.58E+05
Ammonia	5.50E+00	0.00E+00	2.92E+01
Chloride	7.36E+02	0.00E+00	1.73E+03
Cyanide	1.06E+03	0.00E+00	4.06E+03
Fluoride	4.69E+02	0.00E+00	2.74E+03
ICP.a.Al	9.35E+03	0.00E+00	8.26E+04
ICP.a.As	5.84E+01	0.00E+00	2.89E+02
ICP.a.B	7.79E+01	0.00E+00	2.68E+02
ICP.a.Ba	3.16E+01	0.00E+00	7.86E+01
ICP.a.Be	2.87E+00	0.00E+00	2.91E+01
ICP.a.Ca	1.26E+04	0.00E+00	3.16E+04
ICP.a.Cd	1.18E+01	0.00E+00	6.99E+01

Table B3-8. Analytical-Based Inventory for Solid Composite Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
ICP.a.Ce	6.88E+01	0.00E+00	3.07E+02
ICP.a.Co	3.92E+01	0.00E+00	1.00E+02
ICP.a.Cr	1.47E+02	6.23E+01	2.32E+02
ICP.a.Cu	7.71E+00	0.00E+00	3.14E+01
ICP.a.Dy	1.16E+00	0.00E+00	7.11E+00
ICP.a.Fe	1.28E+04	0.00E+00	3.36E+04
ICP.a.K	4.06E+02	2.41E+02	5.71E+02
ICP.a.La	3.86E+01	0.00E+00	3.84E+02
ICP.a.Li	4.04E+00	0.00E+00	1.58E+01
ICP.a.Mg	3.16E+02	0.00E+00	7.61E+02
ICP.a.Mn	1.15E+02	0.00E+00	3.80E+02
ICP.a.Mo	2.35E+01	1.36E+01	3.34E+01
ICP.a.Na	6.43E+04	3.24E+04	9.61E+04
ICP.a.Nd	8.62E+01	0.00E+00	6.93E+02
ICP.a.Ni	9.19E+03	0.00E+00	3.87E+04
ICP.a.P	1.62E+04	0.00E+00	6.47E+04
ICP.a.Pb	1.25E+03	0.00E+00	9.84E+03
ICP.a.Re	5.85E+00	0.00E+00	3.35E+01
ICP.a.Ru	1.87E+01	0.00E+00	1.99E+02
ICP.a.Sb	7.13E+01	0.00E+00	6.74E+02
ICP.a.Se	5.11E+01	0.00E+00	2.65E+02
ICP.a.Si	7.46E+02	0.00E+00	3.27E+03
ICP.a.Sr	1.73E+02	0.00E+00	6.25E+02
ICP.a.Th	6.42E+01	3.03E+01	9.80E+01
ICP.a.Ti	2.30E+01	0.00E+00	1.04E+02
ICP.a.Tl	1.38E+02	0.00E+00	9.60E+02
ICP.a.U	3.12E+04	0.00E+00	3.27E+05
ICP.a.V	1.01E+01	0.00E+00	5.28E+01
ICP.a.Zn	1.34E+02	0.00E+00	2.85E+02
ICP.a.Zr	1.55E+01	0.00E+00	6.58E+01
ICP.f.Al	1.18E+04	0.00E+00	1.08E+05
ICP.f.Ba	5.64E+01	0.00E+00	1.39E+02

Table B3-8. Analytical-Based Inventory for Solid Composite Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
ICP.f.Be	6.12E+00	2.64E+00	9.61E+00
ICP.f.Ca	1.60E+04	0.00E+00	5.15E+04
ICP.f.Cd	1.51E+01	1.31E+01	1.71E+01
ICP.f.Cr	1.87E+02	0.00E+00	4.49E+02
ICP.f.Cu	3.67E+01	0.00E+00	9.53E+01
ICP.f.Fe	1.62E+04	3.30E+03	2.91E+04
ICP.f.Mg	3.65E+02	0.00E+00	7.59E+02
ICP.f.Mn	1.92E+02	0.00E+00	4.44E+02
ICP.f.Mo	2.87E+01	2.55E+01	3.18E+01
ICP.f.Na	7.67E+04	5.28E+04	1.01E+05
ICP.f.P	1.91E+04	0.00E+00	8.02E+04
ICP.f.Pb	1.42E+03	0.00E+00	1.08E+04
ICP.f.Sb	1.25E+02	0.00E+00	4.83E+02
ICP.f.Si	1.65E+03	0.00E+00	6.71E+03
ICP.f.Sr	2.07E+02	0.00E+00	8.44E+02
ICP.f.Ti	5.85E+01	0.00E+00	1.36E+02
ICP.f.U	3.88E+04	0.00E+00	4.12E+05
ICP.f.Zn	1.99E+02	1.07E+02	2.91E+02
ICP.f.Zr	1.89E+01	0.00E+00	5.98E+01
ICP.w.Al	3.87E+02	0.00E+00	2.43E+03
ICP.w.B	2.13E+01	0.00E+00	6.42E+01
ICP.w.Ca	2.19E+02	0.00E+00	1.21E+03
ICP.w.Cr	1.25E+02	0.00E+00	3.19E+02
ICP.w.Fe	9.77E+02	4.49E+00	1.95E+03
ICP.w.K	3.44E+02	0.00E+00	9.46E+02
ICP.w.Mg	2.21E+01	0.00E+00	1.08E+02
ICP.w.Mn	1.31E+00	0.00E+00	1.15E+01
ICP.w.Mo	1.92E+01	0.00E+00	4.90E+01
ICP.w.Na	6.96E+04	0.00E+00	1.78E+05
ICP.w.Ni	5.80E+02	0.00E+00	1.44E+03
ICP.w.P	7.78E+03	0.00E+00	4.91E+04
ICP.w.Si	4.67E+01	0.00E+00	1.90E+02

Table B3-8. Analytical-Based Inventory for Solid Composite Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
ICP.w.Sr	2.86E+00	0.00E+00	2.48E+01
ICP.w.U	1.94E+03	0.00E+00	1.77E+04
ICP.w.Zn	3.72E+00	0.00E+00	1.09E+01
Nitrate	4.83E+04	0.00E+00	1.26E+05
Nitrite	3.62E+04	0.00E+00	9.69E+04
Phosphate	2.35E+04	0.00E+00	1.48E+05
Sulfate	9.31E+03	0.00E+00	2.23E+04
TC (TIC/TOC/TC)	5.96E+03	0.00E+00	2.68E+04
TIC (Persulfate)	4.51E+03	0.00E+00	1.80E+04
TOC (Persulfate)	1.45E+03	0.00E+00	8.78E+03
Group V			
Wt.loss.%/total	3.07E+05	2.65E+05	3.48E+05
Wt.loss.%/trans 1	2.88E+05	2.43E+05	3.33E+05
Alpha.f.Ce-242	9.74E-02	0.00E+00	6.81E-01
Alpha.f.Ce-243/44	8.77E-01	0.00E+00	2.63E+00
f.C-14	2.73E+00	0.00E+00	3.07E+01
GEA.w.Co-60	2.77E+00	1.72E+00	3.82E+00
GEA.w.Cs-137	4.00E+03	0.00E+00	3.32E+04
GEA.w.Eu-154	6.86E+00	0.00E+00	2.94E+01
GEA.w.Eu-155	6.75E+00	0.00E+00	1.97E+01
w.C-14	1.27E-02	0.00E+00	4.18E-02
Hexavalent chromium	4.87E+01	0.00E+00	2.24E+02
Mercury	2.86E+00	0.00E+00	9.86E+00
TC (Persulfate)	4.55E+03	3.38E+03	5.71E+03
TIC (TIC/TOC/TC)	2.57E+03	8.15E+02	4.32E+03
TOC (TIC/TOC/TC)	1.98E+03	1.40E+03	2.56E+03
Total organic halides	3.44E+00	0.00E+00	2.33E+01
Analytes with only one observation.			
Wt.%.solids/TGA total	2.60E+05	n/a	n/a
Wt.%.solids/TGA trans 1	2.25E+05	n/a	n/a
GEA.f.Am-241	4.92E+02	n/a	n/a

Table B3-8. Analytical-Based Inventory for Solid Composite Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
GEA.f.Co-60	1.94E+01	n/a	n/a
GEA.f.Eu-155	8.25E+02	n/a	n/a
GEA.w.Am-241	5.88E+00	n/a	n/a
Analytes with more than 50 percent of analytical results less than the detection values.			
Antimony	<2.34E+00	n/a	n/a
Arsenic	<5.85E-01	n/a	n/a
ICP.a.Ag	<1.00E+00	n/a	n/a
ICP.a.Rh	<1.06E+01	n/a	n/a
ICP.a.Te	<1.30E+01	n/a	n/a
ICP.f.Ag	<1.28E+01	n/a	n/a
ICP.f.As	<1.66E+02	n/a	n/a
ICP.f.B	<9.97E+01	n/a	n/a
ICP.f.Ce	<1.67E+02	n/a	n/a
ICP.f.Co	<3.06E+02	n/a	n/a
ICP.f.Dy	<8.70E+00	n/a	n/a
ICP.f.La	<3.65E+01	n/a	n/a
ICP.f.Li	<1.21E+01	n/a	n/a
ICP.f.Nd	<1.03E+02	n/a	n/a
ICP.f.Re	<2.84E+01	n/a	n/a
ICP.f.Rh	<1.35E+02	n/a	n/a
ICP.f.Ru	<5.74E+01	n/a	n/a
ICP.f.Se	<2.49E+02	n/a	n/a
ICP.f.Te	<1.56E+02	n/a	n/a
ICP.f.Th	<1.20E+02	n/a	n/a
ICP.f.Tl	<9.02E+02	n/a	n/a
ICP.f.V	<1.58E+01	n/a	n/a
ICP.w.Ag	<1.22E+00	n/a	n/a
ICP.w.As	<1.59E+01	n/a	n/a
ICP.w.Ba	<1.26E+00	n/a	n/a
ICP.w.Be	<5.02E-01	n/a	n/a
ICP.w.Cd	<1.27E+00	n/a	n/a
ICP.w.Ce	<1.60E+01	n/a	n/a

