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# Tank Characterization Report for Single-Shell Tank 241-B-106

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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-B-106. This report supports the requirements of Tri-Party Agreement Milestone M-44-09.



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# Tank Characterization Report for Single-Shell Tank 241-B-106

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## EXECUTIVE SUMMARY

This characterization report summarizes the available information on the historical uses, current status, and sampling and analysis results of waste contained in underground storage tank 241-B-106. This report supports the requirements of the *Hanford Federal Facility Agreement and Consent Order*, Milestone M-44-09 (Ecology et al. 1996).

Tank 241-B-106 is located in the B Tank Farm in the 200 East Area of the Hanford Site. It is the third in a cascade series of three tanks, beginning with tank 241-B-104. Tank 241-B-106 entered service in August 1947 and received second-cycle decontamination waste through the cascade. Between 1949 and 1950, the tank was emptied, refilled with second-cycle decontamination waste through the cascade, and emptied again. In 1951, tank 241-B-106 was designated as the feed tank for the 242-B Evaporator; it began receiving evaporator feed waste in the fourth quarter. Tank 241-B-106 continued to operate as the evaporator feed tank until the end of 1955, receiving primarily first-cycle decontamination waste and tributyl phosphate waste from various tanks. Between 1955 and 1978, tank 241-B-106 received several other waste types including miscellaneous laboratory wastes, 224 waste, ion-exchange waste, and B Plant low-level waste. The waste currently in the tank is predicted to be B saltcake (Agnew et al. 1996a). The tank was declared inactive in 1978, and interim stabilization and intrusion prevention were completed in 1985.

Table ES-1 and Figure ES-1 describe tank 241-B-106 and its status. The tank has an operating capacity of 2,010 kL (530 kgal) and presently contains an estimated 443 kL

(117 kgal) of noncomplexed waste. Hanlon (1996) estimates that 439 kL (116 kgal) is sludge, and 4 kL (1 kgal) is supernate. The Tank Layer Model (TLM) in Agnew et al. (1996a) predicts the tank contains 439 kL (116 kgal) of saltcake and 4 kL (1 kgal) of supernate. Sampling data indicates the bulk of the tank contents consists of concentrated wastes with entrained solids.

The characterization of tank 241-B-106 is based on two push-mode core samples obtained in July 1995. The data are reported in the *Final Report for Tank 241-B-106, Push Mode Core Samples 93 and 94* (Conner 1996a). Cores 93 and 94 were obtained from risers 2 and 7, respectively. The sampling event was initially performed to satisfy the requirements listed in the *Tank Safety Screening Data Quality Objective* (Babad et al. 1995) and the *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology* (Kupfer et al. 1995). The sampling and analytical requirements of these two documents were subsequently integrated into the *Tank 241-B-106 Push Mode Core Sampling and Analysis Plan*, Rev. 0 (Conner 1996b), the sampling and analysis plan (SAP). The safety screening DQO requires measuring the total fuel content/energetics of the waste by differential scanning calorimetry (DSC), weight percent water by thermogravimetric analysis (TGA), bulk density measurements by centrifugation, total alpha activity by alpha proportional counting, and a visual examination of waste samples for the presence of an organic layer (liquids only). The safety screening DQO also requires determining tank headspace flammability. To satisfy this requirement, the tank headspace was monitored through riser 3, and the flammability was

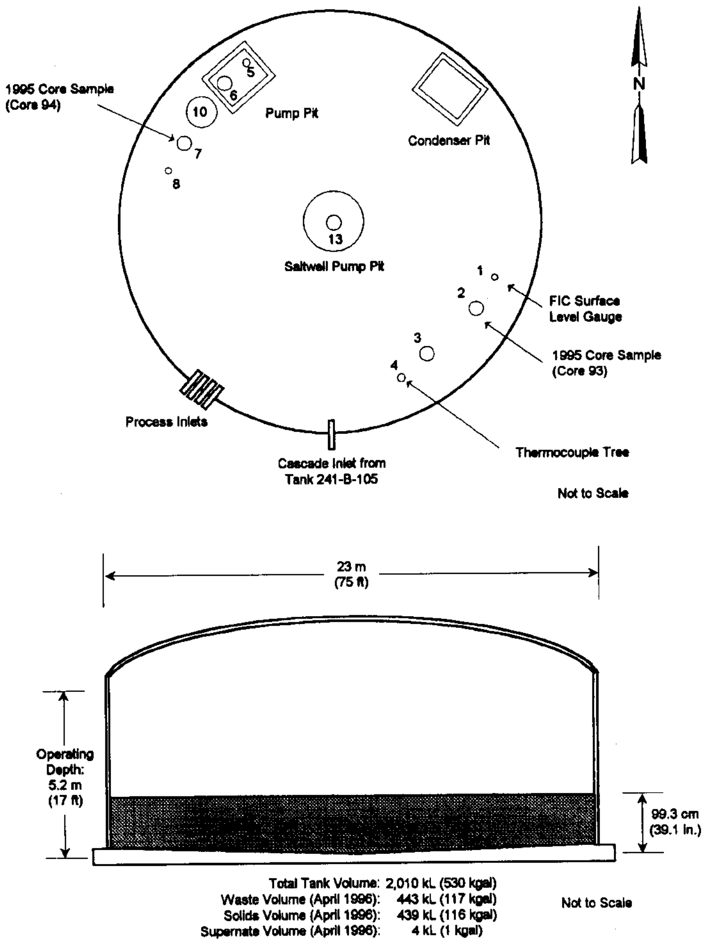
Table ES-1. Description and Status of Tank 241-B-106.

| | |
|---|---|
| **TANK DESCRIPTION** | |
| Type | Single-shell |
| Constructed | 1943 to 1944 |
| In service | August 1947 |
| Diameter | 23 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 | 443 kL (117 kgal) |
| Supernate volume | 4 kL (1 kgal) |
| Sludge volume[1] | 439 kL (116 kgal) |
| Saltcake volume[1] | 0 kL (0 kgal) |
| Drainable interstitial liquid | 23 kL (6 kgal) |
| Waste surface level (1985 to 1996) | 96.5 cm (3.16 ft) to 99.8 cm (3.27 ft) |
| Temperature (1974 to present) | 6 °C (43 °F) to 30 °C (86 °F) |
| Integrity | Sound |
| Watch List | None |
| **SAMPLING DATES** | |
| Push-mode core samples | July 1995 |
| Tank headspace flammability | April 1996 |
| **SERVICE STATUS** | |
| Declared inactive | 1978 |
| Interim stabilized | March 1985 |
| Intrusion prevention | October 1985 |

Note:

[1]Based on Hanlon (1996) estimate. Analytical results indicate problems with the Hanlon estimate.

Figure ES-1. Description and Status of Tank 241-B-106.



measured as a percent of the lower flammability limit (LFL). A tank composite sample was prepared for sludge washing evaluation. The SAP also required lithium analysis by inductively coupled plasma spectroscopy (ICP) and bromide analysis by ion chromotography (IC), to check for hydrostatic head fluid (HHF) contamination of the segments.

The SAP was revised in February 1996 to include the requirements of the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995), the historical DQO. This document required measuring the subsegments the following analytes: bulk density, sodium, fluoride, nitrate, phosphate, $^{137}$Cs, $^{90}$Sr, total beta, uranium (by phosphorescence), and total organic carbon (TOC). Results for metals, anions, and radionuclides were obtained during the ICP, IC and gamma energy analysis (GEA) evaluations, respectively. Results for total inorganic carbon (TIC) were obtained during the TOC analysis. The historical DQO also required the formation and analysis of core composites. Composites from each core were produced and subjected to the same analyses as the subsegments and to DSC, TGA, and total alpha activity analyses.

No exothermic reactions were observed during the DSC analysis. The moisture content of all samples was well above the 17 weight percent safety screening DQO limit; the smallest lower limit for a 95 percent confidence interval on the mean was 54.7 weight percent. All total alpha activity results and upper limits for a 95 percent confidence interval on the mean were at least two orders of magnitude below the DQO threshold of 41 $\mu$Ci/g. The headspace flammability was measured at 0 percent LFL. Finally, no separable organic layer was observed in the drainable liquid sample.

Additional safety issues for waste tanks concern TOC content and the heat generation rate of the waste. Although TOC was not required by the safety screening DQO for tank 241-B-106, the TOC results have been compared with the organic safety program action limit of 30,000 μg C/g (Conner 1996a). The overall TOC mean was 1,860 μg C/g. The upper half sample from segment 1 of core 93 contained a much higher concentration of TOC than other subsegments. The mean TOC content from this subsegment was 11,700 μg C/g (wet weight basis), and 28,700 μg C/g (dry weight basis). The heat generated by radiolytic decay in the tank waste was estimated from the radionuclide analytical data to be approximately 338 W (1,150 Btu/hr), which is below the operating specification limit of 11,700 W (40,000 Btu/hr) (Bergmann 1991). Additional estimates of 96.9 W (331 Btu/hr) (Agnew et al. 1996a) and 589 W (2,010 Btu/hr) (Kummerer 1994) were also below the limit. The most recent tank surveillance information indicates that from 1974 to the present, tank temperatures have fluctuated between 6 °C (43 °F) to 30 °C (86 °F). The tank exhibited a temperature spike in the past, but from that date (1989) it may be concluded that heat generated from radioactive sources throughout the year is dissipated.

Based on the decision criteria in the safety screening DQO, the waste in tank 241-B-106 may be considered "safe." No special action is required to continue storing waste in the tank, and no additional characterization efforts are required at this time.

The historical DQO establishes sampling and analysis requirements for examining waste type composition models. Each waste type of concern has a unique combination of analytes (fingerprint analytes) that distinguish it from other waste types. The subsegments from the segment 1 met the DQO concentration levels for all fingerprint analytes except fluoride. B saltcake is also unlikely to have the observed iron and uranium concentrations. The upper three half segments may actually be representative of uranium recovery wastes. The upper half of each core's second segment was chemically consistent with the first segment. However, the lower halves of these segments were visually and chemically distinct from the rest of the tank. These observations suggest that a different waste type is found near the tank bottom (most likely first cycle waste). The historical expectation was to find a homogeneous saltcake. Analytical results show layering with sludge-like properties and composition. Therefore, the historical DQO evaluation results should be used with caution (Conner 1996a) (see Section 5.5.2 for more detail).

The concentration and tank inventories for major constituents and analytes of concern in the tank waste are listed in Appendix A and summarized (using means of segment analyses) in Table ES-2.

Table ES-2. Concentrations and Inventories for Major Analytes and Analytes of Concern in Tank 241-B-106.

| Metals | Top Layer | | Bottom Layer | | Projected Inventory[1] |
|---|---|---|---|---|---|
| | Mean (μg/g) | RSD (%) | Mean (μg/g) | RSD (%) | kg |
| Al | 1,506 | 19.3 | 13,725 | 15.8 | 3,450 |
| Bi | 807 | 42.4 | 19,425 | 4.68 | 4,350 |
| Ca | 2,414 | 29.9 | 319 | 3.17 | 1,040 |
| Cr | 217 | 22.4 | 734 | 12.0 | 240 |
| $CO_3^{2-}$ (TIC) | 329 | 3.85 | 253 | 8.39 | 185 |
| Fe | 18,426 | 13.5 | 8,220 | 6.57 | 9,150 |
| Pb | 367 | 11.2 | 274 | 53.7 | 205 |
| Mn | 189 | 43.3 | 30.4 | 5.68 | 83 |
| Ni | 70.7 | 25.1 | 18.4 | 15.8 | 32 |
| Si | 1,519[2] | 13.8 | 4,437[2] | 9.52 | 1,530 |
| Na | 106,690 | 8.07 | 121,250 | 1.70 | 68,200 |
| Sr | 508 | 19.1 | 153 | 8.02 | 237 |
| U | 16,369 | 26.3 | 3,322 | 55 | 7,300 |
| **Anions** | **Mean (μg/g)** | **RSD (%)** | **Mean (μg/g)** | **RSD (%)** | **kg** |
| Chloride | 1,533 | 19.8 | 1472 | 22.9 | 924 |
| Fluoride | 1,543 | 32.6 | 10,145 | 13.9 | 2,720 |
| Nitrate | 194,830 | 6.50 | 170,000 | 1.5 | 114,000 |
| Nitrite | 7,837 | 10.2 | 6,650 | 3.61 | 4,540 |
| Phosphate | 75,651 | 14.7 | 67,080 | 13.8 | 44,440 |
| Sulfate | 14,841 | 5.4 | 13,975 | 2.55 | 8,890 |
| **Radionuclides** | **Mean (μCi/g)** | **RSD (%)** | **Mean (μCi/g)** | **RSD (%)** | **Ci** |
| $^{137}Cs$ | 22.2 | 34.2 | 12.1 | 5.30 | 11,500 |
| $^{90}Sr$ | 88.0 | 14.4 | 5.91 | 17.3 | 36,800 |
| ($^{239/240}Pu$) | Not Detected[3] | nc | 0.057 [3] | 7.19 | 11.8[4] |

Table ES-2. Concentrations and Inventories for Major Analytes and Analytes of Concern in Tank 241-B-106.

| **Carbon** | **µg C/g** | **RSD (%)** | **µg C/g** | **RSD (%)** | **kg C** |
|---|---|---|---|---|---|
| TOC | 2,405 | 81.2 | 207.5 | 20.3 | 1,010 |
| **Other** | **g/mL** | **RSD (%)** | **g/mL** | **RSD (%)** | |
| Density | 1.36 | nc | 1.415 | nc | na |
| % Water | 62.4 wt % | 1.66 | 56.8 wt % | 0.50 | 60.6% |

Notes:

nc = not calculated
na = not applicable

[1]Inventory values are based on 4.04E+08 grams top layer and 2.07E+08 grams bottom layer.

[2]The data are from ICP water digestion.

[3]The data were analyzed as total alpha.

[4]The inventory was derived using bottom layer data only.

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## CONTENTS

## CONTENTS (Continued)



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## LIST OF TABLES

## LIST OF TABLES (Continued)

## LIST OF TERMS

| | |
|---|---|
| ANOVA | analysis of variance |
| BSltCk | B saltcake |
| Btu/hr | British thermal units per hour |
| Ci | curies |
| Ci/g | curies per gram |
| Ci/L | curies per liter |
| cm | centimeters |
| DL | drainable liquid |
| DQO | data quality objective |
| DSC | differential scanning calorimetry |
| ft | feet |
| g | gram |
| gal/in. | gallons per inch |
| g/mL | grams per milliliter |
| GEA | gamma energy analysis |
| HDW | Hanford Defined Waste |
| HHF | hydrostatic head fluid |
| IC | ion chromatography |
| ICP | inductively coupled plasma |
| in. | inches |
| J/g | joules per gram |
| kg | kilograms |
| kg C | kilograms of carbon |
| kgal | kilogallons |
| kL | kiloliters |
| LEL | lower explosive limit |
| LFL | lower flammability limit |
| m | meters |
| mL/L | milliliter per liter |
| M | moles per liter |
| mg | milligrams |
| mR/hr | milliroentgens per hour |
| mrad/hr | millirads per hour |
| n/a | not applicable |
| NFPA | National Fire Protection Association |
| ppm | parts per million |
| Rev. | revision |
| RPD | relative percent difference |
| RSD | relative standard deviation |
| SAP | sampling and analysis plan |
| Seg. | segment |

## LIST OF TERMS (Continued)

| | |
|---|---|
| Subseg. | subsegment |
| TIC | total inorganic carbon |
| TGA | thermogravimetric analysis |
| TLM | Tank Layer Model |
| TOC | total organic carbon |
| W | watts |
| WSTRS | Waste Status and Transaction Record Summary |
| wt% | weight percent |
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| μCi/g | microcuries per gram |
| μCi/gal | microcuries per gallon |
| μeq/g | microequivalents per gram |
| μg/g | micrograms per gram |
| μg C/g | micrograms of carbon per gram |
| ΔH | change in enthalpy |

# 1.0 INTRODUCTION

This tank characterization report provides an overview of single-shell tank 241-B-106 and its waste contents. It includes estimated concentrations and inventories for waste components based on the latest sampling and analysis activities and background tank information. The sampling and analysis event is based on results from two push-mode core samples taken in July 1995. That event was governed by the *Tank Safety Screening Data Quality Objective* (Babad et al. 1995), *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995), and *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology* (Kupfer et al. 1995). Results from a 1975 historical sampling event are also included for information only.

Tank 241-B-106 was declared inactive in 1978, and it was interim stabilized in 1985. Consequently, the waste composition should not change appreciably until pretreatment and retrieval activities begin. The concentration and inventory values reported reflect best estimates based on the most recent analytical data. This report supports the requirements of the *Hanford Federal Facility Agreement and Consent Order*, Milestone M-44-09 (Ecology et al. 1996).

## 1.1 PURPOSE

The purpose of this report is to summarize the information about the use and contents of tank 241-B-106. Where possible, this information will be used to assess issues associated with safety, operational, environmental, and process development activities. This report also provides a reference point for more detailed information about tank 241-B-106.

## 1.2 SCOPE

The SAP, *Tank 241-B-106 Push Mode Core Sampling and Analysis Plan* (Conner 1996b), integrated the sampling and analytical requirements of the documents which governed the sampling event. The following safety screening analyses were performed on the solids subsegments: DSC to evaluate the energetics, TGA to measure the moisture content, bulk density, and alpha proportional counting to determine the total alpha activity for criticality potential. The flammability of tank headspace gases was determined using a combustible gas meter. Lithium was analyzed by ICP and bromide by IC to gauge the amount of HHF contamination. Analyses for energetics, moisture content, and lithium were performed on the drainable liquid of segment 1 of core 93. An visual check was made for the presence of an organic layer.

In accordance with the historical DQO, the following analytes were evaluated on solids, subsegments, and core composites: bulk density, sodium, fluoride, nitrate, phosphate, $^{137}Cs$, $^{90}Sr$, total beta, uranium (by phosphorescence), and TOC. Results for the remaining metals, anions, and radionuclides (evaluated by GEA) were reported on an opportunistic basis. Differential scanning calorimetry, TGA, and a total alpha activity analysis also were performed on the core composites.

# 2.0 HISTORICAL TANK INFORMATION

This section describes tank 241-B-106 based on historical information. It discusses the current condition of the tank, tank design, transfer history, and the process sources that contributed to tank waste, including an estimate of the current contents based on the process history. It includes events that may be related to tank safety issues, such as potentially hazardous tank contents or off-normal operating temperatures. The section also summarizes available surveillance data for the tank. Solid and liquid level data are used to determine tank integrity (leaks) and to provide clues to internal activity in the solid layers of the tank. Temperature data are used to evaluate the heat generating characteristics of the waste.

## 2.1 TANK STATUS

As of April 30, 1996, tank 241-B-106 contained an estimated 443 kL (117 kgal) of waste classified as noncomplexed (Hanlon 1996). Both liquid and solids volumes were estimated using a Food Instrument Corporation surface level gauge. The solids volume was updated on March 31, 1985. Table 2-1 shows the amounts of the waste phases in the tank.

Table 2-1. Estimated Tank Contents.[1]

| Waste Form | Estimated Volume | |
|---|---|---|
| | kL | kgal |
| Total waste | 443 | 117 |
| Supernatant liquid | 4 | 1 |
| Sludge | 439 | 116 |
| Saltcake | 0 | 0 |
| Drainable interstitial liquid | 23 | 6 |
| Drainable liquid remaining | 26 | 7 |
| Pumpable liquid remaining | 0 | 0 |

Note:

[1]Hanlon (1996)

Tank 241-B-106 is categorized as sound. Interim stabilization and intrusion prevention were completed in 1985. The tank is passively ventilated and is not on any Watch List. All monitoring systems were in compliance with documented standards as of April 30, 1996 (Hanlon 1996).

## 2.2 TANK DESIGN AND BACKGROUND

The B Tank Farm, a first generation design, was built during 1943 and 1944. It consists of twelve 2,010 kL (530 kgal) tanks and four 208 kL (55 kgal) tanks. These tanks were designed for nonboiling waste with a maximum fluid temperature of 104 °C (220 °F). As with all first generation tank farms, equipment to monitor and maintain the waste is sparse. A typical B tank contains 10 to 13 risers, ranging in diameter from 5.0 cm (2 in.) to 1.1 m (3.5 ft), that provide surface level access to the underground tank. Generally, there is one riser through the center of the tank dome, five risers located on opposite sides of the tank, and the remainder scattered on the dome.

Tank 241-B-106 entered service in August 1947. It is the third of a three-tank cascade. The bottom center elevation of each tank is one foot lower than the preceding tank. The cascade overflow height is approximately 4.78 m (15.66 ft) from the tank bottom and 60 cm (2 ft) below the top of the steel liner. The single-shell tank is constructed of 30-cm (1-ft)-thick reinforced concrete with a 0.64-cm (.25-in.)-thick mild carbon steel liner on the bottom and sides, and a 38 cm (1.25-ft)-thick-domed concrete top. The tanks have a dished bottom with a 1.2 m (4 ft) radius knuckle and a 5.2 m (17 ft) operating depth. The tanks are set on a reinforced concrete foundation. A three-ply cotton fabric waterproofing was applied over the foundation and steel tank. Four coats of primer paint were sprayed on all exposed interior tank surfaces. Tank ceiling domes were covered with three applications of magnesium zincfluorosilicate wash. Lead flashing was used to protect the joint where the steel liner met the concrete dome. Asbestos gaskets were used to seal the manholes in the tank dome. The tanks were waterproofed on the sides and top with tar and gunite. Each tank was covered with approximately 2.2 m (7.25 ft) of overburden.

Table 2-2 lists and describes tank 241-B-106 risers. Tank 241-B-106 has four tank inlet nozzles and one cascade overflow nozzle approximately 4.86 m (15.12 ft) from the tank bottom (as measured at the tank wall). Figure 2-1 shows the riser configuration and nozzle locations.

Figure 2-2 is a tank cross section showing the approximate waste level and a schematic of the tank equipment. Tank 241-B-106 has 10 risers. Three 30 cm (1 ft) in diameter risers are unobstructed for sampling purposes (2, 3, and 7). If used as sampling ports, these risers would access a section on the southeast side of the tank and a small section on the northwest side of the tank.

Table 2-2. Tank 241-B-106 Risers.[1,2]

| Riser Number | Diameter (in.) | Description and Comments |
|---|---|---|
| R1 | 4 | Food Instrument Corporation level gauge |
| R2 | 12 | Blind flange |
| R3 | 12 | Flange, B-222 observation port |
| R4 | 4 | Thermocouple tree |
| R5 | 4 | Flange |
| R6 | 12 | Transfer pump |
| R7 | 12 | Flange, benchmark |
| R8 | 4 | Breather filter, G1 housing |
| R10 | 42 | Manhole, below grade |
| R13 | 12 | Saltwell screen and pump |
| **Nozzle Number** | **Diameter (in.)** | **Description and Comments** |
| N1 | 3 | Cascade inlet nozzle (from tank 241-B-105) |
| N2 | 3 | Process inlet nozzle |
| N3 | 3 | Process inlet nozzle (spare) |
| N4 | 3 | Process inlet nozzle (spare) |
| N5 | 3 | Process inlet nozzle (spare) |

Notes:
[1]Alstad (1993)
[2]Vitro Engineering Corporation (1986)

Figure 2-1. Riser Configuration for Tank 241-B-106.

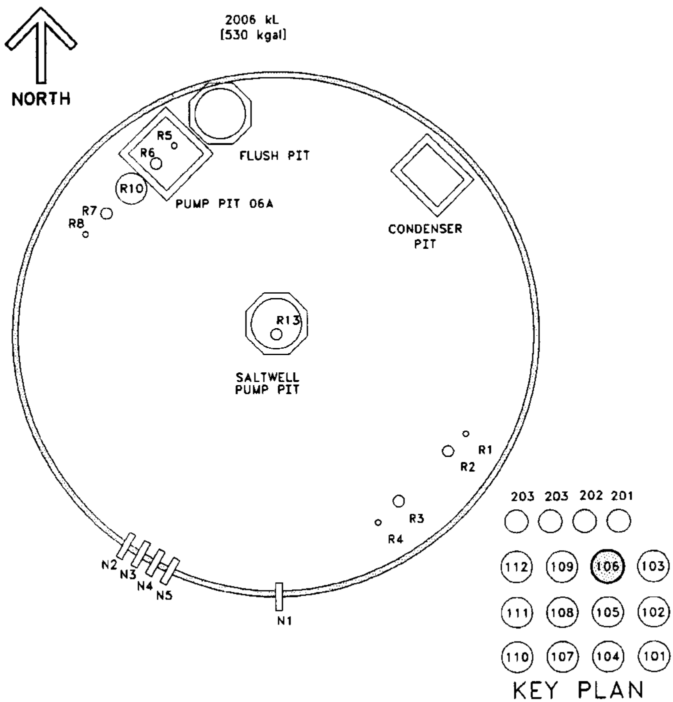
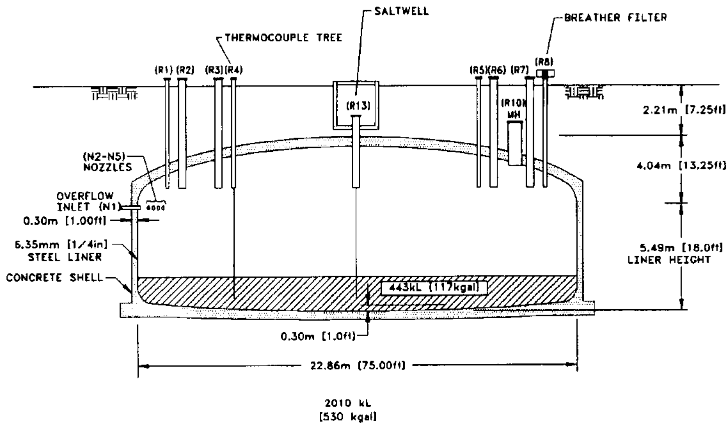


Figure 2-2. Tank 241-B-106 Cross Section.



## 2.3 PROCESS KNOWLEDGE

This section describes the waste transfer history of tank 241-B-106 and the historical estimate of tank contents.

### 2.3.1 Waste Transfer History

Historical records indicate that tank 241-B-106 received cascaded second-cycle decontamination waste from tank 241-B-105 during the third quarter of 1947. The cascade was filled in May 1948. Supernate from tank 241-B-106 was sent to crib B-008 from December 1948 to the first quarter of 1949 when the tank was emptied into the crib. Tank 241-B-106 again received cascaded second-cycle decontamination waste from tank 241-B-105 from the fourth quarter of 1949 to the first quarter of 1950. Supernate from tank 241-B-106 was sent to crib B-008 until the second quarter of 1950 when the tank was emptied again.

The 242-B Evaporator was constructed to reduce the amount of liquid waste in the 200 East Area tanks. Tank 241-B-106 was designated as the feed tank for the evaporator which began operations on December 14, 1951. Tank 241-B-106 received waste, scheduled for evaporation during the fourth quarter of 1951, from tank 241-B-108. Tank 241-B-106 also was scheduled to receive the resultant saltcake from the 242-B Evaporator. The excess condensate from the evaporator was sent to an undesignated crib, and the saltcake was sent to tank 241-B-108 during the fourth quarter of 1951. The first evaporator run reduced first-cycle decontamination waste from the tanks listed in Table 2-3. The tanks, receiving the resultant tank 241-B-1-6 saltcake during this time, are listed in Table 2-4. The evaporator began reducing tributyl phosphate waste during 1954. The tanks sending the waste to be evaporated are listed in Table 2-3. The slurry receiver tanks are listed in Table 2-4. Condensate from tank 241-B-106 continued to be sent to an unknown crib until the fourth quarter of 1954. The final transfers into and out of tank 241-B-106 and the evaporator occurred during the fourth quarter of 1955 when tank 241-B-106 received saltcake waste from the 242-B Evaporator.

