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# Status Report: Pretreatment Chemistry Evaluation—Wash and Leach Factors for the Single-shell Tank Waste Inventory

N. G. Colton

September 1996

Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

Pacific Northwest National Laboratory
Operated for the U.S. Department of Energy
by Battelle

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# Summary

This report discusses a weighting methodology developed to depict overall wash and leach factors for the Hanford single-shell tank (SST) inventory. The factors derived from this methodology, which is based on available partitioning data, are applicable to a composite SST inventory rather than only an assumed insoluble portion. The purpose of considering the entire inventory is to provide a more representative picture of the partitioning behavior of the analytes during envisioned waste retrieval and processing activities.

The work described in this report was conducted by the Pretreatment Chemistry Evaluation task of the Tank Waste Remediation System (TWRS). Wash and leach factors, developed as part of this task, will be incorporated into the TWRS Process Technical Baseline. The wash factors will be used to partition the SST inventory into soluble and insoluble portions. The leach factors will be used to estimate the further removal of analytes, such as sodium, aluminum, phosphate, and other minor components.

Wash and leach factors are given here for 18 analytes, including chromium, phosphate, and aluminum, elements expected to drive the volume of material disposed of as high-level waste (HLW). Results from detailed evaluations using the weighting methodology are given in the form of worksheets that show the 1) distribution of a particular analyte (in metric tons) among wash and leach steps and in the residual solids and 2) analyte-specific wash factors (% of analyte removed from initial solids) and leach factors (% of analyte removed from washed solids).

Results from this work indicate that with the exception of chromium, analyte partitioning assumptions used in the past for planning purposes tend to be supported by the newly evaluated wash and leach factors. As a result of the newly derived chromium leach factor, there is a potential twofold increase in chromium in solids destined for disposal in HLW glass. In turn, there is a concern that the total chromium inventory may be larger than originally estimated.

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The author wishes to thank the following persons who provided valuable assistance and input to this task: D. J. Washenfelder, A. L. Boldt, and M. J. Kupfer (Westinghouse Hanford Company); G. J. Lumetta, B. M. Rapko, and S. R. Gano (Pacific Northwest National Laboratory); D. J. Temer (Los Alamos National Laboratory); and G. L. Borsheim (Borsheim Associates).

# 1.0 Introduction

After the primary mission at the Hanford Site changed from plutonium production to environmental restoration (1990), the Tank Waste Remediation System (TWRS) was established by the U.S. Department of Energy (DOE) to safely manage and dispose of high-level wastes (HLW) stored in the underground tanks. A key element of the disposal activities under TWRS involves establishing a reference strategy for pretreating wastes prior to disposal. Pretreatment strategies include utilizing processes and equipment to separate and/or destroy waste components to minimize treated waste volumes and to produce waste fractions that are compatible with final waste forms and their disposal criteria.

The currently envisioned pretreatment strategy proposes 1) to remove radionuclides from the aqueous waste fractions to produce streams suitable for disposal as low-level waste (LLW) and 2) to use washing and selective leaching strategies to remove elements from sludges expected to drive HLW production, i.e., aluminum, phosphorus, and chromium. The effect of this pretreatment strategy on final waste volumes is evaluated in systems engineering studies, such as the TWRS Process Flowsheet (Orme 1995), by employing assumptions about the chemical and physical behavior of the wastes. Included in these assumptions are wash and leach factors, i.e., the fraction of each waste component expected to dissolve or to leach from waste streams during various processing steps.

In the past, the single-shell tank (SST) and double-shell tank (DST) waste inventories were partitioned into soluble (salt) and insoluble (sludge) portions based on the judgment of experienced personnel. Estimated sludge wash factors were employed to further separate residual soluble material from the insoluble sludge portion. These estimated sludge wash factors (Boomer et al. 1993) were derived from a very limited set of available data. Portions of this set were updated in 1994 by the TWRS Pretreatment Chemistry task by analyzing results from waste characterization studies of 27 SST sludges (Colton 1995).

Since 1994, as part of the TWRS Program to provide experimental data and a technical basis for wash and leach factors, washing and caustic leaching tests of Hanford tank sludges have been performed by Pacific Northwest National Laboratory (PNNL)[a] and Los Alamos National Laboratory (LANL). Tests have been completed on 23[b] individual SST

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(a) Operated for the U.S. Department of Energy by Battelle under Contract DE-AC06-76RLO 1830.

(b) While washing and leaching tests have been completed for SST SX-108, results from these tests were not available for consideration in this evaluation.

wastes and 1 DST waste. The bulk of the total waste solids inventory (sludges, salt cake, and associated interstitial liquid) is in the SSTs. Table 1 summarizes the 23 SST wastes in terms of process origin, number of wastes tested from each process, and representative tank waste volumes and volume fractions for each process.

**Table 1.** Summary of Single-shell Tank Wastes Used in Washing and Leaching Tests

| Process Origin | Number of Tank Wastes | Representative Volume (kL) | Volume Fraction (%) |
|---|---|---|---|
| Bismuth Phosphate | 11 | 10200 | 55.8 |
| Uranium Recovery | 6 | 1930 | 10.6 |
| Redox | 3[a] | 2860 | 15.6 |
| Purex | 1 | 235 | 1.29 |
| Evaporator Campaign/s[b] | 2 | 3050 | 16.7 |
| Totals | 23 | 18275 | 100 |

(a) Results from tests performed with one of these wastes, SX-108, were not available for consideration in this evaluation.
(b) Predominantly salt-type wastes.

This table shows that 17 of the washing and leaching tests were performed with wastes that originated from the Bismuth Phosphate and Uranium Recovery processes. As a result, overall wash and leach factors derived solely by weighting individual test results on a tank volume basis could be unduly influenced by partitioning behaviors observed in these 17 wastes. Therefore, a modified weighting scheme was developed to estimate overall wash and leach factors that would be more representative of the entire SST solids inventory.

This report presents the modified weighting methodology, developed by the TWRS Pretreatment Chemistry Evaluation task, and the overall partitioning factors derived from it. The methodology is described in Section 2.0. The overall wash and leach factor results are given in Section 3.0 in the form of detailed evaluations by analyte, and conclusions and recommendations are offered in Section 4.0. Supporting worksheets, i.e., individual tank data summary worksheets and tank-specific, experimental washing and leaching data summary worksheets, are contained in Appendices A and B, respectively.

# 2.0 Methodology

In FY 1996, the Pretreatment Chemistry Evaluation task was charged with updating currently assumed partitioning factors based on the washing and leaching results and other relevant data. An important point to be considered before developing a methodology to tie these individual results to the SST inventory was that the bulk of the chromium and aluminum inventories potentially reside in wastes from the Redox Process and evaporator campaigns. If a normalization method based solely on tank volumes were used, the four wastes tested to date from the Redox Process and evaporator campaigns would contribute to less than a third of the partitioning behaviors incorporated into the overall factors. Another point to be considered was how to incorporate data from the two predominantly salt-type wastes into factors that, in the past, had been applied only to insoluble sludges to remove residual soluble material. The modified weighting scheme was developed to estimate overall wash and leach factors, accounting for these two points, that would be more representative of the entire SST inventory. This methodology is described in further detail in the following sections.

## 2.1 Data Compilation and Review

The first step in deriving overall wash and leach factors was to compile and review relevant data generated over the years as part of characterization, washing and leaching, and radionuclide removal studies. Table 2 summarizes reviewed data sources for 42 SST wastes.

**Table 2.** Reviewed Data Sources for 42 Single-shell Tanks

| Tank | Characterization Data 1986 or later | Sludge Washing/ Leaching Data 1994 or later | Radionuclide Removal Test Data 1980 or earlier |
|---|---|---|---|
| A-103 | Colton (1995) [data from Weiss and Schull (1988a)] | -- | -- |
| A-106 | Colton (1995) [data from Weiss and Schull (1988b)] | -- | -- |
| B-104 | Field et al. (1996a) | Temer and Villarreal (1996) | -- |
| B-105 | -- | -- | Schulz (1980) |
| B-110 | Colton (1995) [data from PNNL letter report to WHC] | Lumetta and Rapko (1994) | -- |

Table 2. cont'd.

| Tank | Characterization Data 1986 or later | Sludge Washing/ Leaching Data 1994 or later | Radionuclide Removal Test Data 1980 or earlier |
|---|---|---|---|
| B-111 | Colton (1995) [from Giamberardini (1993)] | Rapko et al. (1995) | -- |
| B-201 | Colton (1995) from [data from WHC (1993a)] | Lumetta and Rapko (1994) | -- |
| B-202 | Worksheet provided in Appendix A | Temer and Villarreal (1995) | -- |
| BX-104 | Colton (1995) [data from Weiss and Schull (1988c)] | -- | -- |
| BX-105[a] | Colton (1995) [data from Weiss and Schull (1988d)] | Temer and Villarreal (1995) | -- |
| BX-107 | Kristofski (1993) | Rapko et al. (1995) | -- |
| BX-109 | Field et al. (1996b) | Temer and Villarreal (1996) | -- |
| BY-104 | Worksheet provided in Appendix A | Lumetta et al. (1996) | -- |
| BY-110 | Worksheet provided in Appendix A | Lumetta et al. (1996) | -- |
| C-103 | Colton (1995) [data from Weiss and Schull (1988e)] | Rapko et al. (1995) | -- |
| C-104 | Colton (1995) [data from Weiss and Schull (1988f)] | -- | -- |
| C-105 | Colton (1995) [data from Weiss and Schull (1988g)] | -- | -- |
| C-106 | Colton (1995) [data from Weiss and Schull (1988h)] | -- | -- |
| C-107 | Colton (1995) [data from Bell et al. (1995)] | Temer and Villarreal (1995) Lumetta and Rapko (1996) | -- |
| C-108 | Worksheet provided in Appendix A | Temer and Villarreal (1995) | -- |
| C-109 | Colton (1995) [data from Simpson et al. (1993a)] | Lumetta and Rapko (1994) | -- |
| C-110 | Colton (1995) [data from WHC (1993b)] | -- | -- |

Table 2. cont'd.

| Tank | Characterization Data 1986 or later | Sludge Washing/ Leaching Data 1994 or later | Radionuclide Removal Test Data 1980 or earlier |
|---|---|---|---|
| C-112 | Colton (1995) [data from Simpson et al. (1993b)] | Lumetta and Rapko (1994) | -- |
| S-104 | Colton (1995) from [data from Kocher (1993)] | Temer and Villarreal (1995) Rapko et al. (1995) | -- |
| S-105 | -- | -- | Schulz (1980) |
| S-107 | Worksheet provided in Appendix A | Lumetta et al. (1996) | -- |
| S-109 | -- | -- | Schulz (1980) |
| S-110 | -- | -- | Schulz (1980) |
| SX-102 | -- | -- | Schulz (1980) |
| SX-103 | -- | -- | Schulz (1980) |
| T-102 | Colton (1995) [data from WHC (1993c)] | -- | -- |
| T-104 | Colton (1995) [data from WHC (1993d)] | Temer and Villarreal (1995) Rapko et al. (1995) | -- |
| T-105 | Worksheet provided in Appendix A | -- | -- |
| T-107 | Colton (1995) [data from WHC (1993e)] | Temer and Villarreal (1995) | -- |
| T-108 | Baldwin et al. (1996) | -- | -- |
| T-111 | Colton (1995) [data from WHC (1993f)] | Rapko et al. (1995) | -- |
| TX-116 | -- | -- | Schulz (1980) |
| TY-102 | Worksheet provided in Appendix A [data from Weiss and Mauss (1988a)] | -- | -- |

Table 2. cont'd.

| Tank | Characterization Data 1986 or later | Sludge Washing/ Leaching Data 1994 or later | Radionuclide Removal Test Data 1980 or earlier |
|---|---|---|---|
| TY-104 | Colton (1995) [data from Weiss and Mauss (1988b)] | Temer and Villarreal (1995) | -- |
| TY-105 | Colton (1995) [data from Weiss and Mauss (1988c)] | -- | -- |
| TY-106 | Colton (1995) [data from Weiss and Mauss (1988d)] | -- | -- |
| U-110 | Colton (1995) [data from Brown and Jenson (1993)] | Lumetta and Rapko (1994) | -- |

(a) Data from this tank have not been included in this evaluation because of discrepancies in projected inventories derived from core samples obtained in 1986 and auger surface samples obtained in 1994. (The auger method generally was used to sample the first 8 inches of solids on the tank waste surface). These samples may be representative of cladding waste, the last type of waste added to this tank. Washing and leaching tests were performed only on the auger surface sample.

Information important to deriving wash and leach factors included both analyte partitioning and inventory information. Some of this information was available from data summary worksheets that were completed for 27 SST wastes as part of an earlier activity to update sludge wash factors (Colton 1995). These worksheets provided a uniform format for reviewing data, as well as the means to verify whether the data set for each tank was complete. The analytical water wash data contained in these worksheets provided tank-specific information about the fraction of each component that dissolved with water, i.e., wash factor information. In addition, these worksheets provided analyte inventory values calculated from analyte concentrations, the waste density, and the tank waste volume.

Data summary worksheets were completed for an additional 18 SST wastes as part of this work (refer to Appendix A). Note that because some sample analyses were limited, some of these worksheets are not as detailed as others. Also note that data for 7 tanks containing predominantly salt-type wastes (B-105, TX-116, S-105, S-109, S-110, SX-102, SX-103) originated from radionuclide removal tests performed by Schulz (1980), and data for C-107 originated from washing and leaching tests performed by Temer et al. (1995). With the exception of the 7 salt-type wastes, concentrations were entered on the worksheets as reported, and no effort was made to ion balance results. In the case of the 7 salt-type wastes, sodium or nitrate was adjusted for ion balancing purposes, and the residual solids were adjusted to reflect those reported by Schulz (1980). Any adjustments to waste concentrations were noted at the bottom of each worksheet.

As experimental washing and leaching data were an integral part of this activity, these data (Lumetta and Rapko 1994; Rapko et al. 1995; Temer and Villarreal 1995; Lumetta et al 1996; and Temer and Villarreal 1996) also were summarized on worksheets (refer to Appendix B). These worksheets projected wash and leach factors onto tank-specific inventories obtained from data summary worksheets contained in Appendix A and in Colton (1995). The washing and leaching worksheets provide concentration values obtained by two different methods: 1) direct sample analysis and 2) summation of analytes distributed among the washing and leaching solutions and the residual solids. Note that there is considerable deviation among some of the analyte concentrations obtained by the two different methods. This deviation may indicate that one or the other (or possibly both) of these concentrations is not representative of the actual tank waste or that poor mass balances were obtained from summing different test results. These deviations could potentially be used to estimate error ranges for the experimentally determined wash and leach factors.

## 2.2 Wash and Leach Factor Spreadsheet Evaluation

The second step in deriving overall wash and leach factors entailed entering individual tank waste data into a spreadsheet, in terms of metric tons of 1) analyte inventory, 2) analyte removed with washing, and 3) analyte removed with alkaline leaching. In this spreadsheet, the analyte amounts were then weighted according to the volume contribution of their characteristic waste type. Characteristic waste type groups were assigned by using the Sort on Radioactive Waste Type (SORWT) model (Hill et al. 1995). This model categorizes tanks into groups expected to have similar physical and chemical compositions.

The relationship among individual tank wastes and characteristic waste types, according to the SORWT model, is depicted schematically in Figure 1. Tank-specific wastes that were included in this evaluation are marked in the figure as follows: wastes with washing and leaching test data are represented by dark shading; wastes with only wash information, derived from water leach tests obtained during characterization studies, are represented by light shading; and salt-type wastes with dissolution data obtained from radionuclide removal tests are represented by a double box. Note in Figure 1 that not all characteristic waste-type groups have corresponding tanks with available waste data.

For this evaluation, the following assumptions were made:

- Redox sludges were removed from Redox/Evaporator Bottom (SORWT Group I), Redox (SORWT Group IV), Evaporator Bottom/Redox (SORWT Group IX), and Evaporator Bottom/Cladding Waste (SORWT Group VI) characteristic waste groups and repartitioned as follows:

- Redox boiling sludges (4290 kL): S-104, SX-107, SX-108, SX-109, SX-111, SX-112, SX-114.

- Redox nonboiling sludges (4750 kL): SX-110, SX-115, U-101 and 5440 kL sludge from Redox/Evaporator Bottom (SORWT Group I) (including S-107), 481 kL sludge from Evaporator Bottom/Redox (SORWT Group IX), and 1190 kL sludge from Evaporator Bottom/Cladding Waste (SORWT Group VI). Sludge volumes for individual tanks are based on Hanlon (1995).

- Characteristic waste-type groups with no available individual tank waste data were assigned representative tanks that are believed to have similar waste compositions, e.g., first-cycle bismuth phosphate waste (1C) and first-cycle bismuth phosphate waste with additional salts added to the waste from evaporator campaigns (1C/EB).

- Mass of analyte in a particular characteristic waste type $M_{A(c)}$ is given by:

$$M_{A(c)} = \sum m_{A(i)} \left( \frac{V_c}{\sum V_i} \right)$$

where
$M_{A(c)}$ = mass of analyte in a particular waste type
$m_{A(i)}$ = mass of analyte in an individual waste
$V_c$ = volume of characteristic waste
$V_i$ = volume of individual waste

Tank volumes for wastes that contribute only wash data are not included in the summation of volumes used to weight leach data.

- For waste types originating from the Purex Process, where wash information derived from characterization analyses were available, metric tons of analyte leached were calculated using leach factors from a waste type expected to exhibit similar leaching behavior. Specific assumptions are noted at the end of each analyte worksheet.

- For wastes that were tested by both PNNL and LANL (C-107, S-104, and T-104), metric tons of washed and leached analyte were calculated by averaging the results from each analysis. In some cases, results for a minor analyte were only reported by one laboratory.

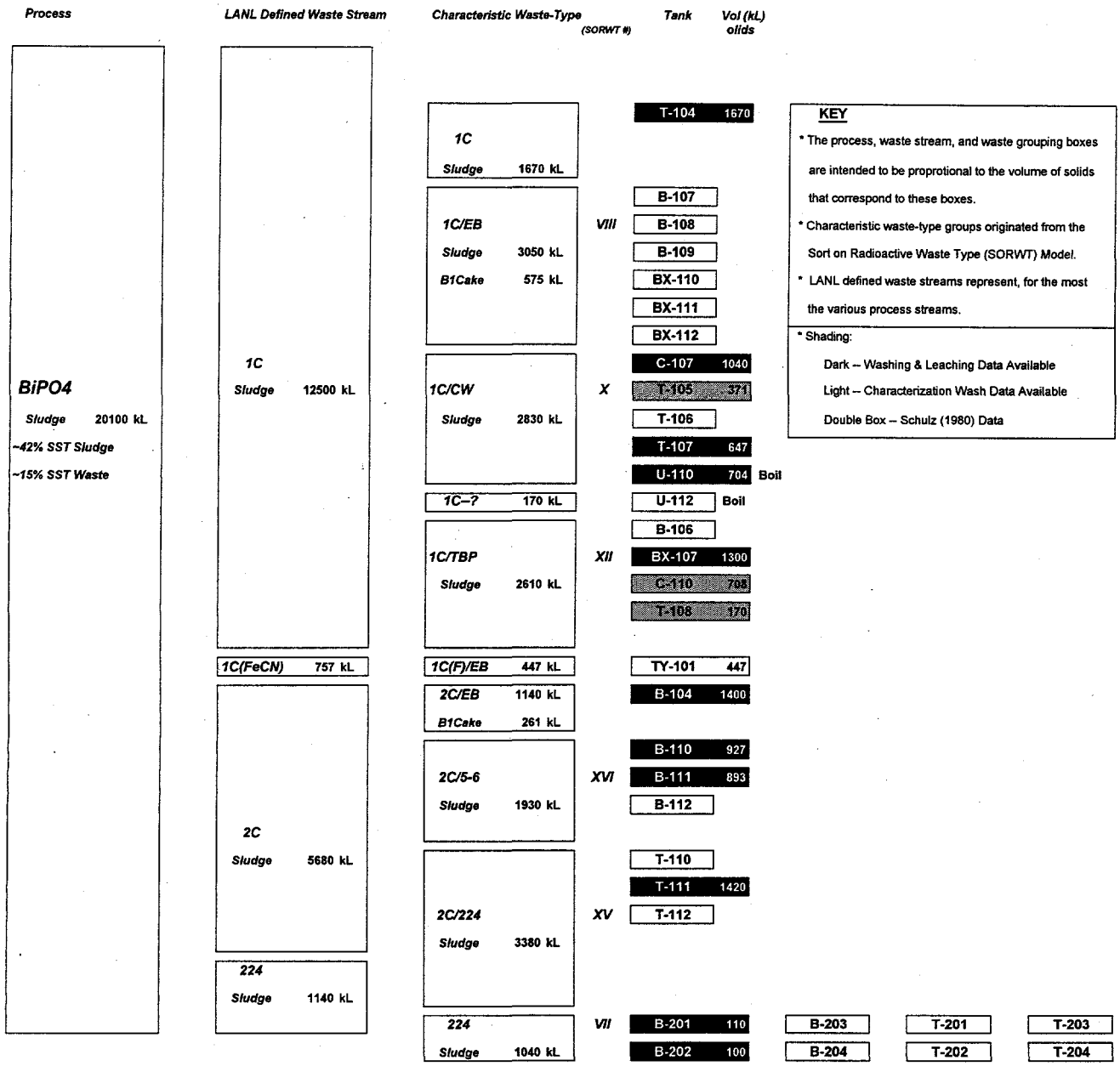


Figure 1. Pictorial Summary of Relationships Among Chemical Processes/Campaigns, Waste Streams, Characteristic Waste-type Groups, and Single-shell Tanks

| Process | LANL Defined Waste Stream | Characteristic Waste-Type | (SORWT #) | Tank | Vol (kL) solids | |
|---|---|---|---|---|---|---|
| | | TBP/Sr 570 kL | | C-105 | 568 | |
| | | TBP/DiaE 64 kL | | TY-106 | 64 | |
| | | TBP/EB Sludge 814 kL | XXI | T-109 | | |
| | | | | TX-103 | | |
| | | TBP Sludge 874 kL | | TY-105 | 874 | |
| TBP Sludge 7570 kL ~16% SST Sludge ~5% SST Waste | TBP Sludge 3790 kL | TBP/CW Sludge 2560 kL SaltCake 10 kL | V | BX-101 | | BX-106 |
| | | | | BX-102 | | BX-108 |
| | | | | BX-103 | | BX-109 731 |
| | | | | BX-104 | 360 | C-101 |
| | | | | BX-105* | 160 | |
| | | TBP/1C(F) Sludge 776 kL | XXII | TY-103 | 613 | |
| | | | | TY-104 | 160 | |
| | TFeCN Sludge 1130 kgal | TBP(F)/1C Sludge 1090 kL | XIII | C-108 | 250 | C-111 |
| | | | | C-109 | 230 | C-112 394 |
| | PFeCN Sludge 2650 kgal | TBP(F)/EB Sludge 2410 kL BYits Cake 12700 kL | III | BY-101 | | |
| | | | | BY-103 | | |
| | | | | BY-104 | 1540 | |
| | | | | BY-105 | | |
| | | | | BY-106 | | |
| | | | | BY-107 | | |
| | | | | BY-108 | | |
| | | | | BY-110 | 1510 | |
| | | | | BY-111 | | |
| | | | | BY-112 | | |
| Evaporator Bottoms SaltCake 87400 kL ~65% SST Waste | BYits SaltCake 15200 kL ~17% SST SaltCake | TBP/EBits Sludge 310 kL SaltCake 2580 kL | XIX | BY-102 | | |
| | | | | BY-109 | | |

*Washing and leaching tests performed; however, not included in this evaluation due to discrepancies in projected inventories.

| Process | LANL Defined Waste Stream | Characteristic Waste-Type | (SORWT#) | Tank | Vol (kL) solids | | | |
|---|---|---|---|---|---|---|---|---|
| REDOX<br>Sludge 12900 kL<br>~27% SST Sludge<br>~10% SST Waste | Flowsheet #4<br>Flowsheet #5<br>Flowsheet #6<br>Flowsheet #7<br>Flowsheet #8<br>Flowsheet #9<br>Sludge 12900 kL | REDOX<br>Sludge 4650 kL | IV | S-104* | 1110 | Boil | SX-114 | Boil |
| | | | | SX-107 | | Boil | SX-115 | |
| | | | | SX-108** | 329 | Boil | U-101 | |
| | | | | SX-109 | | Boil | | |
| | | | | SX-110 | | | | |
| | | | | SX-111 | | Boil | | |
| | | | | SX-112 | | Boil | | |
| | | R/2C 8 kL | | U-204 | | | | |
| | | R/Dia 560 kL | XXIV | SX-113 | | | U-104 | |
| | | R/Mix 318 kL | | TX-101 | | | | |
| | | RCW/Mix 382 kL | XVII | T-101 | | | | |
| | | RCW 38 kL | XVIII | U-201 | | | U-202 | U-203 |
| Evaporator Bottoms (Cont) | S1<br>SaltCake 26700 kL<br>~31% SST SaltCake | R-RCW/EB<br>Sludge 5440 kL<br>S1 Cake 26700 kL<br>T2 Cake 5590 kL | I | S-101 | | Boil | | |
| | | | | S-102 | | | | |
| | | | | S-103 | | | | |
| | | | | S-105 | 1730 | | | |
| | | | | S-106 | | | | |
| | | | | S-107(Zr) | 1420 | | | |
| | | | | S-108 | | | | |
| | | | | S-109 | 901 | | | |
| | | | | S-110 | 1480 | | | |
| | | | | S-111 | | | | |
| | | | | S-112 | | | | |
| | | | | SX-101 | | Boil | | |
| | | | | SX-102 | 2050 | Boil | | |
| | | | | SX-103 | 2460 | Boil | | |
| | | | | SX-104 | | | | |
| | | | | SX-105 | | | | |
| | | | | SX-106 | | | | |
| | | | | TX-102 | | | | |
| | | | | TX-104 | | | | |
| | | | | TX-105 | | | | |
| | | | | TX-106 | | | | |
| | | | | TX-107 | | | | |

* Contains 10% RCW.

**Washing and leaching tests performed; however, tests results not available for this evaluation.

| Process | LANL Defined Waste Stream | Characteristic Waste-Typ | (SORWT #) | Tank | Vol (kL) Solids |
|---|---|---|---|---|---|
| Evaporator Bottoms (cont) | S1 (cont) | R-RCW/EB (cont) | I | | |
| | T2<br>SaltCake 22300 kL<br>~26% SST SaltCake | EB/1C<br>Sludge 151 kL<br>B1 Cake 1160 kL<br>T2 Cake 13800 kL<br>T1 Cake 2420 kL | II | B-105 1160<br>TX-109<br>TX-110<br>TX-111<br>TX-112<br>TX-113<br>TX-114<br>TY-102 242<br>TX-116 2390<br>TX-117 | |

| Process | LANL Defined Waste Stream | Characteristic Waste-Type | (SORWT #) | Tank | Vol (kL) Solids | |
|---|---|---|---|---|---|---|
| Evaporator Bottoms (cont) | T2 (cont) | EB/1C (cont) | II | | | |
| | R1<br>SaltCake 10400 kL<br>~12% SST SaltCake | EB/DW 507 kL | | TX-108 | | |
| | | EB/R<br>Sludge 481 kL<br>T2 Cake 2420 kL<br>R1 Cake 4630 kL | IX | TX-115<br>U-102<br>U-103<br>U-106<br>U-111 | Boil | |
| | T1<br>SaltCake 3750 kL<br>~4% SST SaltCake | EB/CW<br>Sludge 1190 kL<br>B1 Cake 38 kL<br>T1 Cake 1310 kL<br>R1 Cake 5750 kL | VI | B-101<br>B-102<br>B-103<br>TX-118<br>U-105<br>U-107<br>U-108<br>U-109 | | |
| | B1<br>SaltCake 2040 kL<br>~2% SST SaltCake | | | | | |
| | A1<br>SaltCake 7040 kL<br>~8% SST SaltCake | CC/DSSF 560 kL | XXIII | AX-102 | | AX-103 |
| | | DSSF<br>Sludge 1460 kL<br>A1 Cake 6500 kL | XI | A-101<br>A-102 140<br>A-103 1390<br>AX-101 | | |

| Process | Waste Streams | Characteristic Waste-Type | (SORWT #) | Tank | Vol (kL) Solids | | | |
|---|---|---|---|---|---|---|---|---|
| | PUREX Supernatant and Sludge | | | | | | | |
| | Supernatant (PSN) to Cs Recovery | DSSF (cont) | XI | | | | | |
| | Sludge (PSL) to Sr Recovery | | | | | | | |
| | - Sludge Supernatant (PSS) | P Sludge 178 kL | | A-104 | | A-105 | | |
| | - Acidified Sludge (PAS) | CC/AR 473 kL | | A-106 | 473 | | | |
| PUREX | - Neutralized PAS --> AR sludge | AR Sludge 26 kL | | AX-104 | | | | |
| Sludge 6430 kL | Sludge 6430 kL | AR/PCW | XX | C-103 | 235 | | | |
| ~15% SST Sludge | | Sludge 980 kL | | C-106 | 518 | | | |
| ~5% SST Waste | | PCW/Mix 159 kL | XVII | T-102 | 72 | T-103 | | |
| | | PCW/ZrCW | | C-102 | | | | |
| | | Sludge 2720 kL | | C-104 | 1120 | | | |
| | | HS? 42 kL | XIV | C-201 | | C-202 | C-203 | C-204 |

# 3.0 Results

Wash and leach factor evaluations have been completed for 16 nonradioactive analytes (Al, Ba, Bi, Ca, Cd, Cr, Fe, Mg, Mn, Na, Ni, $PO_4$, Si, Sr, U, and Zr) and 2 radioactive analytes ($^{137}Cs$ and $^{90}Sr$). The results from these extensive evaluations are detailed in analyte worksheets at the end of this section. These worksheets show the calculated distribution of a particular analyte (in metric tons) among the wash and leach steps and in the residual solids. An analyte-specific wash factor (% analyte removed from initial solids) and leach factor (% analyte removed from washed solids) also have been calculated.

Examples of additional information that can be readily extracted from these analyte worksheets are listed below:

- tanks that have an unusually high inventory of a particular analyte; e.g., C-112 has a very high inventory of uranium.

- characteristic wastes groups that contain a large fraction of a particular analyte inventory; e.g., half the sodium inventory may be concentrated in 22 tanks that contain Redox/Evaporator Bottom wastes (SORWT Group I).

- characteristic waste groups that require more sampling/testing because of their significant bearing on TPA Milestone M50-03 (the 1998 decision regarding the level of pretreatment to be incorporated into the tank waste process flowsheets), e.g., Redox/Evaporator Bottom, and Double-shell Slurry Feed wastes that potentially have large concentrations of chromium remaining in the residual solids (after washing and leaching).

The wash and leach factors resulting from these evaluations are summarized in Table 3. These factors will be incorporated into the TWRS Process Technical Baseline, where the wash factors will be used to partition the SST inventory into soluble and insoluble portions, and the leach factors will be used to further remove analytes, such as sodium, aluminum, chromium, phosphate, and other minor components.

**Table 3.** Summary of Wash and Leach Factors for a Composite Single-shell Tank Waste Inventory

| Analyte | Wash Factor (% analyte removed from initial solids) | Leach Factor (% analyte removed from washed solids) | Analyte | Wash Factor (% analyte removed from initial solids) | Leach Factor (% analyte removed from washed solids) |
|---|---|---|---|---|---|
| Al | 31 | 60 | Mn | <1 | ~0 |
| Ba | 1 | ~0 | Na | 95[a]<br>94[c] | 45[a]<br>46[c] |
| Bi | 0.3 | 0.3 | Ni | 2 - 5 | ~0 |
| Ca | 4 | 2 | $PO_4$ | 76[a]<br>75[c] | 70[a]<br>70[c] |
| Cd | 15 | <1 | Si | 12 | 13 |
| Cr | 61[a]<br>59[b] | 10[a]<br>14[b] | Sr | <1 | ~0 |
| $^{137}Cs$ | 60[a]<br>59[c] | 60[a]<br>61[c] | $^{90}Sr$ | <1 | 0.1 |
| Fe | 0.4 | 0.2 | U | 2 | 2 |
| Mg | 1 | 0.6 | Zr | 0.3 | ~0 |

(a) Factors presented in June 30, 1996 draft report.
(b) As a result of technical review comments, chromium was reevaluated based on partitioning the Uranium Recovery/Evaporator Bottom waste group into a high chromium concentration waste group, i.e., BY-104 and BY-110 tank wastes, and a low chromium concentration waste group. Also, the density of salt cake was assumed to be 1.7 g/mL rather than 1.9 g/mL.
(c) As a result of technical review comments, the density of salt cake was assumed to be 1.7 g/mL rather than 1.9 g/mL. This change in density affected some partitioning factors.