Table B3-8. Analytical-Based Inventory for Solid Composite Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
ICP.w.Co	<2.93E+01	n/a	n/a
ICP.w.Cu	<1.38E+00	n/a	n/a
ICP.w.Dy	<8.32E-01	n/a	n/a
ICP.w.La	<1.95E+00	n/a	n/a
ICP.w.Li	<1.16E+00	n/a	n/a
ICP.w.Nd	<7.79E+00	n/a	n/a
ICP.w.Pb	<1.30E+01	n/a	n/a
ICP.w.Re	<2.72E+00	n/a	n/a
ICP.w.Rh	<1.29E+01	n/a	n/a
ICP.w.Ru	<5.49E+00	n/a	n/a
ICP.w.Sb	<9.76E+00	n/a	n/a
ICP.w.Se	<2.38E+01	n/a	n/a
ICP.w.Te	<1.49E+01	n/a	n/a
ICP.w.Th	<1.15E+01	n/a	n/a
ICP.w.Ti	<9.62E-01	n/a	n/a
ICP.w.Tl	<8.62E+01	n/a	n/a
ICP.w.V	<1.41E+00	n/a	n/a
ICP.w.Zr	<1.19E+00	n/a	n/a
Selenium	<8.44E+00	n/a	n/a

Table B3-9. Analytical-Based Inventory for Segment Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
Group I			
GEA.f.K-40	2.93E+01	0.00E+00	3.59E+02
GEA.w.Am-241	5.17E+00	0.00E+00	1.48E+01
GEA.w.Eu-154	7.46E+00	0.00E+00	4.29E+01
GEA.w.Eu-155	9.29E+00	0.00E+00	2.64E+01
Group II			
GEA.w.Sb-125	3.17E+00	0.00E+00	1.29E+01
Group IV			
Wt.%.Solids	3.34E+05	1.86E+05	4.82E+05
Wt.loss.%/total	3.05E+05	2.64E+04	5.84E+05
Wt.loss.%/transition 1	2.94E+05	1.18E+05	4.69E+05
f.Sr-90	1.17E+06	0.00E+00	3.79E+06
GEA.a.Am-241	2.94E+02	0.00E+00	7.26E+02
GEA.a.Co-60	5.65E+00	0.00E+00	1.73E+01
GEA.a.Cs-137	1.02E+04	0.00E+00	3.05E+04
GEA.a.Eu-154	5.47E+02	0.00E+00	1.73E+03
GEA.a.Eu-155	6.30E+02	0.00E+00	2.01E+03
GEA.f.Am-241	3.63E+02	0.00E+00	1.04E+03
GEA.f.Co-60	1.76E+01	0.00E+00	1.19E+02
GEA.f.Cs-137	3.58E+05	5.93E+04	6.56E+05
GEA.f.Eu-154	6.30E+02	0.00E+00	2.01E+03
GEA.f.Eu-155	6.94E+02	0.00E+00	2.16E+03
GEA.w.Co-60	2.08E+00	1.43E+00	2.73E+00
GEA.w.Cs-137	2.90E+03	0.00E+00	6.15E+03
GEA.w.K-40	8.03E-01	0.00E+00	2.27E+00
Chloride	5.64E+02	3.61E+02	7.67E+02
Cyanide	7.47E+02	7.20E+01	1.42E+03
Fluoride	4.14E+02	0.00E+00	8.99E+02
ICP.a.Al	1.36E+04	0.00E+00	3.80E+04
ICP.a.As	8.33E+01	0.00E+00	3.23E+02
ICP.a.B	5.57E+01	2.34E+01	8.80E+01
ICP.a.Ba	3.56E+01	0.00E+00	8.45E+01

Table B3-9. Analytical-Based Inventory for Segment Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
ICP.a.Be	2.27E+00	0.00E+00	6.46E+00
ICP.a.Ca	8.10E+03	0.00E+00	2.64E+04
ICP.a.Cd	1.10E+01	0.00E+00	2.34E+01
ICP.a.Ce	9.59E+01	0.00E+00	2.36E+02
ICP.a.Cr	1.44E+02	9.37E+01	1.94E+02
ICP.a.Cu	2.07E+01	0.00E+00	5.35E+01
ICP.a.Dy	3.60E+00	0.00E+00	1.53E+01
ICP.a.Fe	1.46E+04	3.51E+03	2.57E+04
ICP.a.K	3.09E+02	2.92E+02	3.27E+02
ICP.a.La	4.98E+01	0.00E+00	1.31E+02
ICP.a.Li	3.59E+00	6.18E-01	6.56E+00
ICP.a.Mg	3.53E+02	4.99E+01	6.56E+02
ICP.a.Mn	1.31E+02	1.16E+01	2.51E+02
ICP.a.Mo	2.03E+01	1.17E+01	2.89E+01
ICP.a.Na	5.22E+04	3.56E+04	6.88E+04
ICP.a.Nd	1.07E+02	0.00E+00	2.22E+02
ICP.a.Ni	7.51E+03	0.00E+00	1.84E+04
ICP.a.P	1.37E+04	5.97E+03	2.13E+04
ICP.a.Pb	1.57E+03	0.00E+00	3.38E+03
ICP.a.Re	6.94E+00	0.00E+00	1.58E+01
ICP.a.Sb	6.29E+01	0.00E+00	1.75E+02
ICP.a.Se	9.10E+01	0.00E+00	2.57E+02
ICP.a.Si	9.02E+02	0.00E+00	2.13E+03
ICP.a.Sr	2.17E+02	0.00E+00	5.38E+02
ICP.a.Te	1.99E+01	0.00E+00	4.86E+01
ICP.a.Th	1.47E+02	0.00E+00	5.46E+02
ICP.a.Ti	3.18E+01	0.00E+00	7.14E+01
ICP.a.U	2.55E+04	0.00E+00	7.68E+04
ICP.a.V	1.45E+01	0.00E+00	3.23E+01
ICP.a.Zn	1.61E+02	5.09E+01	2.71E+02
ICP.a.Zr	1.08E+01	0.00E+00	2.62E+01
ICP.f.Al	1.55E+04	0.00E+00	4.25E+04

Table B3-9. Analytical-Based Inventory for Segment Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
ICP.f.Ba	6.09E+01	2.77E+01	9.41E+01
ICP.f.Ca	1.31E+04	1.99E+03	2.41E+04
ICP.f.Cr	1.39E+02	1.01E+02	1.77E+02
ICP.f.Cu	7.44E+01	0.00E+00	2.34E+02
ICP.f.Fe	1.21E+04	1.76E+03	2.23E+04
ICP.f.Mg	3.96E+02	0.00E+00	8.80E+02
ICP.f.Mn	1.50E+02	6.60E+01	2.33E+02
ICP.f.Na	5.56E+04	4.04E+04	7.08E+04
ICP.f.P	1.28E+04	4.90E+03	2.07E+04
ICP.f.Pb	1.57E+03	0.00E+00	4.18E+03
ICP.f.Si	2.66E+03	0.00E+00	8.94E+03
ICP.f.Sr	1.63E+02	2.35E+01	3.02E+02
ICP.f.Ti	5.64E+01	2.38E+00	1.10E+02
ICP.f.U	2.68E+04	0.00E+00	8.98E+04
ICP.f.Zn	1.98E+02	5.36E+01	3.41E+02
Nitrate	3.81E+04	1.89E+04	5.74E+04
Nitrite	2.92E+04	1.50E+04	4.34E+04
Phosphate	1.32E+04	0.00E+00	2.84E+04
Sulfate	7.32E+03	4.39E+03	1.02E+04
TC (Persulfate)	5.85E+03	2.38E+03	9.31E+03
TIC (Persulfate)	3.12E+03	5.36E+02	5.69E+03
TOC (Persulfate)	2.62E+03	5.51E+02	4.69E+03
Group V			
Wt.%.solids/TGA total	3.15E+05	1.75E+05	4.54E+05
Wt.%.solids/TGA trans 1	2.83E+05	1.30E+05	4.36E+05
Alpha.f.Am-241	4.95E+02	0.00E+00	1.00E+03
C-14	3.73E+00	0.00E+00	3.00E+01
f.alpha	7.66E+02	4.16E+02	1.12E+03
f.beta	4.53E+06	3.30E+06	5.76E+06
f.Np-237	7.76E-01	0.00E+00	2.47E+00
f.Pu-238	8.87E+00	1.28E+00	1.65E+01
f.Pu-239/240	9.81E+01	5.14E+01	1.45E+02