Table 2-3. Summary of Tank 241-B-106 Waste Input History.[1,2]

| Transfer Source | Waste Type Received | Time Period | Estimated Waste Volume | |
|---|---|---|---|---|
| | | | kL | kgal |
| 241-B-105 | Cascade of second-cycle decontamination waste | 1947 to 1950 | 3,698 | 977 |
| 241-B-104, 241-B-105, 241-B-107, 241-B-108, 241-B-109, 241-BX-107, 241-BX-107, 241-BX-109, 241-BY-107, 241-BY-108, 241-C-107, 241-C-108, 241-C-109, 241-C-110, 241-C-111, 241-C-112 | First-cycle decontamination waste from listed tanks | 1951 to 1953 | 41,466 | 10,954 |
| 241-BX-109, 241-BY-107, 241-BY-108, 241-C-101 | Transfer of supernatant tributyl phosphate waste | 1954 | 17,246 | 4,556 |
| 242-B Evaporator | 242-B Evaporator saltcake bottoms | 1955 | 1,613 | 426 |
| 241-B-103 | Supernatant evaporator feed waste | 1957 | 269 | 71 |
| Hanford Laboratories | Miscellaneous liquid waste additions | 1959 to 1966, 1968, 1971 | 988 | 261 |
| 241-B-201 | Transfer of supernatant 224 waste | 1971 | 83 | 22 |
| 241-B-102 | Transfer of supernatant ion-exchange and B Plant low-level waste | 1974 | 238 | 63 |

Notes:

[1]Agnew et al. (1996b)

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

Table 2-4. Summary of Tank 241-B-106 Output History.[1,2]

| Transfer Destination | Time Period Year - Quarter |
|---|---|
| 241-B-104 | 1952 - 4, 1953 - 3, 1953 - 4 |
| 241-B-105 | 1952 - 4, 1953 - 1, 1953 - 4, |
| 241-B-107 | 1952 - 3, 1952 - 4, 1953 - 2, 1953 - 3, |
| 241-B-108 | 1951 - 4, 1952 - 1, 1952 - 2, 1953 - 1, 1953 - 2 |
| 241-B-109 | 1952 - 2, 1952 - 3, 1953 - 2, 1953 - 3, |

Notes:
[1]Agnew et al. (1996b)
[2]Waste volumes and types are best estimates based on historical data.

Tank 241-B-106 received evaporator feed supernate from tank 241-B-103 during the second quarter of 1957. Tank 241-B-106 sent waste to tank 241-C-112 for cesium scavenging using ferrocyanide during the fourth quarter of 1957. Tank 241-B-106 received miscellaneous Hanford laboratory wastes from the third quarter of 1959 to the first quarter of 1966. Additional laboratory wastes also were received in the first quarter of 1968 and the second quarter of 1971. Supernatant waste was sent from tank 241-B-106 to tank 241-B-103 during the third quarter of 1969.

Waste from tank 241-B-201, noted as 224 supernatant waste, was sent to tank 241-B-106 during the second quarter of 1971. In that period, tank 241-B-106 also sent waste to tank 241-BY-112. Tank 241-BY-112 also received waste during the second quarter of 1972.

The last waste received by tank 241-B-106 was B Plant low-level waste and ion-exchange waste from tank 241-B-102 during the third quarter of 1974. Tank 241-B-106 sent waste to tank 241-B-103 during the fourth quarter of 1975. The final transfer for tank 241-B-106 occurred during the third quarter of 1987 when the tank was saltwell pumped, and the resultant liquid was sent to tank 241-AN-101.

Tank 241-B-106 was declared inactive in 1978. The supernate was pumped to interim stabilize the tank in March 1985. Intrusion prevention was completed in October 1985 (Brevick et al. 1994a).

### 2.3.2 Historical Estimation of Tank Contents

Estimates of tank 241-B-106 contents are based on historical transfer data. The historical data are from the *Waste Status and Transaction Record Summary for the Northeast Quadrant* (WSTRS) (Agnew et al. 1996b) and *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3* (Agnew et al. 1996a). The Hanford Defined Waste [HDW] Model Rev. 3 document contains the HDW list, the TLM, and the historical tank content estimate. The WSTRS is a compilation of available waste transfer and volume status data. The HDW provides the assumed typical compositions for 50 waste types. In most cases, the available data are incomplete, thereby reducing the reliability of the transfer data and the derived modeling results. The TLM uses the WSTRS data to model the waste deposition processes and, using additional data from the HDW (which may introduce more error), generates an estimate of the tank contents. For these reasons, these model predictions are considered only estimates that require further evaluation using analytical data.

Based on the TLM, tank 241-B-106 contains a top layer of 4 kL (1 kgal) of supernate, and a bottom layer of 440 kL (116 kgal) of 242-B Evaporator saltcake (BSltCk) waste (see Figure 2-3). The BSltCk layer should contain large quantities of sodium, hydroxide, and nitrate and smaller concentrations of aluminum, nitrite, carbonate, phosphate, sulfate, fluoride, and chloride. Cesium and strontium are present in modest concentrations (< 20 $\mu$Ci/g); therefore, the layer will have minimal activity. Table 2-5 shows an estimate of the expected waste constituents and their concentrations.

Figure 2-3. Tank Layer Model.

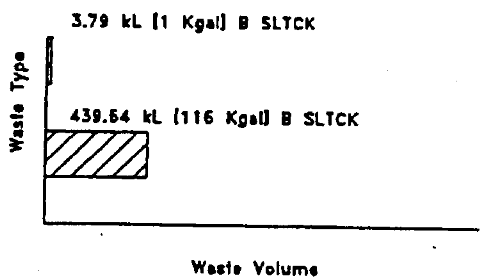


Table 2-5. Tank 241-B-106 Inventory Estimate.[1,2] (2 sheets)

| Total Inventory Estimate | | | |
|---|---|---|---|
| **Physical Properties** | | | |
| Total waste | 6.75E+05 kg (117 kgal) | | |
| Heat load | 96.9 W (331 Btu/hr) | | |
| Bulk density | 1.53 (g/mL) | | |
| Water wt% | 55.8 | | |
| Total Organic Carbon wt% Carbon (wet) | 0.00117 | | |
| **Chemical Constituents** | **M** | **ppm** | **kg**[3] |
| $Na^+$ | 9.11 | 1.37E+05 | 92,800 |
| $Al^{3+}$ | 0.224 | 3,960 | 2,670 |
| $Fe^{3+}$ (total Fe) | 0.203 | 7,440 | 5,030 |
| $Cr^{3+}$ | 0.00593 | 202 | 137 |
| $Bi^{3+}$ | 0.0457 | 6,260 | 4,230 |
| $La^{3+}$ | 5.33E-06 | 0.486 | 0.328 |
| $Hg^{2+}$ | 5.06E-05 | 6.65 | 4.49 |
| Zr (as $ZrO(OH)_2$) | 0.00389 | 233 | 157 |
| $Pb^{2+}$ | 4.08E-06 | 0.554 | 0.374 |
| $Ni^{2+}$ | 0.00803 | 309 | 209 |
| $Sr^{2+}$ | 1.78E-06 | 0.102 | 0.0690 |
| $Mn^{4+}$ | 8.99E-06 | 0.324 | 0.219 |
| $Ca^{2+}$ | 0.0899 | 2,360 | 1,600 |
| $K^+$ | 0.0158 | 406 | 274 |
| $OH^-$ | 1.56 | 17,900 | 11,700 |
| $NO_3^-$ | 3.75 | 1.58E+05 | 1.03E+05 |
| $NO_2^-$ | 0.300 | 9,350 | 6,100 |
| $CO_3^{2-}$ | 0.218 | 8,890 | 5,800 |
| $PO_4^{3-}$ | 1.39 | 89,600 | 58,500 |
| $SO_4^{2-}$ | 0.145 | 9,480 | 6,190 |

Table 2-5. Tank 241-B-106 Inventory Estimate.[1,2] (2 sheets)

| Chemical Constituents | M | ppm | kg[3] |
|---|---|---|---|
| Si (as $SiO_3^{2-}$) | 0.0314 | 599 | 391 |
| $F^-$ | 0.158 | 2,030 | 1,330 |
| $Cl^-$ | 0.0879 | 2,110 | 1,380 |
| $C_6H_5O_7^{3-}$ | 3.85E-05 | 4.77 | 3.22 |
| $EDTA^{4-}$ | 6.87E-06 | 1.30 | 0.877 |
| $HEDTA^{3-}$ | 1.13E-06 | 0.203 | 0.137 |
| glycolate$^-$ | 4.25E-05 | 2.09 | 1.41 |
| acetate$^-$ | 4.03E-05 | 1.56 | 1.05 |
| oxalate$^{2-}$ | 4.56E-06 | 0.263 | 0.178 |
| DBP | 5.66E-05 | 10.0 | 6.67 |
| Butanol | 5.66E-05 | 2.79 | 1.86 |
| $NH_3$ | 9.37E-04 | 10.8 | 7.06 |
| $Fe(CN)_6^{4-}$ | 0 | 0 | 0 |
| **Radiological Constituents** | **Ci/L** | **$\mu$Ci/g** | **Ci[3]** |
| Pu | --- | 0.00950 | 0.107 (kg) |
| U | 0.00601 (M) | 938 ($\mu$g/g) | 633 (kg) |
| Cs | 0.0219 | 14.4 | 9,710 |
| Sr | 0.0172 | 11.3 | 7,630 |

Notes:

[1]These estimates have not been validated and should be used with caution.

[2]Agnew et al. (1996a)

[3]Small differences appear to exist among the inventories in this column and the inventories calculated from the two sets of concentrations. These differences are being evaluated.

## 2.4 SURVEILLANCE DATA

Tank 241-B-106 surveillance consists of surface level measurements (liquid and solid), temperature monitoring inside the tank (waste and headspace), and leak detection well (drywell) monitoring for radioactivity outside the tank. The data provide the basis for determining tank integrity.

Liquid level measurements can indicate whether a tank has leaked. Solid surface level measurements indicate physical changes and the consistency of the solid layers of a tank. Drywells around the tank perimeter may show increased radioactivity caused by leaks.

### 2.4.1 Surface Level Readings

Tank 241-B-106 waste surface level is monitored with a Food Instrument Corporation surface level gauge through riser 1. Manual field measurements will be conducted daily if the Food Instrument Corporation gauge fails. The maximum allowable deviation from the 98.9 cm (3.24 ft) baseline is a 5 cm (2 in.) increase or a 7.5 cm (3 in.) decrease. The surface level has remained steady from June 1985 to June 1996 with a low of 96.5 cm (3.16 ft), a high of 99.8 cm (3.27 ft), and an average of 99.3 cm (3.25 ft). An occurrence report was issued in 1978 when the liquid level fell below the decrease criterion. Figure 2-4 shows a volume history graph of the level measurements.

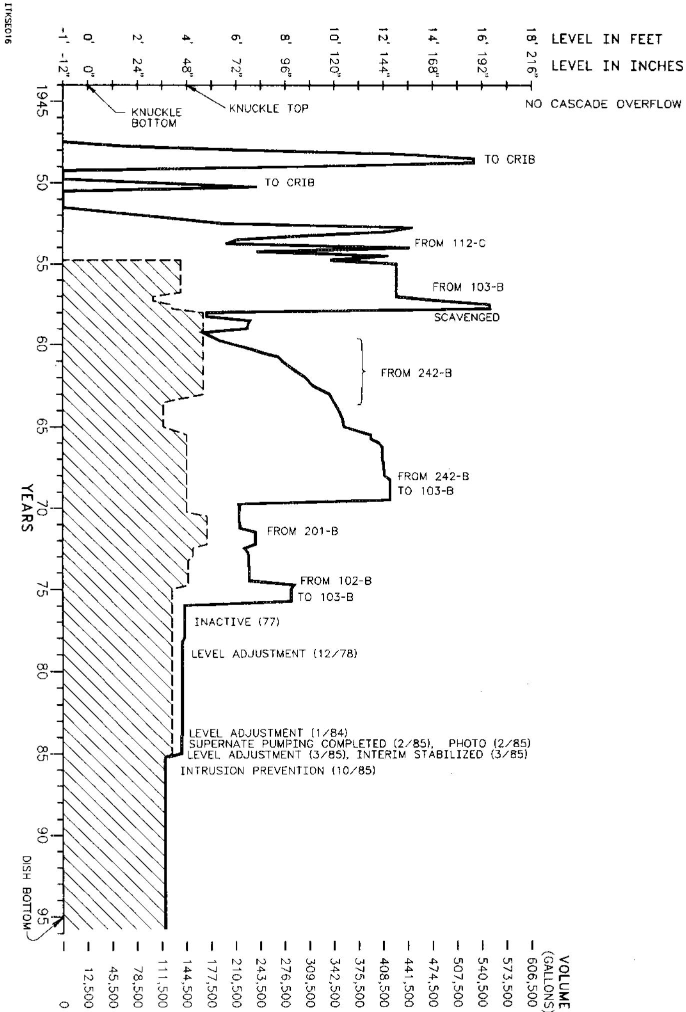
Tank 241-B-106 does not have a liquid observation well. Four drywells are identified for tank 241-B-106 (Brevick et al. 1994a).

### 2.4.2 Internal Tank Temperatures

Tank 241-B-106 has a single thermocouple tree in riser 4 with 13 thermocouples to monitor the waste temperature. Thermocouple 1 is 46.3 cm (1.52 ft) from the tank bottom tank. Thermocouples 2 through 12 are spaced at 60 cm (2 ft) intervals above thermocouple 1. The elevation for thermocouple 13 is unavailable. Tank 241-B-106 level history indicates that from September 1974 to January 1976, thermocouples 1 and 2 were in or near the solids level, thermocouples 3 and 4 were in or near the liquid level, and thermocouples 5 through 13 were in the headspace. After January 1976, thermocouples 1 and 2 were in or near the solids level, and the remainder of the thermocouples were in the headspace.

Thermocouples 1 and 2 have similar temperature data spanning 1974 to 1982. Thermocouples 3 through 12 have similar temperature data spanning the period 1974 to 1993. Thermocouple 13 has one recorded measurement taken in March 1980. There is a gap in the temperature readings from February 1984 to July 1989.

Figure 2-4. Tank 241-B-106 Level History.

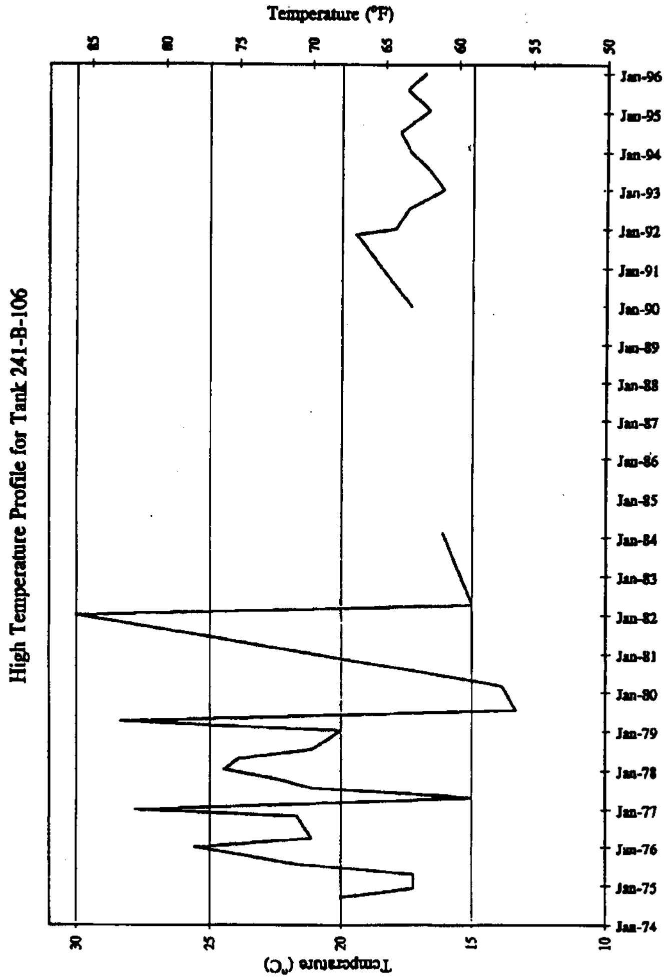


The Surveillance Analysis Computer Systems data from September 1974 to the present indicates the mean tank temperature is 18.3 °C (65 °F), the minimum is 6 °C (43 °F), and the maximum is 30 °C (86 °F). Tank 241-B-106 is a low-heat load tank and is scheduled to be monitored semiannually in January and July. Plots of the individual thermocouple readings are in Brevick et al. (1994a). Figure 2-5 shows a graph of the high temperature for available recordings. A review of thermocouple readings from the lowest elevation within the tank shows no abnormalities that exceed the range in Figure 2-5.

### 2.4.3 Tank 241-B-106 Photographs

Photographs of the interior of tank 241-B-106 from 1985 indicate a thin liquid surface over a reddish-brown sludge. The rest of the interior is a bluish color. Visible equipment in the photographs include spare inlet nozzles, a thermocouple tree, an old measurement tape, a Food Instrument Corporation level probe, spare nozzles, and a saltwell screen. The photographs were taken before the supernate was pumped from the tank; therefore, the pictures may not accurately represent the waste surface (Brevick et al. 1994a). Tank photographs are not included in this document because available photographs do not add value for interpretation of tank content.

Figure 2-5. Tank 241-B-106 High Temperature Plot.



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## 3.0 TANK SAMPLING OVERVIEW

This section describes the July 1995 sampling and analysis event for tank 241-B-106. Two push-mode core samples were taken to satisfy the requirements of the *Tank Safety Screening Data Quality Objective* (Babad et al. 1995), *Historical Model Evaluation Data Requirements* (Simpson and McCain 1995), and *Strategy for Sampling Hanford Site Tank Wastes for Development of Disposal Technology* (pretreatment DQO) (Kupfer et al. 1995). The SAP, *Tank 241-B-106 Push Core Sampling and Analysis Plan* (Conner 1996b), integrated the sampling and analytical requirements of these documents. Table 3-1 summarizes the requirements. For further information on the sampling and analysis procedures, refer to the *Tank Characterization Reference Guide* (DeLorenzo et al. 1994).

Table 3-1. Integrated Data Quality Objective Requirements for the July 1995 Sampling Event for Tank 241-B-106.[1]

| Applicable DQOs | Sampling Requirements | Primary Analytical Requirements |
|---|---|---|
| Safety screening (Babad et al. 1995) | Core samples from a minimum of two risers separated radially to the maximum extent possible.<br><br>Flammability monitoring done in tank headspace. | ▸ Energetics<br>▸ Moisture content<br>▸ Total alpha activity<br>▸ Bulk density<br>▸ Headspace gas flammability<br>▸ Visual check for presence of organic layer (liquids only) |
| Historical (Simpson and McCain 1995) | Isolation of a segment containing only one specified waste type (B salt cake) | ▸ Energetics<br>▸ Moisture content<br>▸ Bulk density<br>▸ Na by ICP (after both acid and water digestions)<br>▸ $F^-$, $NO_3^-$, and $PO_4^{3-}$ by IC<br>▸ $^{137}Cs$, $^{90}Sr$, total beta, and total U (by phosphorescence)<br>▸ TOC |
| Pretreatment (Kupfer et al. 1995) | Provide composite for process development work. | n/a |

Note:
[1]Conner (1996b)

## 3.1 DESCRIPTION OF SAMPLING EVENT

All core samples were taken using the push-mode core sampling method. Core 93 was taken from riser 2 on July 14, 1995. Core 94 was taken from riser 7 on July 18, 1995. No sampling anomalies were noted on the chain-of-custody forms (Conner 1996a). Both cores were shipped to the Westinghouse Hanford Company 222-S Laboratory. A field blank was produced and delivered with core 93.

On April 26, 1996, the flammability of the tank headspace was measured to address the vapor flammability issue of the safety screening DQO (Babad et al. 1995). Headspace gases were monitored with a combustible gas meter through riser 3.

Hydrostatic head fluid was used in conjunction with the core sampling. A tracer (lithium bromide) was added to the HHF to gauge HHF contamination of the segments. An HHF blank was produced and sent to the laboratory with core samples.

## 3.2 SAMPLE HANDLING

The core samples were extruded on July 18 and 19 at the 222-S Laboratory. Each core consisted of two segments. Segment 1, core 93 was the only segment that contained drainable liquid. The estimates for percent recovery were derived by dividing the length of sample recovered for each segment by the expected sample length (Conner 1996a). Table 3-2 describes the core samples.

Segments were subsampled for analysis in accordance with Conner (1996b). Both segments from each core were divided into upper and lower halves. The half segments were homogenized before aliquots were removed for analysis. Depending on the analysis, solids were analyzed directly or following fusion, acid, or water digestion. Fusion digestions were performed on the solids before the analysis for total alpha activity, $^{137}Cs$, $^{90}Sr$, total beta, and uranium (by phosphorescence). The ICP analyses were performed after both acid and water digestions. The drainable liquid was analyzed directly.

A composite of each core was made to support the requirements of the historical DQO. Aliquots of the composites were taken for analysis according to the historical DQO. To satisfy the pretreatment DQO, a tank composite was prepared and shipped for process development studies.

Table 3-2. Subsampling Scheme and Sample Descriptions.[1] (2 sheets)

| Seg. | Percent Recovery[2] (%) | Drill String Dose Rate (mR/hr) | Sample Weights Solid (g) | Sample Weights Liquid (g) | Subseg. | Sample Description |
|---|---|---|---|---|---|---|
| **Core 93 - Riser 2** | | | | | | |
| 1 | 58 | 320 | 287.6 | 84.20 | Drainable Liquids | Eleven in. of wet, brown, solids were recovered. The sample did not retain its shape but tended to sag and spread out on the tray. The lower ½ sample appeared lighter in color than the upper ½ sample. The liquid was light-brown. |
| | | | | | Upper ½ | |
| | | | | | Lower ½ | |
| 2 | 100 | 150 | 238.8 | 0 | Upper ½ | Nineteen in. of waste were recovered. The upper 13.5 in. were a brown sludge similar to the first segment solids. |
| | | | 95.7 | 0 | Lower ½ | The lower 5.5 in. appeared to be a light-green, creamy sludge. |
| **Core 94 - Riser 7** | | | | | | |
| 1 | 100 | 50 | 335.9 | 0 | Upper ½ | Nineteen in. of waste were recovered. The waste was a creamy, brown sludge which tended to sag and spread out on the tray. The upper ½ sample was 14 in. long. |
| | | | 87.8 | 0 | Lower ½ | The lower ½ sample was similar in appearance to the upper ½ except that it was a darker shade of brown. The segment was subsampled based on the color change. |

Table 3-2. Subsampling Scheme and Sample Descriptions.[1] (2 sheets)

| Seg. | Percent Recovery[2] (%) | Drill String Dose Rate (mR/hr) | Sample Weights Solid (g) | Sample Weights Liquid (g) | Subseg. | Sample Description |
|---|---|---|---|---|---|---|
| Core 94 - Riser 7 | | | | | | |
| 2 | 94 | 220 | 217.9 | 0 | Upper ½ | Sixteen in. of waste were recovered. The upper ½ sample was light brown and 11.5 in. long. |
| | | | 91.3 | 0 | Lower ½ | The lower ½ sample was 4.5 in. long and light-green color. |

Notes:

Seg. = segment
Subseg. = subsegment

[1]Conner (1995)

[2]The percent recoveries were estimated by dividing the recovered sample lengths by the expected sample lengths taken from the chain-of-custody records in Conner (1996a).

## 3.3 SAMPLE ANALYSIS

The analyses initially performed on the subsegments were those required by the safety screening DQO. They included measurements of the energetics by DSC, moisture content by TGA, total alpha activity by alpha proportional counting, and bulk density. A visual check for the presence of an organic layer was made on the drainable liquid. Lithium also was analyzed on the subsegments to determine whether there was HHF contamination.

Conner (1996b) was revised in February 1996 to include the requirements of the historical DQO. The required analyses included the following for the subsegments: bulk density determinations; ICP for sodium after an acid digestion; ICP for lithium and sodium after a water digestion; IC for fluoride, nitrate, and phosphate; GEA for $^{137}Cs$; beta proportional counting for $^{90}Sr$ and total beta; phosphorescence for total uranium; and direct persulfate oxidation for TOC. Results were obtained for many analytes not required by the applicable DQOs. These results, acquired on an opportunistic basis, included data from a full suite of metals, anions, and radionuclides (analyzed by GEA). Similarly, results for total inorganic carbon (TIC) were obtained during the TOC analysis. All analyses required by the historical DQO for the subsegments were performed on the core composites including DSC, TGA, and total alpha activity.

The pretreatment DQO also applied to the sampling event. However, no analyses were needed to meet the pretreatment DQO requirements.

In addition to core sample analyses, tank headspace flammability was measured using a combustible gas meter.

Laboratory quality control checks included, where appropriate, laboratory control standards, matrix spikes, duplicate analyses, and blanks. Section 5.1.2 assesses the quality control procedures and data.

All analyses were performed in accordance with approved laboratory procedures. Table 3-3 lists the sample numbers and applicable analyses. Table 3-4 lists the analytical procedures by title and number. Conner (1996a) noted that for the lower half sample of segment 1 of core 93, insufficient material was available to perform a density measurement. No other deviations or modifications were noted by the laboratory.

Table 3-3. Summary of Samples and Analyses. (3 sheets)

| Core | Seg. | Segment Portion | Labcore Number | Analyses |
|---|---|---|---|---|
| 93 | 1 | Upper ½ | S95T001278 | DSC, TGA |
| | | | S95T001279 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001288 | Bulk density |
| | | | S96T001199 | ICP (acid) |
| | | | S96T001210 | ICP (water) |
| | | | S96T001200 | IC |
| | | | S96T001198 | TIC, TOC |
| | | Lower ½ | S95T001275 | DSC, TGA |
| | | | S95T001277 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001274 | Bulk density |
| | | | S96T001214 | ICP (acid) |
| | | | S96T001221 | ICP (water) |
| | | | S96T001216 | IC |
| | | | S96T001212 | TIC, TOC |
| | | DL | S95T001272 | DSC, TGA, Li (ICP) |

Table 3-3. Summary of Samples and Analyses. (3 sheets)

| Core | Seg. | Segment Portion | Labcore Number | Analyses |
|---|---|---|---|---|
| Cont. | 2 | Upper ½ | S95T001284 | DSC, TGA |
| | | | S95T001282 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001283 | Bulk density |
| | | | S96T001228 | ICP (acid) |
| | | | S96T001222 | ICP (water) |
| | | | S96T001244 | IC |
| | | | S96T001225 | TIC, TOC |
| | | Lower ½ | S95T001281 | DSC, TGA |
| | | | S95T001285 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001289 | Bulk density |
| | | | S96T001229 | ICP (acid) |
| | | | S96T001223 | ICP (water) |
| | | | S96T001245 | IC |
| | | | S96T001226 | TIC, TOC |
| Core 93 composite | | | S96T001227 | DSC, TGA, TIC, TOC |
| | | | S96T001220 | Alpha, GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S96T001292 | Bulk density |
| | | | S96T001230 | ICP (acid) |
| | | | S96T001224 | ICP (water) |
| | | | S96T001246 | IC |
| 94 | 1 | Upper ½ | S95T001302 | DSC, TGA |
| | | | S95T001303 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001301 | Bulk density |
| | | | S96T001240 | ICP (acid) |
| | | | S96T001255 | ICP (water) |
| | | | S96T001247 | IC |
| | | | S96T001236 | TIC, TOC |
| | | Lower ½ | S95T001298 | DSC, TGA |
| | | | S95T001299 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001300 | Bulk density |
| | | | S96T001241 | ICP (acid) |
| | | | S96T001256 | ICP (water) |
| | | | S96T001248 | IC |
| | | | S96T001237 | TIC, TOC |

Table 3-3. Summary of Samples and Analyses. (3 sheets)

| Core | Seg. | Segment Portion | Labcore Number | Analyses |
|---|---|---|---|---|
| Cont. | 2 | Upper ½ | S95T001310 | DSC, TGA |
| | | | S95T001311 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001309 | Bulk density |
| | | | S96T003625 | ICP (acid) |
| | | | S96T003627 | ICP (water) |
| | | | S96T003626 | IC |
| | | | S96T003624 | TIC, TOC |
| | | Lower ½ | S95T001306 | DSC, TGA |
| | | | S95T001307 | Alpha, Li (ICP), GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S95T001308 | Bulk density |
| | | | S96T001243 | ICP (acid) |
| | | | S96T001258 | ICP (water) |
| | | | S96T001250 | IC |
| | | | S96T001239 | TIC, TOC |
| Core 94 composite | | | S96T001644 | DSC, TGA, TIC, TOC |
| | | | S96T001647 | Alpha, GEA, $^{90}$Sr, beta, U (phos.) |
| | | | S96T001314 | Bulk density |
| | | | S96T001645 | ICP (acid) |
| | | | S96T001648 | ICP (water) |
| | | | S96T001646 | IC |
| Vapor tests: tank headspace | | | n/a | Combustible gas meter readings for headspace flammability |

Notes:

DL = drainable liquid
n/a = not applicable
phos. = phosphorescence

Table 3-4. Analytical Procedures.[1] (2 sheets)

| Analyte | Method | Preparation Procedure | Analytical Procedure |
|---|---|---|---|
| Energetics | DSC: Mettler[1] Perkin-Elmer[2] (composites only) | n/a | LA-514-113, Rev. B-1 or LA-514-114, Rev. C-1 |
| Percent water | TGA: Mettler™ Perkin-Elmer™ (composites only) | n/a | LA-560-112, Rev. A-2 or LA-514-114, Rev. C-1 |
| Total alpha activity | Alpha proportional counting | LA-549-141, Rev. D-0 (fusion digest) | LA-508-101, Rev. D-2 |
| Bulk density | Centrifugation | n/a | LO-160-103, Rev. B-0 |
| TOC | Persulfate/coulometry | n/a | LA-342-100, Rev. D-0 |
| Metals | ICP | For the solids: LA-505-149, Rev. D-0 (acid digest) LA-504-101, Rev. E-0 (water digest); Lithium was also analyzed after a fusion digest (LA-549-141 Rev. D-0); Direct on the drainable liquid. | LA-505-151, Rev. A-1 LA-505-161, Rev. A-1 (these analytical methods are equivalent and were used interchangeably) |
| Anions | IC | LA-504-101, Rev. E-0 (water digest) | LA-533-105, Rev. D-1 |
| Total beta activity | Beta proportional counting | LA-549-141, Rev. D-0 (fusion digest) | LA-508-101, Rev. D-2 |
| Uranium | Phosphorescence | LA-549-141, Rev. D-0 (fusion digest) | LA-925-009, Rev. A-1 |
| $^{89/90}Sr$ | Beta proportional counting | LA-549-141, Rev. D-0 (fusion digest) | LA-220-101, Rev. D-1 |

[1]Mettler is a trademark of Mettler Electronics, Anaheim California.