# Analyte Wash and Leach Factor Evaluations

# Analyte Wash and Leach Factor Evaluations

*Element: Al*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.303** | **0.97** | **19.3** | **61.68** | **11.597** | **37.06** | **31.2** | **99.71** |
| | | T-105 (w) | 371 | 0.0738 | | | | | | 18.9 | |
| | | C-107 | 897 | 1.035 | | 49.4 | | | | 65 | |
| | | T-107 | 655 | 0.57 | | 11.9 | | | | 16 | |
| | | U-110 | 704 | 1.77 | | 145 | | | | 177 | |
| **1C/CW** | **2830** | | **2627** | **3.4488** | **3.72** | **206.3** | **258.79** | **67.1512** | **72.34** | **276.9** | **334.85** |
| | | T-108 (w) | 167 | 0.127 | | | | | | 0.572 | |
| | | C-110 (w) | 708 | 1.03 | | | | | | 12.4 | |
| | | BX-107 | 1302 | 0.223 | | 15 | | | | 22.3 | |
| **1C/TBP** | **2610** | | **2177** | **1.38** | **1.65** | **15** | **30.07** | **18.892** | **22.65** | **35.272** | **54.37** |
| **2C/EB** | **1400** | B-104 | **1400** | **0.202** | **0.20** | **1.9** | **1.90** | **1.258** | **1.26** | **3.36** | **3.36** |
| | | B-110 | 927 | 0 | | 0 | | | | 1.54 | |
| | | B-111 | 893 | 0 | | 0.03 | | | | 1.52 | |
| **2C/5-6** | **1930** | | **1820** | **0** | **0.00** | **0.03** | **0.03** | **3.03** | **3.21** | **3.06** | **3.24** |
| **2C/224** | **3380** | T-111 | **1715** | **0** | **0.00** | **0.14** | **0.28** | **0.94** | **1.85** | **1.08** | **2.13** |
| | | B-201 | 106 | 0 | | 0.18 | | | | 0.643 | |
| | | B-202 | 102 | 0 | | 0.016 | | | | 0.1 | |
| **224** | **1040** | | **208** | **0** | **0.00** | **0.196** | **0.98** | **0.547** | **2.74** | **0.743** | **3.72** |
| | | B-105 | 1158 | 0.432 | | 0 | | | | 1.84 | |
| | | TY-102 | 242 | 0.0012 | | 0 | | | | 0.32 | |
| | | TX-116 | 2388 | 0.221 | | 0 | | | | 4.31 | |
| **EB/1C** | **18100** | | **3788** | **0.6542** | **3.13** | **0** | **0.00** | **5.8158** | **27.79** | **6.47** | **30.92** |
| **Total (MT)** | | | | | 9.67 | | 353.73 | | 168.90 | | 532.29 |
| **% Inventory** | | | | | 0.20 | | 7.19 | | 3.43 | | 10.82 |

**TBP**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0898** | **0.09** | **26.112** | **26.11** | **28.1982** | **28.20** | **54.4** | **54.40** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0003** | **0.00** | **0.326** | **0.33** | **0.278** | **0.28** | **0.604** | **0.60** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 77.7 | | 38.9 | | | | 118 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 28 | | 0.597 | | | | 29.8 | |
| | **18804** | | **3050** | **105.7** | **651.67** | **39.497** | **243.51** | **2.603** | **16.05** | **147.8** | **911.22** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.003** | **0.00** | **1.28** | **1.28** | **1.277** | **1.28** | **2.56** | **2.56** |
| | | BX-104 (w) | 363 | 0.783 | | | | | | 31.1 | |
| | | BX-109 | 731 | 1.28 | | 0.76 | | | | 2.09 | |
| **TBP/CW** | **2570** | | **1094** | **2.063** | **4.85** | **0.76** | **2.67** | **30.367** | **71.34** | **33.19** | **78.86** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.228** | **1.09** | **1.35** | **6.43** | **0.922** | **4.39** | **2.5** | **11.90** |
| | | C-108 | 250 | 0.513 | | 15.3 | | | | 16.9 | |
| | | C-109 | 235 | 1.72 | | 26.1 | | | | 34.4 | |
| | | C-112 | 394 | 2.67 | | 6.41 | | | | 10.7 | |
| **TBP(f)/1C** | **1090** | | **879** | **4.903** | **6.08** | **47.81** | **59.29** | **9.287** | **11.52** | **62** | **76.88** |
| **Total (MT)** | | | | | 663.77 | | 339.61 | | 133.04 | | 1136.43 |
| **% Inventory** | | | | | 13.49 | | 6.90 | | 2.70 | | 23.10 |

*Element: Al (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Boil}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **6.575** | **27.87** | **62.9** | **266.57** | **126.525** | **536.22** | **196** | **830.66** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **19.2** | **112.74** | **156** | **916.05** | **64.8** | **380.51** | **240** | **1409.30** |
| | | S-105 | 1718 | 20.0 | | | | | | 20.0 | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 30.4 | | | | | | 34.0 | |
| **EB/R** | 7050 | S-110 | 980 | 12.2 | | | | | | 12.2 | |
| **EB/CW** | 7100 | SX-102 | 2029 | 20.7 | | | | | | 23.4 | |
| **EB/DW** | 507 | SX-103 | 1612 | 9.85 | | | | | | 9.88 | |
| | **46957** | | **8489** | **93.15** | **515.26** | | **0.00** | **6.33** | **35.01** | **99.48** | **550.27** |
| **Total (MT)** | | | | | 655.87 | | 1182.62 | | 951.75 | | 2790.24 |
| **% Inventory** | | | | | 13.33 | | 24.04 | | 19.35 | | 56.72 |

**PUREX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **27.7** | **170.40** | **1.76** | **10.83** | **1.44** | **8.86** | **30.9** | **190.09** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0.102** | **0.23** | **18.6** | **41.13** | **20.074** | **44.33** | **38.8** | **85.68** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.731** | **2.03** | **39.5** | **109.57** | **0.49** | **1.36** | **40.7** | **112.95** |
| **CC/AR** | **473** | A-106 (w) | **473** | **7.56** | **7.56** | **8.016** | **8.02** | **1.124** | **1.12** | **16.7** | **16.70** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (w) | 746 | 0.0229 | | | | | | 43.6 | |
| **AR/PCW** | 980 | C-103 | 235 | 0 | | 2.19 | | | | 4.56 | |
| | **1228** | | **981** | **0.0229** | **0.02** | **2.19** | **9.13** | **45.9471** | **45.90** | **48.16** | **55.06** |
| **Total (MT)** | | | | | 180.24 | | 178.67 | | 101.57 | | 460.48 |
| **% Inventory** | | | | | 3.66 | | 3.63 | | 2.06 | | 9.36 |
| **TOTAL (MT)** | | | | | **1509.54** | | **2054.63** | | **1355.26** | | **4919.43** |
| **Distribution** | | | | | **30.7** | | **41.8** | | **27.5** | | |
| | | **Wash Factor** | **31** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **60** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **78** |

**Leach factor from tests performed with AR/PCW (Purex) waste (C-103) used for DSSF, CC/DSSF, PCW/Mix, PCW/ZrCW, and CC/AR (Purex) wastes.**

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **7850** |
| **less TWRS DST Inventory** | **-1570** * |
| **Expected SST Inventory** | **6280** |
| **This Evaluation** | **4920** |
| **Expected Inventory Accounted for** | **78 %** |

***LANL estimates 2190 MT in DSTs. Potentially more than expected in DSTs or missing representative tanks for Al in this analysis.**

*Element: Ba*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.0002** | **0.00** | | **0.00** | **0.0198** | **0.06** | **0.02** | **0.06** |
| | | C-107 | 897 | 0 | | 0 | | | | 0.52 | |
| | | T-107 | 655 | 0 | | 0 | | | | 0.05 | |
| | | U-110 | 704 | 0.0058 | | 0 | | | | 0.05 | |
| **1C/CW** | **2830** | | **2256** | **0.0058** | **0.01** | **0** | **0.00** | **0.6142** | **0.77** | **0.62** | **0.78** |
| | | T-108 (w) | 167 | 0 | | | | | | 0 | |
| | | C-110 (w) | 708 | 0.0007 | | | | | | 0.0064 | |
| | | BX-107 | 1302 | 0.0007 | | 0 | | | | 0.01 | |
| **1C/TBP** | **2610** | | **2177** | **0.0014** | **0.00** | **0** | **0.00** | **0.015** | **0.02** | **0.0164** | **0.02** |
| **2C/EB** | **1400** | B-110 | **1400** | **0** | **0.00** | | **0.00** | **0.03** | **0.03** | **0.03** | **0.03** |
| | | B-110 | 927 | 0 | | 0 | | | | 0.03 | |
| | | B-111 | 893 | 0 | | 0 | | | | 0.05 | |
| **2C/5-6** | **1930** | | **1820** | **0** | **0.00** | **0** | **0.00** | **0.08** | **0.08** | **0.08** | **0.08** |
| **2C/224** | **3380** | T-111 | **1715** | **0.0008** | **0.00** | | **0.00** | **0.1292** | **0.25** | **0.13** | **0.26** |
| | | B-201 | 106 | 0.0001 | | 0 | | | | 0.05 | |
| | | B-202 | 102 | 0.0002 | | 0 | | | | 0.2 | |
| **224** | **1040** | | **208** | **0.0003** | **0.00** | **0** | **0.00** | **0.2497** | **1.25** | **0.25** | **1.25** |
| **EB/1C** | **18100** | TY-102 | **242** | **0.0025** | **0.19** | | **0.00** | **0.0026** | **0.19** | **0.0051** | **0.38** |
| **Total (MT)** | | | | | 0.20 | | 0.00 | | 2.66 | | 2.86 |
| **% Inventory** | | | | | 0.48 | | 0.00 | | 6.45 | | 6.93 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0031** | **0.00** | | **0.00** | **2.2569** | **2.26** | **2.26** | **2.26** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0007** | **0.00** | | **0.00** | **0.1153** | **0.12** | **0.116** | **0.12** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 0.0762 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 0.13 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **0.2062** | **1.27** | **0.2062** | **1.27** |
| **TBP** | **874** | TY-104 | **874** | **0.0003** | **0.00** | | **0.00** | **0.0197** | **0.02** | **0.02** | **0.02** |
| | | BX-104 (w) | 363 | 0.0006 | | | | | | 1.08 | |
| | | BX-109 | 731 | 0 | | 0 | | | | 0.04 | |
| **TBP/CW** | **2570** | | **1094** | **0.0006** | **0.00** | **0** | **0.00** | **1.1194** | **2.63** | **1.12** | **2.63** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.0003** | **0.00** | | **0.00** | **0.0197** | **0.09** | **0.02** | **0.10** |
| | | C-109 | 235 | 0 | | 0 | | | | 0.03 | |
| | | C-112 | 394 | 0 | | 0 | | | | 0.05 | |
| **TBP(f)/1C** | **1090** | | **629** | **0** | **0.00** | **0** | **0.00** | **0.08** | **0.14** | **0.08** | **0.14** |
| **Total (MT)** | | | | | 0.01 | | 0.00 | | 6.53 | | 6.53 |
| **% Inventory** | | | | | 0.02 | | 0.00 | | 15.79 | | 15.81 |

*Element: Ba (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Boil}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.0005** | **0.00** | | **0.00** | **0.0595** | **0.25** | **0.06** | **0.25** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | | **0.00** | | **0.00** | **0.04** | **0.23** | **0.04** | **0.23** |
| | | SX-102 | 2029 | 0.0025 | | | | | | 0.005 | |
| **R-RCW/EB** | 32300 | S-105 | 1718 | 0.0025 | | | | | | 0.005 | |
| **EB/R** | 7050 | S-109 | 2150 | 0.0025 | | | | | | 0.005 | |
| **EB/CW** | 7100 | S-110 | 980 | 0.0025 | | | | | | 0.005 | |
| **EB/DW** | 507 | SX-103 | 1612 | 0.0025 | | | | | | 0.005 | |
| | **46957** | | **8489** | **0.0125** | **0.07** | | **0.00** | **0.0125** | **0.07** | **0.025** | **0.14** |
| | | | | (based on TY-102) | | | | | | (based on TY-102) | |
| **Total (MT)** | | | | | 0.07 | | 0.00 | | 0.56 | | 0.63 |
| **% Inventory** | | | | | 0.17 | | 0.00 | | 1.35 | | 1.52 |
| **PUREX** | | | | | | | | | | | |
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.008** | **0.05** | | **0.00** | **1.062** | **6.53** | **1.07** | **6.58** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0** | **0.00** | | **0.00** | **0.0015** | **0.00** | **0.0015** | **0.00** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.0041** | **0.01** | | **0.00** | **5.2759** | **14.64** | **5.28** | **14.65** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.0017** | **0.00** | | **0.00** | **1.5783** | **1.58** | **1.58** | **1.58** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (w) | 746 | 0.0031 | | | | | | 5.21 | |
| **AR/PCW** | 980 | C-103 | 235 | 0.016 | | 0 | | | | 1.56 | |
| | **1228** | | **981** | **0.0191** | **0.02** | **0** | **0.00** | **6.7509** | **8.45** | **6.77** | **8.47** |
| **Total (MT)** | | | | | 0.09 | | 0.00 | | 31.21 | | 31.29 |
| **% Inventory** | | | | | 0.21 | | 0.00 | | 75.53 | | 75.74 |
| **TOTAL (MT)** | | | | | **0.36** | | **0.00** | | **40.95** | | **41.32** |
| **Distribution** | | | | | **0.88** | | **0.00** | | **99.12** | | |
| | | **Wash Factor** | **1** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | * |

**Leach factor from tests performed with AR/PCW (Purex) waste (C-103) used for DSSF, CC/DSSF, PCW/Mix, PCW/ZrCW, and CC/AR (Purex) wastes.**

***Ba inventory value not available.**

*Element: Bi*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0** | **0.00** | **0** | **0.00** | **36.4** | **116.33** | **36.4** | **116.33** |
| | | T-105 (w) | 371 | 0.0031 | | | | | | 0.506 | |
| | | C-107 | 897 | 0 | | 0.619 | | | | 15.5 | |
| | | T-107 | 655 | 0.004 | | 0.041 | | | | 11.8 | |
| | | U-110 | 704 | 0 | | 0 | | | | 14.7 | |
| **1C/CW** | **2830** | | **2627** | **0.0071** | **0.01** | **0.66** | **0.83** | **41.8389** | **45.07** | **42.506** | **45.91** |
| | | T-108 (w) | 167 | 0 | | | | | | 0.151 | |
| | | C-110 (w) | 708 | 0.1 | | | | | | 14 | |
| | | BX-107 | 1302 | 0 | | 0 | | | | 37.7 | |
| **1C/TBP** | **2610** | | **2177** | **0.1** | **0.12** | **0** | **0.00** | **51.751** | **62.04** | **51.851** | **62.16** |
| **2C/EB** | **1400** | B-104 | **1400** | **0** | **0.00** | **0.708** | **0.71** | **20.092** | **20.09** | **20.8** | **20.80** |
| | | B-110 | 927 | 0 | | 0 | | | | 25.2 | |
| | | B-111 | 893 | 0 | | 0 | | | | 22.6 | |
| **2C/5-6** | **1930** | | **1820** | **0** | **0.00** | **0** | **0.00** | **47.8** | **50.69** | **47.8** | **50.69** |
| **2C/224** | **3380** | T-111 | **1715** | **0** | **0.00** | **0** | **0.00** | **48.9** | **96.37** | **48.9** | **96.37** |
| | | B-201 | 106 | 0 | | 0 | | | | 13.7 | |
| | | B-202 | 102 | 0 | | 0.002 | | | | 4.37 | |
| **224** | **1040** | | **208** | **0** | **0.00** | **0.002** | **0.01** | **18.068** | **90.34** | **18.07** | **90.35** |
| | | B-105 | 1158 | 0 | | 0 | | | | 0 | |
| | | TY-102 | 242 | 0.004 | | 0 | | | | 0.051 | |
| | | TX-116 | 2388 | 0 | | 0 | | | | 0 | |
| **EB/1C** | **18100** | | **3788** | **0.004** | **0.02** | **0** | **0.00** | **0.047** | **0.22** | **0.051** | **0.24** |
| **Total (MT)** | | | | | 0.15 | | 1.55 | | 481.16 | | 482.86 |
| **% Inventory** | | | | | 0.03 | | 0.28 | | 86.21 | | 86.51 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.062** | **0.06** | **0** | **0.00** | **0.488** | **0.49** | **0.55** | **0.55** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0009** | **0.00** | | **0.00** | **0.5231** | **0.52** | **0.524** | **0.52** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 0.19 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 2.1 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **2.29** | **14.12** | **2.29** | **14.12** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0096** | **0.01** | **0** | **0.00** | **0.5124** | **0.51** | **0.522** | **0.52** |
| | | BX-104 (w) | 363 | 0.0075 | | | | | | 0.919 | |
| | | BX-109 | 731 | 0 | | 0.001 | | | | 0.43 | |
| **TBP/CW** | **2570** | | **1094** | **0.0075** | **0.02** | **0.001** | **0.00** | **1.3405** | **3.15** | **1.349** | **3.17** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.002** | **0.01** | **0.038** | **0.18** | **4.83** | **22.99** | **4.87** | **23.18** |
| | | C-108 | 250 | 0 | | 0 | | | | 4.13 | |
| | | C-109 | 235 | 0 | | 0 | | | | 3.46 | |
| | | C-112 | 394 | 0 | | 0 | | | | 3.78 | |
| **TBP(f)/1C** | **1090** | | **879** | **0** | **0.00** | **0** | **0.00** | **11.37** | **14.10** | **11.37** | **14.10** |
| **Total (MT)** | | | | | 0.10 | | 0.18 | | 55.88 | | 56.17 |
| **% Inventory** | | | | | 0.02 | | 0.03 | | 10.01 | | 10.06 |

*Element: Bi (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Roll}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0** | **0.00** | **0** | **0.00** | **0.03** | **0.13** | **0.03** | **0.13** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **0** | **0.00** | **0.01** | **0.06** | **0.07** | **0.41** | **0.08** | **0.47** |
| | | S-105 | 1718 | 0 | | | | | | NA | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 0 | | | | | | NA | |
| **EB/R** | 7050 | S-110 | 980 | 0 | | | | | | NA | |
| **EB/CW** | 7100 | SX-102 | 2029 | 0 | | | | | | NA | |
| **EB/DW** | 507 | SX-103 | 1612 | 0 | | | | | | NA | |
| | **46957** | | **8489** | **0** | **0.00** | | **0.00** | **0** | **0.00** | **0** | **0.00** |
| **Total (MT)** | | | | | 0.00 | | 0.06 | | 0.54 | | 0.60 |
| **% Inventory** | | | | | 0.00 | | 0.01 | | 0.10 | | 0.11 |

**PUREX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.161** | **0.99** | | **0.00** | **0.414** | **2.55** | **0.575** | **3.54** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0** | **0.00** | **0** | **0.00** | **0** | **0.00** | **0** | **0.00** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.0812** | **0.23** | | **0.00** | **4.9088** | **13.62** | **4.99** | **13.85** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.0364** | **0.04** | | **0.00** | **0.1346** | **0.13** | **0.171** | **0.17** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (wash) | 746 | 0.003 | | | | | | 0.534 | |
| **AR/PCW** | 980 | C-103 | 235 | 0.00926 | | 0 | | | | 0.226 | |
| | **1228** | | **981** | **0.01226** | **0.02** | **0** | **0.00** | **0.74774** | **0.94** | **0.76** | **0.95** |
| **Total (MT)** | | | | | 1.27 | | 0.00 | | 17.24 | | 18.51 |
| **% Inventory** | | | | | 0.23 | | 0.00 | | 3.09 | | 3.32 |
| **TOTAL (MT)** | | | | | **1.51** | | **1.79** | | **554.83** | | **558.13** |
| **Distribution** | | | | | **0.27** | | **0.32** | | **99.41** | | |
| | | **Wash Factor** | **0.3** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0.3** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **87 - 107** |

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **580 +/-60** |
| **less TWRS DST Inventory** | **-2.2 *** |
| **Expected SST Inventory** | **578 +/-60** |
| **This Evaluation** | **558** |
| **Expected Inventory Accounted for** | **97 %** |

*Element: Ca*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.1695** | **0.54** | **0.0605** | **0.19** | **1.05** | **3.36** | **1.28** | **4.09** |
| | | T-105 (w) | 371 | 0.0564 | | | | | | 2.43 | |
| | | C-107 | 897 | 0.0165 | | 0.004 | | | | 0.6 | |
| | | T-107 | 655 | 0.263 | | 0 | | | | 0.75 | |
| | | U-110 | 704 | 0.115 | | 0 | | | | 3.01 | |
| **1C/CW** | **2830** | | **2627** | **0.4509** | **0.49** | **0.004** | **0.01** | **6.3351** | **6.82** | **6.79** | **7.32** |
| | | T-108 (w) | 167 | 0 | | | | | | 0.0442 | |
| | | C-110 (w) | 708 | 0.159 | | | | | | 0.54 | |
| | | BX-107 | 1302 | 0.227 | | 0.227 | | | | 1.62 | |
| **1C/TBP** | **2610** | | **2177** | **0.386** | **0.46** | **0.227** | **0.46** | **1.5912** | **1.91** | **2.2042** | **2.83** |
| **2C/EB** | **1400** | B-104 | **1400** | **0** | **0.00** | **0** | **0.00** | **0.6** | **0.60** | **0.6** | **0.60** |
| | | B-110 | 927 | 0.121 | | 0.109 | | | | 1.21 | |
| | | B-111 | 893 | 0.069 | | 0.015 | | | | 0.76 | |
| **2C/5-6** | **1930** | | **1820** | **0.19** | **0.20** | **0.124** | **0.13** | **1.656** | **1.76** | **1.97** | **2.09** |
| **2C/224** | **3380** | T-111 | **1715** | **0** | **0.00** | **0.046** | **0.09** | **4.514** | **8.90** | **4.56** | **8.99** |
| | | B-201 | 106 | 0 | | 0.018 | | | | 1.83 | |
| | | B-202 | 102 | 0.003 | | 0 | | | | 1.19 | |
| **224** | **1040** | | **208** | **0.003** | **0.02** | **0.018** | **0.09** | **2.999** | **15.00** | **3.02** | **15.10** |
| | | B-105 | 1158 | 0.02 | | 0 | | | | 0.02 | |
| | | TY-102 | 242 | NR | | 0 | | | | NR | |
| | | TX-116 | 2388 | NR | | 0 | | | | NR | |
| **EB/1C** | **18100** | | **3788** | **0.02** (Assumed) | **0.31** | **0** | **0.00** | **0** | **0.00** | **0.02** | **0.31** |
| **Total (MT)** | | | | | 2.02 | | 0.97 | | 38.34 | | 41.32 |
| **% Inventory** | | | | | 0.96 | | 0.46 | | 18.31 | | 19.74 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0631** | **0.06** | | **0.00** | **6.7969** | **6.80** | **6.86** | **6.86** |
| **TBP/DiaE** | **64** | TY-104 | **64** | **0.002** | **0.00** | | **0.00** | **0.208** | **0.21** | **0.21** | **0.21** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 2.73 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 2.51 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **5.24** | **32.31** | **5.24** | **32.31** |
| **TBP** | **874** | TY-104 | **163** | **0.002** | **0.01** | | **0.00** | **0.208** | **1.12** | **0.21** | **1.13** |
| | | BX-104 (w) | 363 | 0.0394 | | | | | | 4.85 | |
| | | BX-109 | 731 | 0 | | 0 | | | | 4.42 | |
| **TBP/CW** | **2570** | | **1094** | **0.0394** | **0.28** | **0** | **0.00** | **9.2306** | **21.68** | **9.27** | **21.96** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.002** | **0.01** | | **0.00** | **0.208** | **0.99** | **0.21** | **1.00** |
| | | C-108 | 250 | 0.009 | | 0 | | | | 4.13 | |
| | | C-109 | 235 | 0.056 | | 0.056 | | | | 5.58 | |
| | | C-112 | 394 | 0.146 | | 0 | | | | 14.6 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.211** | **0.26** | **0.056** | **0.07** | **24.043** | **29.81** | **24.31** | **30.15** |
| **Total (MT)** | | | | | 0.63 | | 0.07 | | 92.92 | | 93.61 |
| **% Inventory** | | | | | 0.30 | | 0.03 | | 44.38 | | 44.71 |

*Element: Ca (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Boil}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.372** | **1.58** | **0.258** | **1.09** | **2.55** | **10.81** | **3.18** | **13.48** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **0.14** | **0.82** | **0.251** | **1.47** | **0.609** | **3.58** | **1** | **5.87** |
| | | S-105 | 1718 | 0 | | | | | | NR | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 0 | | | | | | NR | |
| **EB/R** | 7050 | S-110 | 980 | 0 | | | | | | NR | |
| **EB/CW** | 7100 | SX-102 | 2029 | 0.0578 | | | | | | 0.0578 | |
| **EB/DW** | 507 | SX-103 | 1612 | 0 | | | | | | NR | |
| | **46957** | | **8489** | **0.0578** | **1.34** | | **0.00** | **0** | **0.00** | **0.0578** | **1.34** |
| **Total (MT)** | | | | | 3.74 | | 2.57 | | 14.38 | | 20.69 |
| **% Inventory** | | | | | 1.78 | | 1.23 | | 6.87 | | 9.88 |
| **PUREX** | | | | | | | | | | | |
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.262** | **1.61** | **0** | **0.00** | **2.938** | **18.07** | **3.2** | **19.69** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0.0134** | **0.03** | **0** | **0.00** | **2.5866** | **5.71** | **2.6** | **5.74** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.0609** | **0.17** | | **0.00** | **1.4491** | **4.02** | **1.51** | **4.19** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.0472** | **0.05** | | **0.00** | **3.8128** | **3.81** | **3.86** | **3.86** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (wash) | 746 | 0.0486 | | | | | | 12.7 | |
| **AR/PCW** | 980 | C-103 | 235 | 0.035 | | 0 | | | | 3.49 | |
| | **1228** | | **981** | **0.0836** | **0.10** | **0** | **0.00** | **16.1064** | **20.16** | **16.19** | **20.27** |
| **Total (MT)** | | | | | 1.96 | | 0.00 | | 51.78 | | 53.74 |
| **% Inventory** | | | | | 0.94 | | 0.00 | | 24.73 | | 25.67 |
| **TOTAL (MT)** | | | | | **8.34** | | **3.60** | | **197.42** | | **209.36** |
| **Distribution** | | | | | **4.0** | | **1.7** | | **94.3** | | |
| | | **Wash Factor** | **4** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **2** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **111** |

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **214** |
| **less TWRS DST Inventory** | **-25.7** |
| **Expected SST Inventory** | **188** |
| **This Evaluation** | **209** |
| **Expected Inventory Accounted for** | **111 %** |

## *Element: Cd*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0** | **0.00** | | **0.00** | **0.01** | **0.03** | **0.01** | **0.03** |
| | | T-105 (w) | 371 | 0.0014 | | | | | | 0.0093 | |
| | | C-107 | 897 | 0 | | 0 | | | | 0.06 | |
| | | U-110 | 704 | 0 | | 0 | | | | 0.02 | |
| **1C/CW** | **2830** | | **1972** | **0.0014** | **0.00** | **0** | **0.00** | **0.0879** | **0.13** | **0.0893** | **0.13** |
| | | C-110 (w) | 708 | 0.0007 | | | | | | 0.0044 | |
| | | BX-107 | 1302 | 0.0011 | | 0 | | | | 0.01 | |
| **1C/TBP** | **2610** | | **2010** | **0.0018** | **0.00** | **0** | **0.00** | **0.0126** | **0.02** | **0.0144** | **0.02** |
| **2C/EB** | **1400** | B-110 | **1400** | **0.0078** | **0.01** | | **0.00** | **0.0322** | **0.03** | **0.04** | **0.04** |
| | | B-110 | 927 | 0.0078 | | 0 | | | | 0.04 | |
| | | B-111 | 893 | 0 | | 0 | | | | 0.02 | |
| **2C/5-6** | **1930** | | **1820** | **0.0078** | **0.01** | **0** | **0.00** | **0.0522** | **0.06** | **0.06** | **0.06** |
| **2C/224** | **3380** | T-111 | **1715** | **0.0008** | **0.00** | | **0.00** | **-0.0008** | **0.00** | | **0.00** |
| | | B-201 | 106 | 0.0001 | | 0 | | | | 0.01 | |
| | | B-202 | 102 | 0.0001 | | 0 | | | | 0.0017 | |
| **224** | **1040** | | **208** | **0.0002** | **0.00** | **0** | **0.00** | **0.0115** | **0.06** | **0.0117** | **0.06** |
| | | TY-102 | 242 | 0.0009 | | 0 | | | | 0.0019 | |
| **EB/1C** | **18100** | | **242** | **0.0009** | **0.07** | **0** | **0.00** | **0.001** | **0.07** | **0.0019** | **0.14** |
| **Total (MT)** | | | | | 0.09 | | 0.00 | | 0.39 | | 0.48 |
| **% Inventory** | | | | | 0.99 | | 0.00 | | 4.30 | | 5.29 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0496** | **0.05** | | **0.00** | **0.0894** | **0.09** | **0.139** | **0.14** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0002** | **0.00** | | **0.00** | **0.0023** | **0.00** | **0.0025** | **0.00** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 0.17 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 0.05 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **0.22** | **1.36** | **0.22** | **1.36** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0022** | **0.00** | | **0.00** | **0.0051** | **0.01** | **0.0073** | **0.01** |
| | | BX-104 (w) | 363 | 0.0017 | | | | | | 0.0162 | |
| | | BX-109 | NA | 0 | | 0 | | | | NR | |
| **TBP/CW** | **2570** | | **363** | **0.0017** | **0.01** | **0** | **0.00** | **0.0145** | **0.10** | **0.0162** | **0.11** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.0009** | **0.00** | | **0.00** | **0.0026** | **0.01** | **0.0035** | **0.02** |
| | | C-109 | 235 | 0 | | 0 | | | | 0.0028 | |
| | | C-112 | 394 | 0 | | 0 | | | | 0.0032 | |
| **TBP(f)/1C** | **1090** | | **629** | **0** | **0.00** | **0** | **0.00** | **0.006** | **0.01** | **0.006** | **0.01** |
| **Total (MT)** | | | | | 0.07 | | 0.00 | | 1.58 | | 1.65 |
| **% Inventory** | | | | | 0.75 | | 0.00 | | 17.29 | | 18.04 |

*Element: Cd (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Bell}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0** | **0.00** | | **0.00** | **0.001** | **0.00** | **0.001** | **0.00** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | | **0.00** | | **0.00** | **0.01** | **0.06** | **0.01** | **0.06** |
| **R-RCW/EB** | 32300 | | | | | | | | | | |
| **EB/R** | 7050 | | | | | | | | | | |
| **EB/CW** | 7100 | | | | | | | | | | |
| **EB/DW** | 507 | TY-102 | 242 | 0.0009 | | | | | | 0.0019 | |
| | **46957** | | **242** | **0.0009** | **0.17** | | **0.00** | **0.001** | **0.19** | **0.0019** | **0.37** |
| **Total (MT)** | | | | | 0.17 | | 0.00 | | 0.26 | | 0.43 |
| **% Inventory** | | | | | 1.91 | | 0.00 | | 2.81 | | 4.73 |
| **PUREX** | | | | | | | | | | | |
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.129** | **0.79** | | **0.00** | **0.04** | **0.25** | **0.169** | **1.04** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0** | **0.00** | | **0.00** | **0.0016** | **0.00** | **0.0016** | **0.00** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.0885** | **0.25** | | **0.00** | **1.6425** | **4.56** | **1.731** | **4.80** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.0083** | **0.01** | | **0.00** | **0.0199** | **0.02** | **0.0282** | **0.03** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (w) | 746 | 0.0128 | | | | | | 0.395 | |
| **AR/PCW** | 980 | C-103 | 235 | 0.002 | | 0 | | | | 0.16 | |
| | **1228** | | **981** | **0.0148** | **0.02** | **0** | **0.00** | **0.5402** | **0.68** | **0.555** | **0.69** |
| **Total (MT)** | | | | | 1.07 | | 0.00 | | 5.50 | | 6.57 |
| **% Inventory** | | | | | 11.67 | | 0.00 | | 60.27 | | 71.95 |
| **TOTAL (MT)** | | | | | **1.40** | | **0.00** | | **7.73** | | **9.13** |
| **Distribution** | | | | | **15.32** | | **0.00** | | **84.68** | | |
| | | **Wash Factor** | **15** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | * |

*Element: Cr*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.15** | **0.48** | **0.3805** | **1.22** | **1.2295** | **3.93** | **1.76** | **5.62** |
| | | T-105 (w) | 371 | 0.0964 | | | | | | 0.295 | |
| | | C-107 | 897 | 0.1695 | | 0.0865 | | | | 0.44 | |
| | | T-107 | 655 | 0.148 | | 0.066 | | | | 0.35 | |
| | | U-110 | 704 | 0.439 | | 0.032 | | | | 0.65 | |
| **1C/CW** | **2830** | | **2627** | **0.8529** | **0.92** | **0.1845** | **0.23** | **0.6976** | **0.75** | **1.735** | **1.90** |
| | | T-108 (w) | 167 | 0 | | | | | | 0 | |
| | | C-110 (w) | 708 | 0.22 | | | | | | 0.396 | |
| | | BX-107 | 1302 | 0.318 | | 0.121 | | | | 1.51 | |
| **1C/TBP** | **2610** | | **2177** | **0.538** | **0.65** | **0.121** | **0.24** | **1.247** | **1.50** | **1.906** | **2.38** |
| **2C/EB** | **1400** | B-104 | **1400** | **0.028** | **0.03** | **0.644** | **0.64** | **0.268** | **0.27** | **0.94** | **0.94** |
| | | B-110 | 927 | 0.122 | | 0.584 | | | | 1.22 | |
| | | B-111 | 893 | 0.347 | | 0.18 | | | | 1.28 | |
| **2C/5-6** | **1930** | | **1820** | **0.469** | **0.50** | **0.764** | **0.81** | **1.267** | **1.34** | **2.5** | **2.65** |
| **2C/224** | **3380** | T-111 | **1715** | **0** | **0.00** | **0.003** | **0.01** | **0.057** | **0.11** | **0.06** | **0.12** |
| | | B-201 | 106 | 0.151 | | 0.102 | | | | 0.44 | |
| | | B-202 | 102 | 0.079 | | 0.03 | | | | 0.37 | |
| **224** | **1040** | | **208** | **0.23** | **1.15** | **0.132** | **0.66** | **0.448** | **2.24** | **0.81** | **4.05** |
| | | B-105 | 1158 | 0.0278 | | 0 | | | | 0.029 | |
| | | TY-102 | 242 | 0.0033 | | 0 | | | | 0.043 | |
| | | TX-116 | 2388 | 0.889 | | 0 | | | | 1.49 | |
| **EB/1C** | **18100** | | **3788** | **0.9201** | **4.40** | **0** | **0.00** | **0.6419** | **3.07** | **1.562** | **7.46** |
| **Total (MT)** | | | | | 8.11 | | 3.81 | | 13.21 | | 25.13 |
| **% Inventory** | | | | | 2.35 | | 1.10 | | 3.82 | | 7.26 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.411** | **0.41** | **0.083** | **0.08** | **0.336** | **0.34** | **0.83** | **0.83** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0001** | **0.00** | **0.00175** | **0.00** | **0.01065** | **0.01** | **0.0125** | **0.01** |
| **TBP/EB** | **814** | T-109 | **220** | **0.014** | **0.05** | **0** | **0.00** | **0** | **0.00** | **0.014** | **0.05** |
| | | | | (assume removed w/wash) | | | | | | | |
| | | BY-104 | 1540 | 10 | | 0.129 | | | | 14.3 | |
| | | BY-110 | 1510 | 2.95 | | 0.063 | | | | 6.28 | |
| **TBP(f)/EB** (high [Cr]) | **3050** | | **3050** | **12.95** | **12.95** | **0.192** | **0.19** | **7.44** | **7.44** | **20.58** | **20.58** |
| **TBP(f)/EB** | 12050 | BY-105 | 1900 | 0.246 | | 0.004 | | | | 0.35 | |
| **TBP/EBits** | 2890 | BY-108 | 863 | 0.638 | | 0.009 | | | | 0.91 | |
| (low [Cr]) | **14940** | | **2763** | **0.884** | **4.78** | **0.013** | **0.07** | **0.36** | **1.96** | **1.26** | **6.81** |
| | | | | (BY-104 wash factor 70% | | (BY-104 leach factor 3%) | | | | | |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0313** | **0.03** | **0.00146** | **0.00** | **0.11324** | **0.11** | **0.146** | **0.15** |
| | | BX-104 (w) | 363 | 0.388 | | | | | | 2.48 | |
| | | BX-109 | 731 | 0.054 | | 0.067 | | | | 0.15 | |
| **TBP/CW** | **2570** | | **1094** | **0.442** | **1.04** | **0.067** | **0.24** | **2.121** | **4.98** | **2.63** | **6.26** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.46** | **2.19** | **0.087** | **0.41** | **0.093** | **0.44** | **0.64** | **3.05** |
| | | C-108 | 250 | 0.047 | | 0.003 | | | | 0.06 | |
| | | C-109 | 235 | 0.05 | | 0.01 | | | | 0.07 | |
| | | C-112 | 394 | 0.07 | | 0.059 | | | | 0.15 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.167** | **0.21** | **0.072** | **0.09** | **0.041** | **0.05** | **0.28** | **0.35** |
| **Total (MT)** | | | | | 21.66 | | 1.09 | | 15.34 | | 38.08 |
| **% Inventory** | | | | | 6.26 | | 0.31 | | 4.43 | | 11.01 |

*Element: Cr (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R-Sludge$_{Boil}$ | 4280 | | | | | | | | | | |
| RCW/Mix | 382 | | | | | | | | | | |
| RCW | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **6.305** | **26.72** | **0.556** | **2.36** | **0.279** | **1.18** | **7.14** | **30.26** |
| R-Sludge | 7470 | | | | | | | | | | |
| R/DiaE | 560 | | | | | | | | | | |
| R/Mix | 318 | | | | | | | | | | |
| R/2C | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **1.31** | **7.69** | **1.63** | **9.57** | **2.51** | **14.74** | **5.45** | **32.00** |
| | | S-105 | 1718 | 5.38 | | | | | | 5.38 | |
| R-RCW/EB | 32300 | S-109 | 2150 | 8.36 | | | | | | 10.6 | |
| EB/R | 7050 | S-110 | 980 | 2.55 | | | | | | 2.55 | |
| EB/CW | 7100 | SX-102 | 2029 | 6.28 | | | | | | 10.6 | |
| EB/DW | 507 | SX-103 | 1612 | 2.31 | | | | | | 5.8 | |
| | **46957** | | **8489** | **24.88** | **137.62** | | **0.00** | **10.05** | **55.59** | **34.93** | **193.22** |
| **Total (MT)** | | | | | 172.04 | | 11.93 | | 71.51 | | 255.48 |
| **% Inventory** | | | | | 49.72 | | 3.45 | | 20.67 | | 73.84 |
| **PUREX** | | | | | | | | | | | |
| DSSF | 7960 | | | | | | | | | | |
| CC/DSSF | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.0855** | **0.53** | **0.285** | **1.75** | **2.4795** | **15.25** | **2.85** | **17.53** |
| AR/PCW | 980 | | | | | | | | | | |
| P Sludge | 180 | | | | | | | | | | |
| AR Sludge | 26 | C-106 (wash) | 746 | 0.0015 | | | | | | 1.05 | |
| HS | 42 | C-103 | 235 | 0.004 | | 0.019 | | | | 0.19 | |
| | **1228** | | **981** | **0.0055** | **0.01** | **0.019** | **0.10** | **1.2155** | **1.52** | **1.24** | **1.63** |
| PCW/Mix | **159** | T-102 (w) | **72** | **0.0993** | **0.22** | **0.00017** | **0.00** | **0.00153** | **0.00** | **0.101** | **0.22** |
| PCW/ZrCW | **3100** | C-104 (w) | **1117** | **0.0609** | **0.17** | **0.151** | **0.42** | **1.2981** | **3.60** | **1.51** | **4.19** |
| CC/AR | **473** | A-106 (w) | **473** | **0.303** | **0.30** | **0.371** | **0.37** | **3.036** | **3.04** | **3.71** | **3.71** |
| **Total (MT)** | | | | | 1.22 | | 2.64 | | 23.42 | | 27.28 |
| **% Inventory** | | | | | 0.35 | | 0.76 | | 6.77 | | 7.89 |
| **TOTAL (MT)** | | | | | **203.04** | | **19.47** | | **123.47** | | **345.98** |
| **Distribution** | | | | | **58.7** | | **5.6** | | **35.7** | | |
| | | **Wash Factor** | **59** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **14** | **% washed solids** | | | | | | | |
| | | | | | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **40 - 65*** |

**Leach factor from tests performed with AR/PCW (Purex) waste (C-103) used for DSSF, CC/DSSF, PCW/Mix, PCW/ZrCW, and CC/AR (Purex) wastes.**

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **785 +/- 170*** |
| **less TWRS DST Inventory** | **-85** |
| **Expected SST Inventory** | **700 +/- 170*** |
| **This Evaluation** | **346** |
| **Expected Inventory Accounted for** | **49 %** |

*** Uncertainty in timing of changes to flowsheet results in a 170 MT uncertainty in the calculated Cr inventory.**

*Element:* $^{137}$ *Cs*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash Ci Tank | Wash Ci Waste Type | Leach Ci Tank | Leach Ci Waste Type | Residual Solids (after washing & leaching) Ci Tank | Residual Solids Ci Waste Type | Total Ci Tank | Total Ci Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **27.8** | **89** | **41.4** | **132** | **157** | **501** | **226** | **722** |
| | | T-105 (w) | 371 | 19630 | | | | | | 51210 | |
| | | C-107 | 897 | 9919 | | 20660 | | | | 46690 | |
| | | T-107 | 655 | 4553 | | 12124 | | | | 18396 | |
| | | U-110 | 704 | 1087 | | 2019 | | | | 15531 | |
| **1C/CW** | **2830** | | **2627** | **35189** | **37908** | **34804** | **43659** | **61835** | **66613** | **131827** | **148180** |
| **1C/TBP** | **2610** | **BX-107** | **2610** | **4026** | **4026** | **18230** | **18230** | **1427** | **1427** | **23682** | **23682** |
| **2C/EB** | **1400** | B-104 | **1400** | **0** | **0** | **9299** | **9299** | **66** | **66** | **9365** | **9365** |
| | | B-110 | 927 | 13670 | | 1256 | | | | 15706 | |
| | | B-111 | 893 | 76236 | | 64502 | | | | 146588 | |
| **2C/5-6** | **1930** | | **1820** | **89906** | **95340** | **65759** | **69733** | **6630** | **7030** | **162294** | **172103** |
| **2C/224** | **3380** | T-111 | **1715** | **68.20** | **134.41** | **84.57** | **166.68** | **119.85** | **236.21** | **272.62** | **537** |
| | | B-201 | 106 | 17.6 | | 8.28 | | | | 104 | |
| | | B-202 | 102 | 5.11 | | 2.36 | | | | 9.76 | |
| **224** | **1040** | | **208** | **22.7** | **114** | **10.6** | **53.2** | **80.1** | **400** | **113** | **567** |
| | | B-105 | 1158 | 660 | | 0 | | | | 96705 | |
| | | TY-102 | 242 | 837 | | 0 | | | | 1063 | |
| | | TX-116 | 2388 | 28227 | | 0 | | | | 140836 | |
| **EB/1C** | **18100** | | **3788** | **29724** | **142030** | **0** | **0** | **208879** | **998078** | **238604** | **1140108** |
| **Total (Ci)** | | | | | 2.80E+5 | | 1.41E+5 | | 1.07E+6 | | 1.50E+6 |
| **% Inventory** | | | | | 2.48 | | 1.25 | | 9.51 | | 13.24 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **8194.56** | **8195** | **27689.232** | **27689** | **64608.208** | **64608.21** | **100492** | **100492** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **337.56** | **338** | **385.7496** | **386** | **900.0824** | **900.08** | **1623.392** | **1623** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | | | | | | | | | | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 130800 | | | | 130800 | |
| | **18804** | | **1510** | **0** | **0** | **130800** | **1628850** (Assumed) | **0** | **0.00** | **130800** | **1628850** |
| **TBP** | **874** | TY-105 (w) | **874** | **6706.192** | **6706** | **3164.528** | **3165** (Assumed) | **9.095E-13** | **0.00** | **9870.72** | **9871** |
| | | BX-104 (w) | 363 | 31428 | | | | | | 49702.8 | |
| | | BX-109 | 731 | 0 | | 11818.48 | | | | 11818.48 | |
| **TBP/CW** | **2570** | | **1094** | **31428** | **73830** | **11818.48** | **41551** | **18274.8** | **42930.75** | **61521.28** | **158311** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **3942.856** | **18771** | **1240.824** | **5907** | **4508.56** | **21464.06** | **9692.24** | **46142** |
| | | C-108 | 250 | 1534 | | 36790 | | | | 38350 | |
| | | C-109 | 235 | 8770.97 | | 163138.3 | | | | 175332.3 | |
| | | C-112 | 394 | 16357.38 | | 384328.75 | | | | 408847.4 | |
| **TBP(f)/1C** | **1090** | | **879** | **26662.35** | **33063** | **584257.05** | **724505** | **11610.3** | **14397.30** | **622529.7** | **771965** |
| **Total (Ci)** | | | | | 1.41E+5 | | 2.43E+6 | | 1.44E+5 | | 2.72E+6 |
| **% Inventory** | | | | | 1.25 | | 21.54 | | 1.28 | | 24.07 |