Table B3-9. Analytical-Based Inventory for Segment Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
f.Tc-99	6.31E+01	2.92E+01	9.69E+01
Ni-59	8.64E+00	0.00E+00	2.15E+01
Ni-63	8.35E+02	7.76E+02	8.93E+02
Se-79	5.75E-01	4.00E-01	7.50E-01
Tritium	1.20E+01	1.51E+00	2.25E+01
w.alpha	5.49E+00	0.00E+00	1.86E+01
w.beta	3.66E+04	0.00E+00	1.09E+05
Ammonia	3.31E+00	3.31E+00	3.31E+00
ICP.w.Al	2.15E+02	1.82E+02	2.47E+02
ICP.w.B	1.12E+01	0.00E+00	3.33E+01
ICP.w.Ca	2.20E+02	0.00E+00	6.28E+02
ICP.w.Cr	8.55E+01	8.32E+01	8.79E+01
ICP.w.Fe	4.63E+02	3.50E+02	5.75E+02
ICP.w.K	2.26E+02	1.73E+02	2.78E+02
ICP.w.Mg	2.06E+01	1.65E+01	2.47E+01
ICP.w.Mn	5.85E-01	0.00E+00	1.75E+00
ICP.w.Mo	1.03E+01	7.93E+00	1.26E+01
ICP.w.Na	3.93E+04	3.74E+04	4.12E+04
ICP.w.Ni	2.64E+02	2.17E+02	3.11E+02
ICP.w.P	3.66E+03	2.79E+03	4.53E+03
ICP.w.Pb	1.31E+01	0.00E+00	4.46E+01
ICP.w.Si	3.95E+01	6.26E+00	7.28E+01
ICP.w.Sr	3.34E+00	0.00E+00	1.09E+01
ICP.w.U	2.99E+02	1.09E+02	4.89E+02
ICP.w.V	1.69E+00	5.22E-01	2.86E+00
ICP.w.Zn	2.11E+00	0.00E+00	5.03E+00
TC (TIC/TOC/TC)	3.93E+03	2.18E+03	5.68E+03
TIC (TIC/TOC/TC)	3.18E+03	0.00E+00	6.68E+03
TOC (TIC/TOC/TC)	7.47E+02	0.00E+00	2.50E+03
Uranium (LF:F)	2.88E+04	1.48E+04	4.28E+04
Analyte with only one observation.			
GEA.f.Cs-134	4.75E+00	n/a	n/a

Table B3-9. Analytical-Based Inventory for Segment Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
Analytes with more than 50 percent of analytical results less than the detection values.			
ICP.a.Ag	<9.79E-01	n/a	n/a
ICP.a.Co	<5.08E+01	n/a	n/a
ICP.a.Rh	<3.26E+01	n/a	n/a
ICP.a.Ru	<3.74E+01	n/a	n/a
ICP.a.Tl	<3.51E+02	n/a	n/a
ICP.f.Ag	<3.02E+01	n/a	n/a
ICP.f.As	<3.92E+02	n/a	n/a
ICP.f.B	<2.30E+02	n/a	n/a
ICP.f.Be	<1.31E+01	n/a	n/a
ICP.f.Cd	<3.09E+01	n/a	n/a
ICP.f.Ce	<3.94E+02	n/a	n/a
ICP.f.Co	<7.43E+02	n/a	n/a
ICP.f.Dy	<2.05E+01	n/a	n/a
ICP.f.La	<5.44E+01	n/a	n/a
ICP.f.Li	<2.87E+01	n/a	n/a
ICP.f.Mo	<5.09E+01	n/a	n/a
ICP.f.Nd	<1.92E+02	n/a	n/a
ICP.f.Re	<6.69E+01	n/a	n/a
ICP.f.Rh	<3.17E+02	n/a	n/a
ICP.f.Ru	<1.35E+02	n/a	n/a
ICP.f.Sb	<2.17E+02	n/a	n/a
ICP.f.Se	<5.86E+02	n/a	n/a
ICP.f.Te	<3.67E+02	n/a	n/a
ICP.f.Th	<2.86E+02	n/a	n/a
ICP.f.Tl	<2.12E+03	n/a	n/a
ICP.f.V	<3.48E+01	n/a	n/a
ICP.f.Zr	<3.32E+01	n/a	n/a
ICP.w.Ag	<1.01E+00	n/a	n/a
ICP.w.As	<1.31E+01	n/a	n/a
ICP.w.Ba	<1.04E+00	n/a	n/a
ICP.w.Be	<4.15E-01	n/a	n/a

Table B3-9. Analytical-Based Inventory for Segment Sample Data for Tank 241-C-112. (6 sheets)

Analyte	Inventory (kg or Ci)	LL	UL
ICP.w.Cd	<9.72E-01	n/a	n/a
ICP.w.Ce	<1.32E+01	n/a	n/a
ICP.w.Co	<2.42E+01	n/a	n/a
ICP.w.Cu	<1.14E+00	n/a	n/a
ICP.w.Dy	<6.87E-01	n/a	n/a
ICP.w.La	<1.61E+00	n/a	n/a
ICP.w.Li	<9.59E-01	n/a	n/a
ICP.w.Nd	<6.43E+00	n/a	n/a
ICP.w.Re	<2.24E+00	n/a	n/a
ICP.w.Rh	<1.06E+01	n/a	n/a
ICP.w.Ru	<4.54E+00	n/a	n/a
ICP.w.Sb	<6.16E+00	n/a	n/a
ICP.w.Se	<1.96E+01	n/a	n/a
ICP.w.Te	<1.23E+01	n/a	n/a
ICP.w.Th	<9.51E+00	n/a	n/a
ICP.w.Ti	<7.00E-01	n/a	n/a
ICP.w.Tl	<7.12E+01	n/a	n/a
ICP.w.Zr	<9.85E-01	n/a	n/a

B4.0 APPENDIX B REFERENCES

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

C1.0 STATISTICS FOR SAFETY SCREENING DATA QUALITY OBJECTIVE

Appendix C provides DQO-required statistical analyses for tank 241-C-112 analytical data. Because the 1992 core sampling of tank 241-C-112 predated DQOs, no DQO applied to the sampling event. Although an effort has been made to apply the current safety screening DQO requirements to the 1992 data set, only some statistical analyses were made as required. Confidence intervals were not calculated for total alpha or DSC data for which duplicate results were not reported.

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, one-sided confidence limits supporting the safety screening DQO are calculated for tank 241-C-112. All data in this section are from the final laboratory data package for the 1993 core sampling event for tank 241-C-112 (Bell 1993).

Confidence intervals were computed for each sample number from tank 241-C-112 analytical data. Tables C1-1 and C2-2 provide the sample numbers and confidence intervals are provided in Table C1-1 for Alpha and DSC, respectively.

The 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-C-112 data (per sample number), df equals the number of observations minus one.

Table C1-1 lists the UL of the 95 percent confidence interval for each sample number based on alpha activity data. The upper confidence interval value is 1.37 μCi/g which is much less than the threshold value of 30.8 μCi/g. Therefore, the null hypothesis that the alpha activity in the tank waste is greater than 30.8 μCi/g is rejected, and the occurrence of a criticality in tank 241-C-112 waste is not a concern.

Table C1-2 lists the UL of the 95 percent confidence interval for each sample number based on DSC data. The upper confidence interval value is 189 J/g which is much less than the threshold value of 480 J/g. Therefore, the null hypothesis that the DSC value is greater than 480 J/g is rejected. The conclusion is that tank 241-C-112 waste is unlikely to propagate an exothermic reaction.

Table C1-1. 95 Percent Confidence Interval Upper Limits for Alpha for Tank 241-C-112 (Units are μCi/g).

Sample Number	Description	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
92-06740-B1[1]	Core 34, Core Composite	9.46E-01	n/a	n/a
92-08169-A1	Core 35, Segment 2	1.18E+00	3.00E-02	1.37E+00
92-08169-A1	Core 35, Core Composite, Drainable Liquid	8.20E-04	3.80E-05	1.06E-03
92-06767-H1	Core 36, Core Composite	1.64E-01	1.50E-02	2.59E-01

Note:

[1]No duplicate was measured in the sample; therefore, a 95 percent confidence interval on the mean cannot be constructed.

Table C1-2. 95 Percent Confidence Interval Upper Limits for DSC for Tank 241-C-112 (Units are Joules/g-Dry).

Sample Number	Description	$\hat{\mu}$	$\hat{\sigma}_{\hat{\mu}}$	UL
92-06740[1]	Core 34, Core Composite	7.50E+01	n/a	n/a
92-06741[1]	Core 34, Segment 2, Quarter B	6.30E+01	n/a	n/a
92-06742[1]	Core 34, Segment 2, Quarter C	3.50E+01	n/a	n/a
92-06743[1]	Core 34, Segment 2, Quarter D	4.70E+01	n/a	n/a
92-08170	Core 35, Segment 2, Quarter D	8.56E+01	1.63E+01	1.89E+02
92-06761	Core 36, Segment 1, Quarter C	1.51E+01	9.58E+00	7.56E+01
92-06762	Core 36, Segment 1, Quarter D	3.24E+01	6.22E+00	7.17E+01
92-06763	Core 36, Segment 2, Quarter A	2.24E+01	6.16E+00	6.12E+01
92-06764	Core 36, Segment 2, Quarter B	1.58E+01	4.07E+00	4.14E+01
92-06767	Core 36, Core Composite	4.12E+01	6.00E+00	7.91E+01

Note:

[1]No duplicate was measured in the sample; therefore, a 95 percent confidence interval on the mean cannot be constructed.

The vapor DQO (Osborne et al. 1994) was applicable to the August 1994 vapor sampling event, and the June 1994 vapor sampling event was performed in accordance with Farley (1991). Neither document required statistical calculations for issue resolution.