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

Table 3-4. Analytical Procedures.[1] (2 sheets)

| Analyte | Method | Preparation Procedure | Analytical Procedure |
|---|---|---|---|
| $^{137}Cs$ | Gamma energy analysis | LA-549-141, Rev. D-0 (fusion digest) | LA-548-121, Rev. E-0 |
| Headspace flammability | Combustible gas meter readings | n/a | WHC-IP-0030 IH 1.4 and IH 2.1 |

Notes:

Rev. = revision

[1]Conner (1996 and 1995)

## 3.4 DESCRIPTION OF HISTORICAL SAMPLING EVENTS

Information was available from only one historical sampling event for tank 241-B-106. A sample of the supernate was taken on October 6, 1975 (Wheeler 1975). The sampling method was probably the "bottle-on-a-string" method. Additional information concerning the sampling and analysis event was not available for the sampling riser, sampling depth, sample handling, and analytical procedures. As discussed in Section 5.2, no comparisons between the results of this sampling event and the 1995 core sampling event have been made. The results from the 1975 sampling event are provided in Appendix C.

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# 4.0 ANALYTICAL RESULTS

This section summarizes the analytical results associated with the July 1995 core sampling of tank 241-B-106. The sampling and analysis parameters governing this event were described in Section 3.0. Analysis of the core samples was performed at the Westinghouse Hanford Company 222-S Laboratory.

Table 4-1 shows the data locations for this tank characterization report. The complete analytical data set is in Appendix A. Section 4.0 reports only analyte overall means. Appendix B contains the data for lithium and bromide, the analytes evaluated to estimate the amount of HHF contamination.

Table 4-1. Analytical Data Presentation Tables.

| Data Type | Table |
|---|---|
| Chemical data summary | Table 4-2 |
| Comprehensive analytical data | Appendix A |
| Hydrostatic head fluid contamination check data | Appendix B |
| Historical sampling data | Appendix C |

## 4.1 DATA PRESENTATION

The analytical results from the July 1995 sampling of tank 241-B-106 were taken from the *Final Report for Tank 241-B-106, Push-Mode Core Samples 93 and 94* (Conner 1996a). Sections 4.1.1, 4.1.2, 4.1.3, and 4.1.4 provide the chemical data, physical data, headspace flammability results, and HHF contamination check results, respectively.

### 4.1.1 Chemical Data Summary

It is apparent that the lower half segments of each core have analytical values significantly different from the upper one and one-half segments of the core. To more accurately represent the inventories, the two "layers" were separated in the summary. Table 4-2 lists concentration estimates and inventories. All information in Table 4-2 was taken from Appendix A tables and adjusted to reflect the contribution of the two separate layers. Table 4-2 has been formatted to display mean values for each layer which are then weighted to provide a projected inventory. The mass of each layer is determined by using standard conventions for waste tanks found in Brevick (1994b), that is, there are 2,750 gallons waste per inch within the tank and roughly 12,500 gallons waste in the (unmeasured) heel of tank 241-B-106. When the top layer is assigned a depth of 28.5 in. (one and one half 19 in. segments), a total mass is derived as shown below:

28.5 in. x 2,750 gal/in. x 3.785 L/gal x 1,000 mL/L x 1.362 g/mL = 4.04E+08 g

When the projected 12,500 gallon volume of the tank heel is added to the 9.5 in. (one-half segment of waste for the bottom layer, the following is obtained:

[(9.5 in. x 2,750 gal/in.) + 12,500 gal] x 3.785 L/gal x 1,000 mL/L x 1.415 = 2.07E+08 g

Table 4-2, column 1 lists the major analytes and the analytes of concern for tank 241-B-106. Columns 2 and 3 show the data from the top three half segments for each core. Columns 4 and 5 show the data from the lower one-half segment of each core. Data from the two layers were combined in proportion to their respective masses to derive overall estimates of total inventory. The ICP analysis was performed after acid and water digestions. Only the means based on the acid data are shown; means based on the water digestion data are shown in Appendix A. The only exceptions are for the potassium, silicon, and silver results. For potassium and silver, the water digest results were reported instead of the acid digest results because the acid digest results were nondetected. For silicon, the water digest results were reported because they were nearly 50 percent larger than the acid digest results. This is an anomaly, because acid digest results for silicon are usually higher than water digest results. However, because the silicon analyses are opportunistic only, no investigative analyses will be performed. Silicon is not a major contributor to the tank waste.

Only three analyses were performed on the drainable liquid recovered from segment 1 of core 93, and a mean was calculated based on those results for only one analyte (weight percent water). The results from the drainable liquid TGA were averaged together with the solids TGA results to derive the weight percent water mean for this segment. This averaging was based on weighting factors. The weighting factors, which were derived from the recovered masses of solids and liquid from the segment, included 1) solids = 77.4 percent, and 2) liquids = 22.6 percent (see Appendix A).

### 4.1.2 Physical Data Summary

The physical analyses required by the safety screening and historical DQOs included DSC, TGA, and a bulk density determination. In addition, a visual examination was made of the drainable liquid from segment 1 of core 93 for the presence of an organic layer.

Table 4-2. Major Analytes and Analytes of Concern. (2 sheets)

| Metals | Top Layer | | Bottom Layer | | Projected Inventory[1] |
|---|---|---|---|---|---|
| | Mean (μg/g) | RSD (%) | Mean (μg/g) | RSD (%) | kg |
| Al | 1,506 | 19.3 | 13,725 | 15.8 | 3,450 |
| Bi | 807 | 42.4 | 19,425 | 4.68 | 4,350 |
| Ca | 2,414 | 29.9 | 319 | 3.17 | 1,040 |
| Cr | 217 | 22.4 | 734 | 12.0 | 240 |
| $CO_3^{2-}$ (TIC) | 329 | 3.85 | 253 | 8.39 | 185 |
| Fe | 18,426 | 13.5 | 8,220 | 6.57 | 9,150 |
| Pb | 367 | 11.2 | 274 | 53.7 | 205 |
| Mn | 189 | 43.3 | 30.4 | 5.68 | 83 |
| Ni | 70.7 | 25.1 | 18.4 | 15.8 | 32 |
| Si | 1,519[2] | 13.8 | 4,437[2] | 9.52 | 1,530 |
| Na | 106,690 | 8.07 | 121,250 | 1.70 | 68,200 |
| Sr | 508 | 19.1 | 153 | 8.02 | 237 |
| U | 16,369 | 26.3 | 3,322 | 55 | 7,300 |
| **Anions** | **Mean (μg/g)** | **RSD (%)** | **Mean (μg/g)** | **RSD (%)** | **kg** |
| Chloride | 1,533 | 19.8 | 1472 | 22.9 | 924 |
| Fluoride | 1,543 | 32.6 | 10,145 | 13.9 | 2,720 |
| Nitrate | 194,830 | 6.50 | 170,000 | 1.5 | 114,000 |
| Nitrite | 7,837 | 10.2 | 6,650 | 3.61 | 4,540 |
| Phosphate | 75,651 | 14.7 | 67,080 | 13.8 | 44,440 |
| Sulfate | 14,841 | 5.4 | 13,975 | 2.55 | 8,890 |
| **Radionuclides** | **Mean (μCi/g)** | **RSD (%)** | **Mean (μCi/g)** | **RSD (%)** | **Ci** |
| $^{137}Cs$ | 22.2 | 34.2 | 12.1 | 5.30 | 11,500 |
| $^{90}Sr$ | 88.0 | 14.4 | 5.91 | 17.3 | 36,800 |
| ($^{239/240}Pu$) | Not Detected[3] | nc | 0.057 [3] | 7.19 | 11.8[4] |

Table 4-2. Major Analytes and Analytes of Concern. (2 sheets)

| Carbon | μg C/g | RSD (%) | μg C/g | RSD (%) | kg C |
|---|---|---|---|---|---|
| TOC | 2,405 | 81.2 | 207.5 | 20.3 | 1,010 |
| **Other** | **g/mL** | **RSD (%)** | **g/mL** | **RSD (%)** | |
| Density | 1.36 | nc | 1.415 | nc | na |
| % Water | 62.4 wt % | 1.66 | 56.8 wt % | 0.50 | 60.6% |

Notes:

nc = not calculated
na = not applicable

[1]Inventory values are based on 4.04E+08 grams top layer and 2.07E+08 grams bottom layer.

[2]The data are from ICP water digestion.

[3]The data were analyzed as total alpha.

[4]The inventory was derived using bottom layer data only.

**4.1.2.1 Thermogravimetric Analyses.** During a TGA, the mass of a sample is measured while it is heated 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 represents a loss of gaseous matter from the sample through evaporation or through a reaction that forms gas phase products. The moisture content is estimated by assuming that all TGA sample weight loss up to a certain temperature (typically 150 to 200 °C) is caused by water evaporation. Thermogravimetric analysis was performed directly on the solids subsegments, drainable liquid sample, and core composites.

The TGA results for tank 241-B-106 are shown in Table A-60. All samples exhibited a large weight loss between ambient temperature and approximately 200 °C. This weight loss is attributed to water evaporation. Only one transition was displayed in all but one TGA scan. Two transitions were exhibited for the primary run on sample S95T001281. Because both occurred below 150 °C, their weight losses were summed to derive the sample weight percent water mean. The overall mean percent water for the tank waste was 60.8 weight percent.

**4.1.2.2 Differential Scanning Calorimetry**. During a DSC analysis, heat absorbed or emitted by a substance is measured while the substance is heated at a constant rate. As the substance is being heated, nitrogen is passed over the waste material to remove any gases being released. The onset temperature for an endothermic (characterized by or causing the absorption of heat) or an exothermic (characterized by or causing the release of heat) event is measured with thermocouples and displayed graphically.

Differential scanning calorimetry was performed on all solids subsegments, the drainable liquid sample, and core composites. The DSC results (wet weight basis) are shown in Table A-59. The peak temperature and maximum enthalpy change are given for each transition. No exothermic reactions were found. Two endothermic transitions were exhibited for all samples except one, sample S96T001644 (core 94 composite), which had a third transition.

**4.1.2.3 Density**. Density measurements were performed on all but one solid subsegment and both core composites. For the lower half of segment 1 of core 93, insufficient material was available to determine the density (Conner 1996a). The density values ranged from 1.33 g/mL to 1.43 g/mL for the subsegments, with an overall mean of 1.38 g/mL. Both core composites exhibited a density of 1.34 g/mL. Density data are shown in Table A-61.

**4.1.2.4 Visual Check for an Organic Layer**. The drainable liquid sample was visually inspected for a separable organic layer as required by the safety screening DQO. No separable organic layer was observed.

### 4.1.3 Headspace Flammability Screening Results

The flammability of the tank 241-B-106 headspace was monitored inside riser 3 with a combustible gas meter as required by the safety screening DQO. The notification limit for headspace flammability is 25 percent of the LFL. The combustible gas meter reports results as a percent of the lower explosive limit. Because the National Fire Protection Association (NFPA) defines the terms LFL and lower explosive limit identically, the two terms may be used interchangeably (NFPA 1995). The reported LFL of 0 percent was well below the safety screening limit. In addition, the concentrations of oxygen (20.9 percent), total organic vapors (0 ppm), and ammonia (0 ppm) were determined. Testing was performed on April 26, 1996.

### 4.1.4 Hydrostatic Head Fluid Contamination Check

Water was used as an HHF during the 1995 core sampling event. Lithium bromide was added to the HHF as a tracer. It presence in the core samples would indicate HHF contamination. According to Conner (1996b), the primary analysis for the contamination check was lithium. Lithium was analyzed by ICP, and no result exceeded the 100 $\mu$g/g threshold. Because lithium was not found in quantities above the threshold, bromide was not analyzed specifically for contamination check purposes. However, results for bromide were obtained during the IC analysis. Comparison of bromide results to the 1,200 $\mu$g/g contamination check limit did not reveal any significant contamination. All results were below the limit. Therefore, the analytical results show that no significant contamination of the segments occurred from the HHF. The analytical results for lithium and bromide were not included in Table 4-2 because they are not constituents of the tank waste. The results are in Appendix B.

# 5.0 INTERPRETATION OF CHARACTERIZATION RESULTS

This section discusses the overall quality and consistency of current analytical results for tank 241-B-106, and it assesses and compares these results against historical information and program requirements.

## 5.1 ASSESSMENT OF SAMPLING AND ANALYTICAL RESULTS

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

### 5.1.1 Field Observations

The safety screening DQO objective, that vertical profiles of the waste be obtained from at least two widely spaced risers, was fulfilled. No problems with the sampling event were noted on the chain-of-custody forms (Conner 1996a). Hydrostatic head fluid was used during the acquisition of the core samples. No HHF contamination of the samples was found. Recoveries were nearly 100 percent except for segment 1 of core 93, which had a recovery of 58 percent. No issues were found which would impact data usability.

### 5.1.2 Quality Control Assessment

The usual quality control assessment includes evaluating appropriate standard recoveries, matrix spike recoveries, duplicate analyses, and blanks that are performed in conjunction with the chemical analyses. All pertinent quality control tests were conducted on the 1995 core samples, enabling a full assessment of data accuracy and precision. The SAP (Conner 1996b) established the specific criteria for all quality control checks.

Revision 0 of the SAP contained the sampling and analytical requirements for the safety screening analyses. It dictated the quality control limit for standards and spikes would be 90 to 110 percent recovery, and the quality control limit for duplicate analyses would be 10 percent relative percent difference (RPD). The SAP was revised in February 1996 to include the historical DQO analyses. For quality control limits for these analyses, the SAP deferred to the *Hanford Analytical Services Quality Assurance Plan* (DOE 1995). Only the primary analytes required by the historical DQO were reviewed for adherence to the quality control parameters. Analyte results obtained on an opportunistic basis were not investigated for quality control compliance (Conner 1996b). Quality control results outside their respective criteria are identified by superscripts in Appendix A tables. The quality control results are summarized below.

Standard and matrix spike recovery results estimate 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. Standard recoveries for all analytes were within the defined criteria except for total alpha activity and sodium. Although one of four total alpha activity standards was slightly below the SAP quality control limits, no reruns were considered necessary because it was within the laboratory internal limits (DOE 1995). Furthermore, the analytical results were far below established action limits (Conner 1995). Because sodium is a pervasive analyte, the high standard recoveries for the acid-digested samples were not considered unusual, and no reruns were initiated (Conner 1996a). The total alpha activity analysis on the two core composite samples had spikes below the quality control limits. Low total alpha activity spike recoveries are common because of difficulties in preparing the sample mount which can cause self-shielding. Fluoride, sodium, uranium, and TOC also had minor spike recovery deviations. These exceptions were discussed with the historical DQO point of contact, and no reruns were requested. The small deviations should not impact data quality.

Analytical 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. Total organic carbon had two samples with RPD values above the criterion of 20 percent. No reruns were initiated because all results were below the programmatic action limit of 30,000 $\mu$g C/g (Conner 1996a). Fluoride, nitrate, phosphate, sodium, uranium, and TOC displayed minor RPD deviations, possibly influenced by sample heterogeneity problems. Again, these deviations were discussed with the historical DQO point of contact and were determined inconsequential. Finally, no sample exceeded the criteria for preparation blanks; therefore, contamination was not a problem for any analyte.

In summary, almost all quality control results were within the boundaries specified in the SAP (Conner 1996b). The few discrepancies should not impact data validity or use.

### 5.1.3 Data Consistency Checks

Comparing different analytical methods is helpful in assessing data consistency and quality. Close agreement strengthens the credibility of results, and poor agreement brings the reliability of the data or assumptions about the data into question. Several comparisons were made: total beta activity to the sum of the individual emitters, the ICP phosphorus result to the IC phosphate number, and the ICP sulfur value to the IC sulfate result. Mass and charge balances also were calculated.

**5.1.3.1 Comparison of Results from Different Analytical Methods.** Table 5-1 compares total beta activity mean to the sum of the activity means of the individual beta emitters. Only the results for the beta-emitting radionuclides present in detectable quantities were used. The sum of activities of individual beta emitters was determined by adding the $^{137}$Cs and $^{89/90}$Sr activities.

Because $^{89/90}Sr$ is in equilibrium with its daughter product $^{90}Y$, the $^{89/90}Sr$ activity must be multiplied by 2 to account for all major beta emitters. The total beta activity result indicates the sum of the beta emitters should be approximately 154 $\mu$Ci/g because the sum of individual beta emitters should be equal to total beta activity emitted. The two values agreed well as evidenced by the ratio of 1.02.

Table 5-1. Comparison of Total Beta Activity With the Sum of the Individual Activities.

| Analyte | Overall Mean ($\mu$Ci/g) |
|---|---|
| $^{137}Cs$ | 19.7 |
| $^{89/90}Sr$ | 68.7 * 2 = 137.4 |
| Sum of beta emitters | 157.1 |
| Total beta activity | 154 |
| Ratio | 1.02 |

Table 5-2 compares the ICP phosphorus and sulfur concentration means to the IC phosphate and sulfate concentration means. The ICP acid digest phosphorus result was 23,800 $\mu$g/g. The IC phosphate value of 28,600 $\mu$g/g, which is a measurement of the water soluble phosphorus in the form of phosphate, converted to 9,330 $\mu$g/g of phosphorus. The ratio between these two values (IC/ICP) was 0.392, or 39.2 percent soluble. The calculated 9,330 $\mu$g/g value was consistent with the ICP water digest phosphorus result of 9,740 $\mu$g/g. These results demonstrate that 1) all phosphorous can be accounted for by phosphate, and 2) a large portion of the phosphorus (approximately 60 percent) exists in an insoluble form that was not detected by the IC analysis.

The IC sulfate value of 14,700 $\mu$g/g, which represents soluble sulfur in the form of sulfate, was equivalent to 4,910 $\mu$g/g of sulfur. The ICP result for total sulfur was 5,470 $\mu$g/g, yielding a ratio of 1.11 between the two sulfur numbers. In addition, the ICP water digest sulfur mean was 5,440 $\mu$g/g. Consequently, it appears that all sulfur is present as soluble sulfate.

Table 5-2. Comparison of Phosphorus and Sulfur Concentrations With the Equivalent Concentrations of Phosphate and Sulfate.

| Analyte | Overall Mean ($\mu$g/g) |
|---|---|
| **Phosphorus** | |
| Measured mean water soluble phosphorus concentration | 9,740 (additional information shows phosphorus solubility is approximately 39 to 41%) |
| Phosphorus concentration from phosphate | 9,330 |
| Ratio | 1.04 |
| **Sulfur** | |
| Measured mean sulfur concentration | 5,470 |
| Sulfur concentration from sulfate | 4,910 |
| Ratio | 1.11 |

**5.1.3.2 Mass and Charge Balances.** The primary objective in performing mass and charge balances is to determine whether measurements are consistent. When calculating the balances, only Table 4-2 analytes, which were detected at a concentration of 3,000 $\mu$g/g (0.3 weight percent) or greater, were considered.

Table 5-3 shows the cation mass and charge data. This determination uses the overall mass data rather than layered mass data. The difference is not significant. Based on the ICP phosphorus and IC phosphate comparison (see Section 5.1.3.1), it was determined that approximately 60 percent of the phosphorus existed in an insoluble form, and 40 percent existed as soluble phosphate. The insoluble phosphorus was assumed to be present in the following compounds: $BiPO_4$, $FePO_4$, and $Na_3PO_4$. The amount of sodium expected in the $Na_3PO_4$ species was consistent with the insoluble sodium concentration derived from the difference between the acid digest sodium mean and the water digest sodium mean. Because precipitates are neutral species, all positive charge was attributed to the sodium portion existing in a soluble form (97,400 $\mu$g/g). Aluminum was assumed to be present as $Al(OH)_3$, and uranium was assumed to be present as $U_3O_8$. The anions listed in Table 5-4 were assumed to be present as sodium salts and were expected to balance the positive charge exhibited by sodium. Based on the ICP sulfur and IC sulfate comparison, sulfur was assumed to be present as the soluble sulfate ion. The concentrations of cations in Table 5-3, the sum of the anions in Table 5-4, and the percent water estimate were used to calculate the mass balance in Table 5-5. The uncertainty estimates (relative standard deviations [RSDs]) associated with each analyte also are given in the tables. The uncertainty estimates for the cation and anion totals and the overall uncertainty given in Table 5-5 were computed by a statistical technique known as the propagation of errors (Nuclear Regulatory Commission 1988).

Table 5-3. Cation Mass and Charge Data.

| Analyte | Concentration (μg/g) | Assumed Species | Concentration of Assumed Species (μg/g) | RSD (Mean) (%) | Charge (μeq/g) |
|---|---|---|---|---|---|
| Aluminum | 4,570 | $Al(OH)_3$ | 13,200 | 39.3 | --- |
| Bismuth[1] | 5,330 | $BiPO_4$ | 7,750 | 54.8 | --- |
| Iron[1] | 15,200 | $FePO_4$ | 41,100 | 9.92 | --- |
| Sodium[1,2] | 109,000 | $Na_3PO_4$ | 27,600 | 6.75 | --- |
| | | $Na^+$ | 97,400 | | 4,230 |
| Uranium | 11,800 | $U_3O_8$ | 13,900 | 23.6 | --- |
| Total | | | 201,000 | 6.0 | 4,230 |

Notes:

[1]A mean of 23,800 μg/g of phosphorus was found in the tank. Of that amount, 9,330 μg/g were in the form of soluble phosphate (see Section 5.1.3.1). Another 790 μg/g were assumed to exist as $BiPO_4$ and 8,450 μg/g were predicted to exist as the compound $FePO_4$. The remaining 5,230 μg/g was assumed to exist as $Na_3PO_4$. The amount of sodium present in this compound was consistent with the insoluble sodium portion derived by subtracting the ICP water digest sodium mean from the ICP acid digest sodium mean.

[2]The total amount of sodium was 109,000 μg/g. The insoluble portion was calculated to be 11,600 μg/g; the remaining 97,400 μg/g was assumed to be soluble.

Table 5-4. Anion Mass and Charge Data.

| Analyte | Concentration (μg/g) | Assumed Species | Concentration of Assumed Species (μg/g) | RSD (Mean) (%) | Charge (μeq/g) |
|---|---|---|---|---|---|
| Fluoride | 3,490 | $F^-$ | 3,490 | 46.5 | -184 |
| Nitrate | 189,000 | $NO_3^-$ | 189,000 | 5.37 | -3,050 |
| Nitrite | 7,540 | $NO_2^-$ | 7,540 | 8.07 | -164 |
| Phosphate | 28,600 | $PO_4^{-3}$ | 28,600 | 14.6 | -903 |
| Sulfate | 14,700 | $SO_4^{-2}$ | 14,700 | 4.63 | -306 |
| Total | | | 243,000 | 4.6 | -4,610 |

Table 5-5. Mass Balance Totals.

| Totals | Concentrations ($\mu$g/g) | Charge Balances $\mu$eq/g |
|---|---|---|
| Cation Total from Table 5-3 | 201,000 | 4,230 |
| Anion Total from Table 5-4 | 243,000 | -4,610 |
| Water | 608,000 | 0 |
| Grand Total | 1,050,000 | -380 |

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

Mass balance = Percent water + 0.0001 x [total analyte concentration]
= Percent water + 0.0001 x [$Al(OH)_3$ + $BiPO_4$ + $FePO_4$ + $Na_3PO_4$ + $Na^+$ + $U_3O_8$ + $F^-$ + $NO_3^-$ + $NO_2^-$ + $PO_4^{3-}$ + $SO_4^{2-}$]

The total analyte concentration calculated from the above equation is 444,000 $\mu$g/g. The mean weight percent water obtained from thermogravimetric analysis reported in Table 4-2 is 60.8 percent, or 608,000 $\mu$g/g. The mass balance resulting from adding the percent water to the total analyte concentration is 105 percent (see Table 5-5).

The following equations derive total cations and total anions. The charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 0.92. Only the assumed soluble species are used.

Total cations ($\mu$eq/g) = [$Na^+$](soluble only)/23.0 = 4,230 $\mu$eq/g

Total anions ($\mu$eq/g) = [$F^-$]/19.0 + [$NO_3^-$]/62.0 + [$NO_2^-$]/46.0 + [$PO_4^{3-}$](soluble only)/31.7 + [$SO_4^{2-}$]/48.1 = 4,610 $\mu$eq/g

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

## 5.2 COMPARISON OF HISTORICAL AND RECENT ANALYTICAL RESULTS

No comparisons have been made between the results of the 1975 sampling event and the current sampling results. A supernate sample was obtained in 1975; the 1995 core sampling event yielded primarily solids. Only DSC, TGA, and a lithium analysis were performed on the drainable liquid from the 1995 core sampling event. In addition, at the time of the 1975 sampling, tank 241-B-106 contained approximately 605 kL (160 kgal) of supernate (Agnew et al. 1996b). Since that time, the tank has been interim stabilized and saltwell pumped, and the supernate volume has been reduced to 4 kL (1 kgal).

## 5.3 TANK WASTE PROFILE

According to the estimate reported in Hanlon (1996), tank 241-B-106 contains 439 kL (116 kgal) of sludge and 0 kL (0 kgal) of saltcake. This estimate contradicts the TLM, which predicts that the 439 kL (116 kgal) of solid waste is B saltcake (Conner 1996b). Both sources predict a supernate layer of 4 kL (1 kgal).

The extruded waste appeared like a wet sludge instead of crystalline saltcake. Much of the waste did not retain its shape upon extrusion. These observations support the Hanlon waste matrix prediction. However, the historical DQO evaluation demonstrated, with one exception, that subsegment results for the fingerprint analytes met the concentration levels that indicate B saltcake waste.

The visual descriptions between the two cores were similar indicating horizontal homogeneity. However, drainable liquid was found only in segment 1 of core 93. The visual descriptions within cores were similar except that the lower half of segment 2 of each core was different in color. The bottom 12.7 cm (5 in.) were a light green color and the remaining waste was brown.

An inspection of the subsegment data for concentration differences between the lower half subsegment of segment 2 and the rest of the tank yielded the following results (see Table 5-6). Substantial differences existed in the concentration for some analytes. This evidence and the visual descriptions between and within cores, strongly suggest that a waste type other than B saltcake makes up the bottom 12.7 cm (5 in.) of waste, or that the assumptions regarding the formation of the saltcake were oversimplified or incomplete.

Table 5-6 compares differences in analyte concentration as a function of depth for selected analytes. A random effects analysis of variance (ANOVA) model was fit to the concentration data from the cores and subsegments. The results from these models were used to judge vertical variability in the mean analyte concentration. P-values, derived from the ANOVA computation, were compared to a standard significance level ($\alpha = 0.05$). The results support the observed differences between subsegments. This result suggests variation as a function of depth, and not the homogeneity indicated in Agnew et al. (1996a).