*Element:* $^{137}$ *Cs*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash Ci Tank | Wash Ci Waste Type | Leach Ci Tank | Leach Ci Waste Type | Residual Solids (after washing & leaching) Ci Tank | Residual Solids Ci Waste Type | Total Ci Tank | Total Ci Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R-Sludge$_{Boil}$ | 4280 | | | | | | | | | | |
| RCW/Mix | 382 | | | | | | | | | | |
| RCW | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **80642** | **341763** | **8184** | **34684** | **2717** | **11513** | **91542** | **387960** |
| R-Sludge | 7470 | | | | | | | | | | |
| R/DiaE | 560 | | | | | | | | | | |
| R/Mix | 318 | | | | | | | | | | |
| R/2C | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **115500** | **678228** | **34500** | **202587** | **0** | **0.00** | **150000** | **880815** |
| | | S-105 | 1718 | 71983 | | 58200 (Assumed) | | | | 105899 | |
| R-RCW/EB | 32300 | S-109 | 2150 | 196555 | | | | | | 196656 | |
| EB/R | 7050 | S-110 | 980 | 33039 | | | | | | 33039 | |
| EB/CW | 7100 | SX-102 | 2029 | 196871 | | | | | | 196871 | |
| EB/DW | 507 | SX-103 | 1612 | 89850 | | | | | | 89850 | |
| | **46957** | | **8489** | **588299** | **3254181** | | **0** | **34017** | **188164** | **622315** | **3442344** |
| **Total (Ci)** | | | | | 4.27E+6 | | 2.37E+5 | | 2.00E+5 | | 4.71E+6 |
| **% Inventory** | | | | | 38 | | 2 | | 1.77 | | 42 |
| **PUREX** | | | | | | | | | | | |
| DSSF | 7960 | | | | | | | | | | |
| CC/DSSF | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **288439** | **1774370** | | **0** | **2716** | **16708** | **291155** | **1791077** |
| P Sludge | 180 | | | | | | | | | | |
| AR Sludge | 26 | | | | | | | | | | |
| HS | 42 | | | | | | | | | | |
| | **248** | C-103 | **235** | **2899** | **3060** | **3479** | **3671** | **8118** | **8567** | **14496** | **15298** |
| PCW/Mix | **159** | T-102 (w) | **72** | **2960** | **6536** | **182** | **401** | **424** | **936** | **3565** | **7873** |
| PCW/ZrCW | **3100** | C-104 (w) | **1117** | **5205** | **14444** | **8307** | **23054** | **19383** | **53793** | **32895** | **91292** |
| CC/AR | **473** | A-106 (w) | **473** | **59612** | **59612** | **7282** | **7282** | **16991** | **16991** | **83886** | **83886** |
| P Sludge | 180 | | | | | | | | | | |
| AR Sludge | 26 | | | | | | | | | | |
| HS | 42 | C-106 (wash) | 746 | 51449 | | | | | | 273307 | |
| AR/PCW | 980 | C-103 | 235 | 2902 | | 4483 | | | | 14496 | |
| | **1228** | | **981** | **54351** | **68036** | **4483** | **23426** | **228969** | **286620** | **287803** | **378081** |
| **Total (Ci)** | | | | | 1.93E+6 | | 5.78E+4 | | 3.84E+5 | | 2.37E+6 |
| **% Inventory** | | | | | 17.06 | | 0.51 | | 3.40 | | 20.97 |
| **TOTAL (Ci)** | | | | | **6.62E+6** | | **2.87E+6** | | **1.80E+6** | | **11.3E+6** |
| **Distribution** | | | | | **59** | | **25** | | **16** | | |
| | | **Wash Factor** | **59** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **61** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **119*** |

**Leach factor from tests performed with AR/PCW (Purex) waste (C-103) used for DSSF, CC/DSSF, PCW/Mix, PCW/ZrCW, and CC/AR (Purex) wastes.**

***Based on decaying inventories to 1999. Note that decay calculations were based on sample reporting dates, and as a result inventories are approximations.**

| | (Ci) |
|---|---|
| **"Provisional" Best-basis Total** | |
| **Inventory (on-going work at WHC)** | **34.9E+6** |
| **less TWRS DST Inventory** | **-25.4E+6** |
| **Expected SST Inventory** | **09.5E+6** |
| **This Evaluation** | **11.3E+6 *** |
| **Expected Inventory Accounted for** | **119 %** |

*Element: Fe*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.153** | **0.49** | **0** | **0.00** | **17.15** | **54.80** | **17.3** | **55.29** |
| | | T-105 (w) | 371 | 0.0013 | | | | | | 19.6 | |
| | | C-107 | 897 | 0.635 | | 0.046 | | | | 57.2 | |
| | | T-107 | 655 | 0.025 | | 0.006 | | | | 30.9 | |
| | | U-110 | 704 | 0.0338 | | 0 | | | | 10.7 | |
| **1C/CW** | **2830** | | **2627** | **0.6951** | **0.75** | **0.052** | **0.07** | **117.65** | **126.74** | **118.4** | **127.56** |
| | | T-108 (w) | 167 | 0.0179 | | | | | | 1.53 | |
| | | C-110 (w) | 708 | 0.264 | | | | | | 9.3 | |
| | | BX-107 | 1302 | 0.185 | | 0 | | | | 17.3 | |
| **1C/TBP** | **2610** | | **2177** | **0.4669** | **0.56** | **0** | **0.00** | **27.66** | **33.17** | **28.13** | **33.72** |
| **2C/EB** | **1400** | B-104 | **1400** | **0** | **0.00** | **0** | **0.00** | **19.70** | **19.70** | **19.7** | **19.70** |
| | | B-110 | 927 | 0.149 | | 0 | | | | 24.2 | |
| | | B-111 | 893 | 0.091 | | 0 | | | | 18.3 | |
| **2C/5-6** | **1930** | | **1820** | **0.24** | **0.25** | **0** | **0.00** | **42.26** | **44.81** | **42.5** | **45.07** |
| **2C/224** | **3380** | T-111 | **1715** | **0.241** | **0.47** | | **0.00** | **34.26** | **67.52** | **34.5** | **67.99** |
| | | B-201 | 106 | 0.0008 | | 0.02 | | | | 2 | |
| | | B-202 | 102 | 0.002 | | 0 | | | | 0.72 | |
| **224** | **1040** | | **208** | **0.0028** | **0.01** | **0.02** | **0.10** | **2.70** | **13.49** | **2.72** | **13.60** |
| | | B-105 | 1158 | 0.0371 | | 0 | | | | 11.8 | |
| | | TY-102 | 242 | 0.0005 | | 0 | | | | 0.499 | |
| | | TX-116 | 2388 | 0 | | 0 | | | | 35.5 | |
| **EB/1C** | **18100** | | **3788** | **0.0376** | **0.18** | **0** | **0.00** | **47.76** | **228.22** | **47.799** | **228.40** |
| **Total (MT)** | | | | | 2.72 | | 0.17 | | 588.44 | | 591.33 |
| **% Inventory** | | | | | 0.22 | | 0.01 | | 47.75 | | 47.98 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0045** | **0.00** | | **0.00** | **9.33** | **9.33** | **9.33** | **9.33** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0004** | **0.00** | | **0.00** | **4.04** | **4.04** | **4.04** | **4.04** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | | | | | | | 11.8 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0.065 | | 0 | | | | 2.17 | |
| | **18804** | | **3050** | **0.065** | **0.81** | **0** | **0.00** | **13.91** | **85.73** | **13.97** | **86.13** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0008** | **0.00** | | **0.00** | **28.00** | **28.00** | **28** | **28.00** |
| | | BX-104 (w) | 363 | 0.0008 | | | | | | 4.7 | |
| | | BX-109 | 731 | 0 | | 0 | | | | 23.6 | |
| **TBP/CW** | **2570** | | **1094** | **0.0008** | **0.00** | **0** | **0.00** | **28.30** | **66.48** | **28.3** | **66.48** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.058** | **0.28** | **0.008** | **0.04** | **8.90** | **42.39** | **8.97** | **42.70** |
| | | C-108 | 250 | 0.202 | | 0.278 | | | | 2.33 | |
| | | C-109 | 235 | 0.213 | | 0.053 | | | | 5.32 | |
| | | C-112 | 394 | 0.288 | | 0.576 | | | | 14.4 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.703** | **0.87** | **0.907** | **1.12** | **20.44** | **25.35** | **22.05** | **27.34** |
| **Total (MT)** | | | | | 1.96 | | 1.16 | | 261.31 | | 264.03 |
| **% Inventory** | | | | | 0.16 | | 0.09 | | 21.20 | | 21.42 |

*Element: Fe (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Boil}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0** | **0.00** | **0.014** | **0.06** | **4.13** | **17.49** | **4.14** | **17.55** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **0** | **0.00** | **0.131** | **0.77** | **4.24** | **24.89** | **4.37** | **25.66** |
| | | S-105 | 1718 | 0.0256 | | | | | | NR | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 0 | | | | | | 10.7 | |
| **EB/R** | 7050 | S-110 | 980 | 0 | | | | | | NR | |
| **EB/CW** | 7100 | SX-102 | 2029 | 0 | | | | | | 6.18 | |
| **EB/DW** | 507 | SX-103 | 1612 | 0 | | | | | | 1.7 | |
| | **46957** | | **8489** | **0.0256** | **0.70** | | **0.00** | **18.55** | **102.63** | **18.58** | **103.33** |
| **Total (MT)** | | | | | 0.70 | | 0.83 | | 145.01 | | 146.54 |
| **% Inventory** | | | | | 0.06 | | 0.07 | | 11.77 | | 11.89 |

**PUREX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.0118** | **0.07** | | **0.00** | **0.65** | **3.99** | **0.661** | **4.07** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0.0134** | **0.03** | | **0.00** | **2.59** | **5.71** | **2.6** | **5.74** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.0094** | **0.03** | | **0.00** | **35.19** | **97.66** | **35.2** | **97.69** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.003** | **0.00** | | **0.00** | **19.30** | **19.30** | **19.3** | **19.30** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (wash) | 746 | 0.0012 | | | | | | 55.5 | |
| **AR/PCW** | 980 | C-103 | 235 | 0.0022 | | 0 | | | | 27.3 | |
| | **1228** | | **981** | **0.0034** | **0.00** | **0** | **0.00** | **82.80** | **103.64** | **82.8** | **103.65** |
| **Total (MT)** | | | | | 0.14 | | 0.00 | | 230.31 | | 230.45 |
| **% Inventory** | | | | | 0.01 | | 0.00 | | 18.69 | | 18.70 |
| **TOTAL (MT)** | | | | | **5.52** | | **2.16** | | **1225.07** | | **1232.34** |
| **Distribution** | | | | | **0.4** | | **0.2** | | **99.4** | | |
| | | **Wash Factor** | **0.4** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0.2** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **115** |

**Leach factor from tests performed with AR/PCW (Purex) waste (C-103) used for DSSF, CC/DSSF, PCW/Mix, PCW/ZrCW, and CC/AR (Purex) wastes.**

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **1230** |
| **less TWRS DST Inventory** | **-162** |
| **Expected SST Inventory** | **1068** |
| **This Evaluation** | **1230** |
| **Expected Inventory Accounted for** | **115 %** |

*Element: Mg*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.0124** | **0.04** | | **0.00** | **0.2976** | **0.95** | **0.31** | **0.99** |
| | | T-105 (w) | 371 | 0.0031 | | | | | | 0.603 | |
| | | C-107 | 897 | 0.004 | | 0.001 | | | | 0.3 | |
| | | T-107 | 655 | 0.031 | | 0 | | | | 0.22 | |
| | | U-110 | 704 | 0.335 | | 0 | | | | 1.44 | |
| **1C/CW** | **2830** | | **2627** | **0.3731** | **0.40** | **0.001** | **0.00** | **2.1889** | **2.36** | **2.563** | **2.76** |
| | | C-110 (w) | 708 | 0.0018 | | | | | | 0.0451 | |
| | | BX-107 | 1302 | 0.0257 | | 0 | | | | 0.25 | |
| **1C/TBP** | **2610** | | **2010** | **0.0275** | **0.04** | **0** | **0.00** | **0.2676** | **0.35** | **0.2951** | **0.38** |
| **2C/EB** | **1400** | B-104 | **1400** | **0** | **0.00** | **0.019** | **0.02** | **0.231** | **0.23** | **0.25** | **0.25** |
| | | B-110 | 927 | 0.022 | | 0 | | | | 0.24 | |
| | | B-111 | 893 | 0 | | 0 | | | | 0.82 | |
| **2C/5-6** | **1930** | | **1820** | **0.022** | **0.02** | **0** | **0.00** | **1.038** | **1.10** | **1.06** | **1.12** |
| **2C/224** | **3380** | T-111 | **1715** | **0.0467** | **0.09** | | **0.00** | **0.6633** | **1.31** | **0.71** | **1.40** |
| | | B-201 | 106 | 0.0017 | | 0 | | | | 0.45 | |
| | | B-202 | 102 | 0.0006 | | 0 | | | | 0.0606 | |
| **224** | **1040** | | **208** | **0.0023** | **0.01** | **0** | **0.00** | **0.5083** | **2.54** | **0.5106** | **2.55** |
| | | B-105 | 1158 | 0 | | 0 | | | | 0.005 | |
| | | TY-102 | 242 | 0 | | 0 | | | | 0.001 | |
| | | TX-116 | 2388 | 0 | | 0 | | | | 0.01 | |
| **EB/1C** | **18100** | | **3788** | **0** | **0.00** | **0** | **0.00** | **0.016** | **0.08** | **0.016** (Assumed) | **0.08** |
| **Total (MT)** | | | | | 0.60 | | 0.02 | | 8.91 | | 9.54 |
| **% Inventory** | | | | | 0.89 | | 0.03 | | 13.09 | | 14.00 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0215** | **0.02** | | **0.00** | **3.2285** | **3.23** | **3.25** | **3.25** |
| **TBP/DiaE** | **64** | TY-104 | **64** | **0.001** | **0.00** | | **0.00** | **0.079** | **0.08** | **0.08** | **0.08** |
| **TBP(f)/EB** | 15100 | | | | | | | | | | |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 0.27 | |
| | **18804** | | **1510** | **0** | **0.00** | **0** | **0.00** | **0.27** | **3.36** | **0.27** | **3.36** |
| **TBP** | **874** | TY-104 | **874** | **0.001** | **0.00** | | **0.00** | **0.079** | **0.08** | **0.08** | **0.08** |
| | | BX-104 (w) | 363 | 0.0007 | | | | | | 1.62 | |
| | | BX-109 | 731 | 0 | | 0 | | | | 0.82 | |
| **TBP/CW** | **2570** | | **1094** | **0.0007** | **0.00** | **0** | **0.00** | **2.4393** | **5.73** | **2.44** | **5.73** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.001** | **0.00** | | **0.00** | **0.079** | **0.38** | **0.08** | **0.38** |
| | | C-108 | 250 | 0.001 | | 0 | | | | 0.06 | |
| | | C-109 | 235 | 0.002 | | 0 | | | | 0.138 | |
| | | C-112 | 394 | 0.0216 | | 0 | | | | 0.33 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.0246** | **0.03** | **0** | **0.00** | **0.5034** | **0.62** | **0.528** | **0.65** |
| **Total (MT)** | | | | | 0.06 | | 0.00 | | 13.48 | | 13.54 |
| **% Inventory** | | | | | 0.09 | | 0.00 | | 19.79 | | 19.88 |

*Element: Mg (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Boil}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.0075** | **0.03** | | **0.00** | **0.0825** | **0.35** | **0.09** | **0.38** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **0.028** | **0.16** | **0.061** | **0.36** | **0.171** | **1.00** | **0.26** | **1.53** |
| | | S-105 | 1718 | 0 | | | | | | 0.01 | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 0 | | | | | | 0.01 | |
| **EB/R** | 7050 | S-110 | 980 | 0 | | | | | | 0.005 | |
| **EB/CW** | 7100 | SX-102 | 2029 | 0 | | | | | | 0.01 | |
| **EB/DW** | 507 | SX-103 | 1612 | 0 | | | | | | 0.01 | |
| | **46957** | | **8489** | **0** | **0.00** | | **0.00** | **0.045** | **0.25** | **0.045** (Assumed) | **0.25** |
| **Total (MT)** | | | | | 0.20 | | 0.36 | | 1.60 | | 2.16 |
| **% Inventory** | | | | | 0.29 | | 0.53 | | 2.35 | | 3.17 |

**PUREX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.0054** | **0.03** | | **0.00** | **1.4746** | **9.07** | **1.48** | **9.10** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0** | **0.00** | | **0.00** | **0.0138** | **0.03** | **0.0138** | **0.03** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.0062** | **0.02** | | **0.00** | **7.3738** | **20.46** | **7.38** | **20.48** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.0004** | **0.00** | | **0.00** | **2.0796** | **2.08** | **2.08** | **2.08** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (w) | 746 | 0.0122 | | | | | | 6.99 | |
| **AR/PCW** | 980 | C-103 | 235 | 0.003 | | 0 | | | | 1.94 | |
| | **1228** | | **981** | **0.0152** | **0.02** | **0** | **0.00** | **8.9148** | **11.16** | **8.93** | **11.18** |
| **Total (MT)** | | | | | 0.07 | | 0.00 | | 42.81 | | 42.87 |
| **% Inventory** | | | | | 0.10 | | 0.00 | | 62.85 | | 62.95 |
| **TOTAL (MT)** | | | | | **0.93** | | **0.38** | | **66.80** | | **68.11** |
| **Distribution** | | | | | **1.4** | | **0.6** | | **98.1** | | |
| | | **Wash Factor** | **1.4** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0.6** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | * |

***Mg inventory value unavailable.**

*Element: Mn*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.0008** | **0.00** | | **0.00** | **0.11** | **0.35** | **0.11** | **0.35** |
| | | T-105 (w) | 371 | 0.0004 | | | | | | 8.63 | |
| | | C-107 | 897 | 0 | | 0 | | | | 1.79 | |
| | | T-107 | 655 | 0.0025 | | 0 | | | | 0.22 | |
| | | U-110 | 704 | 0 | | 0 | | | | 2.49 | |
| **1C/CW** | **2830** | | **2627** | **0.0029** | **0.00** | **0** | **0.00** | **13.13** | **14.14** | **13.13** | **14.14** |
| | | T-108 (w) | 167 | 0 | | | | | | 0.182 | |
| | | C-110 (w) | 708 | 0.0018 | | | | | | 0.0451 | |
| | | BX-107 | 1302 | 0.01 | | 0.001 | | | | 0.1 | |
| **1C/TBP** | **2610** | | **2177** | **0.0118** | **0.01** | **0.001** | **0.00** | **0.31** | **0.38** | **0.3271** | **0.39** |
| **2C/EB** | **1400** | B-104 | **1400** | **0** | **0.00** | | **0.00** | **0.07** | **0.07** | **0.07** | **0.07** |
| | | B-110 | 927 | 0 | | 0 | | | | 0.11 | |
| | | B-111 | 893 | 0 | | 0 | | | | 0.12 | |
| **2C/5-6** | **1930** | | **1820** | **0** | **0.00** | **0** | **0.00** | **0.23** | **0.24** | **0.23** | **0.24** |
| **2C/224** | **3380** | T-111 | **1715** | **0.0467** | **0.09** | | **0.00** | **11.89** | **23.44** | **11.94** | **23.53** |
| | | B-201 | 106 | 0.0005 | | 0 | | | | 3.06 | |
| | | B-202 | 102 | 0.0003 | | 0 | | | | 1.49 | |
| **224** | **1040** | | **208** | **0.0008** | **0.00** | **0** | **0.00** | **4.55** | **22.75** | **4.55** | **22.75** |
| | | B-105 | 1158 | 0 | | 0 | | | | 0 | |
| | | TY-102 | 242 | 0.0007 | | 0 | | | | 0.0123 | |
| | | TX-116 | 2388 | 0 | | 0 | | | | 0 | |
| **EB/1C** | **18100** | | **3788** | **0.0007** | **0.05** | **0** | **0.00** | **0.01** | **0.87** | **0.0123** | **0.92** |
| **Total (MT)** | | | | | 0.17 | | 0.00 | | 62.23 | | 62.40 |
| **% Inventory** | | | | | 0.11 | | 0.00 | | 40.61 | | 40.72 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0205** | **0.02** | | **0.00** | **2.16** | **2.16** | **2.18** | **2.18** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0016** | **0.00** | | **0.00** | **0.05** | **0.05** | **0.0488** | **0.05** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 0.22 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 0.11 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **0.33** | **2.03** | **0.33** | **2.03** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0175** | **0.02** | | **0.00** | **0.20** | **0.20** | **0.218** | **0.22** |
| | | BX-104 (w) | 363 | 0.0137 | | | | | | 0.643 | |
| | | BX-109 | 731 | 0 | | 0 | | | | 0.11 | |
| **TBP/CW** | **2570** | | **1094** | **0.0137** | **0.03** | **0** | **0.00** | **0.74** | **1.74** | **0.753** | **1.77** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.0041** | **0.02** | **0.001** | **0.00** | **0.56** | **2.69** | **0.57** | **2.71** |
| | | C-108 | 250 | 0.0001 | | 0.0001 | | | | 0.01 | |
| | | C-109 | 235 | 0 | | 0 | | | | 0.03 | |
| | | C-112 | 394 | 0.0011 | | 0 | | | | 0.14 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.0012** | **0.00** | **0.0001** | **0.00** | **0.18** | **0.22** | **0.18** | **0.22** |
| **Total (MT)** | | | | | 0.09 | | 0.00 | | 9.09 | | 9.19 |
| **% Inventory** | | | | | 0.06 | | 0.00 | | 5.93 | | 5.99 |

*Element: Mn (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Boil}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.0005** | **0.00** | | **0.00** | **1.81** | **7.67** | **1.81** | **7.67** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **0** | **0.00** | | **0.00** | **1.13** | **6.64** | **1.13** | **6.64** |
| **EB/R** | 7050 | S-105 | 1718 | 0 | | | | | | 0.375 | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 0 | | | | | | 0.77 | |
| **EB/CW** | 7100 | SX-102 | 2029 | 0 | | | | | | 5.7 | |
| **EB/DW** | 507 | SX-103 | 1612 | 0 | | | | | | 0.948 | |
| | **46957** | | **7509** | **0** | **0.00** | | **0.00** | **7.79** | **48.73** | **7.793** | **48.73** |
| **Total (MT)** | | | | | 0.00 | | 0.00 | | 63.04 | | 63.04 |
| **% Inventory** | | | | | 0.00 | | 0.00 | | 41.13 | | 41.14 |
| **PUREX** | | | | | | | | | | | |
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.053** | **0.33** | | **0.00** | **0.18** | **1.10** | **0.232** | **1.43** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0.001** | **0.00** | | **0.00** | **0.12** | **0.27** | **0.125** | **0.28** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.0062** | **0.02** | | **0.00** | **4.45** | **12.36** | **4.46** | **12.38** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.0662** | **0.07** | | **0.00** | **1.04** | **1.04** | **1.103** | **1.10** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (w) | 746 | 0.0053 | | | | | | 1.963 | |
| **AR/PCW** | 980 | C-103 | 235 | 0.0037 | | 0 | | | | 0.78 | |
| | **1228** | | **981** | **0.009** | **0.01** | **0** | **0.00** | **2.73** | **3.42** | **2.743** | **3.43** |
| **Total (MT)** | | | | | 0.42 | | 0.00 | | 18.19 | | 18.62 |
| **% Inventory** | | | | | 0.28 | | 0.00 | | 11.87 | | 12.15 |
| **TOTAL (MT)** | | | | | **0.69** | | **0.01** | | **153** | | **153** |
| **Distribution** | | | | | **0.45** | | **0.00** | | **99.55** | | |
| | | **Wash Factor** | **0.5** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **170-239*** |

| | | |
|---|---|---|
| **"Provisional" Best-basis Total** | | |
| **Inventory (on-going work at WHC)** | **105** | **+/-13** |
| **less TWRS DST Inventory** | **-28.3** | * |
| **Expected SST Inventory** | **76.7** | **+/-13** |
| **This Evaluation** | **153** | |
| **Expected Inventory Accounted for** | **199** | **%** |

***Range reflects 36.7 - 50 MT Mn estimated from REDOX Process. Potentially less than 28.3 MT Mn in DSTs.**

*Element: Na*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **31.3** | **100.03** | **88.4** | **282.51** | **4.3** | **13.74** | **124** | **396.28** |
| | | T-105 (w) | 371 | 29.2 | | | | | | 29.9 | |
| | | C-107 | 897 | 20 | | 63.8 | | | | 87 | |
| | | T-107 | 655 | 65.1 | | 48.6 | | | | 128 | |
| | | U-110 (w) | 704 | 79.4 | | 0 | | | | 115 | |
| **1C/CW** | **2830** | | **2627** | **193.7** | **208.67** | **112.4** | **204.96** | **53.8** | **57.96** | **359.9** | **471.58** |
| | | T-108 (w) | 167 | 27.7 | | | | | | 55.7 | |
| | | C-110 (w) | 708 | 56.2 | | | | | | 71.1 | |
| | | BX-107 | 1302 | 106 | | NR | | | | 158 | |
| **1C/TBP** | **2610** | | **2177** | **189.9** | **227.67** | **0** | **0.00** | **94.9** | **113.78** | **284.8** | **341.45** |
| **2C/EB** | **1400** | B-104 | **1400** | **199** | **199.00** | | **0.00** | **15** | **15.00** | **214** | **214.00** |
| | | B-110 | 927 | 116 | | NR | | | | 125 | |
| | | B-111 | 893 | 89.8 | | NR | | | | 97.6 | |
| **2C/5-6** | **1930** | | **1820** | **205.8** | **218.24** | **0** | **0.00** | **16.8** | **17.82** | **222.6** | **236.05** |
| **2C/224** | **3380** | T-111 | **1715** | **62** | **122.19** | | **0.00** | **7.8** | **15.37** | **69.8** | **137.57** |
| | | B-201 | 106 | 4.07 | | NR | | | | 5.5 | |
| | | B-202 | 102 | 1.89 | | 1.98 | | | | 4.2 | |
| **224** | **1040** | | **208** | **5.96** | **29.80** | **1.98** | **9.90** | **1.76** | **8.80** | **9.7** | **48.50** |
| | | B-105 | 1158 | 325 | | 0 | | | | 330 | |
| | | TY-102 | 242 | 81.5 | | 0 | | | | 84.7 | |
| | | TX-116 | 2388 | 784 | | 0 | | | | 804 | |
| **EB/1C** | **18100** | | **3788** | **1190.5** | **5688.50** | **0** | **0.00** | **28.2** | **134.75** | **1218.7** | **5823.25** |
| **Total (MT)** | | | | | 6794.10 | | 497.37 | | 377.21 | | 7668.68 |
| **% Inventory** | | | | | 16.24 | | 1.19 | | 0.90 | | 18.33 |

**TBP**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TBP/Sr** | **568** | C-105 (w) | **568** | **30.7** | **30.70** | | **0.00** | **32.5** | **32.50** | **63.2** | **63.20** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **109** | **109.00** | | **0.00** | **45** | **45.00** | **154** | **154.00** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 553 | | 0 | | | | 553 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 562 | | 0 | | | | 574 | |
| | **18804** | | **3050** | **1115** | **6874.25** | **0** | **0.00** | **12** | **73.98** | **1127** | **6948.23** |
| **TBP** | **874** | TY-105 (w) | **874** | **109** | **109.00** | | **0.00** | **45** | **45.00** | **154** | **154.00** |
| | | BX-104 (w) | 363 | 32.3 | | | | | | 45 | |
| | | BX-109 | 731 | 120 | | 0 | | | | 125 | |
| **TBP/CW** | **2570** | | **1094** | **152.3** | **357.78** | **0** | **0.00** | **17.7** | **41.58** | **170** | **399.36** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **12.7** | **60.46** | **17** | **80.93** | **1.4** | **6.67** | **31.1** | **148.06** |
| | | C-108 | 250 | 19 | | 0 | | | | 30.6 | |
| | | C-109 | 235 | 18 | | 0 | | | | 23.7 | |
| | | C-112 | 394 | 50.1 | | 0 | | | | 69.7 | |
| **TBP(f)/1C** | **1090** | | **879** | **87.1** | **108.01** | **0** | **0.00** | **36.9** | **45.76** | **124** | **153.77** |
| **Total (MT)** | | | | | 7649.20 | | 80.93 | | 290.49 | | 8020.62 |
| **% Inventory** | | | | | 18.28 | | 0.19 | | 0.69 | | 19.17 |

*Element: Na (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge Bell** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **75.5** | **319.97** | **115** | **487.38** | **7.5** | **31.79** | **198** | **839.13** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | 165 | **968.90** | | **0.00** | **13** | **76.34** | **178** | **1045.23** |
| | | S-105 | 1718 | 831 | | | | | | 835 | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 971 | | | | | | 990 | |
| **EB/R** | 7050 | S-110 | 980 | 418 | | | | | | 418 | |
| **EB/CW** | 7100 | SX-102 | 2029 | 915 | | | | | | 919 | |
| **EB/DW** | 507 | SX-103 | 1612 | 677 | | | | | | 679 | |
| | **46957** | | **8489** | **3812** | **21086.12** | | **0.00** | **29** | **160.41** | **3841** | **21246.54** |
| **Total (MT)** | | | | | 22374.99 | | 487.38 | | 268.54 | | 23130.90 |
| **% Inventory** | | | | | 53.47 | | 1.16 | | 0.64 | | 55.28 |
| **PUREX** | | | | | | | | | | | |
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **380** | **2337.62** | | **0.00** | **9** | **55.36** | **389** | **2392.98** |
| **AR/PCW** | 980 | | | | | | | | | | |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | C-106 (wash) | 746 | 48.5 | | | | | | 125 | |
| **HS** | 42 | C-103 | 235 | 2.38 | | 0 | | | | 15.9 | |
| | **1228** | | **981** | **50.88** | **63.69** | **0** | **0.00** | **90.02** | **112.69** | **140.9** | **176.38** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **3.71** | **8.19** | | **0.00** | **0** | **0.00** | **3.71** | **8.19** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **78.4** | **217.58** | | **0.00** | **50.6** | **140.43** | **129** | **358.01** |
| **CC/AR** | **473** | A-106 (w) | **473** | **74.9** | **74.90** | | **0.00** | **14.4** | **14.40** | **89.3** | **89.30** |
| **Total (MT)** | | | | | 2701.98 | | 0.00 | | 322.88 | | 3024.86 |
| **% Inventory** | | | | | 6.46 | | 0.00 | | 0.77 | | 7.23 |
| **TOTAL (MT)** | | | | | **39520.27** | | **1065.67** | | **1259.11** | | **41845.06** |
| **Distribution** | | | | | **94** | | **3** | | **3** | | |
| | | **Wash Factor** | **94** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **46** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **97** |

**Leach factor from tests performed with AR/PCW (Purex) waste (C-103) used for DSSF, CC/DSSF, PCW/Mix, PCW/ZrCW, and CC/AR (Purex) wastes.**

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **54200** |
| ***less TWRS DST Inventory*** | **-11200** |
| **Expected SST Inventory** | **43000** |
| **This Evaluation** | **41800** |
| **Expected Inventory Accounted for** | **97 %** |

*Element: Ni*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0** | **0.00** | **0.001** | **0.003** | **0.019** | **0.06** | **0.02** | **0.06** |
| | | C-107 | 897 | 0.004 | | 0 | | | | 0.39 | |
| | | T-107 | 655 | 0.002 | | 0 | | | | 0.28 | |
| | | U-110 | 704 | 0 | | 0 | | | | 0.0987 | |
| **1C/CW** | **2830** | | **2256** | **0.006** | **0.01** | **0** | **0.00** | **0.7627** | **0.96** | **0.7687** | **0.96** |
| | | T-108 (w) | 167 | 0 | | | | | | 0 | |
| | | C-110 (w) | 708 | 0.0024 | | | | | | 0.0206 | |
| | | BX-107 | 1302 | 0.0024 | | 0 | | | | 0.02 | |
| **1C/TBP** | **2610** | | **2177** | **0.0048** | **0.01** | **0** | **0.00** | **0.0358** | **0.04** | **0.0406** | **0.05** |
| **2C/EB** | **1400** | B-104 | **1400** | | **0.00** | | **0.00** | | **0.00** | **NR** | |
| | | B-110 | 927 | 0 | | 0 | | | | 0.11 | |
| | | B-111 | 893 | 0 | | 0 | | | | 0.0208 | |
| **2C/5-6** | **1930** | | **1820** | **0** | **0.00** | **0** | **0.00** | **0.1308** | **0.14** | **0.1308** | **0.14** |
| **2C/224** | **3380** | T-111 | **1715** | **0.0032** | **0.01** | | **0.00** | **0.2468** | **0.49** | **0.25** | **0.49** |
| | | B-201 | 106 | 0.0004 | | 0 | | | | 0.0992 | |
| | | B-202 | 102 | 0.0002 | | 0 | | | | 0.0229 | |
| **224** | **1040** | | **208** | **0.0006** | **0.00** | **0** | **0.00** | **0.1215** | **0.61** | **0.1221** | **0.61** |
| **EB/1C** | **18100** | TY-102 | **242** | **0.0006** | **0.04** | | **0.00** | **0.0079** | **0.59** | **0.0085** | **0.64** |
| **Total (MT)** | | | | | 0.07 | | 0.00 | | 2.88 | | 2.95 |
| **% Inventory** | | | | | 0.12 | | 0.01 | | 5.12 | | 5.25 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0053** | **0.01** | | **0.00** | **1.6667** | **1.67** | **1.672** | **1.67** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0001** | **0.00** | | **0.00** | **0.0041** | **0.00** | **0.0042** | **0.00** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 2.26 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 0.68 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **2.94** | **18.13** | **2.94** | **18.13** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0014** | **0.00** | | **0.00** | **0.1116** | **0.11** | **0.113** | **0.11** |
| | | BX-104 (w) | 363 | 0.011 | | | | | | 0.102 | |
| | | BX-109 | 731 | 0.001 | | 0 | | | | 0.06 | |
| **TBP/CW** | **2570** | | **1094** | **0.012** | **0.03** | **0** | **0.00** | **0.15** | **0.35** | **0.162** | **0.38** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.001** | **0.00** | | **0.00** | **0.429** | **2.04** | **0.43** | **2.05** |
| | | C-108 | 250 | 0.015 | | 0 | | | | 3.16 | |
| | | C-109 | 235 | 0.0251 | | 0 | | | | 3.75 | |
| | | C-112 | 394 | 0.529 | | 0 | | | | 8.38 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.5691** | **0.71** | **0** | **0.00** | **14.7209** | **18.25** | **15.29** | **18.96** |
| **Total (MT)** | | | | | 0.75 | | 0.00 | | 40.56 | | 41.30 |
| **% Inventory** | | | | | 1.32 | | 0.00 | | 72.03 | | 73.35 |

*Element: Ni (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R-Sludge$_{Boil}$ | 4280 | | | | | | | | | | |
| RCW/Mix | 382 | | | | | | | | | | |
| RCW | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.0028** | **0.01** | | **0.00** | **0.0884** | **0.37** | **0.0912** | **0.39** |
| R-Sludge | 6100 | | | | | | | | | | |
| R/DiaE | 560 | | | | | | | | | | |
| R/Mix | 318 | | | | | | | | | | |
| R/2C | 8 | | | | | | | | | | |
| | **6986** | S-104 | **1109** | | **0.00** | | **0.00** | **0.09** | **0.57** | **0.09** | **0.57** |
| R-RCW/EB | 32300 | S-109 | 2150 | 0.0283 | | | | | | 0.0283 | |
| EB/R | 7050 | S-110 | 980 | 0.0151 | | | | | | 0.0151 | |
| EB/CW | 7100 | SX-102 | 2029 | 0.055 | | | | | | 0.055 | |
| EB/DW | 507 | SX-103 | 1612 | 0.0377 | | | | | | 0.0377 | |
| | **46957** | | **6771** | **0.1361** | **0.94** | | **0.00** | **0** | **0.00** | **0.1361** | **0.94** |
| Redox (w/Zr) | **1370** | S-107 | **1370** | **0** | **0.00** | | **0.00** | **1.53** | **1.53** | **1.53** | **1.53** |
| Total (MT) | | | | | 0.96 | | 0.00 | | 2.47 | | 3.43 |
| % Inventory | | | | | 1.70 | | 0.00 | | 4.39 | | 6.09 |