C2.0 APPENDIX C REFERENCES

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY

FOR SINGLE-SHELL TANK 241-C-112

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR SINGLE-SHELL TANK 241-C-112

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 chemical information for tank 241-C-112 was performed, and a best-basis inventory was established. This work follows the methodology that was established by the standard inventory task.

D1.0 IDENTIFY/COMPILE INVENTORY SOURCES

The inventory sources identified for this best-basis effort include the following:

- Sample data from a 1992 push-mode core sample consisting of three cores: 34, 35, and 36 (Bell 1993).
- The HDW model document (Agnew et al. 1997a) provides tank content estimates in terms of component concentrations and inventories.

D2.0 COMPARE COMPONENT INVENTORY VALUES AND NOTE SIGNIFICANT DIFFERENCES

Tables D-1 and D-2 compare the HDW model inventories and sample-based inventories. The tank volume used to generate the HDW inventory is 394 kL (104 kgal) waste (Agnew et al. 1997a). Hanlon (1997) also indicates 394 kL (104 kgal) of waste. Both sources indicate the waste is all sludge. The HDW model density for the sludge waste is estimated to be 1.39 g/mL. The sample-based inventories are based on a volume of 394 kL of solids at a density of 1.65 g/mL.

Table D-1. Sampling-Based and Hanford Defined Waste-Based Inventory Estimates for Nonradioactive Components in Tank 241-C-112.

Analyte	Sampling[1] Inventory Estimate (kg)	HDW[2] Inventory Estimate (kg)	Analyte	Sample[1] Inventory Estimate (kg)	HDW[2] Inventory Estimate (kg)
Al	11,800	9,550	NO_3^-	48,300	5,940
Bi	n/r	740	OH^-	n/r	26,800
Ca	16,000	9,230	Pb	1,420	2,080
Cl^-	736	550	P as PO_4^{-3}	58,400	9,240
Cr	187	23.6	Si	1,650	380
F^-	469	141	SO_4^{-2}	9,310	742
Fe	16,200	8,490	TIC as CO_3^{-2}	22,600	n/r
$Fe(CN)_6^{-4}$	2,150[3]	26,300	TOC	1,450	710
K	406	141	U_{total}	36,400	4,940
Na	76,700	31,000	Zr	18.9	1.24
Ni	9,190	10,500	H_2O (Wt%)	41.6	65.2
NO_2^-	36,200	30,700	density (kg/L)	1.65	1.39

Notes:

n/r = not reported

[1]See Appendix B.
[2]Agnew et al. (1997a)
[3]The estimate was derived from cyanide results.

Table D-2. Sampling and Predicted Inventory Estimates for Radioactive Components in Tank 241-C-112.

Analyte	Sampling[1] Inventory Estimate (Ci)	HDW[2] Inventory Estimate (Ci)	Analyte	Sampling[1] Inventory Estimate (Ci)	HDW[2] Inventory Estimate (Ci)
^{79}Se	0.239	0.043	^{237}Np	0.347	0.0078
^{99}Tc	79.7	1.27	^{238}Pu	5.54	2.21
^{90}Sr	1,300,000	245,000	$^{239/240}Pu$	69.5	139
^{137}Cs	257,000	241,000	^{241}Am	219	5.14
^{155}Eu	456	52.1	^{154}Eu	630[3]	1.01
^{59}Ni	9.4	3.57	^{63}Ni	921	325
^{242}Cm	0.097	0.0015	$^{243/244}Cm$	0.877	0.00085
^{3}H	28.1	1.01	^{14}C	2.73	0.183

Notes:
[1]See Appendix B.
[2]Agnew et al. (1997a)
[3]Segment level result

D3.0 REVIEW AND EVALUATION OF COMPONENT INVENTORIES

D3.1 WASTE HISTORY TANK 241-C-112

This section is a brief synopsis of the most relevant facts regarding the operating history of this tank. Appendix A provides a more detailed description of the waste history for tank 241-C-112.

D3.1.1 Process History for Tank 241-C-112

The first type of waste that tank 241-C-112 received and stored was 1C1 waste from the bismuth phosphate process (1946 to 1952). The supernatant was disposed to tank 241-B-106 in 1952, leaving a heel of 57 kL (15 kgal) of solids and 8 kL (2 kgal) of liquid. The tank was refilled with unscavenged uranium recovery (UR) waste in 1953 and 1954 (Anderson 1990). In late 1955, the supernatant in tank 241-C-112 was transferred to tank 241-C-104. From 1955 to 1958, tank 241-C-112 was used as a primary settling tank for in-tank ferrocyanide scavenging. During ferrocyanide scavenging operations, waste was not cascaded through the tank 241-C-110, -111, and -112 cascade. The pH was adjusted with HNO_3 and/or NaOH, and $Fe(CN)^{-4}_6$ and Ni^{+2} ions were added to precipitate ^{137}Cs

(Sloat 1954). This involved the repeated transfer of scavenged waste into the tank to allow ^{137}Cs and ^{90}Sr bearing particulate material to settle; the resulting decontaminated supernatant was transferred from the tank to cribs. Furthermore, in addition to ^{137}Cs scavenging with ferrocyanide, ^{90}Sr was scavenged using $Ca_3(PO_4)_2$ and $Sr_3(PO_4)_2$ (Sloat 1954 and Sloat 1955). This is the period when tank 241-C-112 accumulated most of its solids contents.

After ferrocyanide scavenging was completed, tank 241-C-112 received PUREX cladding waste (CWP), which was later pumped out of the tank. In the third and fourth quarters of 1960, a total of 996 kL (263 kgal) of highly alkaline cladding waste was added to the tank, but the reported solids inventory (174 kL [46 kgal]) did not change (Anderson 1990 and Agnew 1997a). Cladding waste solids would have settled on top of the ferrocyanide sludge already present.

Several small transfers with relatively high concentrations of ^{90}Sr occurred after 1958. Waste from the strontium semiworks/hot semiworks was added to the tank with the total volume listed as 2,070 kL (547 kgal) at the end of 1962. (The reported solids inventory was still only 174 kL [46 kgal].) The listed volumes for the first quarter report in 1965 are a total volume of 2,040 kL (538 kgal) and a solids volume of 485 kL (128 kgal) (Anderson 1990). This solids level measurement was apparently the first since additional waste was added to the tank following the last scavenging pump in 1958.

D3.1.2 Major Analytes of Waste Types Transferred into Tank 241-C-112

First-cycle decontamination (1C1) waste entered tank 241-C-112 through cascade lines. This waste was produced by the bismuth phosphate process at B-Plant. Analytes characteristic of 1C1 waste were expected to be present in concentrations around 10,000 μg/g and included iron, bismuth, and phosphate (Schneider 1951 and Agnew et al. 1997a). The 1C1 waste, if present, is expected to be located in the dished region at the tank bottom. Transfer records indicate the sludge was discharged there before the additions of unscavanged UR waste to the tank were made (Agnew et al. 1997b).

The scavenged waste was allowed to settle, and the supernatant was decanted to a crib leaving an accumulation of solids in tank 241-C-112. These solids had a much greater activity than the 1C1 waste from the scavenged ^{137}Cs and ^{90}Sr present. Other compositional changes included much higher levels of calcium, nonradioactive strontium, and nickel than in 1C1 waste (Schneider 1951, Agnew et al. 1997a, Sloat 1954, Sloat 1955, and Schmidt and Stedwell 1955). These solids make up the majority of the tank solids volume and are located on top of the 1C1 sludge waste.

The PUREX cladding waste, produced during the dissolution of aluminum fuel cladding at PUREX, will have a much different composition than 1C1 waste or ferrocyanide scavenging waste. Cladding waste has comparatively high (greater than 100,000 μg/g) aluminum concentrations and is low in bismuth, phosphate, and other analytes characteristic of 1C and scavenging wastes (Schneider 1951 and Agnew et al. 1997a). The HDW model assumes that

CWP waste did not contribute to the solids formation in the tank. However, Hill et al. (1995) predicts CWP to be the tertiary waste type in the tank. Because of uncertainty regarding the flow properties of the waste in tank-to-tank transfers, the contribution of CWP to the tank is not well defined.

Hot semiworks waste was the effluent from strontium recovery operations. It contained elevated concentrations of lead (estimated at greater than 20,000 μg/g) and ^{90}Sr (estimated at greater than 10,000 μCi/g) that distinguished it from the other wastes present. It lacked bismuth, aluminum, nickel, and calcium. Very little hot semiworks waste was generated. This waste is assumed to be the top layer of waste (Agnew et al. 1997a).

D3.2 CONTRIBUTING WASTE TYPES

There are two interpretations of the waste types that contribute to the waste inventory in tank 241-C-112. The interpretations agree about the main waste contributors but differ on the smaller ones. The HDW model (Agnew et al. 1997a) predicts the tank contains a total of 394 kL of solid waste made up of the following five waste types:

1. 57 kL 1C1 waste from the $BiPO_4$ process

2. 273 kL of ferrocyanide sludge produced by in-tank/in-farm scavenging (TFeCN) of which 15 kL is classified as unknown

3. 49 kL CWP1

4. 11 kL CWP2

5. 4 kL of hot semiworks

The sort on radioactive waste type model (Hill et al. 1995) lists four waste types contributing to tank 241-C-112 solids. No quantification is made of their contribution.

1. Tributyl phosphate uranium-extraction process at U Plant (TBP-F) was the primary waste type.

2. 1C1 from the $BiPO_4$ process at B and T Plants was a secondary waste type.