Table 5-6. Comparison of Subsegment Results.

| Analyte | Concentration Range Bottom Layer: Cores 93 and 94 Segment 2-Lower Half ($\mu$g/g) | Concentration Range Top Layer: Cores 93 and 94 Segment 1- Both Halves; Segment 2-Upper Half ($\mu$g/g) | Subsegment Level p-Value | Typical Concentration for B Saltcake ($\mu$g/g) |
|---|---|---|---|---|
| Al | 10,500 to 18,400 | 433 to 2,450 | 1.99E-05 | 3,930 |
| Bi | 17,200 to 21,100 | 181 to 2,100 | 1.91E-07 | 6,300 |
| Ca | 296 to 336 | 688 to 4,930 | 5.42E-07 | 2,380 |
| Fe | 6,990 to 9,410 | 13,200 to 31,900 | 1.75E-03 | 7,490 |
| F | 6,080 to 12,300 | 494 to 2,840 | 1.25E-03 | 1,970 |
| Si | 551 to 7,110 | 347 to 1,330 | 6.74E-04 | 580 |
| U | 1,580 to 3,300 | 7,600 to 22,200 | 2.38E-04 | 940 |
| Sr-90 | 4.73 to 7.42 $\mu$Ci/g | 58 to 119 $\mu$Ci/g | 2.80E-10 | 11.3 |

This evidence and the visual differences observed in the segments implies that the waste is heterogeneous, with potentially two (or more) waste types layered on top of each other. Additionally, the waste type predicted by Agnew et al. (1996a) may not be one of the waste types present, or assumptions in the historical TLM model may not be sufficient to describe the spatial arrangement of the waste. Plausible waste types for the lower half of segment 2 are first cycle waste or second cycle waste. Plausible waste types for the remainder of the waste are uranium recovery waste or B saltcake.

## 5.4 COMPARISON OF TRANSFER HISTORY WITH ANALYTICAL RESULTS

Table 5-7 compares the Agnew et al. (1996a) estimates of tank contents to the analytical results from the 1995 core sampling event. The Agnew et al. values are generated using a combination of several data sources (see Section 2.3.2). Each data source contains assumptions and/or other factors (such as transfers of an unknown waste type into the tank)

Table 5-7. Comparison of Agnew et al. Predictions With 1995 Analytical Results. (2 sheets)

| Analyte | Agnew et al. Estimate[1] | Overall Tank Inventories[2] | RPD | Ratio of Analytical Derived Inventories to Historical Derived Inventories |
|---|---|---|---|---|
| **METALS** | **kg** | **kg** | **%** | **unitless** |
| Aluminum | 2,670 | 3,370 | 23.3 | 1.29 |
| Bismuth | 4,230 | 4,230 | 0.09 | 1.03 |
| Calcium | 1,600 | 1,050 | 41.4 | 0.65 |
| Iron | 5,030 | 9,190 | 58.5 | 1.82 |
| Silicon | 391 | 1510[3] | 118 | 3.92 |
| Sodium | 92,800 | 68,000 | 30.8 | 0.73 |
| Uranium | 633 | 7,360 | 168 | 11.5 |
| **ANIONS** | **kg** | **kg** | **%** | **unitless** |
| Chloride | 1,380 | 923 | 39.7 | 0.67 |
| Fluoride | 1,330 | 2,670 | 67 | 2.05 |
| Nitrate | 1.03E+05 | 1.14E+05 | 10.1 | 1.11 |
| Nitrite | 6,100 | 4,540 | 29.3 | 0.74 |
| Phosphate | 58,500 | 44,440 | 111 | 0.76 |
| Sulfate | 6,190 | 8,880 | 35.7 | 1.44 |
| **RADIO-NUCLIDES** | **Ci** | **Ci** | **%** | **unitless** |
| $^{137}$Cs | 9,710 | 11,500 | 17.1 | 1.19 |
| $^{90}$Sr | 7,630 | 37,200 | 132 | 4.87 |
| (Pu) total alpha activity | 1,730[5] | 11.8[6] | nc | <0.01 |

Table 5-7. Comparison of Agnew et al. Predictions With 1995 Analytical Results. (2 sheets)

| Analyte | Agnew et al. Estimate[1] | Overall Tank Inventories[2] | RPD | Ratio of Analytical Derived Inventories to Historical Derived Inventories |
|---|---|---|---|---|
| CARBON | kg C | kg C | % | unitless |
| Total inorganic carbon | 1,160 | 185 | 145 | 0.16 |
| Total organic carbon | 7.90 | 1,010 | 197 | 128 |
| PHYSICAL PROPERTIES | | | | |
| Weight percent water | 55.8 % | 60.6% | 8.6% | 1.09 |

Notes:

nc = not calculated

[1]Agnew et al. (1996a)

[2]Overall Tank Inventories were calculated using two sample populations representing top inventory (segment 1 upper half and lower half and segment 2 upper half with total mass of 4.04E+05 kg) and bottom inventory (segment 2 lower half with total mass of 2.07E+05 kg). REML means for each analyte from each population were multiplied by their respective volumes and summed to arrive at a total inventory estimate.

[3]The water digest results were used to derive the overall tank mean.

[4]Results are based on fusion digested samples.

[5]The estimate is calculated from the plutonium inventory in Agnew (107grams * 16.12 Ci/g).

[6]The inventory was derived using bottom layer data only.

that may impact the modeled concentrations. Because the Agnew et al. (1996a) uncertainty values are not established, the comparisons are for information only. Column 3 shows overall tank inventories based on the subsegment data. For the metals, these values came from the acid digested samples unless otherwise noted. Columns 4 and 5 compare the two estimates.

The comparison yielded varying results. Ten of the 20 analytes evaluated had RPDs less than 50 percent and ratios between 0.5 and 2.0. These analytes (Al, Bi, Ca, Na, $Cl^-$, $NO_2^-$, $NO_3^{-1}$, $SO_4^{-2}$, $Cs^{137}$, water) describe the bulk of the waste.

Although the tank received large quantities of second cycle waste according to the available documentation, it was received through the cascade (Agnew et al. 1996b). Tank 241-B-106 was the last tank in the cascade. The solids probably settled out of the waste stream before the waste entered the tank; therefore, it is unlikely that second cycle waste solids were received.

A data inspection indicates the waste most likely to be in the bottom of tank 241-B-106 is first cycle waste. However, documented transfers of this waste to the tank have not been found. Because early tank farm transfer records are often missing or incomplete, there may not be documentation for these transfers.

## 5.5 EVALUATION OF PROGRAM REQUIREMENTS

The July 1995 core sampling event was governed by the safety screening, historical, and pretreatment DQOs. The pretreatment DQO is not discussed in this section because it did not require analyses. The safety screening DQO lists requirements for examining waste in each Hanford underground waste tank to identify safety problems and to evaluate the tank for placement on a Watch List or to verify current Watch List status. The historical DQO attempts to obtain information through selective tank sampling to quantify the errors associated with the predictions for the waste composition. These issues were integrated by the SAP (Conner 1996b) into a list of required analytical tests and their respective decision criteria thresholds. This section discusses the DQO requirements and compares the analytical data to their decision criteria thresholds. Section 5.5.1 discusses each safety issue as identified in the safety screening DQO and evaluates the estimated tank heat load. Section 5.5.2 examines the historical model evaluation DQO.

### 5.5.1 Safety Evaluation

The safety screening DQO sampling objective, that vertical profiles of the waste be obtained from at least two widely spaced risers, was met. The risers sampled were near the tank perimeter and nearly diametrically opposite each other. Of the five primary analyses required by the DQO, three have decision criteria thresholds which, if exceeded, could warrant further investigation to ensure tank safety. The three analyses include DSC to evaluate the fuel content, total alpha activity to determine the criticality potential, and a determination of the tank headspace flammability. Table 5-8 lists the applicable primary decision variables and decision criteria thresholds of the safety screening DQO and the analytical results from the 1995 core sampling event. The DQO also required computing 90 percent confidence interval limits to compare to decision criteria thresholds.

Table 5-8. Decision Variables and Criteria for the Safety Screening Data Quality Objective.

| Primary Decision Variable | Decision Criteria Threshold | Analytical Result |
|---|---|---|
| Total fuel content (measured by DSC) | -480 J/g (dry weight) | No exothermic reactions were observed. |
| Weight percent water (measured by TGA) | 17 wt % | No results were below the limit. Lowest one-sided 95% confidence interval lower limit = 54.71 wt %. |
| Total alpha activity | 41 μCi/g[1] | No results exceeded the limit. Highest one-sided 95% confidence interval upper limit = 0.1 μCi/g. |
| Flammable gas | 25% of the LFL | 0% of the LFL |

Note:

[1]Although the actual decision criteria threshold listed in the DQO was 1 g/L, total alpha activity was reported in μCi/g rather than g/L. To convert the notification limit for total alpha into the same units as those used by the laboratory, it was assumed that all alpha decay originated from $^{239}$Pu. Using an assumed tank density of 1.5 g/mL and the specific activity of $^{239}$Pu (0.0615 Ci/g), the decision criteria threshold was converted to 41 μCi/g using the equation below (Conner 1996b). Because all measured densities for this tank were less than 1.5 g/mL, this calculation is conservative.

$$\left[\frac{1\ g}{L}\right]\left[\frac{1\ L}{10^3\ mL}\right]\left[\frac{1}{density}\ \frac{mL}{g}\right]\left[\frac{0.0615\ Ci}{1\ g}\right]\left[\frac{10^6\ \mu Ci}{1\ Ci}\right] = \frac{61.5}{density}\ \frac{\mu Ci}{g}$$

The safety screening DQO has established a decision criteria threshold of -480 J/g for the DSC analysis. No exothermic reactions were observed; consequently, no confidence interval limits were calculated. All weight percent water values were far above the 17 percent limit. The lowest one-sided 95 percent confidence interval lower limit was 54.71 weight percent. All total alpha activity results were well below the 41 μCi/g limit. The highest 90 percent confidence interval upper limit was 0.1 μCi/g. The headspace flammability was measured at 0 percent of the LFL, below the limit of 25 percent of the LFL. Finally, no separable organic layer was found in the drainable liquid sample. These results indicate that the tank may be declared "safe" according to the safety screening DQO.

Although TOC was not required by the safety screening DQO, the TOC results were compared to the programmatic action limit of 30,000 μg C/g for information only (Conner 1996a). The overall TOC mean was 1,860 μg C/g. One subsegment, the upper half of segment 1 of core 93, contained much higher TOC results than the remaining subsegments. The mean TOC concentration from this subsegment was 11,700 μg C/g. Conversion to a dry weight basis yielded a value of 28,700 μg C/g, still below the limit.

Another factor in assessing tank safety is the heat generation from radioactive decay. The heat load value calculated from the radionuclide data from the 1995 core sampling event was 338 W (1,150 Btu/hr) (see Table 5-9). Only the radionuclides present in detectable quantities ($^{137}$Cs and $^{89/90}$Sr) were used in the calculation. The Agnew et al. total inventory estimate was 96.9 W (331 Btu/hr) (Agnew et al. 1996a), and Kummerer (1994) estimated 589 W (2,010 Btu/hr) based on tank headspace temperatures. All estimates were below the 11,700 W (40,000 Btu/hr) design specification for single-shell tanks (Bergmann 1991). Although a high temperature spike has been observed in the past (see Section 2.4.2), it may be concluded that any heat generated from radioactive sources throughout the year is adequately dissipated.

Table 5-9. Tank 241-B-106 Projected Heat Load.

| Radionuclide | Specific Activity | Projected Inventory | Heat Load from Radioactive Decay |
|---|---|---|---|
| | µCi/g | Ci | W |
| $^{137}$Cs | 19.7 | 12,000 | 56.6 |
| $^{89/90}$Sr | 68.7 | 42,000 | 281.4 |
| Total | | 54,000 | 338 |

### 5.5.2 Historical Model Evaluation

The primary objective of the historical model evaluation DQO is to acquire adequate information through selective tank sampling to quantify the errors associated with predicting tank waste composition based on waste transaction history and waste type compositions (Simpson and McCain 1995). The DQO identifies key waste components and their characteristic concentrations for certain waste types.

The first step in the evaluation is to compare the analytical results with DQO-defined concentration levels for a selected number of analytes. This ensures that the predicted waste type may be in the tank and at the predicted location. If the analytical results are ≥ 10 percent of the DQO levels (ratio of 0.1 or more), the waste type and layer identification are considered acceptable for further investigation, and additional analyses are requested (Simpson and McCain 1995).

Tank 241-B-106 was not listed as a priority tank in Simpson and McCain (1995) but is an acceptable alternate for tank 241-B-108 (Conner 1996a). All solids in the tank are predicted by Agnew et al. (1996a) to be B saltcake waste. Table 5-10 compares the expected and measured concentrations for the B saltcake historical DQO threshold analytes.

Table 5-10 data show the waste in segment 2, or the bottom 48 cm (19 in.), is consistent with the B saltcake waste type. Although segment 2 of each core is chemically consistent with B saltcake for fingerprint analytes, the lower half of the second segment of each core was visually and chemically distinct from the rest of the tank (see Section 5.3). These observations suggest that a different waste type composes approximately the bottom 12.7 cm (5 in.) of the tank. The subsegments from the first segment met the DQO concentration levels for all fingerprint analytes except fluoride (Conner 1996a).

Table 5-10. Tank 241-B-106 Historical Model Evaluation for B Saltcake.[1]

| Fingerprint Analyte | Expected Concentration | Core Composite Concentration | Were All Subsegments ≥ 10 % of Expected Concentration? |
|---|---|---|---|
| Sodium | 137,500 μg/g | 134,000 μg/g (Core 93)<br>96,200 μg/g (Core 94) | Yes |
| Fluoride | 10,000 μg/g | 5,740 μg/g (Core 93)<br>4,100 μg/g (Core 94) | No[2] |
| Nitrate | 81,700 μg/g | 185,000 μg/g (Core 93)<br>177,000 μg/g (Core 94) | Yes |
| Phosphate | 93,600 μg/g | 33,200 μg/g (Core 93)<br>27,500 μg/g (Core 94) | Yes |
| Percent water | 39.4% | 57.04% (Core 93)<br>58.06% (Core 94) | Yes |

Notes:

[1]Conner (1996a)

[2]Only the upper and lower half segment portions from segment 2 of both cores met the ≥ 10 percent criterion.

The waste in the top of tank 241-B-106 may be B saltcake because several subsegments pass the gateway analysis in the historical DQO. Table 5-11 compares the data to the predictions for B saltcake. Reasonable agreement exists between several analytes. A measure of agreement for the Agnew et al. estimates is whether they fall within the 95 percent confidence interval on the mean. Twenty of 23 analytes compared (87 percent) are in the confidence interval. However, because of solubility considerations, B saltcake is unlikely to have the observed iron and uranium concentrations (mean concentration Fe = 18,400 and U = 16,400).

Table 5-11. Comparison of Top Segment Data to B Saltcake Waste: Cores 93 and 94 Segment 1 Upper Half and Lower Half, Segment 2 Upper Half.

| Analyte | Analyte Mean (µg/g) | Typical Agnew et al. Estimate for B Saltcake Waste (µg/g) | 95% Confidence Interval of the Analytical Data Lower Limit - Upper Limit on the Mean (µg/g) | Is Agnew Estimate Within 95% Confidence Interval? |
|---|---|---|---|---|
| Na | 106,690 | 138,000 | 0 to 216,130 | Yes |
| Al | 1,506 | 3,931 | 0 to 5,190 | Yes |
| Fe | 18,426 | 7,490 | 0 to 50,056 | Yes |
| Cr | 217 | 201 | 0 to 834 | Yes |
| Bi | 807 | 6,295 | 0 to 5,153 | No |
| Pb | 367 | 0 | 0 to 886 | Yes |
| Ni | 70.7 | 310 | 0 to 296 | No |
| Sr | 508 | 0 | 0 to 1,740 | Yes |
| Mn | 189 | 0 | 0 to 1,232 | Yes |
| Ca | 2,414 | 2,380 | 0 to 11,584 | Yes |
| wt% $H_2O$ | 62.4 | 55.6 | 49.3 to 75.6 | Yes |
| TOC wt% C | .2405 | 2.0E-04 | 0 to 27,212 | Yes |
| $NO_3^-$ | 194,830 | 153,000 | 33,895 to 355,766 | Yes |
| $NO_2^-$ | 7,837 | 7,000 | 0 to 17,994 | Yes |
| $CO_3^-$ | 329 | 8,610 | 168 to 490 | No |
| $PO_4^-$ | 10,526 | 87,100 | 0 to 92,630 | Yes |
| $SO_4^-$ | 14,841 | 9,174 | 4,675 to 25,007 | Yes |
| $SiO_3^-$ | 1,519(water) | 580 | 0 to 4,173 | Yes |
| $F^-$ | 1,543 | 1,970 | 0 to 7,926 | Yes |
| $Cl^-$ | 1,533 | 2,040 | 0 to 5,392 | Yes |
| Pu-239 (µCi/g) | Not detected by total alpha | 0.0095 | not calculated | |
| U-238 | 16,369 (ICP acid) | 940 | 0 to 71,070 | Yes |
| Cs-137 (µCi/g) | 22.2 | 14.3 | 0 to 119 | Yes |
| Sr-90 (µCi/g) | 88.0 | 11.3 | 0 to 249 | Yes |

Inspecting data for the top layer of waste indicates the waste may be uranium recovery waste. The tank interacted multiple times with tank 241-BX-109, a known uranium recovery waste receiver (Agnew et al. 1996b). Additionally, over 4 million gal of uranium recovery waste were processed through the 242-B Evaporator; this information was used to define B saltcake as a Hanford Defined Waste (Agnew 1996a). Table 5-12 compares the data to the predictions for uranium recovery waste. There is reasonable agreement between several analytes as well. In this case, 21 of 23 analytes (91 percent) compared are in the confidence interval. Furthermore, the agreement with the chemistry, solubility behavior, and visual observations of the waste are more reasonable.

Table 5-13 compares the data from the lowest half segment of cores 93 and 94. Again, a measure of agreement for the Agnew et al. (1996a) estimates is whether they fall within the 95 percent confidence interval of the mean for analytical data. In this case, 16 of 24 analytes compared (75 percent) are in the confidence interval. The elevated sodium, nitrate, and sulfate concentrations which are outside the confidence interval may be a result of later process history.

Table 5-14 shows the historical tank content concentration estimate of tank 241-B-106 and the core composite concentration estimates from the 1995 analytical results. The comparison is for information only. The HTCE estimates are generated from a combination of inputs from the WSTRS (Agnew 1996b) and the HDW Model (Agnew 1996a). Each input contains assumptions and/or other factors that may impact the HTCE values (such as transfers of an unknown waste type into a tank). Because the HTCE value uncertainties have not been established, they should be used with caution.

Comparing predicted values with the analytical values produced varied results. A total of 26 analytes were compared. Nineteen analytes (sodium, aluminum, iron, chromium, bismuth, lead, strontium, manganese, calcium, potassium, water, TOC, nitrate, nitrite, phosphate, silicate, fluoride, plutonium, uranium) of 26, or 73 percent, were within the 95 percent confidence interval of the mean. Twelve analytes had ratios (analytical to prediction) for both composite means between 0.5 to 2.0, also suggesting agreement. In several cases, analytes with results outside the confidence interval, or ratios less than 0.5/greater than 2, were trace analytes.

The process history of this tank indicates that it was a feed and receiver tank for the B evaporator. One model assumption for B saltcake was that all supernatants that were processed through the evaporator were blended together, and the resulting waste stream was the average of the concentrate. This assumption may not be valid.

A possible explanation for the observed data from tank 241-B-106 is that evaporation runs were staged, that is, early feeds were primarily first cycle waste (approximately 2 million gal), and later runs were primarily uranium recovery waste (approximately 4 million gal). This interpretation would resolve several discrepancies (especially the elevated soluble analytes such as sodium, nitrate, and sulfate) and explain the relatively close agreement of the historical estimates and analytical data.

Table 5-12. Comparison of Top Segment Data to UR Waste: Cores 93 and 94 Segment 1 Upper Half and Lower Half, Segment 2 Upper Half.

| Analyte | Analyte Mean ($\mu g/g$) | Typical Agnew et al. Estimate for UR Waste ($\mu g/g$) | 95% Confidence Interval of the Analytical Data Lower Limit - Upper Limit ($\mu g/g$) | Is Agnew Estimate Within 95% Confidence Interval? |
|---|---|---|---|---|
| Na | 106,690 | 62,431 | 0 to 216,130 | Yes |
| Al | 1,506 | 0 | 0 to 5,190 | Yes |
| Fe | 18,426 | 66,802 | 0 to 50,056 | No |
| Cr | 217 | 116 | 0 to 834 | Yes |
| Bi | 807 | 0 | 0 to 5,153 | Yes |
| Pb | 367 | 0 | 0 to 886 | Yes |
| Ni | 70.7 | 65.4 | 0 to 296 | Yes |
| Sr | 508 | 0 | 0 to 1,740 | Yes |
| Mn | 189 | 0 | 0 to 1,232 | Yes |
| Ca | 2,414 | 10,513 | 0 to 11,584 | Yes |
| Density | 1.36 | 1.32 | not applicable | not applicable |
| wt.% $H_2O$ | 62.4 | 60.1 | 49.3 to 75.6 | Yes |
| TOC $\mu gC/g$ | 2,405 | 3.0E-04 | 0 to 27,212 | Yes |
| $NO_3^-$ | 194,830 | 103,244 | 33,895 to 355,766 | Yes |
| $NO_2^-$ | 7,837 | 12,915 | 0 to 17,994 | Yes |
| $CO_3^-$ | 329 | 23,333 | 168 to 490 | No |
| $PO_4^-$ | 32,257 | 8,601 | 0 to 92,630 | Yes |
| $SO_4^-$ | 14,841 | 9,476 | 4,675 to 25,007 | Yes |
| $SiO_3^-$ | 1,519 (water) | 0 | 0 to 4,173 | Yes |
| $F^-$ | 1,543 | 0 | 0 to 7,926 | Yes |
| $Cl^-$ | 1,533 | 2,527 | 0 to 5,392 | Yes |
| Pu-239 ($\mu Ci/g$) | Not detected by total alpha | 0.003 | not calculated | |
| U-238 | 16,369 (ICP acid) | 25,288 | 0 to 71,070 | Yes |
| Cs-137 ($\mu Ci/g$) | 22.2 | 1.02 | 0 to 119 | Yes |
| Sr-90 ($\mu Ci/g$) | 88.0 | 16.7 | 0 to 249 | Yes |

Table 5-13. Comparison of Bottom Segment Data to 1C1Waste: Cores 93 and 94 Segment 2 Lower Half. (2 sheets)

| Analyte | Analyte Mean (μg/g) | Typical Agnew et al. Estimate for 1C1 Waste (μg/g) | 95% Confidence Interval of the Analytical Data | Is Agnew Estimate Within 95% Confidence Interval? |
|---|---|---|---|---|
| Na | 121,250 | 86,850 | 95,121 to 147,379 | No |
| Al | 13,725 | 9,930 | 0 to 41,366 | Yes |
| Fe | 8,220 | 14,000 | 1,359 to 15,081 | Yes |
| Cr | 734 | 152 | 0 to 1,859 | Yes |
| Bi | 19,425 | 12,500 | 7,879 to 30,971 | Yes |
| Pb | 274 | 0 | 0 to 2,149 | Yes |
| Ni | 18.4 | 52.8 | 0 to 55.2 | Yes |
| Sr | 153 | 0 | 0 to 308 | Yes |
| Mn | 30.4 | 0 | 8.5 to 52.4 | No |
| Ca | 319 | 2,340 | 190 to 448 | No |
| wt.% $H_2O$ | 56.8 | 70.9 | 53.2 to 60.4 | No |
| TOC wt% C | .208 | 0 | 0 to 745 | Yes |
| $NO_3^-$ | 170,000 | 18,000 | 137,599 to 202,401 | No |
| $NO_2^-$ | 6,650 | 6,370 | 3,601 to 9,699 | Yes |
| $CO_3^-$ (TIC) | 253 | 3,508 | 0 to 523 | No |
| $PO_4^-$ | 72,000 | 98,000 | 0 to 148,100 | Yes |
| $SO_4^-$ | 13,975 | 3,320 | 9,442 to 18,508 | No |
| $SiO_3^-$ | 4,438 (water) | 1,380 | 0 to 9,806 | Yes |
| $F^-$ | 10,145 | 2,430 | 0 to 28,101 | Yes |
| $Cl^-$ | 1,472 | 410 | 0 to 5,765 | Yes |
| Pu-239 (μCi/g) | 0.057 as total alpha | 0.0059 | 0.00496 to 0.110 | Yes |

Table 5-13. Comparison of Bottom Segment Data to 1C1Waste: Cores 93 and 94 Segment 2 Lower Half. (2 sheets)

| Analyte | Analyte Mean (μg/g) | Typical Agnew et al. Estimate for 1C1 Waste (μg/g) | 95% Confidence Interval of the Analytical Data | Is Agnew Estimate Within 95% Confidence Interval? |
|---|---|---|---|---|
| U-238 | 3,322 (ICP acid) | 105 | 0 to 26,542 | Yes |
| Cs-137 (μCi/g) | 12.1 | 9.44 | 3.96 to 20.3 | No |
| Sr-90 (μCi/g) | 5.91 | 0.084 | 0 to 18.9 | Yes |

Table 5-14. Comparison of Core Composite Data to HTCE Values. (2 sheets)

| Analyte | Core 93 Composite Value ($\mu g/g$) | Core 94 Composite Value ($\mu g/g$) | Agnew et al. 1996 ($\mu g/g$) | Ratio-Core 93 to Agnew | Ratio-Core 94 to Agnew | 95% CI of Combined Means | Is Agnew Estimate Within 95% Confidence Interval? |
|---|---|---|---|---|---|---|---|
| Na | 1.34E+05 | 96,200 | 1.37E+05 | .98 | .70 | 0 to 355,000 | Yes |
| Al | 3,350 | 2,110 | 3.96E+03 | .85 | .53 | 0 to 10,600 | Yes |
| Fe | 18,500 | 13,900 | 7.44E+03 | 2.48 | 1.87 | 0 to 45,400 | Yes |
| Cr | 342 | 203 | 202 | 1.69 | 1.0 | 0 to 1,160 | Yes |
| Bi | 3,200 | 1,920 | 6.26E+03 | .51 | 0.31 | 0 to 10,600 | Yes |
| Zr | 29.45 | 26.55 | 233 | .13 | 0.12 | 1.00 to 55 | No |
| Pb | 412 | 270 | 0.554 | >10 | >10 | 0 to 1,240 | Yes |
| Ni | 63.1 | 53.4 | 309 | .20 | 0.17 | 0 to 136 | No |
| Sr | 467.5 | 371.5 | 0.102 | >10 | >10 | 0 to 1,132 | Yes |
| Mn | 287 | 97.05 | 0.324 | >10 | >10 | 0 to 1,400 | Yes |
| Ca | 3,240 | 1,800 | 2.36E+03 | 1.37 | 0.76 | 0 to 11,600 | Yes |
| K | <467.5 | 325.5 | 406 | nc | 0.8 | 0 to 1,300 | Yes |
| wt.% $H_2O$ | 57.04 | 58.06 | 55.8 | 1.02 | 1.04 | 51.1 to 64.0 | Yes |
| TOC wt% C | 568.5 | 441 | 1.17E-03 | >10 | >10 | 0 to 1,310 | Yes |
| $NO_3^-$ | 1.85E+05 | 1.77E+05 | 1.58E+05 | 1.17 | 1.12 | 133,000 to 228,000 | Yes |

Table 5-14. Comparison of Core Composite Data to HTCE Values. (2 sheets)

| Analyte | Core 93 Composite Value ($\mu g/g$) | Core 94 Composite Value ($\mu g/g$) | Agnew et al. 1996 ($\mu g/g$) | Ratio-Core 93 to Agnew | Ratio-Core 94 to Agnew | 95% CI of Combined Means | Is Agnew Estimate Within 95% Confidence Interval? |
|---|---|---|---|---|---|---|---|
| $NO_2^-$ | 7,790 | 7,420 | 9.35E+03 | 0.83 | 0.79 | 5,250 to 9,960 | Yes |
| $CO_3^-$ | 329.5 | 302 | 8.89E+03 | <.1 | <.1 | 705 to 2,450 | No |
| $PO_4^-$ | 97,155 | 61,506 | 8.96E+04 | 1.08 | .69 | 0 to 306,000 | Yes |
| $SO_4^-$ | 14,100 | 13,700 | 9.48E+03 | 1.49 | 1.44 | 11,000 to 16,700 | No |
| $SiO_3^-$ | 3,560 | 2,700 | 599 | 5.9 | 4.5 | 0 to 7,840 | Yes |
| $F^-$ | 5,740 | 4,100 | 2.03E+03 | 2.8 | 2.0 | 0 to 15,300 | Yes |
| $Cl^-$ | 1,290 | 1,240 | 2.11E+03 | .61 | .59 | 947 to 1,580 | No |
| Pu-239 ($\mu Ci/g$) | 0.0455 as total alpha | 0.0364 as total alpha | 9.50E-03 | 4.8 | 3.8 | 0 to 0.099 | Yes |
| U-238 | 13,700 | 10,950 | 938 | >10 | >10 | 0 to 32,700 | Yes |
| Cs-137 ($\mu Ci/g$) | 22.8 | 22.55 | 14.4 | 1.6 | 1.6 | 21.0 to 24.3 | No |
| Sr-90 ($\mu Ci/g$) | 87.95 | 80.6 | 11.3 | 7.8 | 7.1 | 37.6 to 131 | No |

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# 6.0 CONCLUSIONS AND RECOMMENDATIONS

The waste in tank 241-B-106 was core sampled in July 1995 and analyzed in accordance with the safety screening and historical DQOs. The analytes required by the safety screening DQO included energetics to determine the fuel content, weight percent water, bulk density, total alpha activity to assess criticality, visual inspection for separate organic layers, and tank headspace flammability. The analytes required by the historical DQO, to quantify the errors involved in predicting tank waste composition, were bulk density, sodium, fluoride, nitrate, phosphate, $^{137}Cs$, $^{89/90}Sr$, total beta activity, total uranium, and TOC. Results for additional metals, anions, radionuclides, and TIC were obtained on an opportunistic basis. All samples were analyzed at the Westinghouse Hanford Company 222-S Laboratory.