**PUREX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DSSF | 7960 | | | | | | | | | | |
| CC/DSSF | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.0689** | **0.42** | | **0.00** | **0.1051** | **0.65** | **0.174** | **1.07** |
| PCW/Mix | **159** | T-102 (w) | **72** | **0** | **0.00** | | **0.00** | **0.0094** | **0.02** | **0.0094** | **0.02** |
| PCW/ZrCW | **3100** | C-104 (w) | **1117** | **0.105** | **0.29** | | **0.00** | **2.065** | **5.73** | **2.17** | **6.02** |
| CC/AR | **473** | A-106 (w) | **473** | **0.009** | **0.01** | | **0.00** | **0.449** | **0.45** | **0.458** | **0.46** |
| P Sludge | 180 | | | | | | | | | | |
| AR Sludge | 26 | | | | | | | | | | |
| HS | 42 | C-106 (w) | 746 | 0.0343 | | | | | | 0.55 | |
| AR/PCW | 980 | C-103 | 235 | 0.0141 | | 0 | | | | 0.29 | |
| | **1228** | | **981** | **0.0484** | **0.06** | **0** | **0.00** | **0.7916** | **0.99** | **0.84** | **1.05** |
| Total (MT) | | | | | 0.78 | | 0.00 | | 7.84 | | 8.62 |
| % Inventory | | | | | 1.39 | | 0.00 | | 13.92 | | 15.31 |
| TOTAL (MT) | | | | | **2.55** | | **0.00** | | **53.75** | | **56.31** |
| Distribution | | | | | **4.53** | | **0.01** | | **95.46** | | |
| | | **Wash Factor** | **2.5 - 5** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **57** |

| | | |
|---|---|---|
| **"Provisional" Best-basis Total** | | |
| **Inventory (on-going work at WHC)** | **110** | |
| **less TWRS DST Inventory** | **-10.9** | |
| **Expected SST Inventory** | **99.1** | |
| **This Evaluation** | **56.3** | Refer notes |
| **Expected Inventory Accounted for** | **57 %** | |

**1. Sludges are fused for analysis in nickel crucibles; therefore, tank-specific Ni inventories are based on results reported for acid dissolution. As a result, tank-specific inventories above may be incomplete.**
**2. No Ni analyses were performed on residual solids for R-RCW/EB wastes (Schulz 1980); therefore, this waste type may contain more Ni than reported above.**
**3. TWRS assumes ~10 MT Ni in double-shell tanks, while LANL estimates 38 MT Ni in DSTs. Using the LANL figure for DSTs, the % accounted for value becomes 78 - 124%.**
**4. Also note that in addition to wastes that were scavenged with nickel ferrocyanide, nickel concentraptions appear high in Zr-cladding wastes.**

*Element: $PO_4$*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **37.3** | **119.20** | **103** | **329.17** | **1.7** | **5.43** | **142** | **453.80** |
| | | T-105 (w) | 371 | 1.64 | | | | | | 2.83 | |
| | | C-107 | 897 | 39.55 | | 24.35 | | | | 67.8 | |
| | | T-107 | 655 | 80.3 | | 12.4 | | | | 94.5 | |
| | | U-110 | 704 | 41.7 | | 3.7 | | | | 46.4 | |
| **1C/CW** | **2830** | | **2627** | **163.19** | **175.80** | **40.45** | **50.74** | **7.89** | **8.50** | **211.53** | **235.04** |
| | | T-108 (w) | 167 | 3.12 | | | | | | 28 | |
| | | C-110 (w) | 708 | 20.4 | | | | | | 52.5 | |
| | | BX-107 | 1302 | 22 | | 80.3 | | | | 110 | |
| **1C/TBP** | **2610** | | **2177** | **45.52** | **54.57** | **80.3** | **160.97** | **64.68** | **77.54** | **190.5** | **293.09** |
| **2C/EB** | **1400** | B-104 | **1400** | **43.9** | **43.90** | **52.5** | **52.50** | **1.1** | **1.10** | **97.5** | **97.50** |
| | | B-110 | 927 | 55 | | 9.17 | | | | 65.5 | |
| | | B-111 | 893 | 21.9 | | 24.4 | | | | 50.9 | |
| **2C/5-6** | **1930** | | **1820** | **76.9** | **81.55** | **33.57** | **35.60** | **5.93** | **6.29** | **116.4** | **123.44** |
| **2C/224** | **3380** | T-111 | **1715** | **29.5** | **58.14** | **13.6** | **26.80** | **15.9** | **31.34** | **59** | **116.28** |
| | | B-201 | 106 | 0.241 | | 0.386 | | | | 2.41 | |
| | | B-202 | 102 | 0.269 | | 0.146 | | | | 0.95 | |
| **224** | **1040** | | **208** | **0.51** | **2.55** | **0.532** | **2.66** | **2.318** | **11.59** | **3.36** | **16.80** |
| | | B-105 | 1158 | 177 | | 0 | | | | 177 | |
| | | TY-102 | 242 | 10.4 | | 0 | | | | 11.6 | |
| | | TX-116 | 2388 | 274 | | 0 | | | | 274 | |
| **EB/1C** | **18100** | | **3788** | **461.4** | **2204.68** | **0** | **0.00** | **1.2** | **5.73** | **462.6** | **2210.42** |
| **Total (MT)** | | | | | 2740.40 | | 658.44 | | 147.53 | | 3546.37 |
| **% Inventory** | | | | | 56.15 | | 13.49 | | 3.02 | | 72.67 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **3.48** | **3.48** | **2.676** | **2.68** | **0.534** | **0.53** | **6.69** | **6.69** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **1.1** | **1.10** | **2.04** | **2.04** | **1.96** | **1.96** | **5.1** | **5.10** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 36.3 | | 0.386 | | | | 38.6 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 4.23 | | 0.889 | | | | 22.2 | |
| | **18804** | | **3050** | **40.53** | **249.88** | **1.275** | **7.86** | **18.995** | **117.11** | **60.8** | **374.85** |
| **TBP** | **874** | TY-105 (w) | **874** | **10.5** | **10.50** | **99.64** | **99.64** | **5.86** | **5.86** | **116** | **116.00** |
| | | BX-104 (w) | 363 | 6.29 | | | | | | 7.52 | |
| | | BX-109 | 731 | 55 | | 14.5 | | | | 72.3 | |
| **TBP/CW** | **2570** | | **1094** | **61.29** | **143.98** | **14.5** | **50.98** | **4.03** | **9.47** | **79.82** | **204.43** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **18** | **85.69** | **0.688** | **3.28** | **2.912** | **13.86** | **21.6** | **102.83** |
| | | C-108 | 250 | 18.9 | | 0.013 | | | | 25.3 | |
| | | C-109 | 235 | 4.95 | | 1.98 | | | | 16.5 | |
| | | C-112 | 394 | 23.4 | | 20.3 | | | | 52 | |
| **TBP(f)/1C** | **1090** | | **879** | **47.25** | **58.59** | **22.293** | **27.64** | **24.257** | **30.08** | **93.8** | **116.32** |
| **Total (MT)** | | | | | 553.22 | | 194.11 | | 178.87 | | 926.21 |
| **% Inventory** | | | | | 11.34 | | 3.98 | | 3.67 | | 18.98 |

## *Element: $PO_4$ (Continued)*

### REDOX

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Roll}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.108** | **0.46** | **0.02** | **0.08** | **0.352** | **1.49** | **0.48** | **2.03** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **12.1** | **71.05** | | **0.00** | **0** | **0.00** | **12.1** | **71.05** |
| | | S-105 | 1718 | 19 | | | | | | 19 | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | <DL | | | | | | 0 | |
| **EB/R** | 7050 | S-110 | 980 | NR | | | | | | 0 | |
| **EB/CW** | 7100 | SX-102 | 2029 | 6.23 | | | | | | 6.23 | |
| **EB/DW** | 507 | SX-103 | 1612 | 4.1 | | | | | | 4.1 | |
| | **46957** | | **8489** | **29.33** | **162.24** | | **0.00** | **0** | **0.00** | **29.33** | **162.24** |
| **Total (MT)** | | | | | 233.75 | | 0.08 | | 1.49 | | 235.33 |
| **% Inventory** | | | | | 4.79 | | 0.00 | | 0.03 | | 4.82 |

### PUREX

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **11.9** | **73.20** | **0.08** | **0.49** | **0.12** | **0.74** | **12.1** | **74.43** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0.16** | **0.35** | **0.2368** | **0.52** | **0.1952** | **0.43** | **0.592** | **1.31** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0.353** | **0.98** | **0** | **0.00** | **12.347** | **34.27** | **12.7** | **35.25** |
| **CC/AR** | **473** | A-106 (w) | **473** | **36.5** | **36.50** | **0.8** | **0.80** | **1.2** | **1.20** | **38.5** | **38.50** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (wash) | 746 | 1.41 | | | | | | 9.31 | |
| **AR/PCW** | 980 | C-103 | 235 | 1.06 | | 1.57 | | | | 3.93 | |
| | **1228** | | **981** | **2.47** | **3.09** | **1.57** | **8.20** | **9.2** | **11.52** | **13.24** | **22.81** |
| **Total (MT)** | | | | | 114.13 | | 10.02 | | 48.15 | | 172.30 |
| **% Inventory** | | | | | 2.34 | | 0.21 | | 0.99 | | 3.53 |
| **TOTAL (MT)** | | | | | **3641.50** | | **862.66** | | **376.04** | | **4880.21** |
| **Distribution** | | | | | **75** | | **18** | | **8** | | |
| | | **Wash Factor** | **75** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **70** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **85** |

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **5960** |
| **less TWRS DST Inventory** | **-237** * |
| **Expected SST Inventory** | **5723** |
| **This Evaluation** | **4880** |
| **Expected Inventory Accounted for** | **85 %** |

***TWRS assumes 237 MT PO4 of the 5960 MT PO4 inventory is in DSTs (LANL estimates 714 MT PO4 in DSTs). Potentiall more than expected in DSTs .**

*Element: Si*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **2.59** | **8.28** | **1.447** | **4.62** | **8.363** | **26.73** | **12.4** | **39.63** |
| | | T-105 (w) | 371 | 0.236 | | | | | | 3.74 | |
| | | C-107 | 897 | 0.1365 | | 1.445 | | | | 10.2 | |
| | | T-107 | 655 | 1.65 | | 0.276 | | | | 5.95 | |
| | | U-110 | 704 | 0.576 | | 0.46 | | | | 11.5 | |
| **1C/CW** | **2830** | | **2627** | **2.5985** | **2.80** | **2.181** | **2.74** | **26.6105** | **28.67** | **31.39** | **34.20** |
| | | T-108 (w) | 167 | 0.0442 | | | | | | 0.375 | |
| | | C-110 (w) | 708 | 0.204 | | | | | | 5.99 | |
| | | BX-107 | 1302 | 0 | | 0.318 | | | | 10.6 | |
| **1C/TBP** | **2610** | | **2177** | **0.2482** | **0.30** | **0.318** | **0.64** | **16.3988** | **19.66** | **16.965** | **20.60** |
| **2C/EB** | **1400** | B-104 | **1400** | **0.104** | **0.10** | **5.14** | **5.14** | **5.156** | **5.16** | **10.4** | **10.40** |
| | | B-110 | 927 | 3.45 | | 4.87 | | | | 12.3 | |
| | | B-111 | 893 | 0.323 | | 4.84 | | | | 10.8 | |
| **2C/5-6** | **1930** | | **1820** | **3.773** | **4.00** | **9.71** | **10.30** | **9.617** | **10.20** | **23.1** | **24.50** |
| **2C/224** | **3380** | T-111 | **1715** | **2.14** | **4.22** | **4.28** | **8.44** | **4.28** | **8.44** | **10.7** | **21.09** |
| | | B-201 | 106 | 0.258 | | 1.38 | | | | 3.22 | |
| | | B-202 | 102 | 0.087 | | 0.104 | | | | 0.34 | |
| **224** | **1040** | | **208** | **0.345** | **1.73** | **1.484** | **7.42** | **1.731** | **8.66** | **3.56** | **17.80** |
| | | B-105 | 1158 | 0.0973 | | 0 | | | | 3.76 | |
| | | TY-102 | 242 | 0.0324 | | 0 | | | | 0.154 | |
| | | TX-116 | 2388 | 0 | | 0 | | | | 2.69 | |
| **EB/1C** | **18100** | | **3788** | **0.1297** | **0.62** | **0** | **0.00** | **6.4743** | **30.94** | **6.604** | **31.56** |
| **Total (MT)** | | | | | 22.04 | | 39.29 | | 138.43 | | 199.77 |
| **% Inventory** | | | | | 3.14 | | 5.60 | | 19.72 | | 28.45 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0431** | **0.04** | | **0.00** | **34.9569** | **34.96** | **35** | **35.10** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0049** | **0.00** | **0.4704** | **0.47** | **7.3647** | **7.36** | **7.84** | **7.84** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 1.69 | | 0.735 | | | | 3.67 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0.248 | | 0.727 | | | | 1.55 | |
| | **18804** | | **3050** | **1.938** | **11.95** | **1.462** | **9.01** | **1.82** | **11.22** | **5.22** | **32.18** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0919** | **0.09** | **0.052013** | **0.05** | **0.348087** | **0.35** | **0.492** | **0.49** |
| | | BX-104 (w) | 363 | 0.0859 | | | | | | 21.2 | |
| | | BX-109 | 731 | 0.226 | | 0.396 | | | | 1.88 | |
| **TBP/CW** | **2570** | | **1094** | **0.3119** | **0.73** | **0.396** | **1.39** | **22.3721** | **52.56** | **23.08** | **54.68** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **1.22** | **5.81** | **0.132** | **0.63** | **0.878** | **4.18** | **2.23** | **10.62** |
| | | C-108 | 250 | 0.016 | | 0.072 | | | | 0.62 | |
| | | C-109 | 235 | 0.076 | | 0.331 | | | | 2.55 | |
| | | C-112 | 394 | 0.06 | | 0.196 | | | | 1.51 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.152** | **0.19** | **0.599** | **0.74** | **3.929** | **4.87** | **4.68** | **5.80** |
| **Total (MT)** | | | | | 18.82 | | 12.30 | | 115.50 | | 146.72 |
| **% Inventory** | | | | | 2.68 | | 1.75 | | 16.45 | | 20.90 |

*Element: Si (Continued)*

**REDOX (Continued)**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R-Sludge$_{Bell}$ | 4280 | | | | | | | | | | |
| RCW/Mix | 382 | | | | | | | | | | |
| RCW | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.735** | **3.11** | **0.0395** | **0.17** | **1.6555** | **7.02** | **2.43** | **10.30** |
| R-Sludge | 7470 | | | | | | | | | | |
| R/DiaE | 560 | | | | | | | | | | |
| R/Mix | 318 | | | | | | | | | | |
| R/2C | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **3.83** | **22.49** | **3.92** | **23.02** | **0.96** | **5.64** | **8.71** | **51.15** |
| | | S-105 | 1718 | 0.188 | | | | | | NR | |
| R-RCW/EB | 32300 | S-109 | 2150 | 0.203 | | | | | | 2.21 | |
| EB/R | 7050 | S-110 | 980 | 0.116 | | | | | | NR | |
| EB/CW | 7100 | SX-102 | 2029 | 1.66 | | | | | | NR | |
| EB/DW | 507 | SX-103 | 1612 | NR | | | | | | 0 | |
| | **46957** | | **8489** | **2.167** | **14.80** | | **0.00** | **0.043** | **0.24** | **2.21** | **15.03** |
| **Total (MT)** | | | | | 40.40 | | 23.19 | | 12.89 | | 76.48 |
| **% Inventory** | | | | | 5.75 | | 3.30 | | 1.84 | | 10.89 |
| **PUREX** | | | | | | | | | | | |
| DSSF | 7960 | | | | | | | | | | |
| CC/DSSF | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.714** | **4.39** | **0.206** | **1.27** | **19.68** | **121.06** | **20.6** | **126.72** |
| PCW/Mix | **159** | T-102 (w) | **72** | **0.0059** | **0.01** | **0.0042** | **0.01** | **0.4069** | **0.90** | **0.417** | **0.92** |
| PCW/ZrCW | **3100** | C-104 (w) | **1117** | | **0.00** | | **0.00** | **0** | **0.00** | | **0.00** |
| CC/AR | **473** | A-106 (w) | **473** | **0.0058** | **0.01** | **0.281** | **0.28** | **27.8132** | **27.81** | **28.1** | **28.10** |
| P Sludge | 180 | | | | | | | | | | |
| AR Sludge | 26 | | | | | | | | | | |
| HS | 42 | C-106 (wash) | 746 | 0.0263 | | | | | | 75.7 | |
| AR/PCW | 980 | C-103 | 235 | 0 | | 0.222 | | | | 22.2 | |
| | **1228** | | **981** | **0.0263** | **0.03** | **0.222** | **1.16** | **97.6517** | **122.24** | **97.9** | **123.43** |
| **Total (MT)** | | | | | 4.44 | | 2.72 | | 272.01 | | 279.18 |
| **% Inventory** | | | | | 0.63 | | 0.39 | | 38.74 | | 39.76 |
| **TOTAL (MT)** | | | | | **85.70** | | **77.49** | | **538.84** | | **702.14** |
| **Distribution** | | | | | **12** | | **11** | | **77** | | |
| | | **Wash Factor** | **12** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **13** | **% washed solids** | | | | | | | |
| | | | | | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **160 - 410*** |

**Note that Si concentrations are very high in PUREX wastes.**

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **540 +/-135** |
| **less TWRS DST Inventory** | **-234** |
| **Expected SST Inventory** | **306** |
| **This Evaluation** | **702** |
| **Expected Inventory Accounted for** | **229 %** |

*Element: Sr*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.002** | **0.01** | **0** | **0.00** | **0.188** | **0.60** | **0.19** | **0.61** |
| | | T-105 (w) | 371 | 0.0005 | | | | | | 0.0622 | |
| | | C-107 | 897 | 0 | | 0 | | | | 0.14 | |
| | | T-107 | 655 | 0.0054 | | 0 | | | | 0.94 | |
| | | U-110 | 704 | 0.0037 | | 0 | | | | 0.42 | |
| **1C/CW** | **2830** | | **2627** | **0.0096** | **0.01** | **0** | **0.00** | **1.5526** | **1.67** | **1.5622** | **1.68** |
| | | T-108 (w) | 167 | 0 | | | | | | 0 | |
| | | C-110 (w) | 708 | 0.0047 | | | | | | 0.107 | |
| | | BX-107 | 1302 | 0.0038 | | 0 | | | | 0.263 | |
| **1C/TBP** | **2610** | | **2177** | **0.0085** | **0.01** | **0** | **0.00** | **0.3615** | **0.43** | **0.37** | **0.44** |
| **2C/EB** | **1400** | B-104 | **1400** | | **0.00** | | **0.00** | **0.274** | **0.27** | **0.274** | **0.27** |
| | | B-110 | 927 | 0 | | 0 | | | | 0.27 | |
| | | B-111 | 893 | 0.001 | | 0 | | | | 0.25 | |
| **2C/5-6** | **1930** | | **1820** | **0.001** | **0.00** | **0** | **0.00** | **0.519** | **0.55** | **0.52** | **0.55** |
| **2C/224** | **3380** | T-111 | **1715** | **0.0037** | **0.01** | | **0.00** | **0.5563** | **1.10** | **0.56** | **1.10** |
| | | B-201 | 106 | 0.0001 | | 0 | | | | 0.12 | |
| | | B-202 | 102 | 0.0003 | | 0 | | | | 0.07 | |
| **224** | **1040** | | **208** | **0.0004** | **0.00** | **0** | **0.00** | **0.1896** | **0.95** | **0.19** | **0.95** |
| | | B-105 | 1158 | 0.005 **(based on 1/5 of [Ca])** | | | | | | 0.005 | |
| | | TY-102 | 242 | NR | | 0 | | | | NR | |
| | | TX-116 | 2388 | NR | | 0 | | | | NR | |
| **EB/1C** | **18100** | | **3788** | **0.005** | **0.08** | **0** | **0.00** | **0** | **0.00** | **0.005** | **0.08** |
| **Total (MT)** | | | | | 0.12 | | 0.00 | | 5.58 | | 5.69 |
| **% Inventory** | | | | | 0.33 | | 0.00 | | 16.14 | | 16.48 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0** | **0.00** | | **0.00** | **0.224** | **0.22** | **0.224** | **0.22** |
| **TBP/DiaE** | **64** | TY-104 | **163** | | **0.00** | | **0.00** | **0.17** | **0.07** | **0.17** | **0.07** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 2.85 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 0.13 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **2.98** | **18.37** | **2.98** | **18.37** |
| **TBP** | **874** | TY-104 | **163** | | **0.00** | | **0.00** | **0.17** | **0.91** | **0.17** | **0.91** |
| | | BX-104 (w) | 363 | 0 | | | | | | 0.0406 | |
| | | BX-109 | 731 | 0 | | 0.001 | | | | 0.65 | |
| **TBP/CW** | **2570** | | **1094** | **0** | **0.00** | **0.001** | **0.00** | **0.6896** | **1.62** | **0.6906** | **1.62** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | | **0.00** | | **0.00** | **0.17** | **0.81** | **0.17** | **0.81** |
| | | C-108 | 250 | 0 | | 0 | | | | 0.06 | |
| | | C-109 | 235 | 0.0003 | | 0 | | | | 0.05 | |
| | | C-112 | 394 | 0.002 | | 0 | | | | 0.19 | |
| **TBP(f)/1C** | **1090** | | **879** | **0.0023** | **0.00** | **0** | **0.00** | **0.2977** | **0.37** | **0.3** | **0.37** |
| **Total (MT)** | | | | | 0.00 | | 0.00 | | 22.37 | | 22.38 |
| **% Inventory** | | | | | 0.01 | | 0.01 | | 64.77 | | 64.79 |

*Element: Sr (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **R-Sludge$_{Boil}$** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0.001** | **0.00** | **0** | **0.00** | **0.699** | **2.96** | **0.7** | **2.97** |
| **R-Sludge** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **0** | **0.00** | **0** | **0.00** | **0.45** | **2.64** | **0.45** | **2.64** |
| | | S-105 | 1718 | 0.006 (based on 1/5th of [Ca]) | | | | | | 0.006 | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | NR | | | | | | NR | |
| **EB/R** | 7050 | S-110 | 980 | NR | | | | | | NR | |
| **EB/CW** | 7100 | SX-102 | 2029 | 0.009 (based on 1/5th of [Ca]) | | | | | | 0.009 | |
| **EB/DW** | 507 | SX-103 | 1612 | NR | | | | | | NR | |
| | **46957** | | **8489** | **0.015** | **0.19** | | **0.00** | **0** | **0.00** | **0.015** | **0.19** |
| **Total (MT)** | | | | | 0.19 | | 0.00 | | 5.60 | | 5.80 |
| **% Inventory** | | | | | 0.56 | | 0.00 | | 16.23 | | 16.78 |
| **PUREX** | | | | | | | | | | | |
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0** | **0.00** | | **0.00** | **0.0223** | **0.14** | **0.0223** | **0.14** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | **0** | **0.00** | | **0.00** | **0.0023** | **0.01** | **0.0023** | **0.01** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **0** | **0.00** | | **0.00** | **0.11** | **0.31** | **0.11** | **0.31** |
| **CC/AR** | **473** | A-106 (w) | **473** | **0.0003** | **0.00** | | **0.00** | **0.0382** | **0.04** | **0.0385** | **0.04** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (wash) | 746 | 0 | | | | | | 0.11 | |
| **AR/PCW** | 980 | C-103 | 235 | 0 | | 0 | | | | 0.04 | |
| | **1228** | | **981** | **0** | **0.00** | **0** | **0.00** | **0.15** | **0.19** | **0.15** | **0.19** |
| **Total (MT)** | | | | | 0.00 | | 0.00 | | 0.67 | | 0.67 |
| **% Inventory** | | | | | 0.00 | | 0.00 | | 1.95 | | 1.95 |
| **TOTAL (MT)** | | | | | **0.31** | | **0.00** | | **34.23** | | **34.54** |
| **Distribution** | | | | | **0.9** | | **0.0** | | **99.1** | | |
| | | **Wash Factor** | **1** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **113** |

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **31.3** |
| **less TWRS DST Inventory** | **-0.62** |
| **Expected SST Inventory** | **30.7** |
| **This Evaluation** | **34.5** |
| **Expected Inventory Accounted for** | **113 %** |

*Element:* $^{90}Sr$

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash Ci Tank | Wash Ci Waste Type | Leach Ci Tank | Leach Ci Waste Type | Residual Solids (after washing & leaching) Ci Tank | Residual Solids Ci Waste Type | Total Ci Tank | Total Ci Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0** | **0** | **43** | **138** | **4284** | **13691** | **4327** | **13829** |
| | | C-107 | 897 | 0 | | 0 | | | | 3404000 | |
| | | T-107 | 655 | 46 | | 0 | | | | 92320 | |
| | | U-110 | 704 | 200 | | 2263 | | | | 226268 | |
| **1C/CW** | **2830** | | **2256** | **246** | **309** | **2263** | **2838** | **3720079** | **4666588** | **3722588** | **4669736** |
| **1C/TBP** | **2610** | **BX-107** | **2610** | **0** | **0** | **0** | **0** | **13292** | **13292** | **13292** | **13292** |
| **2C/EB** | **1400** | B-104 | **1400** | | **0** | | **0** | **18800** | **18800** | **18800** | **18800** |
| | | B-110 | 927 | 0 | | 174 | | | | 173724 | |
| | | B-111 | 893 | 0 | | 0 | | | | 454670 | |
| **2C/5-6** | **1930** | | **1820** | **0** | **0** | **174** | **185** | **628219** | **666189** | **628393** | **666373** |
| **2C/224** | **3380** | T-111 | **1715** | | **0** | | **0** | **8810** | **17362** | **8810** | **17362** |
| | | B-201 | 106 | 0 | | 0 | | | | 259 | |
| | | B-202 | 102 | 0 | | 0 | | | | 400 | |
| **224** | **1040** | | **208** | **0** | **0** | **0** | **0** | **659** | **3293** | **659** | **3293** |
| | | B-105 | 1158 | 1107 | | 0 | | | | 262122 | |
| | | TY-102 | 242 | 18 | | 0 | | | | 1433 | |
| | | TX-116 | 2388 | 43 | | 0 | | | | 6388 | |
| **EB/1C** | **18100** | | **3788** | **1167** | **5577** | **0** | **0** | **268775** | **1284273** | **269942** | **1289849** |
| **Total (Ci)** | | | | | 5.89E+3 | | 3.16E+3 | | 6.68E+6 | | 6.69E+6 |
| **% Inventory** | | | | | 0.02 | | 0 | | 26 | | 26 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **288** | **288** | | **0** | **578832** | **578832** | **579120** | **579120** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **4** | **4** | | **0** | **9117** | **9117** | **9121** | **9121** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | | | | | | | | | | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 132200 | |
| | **18804** | | **1510** | **0** | **0** | **0** | **0** | **132200** | **1646284** | **132200** | **1646284** |
| **TBP** | **874** | TY-105 (w) | **874** | **20** | **20** | | **0** | **233456** | **233456** | **233477** | **233477** |
| | | BX-104 (w) | 363 | 139 | | | | | | 132359 | |
| | | BX-109 | 731 | 0 | | 0 | | | | 195000 | |
| **TBP/CW** | **2570** | | **1094** | **139** | **328** | **0** | **0** | **327220** | **768698** | **327359** | **769025** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0** | **0** | **0** | **0** | **27661** | **131685** | **27661** | **131685** |
| | | C-108 | 250 | 0 | | 0 | | | | 8030 | |
| | | C-109 | 235 | 0 | | 2561 | | | | 256100 | |
| | | C-112 | 394 | 0 | | 10180 | | | | 1018022 | |
| **TBP(f)/1C** | **1090** | | **879** | **0** | **0** | **12741** | **15800** | **1269411** | **1574127** | **1282152** | **1589927** |
| **Total (Ci)** | | | | | 6.40E+2 | | 1.58E+4 | | 4.94E+6 | | 4.96E+6 |
| **% Inventory** | | | | | 0.00 | | 0 | | 20 | | 20 |

## *Element: $^{90}$Sr (Continued)*

### REDOX

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash Ci Tank | Wash Ci Waste Type | Leach Ci Tank | Leach Ci Waste Type | Residual Solids (after washing & leaching) Ci Tank | Residual Solids Ci Waste Type | Total Ci Tank | Total Ci Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Redox (Boil)** | 4280 | | | | | | | | | | |
| **RCW/Mix** | 382 | | | | | | | | | | |
| **RCW** | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0** | **0** | **217** | **921** | **434231** | **1840293** | **434448** | **1841213** |
| **Redox** | 7470 | | | | | | | | | | |
| **R/DiaE** | 560 | | | | | | | | | | |
| **R/Mix** | 318 | | | | | | | | | | |
| **R/2C** | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | | **0** | | **0** | **333800** | **1960107** | **333800** | **1960107** |
| | | S-105 | 1718 | 106 | | | | | | 177208 | |
| **R-RCW/EB** | 32300 | S-109 | 2150 | 1709 | | | | | | 315290 | |
| **EB/R** | 7050 | S-110 | 980 | 1511 | | | | | | NR | |
| **EB/CW** | 7100 | SX-102 | 2029 | 9808 | | | | | | 262267 | |
| **EB/DW** | 507 | SX-103 | 1612 | 7379 | | | | | | 52951 | |
| | **46957** | | **8489** | **20513** | **113469** | | **0** | **787202** | **4354416** | **807715** | **4467885** |
| **Total (Ci)** | | | | | 1.13E+5 | | 9.21E+2 | | 08.2E+6 | | 08.3E+6 |
| **% Inventory** | | | | | 0.45 | | 0 | | 32 | | 33 |
| **PUREX** | | | | | | | | | | | |
| **DSSF** | 7960 | | | | | | | | | | |
| **CC/DSSF** | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **2541** | **15633** | | **0** | **133171** | **819218** | **135712** | **834851** |
| **PCW/Mix** | **159** | T-102 (w) | **72** | | **0** | | **0** | **26412** | **58326** | **26412** | **58326** |
| **PCW/ZrCW** | **3100** | C-104 (w) | **1117** | **30** | **83** | | **0** | **381046** | **1057514** | **381076** | **1057597** |
| **CC/AR** | **473** | A-106 (w) | **473** | **1978** | **1978** | | **0** | **634520** | **634520** | **636499** | **636499** |
| **P Sludge** | 180 | | | | | | | | | | |
| **AR Sludge** | 26 | | | | | | | | | | |
| **HS** | 42 | C-106 (wash) | 746 | 166 | | | | | | 1614678 | |
| **AR/PCW** | 980 | C-103 | 235 | 248 | | 0 | | | | 649376 | |
| | **1228** | | **981** | **414** | **518** | **0** | **0** | **2263641** | **2833589** | **2264054** | **2834107** |
| **Total (Ci)** | | | | | 1.82E+4 | | 0.00E+0 | | 5.40E+6 | | 5.42E+6 |
| **% Inventory** | | | | | 0.07 | | 0 | | 21 | | 21 |
| **TOTAL (Ci)** | | | | | **1.38E+5** | | **1.99E+4** | | **25.2E+6** | | **25.3E+6** |
| **Distribution** | | | | | **0.5** | | **0.1** | | **99.4** | | |
| | | **Wash Factor** | **0.5** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **72*** |

***Based on decaying inventories to 1999. Note that decay calculations were based on sample reporting dates, and as a result inventories are approximations.**

| | (Ci) |
|---|---|
| **"Provisional" Best-basis Total Inventory (on-going work at WHC)** | **46.6E+6** |
| **less TWRS DST Inventory** | **-11.4E+6** |
| **Expected SST Inventory** | **35.2E+6** |
| **This Evaluation** | **25.3E+6** |
| **Expected Inventory Accounted for** | **72 %** |

*Element: U*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.0135** | **0.04** | **0.183** | **0.58** | **1.4735** | **4.71** | **1.67** | **5.34** |
| | | C-107 | 897 | 1.9235 | | 1.306 | | | | 14.5 | |
| | | T-107 | 655 | 0.943 | | 0.077 | | | | 24.9 | |
| | | U-110 | 704 | 0 | | 0 | | | | 9 | |
| **1C/CW** | **2830** | | **2256** | **2.8665** | **3.60** | **1.383** | **1.73** | **44.1505** | **55.38** | **48.4** | **60.71** |
| | | T-108 (w) | 167 | 0.158 | | | | | | 0.282 | |
| | | BX-107 | 1302 | 0.567 | | 0.142 | | | | 3.55 | |
| **1C/TBP** | **2610** | | **1469** | **0.725** | **1.29** | **0.142** | **0.28** | **2.965** | **5.27** | **3.832** | **6.84** |
| **2C/EB** | **1400** | B-104 | **1400** | **0.02** | **0.02** | **0.707** | **0.71** | **1.283** | **1.28** | **2.01** | **2.01** |
| | | B-110 | 927 | 0.071 | | 0.147 | | | | 0.51 | |
| | | B-111 | 893 | 0.143 | | 0.01 | | | | 0.25 | |
| **2C/5-6** | **1930** | | **1820** | **0.214** | **0.23** | **0.157** | **0.17** | **0.389** | **0.41** | **0.76** | **0.81** |
| **2C/224** | **3380** | T-111 | **1715** | **0** | **0.00** | **0.106** | **0.21** | **5.174** | **10.20** | **5.28** | **10.41** |
| | | B-201 | 106 | 0 | | 0 | | | | 0.08 | |
| | | B-202 | 102 | 0 | | 0 | | | | 0.04 | |
| **224** | **1040** | | **208** | **0** | **0.00** | **0** | **0.00** | **0.12** | **0.60** | **0.12** | **0.60** |
| | | B-105 | 1158 | 0 | | 0 | | | | 0.0734 | |
| | | TY-102 | 242 | 0.0036 | | 0 | | | | 0.079 | |
| | | TX-116 | 2388 | NR | | 0 | | | | NR | |
| **EB/1C** | **18100** | | **3788** | **0.0036** | **0.05** | **0** | **0.00** | **0.1488** | **0.71** | **0.1524** | **1.97** |
| **Total (MT)** | | | | | 5.22 | | 3.69 | | 78.56 | | 88.68 |
| **% Inventory** | | | | | 0.87 | | 0.61 | | 13.09 | | 14.77 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.565** | **0.57** | **0** | **0.00** | **9.935** | **9.94** | **10.5** | **10.50** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0002** | **0.00** | **0** | **0.00** | **0.7358** | **0.74** | **0.736** | **0.74** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 6.59 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0.187 | | 0 | | | | 9.35 | |
| | **18804** | | **3050** | **0.187** | **1.15** | **0** | **0.00** | **15.753** | **97.12** | **15.94** | **98.27** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0189** | **0.02** | **0** | **0.00** | **7.2011** | **7.20** | **7.22** | **7.22** |
| | | BX-104 (w) | 363 | 0.0022 | | | | | | 16 | |
| | | BX-109 | 731 | 0.355 | | 0 | | | | 17.7 | |
| **TBP/CW** | **2570** | | **1094** | **0.3572** | **0.84** | **0** | **0.00** | **33.3428** | **78.33** | **33.7** | **79.17** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.034** | **0.16** | **0.008** | **0.04** | **5.318** | **25.32** | **5.36** | **25.52** |
| | | C-108 | 250 | 0.014 | | 0 | | | | 0.14 | |
| | | C-109 | 235 | 0 | | 0 | | | | 2.39 | |
| | | C-112 | 394 | 1.57 | | 0 | | | | 35.3 | |
| **TBP(f)/1C** | **1090** | | **879** | **1.584** | **1.96** | **0** | **0.00** | **36.246** | **44.95** | **37.83** | **46.91** |
| **Total (MT)** | | | | | 4.70 | | 0.04 | | 263.59 | | 268.33 |
| **% Inventory** | | | | | 0.78 | | 0.01 | | 43.91 | | 44.70 |

*Element: U (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R-Sludge$_{Boil}$ | 4280 | | | | | | | | | | |
| RCW/Mix | 382 | | | | | | | | | | |
| RCW | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0** | **0.00** | **0.003** | **0.01** | **10.997** | **46.61** | **11** | **46.62** |
| R-Sludge | 7470 | | | | | | | | | | |
| R/DiaE | 560 | | | | | | | | | | |
| R/Mix | 318 | | | | | | | | | | |
| R/2C | 8 | | | | | | | | | | |
| | **8356** | S-107 | **1423** | **0** | **0.00** | **0.566** | **3.32** | **13.634** | **80.06** | **14.2** | **83.38** |
| | | S-105 | 1718 | | | | | | | NR | |
| R-RCW/EB | 32300 | S-109 | 2150 | 0 | | | | | | 0.0118 | |
| EB/R | 7050 | S-110 | 980 | | | | | | | NR | |
| EB/CW | 7100 | SX-102 | 2029 | 0 | | | | | | 0.0883 | |
| EB/DW | 507 | SX-103 | 1612 | 0 | | | | | | 0.107 | |
| | **46957** | | **8489** | **0** | **0.00** | | **0.00** | **0.2071** | **1.15** | **0.2071** | **1.15** |
| **Total (MT)** | | | | | 0.00 | | 3.34 | | 127.81 | | 131.15 |
| **% Inventory** | | | | | 0.00 | | 0.56 | | 21.29 | | 21.85 |