3. PUREX Plant aluminum fuel cladding waste was a tertiary waste type.

4. Ion exchange from the cesium recovery process at B Plant was another waste type.

D3.3 EVALUATION OF TANK WASTE VOLUME

The tank has a capacity of 2,010 kL (530 kgal). Hanlon (1997) reports an estimated volume of 394 kL (104 kgal) of waste consisting entirely of sludge. No description of sludge types or source is given. The analytical and surveillance data suggest the sludge is heterogeneous and has significantly different chemical compositions depending on waste depth. The current surveillance readings report a waste level at 85.4 cm (33.61 in.) which corresponds to approximately 397 kL (105 kgal) of total waste supporting the Hanlon (1997) estimate.

D3.4 ASSUMPTIONS USED IN THIS EVALUATION

For this evaluation, the following assumptions and observations were made:

1. The tank volume listed is equal to the value in Hanlon (1997), 394 kL. The material has a density of 1.65 g/mL. Tank 241-C-112 waste is 100 percent sludge.

2. The core composite mean values were considered adequate and appropriate for calculation of an overall inventory.

3. No aging or degradation of components such as ferrocyanide or nitrate was assumed. All radionuclides were decayed to January 1, 1994.

D3.5 ESTIMATED COMPONENT INVENTORIES

The chemical inventory for selected constituents in tank 241-C-112 is estimated from the assumed sludge volume. Table D-1 shows the resulting inventory estimates. The inventory estimated by the HDW model is included for comparison. Discrepancies between HDW model inventories and data-derived inventories were noted; possible reasons for the discrepancies are explained below.

Aluminum. The HDW model and sample data estimates are in good agreement and have an RPD of 24 percent. The aluminum concentration in the tank is highly variable (RSD of the mean = 65 percent) as expected from the tank's process history. The HDW model indicates four general waste types contributing to the sludge in tank 241-C-112. Two waste types (1C1 and CWP1) have aluminum concentrations at or above one weight percent. There was sufficient CWP1 in the tank to account for the aluminum concentrations observed. The higher aluminum concentration locations on top of the TFeCN waste also agree with the process history.

However, CWP1 has extremely high (approximately 10 weight percent) aluminum concentrations. Although the sample data indicates a decrease in aluminum as a function of depth in the waste, the initial concentrations are not as high as other tanks with cladding waste, thereby suggesting mixing or dilution of the waste. The CWP1 may have been principally a supernatant transfer, thus there may have been signficant soluble aluminum that was transferred which precipitated from the change in pH. There appears to be an incomplete description of the solubility behavior for this analyte. In further agreement with process history, aluminum concentration, as a function of depth through the tank sample data, decreases to small concentrations where the HDW model predicts waste types that have much smaller concentrations or no aluminum present.

Calcium. The HDW model appears to quantify the calcium inventory acceptably, with an RPD of 53 percent with the sample-based estimate. The calcium data appear to be much less variable with an RSD of 17.4 percent. Calcium was widely used in the ferrocyanide scavenging process, and substantial documentation exists to quantify its use and distribution (General Electric 1958). No strong trends in concentration as a function of depth were noted when inspecting the data.

Ferrocyanide. Very little, if any, ferrocyanide appears to remain after 40 years; however, some cyanide is marginally detectable. Abundant evidence supports it was present in the past (elevated nickel and calcium concentrations, high ^{137}Cs activity, and extensive process documentation). Little cyanide is detectable, and only very modest exotherms (less than 120 J/g dry) are observed, thereby strongly suggesting the ferrocyanide has degraded and supporting the waste aging hypothesis indicated by Lilga et al. (1992, 1993, 1994, 1995, and 1996).

Iron. Iron was present in all waste types added to tank 241-C-112. Sample data indicates it is widely distributed through the tank, vertically within a core and horizontally between cores. Iron was a principal component in the ferrocyanide scavenging and bismuth phosphate processes. The reason for the difference between the iron inventories, derived from sample data and HDW model estimate, is not clear. The observed sample concentrations are highly variable, and sample data values range from 7,500 μg/g to 44,500 μg/g. However, the relative standard deviation (RSD) of the mean was 6.2 percent, suggesting a strong central tendency. This discrepancy, coupled with the difference in densities used in estimates, may be responsible for most of the observed difference.

Lead. Process history suggests a small amount of lead is present in a relatively high concentration. Evidence from sample data supports this description. The sample data and HDW model estimates agree relatively well (RPD = 37.7 percent). An inspection of sample data shows lead is irregularly distributed as a function of depth and from side-to-side in the tank (RSD = 52 percent). A small amount of waste highly concentrated in lead (such as the hot semiworks waste), together with modest tank transfer activity, may account for the observed behavior.

Lanthanum and manganese. Sample data show traces of lanthanum and manganese, suggesting impurities in the process chemicals or mixing with waste types that contained these materials. They are not indicated as principal process chemicals in the waste types added to tank 241-C-112.

Nickel. The HDW model and sample data estimates indicate elevated concentrations and inventories of nickel and close agreement regarding the magnitude of the nickel inventory (RPD = 13.4 percent). The nickel precipitates in the waste are very insoluble and may not be fully quantitated by the acid digestion preparation. However, for this analyte, the fusion results are suspect because of possible cross-contamination from the fusion preparation (nickel crucible use). Therefore, acid digestion results were used to estimate the inventory and may understate the nickel concentration. The acid digestion results show an RSD of 25.4 percent, suggesting moderate to high variability.

Nitrite. The HDW model and sample data estimates are in reasonable agreement (RPD = 16.4 percent). There is modest variability with these measurements (RSD of the mean = 13.2 percent).

Nitrate, phosphate (phosphorous), and sodium. Substantial differences are observed between the HDW model and sampling data estimates. These differences may be attributed to source term discrepancies and assumptions regarding the distribution of all three anions and assumptions regarding the possible decomposition of nitrate in the HDW model. The sample data for these analytes are not highly variable (RSD of the mean for nitrate = 12.6 percent; phosphorous = 25 percent; sodium = 2.5 percent). Phosphate is much more variable because of its solubility properties (RSD = 41.5 percent).

Silicon. Silicon is not indicated as a principal process chemical in any wastes proposed as depositing solids, except for CWP. Substantial differences are observed between the HDW model and sampling data estimates. These differences may be attributed to source term discrepancies and assumptions regarding the distribution of this analyte. The concentration and distribution behavior of silicon matches well with the elevated aluminum concentrations observed. The concentration of silicon is less variable than aluminum (RSD of the mean = 24.1 percent) and depends on the sample preparation method (only the fusion preparation appears to fully quantitate silicon). These corresponding behaviors suggest that aluminum and silicon were deposited together.

Strontium and strontium-90. Sample data show traces of strontium in the waste. Calcium phosphate and strontium phosphate precipitations were used to scavenge ^{90}Sr from tank 241-C-112 waste (Sloat 1954 and 1955). Strontium impurities in the process chemicals or slight mixing with wastes containing strontium may have also contributed to the nonradioactive strontium in tank 241-C-112 waste.

For ^{90}Sr, substantial differences were observed between the HDW model and sampling data estimates. The sample-based inventory is five times the HDW model inventory. This difference may be attributed to the distribution of ^{90}Sr observed in the tank. Elevated ^{90}Sr levels were observed in the wastes, with extremely high values (400 to 1,300 μCi/g) found on the tops of cores 34 and 36. Core 35 had an average concentration of 3,200 μCi/g. Core 34 concentrations remained very high (averaging over 1,000 μCi/g), while in core 36 they decreased as a function of depth but remained relatively high (averaging approximately 150 μCi/g).

This behavior was expected from the process history associated with this tank. Hot semiworks waste was believed to have very high concentrations of ^{90}Sr. Furthermore, in addition to ^{137}Cs scavenging with ferrocyanide, ^{90}Sr was scavenged using $Ca_3(PO_4)_2$ and $Sr_3(PO_4)_2$, suggesting that the strontium and ^{90}Sr concentrations in these wastes would be higher than those observed for bismuth phosphate, cladding waste, or uranium recovery waste.

Sulfate. The sample data derived inventory for sulfate is an order of magnitude higher than the HDW model predicted inventory. In the HDW model, sulfate was found in modest concentrations in the majority of waste types added to tank 241-C-112. It was a process chemical used in the ferrocyanide scavenging campaign. The reason for the difference is probably the solubility assumptions made regarding sulfate in the HDW model. The HDW model assumes no sulfate precipitates with the waste solids (that is, it remains in the interstitial liquids). The sample data ranges from 7,800 μg/g to 13,500 μg/g with an RSD of the mean of about 11 percent; therefore, its distribution behavior does not seem to be contributing to the discrepancy.

Uranium. Uranium values from sample data results indicate a U inventory six times the amount reported in the HDW model. The higher U concentrations in subsegments 2B and 2C of core 36 indicate mixing with, or scavenging of, uranium bearing waste. The CWP1 waste added to the scavenged waste from tank 241-C-105 could contain substantial concentrations of uranium from dissolution of the fuel core material during decladding. Substantial variability is associated with the sample data (RSD of the mean = 76 percent). The differences observed between the estimates and the sample data behavior may be attributed to significant source term discrepancies in the scavenging campaign and assumptions regarding the solubility/mobility of uranium in the tank farms.

Cesium-137. The HDW model and sample data estimates for the inventory of ^{137}Cs are close (RPD = 6.4 percent). However, there is significant (RSD = 100 percent) variability associated with the data.

D4.0 BEST-BASIS INVENTORY ESTIMATE

As part of this effort, an evaluation of available chemical information for tank 241-C-112 was performed and included the following.