All safety screening analytical results were within the prescribed concentration ranges of the DQO. No exothermic reactions were found. All weight percent water results were well above 17 percent. The lowest one-sided 95 percent confidence interval lower limit was 54.71 percent. All total alpha activity results and one-sided 95 percent confidence interval upper limits were at least two orders of magnitude below the safety screening limit. No separable organic layer was found in the drainable liquid sample. Finally, the tank headspace flammability was far below the safety screening threshold of 25 percent of the LFL, with a measurement of 0 percent of the LFL. Based on the decision criteria of the safety screening DQO, the waste in tank 241-B-106 may be considered "safe." No special action is needed to continue storing waste in the tank. No additional characterization efforts are needed at this time.

Although TOC was not analyzed to support the safety screening DQO, the results of the analysis were compared to the programmatic threshold of 30,000 $\mu$g C/g for information purposes. The overall mean TOC result was 1,860 $\mu$g C/g. The upper half sample from segment 1 of core 93 had a sample mean of 11,700 $\mu$g C/g. Converting this value to a dry weight yielded a result of 28,700 $\mu$g C/g, still below the limit.

The calculated heat load based on the radionuclide analytical results was 338 W (1,150 Btu/hr). The Agnew et al. (1996a) estimate of the tank heat load was 96.9 W (331 Btu/hr), and the estimate based on the headspace temperature was 589 W (2,010 Btu/hr) (Kummerer 1994). All three estimates were below the 11,700 W (40,000 Btu/hr) high-heat threshold (Bergmann 1991). Because the tank exhibits an upper temperature limit, it may be concluded that any heat generated from radioactive sources throughout the year is adequately dissipated.

Comparison of historical expectations to sampling observations provides mixed results. Homogeneity was expected from the HDW model by virtue of the tank receiving one waste type that deposited solids (evaporator bottoms from 242-B evaporator, e.g., B saltcake). However, vertical heterogeneity was demonstrated from visual inspection and by statistical analysis of the core sample data. Furthermore, several of the analytes and concentrations (specifically iron and uranium) detected for the expected waste were not anticipated to be present in the elevated concentrations because of their low solubility in aqueous alkaline media.

For the TLM element of the Agnew et al. (1996) model, the historical expectation was refuted. Layering was observed in a tank that was predicted to be largely homogeneous. For the HDW element of the Agnew et al. (1996) model, the historical expectation was partially met. The predicted concentrations for twenty of 23 analytes compared (87%) for the specific waste type (B saltcake) identified for the tank fell in the 95 percent confidence interval of the mean of the data. But several other contenders other than the waste type identified met or exceeded this criteria. Therefore, agreement with the HDW model prediction was not confirmed. For the HTCE comparison with core composite data, nineteen of 26 analytes compared (73%) for the tank fell within the 95 percent confidence interval of the mean of the data. Again, agreement with the Agnew et al. (1996) model was not confirmed, but this evaluation provides a measure of agreement for some analytes that may be useful to a data user with modest threshold criteria.

Closer examination of the process history, model assumptions, and data can aid in reconciling the discrepancies observed. The disagreement in the TLM prediction is most likely attributable to the assumption used in generating B saltcake. In the HDW model, for that waste type, a weighted average of all of the contributing supernatants is generated for the typical B saltcake waste stream. In all likelihood, the generation of B saltcake was staged, with 1C supernatant waste (with some entrained solids) processed first through the evaporator (the material at the bottom of the tank), and UR supernatant (also with some entrained solids) processed later. These two supernatant wastes make up the majority of B saltcake. This also explains the elevated concentrations of the soluble analytes observed in this tank. Additionally, there may not be substantial differences between waste types for some processes, thus, confirmation of an HDW prediction with comparison against a specific waste type may not be possible.

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# APPENDIX A

## ANALYTICAL RESULTS FROM THE 1995 CORE SAMPLING OF SINGLE-SHELL TANK 241-B-106

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# A.0 ANALYTICAL RESULTS FROM THE 1995 CORE SAMPLING OF SINGLE-SHELL TANK 241-B-106

## A.1 INTRODUCTION

Appendix A reports the chemical, radiochemical, and physical characteristics of tank 241-B-106 in table form and in terms of the specific concentrations of metals, ions, radionuclides, and physical properties.

Each table lists the following: laboratory sample identification, sample origin (core/segment/subsegment, or composite), an original and duplicate result for each sample, a sample mean, a mean result for the tank in which both cores are weighted equally, an RSD (mean), and a projected tank inventory for the particular analyte using the overall mean, the waste density, the waste volume, and the appropriate conversion factors. Projected tank inventory is not applicable to the DSC or density data. The data are listed in standard notation for values greater than 0.001 and less than 100,000. Values outside these limits are listed in scientific notation.

The tables are numbered A-1 through A-61. A description of the units and symbols used in the analyte tables and the references used in compiling the analytical data are in the List of Terms and Section 7.0, respectively. For a description of the sampling event and information on sampling rationale and locations, see Section 3.0.

## A.2 ANALYTE TABLE DESCRIPTION

Column 1 lists the laboratory sample for which the analyte was measured.

Column 2 lists the core and segment from which each sample was derived.

Column 3 lists the subsegment for which the analyte was measured. The segments were split into halves for analysis. The drainable liquid from the first segment of core 93 was designated DL in the column.

Columns 4 and 5, Result and Duplicate, are self-explanatory. Column 6, Sample Mean, lists the average of the result and duplicate values. If the result and duplicate values were detected, or one of the two values is detected and the other is nondetected, the mean is expressed as a detected value. If the result and duplicate values were nondetected, the mean is expressed as a nondetected result. The result and duplicate values and the result/duplicate means are reported exactly as found in the Tank Characterization Database. The means may appear to have been rounded up in some cases and rounded down in others because the analytical results in the tables may have fewer significant figures than originally reported not because the means were incorrectly calculated.

Column 7 lists the overall means for the waste in tank 241-B-106. They are calculated as follows:

To obtain the overall weighted mean for the tank waste, the individual sample primary and duplicate pairs in a subsegment were averaged to obtain a subsegment mean. The subsegment means in a segment were averaged to obtain a segment mean, the segment means in a core were averaged to obtain a core mean, and finally the two core means were averaged to obtain the overall mean. Not all steps were necessary for each analyte or for each subsegment, but the procedure to be followed is the same. All values, including those below the detection level (indicated by the less-than symbol, <), were used in calculating the overall means. If 50 percent or more of all the individual primary and duplicate results were detected, then the overall mean was expressed as a detected value. If less than 50 percent of all the individual results were detected, then the overall mean was expressed as a nondetected value. If non-detected results are used as quantitative values, the mean concentration and inventory estimates are biased. The magnitude of the bias cannot be estimated. For this reason, those particular results should be used with caution.

For the metals, separate overall means were calculated based on the acid digestion and water digestion results for the subsegment data and the core composite data. In most cases, the mean based on the subsegment acid digest results was used in the characterization of tank 241-B-106. The only exceptions to this are potassium, silicon, and silver. The water digest results were used for potassium and silver because the acid digest results were nondetected. For silicon, the water digest results were used because they were nearly 50 percent greater than the acid digest results. The remaining analytes had only one mean from the subsegment data and one mean for the core composite data. All means based on subsegment data were calculated in the manner described in the preceding paragraph. Only one primary/duplicate pair was analyzed on each core composite; therefore, the overall mean is a simple average of the two core composite sample means.

Drainable liquid was obtained from segment 1 of core 93. Only three analytes (energetics, percent water, and lithium) were evaluated on the drainable liquid, and a mean was only calculated for one of the three (percent water). For percent water, the drainable liquid data were combined with the solids data for segment 1 of core 93. The combining was done on a weighted basis according to the masses of the recovered solids and drainable liquid for the segment. The weighting factors were: 1) solid = 77.4 percent, and 2) liquids = 22.6 percent. After multiplying the solids and drainable liquid analytical values by these weighting factors, the resulting numbers were summed.

The RSD (mean) in column 8 was computed for applicable analytes using standard ANOVA statistical techniques (nested models). If the overall mean for a given analyte was detected, then an RSD (mean) was also calculated for that analyte using all available data because using nondetected results in the mean calculation also requires their use in the RSD (mean) calculations. Therefore, the RSD (mean) estimates and the ANOVA results for analytes with nondetected values should be used with caution.

The projected inventory in column 9 is the product of the overall mean, the volume of tank waste (443 kL [117 kgal]), the density (1.38 g/mL), and the appropriate conversion factors.

The four quality control parameters assessed on the tank 241-B-106 samples were standard recoveries, spike recoveries, duplicate analyses (RPDs), and blanks (see Section 5.1.2). More information is provided in the appendix tables. Sample and duplicate pairs in which any quality control parameters were outside their specified limits are superscripted in the Sample Mean column as follows:

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

Table A-1. Tank 241-B-106 Analytical Results: Aluminum. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 1,800 | 1,830 | 1,820 | 4,570 | 39.3 | 2,790 |
| S96T001214 | | Lower ½ | 2,400 | 2,450 | 2,420 | | | |
| S96T001228 | 93: 2 | Upper ½ | 1,110 | 1,140 | 1,120 | | | |
| S96T001229 | | Lower ½ | 12,600 | 10,500 | 11,600 | | | |
| S96T001240 | 94: 1 | Upper ½ | 1,740 | 1,700 | 1,720 | | | |
| S96T001241 | | Lower ½ | 439 | 433 | 436 | | | |
| S96T003625 | 94: 2 | Upper ½ | 1,230 | 1,890 | 1,560 | | | |
| S96T001243 | | Lower ½ | 18,400 | 13,400 | 15,900 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 365 | 295 | 330 | 350 | 16.3 | 214 |
| S96T001221 | | Lower ½ | 322 | 349 | 335.5 | | | |
| S96T001222 | 93: 2 | Upper ½ | 350 | 325 | 337.5 | | | |
| S96T001223 | | Lower ½ | 199 | 369 | 284 | | | |
| S96T001255 | 94: 1 | Upper ½ | 303 | 343 | 323 | | | |
| S96T001256 | | Lower ½ | 155 | 174 | 164.5 | | | |
| S96T003627 | 94: 2 | Upper ½ | 377 | 286 | 331.5 | | | |
| S96T001258 | | Lower ½ | 949 | 433 | 691 | | | |

Table A-1. Tank 241-B-106 Analytical Results: Aluminum. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 2,490 | 4,210 | 3,350 | 2,730 | 22.7 | 1,620 |
| S96T001645 | 94 | n/a | 2,080 | 2,140 | 2,110 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | 184 | 189 | 186.5 | 173 | 7.80 | 103 |
| S96T001648 | 94 | n/a | 155 | 164 | 159.5 | | | |

Table A-2. Tank 241-B-106 Analytical Results: Antimony. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001199 | 93: 1 | Upper ½ | < 63.00 | < 60.7 | < 61.85 | < 43.3 | n/a | < 26.5 |
| S96T001214 | | Lower ½ | < 56.90 | < 59.1 | < 58.0 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 56.40 | < 55.5 | < 55.95 | | | |
| S96T001229 | | Lower ½ | < 62.90 | < 62.7 | < 62.8 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 27.70 | < 28.3 | < 28.0 | | | |
| S96T001241 | | Lower ½ | < 28.70 | < 30.5 | < 29.6 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 20.10 | < 21.6 | < 20.85 | | | |
| S96T001243 | | Lower ½ | < 28.80 | < 29.9 | < 29.35 | | | |
| **Solids: water digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001210 | 93: 1 | Upper ½ | < 24.30 | < 24.4 | < 24.35 | < 24.7 | n/a | < 15.1 |
| S96T001221 | | Lower ½ | < 26.00 | < 27.0 | < 26.5 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 26.70 | < 26.8 | < 26.75 | | | |
| S96T001223 | | Lower ½ | < 22.90 | < 23.3 | < 23.1 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 23.60 | < 23.0 | < 23.3 | | | |
| S96T001256 | | Lower ½ | < 25.60 | < 25.8 | < 25.7 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 23.40 | < 23.3 | < 23.35 | | | |
| S96T001258 | | Lower ½ | < 24.30 | < 24.6 | < 24.45 | | | |

Table A-2. Tank 241-B-106 Analytical Results: Antimony. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001230 | 93 | n/a | < 55.80 | < 56.3 | < 56.05 | < 44.5 | n/a | < 26.4 |
| S96T001645 | 94 | n/a | < 32.90 | < 33.1 | < 33.0 | | | |
| **Core composite: water digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001224 | 93 | n/a | < 35.10 | < 35.2 | < 35.15 | < 23.8 | n/a | < 14.1 |
| S96T001648 | 94 | n/a | < 12.60 | < 12.1 | < 12.35 | | | |

Table A-3. Tank 241-B-106 Analytical Results: Arsenic. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 105 | < 101 | < 103 | < 72.2 | n/a | < 44.1 |
| S96T001214 | | Lower ½ | < 94.90 | < 98.4 | < 96.65 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 93.90 | < 92.4 | < 93.15 | | | |
| S96T001229 | | Lower ½ | < 105 | < 105 | < 105 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 46.20 | < 47.2 | < 46.7 | | | |
| S96T001241 | | Lower ½ | < 47.80 | < 50.9 | < 49.35 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 33.40 | < 36.0 | < 34.7 | | | |
| S96T001243 | | Lower ½ | < 48.00 | < 49.8 | < 48.9 | | | |
| Solids: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 40.40 | < 40.7 | < 40.55 | < 41.1 | n/a | < 25.1 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | < 38.3 | < 38.8 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-3. Tank 241-B-106 Analytical Results: Arsenic. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | **μg/g** | **μg/g** | **μg/g** | **μg/g** | **%** | **kg** |
| S96T001230 | 93 | n/a | < 92.90 | < 93.9 | < 93.4 | < 74.2 | n/a | < 44.0 |
| S96T001645 | 94 | n/a | < 54.80 | < 55.2 | < 55.0 | | | |
| **Core composite: water digest** | | | **μg/g** | **μg/g** | **μg/g** | **μg/g** | **%** | **kg** |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-4. Tank 241-B-106 Analytical Results: Barium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 52.50 | < 50.6 | < 51.55 | < 44.0 | n/a | < 26.9 |
| S96T001214 | | Lower ½ | < 47.40 | < 49.2 | < 48.3 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 47.00 | < 46.2 | < 46.6 | | | |
| S96T001229 | | Lower ½ | < 52.40 | < 52.3 | < 52.35 | | | |
| S96T001240 | 94: 1 | Upper ½ | 39.5 | 38.8 | 39.15 | | | |
| S96T001241 | | Lower ½ | 31 | 30.2 | 30.6 | | | |
| S96T003625 | 94: 2 | Upper ½ | 45.7 | 72.1 | 58.9 | | | |
| S96T001243 | | Lower ½ | < 24.00 | < 24.9 | < 24.45 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 20.20 | < 20.3 | < 20.25 | < 20.6 | n/a | < 12.6 |
| S96T001221 | | Lower ½ | < 21.60 | < 22.5 | < 22.05 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 22.20 | < 22.3 | < 22.25 | | | |
| S96T001223 | | Lower ½ | < 19.10 | < 19.4 | < 19.25 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 19.70 | < 19.1 | < 19.4 | | | |
| S96T001256 | | Lower ½ | < 21.30 | < 21.5 | < 21.4 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 19.50 | < 19.4 | < 19.45 | | | |
| S96T001258 | | Lower ½ | < 20.20 | < 20.5 | < 20.35 | | | |

Table A-4. Tank 241-B-106 Analytical Results: Barium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | < 46.50 | 52.9 | 49.7 | 40.3 | n/a | 23.9 |
| S96T001645 | 94 | n/a | 30.7 | 31.2 | 30.95 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 29.20 | < 29.3 | < 29.25 | < 19.8 | n/a | < 11.8 |
| S96T001648 | 94 | n/a | < 10.50 | < 10.1 | < 10.3 | | | |

Table A-5. Tank 241-B-106 Analytical Results: Beryllium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 5.250 | < 5.06 | < 5.155 | < 3.61 | n/a | < 2.21 |
| S96T001214 | | Lower ½ | < 4.740 | < 4.92 | < 4.83 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 4.700 | < 4.62 | < 4.66 | | | |
| S96T001229 | | Lower ½ | < 5.240 | < 5.23 | < 4.235 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 2.310 | < 2.36 | < 2.335 | | | |
| S96T001241 | | Lower ½ | < 2.390 | < 2.54 | < 2.465 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 1.670 | < 1.80 | < 1.735 | | | |
| S96T001243 | | Lower ½ | < 2.400 | < 2.49 | < 2.445 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 2.020 | < 2.03 | < 2.025 | < 2.06 | n/a | < 1.26 |
| S96T001221 | | Lower ½ | < 2.160 | < 2.25 | < 2.205 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 2.220 | < 2.23 | < 2.225 | | | |
| S96T001223 | | Lower ½ | < 1.910 | < 1.94 | < 1.925 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 1.970 | < 1.91 | < 1.94 | | | |
| S96T001256 | | Lower ½ | < 2.130 | < 2.15 | < 2.14 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 1.950 | < 1.94 | < 1.945 | | | |
| S96T001258 | | Lower ½ | < 2.020 | < 2.05 | < 2.035 | | | |

Table A-5. Tank 241-B-106 Analytical Results: Beryllium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | < 4.650 | < 4.70 | < 4.675 | < 3.71 | n/a | < 2.20 |
| S96T001645 | 94 | n/a | < 2.740 | < 2.76 | < 2.75 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 2.920 | < 2.93 | < 2.925 | < 1.98 | n/a | < 1.18 |
| S96T001648 | 94 | n/a | < 1.050 | < 1.01 | < 1.03 | | | |

Table A-6. Tank 241-B-106 Analytical Results: Bismuth. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 250 | 266 | 258 | 5,330 | 54.8 | 3,260 |
| S96T001214 | | Lower ½ | 350 | 357 | 353.5 | | | |
| S96T001228 | 93: 2 | Upper ½ | 971 | 960 | 965.5 | | | |
| S96T001229 | | Lower ½ | 20,700 | 17,200 | 18,950 | | | |
| S96T001240 | 94: 1 | Upper ½ | 340 | 330 | 335 | | | |
| S96T001241 | | Lower ½ | 181 | 185 | 183 | | | |
| S96T003625 | 94: 2 | Upper ½ | 1,340 | 2,100 | 1,720 | | | |
| S96T001243 | | Lower ½ | 21,100 | 18,700 | 19,900 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 40.40 | < 40.7 | < 40.55 | < 41.5 | n/a | < 25.4 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | 42.4 | 40.2 | 41.3 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | < 38.3 | < 38.8 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-6. Tank 241-B-106 Analytical Results: Bismuth. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 2,380 | 4,010 | 3,200 | 2,560 | 24.8 | 1,520 |
| S96T001645 | 94 | n/a | 1,900 | 1,950 | 1,920 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-7. Tank 241-B-106 Analytical Results: Boron. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 85.1 | 90.3 | 87.7 | 374 | 36.0 | 229 |
| S96T001214 | | Lower ½ | 110 | 96.6 | 103.3 | | | |
| S96T001228 | 93: 2 | Upper ½ | 89.1 | 100 | 94.55 | | | |
| S96T001229 | | Lower ½ | 1,350 | 947 | 1,150 | | | |
| S96T001240 | 94: 1 | Upper ½ | 194 | 200 | 197 | | | |
| S96T001241 | | Lower ½ | 201 | 173 | 187 | | | |
| S96T003625 | 94: 2 | Upper ½ | 109 | 172 | 140.5 | | | |
| S96T001243 | | Lower ½ | 1,330 | 729 | 1,030 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 537 | 827 | 682 | 754 | 5.95 | 461 |
| S96T001221 | | Lower ½ | 493 | 813 | 653 | | | |
| S96T001222 | 93: 2 | Upper ½ | 757 | 802 | 779.5 | | | |
| S96T001223 | | Lower ½ | 788 | 1,000 | 894 | | | |
| S96T001255 | 94: 1 | Upper ½ | 751 | 581 | 666 | | | |
| S96T001256 | | Lower ½ | 790 | 809 | 799.5 | | | |
| S96T003627 | 94: 2 | Upper ½ | 566 | 486 | 526 | | | |
| S96T001258 | | Lower ½ | 1,070 | 983 | 1,027 | | | |

Table A-7. Tank 241-B-106 Analytical Results: Boron. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 117 | 134 | 125.5 | 170 | 26.3 | 101 |
| S96T001645 | 94 | n/a | 212 | 218 | 215 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | 985 | 963 | 974 | 882 | 10.5 | 524 |
| S96T001648 | 94 | n/a | 722 | 856 | 789 | | | |

Table A-8. Tank 241-B-106 Analytical Results: Cadmium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 5.250 | < 5.06 | < 5.155 | < 3.61 | n/a | < 2.21 |
| S96T001214 | | Lower ½ | < 4.740 | < 4.92 | < 4.83 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 4.700 | < 4.62 | < 4.66 | | | |
| S96T001229 | | Lower ½ | < 5.240 | < 5.23 | < 5.235 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 2.310 | < 2.36 | < 2.335 | | | |
| S96T001241 | | Lower ½ | < 2.390 | < 2.54 | < 2.465 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 1.670 | < 1.80 | < 1.735 | | | |
| S96T001243 | | Lower ½ | < 2.400 | < 2.49 | < 2.445 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 2.020 | < 2.03 | < 2.025 | < 2.06 | n/a | < 1.26 |
| S96T001221 | | Lower ½ | < 2.160 | < 2.25 | < 2.205 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 2.220 | < 2.23 | < 2.225 | | | |
| S96T001223 | | Lower ½ | < 1.910 | < 1.94 | < 1.925 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 1.970 | < 1.91 | < 1.94 | | | |
| S96T001256 | | Lower ½ | < 2.130 | < 2.15 | < 2.14 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 1.950 | < 1.94 | < 1.945 | | | |
| S96T001258 | | Lower ½ | < 2.020 | < 2.05 | < 2.035 | | | |

Table A-8. Tank 241-B-106 Analytical Results: Cadmium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | < 4.650 | < 4.70 | < 4.675 | < 3.71 | n/a | < 2.20 |
| S96T001645 | 94 | n/a | < 2.740 | < 2.76 | < 2.75 | | | |
| **Core composite: water digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 2.920 | < 2.93 | < 2.925 | < 1.98 | n/a | < 1.18 |
| S96T001648 | 94 | n/a | < 1.050 | < 1.01 | < 1.03 | | | |

Table A-9. Tank 241-B-106 Analytical Results: Calcium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 3,480 | 3,600 | 3,540 | 1,960 | 40.0 | 1,200 |
| S96T001214 | | Lower ½ | 4,600 | 4,930 | 4,760 | | | |
| S96T001228 | 93: 2 | Upper ½ | 1,530 | 1,430 | 1,480 | | | |
| S96T001229 | | Lower ½ | 308 | 336 | 322 | | | |
| S96T001240 | 94: 1 | Upper ½ | 3,440 | 3,360 | 3,400 | | | |
| S96T001241 | | Lower ½ | 688 | 693 | 690.5 | | | |
| S96T003625 | 94: 2 | Upper ½ | 936 | 1,450 | 1,190 | | | |
| S96T001243 | | Lower ½ | 336 | 296 | 316 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 80.8 | 50.1 | 65.45 | < 46.2 | n/a | < 28.2 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | 69.4 | 54.35 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-9. Tank 241-B-106 Analytical Results: Calcium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 2,470 | 4,010 | 3,240 | 2,520 | 28.4 | 1,500 |
| S96T001645 | 94 | n/a | 1,780 | 1,830 | 1,800 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-10. Tank 241-B-106 Analytical Results: Cerium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 105 | < 101 | < 103 | < 87.9 | n/a | < 53.7 |
| S96T001214 | | Lower ½ | < 94.90 | < 98.4 | < 96.65 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 93.90 | < 92.4 | < 93.15 | | | |
| S96T001229 | | Lower ½ | < 105 | < 105 | < 105 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 46.20 | < 47.2 | < 46.7 | | | |
| S96T001241 | | Lower ½ | < 47.80 | < 50.9 | < 49.35 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 33.40 | < 36.0 | < 34.7 | | | |
| S96T001243 | | Lower ½ | 185 | 165 | 175 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 40.40 | < 40.7 | < 40.55 | < 41.1 | n/a | < 25.1 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | < 38.3 | < 38.8 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-10. Tank 241-B-106 Analytical Results: Cerium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001230 | 93 | n/a | < 92.90 | < 93.9 | < 93.4 | < 74.2 | n/a | < 44.0 |
| S96T001645 | 94 | n/a | < 54.80 | < 55.2 | < 55.0 | | | |
| **Core composite: water digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-11. Tank 241-B-106 Analytical Results: Chromium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 408 | 417 | 412.5 | 346 | 26.4 | 212 |
| S96T001214 | | Lower ½ | 161 | 164 | 162.5 | | | |
| S96T001228 | 93: 2 | Upper ½ | 153 | 146 | 149.5 | | | |
| S96T001229 | | Lower ½ | 704 | 588 | 646 | | | |
| S96T001240 | 94: 1 | Upper ½ | 171 | 166 | 168.5 | | | |
| S96T001241 | | Lower ½ | 97.9 | 97.2 | 97.55 | | | |
| S96T003625 | 94: 2 | Upper ½ | 244 | 374 | 309 | | | |
| S96T001243 | | Lower ½ | 890 | 756 | 823 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 43.6 | 59.0 | 51.3 | 35.3 | 10.7 | 21.6 |
| S96T001221 | | Lower ½ | 32.7 | 33.6 | 33.15 | | | |
| S96T001222 | 93: 2 | Upper ½ | 32.4 | 31.6 | 32.0 | | | |
| S96T001223 | | Lower ½ | 40.5 | 39.6 | 40.05 | | | |
| S96T001255 | 94: 1 | Upper ½ | 28.3 | 31.1 | 29.7 | | | |
| S96T001256 | | Lower ½ | 27.6 | 27.5 | 27.55 | | | |
| S96T003627 | 94: 2 | Upper ½ | 41.9 | 35.6 | 38.75 | | | |
| S96T001258 | | Lower ½ | 30.8 | 29.6 | 30.2 | | | |

Table A-11. Tank 241-B-106 Analytical Results: Chromium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 256 | 428 | 342 | 273 | 25.5 | 162 |
| S96T001645 | 94 | n/a | 202 | 204 | 203 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | 32.6 | 35.2 | 33.9 | 31.9 | 6.19 | 18.9 |
| S96T001648 | 94 | n/a | 29.6 | 30.3 | 29.95 | | | |

Table A-12. Tank 241-B-106 Analytical Results: Cobalt. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 21.00 | < 20.2 | < 20.6 | < 14.4 | n/a | < 8.80 |
| S96T001214 | | Lower ½ | < 19.00 | < 19.7 | < 19.35 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 18.80 | < 18.5 | < 18.65 | | | |
| S96T001229 | | Lower ½ | < 21.00 | < 20.9 | < 20.95 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 9.240 | < 9.44 | < 9.34 | | | |
| S96T001241 | | Lower ½ | < 9.560 | < 10.2 | < 9.88 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 6.690 | < 7.19 | < 6.94 | | | |
| S96T001243 | | Lower ½ | < 9.600 | < 9.96 | < 9.78 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 8.090 | < 8.14 | < 8.115 | < 8.23 | n/a | < 5.03 |
| S96T001221 | | Lower ½ | < 8.660 | < 8.98 | < 8.82 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 8.900 | < 8.93 | < 8.915 | | | |
| S96T001223 | | Lower ½ | < 7.630 | < 7.78 | < 7.705 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 7.870 | < 7.66 | < 7.765 | | | |
| S96T001256 | | Lower ½ | < 8.520 | < 8.59 | < 8.555 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 7.820 | < 7.77 | < 7.795 | | | |
| S96T001258 | | Lower ½ | < 8.090 | < 8.21 | < 8.15 | | | |