**PUREX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DSSF | 7960 | | | | | | | | | | |
| CC/DSSF | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.018** | **0.11** | **0.05** | **0.31** | **2.602** | **16.01** | **2.67** | **16.42** |
| PCW/Mix | **159** | T-102 (w) | **72** | **0** | **0.00** | | **0.00** | **0.0945** | **0.21** | **0.0945** | **0.21** |
| PCW/ZrCW | **3100** | C-104 (w) | **1117** | **0.0407** | **0.11** | **0.67** | **1.86** | **32.7893** | **91.00** | **33.5** | **92.97** |
| CC/AR | **473** | A-106 (w) | **473** | **0.0065** | **0.01** | **0.01** | **0.01** | **0.5715** | **0.57** | **0.588** | **0.59** |
| P Sludge | 180 | | | | | | | | | | |
| AR Sludge | 26 | | | | | | | | | | |
| HS | 42 | C-106 (wash) | 746 | 0.0097 | | | | | | 0.436 | |
| AR/PCW | 980 | C-103 | 235 | 0.79 | | 0.022 | | | | 1.08 | |
| | **1228** | | **981** | **0.7997** | **1.00** | **0.022** | **0.11** | **0.6943** | **0.87** | **1.516** | **1.99** |
| **Total (MT)** | | | | | 1.23 | | 2.29 | | 108.66 | | 112.18 |
| **% Inventory** | | | | | 0.21 | | 0.38 | | 18.10 | | 18.69 |
| **TOTAL (MT)** | | | | | **11.15** | | **9.35** | | **578.62** | | **600.34** |
| **Distribution** | | | | | **1.9** | | **1.6** | | **96** | | |
| | | **Wash Factor** | **2** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **2** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **41.00** |

***TWRS estimates U inventory to be 1460 MT. The 600 MT U determined by this analysis suggests that:**
**1) retrieval of MW from the Uranium Recovery Process was very successful ;**
**2) there may be large concentrations of U in a few select tanks (e.g., C-112) that do not appear in this analysis; and/or**
**3) there may be MW heels remaining in the tanks.**

| | (MT) |
|---|---|
| **TWRS Inventory** | **1460** |
| **less TWRS DST Inventory** | **-4.49** |
| **Expected SST Inventory** | **1456** |
| **This Evaluation** | **600** |
| **Expected Inventory Accounted for** | **41 %** |

*Element: Zr*

**BiPO4**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1C** | 1670 | | | | | | | | | | |
| **1C/?** | 170 | | | | | | | | | | |
| **1C/EB** | 3050 | | | | | | | | | | |
| **1C(f)/EB** | 447 | | | | | | | | | | |
| | **5337** | T-104 | **1670** | **0.001** | **0.00** | | **0.00** | **0.129** | **0.41** | **0.13** | **0.42** |
| | | T-105 (w) | 371 | 0.0003 | | | | | | 0.0704 | |
| | | C-107 | 897 | 0 | | 0 | | | | 1.61 | |
| | | T-107 | 655 | 0.001 | | 0 | | | | 0.09 | |
| | | U-110 | 704 | 0 | | 0 | | | | 0.23 | |
| **1C/CW** | **2830** | | **2627** | **0.0013** | **0.00** | **0** | **0.00** | **1.9991** | **2.15** | **2.0004** | **2.15** |
| | | T-108 (w) | 167 | 0 | | | | | | 0.0027 | |
| | | C-110 (w) | 708 | 0.0106 | | | | | | 0.142 | |
| | | BX-107 | 1302 | 0 | | 0.002 | | | | 0.21 | |
| **1C/TBP** | **2610** | | **2177** | **0.0106** | **0.01** | **0.002** | **0.00** | **0.3421** | **0.41** | **0.3547** | **0.43** |
| **2C/EB** | **1400** | B-104 | **1400** | **0.0005** | **0.00** | **0.001** | **0.00** | **0.0485** | **0.05** | **0.05** | **0.05** |
| | | B-110 | 927 | 0 | | 0 | | | | 0.0044 | |
| | | B-111 | 893 | 0 | | 0 | | | | 0.0229 | |
| **2C/5-6** | **1930** | | **1820** | **0** | **0.00** | **0** | **0.00** | **0.0273** | **0.03** | **0.0273** | **0.03** |
| **2C/224** | **3380** | T-111 | **1715** | **0.0015** | **0.00** | | **0.00** | **0.006** | **0.01** | **0.0075** | **0.01** |
| | | B-201 | 106 | 0.0001 | | 0 | | | | 0.0083 | |
| | | B-202 | 102 | 1/1000 | | 0 | | | | 0.0009 | |
| **224** | **1040** | | **208** | **0.0001** | **0.00** | **0** | **0.00** | **0.0091** | **0.05** | **0.0092** | **0.05** |
| | | TY-102 | 242 | 0.0017 | | 0 | | | | 0.0039 | |
| **EB/1C** | **18100** | | **242** | **0.0017** | **0.13** | **0** | **0.00** | **0.0022** | **0.16** | **0.0039** | **0.29** |
| **Total (MT)** | | | | | 0.15 | | 0.01 | | 3.28 | | 3.43 |
| **% Inventory** | | | | | 0.05 | | 0.00 | | 1.19 | | 1.25 |
| **TBP** | | | | | | | | | | | |
| **TBP/Sr** | **568** | C-105 (w) | **568** | **0.0099** | **0.01** | | **0.00** | **0.6381** | **0.64** | **0.648** | **0.65** |
| **TBP/DiaE** | **64** | TY-106 (w) | **64** | **0.0004** | **0.00** | | **0.00** | **0.0567** | **0.06** | **0.0571** | **0.06** |
| **TBP/EB** | 814 | | | | | | | | | | |
| **TBP(f)/EB** | 15100 | BY-104 | 1540 | 0 | | 0 | | | | 0.13 | |
| **TBP/EBits** | 2890 | BY-110 | 1510 | 0 | | 0 | | | | 0.13 | |
| | **18804** | | **3050** | **0** | **0.00** | **0** | **0.00** | **0.26** | **1.60** | **0.26** | **1.60** |
| **TBP** | **874** | TY-105 (w) | **874** | **0.0003** | **0.00** | | **0.00** | **0.0701** | **0.07** | **0.0704** | **0.07** |
| | | BX-104 (w) | 363 | 0.0032 | | | | | | 0.82 | |
| | | BX-109 | 731 | 0 | | 0.001 | | | | 0.66 | |
| **TBP/CW** | **2570** | | **1094** | **0.0032** | **0.01** | **0.001** | **0.00** | **1.4758** | **3.47** | **1.48** | **3.48** |
| **TBP/1C(f)** | **776** | TY-104 | **163** | **0.0013** | **0.01** | | **0.00** | **0.0486** | **0.23** | **0.0499** | **0.24** |
| | | C-112 | 394 | 0 | | 0 | | | | 0.0151 | |
| **TBP(f)/1C** | **1090** | | **394** | **0** | **0.00** | **0** | **0.00** | **0.0151** | **0.04** | **0.0151** | **0.04** |
| **Total (MT)** | | | | | 0.02 | | 0.00 | | 6.11 | | 6.14 |
| **% Inventory** | | | | | 0.01 | | 0.00 | | 2.23 | | 2.24 |

*Element: Zr (Continued)*

**REDOX**

| Waste Type | Waste Type Vol (kL) | Representative Tanks | Tank Vol (kL) | Wash MT Tank | Wash MT Waste Type | Leach MT Tank | Leach MT Waste Type | Residual Solids (after washing & leaching) MT Tank | Residual Solids MT Waste Type | Total MT Tank | Total MT Waste Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R-Sludge$_{Bell}$ | 4280 | | | | | | | | | | |
| RCW/Mix | 382 | | | | | | | | | | |
| RCW | 38 | | | | | | | | | | |
| | **4700** | S-104 | **1109** | **0** | **0.00** | **0.002** | **0.01** | **1.068** | **4.53** | **1.07** | **4.53** |
| R-Sludge | 6047 | | | | | | | | | | |
| R/DiaE | 560 | | | | | | | | | | |
| R/Mix | 318 | | | | | | | | | | |
| R/2C | 8 | | | | | | | | | | |
| | **6933** | S-104 | **1109** | **0** | **0.00** | **0.002** | **0.01** | **1.068** | **6.68** | **1.07** | **6.69** |
| Redox (Zr) | **1423** | S-107 | **1423** | 0 | **0.00** | | **0.00** | **10.2** | **10.20** | 10.2 | **10.20** |
| R-RCW/EB | 32300 | | | | | | | | | | |
| EB/R | 7050 | | | | | | | | | | |
| EB/CW | 7100 | | | | | | | | | | |
| EB/DW | 507 | TY-102 | 242 | 0.0017 | | 0 | | | | 0.0039 | |
| | **46957** | | **242** | **0.0017** | **0.33** | | **0.00** | **0.0022** | **0.43** | **0.0039** | **0.76** |
| **Total (MT)** | | | | | 0.33 | | 0.02 | | 21.83 | | 22.18 |
| **% Inventory** | | | | | 0.12 | | 0.01 | | 7.95 | | 8.08 |
| **PUREX** | | | | | | | | | | | |
| DSSF | 7960 | | | | | | | | | | |
| CC/DSSF | 560 | | | | | | | | | | |
| | **8520** | A-103 (w) | **1385** | **0.0257** | **0.16** | | **0.00** | **0.3633** | **2.23** | **0.389** | **2.39** |
| PCW/Mix | **159** | T-102 (w) | **72** | **0** | **0.00** | | **0.00** | **0.0054** | **0.01** | **0.0054** | **0.01** |
| PCW/ZrCW | **3100** | C-104 (w) | **1117** | **0.013** | **0.04** | | **0.00** | **83.487** | **231.70** | **83.5** | **231.74** |
| CC/AR | **473** | A-106 (w) | **473** | **0.0153** | **0.02** | | **0.00** | **0.8827** | **0.88** | **0.898** | **0.90** |
| P Sludge | 180 | | | | | | | | | | |
| AR Sludge | 26 | | | | | | | | | | |
| HS | 42 | C-106 (w) | 746 | 0.121 | | | | | | 2.31 | |
| AR/PCW | 980 | C-103 | 235 | 0.038 | | 0 | | | | 3.84 | |
| | **1228** | | **981** | **0.159** | **0.20** | **0** | **0.00** | **5.991** | **7.50** | **6.15** | **7.70** |
| **Total (MT)** | | | | | 0.41 | | 0.00 | | 242.33 | | 242.74 |
| **% Inventory** | | | | | 0.15 | | 0.00 | | 88.29 | | 88.43 |
| **TOTAL (MT)** | | | | | **0.91** | | **0.03** | | **273.54** | | **274.48** |
| **Distribution** | | | | | **0.33** | | **0.01** | | **99.66** | | |
| | | **Wash Factor** | **0.3** | **% initial solids** | | | | | | | |
| | | **Leach Factor** | **0** | **% washed solids** | | ***% of (Expected) SST Inventory Accounted For:*** | | | | | **166-343*** |

*** Range reflects 45 MT uncertainty in provisional inventory estimate. Note that there may be potentially less than 305 MT Zr expected in DSTs.**

| | (MT) |
|---|---|
| **"Provisional" Best-basis Total** | |
| **Inventory (on-going work at WHC)** | **430 +/-45** |
| **less TWRS DST Inventory** | **-305** |
| **Expected SST Inventory** | **125.0 +/-45** |
| **This Evaluation** | **274.0** |
| **Expected Inventory Accounted for** | **219 %** |

# 4.0 Conclusions and Recommendations

The overall wash and leach factors developed by this task incorporate dissolution data from tests performed with tank wastes, which, in actuality, are mixtures of insoluble and soluble materials. As a result, these overall factors apply to a composite SST inventory and provide a technical basis for partitioning assumptions that previously were based on judgment and limited data. Table 4 compares the total residual solids for SST analytes that result from applying 1) 1995 partitioning factors based on past assumptions, and 2) new partitioning factors based on the methodology developed in this task. This table also includes a comparative ratio (new:1995) that shows, for a particular analyte, whether residual solids (solids remaining after washing and leaching) have increased or decreased as a result of the new factors.

With the exception of chromium, analyte partitioning assumptions used in the past for planning purposes tend to be supported by the newly evaluated wash and leach factors. Because of its important role in HLW glass production, the potential two-fold increase in chromium in solids destined for disposal in HLW glass is cause for concern. The potential increase is based on the newly derived leach factor, which is dramatically less than the 60 percent factor used in past planning activities. An additional cause for concern is that the total chromium inventory may be twice as large as originally estimated [ongoing work at Westinghouse Hanford Company (WHC) to estimate best-basis total analyte inventory values].

Based on the detailed washing and leaching evaluation provided in Section 3.0, the following conclusions and recommendations are made concerning chromium:

- Relatively little chromium was leached from BY-104 and BY-110 wastes. Analysis of BY-110 residual solids indicated CrOOH, i.e., chromium (III), was present (Lumetta 1996). Assuming the chromium in these particular wastes came from evaporator bottoms, discovering what caused the reduction of chromium (VI) in alkaline supernatants sent to the evaporators may help determine if other evaporator bottom-type wastes will exhibit similar chromium leaching behavior.

- A substantial portion of the chromium inventory appeared in Redox/Evaporator Bottom salt-type wastes. Because of the poor leaching behavior exhibited by BY-104 and BY-110 wastes, no chromium leach factors were assumed for the Redox/Evaporator Bottom wastes. Data are need to determine chromium leaching behaviors in predominantly salt-type wastes.

- The bulk of the chromium inventory in Double-shell Slurry Feed wastes appeared in residual solids because the leach factor was derived from C-103 test results; i.e., Purex solids that precipitated in Double-shell Slurry Feed wastes were assumed to behave similarly to Purex solids precipitated in C-103 waste. Actual leach data are needed to determine chromium leaching behavior in Double-shell Slurry Feed wastes.

## Table 4. Comparison of Total Residual Solids for SST Analytes Based on 1995 and Newly Derived Partitioning Factors

| | Current TWRS SST Inv (MT) | 1995 Partitioning Factors | | | | | | | New Partitioning Factors | | | | Comparative Ratio New:1995 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Assumed Partitioning | | Wash Factor | | Washed Solids (MT) | Leach Factor (%) | Residual Solids (MT) | Wash Factor (%) | Washed Solids (MT) | Leach Factor (%) | Residual Solids (MT) | |
| | | Sludge (MT) | Salt Cake (MT) | Sludge (%) | Salt Cake (%) | | | | | | | | |
| Ag+ | **0** | | | 2.0 | 99 | 0 | 0 | **0** | | | | | |
| Al+3 | **2960** | 2220 | 739 | 8.0 | 99 | 2050 | 67 | **676** | 31 | 2345 | 60 | **938** | 0.85 |
| Al+3 (tied to Si) | **438** | 428 | 9.58 | 0.0 | 99 | 428 | 0 | **428** | (factors applied to combined Al inventory 3398 MT) | | | | |
| B+3 | **0** | | | 59 | 99 | 0 | 0 | **0** | | | | | |
| Ba+2 | **0.589** | 0.589 | | 0.2 | 99 | 0.588 | 0 | **0.588** | 0.9 | 0.584 | 0 | **0.584** | 0.99 |
| Bi+3 | **262** | 252 | 9.58 | 0.7 | 99 | 250 | 0 | **250** | 0.3 | 261 | 0.3 | **260** | 1.04 |
| Ca+2 | **128** | 122 | 6.42 | 3.0 | 99 | 118 | 0 | **118** | 4.0 | 123 | 2 | **121** | 1.02 |
| Cd+2 | **3.84** | 3.84 | | 11 | 99 | 3.42 | 0 | **3.42** | 15 | 3 | 0 | **3** | 0.96 |
| Co+3 | **0** | | | 13 | 99 | 0 | 0 | **0** | | | | | |
| Cr+3/+6 | **268** | 121 | 147 | 18 | 99 | 101 | 60 | **40.3** | 59 | 110 | 14 | **94** | **2.34**[a] |
| | | | | | | | | | 61[b] | 105 | 10[b] | **94** | **2.34**[a] |
| Cu+2 | **812** | 26.2 | 786 | 3.7 | 99 | 33.1 | 0 | **33.1** | | | | | |
| Fe+3 | **631** | 607 | 23.7 | 0.67 | 99 | 603 | 0 | **603** | 0.4 | 628 | 0.2 | **627** | 1.04 |
| K+ | **55.3** | 2.43 | 52.9 | 64 | 99 | 1.40 | 0 | **1.40** | | | | | |
| La+3 | **28** | 28 | | 0.24 | 99 | 27.9 | 0 | **27.9** | | | | | |
| Mg+2 | **0** | | | 1.7 | 99 | 0 | 0 | **0** | 1 | 0 | 0.6 | **0** | |
| Mn+4 | **120** | 118 | 2.41 | 0.92 | 99 | 117 | 0 | **117** | 0.5 | 120 | 0 | **120** | 1.02 |
| Na+ | **57342** | 542 | 56800 | 96 | 99 | 590 | 25 | **442** | 94 | 3462 | 46 | **1870** | **2.07**[c] |
| Na+ (w/Al/Si) | **460** | 460 | 0 | 0 | 99 | 460 | 0 | **460** | 95[b] | 2885 | 45[b] | **1587** | **1.76**[c] |
| | | | | | | | | | (factors applied to combined Na inventory 57707 MT) | | | | |
| Ni+2 | **203** | 199 | 4.06 | 2.2 | 99 | 195 | 0 | **195** | 2.5 | 198 | 0 | **198** | 1.02 |
| Pb+2 | **28.3** | 25 | 3.29 | 6.8 | 99 | 23.3 | 0 | **23.3** | | | | | |
| PO4(-3) | **4730** | 1830 | 2900 | 40 | 99 | 1127 | 74 | **293** | 75 | 1183 | 70 | **355** | 1.21 |
| Si+4 | **14.5** | 14.1 | 0.406 | 2.5 | 99 | 13.8 | 0 | **13.8** | 12 | 404 | 13 | **351** | 0.77 |
| Si+4 (tied to Al) | **444** | 444 | 0 | 0 | 99 | 444 | 0 | **444** | (factors applied to combined Si inventory 459 MT) | | | | |
| Sr+2 | **36.1** | 35.7 | 0.36 | 0.62 | 99 | 35.5 | 0 | **35.5** | 1.0 | 36 | 0 | **36** | 1.01 |
| U+6 | **1407** | 1322 | 85.2 | 2.1 | 99 | 1295 | 0 | **1295** | 2.0 | 1379 | 2 | **1352** | 1.04 |
| Zn+2 | **0** | | | 3.2 | 99 | 0 | 0 | **0** | | | | | |
| Zr+4 | **382** | 378 | 3.82 | 0.26 | 99 | 377 | 0 | **377** | 0.3 | 381 | 0 | **381** | 1.01 |

(a) This ratio is based on the Cr SST inventory estimated as of 1995. Ongoing work at WHC indicates this inventory may be twice as large as originally estimated.
(b) Factors presented in June 30, 1996 draft report.
(c) This ratio is based on the Na SST inventory estimated as of 1995. Ongoing work at WHC indicates this inventory is smaller than originally estimated.
The smaller Na inventory, combined with potentially larger inventories of analytes in residual solids, such as Fe, suggests that the $Na_2O$ content in residual solids, on an oxide basis, may be similar to the 14% used in past planning activities.

# 5.0 References


Baldwin, J. H., L. C. Amato, B. J. Morris. 1996. *Tank Characterization Report for Single-Shell Tank 241-T-108*, WHC-SD-WM-ER-554, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Boomer, K. D., et al. 1993. *Tank Waste Technical Options Report, Appendix G.* WHC-EP-06110, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Brown, T. M. and L. Jensen. 1993. *Tank Characterization Report for Single-Shell Tank 241-U-110*, WHC-EP-0643, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland, Washington.

Field, J. G., J. Jo, and T. T. Tran. 1996a. *Tank Characterization Report for Single-Shell Tank 241-B-104*, WHC-SD-WM-ER-552, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Field, J. G., R. D. Schreiber, and B. C. Simpson. 1996b. *Tank Characterization Report for Single-Shell Tank 241-BX-109*, WHC-SD-WM-ER-572, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Giamberardini, K. K. 1993. *PNL 325 Laboratory Single-Shell Tank Waste Characterization, Tank B-111, Cores 29 and 30*, WHC-SD-WM-DP-041, Westinghouse Hanford Company, Richland, Washington.

Hanlon, B. M. 1996. *Waste Tank Summary Report for Month Ending November 30, 1995*, WHC-EP-0182-92, Westinghouse Hanford Company, Richland, Washington.

Hill, J. G., G. S. Anderson, and B. C. Simpson. 1995. *The Sort on Radioactive Waste Type Model: A Method to Sort Single-Shell Tanks into Characteristic Groups*, PNL-9814 Rev 2, Pacific Northwest National Laboratory, Richland, Washington.

Kocher, K. L. 1993. *Single-Shell Tank Waste Characterization Tank 241-S-104 Data Package*, "222-S Laboratory Single-Shell Tank Waste Characterization, Tank S-104 Cores 42, 43 and 44 Validation Summary," WHC-SD-WM-DP-031, Addendum 2 Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Kristofski, J. G. 1993. *Single-Shell Tank Waste Characterization 241-BX-107 Cores 40 and 41*, "Sample Data Summary," WHC-SD-WM-DP-028, Addendum 2, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Lumetta, G. J. and B. M. Rapko. 1994. *Washing and Alkaline Leaching of Hanford Tank Sludges: A Status Report*, PNL-10078, Pacific Northwest National Laboratory, Richland, Washington.

Lumetta, G. J., B. M. Rapko, M. J. Wagner, and J. Liu. 1996. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY 1996 Studies*, PNNL-11278, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

Orme, R. M. 1995. *TWRS Process Flowsheet*, WHC-SD-WM-TI-613, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Rapko, B. M., G. J. Lumetta, and M. J. Wagner. 1995. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY 1995 Studies*, PNL-10712, Pacific Northwest National Laboratory, Richland, Washington.

Schulz, W. W. 1980. *Removal of Radionuclides from Hanford Defense Waste Solutions*, RHO-SA-51, Rockwell Hanford Operations, Richland, Washington.

Simpson, B. C., G. L. Borsheim, L. Jensen. 1993a. *Tank Characterization Report: Tank 241-C-109*, WHC-EP-0668, Westinghouse Hanford Company, Richland, Washington.

Simpson, B. C., G. L. Borsheim, L. Jensen. 1993b. *Tank Characterization Data Report: Tank 241-C-112*, WHC-EP-0640, Westinghouse Hanford Company, Richland, Washington.

Temer, D. J. and R. Villarreal. 1995 *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: A Status Report*, LAUR 95-2070, Lost Alamos National Laboratory, Los Alamos, New Mexico.

Temer, D. J. and R. Villarreal. 1996. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: FY 1996 Results*, LAUR 96-2839, Los Alamos National Laboratory, Los Alamos New Mexico.

Weiss, R. L. and B. M. Mauss. 1987a. *Data Transmittal Package for 241-TY-102 Waste Tank Characterization*, SD-RE-TI-183, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and B. M. Mauss. 1987b. *Data Transmittal Package for 241-TY-104 Waste Tank Characterization*, SD-RE-TI-182, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and B. M. Mauss. 1987c. *Data Transmittal Package for 241-TY-105 Waste Tank Characterization*, SD-RE-TI-186, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and B. M. Mauss. 1987d. *Data Transmittal Package for 241-TY-106 Waste Tank Characterization*, SD-RE-TI-181, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988a. *Data Transmittal Package for 241-A-103 Waste Tank Characterization*, SD-RE-TI-198, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988b. *Data Transmittal Package for 241-A-106 Waste Tank Characterization*, SD-RE-TI-200, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988c. *Data Transmittal Package for 241-BX-104 Waste Tank Characterization*, SD-RE-TI-206, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988d. *Data Transmittal Package for 241-BX-105 Waste Tank Characterization*, SD-RE-TI-202, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988e. *Data Transmittal Package for 241-C-103 Waste Tank Characterization*, SD-RE-TI-203, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988f. *Data Transmittal Package for 241-C-104 Waste Tank Characterization*, SD-RE-TI-199, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988g. *Data Transmittal Package for 241-C-105 Waste Tank Characterization*, SD-RE-TI-204, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Weiss, R. L. and K. E. Schull. 1988h. *Data Transmittal Package for 241-C-106 Waste Tank Characterization*, SD-RE-TI-205, Rev. 0, Rockwell Hanford Operations, Richland, Washington.

WHC. 1993a. *PNL 325 Laboratory Single-Shell Tank Waste Characterization Tank 241-B-201, Cores 26 and 27 Data Package*, WHC-SD-WM-DP-037, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC. 1993b. *Westinghouse 222-S Analytical Laboratory Single-Shell Tank Waste Characterization Tank C-110 Cores 37, 38 and 39*, WHC-SD-WM-DP-027, Addendum 1, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC. 1993c. *PNL 325 Laboratory Single-Shell Tank Waste Characterization Tank T-102, Cores 55 and 56 Validation Summary*, WHC-SD-WM-DP-052, Addendum 1, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC. 1993d. *Westinghouse 222-S Laboratory Single-Shell Tank Waste Characterization, Tank 241-T-104 Cores 45 and 46 Validation Summary*, WHC-SD-WM-DP-032, Addendum 1, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC. 1993e. *Westinghouse 222-S Laboratory Single-Shell Tank Waste Characterization, Tank T-107 Cores 50, 51, and 52 Validation Summary*, WHC-SD-WM-042, Addendum 1A, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

WHC. 1993f. *Westinghouse 222-S Laboratory Single-Shell Tank Waste Characterization, Tank 241-T-111 Cores 31 and 33 Validation Report*, WHC-SD-WM-DP-024, Addendum 1, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

# Appendix A

# Tank Waste Data Summary Worksheets

**B-104 (BiPO4 2C/EB)**

| | |
|---|---|
| Density (g/mL) | 1.30 |
| Volume (L) | 1404235 |
| Mass (kg) | 1825506 |
| Solids (ug/g) | 530000 |
| ~pH | NR |

| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | Overall Mean ug/g sludge (element) | Overall Mean kg/tank (element) | Overall Mean ug/g sludge (oxide) | Overall Mean % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1840.000 | 3358.9 | 3475.760 | 100.00 | 1840.000 | 3358.9 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 11400.000 | 20810.8 | 12711.000 | 100.00 | 11400.000 | 20810.8 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 328.000 | 598.8 | 458.872 | 100.00 | 328.000 | 598.8 |
| Chromium | 1.923 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 513.000 | 936.5 | 986.499 | 100.00 | 513.000 | 936.5 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 10800.000 | 19715.5 | 14925.600 | 100.00 | 10800.000 | 19715.5 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nickel | 1.272 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Phosphate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 53400.000 | 97482.0 | 53400.000 | 100.00 | 53400.000 | 97482.0 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5700.000 | 10405.4 | 12192.300 | 100.00 | 5700.000 | 10405.4 |
| Silver | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 117000.000 | 213584.1 | 117000.000 | 100.00 | 117000.000 | 213584.1 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1100.000 | 0.0 | 1247.400 | 100.00 | 1100.000 | 2008.1 |
| Nitrate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 290000.000 | 529396.6 | 290000.000 | 100.00 | 290000.000 | 529396.6 |
| Chloride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2110.000 | 3851.8 | 2110.000 | 100.00 | 2110.000 | 3851.8 |
| Fluoride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 3460.000 | 6316.2 | 3460.000 | 100.00 | 3460.000 | 6316.2 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| TOC | 1.336 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrite | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2450.000 | 4472.5 | 2450.000 | 100.00 | 2450.000 | 4472.5 |
| Sulfate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 21400.000 | 39065.8 | 21400.000 | 100.00 | 21400.000 | 39065.8 |
| Total | | 0.000 | | | | | 0.000 | | | | 535817.431 | | | |
| | | 0.00 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 101.10 | %total solids in fusion | 101.10 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | | **uCi/g** | **Ci/tank** | **dissolved** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** |
| Total Alpha | | 0.000 | 0.0 | 0.00 | | | 0.0 | 0.00 | | 0.040 | 73.0 | 100.00 | 0.040 | 73.0 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | | 0.0 | #DIV/0! | | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.000 | 0.0 | #DIV/0! | | | 0.0 | #DIV/0! | | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | | 0.0 | #DIV/0! | | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | #DIV/0! | | | 0.0 | #DIV/0! | | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Co-60 | | 0.000 | 0.0 | #DIV/0! | | | 0.0 | #DIV/0! | | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Cs-137 | | 0.000 | 0.0 | #DIV/0! | | | 0.0 | #DIV/0! | | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | | 0.0 | #DIV/0! | | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |

***NOTES:***

Field, J. G., J. Jo, and T. T. Tran. 1996. Tank Characterization Report for Single-Shell Tank 241-B-104, WHC-SD-WM-ER-552, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

NR - Not Reported
NA - No Analysis Performed
<DL - Less than Detection Limit

**B-105 (EB, 1C BiPO4)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 1006810 |
| Mass (kg) | 1711577 |
| Solids (ug/g) | 580000 |
| ~pH | 13.0 |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | RESIDUAL SOLIDS ug/g sludge (element) | RESIDUAL SOLIDS kg/tank (element) | RESIDUAL SOLIDS ug/g sludge (oxide) | RESIDUAL SOLIDS % element dissolved | ug/g sludge (element) | kg/tank (element) | g/g sludge (oxide) | % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 252.882 | 432.8 | 23.46 | 825.000 | 1412.1 | 1558.425 | 76.54 | 0.000 | 0.0 | 0.000 | 0.00 | 1077.882 | 1844.9 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Chromium | 1.923 | 16.234 | 27.8 | 17.62 | 75.900 | 129.9 | 145.956 | 82.38 | 0.000 | 0.0 | 0.000 | 0.00 | 92.134 | 157.7 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 21.652 | 37.1 | 0.31 | 6864.000 | 11748.3 | 9486.048 | 99.69 | 0.000 | 0.0 | 0.000 | 0.00 | 6885.652 | 11785.3 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nickel | 1.272 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Phosphate | 1.000 | 103594.650 | 177310.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 103594.650 | 177310.2 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 56.820 | 97.3 | 2.59 | 2138.400 | 3660.0 | 4574.038 | 97.41 | 0.000 | 0.0 | 0.000 | 0.00 | 2195.220 | 3757.3 |
| H2O (hydration) | 1.000 | | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 190000.000 | 325199.6 | 98.65 | 2600.400 | 4450.8 | 2600.400 | 1.35 | 0.000 | 0.0 | 0.000 | 0.00 | 192600.400 | 329650.4 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 7.730 | 13.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7.730 | 13.2 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 42.900 | 73.4 | 48.649 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 42.900 | 73.4 |
| Nitrate | 1.000 | 125540.080 | 214871.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 125540.080 | 214871.5 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 0.311 | 0.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.311 | 0.5 |
| Carbonate | 1.000 | 1338.000 | 2290.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1338.000 | 2290.1 |
| TOC | 1.336 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrite | 1.000 | 122070.200 | 208932.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 122070.200 | 208932.5 |
| Sulfate | 1.000 | 15400.000 | 26358.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 15400.000 | 26358.3 |
| Total | | 558298.559 | | | | | 18413.515 | | | | 0.000 | | | |
| | | 96.26 | % total solids in wash | | | | 3.17 | % residual solids | | | 0.00 | | 99.43 | % mass balance |

| Radionuclides | WATER uCi/g | WATER Ci/tank | WATER dissolved | RESIDUAL SOLIDS uCi/g | RESIDUAL SOLIDS Ci/tank | RESIDUAL SOLIDS % dissolved | uCi/g | Ci/tank | % dissolved | TOTAL uCi/g | TOTAL Ci/tank |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pu-239,240 | 0.000 | 0.0 | 0.00 | 6.300 | 10782.9 | 100.00 | 0.000 | 0.0 | 0.00 | 6.300 | 10782.9 |
| C-14 | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | 1.035 | 1771.0 | 0.42 | 244.000 | 417624.8 | 99.58 | 0.000 | 0.0 | 0.00 | 245.035 | 419395.8 |
| Tc-99 | 0.000 | 0.0 | 0.00 | 0.009 | 14.7 | 100.00 | 0.000 | 0.0 | 0.00 | 0.009 | 14.7 |
| Am-241 | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Co-60 | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |
| Cs-137 | 0.598 | 1022.9 | 0.68 | 87.000 | 148907.2 | 99.32 | 0.000 | 0.0 | 0.00 | 87.598 | 149930.1 |
| I-129 | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 |

***NOTES:***

Sulfate concentration derived from 6/76 sample analysis.

Sodium has been adjusted from 5.48M to 3.84M for ion balance.

NR - Not Reported

NA - No Analysis Performed

<DL - Less than Detection Limit

**B-202 (BiPO4 224)**

| | |
|---|---|
| Density (g/mL) | 1.10 |
| Volume (L) | 102195 |
| Mass (kg) | 112415 |
| Solids (ug/g) | 241000 |
| ~pH | 12.3 |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | ACID ug/g sludge (element) | ACID kg/tank (element) | ACID ug/g sludge (oxide) | ACID % element dissolved | FUSION ug/g sludge (element) | FUSION kg/tank (element) | FUSION ug/g sludge (oxide) | FUSION % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 16.600 | 1.9 | 1.89 | 457.400 | 51.4 | 864.029 | 52.21 | 402.000 | 45.2 | 759.378 | 45.89 | 876.000 | 98.5 |
| Barium | 1.117 | 1.610 | 0.2 | 0.09 | 1778.390 | 199.9 | 1986.462 | 99.91 | 0.000 | 0.0 | 0.000 | 0.00 | 1780.000 | 200.1 |
| Bismuth | 1.115 | 14.900 | 1.7 | 0.04 | 38885.100 | 4371.2 | 43356.887 | 99.96 | 0.000 | 0.0 | 0.000 | 0.00 | 38900.000 | 4372.9 |
| Boron | 3.220 | 4.720 | 0.5 | 3.47 | 131.280 | 14.8 | 422.722 | 96.53 | 0.000 | 0.0 | 0.000 | 0.00 | 136.000 | 15.3 |
| Cadmium | 1.142 | 0.472 | 0.1 | 3.15 | 14.528 | 1.6 | 16.591 | 96.85 | 0.000 | 0.0 | 0.000 | 0.00 | 15.000 | 1.7 |
| Calcium | 1.399 | 99.000 | 11.1 | 0.93 | 1541.000 | 173.2 | 2155.859 | 14.54 | 8960.000 | 1007.2 | 12535.040 | 84.53 | 10600.000 | 1191.6 |
| Chromium | 1.923 | 707.000 | 79.5 | 21.30 | 2613.000 | 293.7 | 5024.799 | 78.70 | 0.000 | 0.0 | 0.000 | 0.00 | 3320.000 | 373.2 |
| Cobalt | 1.271 | 0.840 | 0.1 | 6.94 | 2.260 | 0.3 | 2.872 | 18.68 | 9.000 | 1.0 | 11.439 | 74.38 | 12.100 | 1.4 |
| Copper | 1.252 | 0.522 | 0.1 | 1.28 | 13.778 | 1.5 | 17.250 | 33.69 | 26.600 | 3.0 | 33.303 | 65.04 | 40.900 | 4.6 |
| Iron | 1.382 | 17.500 | 2.0 | 0.27 | 5372.500 | 603.9 | 7424.795 | 84.21 | 990.000 | 111.3 | 1368.180 | 15.52 | 6380.000 | 717.2 |
| Lead | 1.077 | 9.650 | 1.1 | 1.57 | 561.350 | 63.1 | 604.574 | 91.28 | 44.000 | 4.9 | 47.388 | 7.15 | 615.000 | 69.1 |
| Magnesium | 1.658 | 5.210 | 0.6 | 0.97 | 252.790 | 28.4 | 419.126 | 46.90 | 281.000 | 31.6 | 465.898 | 52.13 | 539.000 | 60.6 |
| Manganese | 1.582 | 2.680 | 0.3 | 0.02 | 13297.320 | 1494.8 | 21036.360 | 99.98 | 0.000 | 0.0 | 0.000 | 0.00 | 13300.000 | 1495.1 |
| Nickel | 1.272 | 1.610 | 0.2 | 0.79 | 203.390 | 22.9 | 258.712 | 99.21 | 0.000 | 0.0 | 0.000 | 0.00 | 205.000 | 23.0 |
| Phosphate | 1.000 | 2080.000 | 233.8 | 24.67 | 5930.000 | 666.6 | 5930.000 | 70.34 | 420.000 | 47.2 | 420.000 | 4.98 | 8430.000 | 947.7 |
| Potassium | 1.000 | 6630.000 | 745.3 | 99.40 | 40.000 | 4.5 | 40.000 | 0.60 | 0.000 | 0.0 | 0.000 | 0.00 | 6670.000 | 749.8 |
| Silicon | 2.139 | 795.000 | 89.4 | 26.59 | 0.000 | 0.0 | 0.000 | 0.00 | 2195.000 | 246.7 | 4695.105 | 73.41 | 2990.000 | 336.1 |
| Lanthanum | 1.430 | 28.800 | 3.2 | 0.20 | 14271.200 | 1604.3 | 20407.816 | 99.80 | 0.000 | 0.0 | 0.000 | 0.00 | 14300.000 | 1607.5 |
| Sodium | 1.000 | 36200.000 | 4069.4 | 96.79 | 1200.000 | 134.9 | 1200.000 | 3.21 | 0.000 | 0.0 | 0.000 | 0.00 | 37400.000 | 4204.3 |
| Strontium | 1.183 | 2.280 | 0.3 | 0.38 | 592.720 | 66.6 | 701.188 | 99.62 | 0.000 | 0.0 | 0.000 | 0.00 | 595.000 | 66.9 |
| Zinc | 1.245 | 9.230 | 1.0 | 2.06 | 33.170 | 3.7 | 41.297 | 7.39 | 406.600 | 45.7 | 506.217 | 90.56 | 449.000 | 50.5 |
| Zirconium | 1.351 | 0.799 | 0.1 | 10.43 | 0.088 | 0.0 | 0.119 | 1.15 | 6.773 | 0.8 | 9.150 | 88.42 | 7.660 | 0.9 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 323.000 | 0.0 | 366.282 | 100.00 | 323.000 | 36.3 |
| Nitrate | 1.000 | 61500.000 | 6913.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 61500.000 | 6913.5 |
| Chloride | 1.000 | 864.000 | 97.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 864.000 | 97.1 |
| Fluoride | 1.000 | 6240.000 | 701.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 6240.000 | 701.5 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | 1960.000 | 220.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1960.000 | 220.3 |
| TOC | 1.336 | 8770.000 | 737.9 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 6564.371 | 737.9 |
| Nitrite | 1.000 | 1090.000 | 122.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1090.000 | 122.5 |
| Sulfate | 1.000 | 1530.000 | 172.0 | 74.78 | 0.000 | 0.0 | 0.000 | 0.00 | 516.000 | 58.0 | 516.000 | 25.22 | 2046.000 | 230.0 |
| Total | | 128582.423 | | | | | 111911.456 | | | | 21733.381 | | | |
| | | 53.35 | %total solids in wash | | | | 46.44 | %total solids in acid | | | 9.02 | %total solids in fusion | 108.81 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | NA | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.153 | 17.2 | | 100.00 | 0.153 | 17.2 |
| C-14 | | 0.0004 | 0.0 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.000 | 0.0 |
| Sr-90 | | NA | 0.0 | 0.00 | | 0.0 | | 0.00 | 4.130 | 464.3 | | 100.00 | 4.130 | 464.3 |
| Tc-99 | | NA | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.005 | 0.6 | | 100.00 | 0.005 | 0.6 |
| Am-241 | | NA | 0.0 | 0.00 | | 0.0 | | 100.00 | 0.068 | 7.7 | | 100.00 | 0.068 | 7.7 |
| Co-60 | | NA | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.010 | 1.1 | | 100.00 | 0.010 | 1.1 |
| Cs-137 | | NA | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.100 | 11.2 | | 100.00 | 0.100 | 11.2 |
| I-129 | | NA | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.016 | 1.8 | | 100.00 | 0.016 | 1.8 |

***NOTES:***

Characterization data obtained from TWINS database.