- The inventory estimate generated by the HDW model (Agnew et al. 1997a)
- An inventory evaluation from 1992 core sample data

Based on this evaluation, a best-basis inventory was developed for tank 241-C-112 (see Tables D-3 and D-4). The sample-based inventory was chosen as the best basis for most analytes for the following reasons:

- Sample-based data trends for specific analytes (aluminum, calcium, lead, nickel, ^{137}Cs, and ^{90}Sr) support the profile suggested in the waste transfer records.
- There is no independent data source from which to derive an inventory.

Several assumptions made in the HDW model are questionable for this tank. These assumptions include the following.

- Assumption of little or no U in any UR scavenged waste
- Inadequate source term and/or solubility descriptions for several principal analytes (sodium, nitrate, uranium, sulfate, and phosphate).
- For those analytes where no values were available from the sample-based inventory, HDW model values were used.

Table D-3. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-C-112. (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, or E)[1]	Comment
Al	11,800	S	
Bi	740	M	
Ca	16,000	S	
Cl^-	736	S	
TIC as CO_3^{-2}	22,600	S	
Cr	187	M	

Table D-3. Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-C-112. (2 sheets)

Analyte	Total Inventory (kg)	Basis (S, M, or E)[1]	Comment
F^-	469	S	
Fe	16,200	S	
Hg	39.6	M	
K	406	M	
La	38	S	
Mn	192	M	
Na	76,700	S	
Ni	9,190	S	
NO_2^-	36,200	S	
NO_3^-	48,300	S	
OH^-	29,000	E	From charge balance
Pb	1,420	S	
P as PO_4^{3-}	58,400	S	
Si	1,650	S	
SO_4^{2-}	9,310	S	
Sr	207	S	
TOC	1,450	S	
U_{TOTAL}	36,400	S	
Zr	18.9	M	

Note:

[1]S = sample-based (see Appendix B), M = HDW model-based, E = engineering assessment-based.

Table D-4. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-C-112.[1] (2 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[2]	Comment
^{3}H	28.1	S	
^{14}C	2.73	S	
^{59}Ni	9.4	S	
^{60}Co	n/r		
^{63}Ni	921	S	
^{79}Se	0.239	S	
^{90}Sr	1,300,000	S	
^{90}Y	1,300,000	S	From ^{90}Sr
^{93}Zr	n/r		
^{93m}Nb	n/r		
^{99}Tc	79.7	S	
^{106}Ru	n/r		
^{113m}Cd	n/r		
^{125}Sb	n/r		
^{126}Sn	n/r		
^{129}I	n/r		
^{134}Cs	n/r		
^{137}Cs	257,000	S	
^{137m}Ba	257,000	S	From ^{137}Cs
^{151}Sm	n/r		
^{152}Eu	n/r		
^{154}Eu	630	S	
^{155}Eu	456	S	
^{226}Ra	n/r		
^{227}Ac	n/r		
^{228}Ra	n/r		
^{229}Th	n/r		
^{231}Pa	n/r		
^{232}Th	n/r		

Table D-4. Best-Basis Inventory Estimates for Radioactive Components in Tank 241-C-112.[1] (2 sheets)

Analyte	Total Inventory (Ci)	Basis (S, M, or E)[2]	Comment
^{232}U	n/r		
^{233}U	n/r		
^{234}U	n/r		
^{235}U	n/r		
^{236}U	n/r		
^{237}Np	0.347	S	
^{238}Pu	5.54	S	
^{238}U	n/r		Use total U estimate
$^{239/240}Pu$	69.5	S	
^{240}Pu	n/r		
^{241}Am	219	S	
^{241}Pu	n/r		
^{242}Cm	0.097	S	
^{242}Pu	n/r		
^{243}Am	n/r		
$^{243/244}Cm$	0.877	S	
^{244}Cm	n/r		

Notes:

[1]Inventory values are decay corrected to January 1, 1994.

[2]S = sample-based (see Appendix B), M = HDW model-based, E = engineering assessment-based.

D5.0 APPENDIX D REFERENCES

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APPENDIX E

BIBLIOGRAPHY FOR TANK 241-C-112

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APPENDIX E

BIBLIOGRAPHY FOR TANK 241-C-112

Appendix E is a bibliography that supports the characterization of tank 241-C-112. 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-C-112 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

- IIa. Sampling of Tank 241-C-112 Waste
- IIb. Sampling of 1C and Ferrocyanide Waste Streams

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

- IIIa. Inventories Using Campaign and Analytical Information
- IIIb. Compendium of Existing Physical and Chemical Documented Data Sources
- IIIc. Other - Nondocumented or Electronic Sources

IV. OTHER RESOURCES

This bibliography is broken down into appropriate sections of material to use, with an annotation, where possible, at the end of each reference describing the information source. A majority of the information listed is available in the Lockheed Martin Hanford Corporation Tank Characterization and Safety Resource Center.

I. NON-ANALYTICAL DATA

Ia. Models/Waste Type Inventories/Campaign Information

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- Contains an evaluation of the effect of aging on ferrocyanide tank waste.

Borsheim, G. L., and B. C. Simpson, 1991, *An Assessment of the Inventories of the Ferrocyanide Watchlist Tanks*, WHC-SD-WM-ER-133, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains a brief description of the ferrocyanide scavenging program and estimations of $Fe(CN)_6^{-4}$, ^{137}Cs, and ^{90}Sr for various ferrocyanide containing tanks.

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.

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

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- Contains results of work conducted by the Pacific Northwest Laboratory in Fiscal Year 1992 on aging and solubility of ferrocyanide sludge in basic solution.

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- Contains compositions of process stream waste before transfer to 200 Area waste tanks.

Ib. Fill History/Waste Transfer Records

Agnew, S. F., P. Baca, R. A. Corbin, T. B. Duran, and K. A. Jurgensen, 1997, *Waste Status and Transaction Record Summary, WSTRS Rev. 4*, LA-UR-97-311, Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains spreadsheets showing all 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 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 views, a description of risers and their contents.

Bergmann, L. M., 1991, *Single-Shell Tank Isolation Safety Analysis Report*, WHC-SD-WM-SAR-006, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Provides a safety analysis with regard to heat load.

Hanlon, B. M., 1997, *Tank Farm Surveillance and Waste Status Summary Report for Month Ending February 28, 1997*, HNF-EP-0182-107, Lockheed Martin Hanford Corporation, Richland, Washington.

- Most recent release of a series of summaries including fill volumes, Watch List tanks, occurrences, integrity information, equipment readings, equipment status, tank location, and other miscellaneous tank information. The series includes monthly summaries from December 1947 to the present; however, Hanlon has only authored the monthly summaries from November 1989 to the present.

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

- Assesses riser locations for each tank; however, not all tanks are included or completed. Also includes an estimate of the risers available for sampling.

McLaren, J. M., 1993, *Heat Load Determination of Tank 241-C-112*, (internal letter 23280-93-JMM-010 to B. C. Simpson, March 23), Westinghouse Hanford Company, Richland, Washington.

- Provides a determination of heat load from temperature profile data and computer modeling.

Swaney, S. L., 1994, *Single-Shell Tank Stabilization Record*, WHC-SD-RE-TI-178, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

- Contains single-shell tank stabilization history.

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

- A compilation of information on thermocouple trees installed in Hanford Site underground waste tanks.

Vitro Engineering Corporation, 1988, "Piping Waste Tank Isolation Tank 241-C-112," Drawing H-2-73351, Rev. 4, Vitro Engineering Corporation, Richland, Washington.

- As-built drawing for configuration, piping, and equipment for tank 241-C-112.

Welty, R. K., 1988, *Waste Storage Tank Status and Leak Detection Criteria, Volumes I and II*, WHC-SD-WM-TI-553, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Describes the nature, scope, and frequency of surveillance employed for waste storage tanks, states action criteria for response to data deviation, and presents tank data reviews between June 15, 1973, and June 15, 1988.

WHC, 1987, *Quarterly Trend Analysis of Surveillance Data,* (internal memorandum 65950-87-587 to R. J. Baumhardt, June 29), Westinghouse Hanford Company, Richland, Washington.

- Third quarter trend analysis of waste tank surveillance data to identify trends or anomalies.

Id. Sample Planning/Tank Prioritization

Brown, T. M., S. J. Eberlein, 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 tanks and assigns a priority number to each tank.

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

- Summarizes issues surrounding the characterization of nuclear wastes stored in Hanford Site waste tanks.

Dukelow, G. T., 1993, *Request for Approval for Vapor Sampling in Ferrocyanide Tanks*, (letter 9354049 to J. D. Wagoner, May 4), Department of Energy-Richland Operations, Richland, Washington.

- Letter requesting permission to vapor sample tank 241-C-112.

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

- Contains Tri-Party Agreement for the Hanford Site.

Farley, W. G., 1991, *Safety Assessment for Gas Sampling All Ferrocyanide Tanks*, WHC-SD-WM-SAD-009, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Contains ferrocyanide program vapor data needs and a list of tanks to be evaluated.

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.

- Contains plan for characterizing waste, short- and long-term goals, tank priority, analysis needs, estimates of analyte concentrations per waste type, and a characterization flowsheet.

Hill, J. G., 1991, *Modified Test Plan for the Ferrocyanide Single-Shell Tanks 241-C-112, C-109 and T-107,* (internal memorandum 9158449 to J. H. Kessner, November 11), Westinghouse Hanford Company, Richland, Washington.

- Contains modified and revised analytical plan stated in Winters et al. (1991).