Table A-12. Tank 241-B-106 Analytical Results: Cobalt. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | < 18.60 | < 18.8 | < 18.7 | < 14.9 | n/a | < 8.84 |
| S96T001645 | 94 | n/a | < 11.00 | < 11.0 | < 11.0 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 11.70 | < 11.7 | < 11.7 | < 7.91 | n/a | < 4.70 |
| S96T001648 | 94 | n/a | < 4.210 | < 4.04 | < 4.125 | | | |

Table A-13. Tank B-106 Analytical Results: Copper. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 25.3 | 25.9 | 25.6 | 22.9 | 12.6 | 14.0 |
| S96T001214 | | Lower ½ | 28.6 | 29.2 | 28.9 | | | |
| S96T001228 | 93: 2 | Upper ½ | 50.9 | 21.1 | 36.0 | | | |
| S96T001229 | | Lower ½ | 12.9 | 12.4 | 12.65 | | | |
| S96T001240 | 94: 1 | Upper ½ | 24.6 | 24.9 | 24.75 | | | |
| S96T001241 | | Lower ½ | 17.7 | 19.8 | 18.75 | | | |
| S96T003625 | 94: 2 | Upper ½ | 12.9 | 17.4 | 15.15 | | | |
| S96T001243 | | Lower ½ | 23.3 | 19.6 | 21.45 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 4.040 | < 4.07 | < 4.055 | < 4.11 | n/a | < 2.51 |
| S96T001221 | | Lower ½ | < 4.330 | < 4.49 | < 4.41 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 4.450 | < 4.47 | < 4.46 | | | |
| S96T001223 | | Lower ½ | < 3.810 | < 3.89 | < 3.85 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 3.930 | < 3.83 | < 3.88 | | | |
| S96T001256 | | Lower ½ | < 4.260 | < 4.29 | < 4.275 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 3.910 | < 3.89 | < 3.90 | | | |
| S96T001258 | | Lower ½ | < 4.050 | < 4.10 | < 4.075 | | | |

Table A-13. Tank B-106 Analytical Results: Copper. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001230 | 93 | n/a | 20.6 | 32.6 | 26.6 | 21.5 | 23.6 | 12.8 |
| S96T001645 | 94 | n/a | 16.6 | 16.3 | 16.45 | | | |
| **Core composite: water digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001224 | 93 | n/a | < 5.840 | < 5.86 | < 5.85 | < 3.96 | n/a | < 2.35 |
| S96T001648 | 94 | n/a | < 2.100 | < 2.02 | < 2.06 | | | |

Table A-14. Tank 241-B-106 Analytical Results: Iron. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 13,800 | 14,300 | 14,000 | 15,200 | 9.92 | 9,290 |
| S96T001214 | | Lower ½ | 18,700 | 18,000 | 18,400 | | | |
| S96T001228 | 93: 2 | Upper ½ | 18,000 | 17,400 | 17,700 | | | |
| S96T001229 | | Lower ½ | 8,370 | 6,990 | 7,680 | | | |
| S96T001240 | 94: 1 | Upper ½ | 16,300 | 15,500 | 15,900 | | | |
| S96T001241 | | Lower ½ | 13,300 | 13,200 | 13,200 | | | |
| S96T003625 | 94: 2 | Upper ½ | 20,300 | 31,900 | 26,100 | | | |
| S96T001243 | | Lower ½ | 9,410 | 8,110 | 8,760 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 585 | 424 | 504.5 | 318 | 28.3 | 194 |
| S96T001221 | | Lower ½ | 148 | 155 | 151.5 | | | |
| S96T001222 | 93: 2 | Upper ½ | 189 | 215 | 202 | | | |
| S96T001223 | | Lower ½ | 49 | 58.5 | 53.75 | | | |
| S96T001255 | 94: 1 | Upper ½ | 177 | 740 | 458.5 | | | |
| S96T001256 | | Lower ½ | 314 | 174 | 244 | | | |
| S96T003627 | 94: 2 | Upper ½ | 1,140 | 674 | 907 | | | |
| S96T001258 | | Lower ½ | < 20.20 | < 20.5 | < 20.35 | | | |

Table A-14. Tank 241-B-106 Analytical Results: Iron. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 13,900 | 23,100 | 18,500 | 16,200 | 14.2 | 9,620 |
| S96T001645 | 94 | n/a | 13,900 | 13,900 | 13,900 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | 177 | 179 | 178 | 145 | 22.8 | 86.1 |
| S96T001648 | 94 | n/a | 111 | 113 | 112 | | | |

Table A-15. Tank 241-B-106 Analytical Results: Lanthanum. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 52.50 | < 50.6 | < 51.55 | < 36.1 | n/a | < 22.1 |
| S96T001214 | | Lower ½ | < 47.40 | < 49.2 | < 48.3 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 47.00 | < 46.2 | < 46.6 | | | |
| S96T001229 | | Lower ½ | < 52.40 | < 52.3 | < 52.35 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 23.10 | < 23.6 | < 23.35 | | | |
| S96T001241 | | Lower ½ | < 23.90 | < 25.4 | < 24.65 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 16.70 | < 18.0 | < 17.35 | | | |
| S96T001243 | | Lower ½ | < 24.00 | < 24.9 | < 24.45 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 20.20 | < 20.3 | < 20.25 | < 20.6 | n/a | < 12.6 |
| S96T001221 | | Lower ½ | < 21.60 | < 22.5 | < 22.05 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 22.20 | < 22.3 | < 22.25 | | | |
| S96T001223 | | Lower ½ | < 19.10 | < 19.4 | < 19.25 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 19.70 | < 19.1 | < 19.4 | | | |
| S96T001256 | | Lower ½ | < 21.30 | < 21.5 | < 21.4 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 19.50 | < 19.4 | < 19.45 | | | |
| S96T001258 | | Lower ½ | < 20.20 | < 20.5 | < 20.35 | | | |

Table A-15. Tank 241-B-106 Analytical Results: Lanthanum. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | < 46.50 | < 47.0 | < 46.75 | < 37.1 | n/a | < 22.0 |
| S96T001645 | 94 | n/a | < 27.40 | < 27.6 | < 27.5 | | | |
| **Core composite: water digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 29.20 | < 29.3 | < 29.25 | < 19.8 | n/a | < 11.8 |
| S96T001648 | 94 | n/a | < 10.50 | < 10.1 | < 10.3 | | | |

Table A-16. Tank 241-B-106 Analytical Results: Lead. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 299 | 276 | 287.5 | 336 | 8.63 | 205 |
| S96T001214 | | Lower ½ | 386 | 388 | 387 | | | |
| S96T001228 | 93: 2 | Upper ½ | 340 | 358 | 349 | | | |
| S96T001229 | | Lower ½ | 475 | 369 | 422 | | | |
| S96T001240 | 94: 1 | Upper ½ | 339 | 333 | 336 | | | |
| S96T001241 | | Lower ½ | 271 | 281 | 276 | | | |
| S96T003625 | 94: 2 | Upper ½ | 403 | 603 | 503 | | | |
| S96T001243 | | Lower ½ | 130 | 124 | 127 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 40.40 | < 40.7 | < 40.55 | < 41.1 | n/a | < 25.1 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | < 38.3 | < 38.8 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-16. Tank 241-B-106 Analytical Results: Lead. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 309 | 515 | 412 | 341 | 20.8 | 202 |
| S96T001645 | 94 | n/a | 274 | 266 | 270 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-17. Tank 241-B-106 Analytical Results: Magnesium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 805 | 828 | 816.5 | 473 | 34.3 | 289 |
| S96T001214 | | Lower ½ | 1,020 | 1,040 | 1,030 | | | |
| S96T001228 | 93: 2 | Upper ½ | 366 | 348 | 357 | | | |
| S96T001229 | | Lower ½ | 143 | 161 | 152 | | | |
| S96T001240 | 94: 1 | Upper ½ | 824 | 789 | 806.5 | | | |
| S96T001241 | | Lower ½ | 185 | 187 | 186 | | | |
| S96T003625 | 94: 2 | Upper ½ | 184 | 251 | 217.5 | | | |
| S96T001243 | | Lower ½ | 239 | 197 | 218 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 43.9 | < 40.7 | 42.3 | < 41.5 | n/a | < 25.4 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | 41.3 | 40.3 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-17. Tank 241-B-106 Analytical Results: Magnesium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 596 | 960 | 778 | 617 | 26.2 | 366 |
| S96T001645 | 94 | n/a | 450 | 461 | 455.5 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-18. Tank 241-B-106 Analytical Results: Manganese. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 547 | 571 | 559 | 155 | 50.1 | 94.8 |
| S96T001214 | | Lower ½ | 213 | 214 | 213.5 | | | |
| S96T001228 | 93: 2 | Upper ½ | 88 | 83.4 | 85.7 | | | |
| S96T001229 | | Lower ½ | 32.1 | 27.1 | 29.6 | | | |
| S96T001240 | 94: 1 | Upper ½ | 166 | 157 | 161.5 | | | |
| S96T001241 | | Lower ½ | 59.9 | 60.6 | 60.25 | | | |
| S96T003625 | 94: 2 | Upper ½ | 79.1 | 125 | 102 | | | |
| S96T001243 | | Lower ½ | 34.5 | 28.1 | 31.3 | | | |
| Solids: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 21 | 13 | 17 | < 5.95 | n/a | < 3.64 |
| S96T001221 | | Lower ½ | < 4.330 | < 4.49 | < 4.41 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 4.450 | < 4.47 | < 4.46 | | | |
| S96T001223 | | Lower ½ | < 3.810 | < 3.89 | < 3.85 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 3.930 | 7.19 | 5.56 | | | |
| S96T001256 | | Lower ½ | < 4.260 | < 4.29 | < 4.275 | | | |
| S96T003627 | 94: 2 | Upper ½ | 4.11 | < 3.89 | 4.00 | | | |
| S96T001258 | | Lower ½ | < 4.050 | < 4.10 | < 4.075 | | | |

Table A-18. Tank 241-B-106 Analytical Results: Manganese. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 215 | 359 | 287 | 192 | 49.5 | 114 |
| S96T001645 | 94 | n/a | 96.7 | 97.4 | 97.05 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 5.840 | < 5.86 | < 5.85 | < 3.96 | n/a | < 2.35 |
| S96T001648 | 94 | n/a | < 2.100 | < 2.02 | < 2.06 | | | |

Table A-19. Tank 241-B-106 Analytical Results: Molybdenum. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 52.50 | < 50.6 | < 51.55 | < 36.1 | n/a | < 22.1 |
| S96T001214 | | Lower ½ | < 47.40 | < 49.2 | < 48.3 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 47.00 | < 46.2 | < 46.6 | | | |
| S96T001229 | | Lower ½ | < 52.40 | < 52.3 | < 52.35 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 23.10 | < 23.6 | < 23.35 | | | |
| S96T001241 | | Lower ½ | < 23.90 | < 25.4 | < 24.65 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 16.70 | < 18.0 | < 17.35 | | | |
| S96T001243 | | Lower ½ | < 24.00 | < 24.9 | < 24.45 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 20.20 | < 20.3 | < 20.25 | < 20.6 | n/a | < 12.6 |
| S96T001221 | | Lower ½ | < 21.60 | < 22.5 | < 22.05 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 22.20 | < 22.3 | < 22.25 | | | |
| S96T001223 | | Lower ½ | < 19.10 | < 19.4 | < 19.25 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 19.70 | < 19.1 | < 19.4 | | | |
| S96T001256 | | Lower ½ | < 21.30 | < 21.5 | < 21.4 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 19.50 | < 19.4 | < 19.4 | | | |
| S96T001258 | | Lower ½ | < 20.20 | < 20.5 | < 20.35 | | | |

Table A-19. Tank 241-B-106 Analytical Results: Molybdenum. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | < 46.50 | < 47.0 | < 46.75 | < 37.1 | n/a | < 22.0 |
| S96T001645 | 94 | n/a | < 27.40 | < 27.6 | < 27.5 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 29.20 | < 29.3 | < 29.2 | < 19.8 | n/a | < 11.8 |
| S96T001648 | 94 | n/a | < 10.50 | < 10.1 | < 10.3 | | | |

Table A-20. Tank 241-B-106 Analytical Results: Neodymium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 105 | < 101 | < 103 | < 72.2 | n/a | < 44.1 |
| S96T001214 | | Lower ½ | < 94.90 | < 98.4 | < 96.65 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 93.90 | < 92.4 | < 93.15 | | | |
| S96T001229 | | Lower ½ | < 105 | < 105 | < 105 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 46.20 | < 47.2 | < 46.7 | | | |
| S96T001241 | | Lower ½ | < 47.80 | < 50.9 | < 49.35 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 33.40 | < 36.0 | < 34.7 | | | |
| S96T001243 | | Lower ½ | < 48.00 | < 49.8 | < 48.9 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 40.40 | < 40.7 | < 40.55 | < 41.1 | n/a | < 25.1 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | < 38.3 | < 38.8 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-20. Tank 241-B-106 Analytical Results: Neodymium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | < 92.90 | < 93.9 | < 93.4 | < 74.2 | n/a | < 44.0 |
| S96T001645 | 94 | n/a | < 54.80 | < 55.2 | < 55.5 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-21. Tank 241-B-106 Analytical Results: Nickel. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 63.3 | 64.4 | 63.85 | 52.6 | 15.9 | 32.2 |
| S96T001214 | | Lower ½ | 50.5 | 49.8 | 50.15 | | | |
| S96T001228 | 93: 2 | Upper ½ | 63.9 | 57.4 | 60.65 | | | |
| S96T001229 | | Lower ½ | 21.7 | < 20.9 | 21.3 | | | |
| S96T001240 | 94: 1 | Upper ½ | 43.1 | 41.5 | 42.3 | | | |
| S96T001241 | | Lower ½ | 43.2 | 44.6 | 43.9 | | | |
| S96T003625 | 94: 2 | Upper ½ | 98.9 | 148 | 123.5 | | | |
| S96T001243 | | Lower ½ | 17 | 14 | 15.5 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 8.090 | < 8.14 | < 8.115 | < 8.23 | n/a | < 5.03 |
| S96T001221 | | Lower ½ | < 8.660 | < 8.98 | < 8.82 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 8.900 | < 8.93 | < 8.915 | | | |
| S96T001223 | | Lower ½ | < 7.630 | < 7.78 | < 7.705 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 7.870 | < 7.66 | < 7.765 | | | |
| S96T001256 | | Lower ½ | < 8.520 | < 8.59 | < 8.555 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 7.820 | < 7.77 | < 7.795 | | | |
| S96T001258 | | Lower ½ | < 8.090 | < 8.21 | < 8.15 | | | |

Table A-21. Tank 241-B-106 Analytical Results: Nickel. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 49.9 | 76.3 | 63.1 | 58.3 | | 34.6 |
| S96T001645 | 94 | n/a | 51.4 | 55.4 | 53.4 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 11.70 | < 11.7 | < 11.7 | < 7.91 | n/a | < 4.70 |
| S96T001648 | 94 | n/a | < 4.210 | < 4.04 | < 4.125 | | | |

Table A-22. Tank 241-B-106 Analytical Results: Phosphorus. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001199 | 93: 1 | Upper ½ | 26,500 | 26,300 | 26,400 | 23,800 | 7.39 | 14,500 |
| S96T001214 | | Lower ½ | 29,600 | 29,600 | 29,600 | | | |
| S96T001228 | 93: 2 | Upper ½ | 22,900 | 21,900 | 22,400 | | | |
| S96T001229 | | Lower ½ | 23,600 | 21,700 | 22,600 | | | |
| S96T001240 | 94: 1 | Upper ½ | 22,400 | 22,100 | 22,200 | | | |
| S96T001241 | | Lower ½ | 16,900 | 17,500 | 17,200 | | | |
| S96T003625 | 94: 2 | Upper ½ | 22,800 | 34,800 | 28,800 | | | |
| S96T001243 | | Lower ½ | 22,400 | 19,700 | 21,000 | | | |
| **Solids: water digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001210 | 93: 1 | Upper ½ | 14,300 | 21,200 | 17,750 | 9,740 | 15.6 | 5,950 |
| S96T001221 | | Lower ½ | 10,700 | 10,700 | 10,700 | | | |
| S96T001222 | 93: 2 | Upper ½ | 9,840 | 9,200 | 9,520 | | | |
| S96T001223 | | Lower ½ | 6,400 | 7,740 | 7,070 | | | |
| S96T001255 | 94: 1 | Upper ½ | 9,040 | 9,320 | 9,180 | | | |
| S96T001256 | | Lower ½ | 7,930 | 8,280 | 8,100 | | | |
| S96T003627 | 94: 2 | Upper ½ | 10,600 | 9,740 | 10,170 | | | |
| S96T001258 | | Lower ½ | 5,470 | 5,450 | 5,460 | | | |

Table A-22. Tank 241-B-106 Analytical Results: Phosphorus. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | $\mu g/g$ | $\mu g/g$ | $\mu g/g$ | $\mu g/g$ | % | kg |
| S96T001230 | 93 | n/a | 23,800 | 39,700 | 31,750 | 25,900 | 22.5 | 15,400 |
| S96T001645 | 94 | n/a | 19,900 | 20,300 | 20,100 | | | |
| **Core composite: water digest** | | | $\mu g/g$ | $\mu g/g$ | $\mu g/g$ | $\mu g/g$ | % | kg |
| S96T001224 | 93 | n/a | 11,500 | 11,800 | 11,600 | 10,700 | 8.88 | 6,350 |
| S96T001648 | 94 | n/a | 9,550 | 9,950 | 9,750 | | | |

Table A-23. Tank 241-B-106 Analytical Results: Potassium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 525 | < 506 | < 515.5 | < 378 | n/a | < 231 |
| S96T001214 | | Lower ½ | < 474 | < 492 | < 483 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 470 | < 462 | < 466 | | | |
| S96T001229 | | Lower ½ | < 524 | < 523 | < 523.5 | | | |
| S96T001240 | 94: 1 | Upper ½ | 273 | < 236 | 254.5 | | | |
| S96T001241 | | Lower ½ | < 239 | 255 | 247 | | | |
| S96T003625 | 94: 2 | Upper ½ | 231 | 353 | 292 | | | |
| S96T001243 | | Lower ½ | < 240 | < 249 | < 244.5 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 246 | 419 | 332.5 | 257 | 7.5 | 157 |
| S96T001221 | | Lower ½ | 259 | 330 | 294.5 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 222 | < 223 | < 222.5 | | | |
| S96T001223 | | Lower ½ | 271 | 204 | 237.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | 270 | < 191 | 230.5 | | | |
| S96T001256 | | Lower ½ | 260 | 228 | 244 | | | |
| S96T003627 | 94: 2 | Upper ½ | 291 | 284 | 287.5 | | | |
| S96T001258 | | Lower ½ | < 202 | < 205 | < 203.5 | | | |

Table A-23. Tank 241-B-106 Analytical Results: Potassium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | < 465 | < 470 | < 467.5 | 397 | n/a | 236 |
| S96T001645 | 94 | n/a | 332 | 319 | 325.5 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 292 | < 293 | < 292.5 | 247 | n/a | 147 |
| S96T001648 | 94 | n/a | 185 | 216 | 200.5 | | | |

Table A-24. Tank 241-B-106 Analytical Results: Samarium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 105 | < 101 | < 103 | < 72.2 | n/a | < 44.1 |
| S96T001214 | | Lower ½ | < 94.90 | < 98.4 | < 96.65 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 93.90 | < 92.4 | < 93.15 | | | |
| S96T001229 | | Lower ½ | < 105 | < 105 | < 105 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 46.20 | < 47.2 | < 46.7 | | | |
| S96T001241 | | Lower ½ | < 47.80 | < 50.9 | < 49.35 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 33.40 | < 36.0 | < 34.7 | | | |
| S96T001243 | | Lower ½ | < 48.00 | < 49.8 | < 48.9 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 40.40 | < 40.7 | < 40.55 | < 41.1 | n/a | < 25.1 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | < 38.3 | < 38.8 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-24. Tank 241-B-106 Analytical Results: Samarium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | < 92.90 | < 93.9 | < 93.4 | < 74.2 | n/a | < 44.0 |
| S96T001645 | 94 | n/a | < 54.80 | < 55.2 | < 55.0 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-25. Tank 241-B-106 Analytical Results: Selenium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 105 | < 101 | < 103 | < 72.2 | n/a | < 44.1 |
| S96T001214 | | Lower ½ | < 94.90 | < 98.4 | < 96.65 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 93.90 | < 92.4 | < 93.15 | | | |
| S96T001229 | | Lower ½ | < 105 | < 105 | < 105 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 46.20 | < 47.2 | < 46.7 | | | |
| S96T001241 | | Lower ½ | < 47.80 | < 50.9 | < 49.35 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 33.40 | < 36.0 | < 34.7 | | | |
| S96T001243 | | Lower ½ | < 48.00 | < 49.8 | < 48.9 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 40.40 | < 40.7 | < 40.55 | < 41.1 | n/a | < 25.1 |
| S96T001221 | | Lower ½ | < 43.30 | < 44.9 | < 44.1 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 44.50 | < 44.7 | < 44.6 | | | |
| S96T001223 | | Lower ½ | < 38.10 | < 38.9 | < 38.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 39.30 | < 38.3 | < 38.8 | | | |
| S96T001256 | | Lower ½ | < 42.60 | < 42.9 | < 42.75 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 39.10 | < 38.9 | < 39.0 | | | |
| S96T001258 | | Lower ½ | < 40.50 | < 41.0 | < 40.75 | | | |

Table A-25. Tank 241-B-106 Analytical Results: Selenium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | < 92.90 | < 93.9 | < 93.4 | < 74.2 | n/a | < 44.0 |
| S96T001645 | 94 | n/a | < 54.80 | < 55.2 | < 55.0 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 58.40 | < 58.6 | < 58.5 | < 39.6 | n/a | < 23.5 |
| S96T001648 | 94 | n/a | < 21.00 | < 20.2 | < 20.6 | | | |

Table A-26. Tank 241-B-106 Analytical Results: Silicon. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 428 | 459 | 443.5 | 1,490 | 45.8 | 911 |
| S96T001214 | | Lower ½ | 412 | 347 | 379.5 | | | |
| S96T001228 | 93: 2 | Upper ½ | 359 | 456 | 407.5 | | | |
| S96T001229 | | Lower ½ | 5,590 | 531 | 3,060 | | | |
| S96T001240 | 94: 1 | Upper ½ | 507 | 601 | 554 | | | |
| S96T001241 | | Lower ½ | 449 | 397 | 423 | | | |
| S96T003625 | 94: 2 | Upper ½ | 840 | 1,330 | 1,090 | | | |
| S96T001243 | | Lower ½ | 3,980 | 7,110 | 5,550 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 909 | 1,740 | 1,320 | 2,220 | 21.9 | 1,360 |
| S96T001221 | | Lower ½ | 1,100 | 1,740 | 1,420 | | | |
| S96T001222 | 93: 2 | Upper ½ | 2,150 | 2,140 | 2,140 | | | |
| S96T001223 | | Lower ½ | 3,400 | 4,630 | 4,020 | | | |
| S96T001255 | 94: 1 | Upper ½ | 1,490 | 1,240 | 1,360 | | | |
| S96T001256 | | Lower ½ | 1,330 | 1,370 | 1,350 | | | |
| S96T003627 | 94: 2 | Upper ½ | 1,480 | 1,030 | 1,260 | | | |
| S96T001258 | | Lower ½ | 5,410 | 4,310 | 4,860 | | | |

Table A-26. Tank 241-B-106 Analytical Results: Silicon. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 398 | 353 | 375.5 | 920 | 59.2 | 546 |
| S96T001645 | 94 | n/a | 1,450 | 1,480 | 1,465 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | 3,520 | 3,600 | 3,560 | 3,130 | 13.7 | 1,860 |
| S96T001648 | 94 | n/a | 2,570 | 2,830 | 2,700 | | | |

Table A-27. Tank 241-B-106 Analytical Results: Silver. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 10.50 | < 10.1 | < 10.3 | < 27.5 | n/a | < 16.8 |
| S96T001214 | | Lower ½ | < 9.490 | < 9.84 | < 9.665 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 9.390 | < 9.24 | < 9.315 | | | |
| S96T001229 | | Lower ½ | < 10.50 | < 10.5 | < 10.5 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 4.620 | < 4.72 | < 4.67 | | | |
| S96T001241 | | Lower ½ | < 4.780 | < 5.09 | < 4.935 | | | |
| S96T003625 | 94: 2 | Upper ½ | 8.79 | 13.3 | 11.04 | | | |
| S96T001243 | | Lower ½ | 139 | 180 | 159.5 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 7.27 | 11.7 | 9.485 | 7.20 | 14.3 | 4.40 |
| S96T001221 | | Lower ½ | 7.87 | 8.44 | 8.155 | | | |
| S96T001222 | 93: 2 | Upper ½ | 7.66 | 7.72 | 7.69 | | | |
| S96T001223 | | Lower ½ | 7.6 | 7.59 | 7.595 | | | |
| S96T001255 | 94: 1 | Upper ½ | 6.93 | 6.55 | 6.74 | | | |
| S96T001256 | | Lower ½ | 6.95 | 7.06 | 7.005 | | | |
| S96T003627 | 94: 2 | Upper ½ | 7.14 | 6.57 | 6.855 | | | |
| S96T001258 | | Lower ½ | < 4.050 | < 4.10 | < 4.075 | | | |

Table A-27. Tank 241-B-106 Analytical Results: Silver. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | < 9.290 | < 9.39 | < 9.34 | < 7.42 | n/a | < 4.40 |
| S96T001645 | 94 | n/a | < 5.480 | < 5.52 | < 5.50 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | < 5.840 | < 5.86 | < 5.85 | < 6.37 | n/a | < 3.78 |
| S96T001648 | 94 | n/a | 6.8 | 6.98 | 6.89 | | | |

Table A-28. Tank 241-B-106 Analytical Results: Sodium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 99,600 | 1.00E+05 | 99,800 | 1.09E+05 | 6.75 | 66,600 |
| S96T001214 | | Lower ½ | 1.10E+05 | 1.10E+05 | 1.10E+05 | | | |
| S96T001228 | 93: 2 | Upper ½ | 1.02E+05 | 98,200 | 1.00E+05 | | | |
| S96T001229 | | Lower ½ | 1.21E+05 | 1.22E+05 | 1.22E+05 | | | |
| S96T001240 | 94: 1 | Upper ½ | 93,300 | 92,400 | 92,800[QC:b] | | | |
| S96T001241 | | Lower ½ | 91,000 | 90,900 | 91,000[QC:b] | | | |
| S96T003625 | 94: 2 | Upper ½ | 1.04E+05 | 1.63E+05 | 1.34E+05[QC:e] | | | |
| S96T001243 | | Lower ½ | 1.26E+05 | 1.16E+05 | 1.21E+05[QC:b] | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 97,600 | 1.61E+05 | 1.29E+05[QC:e] | 98,100 | 9.26 | 60,000 |
| S96T001221 | | Lower ½ | 1.01E+05 | 1.03E+05 | 1.02E+05[QC:d] | | | |
| S96T001222 | 93: 2 | Upper ½ | 97,600 | 95,300 | 96,400[QC:c] | | | |
| S96T001223 | | Lower ½ | 1.01E+05 | 1.01E+05 | 1.01E+05 | | | |
| S96T001255 | 94: 1 | Upper ½ | 90,000 | 88,800 | 89,400 | | | |
| S96T001256 | | Lower ½ | 88,400 | 89,900 | 89,200 | | | |
| S96T003627 | 94: 2 | Upper ½ | 93,600 | 91,100 | 92,400 | | | |
| S96T001258 | | Lower ½ | 88,300 | 82,000 | 85,200[QC:c] | | | |

Table A-28. Tank 241-B-106 Analytical Results: Sodium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 1.01E+05 | 1.67E+05 | 1.34E+05[QC:e] | 1.15E+05 | 16.4 | 68,300 |
| S96T001645 | 94 | n/a | 95,400 | 97,000 | 96,200[QC:d] | | | |
| **Core composite: water digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | 96,200 | 97,800 | 97,000 | 97,600 | 0.886 | 57,900 |
| S96T001648 | 94 | n/a | 96,300 | 99,900 | 98,100 | | | |