NR - Not Reported

NA - No Analysis Performed

**BX-109 (TBP/CW)**

| | |
|---|---|
| Density (g/mL) | 1.50 |
| Volume (L) | 730505 |
| Mass (kg) | 1095758 |
| Solids (ug/g) | 497000 |
| ~pH | NR |

| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | OVERALL MEAN ug/g sludge (element) | OVERALL MEAN kg/tank (element) | OVERALL MEAN ug/g sludge (oxide) | OVERALL MEAN % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1910.000 | 2092.9 | 3607.990 | 100.00 | 1910.000 | 2092.9 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 4035.000 | 4421.4 | 5644.965 | 100.00 | 4035.000 | 4421.4 |
| Chromium | 1.923 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 137.000 | 150.1 | 263.451 | 100.00 | 137.000 | 150.1 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 21500.000 | 23558.8 | 29713.000 | 100.00 | 21500.000 | 23558.8 |
| Lead | 1.077 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 668.000 | 732.0 | 719.436 | 100.00 | 668.000 | 732.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 748.000 | 819.6 | 1240.184 | 100.00 | 748.000 | 819.6 |
| Manganese | 1.582 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nickel | 1.272 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Phosphate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 66000.000 | 72320.0 | 66000.000 | 100.00 | 66000.000 | 72320.0 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1720.000 | 1884.7 | 3679.080 | 100.00 | 1720.000 | 1884.7 |
| Silver | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 114000.000 | 124916.4 | 114000.000 | 100.00 | 114000.000 | 124916.4 |
| Strontium | 1.183 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 590.000 | 646.5 | 697.970 | 100.00 | 590.000 | 646.5 |
| Zinc | 1.245 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 624.000 | 683.8 | 776.880 | 100.00 | 624.000 | 683.8 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 16200.000 | 0.0 | 18370.800 | 100.00 | 16200.000 | 17751.3 |
| Nitrate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 213000.000 | 233396.3 | 213000.000 | 100.00 | 213000.000 | 233396.3 |
| Chloride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1200.000 | 1314.9 | 1200.000 | 100.00 | 1200.000 | 1314.9 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | <500 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| TOC | 1.336 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrite | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 19100.000 | 20929.0 | 19100.000 | 100.00 | 19100.000 | 20929.0 |
| Sulfate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 18800.000 | 20600.2 | 18800.000 | 100.00 | 18800.000 | 20600.2 |
| Total | | 0.000 | | | | | 0.000 | | | | 496813.756 | | | |
| | | 0.00 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 99.96 | %total solids in fusion | 99.96 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Total Alpha | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | <0.05 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 178.000 | 195044.8 | | 100.00 | 178.000 | 195044.8 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | <1.26 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Co-60 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | <0.13 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Cs-137 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 13.900 | 15231.0 | | 100.00 | 13.900 | 15231.0 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** Field, J. G., R. D. Schreiber, B. C. Simpson. 1996. Tank Characterization Report for Single-shell Tank 241-BX-109, WHC-SD-WM-ER-572, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

NR - Not Reported
NA - No Analysis Performed

**BY-104 [TBP(f), EB]**

| | |
|---|---|
| Density (g/mL) | 1.60 |
| Volume (L) | 1536710 |
| Mass (kg) | 2458736 |
| Solids (ug/g) | 770000 |
| ~pH | NR |

| | | WATER | | | ACID | | | | FUSION | | | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | ug/g sludge (element) | kg/tank (element) |
| Aluminum | 1.889 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 47950.000 | 117896.4 | 90577.550 | 100.00 | 47950.000 | 117896.4 |
| Barium | 1.117 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 31.000 | 76.2 | 34.627 | 100.00 | 31.000 | 76.2 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 69.500 | 170.9 | 79.369 | 100.00 | 69.500 | 170.9 |
| Calcium | 1.399 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1112.500 | 2735.3 | 1556.388 | 100.00 | 1112.500 | 2735.3 |
| Chromium | 1.923 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5800.000 | 14260.7 | 11153.400 | 100.00 | 5800.000 | 14260.7 |
| Cobalt | 1.271 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 36.500 | 89.7 | 46.392 | 100.00 | 36.500 | 89.7 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 4790.000 | 11777.3 | 6619.780 | 100.00 | 4790.000 | 11777.3 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nickel | 1.272 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 920.000 | 2262.0 | 1170.240 | 100.00 | 920.000 | 2262.0 |
| Phosphate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 15735.000 | 38688.2 | 15735.000 | 100.00 | 15735.000 | 38688.2 |
| Potassium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2650.000 | 6515.7 | 2650.000 | 100.00 | 2650.000 | 6515.7 |
| Silicon | 2.139 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1494.500 | 3674.6 | 3196.736 | 100.00 | 1494.500 | 3674.6 |
| Silver | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 225000.000 | 553215.6 | 225000.000 | 100.00 | 225000.000 | 553215.6 |
| Strontium | 1.183 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1157.000 | 2844.8 | 1368.731 | 100.00 | 1157.000 | 2844.8 |
| Zinc | 1.245 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 250.000 | 614.7 | 311.250 | 100.00 | 250.000 | 614.7 |
| Zirconium | 1.351 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 53.000 | 130.3 | 71.603 | 100.00 | 53.000 | 130.3 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2682.500 | 0.0 | 3041.955 | 100.00 | 2682.500 | 6595.6 |
| Nitrate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 61775.000 | 151888.4 | 61775.000 | 100.00 | 61775.000 | 151888.4 |
| Chloride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1557.500 | 3829.5 | 1557.500 | 100.00 | 1557.500 | 3829.5 |
| Fluoride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 9417.500 | 23155.1 | 9417.500 | 100.00 | 9417.500 | 23155.1 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 191000.000 | 469618.6 | 191000.000 | 100.00 | 191000.000 | 469618.6 |
| TOC | 1.336 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 10050.000 | 24710.3 | 13426.800 | 100.00 | 10050.000 | 24710.3 |
| Nitrite | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 13800.000 | 33930.6 | 13800.000 | 100.00 | 13800.000 | 33930.6 |
| Sulfate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 35550.000 | 87408.1 | 35550.000 | 100.00 | 35550.000 | 87408.1 |
| Total | | 0.000 | | | | | 0.000 | | | | 689139.820 | | | |
| | | 0.00 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 89.50 | %total solids in fusion | 89.50 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Co-60 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Cs-137 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** CO3 added to ion balance; [CO3] consistent with measured BY-110 (noticeably high).
Characterization data (1992) obtained from TWINS Database (Historical).

NR - Not Reported
NA - No Analysis Performed

**BY-110 [TBP(f), EB]**

| | |
|---|---|
| Density (g/mL) | 1.50 |
| Volume (L) | 1506430 |
| Mass (kg) | 2259645 |
| Solids (ug/g) | 819000 |
| ~pH | |

| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | Average Segments ug/g sludge (element) | Average Segments kg/tank (element) | Average Segments ug/g sludge (oxide) | Average Segments % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 2.720 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 13200.000 | 29827.3 | 35904.000 | 100.00 | 13200.000 | 29827.3 |
| Barium | 1.117 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 58.800 | 132.9 | 65.680 | 100.00 | 58.800 | 132.9 |
| Bismuth | 1.115 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 931.000 | 2103.7 | 1038.065 | 100.00 | 931.000 | 2103.7 |
| Boron | 3.220 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 79.900 | 180.5 | 257.278 | 100.00 | 79.900 | 180.5 |
| Cadmium | 1.142 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 22.100 | 49.9 | 25.238 | 100.00 | 22.100 | 49.9 |
| Calcium | 1.399 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1110.000 | 2508.2 | 1552.890 | 100.00 | 1110.000 | 2508.2 |
| Chromium | 1.923 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2780.000 | 6281.8 | 5345.940 | 100.00 | 2780.000 | 6281.8 |
| Cobalt | 1.271 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 26.600 | 60.1 | 33.809 | 100.00 | 26.600 | 60.1 |
| Copper | 1.252 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 12.200 | 27.6 | 15.274 | 100.00 | 12.200 | 27.6 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 961.000 | 2171.5 | 1328.102 | 100.00 | 961.000 | 2171.5 |
| Lead | 1.077 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 962.000 | 2173.8 | 1036.074 | 100.00 | 962.000 | 2173.8 |
| Magnesium | 1.658 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 120.000 | 271.2 | 198.960 | 100.00 | 120.000 | 271.2 |
| Manganese | 1.582 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 48.800 | 110.3 | 77.202 | 100.00 | 48.800 | 110.3 |
| Nickel | 1.272 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 301.000 | 680.2 | 382.872 | 100.00 | 301.000 | 680.2 |
| Phosphate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 9840.000 | 22234.9 | 9840.000 | 100.00 | 9840.000 | 22234.9 |
| Potassium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1820.000 | 4112.6 | 1820.000 | 100.00 | 1820.000 | 4112.6 |
| Silicon | 2.139 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 685.000 | 1547.9 | 1465.215 | 100.00 | 685.000 | 1547.9 |
| Silver | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 14.400 | 32.5 | 14.400 | 100.00 | 14.400 | 32.5 |
| Sodium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 254000.000 | 573949.8 | 254000.000 | 100.00 | 254000.000 | 573949.8 |
| Strontium | 1.183 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 58.500 | 132.2 | 69.206 | 100.00 | 58.500 | 132.2 |
| Zinc | 1.245 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 39.900 | 90.2 | 49.676 | 100.00 | 39.900 | 90.2 |
| Zirconium | 1.351 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 15.800 | 35.7 | 21.346 | 100.00 | 15.800 | 35.7 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 4140.000 | 0.0 | 4694.760 | 100.00 | 4140.000 | 9354.9 |
| Nitrate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 216000.000 | 488083.3 | 216000.000 | 100.00 | 216000.000 | 488083.3 |
| Chloride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1640.000 | 3705.8 | 1640.000 | 100.00 | 1640.000 | 3705.8 |
| Fluoride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 6450.000 | 14574.7 | 6450.000 | 100.00 | 6450.000 | 14574.7 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 191000.000 | 431592.2 | 191000.000 | 100.00 | 191000.000 | 431592.2 |
| Oxalate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 18200.000 | 41125.5 | 18200.000 | 100.00 | 18200.000 | 41125.5 |
| Nitrite | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 22500.000 | 50842.0 | 22500.000 | 100.00 | 22500.000 | 50842.0 |
| Sulfate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 23200.000 | 52423.8 | 23200.000 | 100.00 | 23200.000 | 52423.8 |
| Total | | 0.000 | | | | | 0.000 | | | | 798225.985 | | | |
| | | 0.00 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 97.46 | %total solids in fusion | 97.46 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.071 | 159.5 | | 100.00 | 0.071 | 159.5 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 21.000 | 47452.5 | | 100.00 | 21.000 | 47452.5 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.409 | 924.2 | | 100.00 | 0.409 | 924.2 |
| Co-60 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.019 | 43.6 | | 100.00 | 0.019 | 43.6 |
| Cs-137 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 57.900 | 130833.4 | | 100.00 | 57.900 | 130833.4 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** Characterization data obtained from TWINS Database.
Noticeably large concentration of CO3 ([TIC] * 5); consistent with ion balance.

NR - Not Reported
NA - No Analysis Performed

**C-107 (BiPO4 1C, CW)**

| | |
|---|---|
| Density (g/mL) | 1.50 |
| Volume (L) | 897045 |
| Mass (kg) | 1345568 |
| Solids (ug/g) | 1000000 |
| ~pH | |

dried sample (% H2O ~54%)

| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | LANL Direct Analyses ug/g sludge (element) | LANL Direct Analyses kg/tank (element) | LANL Direct Analyses ug/g sludge (oxide) | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 2.720 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 105000.000 | 141284.6 | 285600.000 | 105000.000 | 141284.6 |
| Barium | 1.117 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 835.000 | 1123.5 | 932.695 | 835.000 | 1123.5 |
| Bismuth | 1.115 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 24900.000 | 33504.6 | 27763.500 | 24900.000 | 33504.6 |
| Boron | 3.220 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5.850 | 7.9 | 18.837 | 5.850 | 7.9 |
| Cadmium | 1.142 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 101.000 | 135.9 | 115.342 | 101.000 | 135.9 |
| Calcium | 1.399 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 973.000 | 1309.2 | 1361.227 | 973.000 | 1309.2 |
| Chromium | 1.923 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 706.000 | 950.0 | 1357.638 | 706.000 | 950.0 |
| Cobalt | 1.271 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 21.500 | 28.9 | 27.327 | 21.500 | 28.9 |
| Copper | 1.252 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 222.000 | 298.7 | 277.944 | 222.000 | 298.7 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 92400.000 | 124330.4 | 127696.800 | 92400.000 | 124330.4 |
| Lead | 1.077 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5040.000 | 6781.7 | 5428.080 | 5040.000 | 6781.7 |
| Magnesium | 1.658 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 486.000 | 653.9 | 805.788 | 486.000 | 653.9 |
| Manganese | 1.582 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2900.000 | 3902.1 | 4587.800 | 2900.000 | 3902.1 |
| Nickel | 1.272 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5200.000 | 6997.0 | 6614.400 | 5200.000 | 6997.0 |
| Phosphate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 109500.000 | 147339.6 | 109500.000 | 109500.000 | 147339.6 |
| Potassium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 730.000 | 982.3 | 730.000 | 730.000 | 982.3 |
| Silicon | 2.139 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 18100.000 | 24354.8 | 38715.900 | 18100.000 | 24354.8 |
| Silver | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 581.000 | 781.8 | 581.000 | 581.000 | 781.8 |
| Sodium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 141000.000 | 189725.0 | 141000.000 | 141000.000 | 189725.0 |
| Strontium | 1.183 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 232.000 | 312.2 | 274.456 | 232.000 | 312.2 |
| Zinc | 1.245 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 375.000 | 504.6 | 466.875 | 375.000 | 504.6 |
| Zirconium | 1.351 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2600.000 | 3498.5 | 3512.600 | 2600.000 | 3498.5 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 23500.000 | 0.0 | 26649.000 | 23500.000 | 31620.8 |
| Nitrate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 116870.000 | 157256.5 | 116870.000 | 116870.000 | 157256.5 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 9800.000 | 13186.6 | 9800.000 | 9800.000 | 13186.6 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | 0.000 | 0.0 |
| Carbonate | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | 0.000 | 0.0 |
| TOC | 1.336 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | 0.000 | 0.0 |
| Nitrite | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | 0.000 | 0.0 |
| Sulfate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 13000.000 | 17492.4 | 13000.000 | 13000.000 | 17492.4 |
| Total | | 0.000 | | | | | 0.000 | | | | 923687.209 | | |
| | | 0.00 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 92.37 %total solids in fusion | 92.37 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 2.900 | 3902.1 | | 2.900 | 3902.1 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | 0.000 | 0.0 |
| Sr-90 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 5500.000 | 7400621.3 | | 5500.000 | 7400621.3 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | <0.54 | 0.0 | | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 1.140 | 1533.9 | | 1.140 | 1533.9 |
| Co-60 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | 0.000 | 0.0 |
| Cs-137 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 75.400 | 101455.8 | | 75.400 | 101455.8 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | 0.000 | 0.0 |

***NOTES:*** No analyses performed for NO3, CO3, NO2; NO3 concentration added to ion balance.
Al oxide factor based on assuming 75% gibbsite [Al(OH)3], 25% boehmite (AlOOH).

NR - Not Reported
NA - No Analysis Performed

**C-108 [TBP(f), 1C]**

| | |
|---|---|
| Density (g/mL) | 1.30 |
| Volume (L) | 249810 |
| Mass (kg) | 324753 |
| Solids (ug/g) | 430000 |
| ~pH | 12.0 |

| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | Average Samples ug/g sludge (element) | Average Samples kg/tank (element) | Average Samples ug/g sludge (oxide) | Average Samples % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 2.720 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 52072.000 | 16910.5 | 141635.840 | 100.00 | 52072.000 | 16910.5 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 12669.250 | 4114.4 | 17724.281 | 100.00 | 12669.250 | 4114.4 |
| Chromium | 1.923 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7162.000 | 2325.9 | 9897.884 | 100.00 | 7162.000 | 2325.9 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nickel | 1.272 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Phosphate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 77706.000 | 25235.3 | 77706.000 | 100.00 | 77706.000 | 25235.3 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silver | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 94080.250 | 30552.8 | 94080.250 | 100.00 | 94080.250 | 30552.8 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 421.000 | 0.0 | 477.414 | 100.00 | 421.000 | 136.7 |
| Nitrate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 43400.000 | 14094.3 | 43400.000 | 100.00 | 43400.000 | 14094.3 |
| Chloride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 729.333 | 236.9 | 729.333 | 100.00 | 729.333 | 236.9 |
| Fluoride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 3745.000 | 1216.2 | 3745.000 | 100.00 | 3745.000 | 1216.2 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 11900.000 | 3864.6 | 11900.000 | 100.00 | 11900.000 | 3864.6 |
| TOC | 1.336 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1248.250 | 405.4 | 1667.662 | 100.00 | 1248.250 | 405.4 |
| Nitrite | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 24100.000 | 7826.5 | 24100.000 | 100.00 | 24100.000 | 7826.5 |
| Sulfate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 6690.000 | 2172.6 | 6690.000 | 100.00 | 6690.000 | 2172.6 |
| Total | | 0.000 | | | | | 0.000 | | | | 433753.664 | | | |
| | | 0.00 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 100.87 | %total solids in fusion | 100.87 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **% dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.006 | 2.0 | | 100.00 | 0.006 | 2.0 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.029 | 9.6 | | 100.00 | 0.029 | 9.6 |
| Co-60 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.005 | 1.6 | | 100.00 | 0.005 | 1.6 |
| Cs-137 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 117.600 | 38191.0 | | 100.00 | 117.600 | 38191.0 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** Data obtained from TWINS Database.
Aluminum oxide factor based on 75% gibbsite [Al(OH)3] and 25% boehmite (AlOOH).
Density estimated: Average of C-109, C-110, and C-112.

NR - Not Reported
NA - No Analysis Performed
<DL - Less than Detection Limit

**S-105 (REDOX, EB)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 1718390 |
| Mass (kg) | 2921263 |
| Solids (ug/g) | 966000 |
| ~pH | 13.0 |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | RESIDUAL SOLIDS ug/g sludge (element) | RESIDUAL SOLIDS kg/tank (element) | RESIDUAL SOLIDS ug/g sludge (oxide) | RESIDUAL SOLIDS % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 6694.380 | 19556.0 | 97.71 | 156.650 | 457.6 | 295.912 | 2.29 | 0.000 | 0.0 | 0.000 | 0.00 | 6851.030 | 20013.7 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Chromium | 1.923 | 1841.840 | 5380.5 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1841.840 | 5380.5 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 8.753 | 25.6 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 8.753 | 25.6 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 5.222 | 15.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5.222 | 15.3 |
| Manganese | 1.582 | 0.000 | 0.0 | 0.00 | 128.380 | 375.0 | 203.097 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 128.380 | 375.0 |
| Nickel | 1.272 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Phosphate | 1.000 | 6489.450 | 18957.4 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 6489.450 | 18957.4 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 64.464 | 188.3 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 64.464 | 188.3 |
| *Unaccounted* | 1.000 | | 0.0 | 0.00 | 7000.000 | 20448.8 | 7000.000 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7000.000 | 20448.8 |
| Sodium | 1.000 | 284549.100 | 831242.8 | 99.61 | 1113.500 | 3252.8 | 1113.500 | 0.39 | 0.000 | 0.0 | 0.000 | 0.00 | 285662.600 | 834495.6 |
| Strontium | 1.183 | 13.298 | 38.8 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 13.298 | 38.8 |
| Zinc | 1.245 | 61.221 | 178.8 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 61.221 | 178.8 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrate | 1.000 | 552891.200 | 1615140.6 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 552891.200 | 1615140.6 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 8602.000 | 25128.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 8602.000 | 25128.7 |
| Carbonate | 1.000 | 57684.000 | 168510.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 57684.000 | 168510.1 |
| TOC | 1.336 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrite | 1.000 | 23276.000 | 67995.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 23276.000 | 67995.3 |
| Sulfate | 1.000 | NR | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Total | | 942180.928 | | | | | 8612.509 | | | | 0.000 | | | |
| | | 97.53 | % total solids in wash | | | | 0.89 | % residual solids | | | 0.00 | | 98.43 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.058 | 169.2 | 0.06 | 97.000 | 283362.5 | | 99.94 | 0.000 | 0.0 | | 0.00 | 97.058 | 283531.8 |
| Tc-99 | | 0.024 | 68.7 | 73.23 | 0.009 | 25.1 | | 26.77 | 0.000 | 0.0 | | 0.00 | 0.032 | 93.9 |
| Am-241 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Co-60 | | 0.000 | 0.0 | 0.00 | 9.000 | 26291.4 | | 100.00 | 0.000 | 0.0 | | 0.00 | 9.000 | 26291.4 |
| Cs-137 | | 38.203 | 111601.0 | 67.97 | 18.000 | 52582.7 | | 32.03 | 0.000 | 0.0 | | 0.00 | 56.203 | 164183.7 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** Percent water based on 1974 sample.
Nitrate adjusted from 615,000 ug/g to 553,000 ug/g (3.9M in solution to 3.5M in solution) to ion balance.
Unaccounted solids added to adjust residual solids to 0.86% (0.0057 ml sludge/g salt cake*estimated density of 1.5 g sludge/ml sludge).

NR - Not Reported
NA - No Analysis Performed
<DL - Less than Detection Limit

**S-107 (R-RCW/EB)**

| | |
|---|---|
| Density (g/mL) | 1.40 |
| Volume (L) | 1370170 |
| Mass (kg) | 1918238 |
| Solids (ug/g) | 440000 |
| ~pH | 13.3 |

| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | Core Composites ug/g sludge (element) | Core Composites kg/tank (element) | Core Composites ug/g sludge (oxide) | Core Composites % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 67100.000 | 128713.8 | 126751.900 | 100.00 | 67100.000 | 128713.8 |
| Barium | 1.117 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 22.650 | 43.4 | 25.300 | 100.00 | 22.650 | 43.4 |
| Bismuth | 1.115 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 45.250 | 86.8 | 50.454 | 100.00 | 45.250 | 86.8 |
| Boron | 3.220 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 152.000 | 291.6 | 489.440 | 100.00 | 152.000 | 291.6 |
| Cadmium | 1.142 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 4.790 | 9.2 | 5.470 | 100.00 | 4.790 | 9.2 |
| Calcium | 1.399 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 517.500 | 992.7 | 723.983 | 100.00 | 517.500 | 992.7 |
| Chromium | 1.923 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 3030.000 | 5812.3 | 5826.690 | 100.00 | 3030.000 | 5812.3 |
| Cobalt | 1.271 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 9.060 | 17.4 | 11.515 | 100.00 | 9.060 | 17.4 |
| Copper | 1.252 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 26.250 | 50.4 | 32.865 | 100.00 | 26.250 | 50.4 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2280.000 | 4373.6 | 3150.960 | 100.00 | 2280.000 | 4373.6 |
| Lead | 1.077 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 150.000 | 287.7 | 161.550 | 100.00 | 150.000 | 287.7 |
| Magnesium | 1.658 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 131.500 | 252.2 | 218.027 | 100.00 | 131.500 | 252.2 |
| Manganese | 1.582 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 705.500 | 1353.3 | 1116.101 | 100.00 | 705.500 | 1353.3 |
| Nickel | 1.272 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 796.500 | 1527.9 | 1013.148 | 100.00 | 796.500 | 1527.9 |
| Phosphate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 17025.000 | 32658.0 | 17025.000 | 100.00 | 17025.000 | 32658.0 |
| Potassium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 586.500 | 1125.0 | 586.500 | 100.00 | 586.500 | 1125.0 |
| Silicon | 2.139 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1018.000 | 1952.8 | 2177.502 | 100.00 | 1018.000 | 1952.8 |
| Silver | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 16.350 | 31.4 | 16.350 | 100.00 | 16.350 | 31.4 |
| Sodium | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 99350.000 | 190576.9 | 99350.000 | 100.00 | 99350.000 | 190576.9 |
| Strontium | 1.183 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 276.500 | 530.4 | 327.100 | 100.00 | 276.500 | 530.4 |
| Zinc | 1.245 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 181.500 | 348.2 | 225.968 | 100.00 | 181.500 | 348.2 |
| Zirconium | 1.351 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 3920.000 | 7519.5 | 5295.920 | 100.00 | 3920.000 | 7519.5 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7785.000 | 0.0 | 8828.190 | 100.00 | 7785.000 | 14933.5 |
| Nitrate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 59300.000 | 113751.5 | 59300.000 | 100.00 | 59300.000 | 113751.5 |
| Chloride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2075.000 | 3980.3 | 2075.000 | 100.00 | 2075.000 | 3980.3 |
| Fluoride | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 16265.000 | 31200.1 | 16265.000 | 100.00 | 16265.000 | 31200.1 |
| Free OH | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Oxalate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 3042.000 | 5835.3 | 3042.000 | 100.00 | 3042.000 | 5835.3 |
| Nitrite | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 31255.000 | 59954.5 | 31255.000 | 100.00 | 31255.000 | 59954.5 |
| Sulfate | 1.000 | 0.000 | 0.0 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1797.000 | 3447.1 | 1797.000 | 100.00 | 1797.000 | 3447.1 |
| Total | | 0.000 | | | | | 0.000 | | | | 387143.932 | | | |
| | | 0.00 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 87.99 | %total solids in fusion | 87.99 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Gross Alpha | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 1.130 | 2167.6 | | 100.00 | 1.130 | 2167.6 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 122.000 | 234025.0 | | 100.00 | 122.000 | 234025.0 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.701 | 1345.4 | | 100.00 | 0.701 | 1345.4 |
| Co-60 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.088 | 168.4 | | 100.00 | 0.088 | 168.4 |
| Cs-137 | | 0.000 | 0.0 | 0.00 | | 0.0 | | 0.00 | 87.250 | 167366.3 | | 100.00 | 87.250 | 167366.3 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:***

Analyses obtained from TWINS Database. Percent water obtained from historical samples (1980).

NR - Not Reported

NA - No Analysis Performed

**S-109 (REDOX, EB)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 2149880 |
| Mass (kg) | 3654796 |
| Solids (ug/g) | 989400 |
| ~pH | 13.0 |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | RESIDUAL SOLIDS ug/g sludge (element) | RESIDUAL SOLIDS kg/tank (element) | RESIDUAL SOLIDS ug/g sludge (oxide) | RESIDUAL SOLIDS % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 8316.000 | 30393.3 | 89.47 | 978.900 | 3577.7 | 1849.142 | 10.53 | 0.000 | 0.0 | 0.000 | 0.00 | 9294.900 | 33971.0 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Chromium | 1.923 | 2288.000 | 8362.2 | 78.68 | 620.100 | 2266.3 | 1192.452 | 21.32 | 0.000 | 0.0 | 0.000 | 0.00 | 2908.100 | 10628.5 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 2928.900 | 10704.5 | 4047.740 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2928.900 | 10704.5 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | 0.00 | 210.600 | 769.7 | 333.169 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 210.600 | 769.7 |
| Nickel | 1.272 | 7.748 | 28.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7.748 | 28.3 |
| Phosphate | 1.000 | LT | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 55.440 | 202.6 | 9.16 | 549.900 | 2009.8 | 1176.236 | 90.84 | 0.000 | 0.0 | 0.000 | 0.00 | 605.340 | 2212.4 |
| *Unaccounted* | 1.000 | 0.000 | 0.0 | 0.00 | 25000.000 | 91369.9 | 25000.000 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 25000.000 | 91369.9 |
| Sodium | 1.000 | 265650.000 | 970896.6 | 98.10 | 5148.000 | 18814.9 | 5148.000 | 1.90 | 0.000 | 0.0 | 0.000 | 0.00 | 270798.000 | 989711.4 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 3.237 | 11.8 | 3.671 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 3.237 | 11.8 |
| Nitrate | 1.000 | 549692.000 | 2009012.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 549692.000 | 2009012.1 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 13464.000 | 49208.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 13464.000 | 49208.2 |
| Carbonate | 1.000 | 36960.000 | 135081.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 36960.000 | 135081.3 |
| TOC | 1.336 | 1399.200 | 3827.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1047.305 | 3827.7 |
| Nitrite | 1.000 | LT | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sulfate | 1.000 | 10137.600 | 37050.9 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 10137.600 | 37050.9 |
| Total | | 887969.988 | | | | | 38750.410 | | | | 0.000 | | | |
| | | 89.75 | %total solids in wash | | | | 3.92 | %total solids in acid | | | 0.00 | %total solids in fusion | 93.66 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | NR | 0.0 | 0.00 | 0.039 | 142.5 | | 100.00 | 0.000 | 0.0 | | 0.00 | 0.039 | 142.5 |
| C-14 | | NR | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.748 | 2733.8 | 0.54 | 137.280 | 501730.4 | | 99.46 | 0.000 | 0.0 | | 0.00 | 138.028 | 504464.2 |
| Tc-99 | | 0.007 | 24.1 | 5.28 | 0.118 | 432.7 | | 94.72 | 0.000 | 0.0 | | 0.00 | 0.125 | 456.9 |
| Am-241 | | NR | 0.0 | 0.00 | 0.308 | 1126.0 | | 100.00 | 0.000 | 0.0 | | 0.00 | 0.308 | 1126.0 |
| Co-60 | | 0.002 | 6.2 | 0.49 | 0.343 | 1254.3 | | 99.51 | 0.000 | 0.0 | | 0.00 | 0.345 | 1260.5 |
| Cs-137 | | 83.380 | 304736.9 | 99.95 | 0.043 | 156.8 | | 0.05 | 0.000 | 0.0 | | 0.00 | 83.423 | 304893.7 |
| I-129 | | NR | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** Percent water from analysis of sample in 1976.

Unaccounted solids added to adjust residual solids to 3.9% (0.026 ml sludge/g salt cake*estimated density of sludge, 1.5).

NR - Not Reported

NA - No Analysis Performed

**S-110 (REDOX, EB)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 980315 |
| Mass (kg) | 1666536 |
| Solids (ug/g) | 807000 |
| ~pH | 13.0 |

| | | WATER | | | RESIDUAL SOLIDS | | | | | | | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Oxide Factor | ug/g sludge (element) | kg/tank (element) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | ug/g sludge (element) | kg/tank (element) |
| Aluminum | 1.889 | 7322.400 | 12203.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7322.400 | 12203.0 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Chromium | 1.923 | 1527.760 | 2546.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1527.760 | 2546.1 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nickel | 1.272 | 9.045 | 15.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 9.045 | 15.1 |
| Phosphate | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 69.608 | 116.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 69.608 | 116.0 |
| Silver | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 251068.400 | 418414.4 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 251068.400 | 418414.4 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 24.973 | 41.6 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 24.973 | 41.6 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrate | 1.000 | 561881.200 | 936395.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 561881.200 | 936395.0 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 9605.000 | 16007.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 9605.000 | 16007.1 |
| Carbonate | 1.000 | 7458.000 | 12429.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7458.000 | 12429.0 |
| TOC | 1.336 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrite | 1.000 | 31188.000 | 51975.9 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 31188.000 | 51975.9 |
| Sulfate | 1.000 | 2625.216 | 4375.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2625.216 | 4375.0 |
| Total | | 872779.602 | | | | | 0.000 | | | | 0.000 | | | |
| | | 108.15 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 0.00 | %total solids in fusion | 108.15 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.000 | 0.8 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.000 | 0.8 |
| C-14 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 1.451 | 2418.0 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 1.451 | 2418.0 |
| Tc-99 | | 0.030 | 49.3 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.030 | 49.3 |
| Am-241 | | 0.00002 | 0.0 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.000 | 0.0 |
| Co-60 | | LT | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Cs-137 | | 30.736 | 51222.6 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 30.736 | 51222.6 |
| I-129 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** Density assumed.
No residual solids reported.

NR - Not Reported
NA - No Analysis Performed

**SX-102 (REDOX, EB)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 2028760 |
| Mass (kg) | 3448892 |
| Solids (ug/g) | 980000 |
| ~pH | 13.0 |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | RESIDUAL SOLIDS ug/g sludge (element) | RESIDUAL SOLIDS kg/tank (element) | RESIDUAL SOLIDS ug/g sludge (oxide) | RESIDUAL SOLIDS % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 6007.500 | 20719.2 | 88.62 | 771.200 | 2659.8 | 1456.797 | 11.38 | 0.000 | 0.0 | 0.000 | 0.00 | 6778.700 | 23379.0 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 15.000 | 51.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 15.000 | 51.7 |
| Chromium | 1.923 | 1820.000 | 6277.0 | 59.20 | 1254.400 | 4326.3 | 2412.211 | 40.80 | 0.000 | 0.0 | 0.000 | 0.00 | 3074.400 | 10603.3 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 1792.000 | 6180.4 | 2476.544 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1792.000 | 6180.4 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | 0.00 | 1654.000 | 5704.5 | 2616.628 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1654.000 | 5704.5 |
| Nickel | 1.272 | 15.950 | 55.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 15.950 | 55.0 |
| Phosphate | 1.000 | 1805.000 | 6225.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1805.000 | 6225.3 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 430.500 | 1484.7 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 430.500 | 1484.7 |
| *Unaccounted* | 1.000 | 0.000 | 0.0 | 0.00 | 21500.000 | 74151.2 | 21500.000 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 21500.000 | 74151.2 |
| Sodium | 1.000 | 265175.000 | 914559.9 | 99.49 | 1353.600 | 4668.4 | 1353.600 | 0.51 | 0.000 | 0.0 | 0.000 | 0.00 | 266528.600 | 919228.4 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 25.600 | 88.3 | 29.030 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 25.600 | 88.3 |
| Nitrate | 1.000 | 596750.000 | 2058126.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 596750.000 | 2058126.3 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 7225.000 | 24918.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 7225.000 | 24918.2 |
| Carbonate | 1.000 | 21000.000 | 72426.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 21000.000 | 72426.7 |
| TOC | 1.336 | 6300.000 | 16263.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 4715.569 | 16263.5 |
| Nitrite | 1.000 | 17250.000 | 59493.4 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 17250.000 | 59493.4 |
| Sulfate | 1.000 | 4800.000 | 16554.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 4800.000 | 16554.7 |
| Total | | 928593.950 | | | | | 31844.810 | | | | 0.000 | | | |
| | | 94.75 | %total solids in wash | | | | 3.25 | %total solids in acid | | | 0.00 | %total solids in fusion | 98.00 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.001 | 3.5 | 0.86 | 0.118 | 408.3 | | 99.14 | 0.000 | 0.0 | | 0.00 | 0.119 | 411.9 |
| C-14 | | NR | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 4.550 | 15692.5 | 3.74 | 117.120 | 403934.2 | | 96.26 | 0.000 | 0.0 | | 0.00 | 121.670 | 419626.7 |
| Tc-99 | | 0.033 | 114.7 | 92.60 | 0.003 | 9.2 | | 7.40 | 0.000 | 0.0 | | 0.00 | 0.036 | 123.8 |
| Am-241 | | 0.001 | 3.5 | 0.01 | 8.640 | 29798.4 | | 99.99 | 0.000 | 0.0 | | 0.00 | 8.641 | 29802.0 |
| Co-60 | | 0.012 | 41.8 | 100.00 | NA | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.012 | 41.8 |
| Cs-137 | | 88.500 | 305226.9 | 100.00 | NA | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 88.500 | 305226.9 |
| I-129 | | 0.00001 | 0.0 | 100.00 | NA | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.000 | 0.0 |

***NOTES:*** Unaccounted solids added to adjust residual solids to 3.2% (0.021 ml sludge/g salt cake *estimated density of sludge, 1.5).
Sodium adjusted by 7000 ug/g for ion balance.