Winkelman, W. D., 1996, *FY 1997 Tank Waste Analysis Plan,* WHC-SD-WM-PLN-120, Rev. 1, Lockheed Martin Hanford Corporation, Richland, Washington.

- Contains Tri-Party Agreement requirement-driven TWRS Characterization Program information and a list of tanks addressed in Fiscal Year 1996.

Huckaby, J. L., and H. Babad, 1995, *Waste Tank Headspace Gas and Vapor Characterization Reference Guide*, WHC-SD-WM-ER-430, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains general information regarding vapor space characterization.

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

- Contains strategy for defining an inventory estimate for tank wastes.

Osborne, J. W., 1994, *Letter of Instruction to Oak Ridge National Laboratory for Analysis of Triple-Sorbent Trap Samples Collected from Tanks 241-C-101, 241-C-108, 241-C-109, 241-C-110, 241-C-111, and 241-C-112,* (letter 9455239 to R. A. Jenkins, August 12), Westinghouse Hanford Company, Richland, Washington.

Osborne, J. W., 1994, *Letter of Instruction to Pacific Northwest Laboratories for Supply and Analysis of SUMMA Canister and Sorbent Trap Samples Collected of Tanks 241-C-101, 241-C-102, 241-C-107, 241-C-109, 241-C-110, 241-C-111, and 241-C-112,* (letter 9455287 to S. G. Goheen, August 12) Westinghouse Hanford Company, Richland, Washington.

Osborne, J. W., 1994, *Letter of Instruction to Sandia National Laboratory and Oregon Graduate Institute of Science and Technology for Analysis of SUMMA Canister Air Samples Collected from Tanks 241-BY-104, 241-BY-105, 241-BY-106, 241-C-101, 241-C-102, 241-C-107, 241-C-108, 241-C-109, 241-C-110, 241-C-111, and 241-C-112,* (letter 9455506 to W. Einfeld, August 12), Westinghouse Hanford Company, Richland, Washington.

- Directed the analysis of the vapor samples at the various laboratories.

Winters, W. I., L. Jensen, L. M. Sasaki, R. L. Weiss, J. F. Keller, A. J. Schmidt, and M. G. Woodruff, 1990, *Waste Characterization Plan for the Hanford Site Single-Shell Tanks,* WHC-EP-0210, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

- Represents an all-purpose plan to identify sampling and analysis requirements for regulatory, performance assessment, technology and process development purposes.

Ie. Data Quality Objectives and Customers of Characterization Data

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.

- Contains objectives to sample all tanks for safety concerns (ferrocyanide, organic, flammable gas, and criticality) as well as decision thresholds for energetics, criticality and flammability.

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

- Specifies no additional vapor sampling is required for selected tanks.

Homi, C. S., 1995, *Vapor Sampling and Analysis Plan*, WHC-SD-WM-TP-335, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

- Defines sampling plan and data analysis objectives for vapor sampling.

Meacham, J. E., R. J. Cash, B. A. Pulsipher, and G. Chen, 1995, *Data Requirements for the Ferrocyanide Safety Issue Developed Through the Data Quality Objective Process*, WHC-SD-WM-DQO-007, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Contains ferrocyanide program data needs, lists tanks to be evaluated, decision thresholds, and a decision logic flow diagram.

Osborne, J. W., J. L. Huckaby, T. P. Rudolph, E. R. Hewitt, D. D. Mahlum, J. Y. Young and C. M. Anderson, 1994, *Data Quality Objectives for Generic In-Tank Health and Safety Issue Resolution*, WHC-SD-WM-DQO-002, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains program data needs, lists tanks to be evaluated, decision thresholds, and a decision logic flow diagram.

Osborne, J. W., and L. L. Buckley, 1995, *Data Quality Objectives for Hazardous Vapor Safety Screening*, WHC-SD-WM-DQO-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Contains data quality objectives for vapor sampling.

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

- Defines the list of tanks requiring special attention (for example, Watch List tanks).

Simpson, B. C., H. Babad, and R. J. Cash, 1993, *Recent Results from Characterization of Ferrocyanide Waste at the Hanford Site*, WHC-SA-1701-FP, Westinghouse Hanford Company, Richland, Washington.

II. ANALYTICAL DATA - SAMPLING OF TANK WASTE AND WASTE TYPES

IIa. Sampling of Tank 241-C-112

Bell, M. L., 1993, *Single-Shell Tank Waste Characterization Project and Safety Analysis Project Core 34, 35, and 36 Tank 241-C-112*, WHC-SD-WM-DP-026, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains analytical results obtained for core 34, 35, and 36.

Caprio, G. S., 1995, *Vapor and Gas Sampling of Single-Shell Tank 241-C-112 Using the Vapor Sampling System*, WHC-SD-WM-RPT-112, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Provides sampling data resulting from the August 11, 1994, sampling of single-shell tank 241-C-112 using the Vapor Sampling System.

Colby, S. A., 1991, *Graphical Representation of Ferrocyanide Tank Compositions*, (internal memorandum, LET-030491 to R. J. Cash, March 4,), Westinghouse Hanford Company, Richland, Washington.

- Illustrates the composition of the ferrocyanide tanks using a three component diagram. The diagram shows the thermodynamic and physical relationship between reactants and diluents as a function of concentration.

Colton, N. G., 1996, *Status Report: Pretreatment Chemistry Evaluation - Wash and Leach Factors for the Single-Shell Tank Waste Inventory*, PNNL-11290, Pacific Northwest National Laboratory, Richland, Washington.

- Contains sludge wash data for all single-shell tanks evaluated since 1986.

General Electric, 1958, *Record of Scavenged TBP Waste*, General Electric Company, Richland, Washington.

- Contains transfer information and some analytical data for all single-shell tanks involved in the ferrocyanide campaign.

Huckaby and Bratzel, D. R., 1995, *Tank 241-C-112 Headspace Gas and Vapor Characterization Results for Samples Collected in January 1994*, WHC-SD-WM-ER-426, Rev. 2A, Westinghouse Hanford Company, Richland, Washington.

- Contains specific headspace gas and vapor characterization results for all vapor sampling events to date. In addition, changes have been made to the original vapor reports to qualify the data based on quality assurance issues associated with the performing laboratories.

Klem, M. J., 1990, *Total Organic Carbon Concentration of Single-Shell Waste*, (internal memorandum 82316-90-032 to R. E. Raymond, April 27), Westinghouse Hanford Company, Richland, Washington.

- Summarizes and gives references for the TOC values for 47 single-shell tanks based on available laboratory analysis of solid and/or liquid waste samples.

Ligotke, M. W., R. B. Lucke, B. D. McViety, T. W. Clauss, K. H. Pool, J. S. Young, M. McCulloch, J. S. Fruchts, and S. C. Goheen, 1995, *Vapor Space Characterization of Waste Tank 241-C-112: Results from Samples Collected on 8/11/94*, PNL-10643, Pacific Northwest Laboratory, Richland, Washington.

- Provides results for selected inorganic and organic species for tank 241-C-112 vapor samples collected August 1994.

Lumetta, G. L., M. J. Wagner, S. V. Hoops, and R. T. Steele, 1996, *Washing and Caustic Leaching of Hanford Tank C-106 Sludge*, PNNL-11381, Pacific Northwest National Laboratory, Richland, Washington.

- Contains data on samples taken for privatization in 1996. In support of providing privatization vendors with washed tank 241-C-106 sludge for high-level waste vitrification studies, a pretreatment screening study was performed on about 15 g of material.

McVeety, B. D., B. L. Thomas, T. W. Clauss, M. W. Ligotke, K. H. Pool, K. B. Olsen, J. S. Fruchter, and S. C. Goheen, 1995, *Vapor Space Characterization of Waste Tank 241-C-112: Results from Samples Collected on 6/24/94*, PNL-10643, Pacific Northwest Laboratory, Richland, Washington.

- Contains specific headspace gas and vapor characterization results for the June 1994 vapor sampling event.

Pingel, L. A., R. V. Gray, and C. M. Jones, 1992, *Presentation and Discussion of the March 1992 Vapor Sampling Results from Waste Tank C-112*, WHC-SD-CP-RPT-009, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Provides sampling methodology and results for the March 1992 vapor sampling of the tank 241-C-112 headspace.

Pingel, L. A., 1995, *Report from the In-Situ Vapor Sampling of Waste Tank C-112*, (internal memorandum 8E920-SAS94-107 to J. L. Huckaby [dates unknown]), Westinghouse Hanford Company, Richland, Washington.

- Contains results of the June 1994 vapor sampling.

Scheele, R. D., L. L. Burger, J. M. Tingey, S. A. Bryan, G. L. Borsheim, B. C. Simpson, R. J. Cash, and H. H. Cady, 1991, "Ferrocyanide-Containing Waste Tanks: Ferrocyanide Chemistry and Reactivity," in the Proceedings of Environmental Restoration 91, University of Arizona, Tucson, Arizona.

- Document presented at 1991 conference of Waste Management held at Tucson, Arizona.

Simpson, B. C., H. Babad, and R. J. Cash, 1993, *Recent Results from Characterization of Ferrocyanide Wastes at the Hanford Site*, WHC-SA-1701-FP, Westinghouse Hanford Company, Richland, Washington.

- Document presented at 1993 conference of Waste Management held at Tucson, Arizona.

Wheeler, R. E., 1974, *Analysis of Tank Farm Samples Sample T-6185, 112-C*, (letter to R. L. Walser, November 20), Atlantic Richfield Hanford Company, Richland, Washington.