Table A-29. Tank 241-B-106 Analytical Results: Strontium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 292 | 302 | 297 | 389 | 13.5 | 238 |
| S96T001214 | | Lower ½ | 431 | 441 | 436 | | | |
| S96T001228 | 93: 2 | Upper ½ | 515 | 489 | 502 | | | |
| S96T001229 | | Lower ½ | 153 | 128 | 140.5 | | | |
| S96T001240 | 94: 1 | Upper ½ | 384 | 376 | 380 | | | |
| S96T001241 | | Lower ½ | 399 | 393 | 396 | | | |
| S96T003625 | 94: 2 | Upper ½ | 617 | 970 | 793.5 | | | |
| S96T001243 | | Lower ½ | 181 | 149 | 165 | | | |
| **Solids: water digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 9.63 | 5.61 | 7.62 | < 6.90 | n/a | < 4.22 |
| S96T001221 | | Lower ½ | < 4.330 | < 4.49 | < 4.41 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 4.450 | < 4.47 | < 4.46 | | | |
| S96T001223 | | Lower ½ | < 3.810 | < 3.89 | < 3.85 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 3.930 | 12.3 | 8.115 | | | |
| S96T001256 | | Lower ½ | < 4.260 | < 4.29 | < 4.275 | | | |
| S96T003627 | 94: 2 | Upper ½ | 23.7 | 13.1 | 18.4 | | | |
| S96T001258 | | Lower ½ | < 4.050 | < 4.10 | < 4.075 | | | |

Table A-29. Tank 241-B-106 Analytical Results: Strontium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 348 | 587 | 467.5 | 420 | 13.4 | 249 |
| S96T001645 | 94 | n/a | 368 | 375 | 371.5 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 5.840 | < 5.86 | < 5.85 | 4.03 | 45.1 | 2.39 |
| S96T001648 | 94 | n/a | 2.21 | 2.22 | 2.215 | | | |

Table A-30. Tank 241-B-106 Analytical Results: Sulfur. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 5,180 | 5,210 | 5,200 | 5,470 | 4.82 | 3,340 |
| S96T001214 | | Lower ½ | 5,660 | 5,590 | 5,620 | | | |
| S96T001228 | 93: 2 | Upper ½ | 5,310 | 5,080 | 5,200 | | | |
| S96T001229 | | Lower ½ | 5,660 | 5,780 | 5,720 | | | |
| S96T001240 | 94: 1 | Upper ½ | 4,870 | 4,810 | 4,840 | | | |
| S96T001241 | | Lower ½ | 4,800 | 4,960 | 4,880 | | | |
| S96T003625 | 94: 2 | Upper ½ | 5,070 | 7,900 | 6,480 | | | |
| S96T001243 | | Lower ½ | 5,880 | 5,740 | 5,810 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 5,160 | 8,550 | 6,860 | 5,440 | 5.42 | 3,330 |
| S96T001221 | | Lower ½ | 5,490 | 5,600 | 5,540 | | | |
| S96T001222 | 93: 2 | Upper ½ | 5,190 | 5,000 | 5,100 | | | |
| S96T001223 | | Lower ½ | 5,580 | 5,340 | 5,460 | | | |
| S96T001255 | 94: 1 | Upper ½ | 4,990 | 4,850 | 4,920 | | | |
| S96T001256 | | Lower ½ | 5,040 | 5,050 | 5,040 | | | |
| S96T003627 | 94: 2 | Upper ½ | 5,300 | 5,200 | 5,250 | | | |
| S96T001258 | | Lower ½ | 5,580 | 5,180 | 5,380 | | | |

Table A-30. Tank 241-B-106 Analytical Results: Sulfur. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 5,280 | 8,660 | 6,970 | 6,110 | 14.2 | 3,630 |
| S96T001645 | 94 | n/a | 5,180 | 5,300 | 5,240 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | 5,030 | 5,130 | 5,080 | 5,340 | 4.78 | 3,170 |
| S96T001648 | 94 | n/a | 5,500 | 5,680 | 5,590 | | | |

Table A-31. Tank 241-B-106 Analytical Results: Thallium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 210 | < 202 | < 206 | < 144 | n/a | < 88.0 |
| S96T001214 | | Lower ½ | < 190 | < 197 | < 193.5 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 188 | < 185 | < 186.5 | | | |
| S96T001229 | | Lower ½ | < 210 | < 209 | < 209.5 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 92.40 | < 94.4 | < 93.4 | | | |
| S96T001241 | | Lower ½ | < 95.60 | < 102 | < 98.8 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 66.90 | < 71.9 | < 69.4 | | | |
| S96T001243 | | Lower ½ | < 96.00 | < 99.6 | < 97.8 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 80.90 | < 81.4 | < 81.15 | < 82.3 | n/a | < 50.3 |
| S96T001221 | | Lower ½ | < 86.60 | < 89.8 | < 88.2 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 89.00 | < 89.3 | < 89.15 | | | |
| S96T001223 | | Lower ½ | < 76.30 | < 77.8 | < 77.05 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 78.70 | < 76.6 | < 77.65 | | | |
| S96T001256 | | Lower ½ | < 85.20 | < 85.9 | < 85.55 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 78.20 | < 77.7 | < 77.95 | | | |
| S96T001258 | | Lower ½ | < 80.90 | < 82.1 | < 81.5 | | | |

Table A-31. Tank 241-B-106 Analytical Results: Thallium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | < 186 | < 188 | < 187 | < 149 | n/a | < 88.4 |
| S96T001645 | 94 | n/a | < 110 | < 110 | < 110 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 117 | < 117 | < 117 | < 79.1 | n/a | < 47.0 |
| S96T001648 | 94 | n/a | < 42.10 | < 40.4 | < 41.25 | | | |

Table A-32. Tank 241-B-106 Analytical Results: Titanium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 94.9 | 97.8 | 96.35 | 47.5 | 47.8 | 29.0 |
| S96T001214 | | Lower ½ | 125 | 126 | 125.5 | | | |
| S96T001228 | 93: 2 | Upper ½ | 28.6 | 26 | 27.3 | | | |
| S96T001229 | | Lower ½ | < 10.50 | < 10.5 | < 10.5 | | | |
| S96T001240 | 94: 1 | Upper ½ | 90.4 | 87.1 | 88.75 | | | |
| S96T001241 | | Lower ½ | 9.99 | 10.6 | 10.29 | | | |
| S96T003625 | 94: 2 | Upper ½ | 10.7 | 16.1 | 13.4 | | | |
| S96T001243 | | Lower ½ | 9.59 | 6.87 | 8.23 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 4.040 | < 4.07 | < 4.055 | < 4.11 | n/a | < 2.51 |
| S96T001221 | | Lower ½ | < 4.330 | < 4.49 | < 4.41 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 4.450 | < 4.47 | < 4.46 | | | |
| S96T001223 | | Lower ½ | < 3.810 | < 3.89 | < 3.85 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 3.930 | < 3.83 | < 3.88 | | | |
| S96T001256 | | Lower ½ | < 4.260 | < 4.29 | < 4.275 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 3.910 | < 3.89 | < 3.90 | | | |
| S96T001258 | | Lower ½ | < 4.050 | < 4.10 | < 4.075 | | | |

Table A-32. Tank 241-B-106 Analytical Results: Titanium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 60.6 | 98.4 | 79.5 | 61.0 | 30.3 | 36.2 |
| S96T001645 | 94 | n/a | 42.3 | 42.8 | 42.55 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 5.840 | < 5.86 | < 5.85 | < 3.96 | n/a | < 2.35 |
| S96T001648 | 94 | n/a | < 2.100 | < 2.02 | < 2.06 | | | |

Table A-33. Tank 241-B-106 Analytical Results: Uranium (ICP). (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 5,920 | 6,220 | 6,070 | 11,800 | 23.6 | 7,210 |
| S96T001214 | | Lower ½ | 9,590 | 9,720 | 9,660 | | | |
| S96T001228 | 93: 2 | Upper ½ | 19,300 | 18,500 | 18,900 | | | |
| S96T001229 | | Lower ½ | 1,630 | 1,360 | 1,500 | | | |
| S96T001240 | 94: 1 | Upper ½ | 8,440 | 8,200 | 8,320 | | | |
| S96T001241 | | Lower ½ | 17,100 | 16,800 | 17,000 | | | |
| S96T003625 | 94: 2 | Upper ½ | 21,700 | 34,400 | 28,000 | | | |
| S96T001243 | | Lower ½ | 6,440 | 3,860 | 5,150 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 202 | < 203 | < 202.5 | < 206 | n/a | < 126 |
| S96T001221 | | Lower ½ | < 216 | < 225 | < 220.5 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 222 | < 223 | < 222.5 | | | |
| S96T001223 | | Lower ½ | < 191 | < 194 | < 192.5 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 197 | < 191 | < 194 | | | |
| S96T001256 | | Lower ½ | < 213 | < 215 | < 214 | | | |
| S96T003627 | 94: 2 | Upper ½ | 204 | < 194 | 199 | | | |
| S96T001258 | | Lower ½ | < 202 | < 205 | < 203.5 | | | |

Table A-33. Tank 241-B-106 Analytical Results: Uranium (ICP). (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Core composite: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | 10,300 | 17,100 | 13,700 | 12,300 | 13.0 | 7,300 |
| S96T001645 | 94 | n/a | 10,800 | 11,100 | 10,950 | | | |
| **Core composite: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 292 | < 293 | < 292.5 | < 198 | n/a | < 118 |
| S96T001648 | 94 | n/a | < 105 | < 101 | < 103 | | | |

Table A-34. Tank 241-B-106 Analytical Results: Uranium (Phosphorescence).

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S95T001279 | 93: 1 | Upper ½ | 7,600 | 7,700 | 7,650 | 11,000 | 16.7 | 6,720 |
| S95T001277 | | Lower ½ | 8,440 | 8,820 | 8,630 | | | |
| S95T001285 | 93: 2 | Upper ½ | 1,930 | 1,580 | 1,760 | | | |
| S95T001282 | | Lower ½ | 19,100 | 22,200 | 20,600 | | | |
| S95T001303 | 94: 1 | Upper ½ | 7,380 | 9,060 | 8,220[QC:e] | | | |
| S95T001299 | | Lower ½ | 20,500 | 21,900 | 21,200[QC:d] | | | |
| S95T001311 | 94: 2 | Upper ½ | 17,400 | 16,200 | 16,800 | | | |
| S95T001307 | | Lower ½ | 3,070 | 3,310 | 3,190 | | | |
| Core composite: fusion | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001220 | 93 | n/a | 9,510 | 10,300 | 9,900 | 10,400 | 5.01 | 6,170 |
| S96T001647 | 94 | n/a | 11,000 | 10,900 | 11,000[QC:e] | | | |

Table A-35. Tank 241-B-106 Analytical Results: Vanadium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 52.50 | < 50.6 | < 51.55 | < 36.1 | n/a | < 22.1 |
| S96T001214 | | Lower ½ | < 47.40 | < 49.2 | < 48.3 | | | |
| S96T001228 | 93: 2 | Upper ½ | < 47.00 | < 46.2 | < 46.6 | | | |
| S96T001229 | | Lower ½ | < 52.40 | < 52.3 | < 52.35 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 23.10 | < 23.6 | < 23.35 | | | |
| S96T001241 | | Lower ½ | < 23.90 | < 25.4 | < 24.65 | | | |
| S96T003625 | 94: 2 | Upper ½ | < 16.70 | < 18.0 | < 17.35 | | | |
| S96T001243 | | Lower ½ | < 24.00 | < 24.9 | < 24.45 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 20.20 | < 20.3 | < 20.25 | < 20.6 | n/a | < 12.6 |
| S96T001221 | | Lower ½ | < 21.60 | < 22.5 | < 22.05 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 22.20 | < 22.3 | < 22.25 | | | |
| S96T001223 | | Lower ½ | < 19.10 | < 19.4 | < 19.25 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 19.70 | < 19.1 | < 19.4 | | | |
| S96T001256 | | Lower ½ | < 21.30 | < 21.5 | < 21.4 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 19.50 | < 19.4 | < 19.45 | | | |
| S96T001258 | | Lower ½ | < 20.20 | < 20.5 | < 20.35 | | | |

Table A-35. Tank 241-B-106 Analytical Results: Vanadium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001230 | 93 | n/a | < 46.50 | < 47.0 | < 46.75 | < 37.1 | n/a | < 22.0 |
| S96T001645 | 94 | n/a | < 27.40 | < 27.6 | < 27.5 | | | |
| Core composite: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001224 | 93 | n/a | < 29.20 | < 29.3 | < 29.25 | < 19.8 | n/a | < 11.8 |
| S96T001648 | 94 | n/a | < 10.50 | < 10.1 | < 10.3 | | | |

Table A-36. Tank 241-B-106 Analytical Results: Zinc. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: acid digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | 112 | 102 | 107 | 117 | 13.5 | 71.5 |
| S96T001214 | | Lower ½ | 108 | 117 | 112.5 | | | |
| S96T001228 | 93: 2 | Upper ½ | 128 | 121 | 124.5 | | | |
| S96T001229 | | Lower ½ | 203 | 165 | 184 | | | |
| S96T001240 | 94: 1 | Upper ½ | 87 | 84 | 85.5 | | | |
| S96T001241 | | Lower ½ | 69.3 | 73.8 | 71.55 | | | |
| S96T003625 | 94: 2 | Upper ½ | 109 | 168 | 138.5 | | | |
| S96T001243 | | Lower ½ | 126 | 100 | 113 | | | |
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | 8.26 | 9.91 | 9.085 | 6.95 | 11.7 | 4.25 |
| S96T001221 | | Lower ½ | 5.22 | 5.56 | 5.39 | | | |
| S96T001222 | 93: 2 | Upper ½ | 5.12 | 5.76 | 5.44 | | | |
| S96T001223 | | Lower ½ | 5.67 | 6.53 | 6.1 | | | |
| S96T001255 | 94: 1 | Upper ½ | 4.99 | 7.69 | 6.34 | | | |
| S96T001256 | | Lower ½ | 4.91 | 5.07 | 4.99 | | | |
| S96T003627 | 94: 2 | Upper ½ | 12.5 | 9.77 | 11.13 | | | |
| S96T001258 | | Lower ½ | < 4.050 | 10.2 | 7.125 | | | |

Table A-36. Tank 241-B-106 Analytical Results: Zinc. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 110 | 166 | 138 | 110 | 25.6 | 65.3 |
| S96T001645 | 94 | n/a | 81.1 | 82.4 | 81.75 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | 11.4 | 8.6 | 10 | 8.04 | 24.4 | 4.77 |
| S96T001648 | 94 | n/a | 5.98 | 6.18 | 6.08 | | | |

Table A-37. Tank 241-B-106 Analytical Results: Zirconium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: acid digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001199 | 93: 1 | Upper ½ | < 10.50 | 11.4 | 10.95 | 52.0 | 52.2 | 31.8 |
| S96T001214 | | Lower ½ | 10.9 | < 9.84 | 10.4 | | | |
| S96T001228 | 93: 2 | Upper ½ | 15.8 | 11.4 | 13.6 | | | |
| S96T001229 | | Lower ½ | 148 | 121 | 134.5 | | | |
| S96T001240 | 94: 1 | Upper ½ | < 4.620 | < 4.72 | < 4.67 | | | |
| S96T001241 | | Lower ½ | < 4.780 | < 5.09 | < 4.935 | | | |
| S96T003625 | 94: 2 | Upper ½ | 12.2 | 18.3 | 15.25 | | | |
| S96T001243 | | Lower ½ | 230 | 213 | 221.5 | | | |
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001210 | 93: 1 | Upper ½ | < 4.040 | < 4.07 | < 4.055 | < 4.11 | n/a | < 2.51 |
| S96T001221 | | Lower ½ | < 4.330 | < 4.49 | < 4.41 | | | |
| S96T001222 | 93: 2 | Upper ½ | < 4.450 | < 4.47 | < 4.46 | | | |
| S96T001223 | | Lower ½ | < 3.810 | < 3.89 | < 3.85 | | | |
| S96T001255 | 94: 1 | Upper ½ | < 3.930 | < 3.83 | < 3.88 | | | |
| S96T001256 | | Lower ½ | < 4.260 | < 4.29 | < 4.275 | | | |
| S96T003627 | 94: 2 | Upper ½ | < 3.910 | < 3.89 | < 3.90 | | | |
| S96T001258 | | Lower ½ | < 4.050 | < 4.10 | < 4.075 | | | |

Table A-37. Tank 241-B-106 Analytical Results: Zirconium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Core composite: acid digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001230 | 93 | n/a | 24.8 | 34.1 | 29.45 | 28.0 | 7.60 | 16.6 |
| S96T001645 | 94 | n/a | 25.4 | 27.7 | 26.55 | | | |
| Core composite: water digest | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001224 | 93 | n/a | 7.07 | < 5.86 | 6.465 | 4.60 | n/a | 2.73 |
| S96T001648 | 94 | n/a | 2.74 | 2.74 | 2.74 | | | |

Table A-38. Tank 241-B-106 Analytical Results: Chloride.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: water digest** | | | **μg/g** | **μg/g** | **μg/g** | **μg/g** | **%** | **kg** |
| S96T001200 | 93: 1 | Upper ½ | < 137 | 4,670 | 2,400 | 1,520 | 15.7 | 929 |
| S96T001216 | | Lower ½ | 1,370 | 1,540 | 1,450 | | | |
| S96T001244 | 93: 2 | Upper ½ | 1,400 | 1,360 | 1,380 | | | |
| S96T001245 | | Lower ½ | 1,160 | 1,210 | 1,180 | | | |
| S96T001247 | 94: 1 | Upper ½ | 1,240 | 1,270 | 1,250 | | | |
| S96T001248 | | Lower ½ | 1,360 | 1,240 | 1,300 | | | |
| S96T003626 | 94: 2 | Upper ½ | 1,450 | 1,360 | 1,410 | | | |
| S96T001250 | | Lower ½ | 1,040 | 2,480 | 1,760 | | | |
| **Core composite: water digest** | | | **μg/g** | **μg/g** | **μg/g** | **μg/g** | **%** | **kg** |
| S96T001246 | 93 | n/a | 1,270 | 1,310 | 1,290 | 1,270 | 1.98 | 754 |
| S96T001646 | 94 | n/a | 1,230 | 1,250 | 1,240 | | | |

Table A-39. Tank 241-B-106 Analytical Results: Fluoride.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001200 | 93: 1 | Upper ½ | 719 | 981 | 850.1[QC:e] | 3,490 | 46.5 | 2,130 |
| S96T001216 | | Lower ½ | 854 | 952 | 903.1 | | | |
| S96T001244 | 93: 2 | Upper ½ | 1,970 | 1,830 | 1,900 | | | |
| S96T001245 | | Lower ½ | 6,080 | 11,800 | 8,940[QC:e] | | | |
| S96T001247 | 94: 1 | Upper ½ | 719 | 710 | 714.6 | | | |
| S96T001248 | | Lower ½ | 498 | 494 | 496.1 | | | |
| S96T003626 | 94: 2 | Upper ½ | 2,760 | 2,840 | 2,800 | | | |
| S96T001250 | | Lower ½ | 12,300 | 10,400 | 11,300 | | | |
| Core composite | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001246 | 93 | n/a | 5,660 | 5,820 | 5,740[QC:e] | 4,920 | 16.7 | 2,920 |
| S96T001646 | 94 | n/a | 4,050 | 4,150 | 4,100 | | | |

Table A-40. Tank 241-B-106 Analytical Results: Nitrate.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: water digest** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001200 | 93: 1 | Upper ½ | 1.84E+05 | 2.96E+05 | 2.40E+05[QC:e] | 1.89E+05 | 5.37 | 1.16E+05 |
| S96T001216 | | Lower ½ | 1.82E+05 | 2.07E+05 | 1.94E+05 | | | |
| S96T001244 | 93: 2 | Upper ½ | 1.92E+05 | 1.35184E+05 | 1.88E+05 | | | |
| S96T001245 | | Lower ½ | 1.68E+05 | 1.77E+05 | 1.73E+05 | | | |
| S96T001247 | 94: 1 | Upper ½ | 1.56E+05 | 1.76E+05 | 1.66E+05 | | | |
| S96T001248 | | Lower ½ | 1.95E+05 | 1.80E+05 | 1.88E+05 | | | |
| S96T003626 | 94: 2 | Upper ½ | 1.96E+05 | 1.90E+05 | 1.93E+05 | | | |
| S96T001250 | | Lower ½ | 1.65E+05 | 1.70E+05 | 1.68E+05 | | | |
| **Core composite** | | | μg/g | μg/g | μg/g | μg/g | % | kg |
| S96T001246 | 93 | n/a | 1.83E+05 | 1.86E+05 | 1.85E+05 | 1.81E+05 | 2.08 | 1.07E+05 |
| S96T001646 | 94 | n/a | 1.73E+05 | 1.81E+05 | 1.77E+05 | | | |

Table A-41. Tank 241-B-106 Analytical Results: Nitrite.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: water digest | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001200 | 93: 1 | Upper ½ | < 864 | 13,500 | 7,180 | 7,540 | 8.07 | 4,610 |
| S96T001216 | | Lower ½ | 8,270 | 9,230 | 8,750 | | | |
| S96T001244 | 93: 2 | Upper ½ | 8,300 | 7,880 | 8,090 | | | |
| S96T001245 | | Lower ½ | 6,720 | 7,060 | 6,890 | | | |
| S96T001247 | 94: 1 | Upper ½ | 7,270 | 7,620 | 7,450 | | | |
| S96T001248 | | Lower ½ | 8,530 | 7,330 | 7,930 | | | |
| S96T003626 | 94: 2 | Upper ½ | 7,840 | 7,410 | 7,620 | | | |
| S96T001250 | | Lower ½ | 6,230 | 6,590 | 6,410 | | | |
| Core composite | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001246 | 93 | n/a | 7,680 | 7,900 | 7,790 | 7,610 | 2.43 | 4,520 |
| S96T001646 | 94 | n/a | 7,260 | 7,580 | 7,420 | | | |

Table A-42. Tank 241-B-106 Analytical Results: Oxalate.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: water digest** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001200 | 93: 1 | Upper ½ | < 848 | < 853 | < 850.5 | < 706 | n/a | < 432 |
| S96T001216 | | Lower ½ | < 908 | < 942 | < 925 | | | |
| S96T001244 | 93: 2 | Upper ½ | < 478 | < 480 | < 479 | | | |
| S96T001245 | | Lower ½ | < 410 | < 418 | < 414 | | | |
| S96T001247 | 94: 1 | Upper ½ | < 825 | < 803 | < 814 | | | |
| S96T001248 | | Lower ½ | < 894 | 926 | 910 | | | |
| S96T003626 | 94: 2 | Upper ½ | < 819 | < 815 | < 817 | | | |
| S96T001250 | | Lower ½ | < 435 | < 441 | < 438 | | | |
| **Core composite** | | | µg/g | µg/g | µg/g | µg/g | % | kg |
| S96T001246 | 93 | n/a | < 502 | < 503 | < 502.5 | < 473 | n/a | < 281 |
| S96T001646 | 94 | n/a | < 452 | < 434 | < 443 | | | |

Table A-43. Tank 241-B-106 Analytical Results: Phosphate.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: water digest** | | | **μg/g** | **μg/g** | **μg/g** | **μg/g** | **%** | **kg** |
| S96T001200 | 93: 1 | Upper ½ | 43,000 | 59,500 | 51,300[QC:e] | 28,600 | 14.6 | 17,500 |
| S96T001216 | | Lower ½ | 28,800 | 32,600 | 30,700 | | | |
| S96T001244 | 93: 2 | Upper ½ | 30,000 | 28,100 | 29,100 | | | |
| S96T001245 | | Lower ½ | 16,500 | 23,500 | 20,000[QC:e] | | | |
| S96T001247 | 94: 1 | Upper ½ | 24,200 | 27,800 | 26,000 | | | |
| S96T001248 | | Lower ½ | 26,600 | 25,200 | 25,900 | | | |
| S96T003626 | 94: 2 | Upper ½ | 31,600 | 29,700 | 30,600 | | | |
| S96T001250 | | Lower ½ | 14,500 | 15,800 | 15,200 | | | |
| **Core composite** | | | **μg/g** | **μg/g** | **μg/g** | **μg/g** | **%** | **kg** |
| S96T001246 | 93 | n/a | 32,700 | 33,800 | 33,200 | 30,400 | 9.47 | 18,000 |
| S96T001646 | 94 | n/a | 27,000 | 28,000 | 27,500 | | | |

Table A-44. Tank 241-B-106 Analytical Results: Sulfate.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: water digest** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001200 | 93: 1 | Upper ½ | 14,400 | 22,000 | 18,200 | 14,700 | 4.63 | 8,990 |
| S96T001216 | | Lower ½ | 14,000 | 16,100 | 15,100 | | | |
| S96T001244 | 93: 2 | Upper ½ | 14,200 | 13,200 | 13,700 | | | |
| S96T001245 | | Lower ½ | 13,000 | 14,400 | 13,700 | | | |
| S96T001247 | 94: 1 | Upper ½ | 12,100 | 13,300 | 12,700 | | | |
| S96T001248 | | Lower ½ | 15,400 | 14,500 | 14,900 | | | |
| S96T003626 | 94: 2 | Upper ½ | 14,800 | 14,500 | 14,600 | | | |
| S96T001250 | | Lower ½ | 13,900 | 14,600 | 14,300 | | | |
| **Core composite** | | | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **kg** |
| S96T001246 | 93 | n/a | 13,900 | 14,300 | 14,100 | 13,900 | 1.62 | 8,250 |
| S96T001646 | 94 | n/a | 13,300 | 14,000 | 13,700 | | | |

Table A-45. Tank 241-B-106 Analytical Results: Ce/Pr-144.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 1.406 | < 1.38 | < 1.39 | < 0.672 | n/a | < 411 |
| S95T001277 | | Lower ½ | < 0.876 | < 0.890 | < 0.883 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.337 | < 0.319 | < 0.328 | | | |
| S95T001282 | | Lower ½ | < 0.891 | < 0.924 | < 0.9075 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 0.866 | < 0.860 | < 0.863 | | | |
| S95T001299 | | Lower ½ | < 0.477 | < 0.466 | < 0.4715 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.374 | < 0.374 | < 0.374 | | | |
| S95T001307 | | Lower ½ | < 0.157 | < 0.154 | < 0.1555 | | | |
| **Core composite: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 1.255 | < 1.31 | < 1.283 | < 0.807 | n/a | < 0.479 |
| S96T001647 | 94 | n/a | < 0.329 | < 0.333 | < 0.331 | | | |

Table A-46. Tank 241-B-106 Analytical Results: Cesium-134.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 0.105 | < 0.0975 | < 0.101 | < 0.0471 | n/a | < 28.8 |
| S95T001277 | | Lower ½ | < 0.0646 | < 0.0589 | < 0.06175 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.0245 | < 0.0242 | < 0.02435 | | | |
| S95T001282 | | Lower ½ | < 0.0630 | < 0.0571 | < 0.06005 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 0.0512 | < 0.0619 | < 0.05655 | | | |
| S95T001299 | | Lower ½ | < 0.0292 | < 0.0288 | < 0.029 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.0302 | < 0.0305 | < 0.03035 | | | |
| S95T001307 | | Lower ½ | < 0.0134 | < 0.0130 | < 0.0132 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 0.0972 | < 0.100 | < 0.0986 | < 0.0621 | n/a | < 0.0369 |
| S96T001647 | 94 | n/a | < 0.0253 | < 0.0257 | < 0.0255 | | | |

Table A-47. Tank 241-B-106 Analytical Results: Cesium-137.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | 51.6 | 51.8 | 51.7 | 19.7 | 26.1 | 12,000 |
| S95T001277 | | Lower ½ | 10.06 | 10.4 | 10.23 | | | |
| S95T001285 | 93: 2 | Upper ½ | 13.34 | 12.2 | 12.77 | | | |
| S95T001282 | | Lower ½ | 15.8 | 16.8 | 16.3 | | | |
| S95T001303 | 94: 1 | Upper ½ | 10.37 | 10.1 | 10.23 | | | |
| S95T001299 | | Lower ½ | 5.968 | 6.03 | 5.999 | | | |
| S95T001311 | 94: 2 | Upper ½ | 39.01 | 38.7 | 38.86 | | | |
| S95T001307 | | Lower ½ | 11.97 | 11.0 | 11.48 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | 22.6 | 23 | 22.8 | 22.7 | 0.551 | 13,500 |
| S96T001647 | 94 | n/a | 22.4 | 22.7 | 22.55 | | | |