NR - Not Reported
NA - No Analysis Performed

**SX-103 (REDOX, EB)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 1612410 |
| Mass (kg) | 2741097 |
| Solids (ug/g) | 890000 |
| ~pH | 13.0 |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | RESIDUAL SOLIDS ug/g sludge (element) | RESIDUAL SOLIDS kg/tank (element) | RESIDUAL SOLIDS ug/g sludge (oxide) | RESIDUAL SOLIDS % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 3593.700 | 9850.7 | 99.74 | 9.200 | 25.2 | 17.379 | 0.26 | 0.000 | 0.0 | 0.000 | 0.00 | 3602.900 | 9875.9 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Chromium | 1.923 | 843.128 | 2311.1 | 39.71 | 1280.000 | 3508.6 | 2461.440 | 60.29 | 0.000 | 0.0 | 0.000 | 0.00 | 2123.128 | 5819.7 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 620.000 | 1699.5 | 856.840 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 620.000 | 1699.5 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | 0.00 | 346.000 | 948.4 | 547.372 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 346.000 | 948.4 |
| Nickel | 1.272 | 13.755 | 37.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 13.755 | 37.7 |
| Phosphate | 1.000 | 1494.350 | 4096.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1494.350 | 4096.2 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| *Unaccounted* | 1.000 | 0.000 | 0.0 | 0.00 | 5000.000 | 13705.5 | 4000.000 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5000.000 | 13705.5 |
| Sodium | 1.000 | 246885.200 | 676736.3 | 99.62 | 945.000 | 2590.3 | 945.000 | 0.38 | 0.000 | 0.0 | 0.000 | 0.00 | 247830.200 | 679326.6 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | 0.00 | 39.000 | 106.9 | 44.226 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 39.000 | 106.9 |
| Nitrate | 1.000 | 598659.600 | 1640984.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 598659.600 | 1640984.0 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 1604.460 | 4398.0 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1604.460 | 4398.0 |
| Carbonate | 1.000 | 15972.000 | 43780.8 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 15972.000 | 43780.8 |
| TOC | 1.336 | 6098.400 | 12512.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 4564.671 | 12512.2 |
| Nitrite | 1.000 | 10018.800 | 27462.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 10018.800 | 27462.5 |
| Sulfate | 1.000 | 2021.184 | 5540.3 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2021.184 | 5540.3 |
| Total | | 887204.577 | | | | | 8872.257 | | | | 0.000 | | | |
| | | 99.69 | %total solids in wash | | | | 1.00 | %total solids in acid | | | 0.00 | %total solids in fusion | 100.68 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.0004 | 1.2 | 1.53 | 0.028 | 76.8 | | 98.47 | 0.000 | 0.0 | | 0.00 | 0.028 | 77.9 |
| C-14 | | NR | 0.0 | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 4.308 | 11807.5 | 13.94 | 26.600 | 72913.2 | | 86.06 | 0.000 | 0.0 | | 0.00 | 30.908 | 84720.7 |
| Tc-99 | | 0.023 | 61.7 | 99.62 | 0.000 | 0.2 | | 0.38 | 0.000 | 0.0 | | 0.00 | 0.023 | 61.9 |
| Am-241 | | 0.002 | 5.6 | 0.05 | 4.100 | 11238.5 | | 99.95 | 0.000 | 0.0 | | 0.00 | 4.102 | 11244.1 |
| Co-60 | | 0.008 | 21.0 | 100.00 | NA | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.008 | 21.0 |
| Cs-137 | | 50.820 | 139302.5 | 100.00 | NA | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 50.820 | 139302.5 |
| I-129 | | 0.00001 | 0.0 | 100.00 | NA | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.000 | 0.0 |

***NOTES:*** Percent water based on average of values from 1976 sample analysis.
Unaccounted solids added to adjust residual solids to 1% (0.0067 ml sludge/g salt cake*estimated density of 1.5 g sludge/ml sludge).
Sodium adjusted by 12,000 ug/g to ion balance.

NR - Not Reported
NA - No Analysis Performed
<DL - Less than Detection Limit

**T-105 (BiPO4 1C, CW)**

| | |
|---|---|
| Density (g/mL) | 1.30 |
| Volume (L) | 370930 |
| Mass (kg) | 482209 |
| Solids (ug/g) | 380000 |
| ~pH | NR |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | ACID ug/g sludge (element) | ACID kg/tank (element) | ACID ug/g sludge (oxide) | ACID % element dissolved | FUSION ug/g sludge (element) | FUSION kg/tank (element) | FUSION ug/g sludge (oxide) | FUSION % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 153.000 | 73.8 | 0.39 | 0.000 | 0.0 | 0.000 | 0.00 | 39097.000 | 18852.9 | 73854.233 | 99.61 | 39250.000 | 18926.7 |
| Barium | 1.117 | NR | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 6.460 | 3.1 | 0.62 | 0.000 | 0.0 | 0.000 | 0.00 | 1043.540 | 503.2 | 1163.547 | 99.38 | 1050.000 | 506.3 |
| Boron | 3.220 | 303.000 | 146.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 303.000 | 146.1 |
| Cadmium | 1.142 | 2.810 | 1.4 | 14.64 | 0.000 | 0.0 | 0.000 | 0.00 | 16.390 | 7.9 | 18.717 | 85.36 | 19.200 | 9.3 |
| Calcium | 1.399 | 117.000 | 56.4 | 2.32 | 0.000 | 0.0 | 0.000 | 0.00 | 4933.000 | 2378.7 | 6901.267 | 97.68 | 5050.000 | 2435.2 |
| Chromium | 1.923 | 200.000 | 96.4 | 32.68 | 0.000 | 0.0 | 0.000 | 0.00 | 412.000 | 198.7 | 792.276 | 67.32 | 612.000 | 295.1 |
| Cobalt | 1.271 | NR | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | NR | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 2.650 | 1.3 | 0.01 | 0.000 | 0.0 | 0.000 | 0.00 | 40597.350 | 19576.4 | 56105.538 | 99.99 | 40600.000 | 19577.7 |
| Lead | 1.077 | 8.180 | 3.9 | 1.35 | 0.000 | 0.0 | 0.000 | 0.00 | 595.820 | 287.3 | 641.698 | 98.65 | 604.000 | 291.3 |
| Magnesium | 1.658 | 6.390 | 3.1 | 0.51 | 0.000 | 0.0 | 0.000 | 0.00 | 1243.610 | 599.7 | 2061.905 | 99.49 | 1250.000 | 602.8 |
| Manganese | 1.582 | 0.859 | 0.4 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 17899.141 | 8631.1 | 28316.441 | 100.00 | 17900.000 | 8631.5 |
| Nickel | 1.272 | 13.900 | 6.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NR | 0.0 | 0.000 | 0.00 | 13.900 | 6.7 |
| Phosphate | 1.000 | 3393.000 | 1636.1 | 57.85 | 0.000 | 0.0 | 0.000 | 0.00 | 2472.000 | 1192.0 | 2472.000 | 42.15 | 5865.000 | 2828.2 |
| Potassium | 1.000 | 373.000 | 179.9 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NR | 0.0 | 0.000 | 0.00 | 373.000 | 179.9 |
| Silicon | 2.139 | 490.000 | 236.3 | 6.31 | 0.000 | 0.0 | 0.000 | 0.00 | 7275.000 | 3508.1 | 15561.225 | 93.69 | 7765.000 | 3744.4 |
| Silver | 1.000 | 5.160 | 2.5 | 7.45 | 0.000 | 0.0 | 0.000 | 0.00 | 64.140 | 30.9 | 64.140 | 92.55 | 69.300 | 33.4 |
| Sodium | 1.000 | 60550.000 | 29197.8 | 97.50 | 0.000 | 0.0 | 0.000 | 0.00 | 1550.000 | 747.4 | 1550.000 | 2.50 | 62100.000 | 29945.2 |
| Strontium | 1.183 | 0.978 | 0.5 | 0.76 | 0.000 | 0.0 | 0.000 | 0.00 | 128.022 | 61.7 | 151.450 | 99.24 | 129.000 | 62.2 |
| Zinc | 1.245 | NR | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 0.719 | 0.3 | 0.49 | 0.000 | 0.0 | 0.000 | 0.00 | 145.281 | 70.1 | 196.275 | 99.51 | 146.000 | 70.4 |
| Uranium | 1.134 | NR | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrate | 1.000 | 26900.000 | 12971.4 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NA | 0.0 | 0.000 | 0.00 | 26900.000 | 12971.4 |
| Chloride | 1.000 | 510.000 | 245.9 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NA | 0.0 | 0.000 | 0.00 | 510.000 | 245.9 |
| Fluoride | 1.000 | NR | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | NR | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free Hydroxide | 1.000 | 1250.000 | 602.8 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NR | 0.0 | 0.000 | 0.00 | 1250.000 | 602.8 |
| Carbonate | 1.000 | 19800.000 | 9547.7 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NA | 0.0 | 0.000 | 0.00 | 19800.000 | 9547.7 |
| TOC | 1.336 | 3170.000 | 1144.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NA | 0.0 | 0.000 | 0.00 | 2372.754 | 1144.2 |
| Nitrite | 1.000 | 37846.154 | 18249.8 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | NA | 0.0 | 0.000 | 0.00 | 37846.154 | 18249.8 |
| Sulfate | 1.000 | 10900.000 | 5256.1 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 10900.000 | 5256.1 |
| Total | | 166003.260 | | | | | 0.000 | | | | 189850.712 | | | |
| | | 43.69 | %total solids in wash | | | | 0.00 | %total solids in acid | | | 49.96 | %total solids in fusion | 93.65 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **% dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| C-14 | | 0.001 | 0.6 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.001 | 0.6 |
| Sr-90 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Tc-99 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.164 | 79.1 | 10.16 | | 0.0 | | 0.00 | 1.450 | 699.2 | | 89.84 | 1.614 | 778.3 |
| Co-60 | | 0.013 | 6.5 | 20.12 | | 0.0 | | 0.00 | 0.053 | 25.7 | | 79.88 | 0.067 | 32.1 |
| Cs-137 | | 40.700 | 19625.9 | 38.32 | | 0.0 | | 0.00 | 65.500 | 31584.7 | | 61.68 | 106.200 | 51210.6 |
| I-129 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** No Sr-90 or Pu-239,240 reported; only gross alpha and gross beta.
Ions in TWINS database reported as ug/mL; assumed ug/g because analysis was performed on a solid.

NR - Not Reported
NA - No Analysis Performed

**T-108 (BiPO4 1C/TBP)**

| | |
|---|---|
| Density (g/mL) | 1.50 |
| Volume (L) | 166540 |
| Mass (kg) | 249810 |
| Solids (ug/g) | 805000 |
| ~pH | NR |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | ACID ug/g sludge (element) | ACID kg/tank (element) | ACID ug/g sludge (oxide) | ACID % element dissolved | FUSION ug/g sludge (element) | FUSION kg/tank (element) | FUSION ug/g sludge (oxide) | FUSION % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 507.000 | 126.7 | 22.14 | 1783.000 | 445.4 | 3368.087 | 77.86 | 0.000 | 0.0 | 0.000 | 0.00 | 2290.000 | 572.1 |
| Barium | 1.117 | <49 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | <98 | 0.0 | 0.00 | 605.000 | 151.1 | 674.575 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 605.000 | 151.1 |
| Boron | 3.220 | <49 | 0.0 | 0.00 | 193.000 | 48.2 | 621.460 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 193.000 | 48.2 |
| Cadmium | 1.142 | <9.8 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | <98 | 0.0 | 0.00 | 177.000 | 44.2 | 247.623 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 177.000 | 44.2 |
| Chromium | 1.923 | <9.9 | 0.0 | 0.00 | 19.200 | 4.8 | 36.922 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 19.200 | 4.8 |
| Cobalt | 1.271 | <20 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | <9.8 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 71.500 | 17.9 | 1.17 | 6038.500 | 1508.5 | 8345.207 | 98.83 | 0.000 | 0.0 | 0.000 | 0.00 | 6110.000 | 1526.3 |
| Lead | 1.077 | <98 | 0.0 | 0.00 | 533.000 | 133.1 | 574.041 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 533.000 | 133.1 |
| Magnesium | 1.658 | <98 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | <9.8 | 0.0 | 0.00 | 182.000 | 45.5 | 287.924 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 182.000 | 45.5 |
| Nickel | 1.272 | <20 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Phosphate | 1.000 | 12500.000 | 3122.6 | 11.14 | 99700.000 | 24906.1 | 99700.000 | 88.86 | 0.000 | 0.0 | 0.000 | 0.00 | 112200.000 | 28028.7 |
| Potassium | 1.000 | <294 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 177.000 | 44.2 | 11.80 | 1323.000 | 330.5 | 2829.897 | 88.20 | 0.000 | 0.0 | 0.000 | 0.00 | 1500.000 | 374.7 |
| Silver | 1.000 | <9.8 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 111000.000 | 27728.9 | 49.78 | 112000.000 | 27978.7 | 112000.000 | 50.22 | 0.000 | 0.0 | 0.000 | 0.00 | 223000.000 | 55707.6 |
| Strontium | 1.183 | <9.8 | 0.0 | 0.00 | 21.600 | 5.4 | 25.553 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 21.600 | 5.4 |
| Zinc | 1.245 | 13.500 | 3.4 | 25.67 | 39.100 | 9.8 | 48.680 | 74.33 | 0.000 | 0.0 | 0.000 | 0.00 | 52.600 | 13.1 |
| Zirconium | 1.351 | <9.8 | 0.0 | 0.00 | 10.900 | 2.7 | 14.726 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 10.900 | 2.7 |
| Uranium | 1.134 | 633.000 | 158.1 | 56.02 | 497.000 | 124.2 | 563.598 | 43.98 | 0.000 | 0.0 | 0.000 | 0.00 | 1130.000 | 282.3 |
| Nitrate | 1.000 | 392000.000 | 97925.5 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 392000.000 | 97925.5 |
| Chloride | 1.000 | 905.000 | 226.1 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 905.000 | 226.1 |
| Fluoride | 1.000 | 10700.000 | 2673.0 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 10700.000 | 2673.0 |
| Free OH | 1.000 | NR | 0.0 | #DIV/0! | NA | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Carbonate | 1.000 | NR | 0.0 | #DIV/0! | NA | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| TOC | 1.336 | NR | 0.0 | #DIV/0! | NA | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrite | 1.000 | 6180.000 | 1543.8 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 6180.000 | 1543.8 |
| Sulfate | 1.000 | 435.000 | 108.7 | 39.08 | 678.000 | 169.4 | 678.000 | 60.92 | 0.000 | 0.0 | 0.000 | 0.00 | 1113.000 | 278.0 |
| Total | | 535122.000 | | | | | 230016.292 | | | | 0.000 | | | |
| | | 66.47 | %total solids in wash | | | | 28.57 | %total solids in acid | | | 0.00 | %total solids in fusion | 95.05 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| C-14 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Tc-99 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | NR | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.123 | 30.7 | | 100.00 | 0.123 | 30.7 |
| Co-60 | | NR | 0.0 | 0.00 | | 0.0 | | 0.00 | 0.013 | 3.3 | | 100.00 | 0.013 | 3.3 |
| Cs-137 | | NR | 0.0 | 0.00 | | 0.0 | | 0.00 | 2.000 | 499.6 | | 100.00 | 2.000 | 499.6 |
| I-129 | | NR | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | NR | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:***

Component concentrations differ by core (vertical inhomogeneity); concentrations reflect average of two cores.

NR - Not Reported

NA - No Analysis Performed

**TY-102 (EB, BiPO4 1C)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 242240 |
| Mass (kg) | 411808 |
| Solids (ug/g) | 710000 |
| ~pH | NR |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | RESIDUAL SOLIDS ug/g sludge (element) | RESIDUAL SOLIDS kg/tank (element) | RESIDUAL SOLIDS ug/g sludge (oxide) | RESIDUAL SOLIDS % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 3.010 | 1.2 | 0.39 | 775.000 | 319.2 | 1463.975 | 99.61 | 0.000 | 0.0 | 0.000 | 0.00 | 778.010 | 320.4 |
| Barium | 1.117 | 6.070 | 2.5 | 49.35 | 6.230 | 2.6 | 6.959 | 50.65 | 0.000 | 0.0 | 0.000 | 0.00 | 12.300 | 5.1 |
| Bismuth | 1.115 | 9.730 | 4.0 | 17.98 | 44.400 | 18.3 | 49.506 | 82.02 | 0.000 | 0.0 | 0.000 | 0.00 | 54.130 | 22.3 |
| Boron | 3.220 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 2.210 | 0.9 | 46.72 | 2.520 | 1.0 | 2.878 | 53.28 | 0.000 | 0.0 | 0.000 | 0.00 | 4.730 | 1.9 |
| Calcium | 1.399 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Chromium | 1.923 | 8.050 | 3.3 | 7.78 | 95.400 | 39.3 | 183.454 | 92.22 | 0.000 | 0.0 | 0.000 | 0.00 | 103.450 | 42.6 |
| Cobalt | 1.271 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 1.150 | 0.5 | 0.09 | 1210.000 | 498.3 | 1672.220 | 99.91 | 0.000 | 0.0 | 0.000 | 0.00 | 1211.150 | 498.8 |
| Lead | 1.077 | 7.170 | 3.0 | 10.52 | 61.000 | 25.1 | 65.697 | 89.48 | 0.000 | 0.0 | 0.000 | 0.00 | 68.170 | 28.1 |
| Magnesium | 1.658 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 1.770 | 0.7 | 5.95 | 28.000 | 11.5 | 44.296 | 94.05 | 0.000 | 0.0 | 0.000 | 0.00 | 29.770 | 12.3 |
| Nickel | 1.272 | 1.420 | 0.6 | 6.92 | 19.100 | 7.9 | 24.295 | 93.08 | 0.000 | 0.0 | 0.000 | 0.00 | 20.520 | 8.5 |
| Phosphate | 1.000 | 25200.000 | 10377.6 | 89.81 | 2860.000 | 1177.8 | 2860.000 | 10.19 | 0.000 | 0.0 | 0.000 | 0.00 | 28060.000 | 11555.3 |
| Potassium | 1.000 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 78.700 | 32.4 | 21.06 | 295.000 | 121.5 | 631.005 | 78.94 | 0.000 | 0.0 | 0.000 | 0.00 | 373.700 | 153.9 |
| Silver | 1.000 | 0.885 | 0.4 | 47.40 | 0.982 | 0.4 | 0.982 | 52.60 | 0.000 | 0.0 | 0.000 | 0.00 | 1.867 | 0.8 |
| Sodium | 1.000 | 198000.000 | 81538.0 | 96.28 | 7660.000 | 3154.4 | 7660.000 | 3.72 | 0.000 | 0.0 | 0.000 | 0.00 | 205660.000 | 84692.4 |
| Strontium | 1.183 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | NA | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 4.070 | 1.7 | 42.53 | 5.500 | 2.3 | 7.431 | 57.47 | 0.000 | 0.0 | 0.000 | 0.00 | 9.570 | 3.9 |
| Uranium | 1.134 | 8.850 | 3.6 | 4.61 | 183.000 | 75.4 | 207.522 | 95.39 | 0.000 | 0.0 | 0.000 | 0.00 | 191.850 | 79.0 |
| Nitrate | 1.000 | 444000.000 | 182842.8 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 444000.000 | 182842.8 |
| Chloride | 1.000 | NR | 0.0 | #DIV/0! | NA | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | NR | 0.0 | #DIV/0! | NA | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 5700.000 | 2347.3 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 5700.000 | 2347.3 |
| Carbonate | 1.000 | NR | 0.0 | #DIV/0! | NA | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| TOC | 1.336 | 227.000 | 70.0 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 169.910 | 70.0 |
| Nitrite | 1.000 | 1000.000 | 411.8 | 100.00 | NA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 1000.000 | 411.8 |
| Sulfate | 1.000 | 14000.000 | 5765.3 | 100.00 | MA | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 14000.000 | 5765.3 |
| Total | | 688260.085 | | | | | 14880.220 | | | | 0.000 | | | |
| | | 96.94 | %total solids in wash | | | | 2.10 | %total solids in acid | | | 0.00 | %total solids in fusion | 99.03 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.001 | 0.4 | 100.00 | | 0.0 | | 0.00 | 0.000 | 0.0 | | 0.00 | 0.001 | 0.4 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.056 | 23.1 | 1.23 | 4.510 | 1857.3 | | 98.77 | 0.000 | 0.0 | | 0.00 | 4.566 | 1880.3 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.002 | 0.8 | 40.00 | 0.003 | 1.2 | | 60.00 | 0.000 | 0.0 | | 0.00 | 0.005 | 2.1 |
| Co-60 | | 0.001 | 0.4 | 50.00 | 0.001 | 0.4 | | 50.00 | 0.000 | 0.0 | | 0.00 | 0.002 | 0.8 |
| Cs-137 | | 2.620 | 1078.9 | 78.75 | 0.707 | 291.1 | | 21.25 | 0.000 | 0.0 | | 0.00 | 3.327 | 1370.1 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** NO3 adjusted 50,000 ug/g to ion balance.
Percent water based on average of 2% water from TGA first transition and 58% water reported in TWINS database.

NR - Not Reported
NA - No Analysis Performed

**TX-116 (EB, 1C BiPO4)**

| | |
|---|---|
| Density (g/mL) | 1.70 |
| Volume (L) | 2388335 |
| Mass (kg) | 4060170 |
| Solids (ug/g) | 645000 |
| ~pH | 13.0 |

| Component | Oxide Factor | WATER ug/g sludge (element) | WATER kg/tank (element) | WATER % element dissolved | RESIDUAL SOLIDS ug/g sludge (element) | RESIDUAL SOLIDS kg/tank (element) | RESIDUAL SOLIDS ug/g sludge (oxide) | RESIDUAL SOLIDS % element dissolved | ug/g sludge (element) | kg/tank (element) | ug/g sludge (oxide) | % element dissolved | TOTAL ug/g sludge (element) | TOTAL kg/tank (element) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.889 | 54.351 | 220.7 | 5.12 | 1007.400 | 4090.2 | 1902.979 | 94.88 | 0.000 | 0.0 | 0.000 | 0.00 | 1061.751 | 4310.9 |
| Barium | 1.117 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Bismuth | 1.115 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Boron | 3.220 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Cadmium | 1.142 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Calcium | 1.399 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Chromium | 1.923 | 218.868 | 888.6 | 59.79 | 147.200 | 597.7 | 283.066 | 40.21 | 0.000 | 0.0 | 0.000 | 0.00 | 366.068 | 1486.3 |
| Cobalt | 1.271 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Copper | 1.252 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Iron | 1.382 | 0.000 | 0.0 | 0.00 | 8740.000 | 35485.9 | 12078.680 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 8740.000 | 35485.9 |
| Lead | 1.077 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Magnesium | 1.658 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Manganese | 1.582 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nickel | 1.272 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Phosphate | 1.000 | 67461.120 | 273903.6 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 67461.120 | 273903.6 |
| Potassium | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Silicon | 2.139 | 0.000 | 0.0 | 0.00 | 662.400 | 2689.5 | 1416.874 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 662.400 | 2689.5 |
| Silver | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Sodium | 1.000 | 193000.000 | 783612.7 | 97.45 | 5060.000 | 20544.5 | 5060.000 | 2.55 | 0.000 | 0.0 | 0.000 | 0.00 | 198060.000 | 804157.2 |
| Strontium | 1.183 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zinc | 1.245 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Zirconium | 1.351 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Uranium | 1.134 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrate | 1.000 | 312015.000 | 1266833.8 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 312015.000 | 1266833.8 |
| Chloride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Fluoride | 1.000 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Free OH | 1.000 | 6533.100 | 26525.5 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 6533.100 | 26525.5 |
| Carbonate | 1.000 | 16360.200 | 66425.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 16360.200 | 66425.2 |
| TOC | 1.336 | 0.000 | 0.0 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 | 0.000 | #DIV/0! | 0.000 | 0.0 |
| Nitrite | 1.000 | 2272.860 | 9228.2 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 2272.860 | 9228.2 |
| Sulfate | 1.000 | 14000.000 | 56842.4 | 100.00 | 0.000 | 0.0 | 0.000 | 0.00 | 0.000 | 0.0 | 0.000 | 0.00 | 14000.000 | 56842.4 |
| Total | | 611915.499 | | | | | 20741.598 | | | | 0.000 | | | |
| | | 94.87 | % total solids in wash | | | | 3.22 | % residual solids | | | 0.00 | | 98.09 | % mass balance |
| **Radionuclides** | | **uCi/g** | **Ci/tank** | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** | | **dissolved** | **uCi/g** | **Ci/tank** |
| Pu-239,240 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| C-14 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Sr-90 | | 0.017 | 68.2 | 0.67 | 2.500 | 10150.4 | | 99.33 | 0.000 | 0.0 | | 0.00 | 2.517 | 10218.6 |
| Tc-99 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Am-241 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Co-60 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |
| Cs-137 | | 10.779 | 43763.3 | 20.04 | 43.000 | 174587.3 | | 79.96 | 0.000 | 0.0 | | 0.00 | 53.779 | 218350.6 |
| I-129 | | 0.000 | 0.0 | #DIV/0! | NA | 0.0 | | #DIV/0! | 0.000 | 0.0 | | #DIV/0! | 0.000 | 0.0 |

***NOTES:*** SO4 concentration based on T-102 and B-105 which are similar waste types.
0.384M value reported by Schulz for SO4 assumed to be for PO4; 1C waste stream initially had 0.06M SO4 and 0.3M PO4.
Na concentration adjusted to ion balance.
Percent solids based on average of TY-102 (71% solids, PO4=25,200 ug/g) and B-105 (58%, PO4=104,000 ug/g): TX-116 (65% solids, PO4=67,500 ug/g).

NR - Not Reported
NA - No Analysis Performed
<DL - Less than Detection Limit

# Appendix B

# Experimental Washing and Leaching Data

# Summary Worksheets

***B-104 (BiPO4 2C, EB) Experimental Results***

| | |
|---|---|
| 1.3 | Density (g/mL) |
| 1404 | Volume (kL) |

| Component | summation ug/g sample (Temer 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 1310 | 98 | 1840 | 3.36 | 6 | 0.202 | 60 | 1.901 | 57 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | 75.3 | 111 | | 0.00 | 64 | 0.000 | 21 | 0.000 | 8 |
| Ba | 7.37 | 106 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 12000 | 98 | 11400 | 20.81 | 0 | 0.000 | 3 | 0.708 | 3 |
| Ca | 217 | 105 | 328 | 0.60 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cd | | | | 0.00 | 33 | 0.000 | 0 | 0.000 | 0 |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cr | 526.29 | | 513 | 0.94 | 3 | 0.028 | 71 | 0.644 | 69 |
| Cu | 526 | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Fe | 12000 | 104 | 10800 | 19.72 | 0 | 0.000 | 1 | 0.099 | 1 |
| K | 490 | 119 | | 0.89 | 48 | 0.429 | 90 | 0.420 | 47 |
| La | 0.63 | 81 | | 0.00 | | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 136 | 99 | | 0.25 | 0 | 0.000 | 8 | 0.019 | 8 |
| Mn | 35.9 | 107 | | 0.07 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 1.78 | 105 | | 0.00 | 96 | 0.003 | 65 | 0.000 | 3 |
| Na | (130000 direct) | | 117000 | 213.58 | 93 | 198.633 | 0 | 0.000 | |
| Ni | 16.9 | 70 | | 0.03 | 2 | 0.001 | 0 | 0.000 | |
| Pb | 102 | 98 | | 0.19 | 0 | 0.000 | 17 | 0.031 | 17 |
| Pd | 5.71 | 60.4 | | 0.01 | 4 | 0.000 | 11 | 0.001 | 11 |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 3020 | 67.7 | 5700 | 10.41 | 1 | 0.104 | 50 | 5.140 | 49 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 150 | 99 | | 0.27 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 1380 | 94 | 1100 | 2.01 | 1 | 0.020 | 36 | 0.707 | 35 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 30.3 | 50.4 | | 0.00 | 5 | 0.000 | 57 | 0.000 | 55 |
| Zr | 24.8 | 90 | | 0.05 | 1 | 0.0005 | 1 | 0.001 | 1 |

| Component | summation ug/g sample (Temer 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 290000 | 529.40 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 2450 | 4.47 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 57600 | 105 | 53400 | 97.48 | 45 | 43.867 | 98 | 52.543 | 54 |
| SO4-2 | | | 21400 | 39.07 | | 0.000 | 0 | 0.000 | |
| F- | | | 3460 | 6.32 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 2110 | 3.85 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1996)** | **% recovery** | **uCi/g sample (Appendix)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.0859 | 35 | 0.04 | 73.02 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | 0.0647 | 84 | | 118.11 | | 0.000 | <DL | #VALUE! | |
| Am-241+Pu-238 | 0.0009 | 37 | | 1.64 | | 0.000 | <DL | #VALUE! | |
| Am-241 (gamma) | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 5.13 | 103 | | 9364.84 | | 0.000 | 99 | 9299.289 | |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 10.3 | | | 18802.71 | | 0.000 | 0 | 0.000 | |
| Tc-99 | <0.02 | | | 0.00 | | 0.000 | 0 | 0.000 | |

***Notes:***

Characterization data worksheet in Appendix.

Temer, D. J. and R. Vallarreal. 1996. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: FY 1996 Results*, LAUR96-2839, Los Alamos National Laboratory, Los Alamos, New Mexico.

***B-110 (BiPO4 2C, 5-6) Experimental Results***

| | |
|---|---|
| 1.35 | Density (g/mL) |
| 927 | Volume (kL) |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | 86.7 | 0.11 | | 0.000 | 0 | 0.000 | |
| Al | 700 - 2200 | | 1230 | 1.54 | 0 | 0.000 | 0 | 0.000 | 0 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | | | 34.5 | 0.04 | | 0.000 | 0 | 0.000 | |
| Ba | | | 24.6 | 0.03 | | 0.000 | 0 | 0.000 | |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 21000 - 25000 | | 20100 | 25.16 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 870 - 1800 | | 967 | 1.21 | 10 | 0.121 | 10 | 0.109 | 9 |
| Cd | | | 30 | 0.04 | | 0.000 | 0 | 0.000 | |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cr | 890 - 970 | | 972 | 1.22 | 10 | 0.122 | 53 | 0.584 | 48 |
| Cu | | | 59.3 | 0.07 | 0 | 0.000 | 0 | 0.000 | 0 |
| Fe | 20000 - 23000 | | 19300 | 24.16 | 0 | 0.000 | 0 | 0.000 | |
| K | | | 467 | 0.58 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 150 - 180 | | 191 | 0.24 | 9 | 0.022 | 0 | 0.000 | 0 |
| Mn | 72 - 130 | | 90.3 | 0.11 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 99000 - 140000 | | 100000 | 125.19 | 93 | 116.426 | 0 | 0.000 | |
| Ni | | | 88.5 | 0.11 | | 0.000 | 0 | 0.000 | |
| Pb | 960 - 1300 | | 657 | 0.82 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 7000 - 14000 | | 9850 | 12.33 | 28 | 3.453 | 53 | 4.686 | 38 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 220 - 270 | | 217 | 0.27 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 610 - 1900 | | 404 | 0.51 | 14 | 0.071 | 34 | 0.147 | 29 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 6.4 - 180 | | 503 | 0.63 | 0 | 0.000 | 0 | 0.000 | 0 |
| Zr | | | 3.5 | 0.00 | | 0.000 | 0 | 0.000 | |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 181000 | 226.59 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 10400 | 13.02 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 54000 - 60000 | | 52300 | 65.47 | 84 | 54.998 | 88 | 9.166 | 14 |
| SO4-2 | | | 11300 | 14.15 | | 0.000 | 0 | 0.000 | |
| F- | | | 1780 | 2.23 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 1150 | 1.44 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **range uCi/g sample (Lumetta 1994)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | | | 0.116 | 145.22 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.082 | 102.65 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 14.6 - 16.0 | | 15.1 | 18903.52 | 87 | 16446.063 | 62 | 1512.282 | 8 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 169 - 250 | | 169 | 211569.20 | 0 | 0.000 | 0 | 211.569 | 0.1 |
| Tc-99 | 0.026 | | 0.02 | 25.04 | 94 | 23.536 | 100 | 1.502 | 6 |

***Notes:***
Less than wash, leach values entered above as zero.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Lumetta, G. J. and B. M. Rapko. 1994. *Washing and Alkaline Leaching of Hanford Sludges: A Status Report*, PNL-10078, Pacific Northwest National Laboratory, Richland, Washington.

***B-111 (BiPO4 2C, 5-6) Experimental Results***

| | |
|---|---|
| 1.25 | Density (g/mL) |
| 893 | Volume (kL) |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 40.3 | | 97.4 | 0.11 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Al | 1480 | 137 | 1360 | 1.52 | 0 | 0.000 | 2.0 | 0.030 | 2 |
| As | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| B | 105 | | 68.4 | 0.08 | 11 | 0.008 | 4.5 | 0.003 | 4 |
| Ba | 23.4 | 185 | 42.3 | 0.05 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Bi | 14600 | 85 | 20200 | 22.55 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Ca | 592 | 149 | 683 | 0.76 | 9 | 0.069 | 2.2 | 0.015 | 2 |
| Cd | 2.42 | | 20.0 | 0.02 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Ce | 14.3 | | | 0.02 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Co | 3.33 | | 16 | 0.02 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Cr | 950 | | 1150 | 1.28 | 27 | 0.347 | 19.2 | 0.180 | 14 |
| Cu | 191 | | 221 | 0.25 | 1 | 0.002 | 12.1 | 0.030 | 12 |
| Fe | 14500 | 88 | 16400 | 18.31 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| K | | | 613 | 0.68 | | 0.000 | 0.0 | 0.000 | |
| La | 4.29 | | | 0.00 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Mg | | | 738 | 0.82 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Mn | 194 | 55 | 111 | 0.12 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Mo | 38.2 | | | 0.00 | 87 | 0.000 | 30.8 | 0.000 | 4 |
| Na | | | 87400 | 97.59 | 92 | 89.782 | 0.0 | 0.000 | |
| Ni | | | 18.6 | 0.02 | | 0.000 | 0.0 | 0.000 | |
| Pb | 1200 | 83 | | 1.34 | 0 | 0.000 | 5.0 | 0.067 | 5 |
| Pd | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Se | 24.2 | | | 0.03 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Si | 9900 | 106 | 9640 | 10.76 | 3 | 0.323 | 46.4 | 4.844 | 45 |
| Sn | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Sr | 170 | 81 | 221 | 0.25 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Ti | 24.2 | 75 | | 0.03 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| U | 211 | 98 | 225 | 0.25 | 57 | 0.143 | 9.3 | 0.010 | 4 |
| V | 0.173 | | | 0.00 | 0 | 0.000 | 100.0 | 0.000 | 100 |
| W | | | | 0.00 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Y | | | | 0.00 | 0 | 0.000 | 0.0 | 0.000 | |
| Zn | 100 | | 173 | 0.19 | 0 | 0.000 | 38.0 | 0.073 | 38 |
| Zr | 8.06 | | 20.5 | 0.02 | 0 | 0.000 | 0.0 | 0.000 | 0 |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| NO3- | 71600 | | 82000 | 91.56 | 93 | 85.150 | 0.0 | 0.000 | |
| NO2- | 46000 | | 45000 | 50.25 | 91 | 45.724 | 0.0 | 0.000 | |
| PO4-3 | 45600 | 103 | 45600 | 50.92 | 43 | 21.894 | 84.2 | 24.440 | 48 |
| SO4-2 | 11100 | 77 | 11600 | 12.95 | 92 | 11.916 | 0.0 | 0.000 | |
| F- | 950 | | 1560 | 1.74 | 100 | 1.742 | #DIV/0! | #DIV/0! | |
| Cl- | 1130 | | 1030 | 1.15 | 94 | 1.081 | 0.0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| | **summation uCi/g sample (Rapko 1995)** | **% recovery** | **uCi/g sample Colton 1995** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% leach initial solids** |
| Total alpha | 0.234 | 159 | | 261.28 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Pu-239, 240 | 0.11 | 105 | 0.097 | 108.31 | | 0.000 | 0.0 | 0.000 | |
| Am-241+Pu-238 | 0.063 | 138 | | 70.34 | | 0.000 | 0.0 | 0.000 | 0 |
| Am-241 (gamma) | 0.081 | 85 | 0.085 | 94.91 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Cs-137 | 140 | 103 | 158 | 176418.85 | 52 | 91737.802 | 91.7 | 77624.294 | 44 |
| Co-60 | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0.0 | 0.000 | |
| Sr-90 | 240 | 105 | 496 | 553821.20 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| I-129 | | | | | | | 0.0 | 0.000 | |
| Tc-99 | 0.115 | 143 | 0.114 | 127.29 | 93 | 118.379 | 85.7 | 7.637 | 6 |

***Notes:***

Na measurement impractical due to method of sample prep (Rapko 1995); therefore, Na wash factor based on Colton 1995.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Rapko, B. M., G. J. Lumetta, M. J. Wagner. 1995. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY1995 Studies*, PNL-10712, Pacific Northwest National Laboratory, Richland Washington.

***B-201 (BiPO4 224) Experimental Results***

| | |
|---|---|
| 1.25 | Density (g/mL) |
| 106 | Volume (kL) |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 2600 - 3920 | | 4850 | 0.64 | 0 | 0.000 | 28 | 0.180 | 28 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | | | 65 | 0.01 | | 0.000 | 0 | 0.000 | |
| Ba | 104 - 200 | | 396 | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 72000 - 96000 | | 103400 | 13.70 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 9600 - 12000 | | 13800 | 1.83 | 0 | 0.000 | 1 | 0.018 | 1 |
| Cd | | | 39.5 | 0.01 | | 0.000 | 0 | 0.000 | |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | 68.2 | 0.01 | | 0.000 | 0 | 0.000 | |
| Cr | 2520 - 3160 | | 3350 | 0.44 | 34 | 0.151 | 35 | 0.102 | 23 |
| Cu | | | 119 | 0.02 | | 0.000 | 0 | 0.000 | |
| Fe | 12000 - 13600 | | 15100 | 2.00 | 0 | 0.000 | 1 | 0.020 | 1 |
| K | | | 5990 | 0.79 | | 0.000 | 0 | 0.000 | |
| La | 12000 - 16400 | | 15400 | 2.04 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 1320 - 1560 | | 3410 | 0.45 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 18000 - 22400 | | 23100 | 3.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 32000 - 40000 | | 41500 | 5.50 | 74 | 4.068 | 0 | 0.000 | |
| Ni | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pb | 520 - 1200 | | 1510 | 0.20 | 3 | 0.006 | 14 | 0.028 | 14 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 12000 - 20000 | | 24300 | 3.22 | 8 | 0.258 | 47 | 1.384 | 43 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 600 - 840 | | 930 | 0.12 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| U | | | 638 | 0.08 | | 0.000 | 0 | 0.000 | |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | | | 278 | 0.04 | | 0.000 | 0 | 0.000 | |
| Zr | 120 - 204 | | 62.3 | 0.01 | | 0.000 | 0 | 0.000 | |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 50500 | 6.69 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 881 | 0.12 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 32000 - 40000 | | 18200 | 2.41 | 10 | 0.241 | 18 | 0.386 | 16 |
| SO4-2 | | | 347 | 0.05 | | 0.000 | 0 | 0.000 | |
| F- | | | 6000 | 0.79 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 1680 | 0.22 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **range uCi/g sample (Lumetta 1994)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | | | 0.794 | 105.19 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.036 | 4.77 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 0.16 - 1.23 | | 0.897 | 118.83 | 17 | 20.201 | 10 | 9.506 | 8 |
| Co-60 | | | 0.03 | 3.97 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 3.2 - 6.8 | | 2.27 | 300.72 | | 0.000 | 0 | 0.000 | |
| Tc-99 | <DL - 0.0035 | | 0.002 | 0.26 | 74 | 0.196 | 0 | 0.000 | 0 |

***Notes:***

Less than wash, leach values entered above as zero.