- Provides results of the analysis of tank sample supernatant.

Wheeler, R. E., 1975, *Analysis of Tank Farm Samples Sample T-5624, 112-C, Received: June 26, 1975*, (letter to R. L. Walser, October 27), Atlantic Richfield Hanford Company, Richland, Washington.

- Provides results of the analysis of tank sample supernatant.

IIb. Sampling of 1C and Ferrocyanide Waste Streams

This section presents sampling data of other tanks which contain similar waste.

Baldwin, J. H., 1996, *Tank Characterization Report for Single-Shell Tank 241-BY-108*, WHC-SD-WM-ER-533, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Bell, K. E., J. D. Franklin, J. L. Stroup, and J. L. Huckaby, 1996, *Tank Characterization Report for Single-Shell Tank 241-BY-106*, WHC-SD-WM-ER-616, Rev. 0, Westinghouse Hanford Company, Richland, Washington

Benar, C. J., J. G. Field, and L. C. Amato, 1996, *Tank Characterization Report for Single-Shell Tank 241-BY-104*, WHC-SD-WM-ER-608, Rev. 0, Westinghouse Hanford Company, Richland, Washington

Simpson, B. C., R. D. Cromar, R. D. Schreiber, 1996, *Tank Characterization Report for Single-Shell Tank 241-BY-110*, WHC-SD-WM-ER-591, Rev. 0, Westinghouse Hanford Company, Richland, Washington

- Provides analytical results for ferrocyanide waste from various 1996 sampling events.

Winkelman, W. D., 1996, *Tank Characterization Report for Single-Shell Tank 241-BX-112*, WHC-SD-WM-ER-602, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains information about the 1C waste type and presents analytical results from the 1995 auger sampling event.

Schreiber, R. D., 1996, *Tank 241-BX-110 Tank Characterization Report*, WHC-SD-WM-ER-566, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains information about the 1C waste type and presents analytical results from the 1995 auger sampling event.

Simpson, B. C., 1995, *Tank Characterization Report for Single-Shell Tank 241-C-111*, WHC-SD-WM-ER-475, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains analytical results from the 1994 core sampling event. Waste from this tank cascaded to 241-C-112.

Valenzuela, B. D., and L. Jensen, 1994, *Tank Characterization Report for Single-Shell Tank 241-T-107*, WHC-SD-WM-ER-382, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains information about the 1C waste type.

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

IIIa. Inventories from Campaign and Analytical Information

Agnew, S. F., 1995, *Letter Report: Strategy for Analytical Data Comparisons to HDW Model*, (letter CST-4:95-sfa272 to Susan Eberlein, September 28), Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains proposed tank groups based on TLM and the statistical method for comparing analytical information to HDW predictions.

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.

- Gives chemical and radionuclide compositions of the 177 Hanford Site tanks using the HDW model that is derived from the waste status and transaction record summary, the tank layer model, the compositions of about fifty Hanford defined wastes, and a calculation of supernatant blending and concentration with the supernatant mixing model.

Allen, G. K., 1976, *Estimated Inventory of Chemicals Added to Underground Waste Tanks, 1944 - 1975*, ARH-CD-601B, Atlantic Richfield Hanford Company Operations, Richland, Washington.

- Contains major components for waste types and some assumptions.

Allen, G. K., 1975, *Hanford Liquid Waste Inventory as of September 30, 1974*, ARH-CD-229, Atlantic Richfield Hanford Company Operations, Richland, Washington.

- Contains major components for waste types and some assumptions.

Geier, R. G., 1976, *Estimated Hanford Liquid Wastes Chemical Inventory as of June 30, 1976*, ARH-CD-768, Atlantic Richfield Hanford Company, Richland, Washington.

- Contains liquid wste characterization data.

Grigsby, J. M., 1992, *Ferrocyanide Waste Tank Hazard Assessment - Interim Report*, WHC-SD-WM-RPT-032, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains inventory estimates from physical and campaign data for a few constituents in ferrocyanide containing tanks and a few laboratory analyses.

Remund, K. M., and L. Jensen, 1993, *Statistical Analysis of Tank 241-C-112 Data*, (internal letter 12100-PLT93-020, Rev. 1, May 7), Westinghouse Hanford Company, Richland, Washington.

Schmittroth, F. A., 1995, *Inventories for Low-Level Tank Waste*, WHC-SD-WM-RPT-164, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains a global inventory based on process knowledge and radioactive decay estimations using ORIGEN2. Pu and U waste contributions are taken at one percent of the amount used in processes. Also compares information on Tc-99 from ORIGEN2 and analytical data.

IIIb. Compendium of Data from Other Sources Physical and Chemical

Agnew, S. F., and J. G. Watkin, 1994, *Estimation of Limiting Solubilities for Ionic Species in Hanford Waste Tank Supernates*, LA-UR-94-3590, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Gives solubility ranges for key chemical and radionuclide components based on supernatant sample analyses.

Brevick, C. H., J. L. Stroup, and J. W. Funk, 1997, *Supporting Document for the Historical Tank Content Estimate for C Tank Farm*, WHC-SD-WM-ER-313, Rev. 1B, Fluor Daniel Northwest, Richland, Washington.

- Contains tank farm description tank historical summary, level history and surveillance graphs, in-tank photographs, and waste inventory information.

Fauske, H. K., 1996, *Assessment of Chemical Vulnerabilities in the Hanford High-Level Waste Tanks*, WHC-SD-WM-ER-543, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains chemical reactivity results for various simulants.

Harville, D. A., 1977, "Maximum Likelihood Approaches to Variance Component Estimation and to Related Problems," *Journal of the American Statistical Association*, pp. 320-340.

- Contains the method used to calculate variance components in the ANOVA statistical treatment of data.

Hill, J. G., G. S. Anderson, and B. C. Simpson, 1995, *The Sort on Radioactive Waste Type Model: A Method to Sort Single-shell Tanks into Characteristic Groups*, PNL-9814, Rev. 2, Pacific Northwest Laboratory, Richland, Washington.

- Contains a qualitative method developed to group tanks according to their process history.

Husa, E. I., R. E. Raymond, R. K. Welty, S. M. Griffith, B. M. Hanlon, R. R. Rios, and N. J. Vermeulen, 1993, *Hanford Site Waste Storage Tank Information Notebook*, WHC-EP-0625, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Document contains in-tank photographs and summaries on the tank description, leak detection system, and tank status.

Husa, E. I., 1995, *Hanford Waste Tank Preliminary Dryness Evaluation*, WHC-SD-WM-TI-703, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Assesses the relative dryness between tanks.

Brevick, C. H., L. A. Gaddis, and E. D. Johnson, 1996, *Tank Waste Source Term Validation, Volume I, II, & III*, WHC-SD-WM-ER-400, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

- Contains a quick reference to sampling information in spreadsheet or graphical form for 23 chemicals and 11 radionuclides for all tanks.

Hartley, S. A., G. Chen, C. A. LoPresti, T. M. Ferryman, A. M. Liebetrau, K. M. Remund, S. A. Allen, and B. C. Simpson, 1996, *A Comparison of Historical Tank Content Estimate (HTCE) Model, Rev. 3, and Sample-Based Estimates of Hanford Waste Tank Contents*, PNL-11429, Pacific Northwest National Laboratory, Richland, Washington.

- Contains a statistical evaluation of the HDW inventory estimate against analytical values from 12 existing TCR reports using a select component data set.

Jungfleisch, F. M., 1980, *Hanford High-Level Defense Waste Characterization - A Status Report*, RHO-CD-1019, Rockwell Hanford Operations, Richland, Washington.

- Document provides status information to plan outlined by G. W. Grimes, October 1977, containing a summary of sampling, characterization, and analysis data for the tanks sampled.

Leach, C. E., and S. M. Stahl, 1997, *Hanford Site Tank Farm Facilities Interim Safety Basis Volume I and II*, WHC-SD-WM-ISB-001, Westinghouse Hanford Company, Richland, Washington.

- Provides a ready reference to the tank farms safety envelope.

Remund, K. M., and B. C. Simpson, 1996, *Hanford Waste Tank Grouping Study*, PNNL-11433, Pacific Northwest National Laboratory, Richland, Washington.

- Contains a statistical evaluation to group tanks into classes with similar waste properties.

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 an tank inventory estimate based on analytical information.

Shelton, L. W., 1995, *Chemical and Radionuclide Inventory for Single- and Double-Shell Tanks*, (internal memorandum 75520-95-007 to R. M. Orme, August 8), Westinghouse Hanford Company, Richland, Washington.

- Contains an tank inventory estimate based on analytical information.

Shelton, L. W., 1995, *Radionuclide Inventories for Single and Double Shell Tanks*, (internal memorandum 71320-95-002 to F. M. Cooney, February 14), Westinghouse Hanford Company, Richland, Washington.

- Contains an tank inventory estimate based on analytical information.

Toth, J. J., C. E. Willingham, P. G. Heasler, P. D. Whitney, 1994, *Organic Carbon in Hanford Single-Shell Tank Waste*, PNL-9434, Pacific Northwest Laboratory, Richland, Washington.

- Contains organic carbon data for tank 241-C-112.

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EDMC	H6-08	X			
Numatec Hanford Corporation					
J. S. Garfield	H5-49	X			
J. S. Hertzel	H5-61	X			
D. L. Lamberd	H5-61	X			
Pacific Northwest National Laboratory					
A. F. Noonan	K9-91	X			
Rust Federal Services of Hanford, Inc.					
C. T. Narquis	T6-16	X			