Table A-48. Tank 241-B-106 Analytical Results: Cobalt-60.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 0.0595 | < 0.0561 | < 0.0578 | < 0.0336 | n/a | < 20.5 |
| S95T001277 | | Lower ½ | < 0.0530 | < 0.0445 | < 0.04875 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.0113 | < 0.0139 | < 0.0126 | | | |
| S95T001282 | | Lower ½ | < 0.0458 | < 0.0363 | < 0.04105 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 0.0619 | < 0.0629 | < 0.0624 | | | |
| S95T001299 | | Lower ½ | < 0.0255 | < 0.0241 | < 0.0248 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.0133 | < 0.0135 | < 0.0134 | | | |
| S95T001307 | | Lower ½ | < 0.00726 | < 0.00883 | < 0.008045 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 0.0890 | < 0.0922 | < 0.0906 | < 0.0527 | n/a | < 31.3 |
| S96T001647 | 94 | n/a | < 0.0143 | < 0.0151 | < 0.0147 | | | |

Table A-49. Tank 241-B-106 Analytical Results: Europium-154.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 0.156 | < 0.162 | < 0.159 | < 0.101 | n/a | < 61.8 |
| S95T001277 | | Lower ½ | < 0.162 | < 0.155 | < 0.1585 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.0439 | < 0.0466 | < 0.04525 | | | |
| S95T001282 | | Lower ½ | < 0.122 | < 0.166 | < 0.144 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 0.154 | < 0.164 | < 0.159 | | | |
| S95T001299 | | Lower ½ | < 0.0717 | < 0.0719 | < 0.0718 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.0444 | < 0.0422 | < 0.0433 | | | |
| S95T001307 | | Lower ½ | < 0.0238 | < 0.0255 | < 0.02465 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 0.274 | < 0.295 | < 0.2845 | < 0.165 | n/a | < 98.0 |
| S96T001647 | 94 | n/a | < 0.0421 | < 0.0470 | < 0.04455 | | | |

Table A-50. Tank 241-B-106 Analytical Results: Europium-155.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 0.398 | < 0.385 | < 0.3915 | < 0.191 | n/a | < 117 |
| S95T001277 | | Lower ½ | < 0.247 | < 0.263 | < 0.255 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.0903 | < 0.0887 | < 0.0895 | | | |
| S95T001282 | | Lower ½ | < 0.245 | < 0.262 | < 0.2535 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 0.257 | < 0.261 | < 0.259 | | | |
| S95T001299 | | Lower ½ | < 0.138 | < 0.135 | < 0.1365 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.103 | < 0.104 | < 0.1035 | | | |
| S95T001307 | | Lower ½ | < 0.0413 | < 0.0413 | < 0.0413 | | | |
| **Core composite: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 0.288 | < 0.311 | < 0.2995 | < 0.196 | n/a | < 116 |
| S96T001647 | 94 | n/a | < 0.0933 | < 0.0929 | < 0.0931 | | | |

Table A-51. Tank 241-B-106 Analytical Results: Niobium-94.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 0.0434 | < 0.0412 | < 0.0423 | < 0.0284 | n/a | < 17.4 |
| S95T001277 | | Lower ½ | < 0.0448 | < 0.0411 | < 0.04295 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.0115 | < 0.0111 | < 0.0113 | | | |
| S95T001282 | | Lower ½ | < 0.0417 | < 0.0389 | < 0.0403 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 0.0452 | < 0.0447 | < 0.04495 | | | |
| S95T001299 | | Lower ½ | < 0.0241 | < 0.0236 | < 0.02385 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.0152 | < 0.0139 | < 0.01455 | | | |
| S95T001307 | | Lower ½ | < 0.00627 | < 0.00734 | < 0.006805 | | | |
| **Core composite: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 0.0725 | < 0.101 | < 0.08675 | < 0.0507 | n/a | < 30.1 |
| S96T001647 | 94 | n/a | < 0.0141 | < 0.0150 | < 0.01455 | | | |

Table A-52. Tank 241-B-106 Analytical Results: Radium-226.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 2.712 | < 2.76 | < 2.74 | < 1.26 | n/a | < 770 |
| S95T001277 | | Lower ½ | < 1.585 | < 1.52 | < 1.55 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.670 | < 0.656 | < 0.663 | | | |
| S95T001282 | | Lower ½ | < 1.654 | < 1.68 | < 1.67 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 1.586 | < 1.59 | < 1.59 | | | |
| S95T001299 | | Lower ½ | < 0.799 | < 0.800 | < 0.7995 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.769 | < 0.767 | < 0.768 | | | |
| S95T001307 | | Lower ½ | < 0.320 | < 0.317 | < 0.3185 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 2.541 | < 2.69 | < 2.62 | < 1.63 | n/a | < 968 |
| S96T001647 | 94 | n/a | < 0.643 | < 0.642 | < 0.6425 | | | |

Table A-53. Tank 241-B-106 Analytical Results: Ru/Rh-106.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 2.042 | < 1.86 | < 1.951 | < 0.965 | n/a | < 590 |
| S95T001277 | | Lower ½ | < 1.131 | < 1.28 | < 1.206 | | | |
| S95T001285 | 93: 2 | Upper ½ | < 0.551 | < 0.482 | < 0.5165 | | | |
| S95T001282 | | Lower ½ | < 1.312 | < 1.19 | < 1.251 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 1.299 | < 1.23 | < 1.265 | | | |
| S95T001299 | | Lower ½ | < 0.713 | < 0.625 | < 0.669 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.609 | < 0.592 | < 0.6005 | | | |
| S95T001307 | | Lower ½ | < 0.261 | < 0.256 | < 0.2585 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | < 1.920 | < 1.97 | < 1.945 | < 1.22 | n/a | < 724 |
| S96T001647 | 94 | n/a | < 0.493 | < 0.498 | < 0.4955 | | | |

Table A-54. Tank 241-B-106 Analytical Results: Strontium-89/90.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | 111 | 109 | 110 | 68.7 | 27.7 | 42,000 |
| S95T001277 | | Lower ½ | 116 | 119 | 117.5 | | | |
| S95T001285 | 93: 2 | Upper ½ | 7.42 | 6.45 | 6.935 | | | |
| S95T001282 | | Lower ½ | 76.8 | 82.8 | 79.8 | | | |
| S95T001303 | 94: 1 | Upper ½ | 106 | 108 | 107 | | | |
| S95T001299 | | Lower ½ | 64.6 | 64.7 | 64.65 | | | |
| S95T001311 | 94: 2 | Upper ½ | 59 | 58 | 58.5 | | | |
| S95T001307 | | Lower ½ | 5.05 | 4.73 | 4.89 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | 86.4 | 89.5 | 87.95 | 84.3 | 4.36 | 50,000 |
| S96T001647 | 94 | n/a | 80.5 | 80.7 | 80.6 | | | |

Table A-55. Tank 241-B-106 Analytical Results: Total Alpha.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | < 0.0819 | < 0.0600 | < 0.07095 | < 0.0480 | n/a | < 29.3 |
| S95T001277 | | Lower ½ | < 0.0340 | < 0.0455 | < 0.03975 | | | |
| S95T001285 | 93: 2 | Upper ½ | 0.054 | 0.0525 | 0.05325 | | | |
| S95T001282 | | Lower ½ | < 0.0562 | < 0.0541 | < 0.05515 | | | |
| S95T001303 | 94: 1 | Upper ½ | < 0.0380 | < 0.0373 | < 0.03765 | | | |
| S95T001299 | | Lower ½ | < 0.0361 | < 0.0356 | < 0.03585 | | | |
| S95T001311 | 94: 2 | Upper ½ | < 0.0351 | < 0.0252 | < 0.03015[QC:a] | | | |
| S95T001307 | | Lower ½ | 0.0617 | 0.0613 | 0.0615[QC:a] | | | |
| **Core composite: fusion digest** | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | 0.0459 | 0.0451 | 0.0455[QC:c] | 0.0410 | 11.1 | 24.3 |
| S96T001647 | 94 | n/a | 0.0363 | 0.0365 | 0.0364[QC:b,c] | | | |

Table A-56. Tank 241-B-106 Analytical Results: Total Beta.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S95T001279 | 93: 1 | Upper ½ | 262 | 263 | 262.5 | 154 | 25.3 | 94,100 |
| S95T001277 | | Lower ½ | 247 | 246 | 246.5 | | | |
| S95T001285 | 93: 2 | Upper ½ | 27.7 | 24.7 | 26.2 | | | |
| S95T001282 | | Lower ½ | 173 | 178 | 175.5 | | | |
| S95T001303 | 94: 1 | Upper ½ | 219 | 222 | 220.5 | | | |
| S95T001299 | | Lower ½ | 133 | 136 | 134.5 | | | |
| S95T001311 | 94: 2 | Upper ½ | 146 | 151 | 148.5 | | | |
| S95T001307 | | Lower ½ | 21.2 | 19 | 20.1 | | | |
| Core composite: fusion digest | | | µCi/g | µCi/g | µCi/g | µCi/g | % | Ci |
| S96T001220 | 93 | n/a | 178 | 185 | 181.5 | 173 | 4.91 | 103 |
| S96T001647 | 94 | n/a | 162 | 167 | 164.5 | | | |

Table A-57. Tank 241-B-106 Analytical Results: Total Inorganic Carbon.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| **Solids: direct** | | | μg C/g | μg C/g | μg C/g | μg C/g | % | kg C |
| S96T001198 | 93: 1 | Upper ½ | 273 | 402 | 337.5 | 310 | 4.18 | 190 |
| S96T001212 | | Lower ½ | 307 | 329 | 318 | | | |
| S96T001225 | 93: 2 | Upper ½ | 322 | 366 | 344 | | | |
| S96T001226 | | Lower ½ | 230 | 234 | 232 | | | |
| S96T001236 | 94: 1 | Upper ½ | 338 | 343 | 340.5 | | | |
| S96T001237 | | Lower ½ | 281 | 286 | 283.5 | | | |
| S96T003624 | 94: 2 | Upper ½ | 403 | 298 | 350.5 | | | |
| S96T001239 | | Lower ½ | 277 | 272 | 274.5 | | | |
| **Core composite: direct** | | | μg C/g | μg C/g | μg C/g | μg C/g | % | kg C |
| S96T001227 | 93 | n/a | 319 | 340 | 329.5 | 316 | 4.36 | 188 |
| S96T001644 | 94 | n/a | 297 | 307 | 302 | | | |

Table A-58. Tank 241-B-106 Analytical Results: Total Organic Carbon.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) | Projected Inventory |
|---|---|---|---|---|---|---|---|---|
| Solids: direct | | | μg C/g | μg C/g | μg C/g | μg C/g | % | kg C |
| S96T001198 | 93: 1 | Upper ½ | 11,300 | 12,100 | 11,700 | 1,860 | 81.6 | 1,140 |
| S96T001212 | | Lower ½ | 1,250 | 935 | 1,090[QC:e] | | | |
| S96T001225 | 93: 2 | Upper ½ | 273 | 286 | 279.5 | | | |
| S96T001226 | | Lower ½ | 254 | 246 | 250 | | | |
| S96T001236 | 94: 1 | Upper ½ | 770 | 644 | 707 | | | |
| S96T001237 | | Lower ½ | 278 | 299 | 288.5 | | | |
| S96T003624 | 94: 2 | Upper ½ | 452 | 275 | 363.5[QC:c,e] | | | |
| S96T001239 | | Lower ½ | 179 | 152 | 165.5 | | | |
| Core composite: direct | | | μg C/g | μg C/g | μg C/g | μg C/g | % | kg C |
| S96T001227 | 93 | n/a | 549 | 588 | 568.5 | 505 | 12.6 | 300 |
| S96T001644 | 94 | n/a | 441 | 441 | 441 | | | |

Table A-59. Tank 241-B-106 Analytical Results: Differential Scanning Calorimetry. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Run | Sample Weight | Transition 1 | | Transition 2 | | Transition 3 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Solids: direct | | | | mg | Peak Temp. (°C) | ΔH (J/g) | Peak Temp. (°C) | ΔH (J/g) | Peak Temp. (°C) | ΔH (J/g) |
| S95T001272[1] | 93: 1 | DL | 1 | 11.82 | 109 | 1304 | 293 | 20.0 | -- | -- |
| | | | 2 | 13.51 | 112 | 1447 | 293 | 44.7 | -- | -- |
| S95T001278[1] | | Upper ½ | 1 | 18.47 | 113 | 1209 | 297 | 25.1 | -- | -- |
| | | | 2 | 21.05 | 111 | 1091 | 297 | 22.0 | -- | -- |
| S95T001275[1] | | Lower ½ | 1 | 14.60 | 116 | 1175 | 295 | 28.9 | -- | -- |
| | | | 2 | 24.80 | 109 | 1293 | 294 | 43.5 | -- | -- |
| S95T001284[1] | 93: 2 | Upper ½ | 1 | 39.40 | 107 | 981.2 | 294 | 23.4 | -- | -- |
| | | | 2 | 32.15 | 109 | 1034 | 293 | 20.5 | -- | -- |
| S95T001281[1] | | Lower ½ | 1 | 38.20 | 109 | 841.5 | 291 | 27.9 | -- | -- |
| | | | 2 | 18.30 | 113 | 1305 | 293 | 27.2 | -- | -- |
| S95T001302[1] | 94: 1 | Upper ½ | 1 | 64.48 | 99 | 499.5 | 296 | 24.2 | -- | -- |
| | | | 2 | 69.96 | 101 | 474.2 | 296 | 23.7 | -- | -- |
| S95T001298[1] | | Lower ½ | 1 | 34.10 | 113 | 1069 | 295 | 21.1 | -- | -- |
| | | | 2 | 57.40 | 103 | 555.1 | 294 | 23.6 | -- | -- |
| S95T001310[1] | 94: 2 | Upper ½ | 1 | 28.20 | 109 | 1125 | 293 | 22.4 | -- | -- |
| | | | 2 | 24.90 | 109 | 1258 | 293 | 23.2 | -- | -- |
| S95T001306[1] | | Lower ½ | 1 | 30.10 | 109 | 994.7 | 294 | 21.3 | -- | -- |
| | | | 2 | 31.70 | 105 | 1035 | 294 | 22.5 | -- | -- |

Table A-59. Tank 241-B-106 Analytical Results: Differential Scanning Calorimetry. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Run | Sample Weight | Transition 1 | | Transition 2 | | Transition 3 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Core composite: direct | | | | mg | Peak Temp. (°C) | Δ H (J/g) | Peak Temp. (°C) | Δ H (J/g) | Peak Temp. (°C) | Δ H (J/g) |
| S96T001227[2] | 93 | n/a | 1 | 6.420 | 98.5 | 675.9 | 145 | 87.1 | -- | -- |
| | | | 2 | 11.55 | 113 | 708.4 | 144 | 121.0 | -- | -- |
| S96T001644[2] | 94 | n/a | 1 | 26.23 | 124 | 1107 | 296 | 18.3 | -- | -- |
| | | | 2 | 17.57 | 108 | 672.9 | 137 | 10.7 | 148 | 53.6 |

Notes:
[1]Mettler™
[2]Perkin-Elmer™

Table A-60. Tank 241-B-106 Analytical Results: Weight Percent Water.

| Sample Number | Core: Segment | Segment Portion | Result | | Duplicate | | Sample Mean | Overall Mean | RSD (Mean) |
|---|---|---|---|---|---|---|---|---|---|
| Solids: direct | | | % $H_2O$ | Temp. Range (°C) | % $H_2O$ | Temp. Range (°C) | % $H_2O$ | % $H_2O$ | % |
| S95T001272[1] | 93: 1 | DL[2] | 67.32 | 40-150 | 67.13 | 40-150 | 67.22 | 60.8 | 2.03 |
| S95T001278[1] | 93: 1 | Upper ½ | 59.52 | 40-150 | 58.84 | 40-170 | 59.18 | | |
| S95T001275[1] | | Lower ½ | 63.52 | 40-170 | 62.60 | 40-180 | 63.06 | | |
| S95T001284[1] | 93: 2 | Upper ½ | 59.13 | 40-170 | 60.39 | 40-180 | 59.76 | | |
| S95T001281[1] | | Lower ½ | 55.98 | 40-150 | 57.20 | 40-150 | 56.59 | | |
| S95T001302[1] | 94: 1 | Upper ½ | 62.36 | 40-170 | 62.34 | 40-180 | 62.35 | | |
| S95T001298[1] | | Lower ½ | 65.05 | 40-170 | 63.13 | 40-190 | 64.09 | | |
| S95T001310[1] | 94: 2 | Upper ½ | 61.31 | 40-190 | 61.45 | 40-190 | 61.38 | | |
| S95T001306[1] | | Lower ½ | 57.01 | 40-160 | 57.08 | 40-160 | 57.05 | | |
| Core composite: direct | | | | | | | | | |
| S96T001227[3] | 93 | n/a | 56.82 | 25-190 | 57.26 | 25-200 | 57.04 | 57.6 | 0.886 |
| S96T001644[3] | 94 | n/a | 57.95 | 25-200 | 58.17 | 24-200 | 58.06 | | |

Notes:

[1]Mettler™

[2]The drainable liquid result was averaged together with the solids results based on a weighting factor. See the introduction to Appendix A for further explanation.

[3]Perkin-Elmer™

Table A-61. Tank 241-B-106 Analytical Results: Bulk Density.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean | Overall Mean | RSD (Mean) |
|---|---|---|---|---|---|---|---|
| Solids: direct | | | g/mL | g/mL | g/mL | g/mL | % |
| S95T001288 | 93: 1 | Upper ½ | 1.36 | --- | 1.36 | 1.38 | 1.38 |
| S95T001274 | | Lower ½ | Not performed[1] | --- | Not performed[1] | | |
| S95T001283 | 93: 2 | Upper ½ | 1.40 | --- | 1.40 | | |
| S95T001289 | | Lower ½ | 1.43 | --- | 1.43 | | |
| S95T001301 | 94: 1 | Upper ½ | 1.33 | --- | 1.33 | | |
| S95T001300 | | Lower ½ | 1.33 | --- | 1.33 | | |
| S95T001309 | 94: 2 | Upper ½ | 1.39 | --- | 1.39 | | |
| S95T001308 | | Lower ½ | 1.40 | --- | 1.40 | | |
| Core composite: direct | | | g/mL | g/mL | g/mL | g/mL | % |
| S96T001292 | 93 | n/a | 1.34 | --- | 1.34 | 1.34 | 0 |
| S96T001314 | 94 | n/a | 1.34 | --- | 1.34 | | |

Note:

[1]A bulk density determination was not performed on the sample due to insufficient material.

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# APPENDIX B

## RESULTS OF HYDROSTATIC HEAD FLUID CONTAMINATION CHECK FOR SINGLE-SHELL TANK 241-B-106

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# B.0 RESULTS OF HYDROSTATIC HEAD FLUID CONTAMINATION CHECK FOR SINGLE-SHELL TANK 241-B-106

## B.1 INTRODUCTION AND ANALYTE TABLE DESCRIPTION

Appendix B reports the results of the HHF contamination check for the 1995 push-mode core sampling event. Lithium and bromide were measured to detect HHF contamination of the waste samples.

The table for each of the two analytes lists the laboratory sample identification number in column 1. For a description of the sampling event and information on sampling rationale and locations, see Section 3.0. A more detailed description of the HHF contamination check results is in Section 4.1.4.

Column 2 lists the core and segment from which each sample was derived.

Column 3 lists the subsegment for which the analyte was measured. The drainable liquid from segment 1 of core 93 was designated DL.

Columns 4 and 5, Result and Duplicate, are self-explanatory. Column 2, Sample Mean, lists the average of the result and duplicate values. If the result and duplicate values were detected, or one of the two values is detected and the other nondetected, the mean is expressed as a detected value. If the result and duplicate values were nondetected, the mean is expressed as a nondetected result. The result and duplicate values and the result/duplicate means, are reported in the tables exactly as found in the Tank Characterization Database. The means may appear to have been rounded up in some cases and rounded down in others because the analytical results in the tables may have fewer significant figures than originally reported not because the means were incorrectly calculated.

Overall means, RSDs (mean), and projected inventories were not calculated for these two analytes because they are not inherent constituents of the tank waste.

The four quality control parameters assessed on the HHF contamination check analytes were standard recoveries, spike recoveries, duplicate analyses (RPDs), and blanks. Only lithium had any quality control results outside the parameters specified in the SAP (Conner 1996b). Seven samples had low spike recoveries; these samples are identified in the Sample Mean column with a superscripted "QC:c". The "QC:e" superscript designates the four samples which had RPDs outside of the SAP criterion.

Table B-1. Tank 241-B-106 Analytical Results: Lithium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean |
|---|---|---|---|---|---|
| **Solids: fusion digest** | | | **µg/g** | **µg/g** | **µg/g** |
| S95T001272 | 93: 1 | DL | < 4.010 | < 4.0100 | < 4.01[QC:c] |
| S95T001279 | 93: 1 | Upper ½ | < 47.34 | < 46.6800 | < 47.01 |
| S95T001277 | | Lower ½ | < 47.66 | < 47.4400 | < 47.55[QC:c] |
| S95T001285 | 93: 2 | Upper ½ | < 47.15 | < 47.4650 | < 47.31[QC:c] |
| S95T001282 | | Lower ½ | < 44.50 | < 45.4880 | < 44.99 |
| S95T001303 | 94: 1 | Upper ½ | < 49.87 | < 48.9910 | < 49.43[QC:c] |
| S95T001299 | | Lower ½ | < 47.37 | < 46.7460 | < 47.06[QC:c] |
| S95T001311 | 94: 2 | Upper ½ | < 44.08 | < 43.8059 | < 43.94 |
| S95T001307 | | Lower ½ | < 48.06 | < 49.4854 | < 48.77[QC:c] |
| **Solids: acid digest** | | | **µg/g** | **µg/g** | **µg/g** |
| S95T001272 | 93: 1 | DL | < 4.010 | < 4.0100 | < 4.01[QC:c] |
| S96T001199 | 93: 1 | Upper ½ | < 10.50 | < 10.1 | < 10.3 |
| S96T001214 | | Lower ½ | < 9.490 | < 9.84 | < 9.665 |
| S96T001228 | 93: 2 | Upper ½ | 13.7 | 13.7 | 13.7 |
| S96T001229 | | Lower ½ | 12.9 | 11.9 | 12.4 |
| S96T001240 | 94: 1 | Upper ½ | < 4.620 | < 4.72 | < 4.67 |
| S96T001241 | | Lower ½ | 8.87 | 8.3 | 8.585 |
| S96T003625 | 94: 2 | Upper ½ | 27.1 | 44.2 | 35.65[QC:e] |
| S96T001243 | | Lower ½ | 31.2 | 27.6 | 29.4[QC:e] |

Table B-1. Tank 241-B-106 Analytical Results: Lithium. (2 sheets)

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean |
|---|---|---|---|---|---|
| **Solids: water digest** | | | **μg/g** | **μg/g** | **μg/g** |
| S95T001272 | 93: 1 | DL | < 4.010 | < 4.0100 | < 4.01[QC:c] |
| S96T001210 | 93: 1 | Upper ½ | < 4.040 | < 4.07 | < 4.055 |
| S96T001221 | | Lower ½ | < 4.330 | < 4.49 | < 4.41 |
| S96T001222 | 93: 2 | Upper ½ | 11.4 | 10.7 | 11.05 |
| S96T001223 | | Lower ½ | 8.14 | 9.92 | 9.03[QC:e] |
| S96T001255 | 94: 1 | Upper ½ | < 3.930 | < 3.83 | < 3.88 |
| S96T001256 | | Lower ½ | 6.97 | 7.08 | 7.025 |
| S96T003627 | 94: 2 | Upper ½ | 23.5 | 22.7 | 23.1 |
| S96T001258 | | Lower ½ | 19.2 | 17.7 | 18.45 |
| **Core composite: acid digest** | | | **μg/g** | **μg/g** | **μg/g** |
| S96T001230 | 93 | n/a | < 9.290 | 12.7 | 10.995 |
| S96T001645 | 94 | n/a | 13 | 12.9 | 12.95 |
| **Core composite: water digest** | | | **μg/g** | **μg/g** | **μg/g** |
| S96T001224 | 93 | n/a | 6.62 | 7.38 | 7[QC:e] |
| S96T001648 | 94 | n/a | 12.9 | 13.4 | 13.15 |

Table B-2. Tank 241-B-106 Analytical Results: Bromide.

| Sample Number | Core: Segment | Segment Portion | Result | Duplicate | Sample Mean |
|---|---|---|---|---|---|
| Solids: water digest | | | µg/g | µg/g | µg/g |
| S96T001200 | 93: 1 | Upper ½ | < 1,020 | < 1,020 | < 1,020 |
| S96T001216 | | Lower ½ | < 1,090 | < 1,130 | < 1,110 |
| S96T001244 | 93: 2 | Upper ½ | < 573 | < 576 | < 574.6 |
| S96T001245 | | Lower ½ | < 492 | < 501 | < 496.5 |
| S96T001247 | 94: 1 | Upper ½ | < 990 | < 963 | < 976.5 |
| S96T001248 | | Lower ½ | < 1,070 | < 1,080 | < 1,075 |
| S96T003626 | 94: 2 | Upper ½ | < 983 | < 977 | < 980 |
| S96T001250 | | Lower ½ | 663 | 649 | 655.9 |
| Core composite: water digest | | | µg/g | µg/g | µg/g |
| S96T001246 | 93 | n/a | < 602 | < 604 | < 603 |
| S96T001646 | 94 | n/a | < 542 | < 520 | < 531 |

# APPENDIX C

# HISTORICAL ANALYTICAL RESULTS

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# C.0 INTRODUCTION

Information from only one historical sampling event was available for tank 241-B-106. Appendix C shows the analytical results of this sampling event.

## C.1 1975 ANALYTICAL RESULTS

On October 6, 1975, a sample of the supernate in tank 241-B-106 was taken (Wheeler 1975). No information about the sampling depth or riser was available. Although no sampling method was given, it was probably the "bottle-on-a-string" method. The sample was analyzed for selected metals, anions, and radionuclides. Limited testing of physical properties was also performed. No information was provided about the analytical procedures or sample preparation methods. Table C-1 shows the analytical results from the 1975 sampling event.

Because this sample was liquid and the 1995 analytical results are based on solid samples, no comparisons were made between the two data sets. Additionally, the 1975 results may no longer represent the current supernate. The tank contained 605 kL (160 kgal) of supernate at the time of the 1975 sampling. The tank has been interim stabilized and saltwell pumped. The current supernate volume is 4 kL (1 kgal).

Table C-1. Supernatant Sample from Tank 241-B-106.[1,2] (2 sheets)

| Waste Tank 241-B-106 | | |
|---|---|---|
| Analysis of Tank Farm Samples | | |
| December 1, 1975 | | |
| Date received: October 6, 1975 | | |
| **Component** | **Lab Value** | **Lab Unit** |
| **Physical Data** | | |
| Vis-OTR | Yellow, no solids, 200 mrad/hr | |
| pH | 9.5 | --- |
| Specific gravity | 1.227 | --- |
| $H_2O$ | 72.77 | % |
| Differential thermal analysis | No exotherm below 200 °C | --- |
| **Cooling Curve Analysis** | | |
| **Temperature** | **Time** | **Solids** |
| 35 °C | 35 minutes | No solids |
| 30 °C | 35 minutes | No solids |
| 25 °C | 35 minutes | No solids |
| 20 °C | 35 minutes | 2% solids |
| 15 °C | 35 minutes | 2% solids |
| 10 °C | 35 minutes | 2% solids |
| 5 °C | 35 minutes | 2% solids |
| **Chemical Analysis** | | |
| OH | 0.031 | M |
| Al | <4.37E-04 | M |
| Na | 4.00 | M |
| $NO_2$ | 0.187 | M |
| $NO_3$ | 3.0 | M |
| $SO_4$ | Canceled | M |
| $PO_4$ | 0.0951 | M |
| Cl | 0.0557 | M |
| F | 0.00979 | M |
| $CO_3$ | 0.133 | M |

Table C-1. Supernatant Sample from Tank 241-B-106.[1,2] (2 sheets)

| Waste Tank 241-B-106 | | |
|---|---|---|
| Analysis of Tank Farm Samples | | |
| December 1, 1975 | | |
| Date received: October 6, 1975 | | |
| Component | Lab Value | Lab Unit |
| Radiological Analysis | | |
| $^{89/90}Sr$ | 13,700 | μCi/gal |
| Pu | 5.30E-05 | μCi/gal |
| GEA: $^{137}Cs$ | 1.86E+05 | μCi/gal |
| GEA: $^{134}Cs$ | 437 | μCi/gal |

Note:

[1]Wheeler (1975)

[2]This data has no associated quality assurance information, so should be used for information purposes only; not for decision-making purposes.

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