Na value not reported in Lumetta 1995; therefore, Na wash factor based on Colton 1995.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Lumetta, G. J. and B. M. Rapko. 1994. *Washing and Alkaline Leaching of Hanford Sludges: A Status Report*, PNL-10078, Pacific Northwest National Laboratory, Richland Washington.

***B-202 (BiPO4) Experimental Results***

| | |
|---|---|
| 1.1 | Density (g/mL) |
| 102 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 576 | 92 | 876 | 0.10 | 0 | 0.000 | 16 | 0.016 | 16 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | | | 136 | 0.02 | 90 | 0.014 | 93 | 0.001 | 9 |
| Ba | 1060 | 101 | 1780 | 0.20 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 63100 | 109 | 38900 | 4.37 | 0 | 0.000 | 0 | 0.002 | 0 |
| Ca | 1650 | | 10600 | 1.19 | 0 | 0.003 | 0 | 0.000 | 0 |
| Cd | | | 15 | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | 48 | | | 0.01 | 0 | 0.000 | 0 | 0.000 | |
| Co | | | 12.1 | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cr | 2450 | 91 | 3320 | 0.37 | 21 | 0.079 | 10 | 0.030 | 8 |
| Cu | | | 40.9 | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Fe | 4940 | 96 | 6380 | 0.72 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | 6360 | 108 | 6670 | 0.75 | 84 | 0.628 | 89 | 0.109 | 15 |
| La | | | 14300 | 1.61 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 276 | 107 | 539 | 0.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 12200 | 104 | 13300 | 1.50 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 0.437 | | | 0.00 | 0 | 0.000 | 14 | 0.000 | 14 |
| Na | 49400 | 200 | 37400 | 4.20 | 45 | 1.892 | 85 | 1.976 | 47 |
| Ni | | | 205 | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pb | 432 | 99 | 615 | 0.07 | 0 | 0.000 | 2 | 0.001 | 2 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 5690 | 97 | 2990 | 0.34 | 26 | 0.087 | 42 | 0.104 | 31 |
| Sn | 0.876 | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 478 | 103 | 595 | 0.07 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 242 | 102 | 323 | 0.04 | 0 | 0.000 | 1 | 0.000 | 1 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | 3.65 | | | 0.00 | 73 | 0.000 | 69 | 0.000 | 19 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 35.8 | 117 | 449 | 0.05 | 0 | 0.000 | 4 | 0.002 | 4 |
| Zr | | | 7.66 | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 61500 | 6.91 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 1090 | 0.12 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 7030 | 98 | 8430 | 0.95 | 28 | 0.269 | 22 | 0.146 | 15 |
| SO4-2 | 3170 | 90 | 2050 | 0.23 | 29 | 0.067 | 26 | 0.042 | 18 |
| F- | 7150 | 203 | 6240 | 0.70 | 14 | 0.097 | 96 | 0.580 | 83 |
| Cl- | | | 864 | 0.10 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample (Appendix)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.638 | 82 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.749 | 70 | 0.153 | 17.20 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | 0.0432 | 68 | 0.068 | 7.64 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 0.0288 | 109 | 0.1 | 11.24 | 52 | 5.868 | 50 | 2.706 | 24 |
| Co-60 | | | 0.01 | 1.12 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 3.38 | 134 | 4.13 | 464.27 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | | | 0.005 | 0.56 | 0 | 0.000 | 0 | 0.000 | 0 |

***Notes:***
Characterization data worksheet for B-202 is provided in Appendix.

Temer, D. J. and R. Villarreal. 1995. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: A Status Report*, LAUR 95-2070, Los Alamos National Laboratory, Los Alamos, New Mexico.

***BX-105 (TBP, CW) Experimental Results***

| | |
|---|---|
| 1.69 | Density (g/mL) |
| 174 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 0.615 | | 25.8 | 0.01 | | 0.000 | 0 | 0.000 | |
| Al | 147000 | 112 | 33900 | 9.97 | | 0.000 | 0 | 0.000 | |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | | | 5.3 | 0.00 | | 0.000 | 0 | 0.000 | |
| Ba | | | 3200 | 0.94 | | 0.000 | 0 | 0.000 | |
| Be | | | | 0.00 | Data from this tank have not been included in this evaluation because of | | | | |
| Bi | 4.34 | 82 | 776 | 0.23 | discrepancies in projected inventories derived from core samples obtained | | | | |
| Ca | 47.7 | 118 | 6210 | 1.83 | in 1986 and auger surface samples obtained in 1994. Auger samples may | | | | |
| Cd | 0.834 | 140 | 44.3 | 0.01 | be representative of cladding waste, the last type of waste added to this | | | | |
| Ce | | | | 0.00 | tank. Washing and leaching tests were performed only on the auger | | | | |
| Co | 0.394 | 72 | 0.57 | 0.00 | surface sample. | | | | |
| Cr | 154 | 79 | 8650 | 2.55 | | 0.000 | 0 | 0.000 | |
| Cu | 31.2 | 74 | 27.3 | 0.01 | | 0.000 | 0 | 0.000 | |
| Fe | 365 | 91 | 6250 | 1.84 | | 0.000 | 0 | 0.000 | |
| K | | | 1440 | 0.42 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 9.93 | 99 | 3250 | 0.96 | | 0.000 | 0 | 0.000 | |
| Mn | 5.03 | 44 | 1490 | 0.44 | | 0.000 | 0 | 0.000 | |
| Mo | 14.2 | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 88600 | 430 | 110000 | 32.37 | | 0.000 | 0 | 0.000 | |
| Ni | | | 147 | 0.04 | | 0.000 | 0 | 0.000 | |
| Pb | 48.2 | 92 | 563 | 0.17 | | 0.000 | 0 | 0.000 | |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 259 | | 41500 | 12.21 | | 0.000 | 0 | 0.000 | |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | | | 56.2 | 0.02 | | 0.000 | 0 | 0.000 | |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 172 | | 4410 | 1.30 | | 0.000 | 0 | 0.000 | |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 16.1 | | 143 | 0.04 | | 0.000 | 0 | 0.000 | |
| Zr | 1.46 | | 335 | 0.10 | | 0.000 | 0 | 0.000 | |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | 3600 | 1.06 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 33250 | 9.78 | | 0.000 | 0 | 0.000 | |
| NO2- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 1860 | | 59700 | 17.57 | | 0.000 | 0 | 0.000 | |
| SO4-2 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| F- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cl- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | 0.499 | | 0.28 | 82.39 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | 0.0086 | | 0.994 | 292.48 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 25.1 | | 54.1 | 15918.70 | | 0.000 | 0 | 0.000 | |
| Co-60 | | | 0.157 | 46.20 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 1.3 | | 137 | 40311.69 | | 0.000 | 0 | 0.000 | |
| Tc-99 | | | | 0.00 | | 0.000 | 0 | 0.000 | |

***Notes:***


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Temer, D. J. and R. Villarreal. 1995. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: A Status Report*, LAUR 95-2070, Los Alamos National Laboratory, Los Alamos, New Mexico.

***BX-107 (BiPO4 1C, TBP) Experimental Results***

| | |
|---|---|
| 1.2 | Density (g/mL) |
| 1302 | Volume (kL) |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 12300 | 81 | 14300 | 22.34 | 1 | 0.223 | 68 | 14.970 | 67 |
| As | 17.1 | | | 0.03 | 0 | 0.000 | 100 | 0.027 | 100 |
| B | | | 47.1 | 0.07 | 5 | 0.004 | 1 | 0.001 | 1 |
| Ba | 5.67 | | 9.14 | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 33100 | 159 | 24100 | 37.65 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 194 | 22 | 1040 | 1.62 | 14 | 0.227 | 16 | 0.227 | 14 |
| Cd | 2.84 | | 4.2 | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | 84.9 | | | 0.13 | 0 | 0.000 | 0 | 0.000 | 0 |
| Co | 2.84 | 13 | 6.94 | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cr | 585 | 59 | 968 | 1.51 | 21 | 0.318 | 10 | 0.121 | 8 |
| Cu | 9.87 | 3 | 51.7 | 0.08 | 0 | 0.000 | 4 | 0.003 | 4 |
| Fe | 6840 | 56 | 11100 | 17.34 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | | | 263 | 0.41 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 84.9 | 49 | 159 | 0.25 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 38 | 20 | 64.6 | 0.10 | 10 | 0.010 | 1 | 0.001 | 1 |
| Mo | 15 | | | 0.02 | 69 | 0.016 | 0 | 0.000 | 0 |
| Na | | | 101000 | 157.81 | 67 | 105.731 | 0 | 0.000 | |
| Ni | | | 12.3 | 0.02 | | 0.000 | 0 | 0.000 | |
| Pb | 56.7 | | 74.5 | 0.12 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | 18.8 | | | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| Si | 4760 | 55 | 6780 | 10.59 | 0 | 0.000 | 3 | 0.318 | 3 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 88.8 | 55 | 169 | 0.26 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 6.62 | 38 | | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| U | 1990 | 32 | 2270 | 3.55 | 16 | 0.567 | 5 | 0.142 | 4 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 65.8 | 30 | 83.4 | 0.13 | 0 | 0.000 | 57 | 0.074 | 57 |
| Zr | 81.8 | | 136 | 0.21 | 0 | 0.000 | 1 | 0.002 | 1 |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | 90100 | | 137000 | 214.06 | 95 | 203.353 | 100 | 10.703 | 5 |
| NO2- | 17600 | | 8130 | 12.70 | 88 | 11.178 | 100 | 1.524 | 12 |
| PO4-3 | 66600 | 92 | 70400 | 110.00 | 20 | 21.999 | 91 | 80.297 | 73 |
| SO4-2 | 9790 | 114 | 13700 | 21.41 | 90 | 19.265 | 50 | 1.070 | 5 |
| F- | 14600 | | 9080 | 14.19 | 23 | 3.263 | 99 | 10.782 | 76 |
| Cl- | 905 | | 1150 | 1.80 | 94 | 1.689 | 100 | 0.108 | 6 |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Rapko 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.133 | 89 | | 207.81 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.119 | 89 | 0.057 | 89.06 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | 0.0137 | 98 | | 21.41 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | 0.0118 | | 0.018 | 28.12 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 14.2 | 86 | 17.4 | 27186.60 | 17 | 4621.721 | 93 | 20933.678 | 77 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 7.19 | 72 | 9.87 | 15421.36 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | 0.0314 | 140 | 0.037 | 57.81 | 92 | 53.186 | 88 | 4.047 | 7 |

***Notes***:

Na measurement impractical due to method of sample prep (Rapko 1995); therefore, Na wash factor based on Colton 1995.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Rapko, B. M., G. J. Lumetta, M. J. Wagner. 1995. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY1995 Studies*, PNL-10712, Pacific Northwest National Laboratory, Richland Washington.

***BX-109 (TBP/CW) Experimental Results***

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 731 | Volume (kL) |

| Component | summation ug/g sample (Temer 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 555 | 81 | 1910 | 2.09 | 61 | 1.277 | 93 | 0.760 | 36 |
| As | 5.7 | 28 | | 0.01 | 10 | 0.001 | 25 | 0.001 | 23 |
| B | 6.45 | 74 | | 0.01 | 100 | 0.007 | #DIV/0! | #DIV/0! | |
| Ba | 36.1 | 87 | | 0.04 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 396 | 78 | | 0.43 | 0 | 0.000 | 0 | 0.001 | 0 |
| Ca | 2170 | 99 | 4030 | 4.42 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cr | 133 | 78 | 137 | 0.15 | 36 | 0.054 | 70 | 0.067 | 45 |
| Cu | 16.1 | 78 | | 0.02 | 0 | 0.000 | 7 | 0.001 | 7 |
| Fe | 17500 | 85 | 21500 | 23.56 | 0 | 0.000 | 0 | 0.047 | 0 |
| K | 307 | 121 | | 0.00 | 66 | 0.000 | 81 | 0.000 | 28 |
| La | 8.9 | 98 | | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 411 | 96 | 748 | 0.82 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 96 | 89 | | 0.11 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | (100000 direct) | | 114000 | 124.92 | 96 | 119.920 | 0 | 0.000 | |
| Ni | 51.5 | 94 | | 0.06 | 1 | 0.001 | 0 | 0.000 | |
| Pb | 413.5 | 94 | 668 | 0.73 | 0 | 0.000 | 3 | 0.023 | 3 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 535 | 123 | 1720 | 1.88 | 12 | 0.226 | 24 | 0.396 | 21 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 540 | 96 | 590 | 0.65 | 0 | 0.000 | 0 | 0.001 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 16200 | 81 | 16200 | 17.75 | 2 | 0.355 | 0 | 0.000 | |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 95.5 | 90 | 624 | 0.68 | 0 | 0.000 | 44 | 0.302 | 44 |
| Zr | 606 | 90 | | 0.66 | 0 | 0.000 | 1 | 0.006 | 1 |

| Component | summation ug/g sample (Temer 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 213000 | 233.40 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 19100 | 20.93 | | 0.000 | 0 | 0.000 | |
| PO4-3 | | | 66000 | 72.32 | 76 | 54.963 | 83 | 14.464 | 20 |
| SO4-2 | | | 18800 | 20.60 | | 0.000 | 0 | 0.000 | |
| F- | | | <500 | #VALUE! | | #VALUE! | 0 | #VALUE! | |
| Cl- | | | 1200 | 1.31 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1996)** | **% recovery** | **uCi/g sample (Appendix)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.05 | 66 | <0.05 | 54.79 | | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.033 | 108 | | 0.00 | | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | 0.0013 | 75 | | 0.00 | | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | | | <1.26 | #VALUE! | | #VALUE! | 0 | #VALUE! | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 12.8 | 101 | 13.9 | 15231.03 | | 0.000 | 100 | 15185.336 | 100 |
| Co-60 | | | <0.13 | #VALUE! | | #VALUE! | 0 | #VALUE! | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 154 | 92.4 | 178 | 195044.84 | | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | <0.03 | | | 0.00 | | 0.000 | 0 | 0.000 | |

***Notes:***
Characterization data worksheet in Appendix.

Temer, D. J. and R. Vallarreal. 1996. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: FY 1996 Results*, LAUR96-2839, Los Alamos National Laboratory, Los Alamos, New Mexico.

***BY-104 [TBP(f), EB]***

| | |
|---|---|
| 1.6 | Density (g/mL) |
| 1537 | Volume (kL) |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 14500 | 93 | 47900 | 117.77 | 66 | 77.730 | 97 | 38.865 | 33 |
| As | | | 31 | 0.08 | | 0.000 | 0 | 0.000 | |
| B | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ba | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | <800 | | 79.3 | 0.19 | | 0.000 | 0 | 0.000 | |
| Ca | 350 | 10 | 1110 | 2.73 | | 0.000 | 0 | 0.000 | |
| Cd | 27.4 | | 69.5 | 0.17 | | 0.000 | 0 | 0.000 | |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | 16.6 | | 36.5 | 0.09 | | 0.000 | 0 | 0.000 | |
| Cr | 5670 | 145 | 5800 | 14.26 | 70 | 9.982 | 3 | 0.143 | 1 |
| Cu | 5.36 | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Fe | 1700 | | 4790 | 11.78 | | 0.000 | 0 | 0.000 | |
| K | 3060 | 32 | 2650 | 6.52 | 95 | 6.190 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mn | 89.3 | 34 | | 0.22 | 0 | 0.000 | 0 | 0.000 | |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 250000 | 107 | 225000 | 553.22 | 100 | 553.216 | #DIV/0! | #DIV/0! | |
| Ni | | | 920 | 2.26 | | 0.000 | 0 | 0.000 | |
| Pb | 179 | | | 0.00 | 14 | 0.000 | 0 | 0.000 | |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 610 | 37 | 1494 | 3.67 | 46 | 1.690 | 37 | 0.735 | 20 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 380 | 113 | 1160 | 2.85 | | 0.000 | 0 | 0.000 | |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | | | 2680 | 6.59 | | 0.000 | 0 | 0.000 | |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 20.5 | | 250 | 0.61 | 0 | 0.000 | 31 | 0.191 | 31 |
| Zr | 14 | | 53 | 0.13 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| CO3(2-)?? | | | 191000 | 469.62 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 61800 | 151.95 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 13800 | 33.93 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 9860 | 138 | 15700 | 38.60 | 94 | 36.286 | 17 | 0.386 | 1 |
| SO4-2 | | | 35500 | 87.29 | | 0.000 | 0 | 0.000 | |
| F- | | | 9420 | 23.16 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 1560 | 3.84 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Lumetta 1996)** | **% recovery** | **uCi/g sample** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Tc-99 | | | | 0.00 | | 0.000 | 0 | 0.000 | |

***Notes:***
Characterization data worksheet in Appendix.
[CO3] consistent with BY-110 (noticeably high) was added to ion balance;
Radionuclides not reported.

Lumetta, G. J., B. M. Rapko, M. J. Wagner, and J. Liu. 1996. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY 1996 Studies*, PNNL-11278, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

***BY-110 [TBP(f), EB]***

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 1506 | Volume (kL) |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | 14.4 | 0.03 | | 0.000 | 0 | 0.000 | |
| Al | 36000 | 130 | 13200 | 29.83 | 94 | 28.038 | 33 | 0.597 | 2 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | | | 79.9 | 0.18 | 100 | 0.181 | #DIV/0! | #DIV/0! | 0 |
| Ba | 108 | 132 | 58.8 | 0.13 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 861 | | 931 | 2.10 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 10100 | 109 | 1110 | 2.51 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cd | 16.8 | | 22.1 | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | 26.6 | 0.06 | | 0.000 | 0 | 0.000 | |
| Cr | 4160 | 137 | 2780 | 6.28 | 47 | 2.952 | 2 | 0.063 | 1 |
| Cu | | | 12.2 | 0.03 | | 0.000 | 0 | 0.000 | |
| Fe | 13900 | | 961 | 2.17 | 3 | 0.065 | 0 | 0.000 | 0 |
| K | | | 1820 | 4.11 | 69 | 2.838 | 32 | 0.411 | 10 |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 664 | | 120 | 0.27 | | 0.000 | 0 | 0.000 | 0 |
| Mn | 209 | 46 | 48.8 | 0.11 | | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 182000 | 75 | 254000 | 573.95 | 98 | 562.471 | 0 | 0.000 | |
| Ni | | | 301 | 0.68 | 0 | 0.000 | 0 | 0.000 | |
| Pb | 560 | | 962 | 2.17 | 14 | 0.304 | 15 | 0.283 | 13 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 1450 | 40 | 685 | 1.55 | 16 | 0.248 | 56 | 0.727 | 47 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 4050 | 164 | 58.5 | 0.13 | 0 | 0.000 | 0 | 0.000 | |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 15300 | 94 | 4140 | 9.35 | 2 | 0.187 | 0 | 0.000 | 0 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 67.5 | | 39.9 | 0.09 | 8 | 0.007 | 9 | 0.007 | 8 |
| Zr | 27.7 | | 58.5 | 0.13 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| CO3(-2) | | | 191000 | 431.59 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 216000 | 488.08 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 22500 | 50.84 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 21700 | | 9840 | 22.23 | 19 | 4.225 | 5 | 0.889 | 4 |
| SO4-2 | | | 23200 | 52.42 | | 0.000 | 0 | 0.000 | |
| F- | | | 6450 | 14.57 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 1640 | 3.71 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Lumetta 1996)** | **% recovery** | **uCi/g sample (Appendix)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | | | 0.071 | 160.43 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.409 | 924.19 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | | | 57.9 | 130833.45 | | 0.000 | 0 | 0.000 | |
| Co-60 | | | 0.019 | 42.93 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | | | 58.5 | 132189.23 | | 0.000 | 0 | 0.000 | |
| Tc-99 | | | | 0.00 | | 0.000 | 0 | 0.000 | |

***Notes:***

Noticeably large concentration of CO3 (consistent with ion balance).
Analyte concentrations among many segments analyzed by Characterization varied considerably.
Radionuclide data unavailable.

Lumetta, G. J., B. M. Rapko, M. J. Wagner, and J. Liu. 1996. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY 1996 Studies*, PNNL-11278, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

*C-103 (PUREX, SRS) Experimental Results*

| | |
|---|---|
| 1.34 | Density (g/mL) |
| 235 | Volume (kL) |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 369 | 110 | | 0.12 | 0 | 0.000 | 0 | 0.000 | 0 |
| Al | 6150 | 113 | 14500 | 4.56 | 0 | 0.000 | 48 | 2.189 | 48 |
| As | 27.4 | | | 0.01 | 0 | 0.000 | 100 | 0.009 | 100 |
| B | 416 | 107 | 2.4 | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ba | 463 | 60 | 4960 | 1.56 | 1 | 0.016 | 0 | 0.000 | 0 |
| Be | 0.142 | | | 0.00 | 0 | 0.000 | 100 | 0.000 | 100 |
| Bi | 2.14 | | 254 | 0.08 | 0 | 0.000 | 100 | 0.080 | 100 |
| Ca | 2790 | 40 | 11100 | 3.49 | 1 | 0.035 | 0 | 0.000 | 0 |
| Cd | 235 | 68 | 509 | 0.16 | 1 | 0.002 | 0 | 0.000 | 0 |
| Ce | 169 | 48 | | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Co | 26.5 | 68 | 63.8 | 0.02 | 0 | 0.000 | 2 | 0.000 | 2 |
| Cr | 447 | 72 | 618 | 0.19 | 2 | 0.004 | 10 | 0.019 | 10 |
| Cu | 1620 | 73 | 855 | 0.27 | 7 | 0.019 | 9 | 0.022 | 8 |
| Fe | 64600 | 83 | 86700 | 27.26 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | | | 1400 | 0.44 | | 0.000 | 0 | 0.000 | |
| La | 200 | 64 | | 0.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | 4.05 | | | 0.00 | 100 | 0.001 | #DIV/0! | #DIV/0! | 0 |
| Mg | 270 | 69 | 6190 | 1.95 | 3 | 0.058 | 0 | 0.000 | 0 |
| Mn | 1710 | | 2480 | 0.78 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 4.55 | | | 0.00 | 89 | 0.001 | 100 | 0.000 | 11 |
| Na | | | 50500 | 15.88 | 15 | 2.382 | 0 | 0.000 | |
| Ni | | | 915 | 0.29 | | 0.000 | 0 | 0.000 | |
| Pb | 1990 | 72 | 3560 | 1.12 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | 615 | 79 | | 0.19 | 0 | 0.000 | 0 | 0.000 | 0 |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | 2.52 | | | 0.00 | 0 | 0.000 | 100 | 0.001 | 100 |
| Si | 10500 | | 70600 | 22.20 | 0 | 0.000 | 1 | 0.222 | 1 |
| Sn | 27.9 | | | 0.01 | 0 | 0.000 | 100 | 0.009 | 100 |
| Sr | 61.5 | 79 | 117 | 0.04 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 129 | 81 | | 0.04 | 0 | 0.000 | 0 | 0.000 | 0 |
| U | 2180 | 184 | 3440 | 1.08 | 73 | 0.790 | 7 | 0.022 | 2 |
| V | 1.46 | | | 0.00 | 0 | 0.000 | 100 | 0.000 | 100 |
| W | 21 | | | 0.01 | 38 | 0.003 | 98 | 0.004 | 61 |
| Y | 61.5 | 53 | | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Zn | 184 | 68 | 175 | 0.06 | 2 | 0.001 | 16 | 0.009 | 16 |
| Zr | 6690 | 75 | 12200 | 3.84 | 1 | 0.038 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 2810 | 0.88 | | 0.000 | 0 | 0.000 | |
| NO2- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 8180 | 140 | 12500 | 3.93 | 27 | 1.061 | 55 | 1.572 | 40 |
| SO4-2 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| F- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cl- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Rapko 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 7.78 | 72 | | 2446.48 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 1.3 | 69 | 13.6 | 4276.63 | 1 | 42.766 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | 6.38 | 72 | | 2006.24 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | 5.99 | 70 | 1.35 | 424.52 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 103 | 112 | 59.4 | 18678.79 | 20 | 3735.759 | 30 | 4482.910 | 24 |
| Co-60 | | | 3.95 | 1242.11 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 3040 | 79 | 2710 | 852180.64 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | 0.0166 | 203 | 0.264 | 83.02 | 83 | 68.904 | 35 | 4.981 | 6 |

***Notes:***

Na measurement impractical due to method of sample prep (Rapko 1995); therefore, Na wash factor based on Colton 1995.

Bi value from Colton 1995 corrected

Anion measurements could not easily be determined due to matrix effects (Rapko 1995); NO3 concentration relatively low; assume wash factor of 100%.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Rapko, B. M., G. J. Lumetta, M. J. Wagner. 1995. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY1995 Studies*, PNL-10712, Pacific Northwest National Laboratory, Richland Washington.

*C-107 (BiPO4 1C, CW) LANL Experimental Results*

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 897 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Temer 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 212 | 79 | 267 | 0.36 | 5 | 0.018 | 2 | 0.006 | 2 |
| Al | 41500 | 86 | 48300 | 64.99 | 2 | 1.417 | 75 | 47.781 | 74 |
| As | 2.69 | 114 | 2.37 | 0.00 | 30 | 0.001 | 19 | 0.000 | 13 |
| B | 3.1 | 115 | 2.69 | 0.00 | 58 | 0.002 | 72 | 0.001 | 30 |
| Ba | 306 | 80 | 384 | 0.52 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 8690 | 76 | 11500 | 15.47 | 0 | 0.000 | 0 | 0.057 | 0 |
| Ca | 457 | 102 | 448 | 0.60 | 2 | 0.009 | 0 | 0.002 | 0 |
| Cd | 35.1 | 76 | 46.5 | 0.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | 150 | 61 | 245 | 0.33 | 0 | 0.000 | 0 | 0.000 | 0 |
| Co | 10 | 101 | 9.89 | 0.01 | 2 | 0.000 | 0 | 0.000 | 0 |
| Cr | 492 | 151 | 325 | 0.44 | 44 | 0.190 | 43 | 0.107 | 24 |
| Cu | 135 | 132 | 102 | 0.14 | 0 | 0.000 | 0 | 0.001 | 0 |
| Fe | 37800 | 89 | 42500 | 57.19 | 1 | 0.635 | 0 | 0.046 | 0 |
| K | 478 | 143 | 336 | 0.45 | 58 | 0.262 | 82 | 0.155 | 34 |
| La | 82.8 | 63 | 132 | 0.18 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | 60.3 | 99 | 60.7 | 0.08 | 60 | 0.049 | 39 | 0.013 | 15 |
| Mg | 227 | 102 | 224 | 0.30 | 1 | 0.004 | 0 | 0.001 | 0 |
| Mn | 1730 | 130 | 1330 | 1.79 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 57 | 92 | 62.1 | 0.08 | 18 | 0.015 | 2 | 0.001 | 2 |
| Na | 234000 | 361 | 64900 | 87.33 | 23 | 20.007 | 95 | 63.845 | 73 |
| Ni | 1820 | 76 | 2390 | 3.22 | 0 | 0.004 | 0 | 0.000 | 0 |
| Pb | 2130 | 92 | 224 | 0.30 | 0 | 0.000 | 2 | 0.005 | 2 |
| Pd | 15.5 | 77 | 20.3 | 0.03 | 9 | 0.002 | 4 | 0.001 | 4 |
| Rh | 11.9 | 53 | 22.4 | 0.03 | 5 | 0.002 | 0 | 0.000 | 0 |
| Ru | 295 | 75 | 392 | 0.53 | 1 | 0.004 | 0 | 0.001 | 0 |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 8330 | 110 | 7590 | 10.21 | 2 | 0.171 | 4 | 0.440 | 4 |
| Sn | 35.6 | 111 | 32.2 | 0.04 | 4 | 0.002 | 40 | 0.017 | 39 |
| Sr | 107 | 100 | 107 | 0.14 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | 22.4 | 73 | 30.7 | 0.04 | 0 | 0.000 | 0 | 0.000 | 0 |
| Th | 199 | 66 | 300 | 0.40 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ti | 155 | 144 | 108 | 0.15 | 1 | 0.001 | 0 | 0.000 | 0 |
| U | 8790 | 81 | 10800 | 14.53 | 21 | 3.116 | 1 | 0.142 | 1 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | 154 | 75 | 204 | 0.27 | 21 | 0.056 | 17 | 0.037 | 14 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 217 | 126 | 173 | 0.23 | 1 | 0.003 | 14 | 0.033 | 14 |
| Zr | 1030 | 86 | 1200 | 1.61 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Temer 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO2- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 48300 | | 50400 | 67.82 | 48 | 32.321 | 89 | 31.718 | 47 |
| SO4-2 | 6210 | 104 | 5980 | 8.05 | 89 | 7.152 | 5 | 0.043 | 1 |
| F- | 5750 | 128 | 4510 | 6.07 | 75 | 4.570 | 73 | 1.091 | 18 |
| Cl- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample (Temer 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 3.52 | 75 | 4.69 | 6310.71 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 1.21 | 91 | 1.33 | 1789.60 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | 0.598 | 115 | 0.524 | 705.08 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 32.8 | 95 | 34.7 | 46691.19 | 29 | 13769.233 | 62 | 20263.977 | 43 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 2250 | 89 | 2530 | 3404285.78 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | | | | 0.00 | | 0.000 | 0 | 0.000 | |

***Notes:***

Temer, D. J. and R. Vallarreal. 1996. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: FY 1996 Results*, LAUR96-2839, Los Alamos National Laboratory, Los Alamos, New Mexico.

*C-107 (BiPO4 1C, CW) PNNL Experimental Results*

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 897 | Volume (kL) |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Temer 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 278 | 71 | 267 | 0.36 | 0 | 0.000 | 2 | 0.007 | 2 |
| Al | 43600 | 109 | 48300 | 64.99 | 1 | 0.650 | 78 | 50.043 | 77 |
| As | 76.8 | 90 | 2.37 | 0.00 | 0 | 0.000 | 23 | 0.001 | 23 |
| B | 21.5 | 11 | 2.69 | 0.00 | 20 | 0.001 | 48 | 0.001 | 38 |
| Ba | 644 | 97 | 384 | 0.52 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 99.8 | 80 | 11500 | 15.47 | 0 | 0.000 | 8 | 1.238 | 8 |
| Ca | 1020 | 81 | 448 | 0.60 | 4 | 0.024 | 1 | 0.006 | 1 |
| Cd | 109 | 91 | 46.5 | 0.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | 351 | 96 | 245 | 0.33 | 0 | 0.000 | 11 | 0.036 | 11 |
| Co | 38.8 | 92 | 9.89 | 0.01 | 0 | 0.000 | 16 | 0.002 | 16 |
| Cr | 607 | 106 | 325 | 0.44 | 34 | 0.149 | 23 | 0.066 | 15 |
| Cu | 207 | 82 | 102 | 0.14 | 0 | 0.000 | 9 | 0.012 | 9 |
| Fe | 75900 | 92 | 42500 | 57.19 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | | | 336 | 0.45 | | 0.000 | 0 | 0.000 | |
| La | 219 | 97 | 132 | 0.18 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | 169 | | 60.7 | 0.08 | 84 | 0.069 | 31 | 0.004 | 5 |
| Mg | 366 | 102 | 224 | 0.30 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 4020 | 93 | 1330 | 1.79 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 52 | 100 | 62.1 | 0.08 | 23 | 0.019 | 8 | 0.005 | 6 |
| Na | | | 64900 | 87.33 | | 0.000 | 0 | 0.000 | |
| Ni | | | 2390 | 3.22 | | 0.000 | 0 | 0.000 | |
| Pb | 4780 | 98 | 224 | 0.30 | 0 | 0.000 | 18 | 0.054 | 18 |
| Pd | | | 20.3 | 0.03 | | 0.000 | 0 | 0.000 | |
| Rh | | | 22.4 | 0.03 | | 0.000 | 0 | 0.000 | |
| Ru | | | 392 | 0.53 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 11300 | 95 | 7590 | 10.21 | 1 | 0.102 | 24 | 2.451 | 24 |
| Sn | | | 32.2 | 0.04 | | 0.000 | 0 | 0.000 | |
| Sr | 104 | 94 | 107 | 0.14 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | 30.7 | 0.04 | | 0.000 | 0 | 0.000 | |
| Th | | | 300 | 0.40 | | 0.000 | 0 | 0.000 | |
| Ti | 258 | 94 | 108 | 0.15 | 0 | 0.000 | 0 | 0.000 | 0 |
| U | 5470 | 107 | 10800 | 14.53 | 5 | 0.727 | 18 | 2.470 | 17 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | 204 | 0.27 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 114 | 68 | 173 | 0.23 | 0 | 0.000 | 26 | 0.061 | 26 |
| Zr | 4210 | 161 | 1200 | 1.61 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Temer 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO2- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 19700 | 151 | 50400 | 67.82 | 69 | 46.793 | 81 | 16.954 | 25 |
| SO4-2 | | | 5980 | 8.05 | | 0.000 | 0 | 0.000 | |
| F- | | | 4510 | 6.07 | | 0.000 | 0 | 0.000 | |
| Cl- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Lumetta 1996)** | **% recovery** | **uCi/g sample (Temer 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 6.67 | 96 | 4.69 | 6310.71 | 0 | 0.000 | 1 | 63.107 | 1 |
| Pu-239, 240 | 2.31 | 87 | 1.33 | 1789.60 | 1 | 17.896 | 1 | 17.896 | 1 |
| Am-241+Pu-238 | 4.19 | 98 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | | 100 | 0.524 | 705.08 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | 0.179 | 78 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cs-137 | 57 | 98 | 34.7 | 46691.19 | 13 | 6069.855 | 68 | 27547.803 | 59 |
| Co-60 | 0.915 | 95 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Eu-154 | 5.38 | 114 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Eu-155 | 4.78 | 114 | | 6431.81 | 0 | 0.000 | 0 | 0.000 | 0 |
| Sr-90 | 3260 | 127 | 2530 | 3404285.78 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | 0.029 | 142 | | 0.00 | 97 | 0.000 | 0 | 0.000 | 0 |

***Notes:***

Component inventories derived from Temer 1996 (mass balance 95% vs PNNL mass balance of 85%).


Lumetta, G. J., B. M. Rapko, M. J. Wagner, and J. Liu. 1996. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY 1996 Studies*, PNNL-11278, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

Temer, D. J. and R. Vallarreal. 1996. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: FY 1996 Results*, LAUR96-2839, Los Alamos National Laboratory, Los Alamos, New Mexico.

***C-108 [TBP(f), 1C] Experimental Results***

| | |
|---|---|
| 1.3 | Density (g/mL) |
| 250 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 77400 | 119 | 52100 | 16.93 | 3 | 0.513 | 93 | 15.327 | 91 |
| As | 1.99 | 233 | | 0.00 | 45 | 0.000 | 71 | 0.000 | 39 |
| B | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ba | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ca | | | 12700 | 4.13 | 0 | 0.009 | 0 | 0.000 | 0 |
| Cd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cr | 189 | 78 | NR | 0.06 | 76 | 0.047 | 18 | 0.003 | 4 |
| Cu | 16.7 | 93 | | 0.00 | 0 | 0.000 | 3 | 0.000 | 3 |
| Fe | 4900 | 153 | 7160 | 2.33 | 9 | 0.202 | 13 | 0.278 | 12 |
| K | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 187 | 88 | | 0.06 | 1 | 0.001 | 0 | 0.000 | 0 |
| Mn | 28.6 | | | 0.01 | 1 | 0.000 | 1 | 0.000 | 1 |
| Mo | | | | 0.00 | | 0.000 | 2 | 0.000 | 2 |
| Na | 75700 | 95 | 94100 | 30.58 | 62 | 18.961 | 0 | 0.000 | |
| Ni | 9720 | 128 | | 3.16 | 0 | 0.015 | 0 | 0.001 | 0 |
| Pb | 196 | 121 | | 0.00 | 0 | 0.000 | 3 | 0.000 | 3 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | 1.5 | 136 | | 0.00 | 92 | 0.000 | 34 | 0.000 | 3 |
| Ru | 5.29 | 113 | | 0.00 | 82 | 0.000 | 37 | 0.000 | 7 |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 1910 | 110 | | 0.62 | 3 | 0.016 | 12 | 0.072 | 12 |
| Sn | 10.1 | 122 | | 0.00 | 44 | 0.001 | 0 | 0.000 | |
| Sr | 195 | 134 | | 0.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 54.2 | 94 | | 0.00 | 3 | 0.000 | 0 | 0.000 | 0 |
| U | 2790 | 121 | 421 | 0.14 | 10 | 0.014 | 0 | 0.000 | |
| V | 13.9 | 501 | | 0.00 | 20 | 0.000 | 72 | 0.000 | 58 |
| W | 1.44 | 89 | | 0.00 | 56 | 0.000 | 10 | 0.000 | 4 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | |
| Zr | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample Appendix | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 43400 | 14.11 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 24100 | 7.83 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 76800 | 100 | 77700 | 25.25 | 75 | 18.939 | 0 | 0.013 | 0 |
| SO4-2 | 5590 | 94 | 6690 | 2.17 | 94 | 2.044 | 7 | 0.009 | 0 |
| F- | 2030 | 92 | 3740 | 1.22 | 96 | 1.167 | 15 | 0.007 | 1 |
| Cl- | | | 729 | 0.24 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample Appendix** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.275 | 14 | | 89.38 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.0903 | 9 | 0.006 | 1.95 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.029 | 9.43 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 250.69 | 95 | 118 | 38350.00 | 4 | 1534.000 | 100 | 36789.155 | 96 |
| Co-60 | | | 0.005 | 1.63 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 24.7 | 143 | | 8027.50 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | | | | 0.00 | | 0.000 | 0 | 0.000 | |

***Notes:***
Characterization data worksheet in Appendix.

Temer, D. J. and R. Villarreal. 1995. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: A Status Report*, LAUR 95-2070, Los Alamos National Laboratory, Los Alamos, New Mexico.

*C-109 [TBP(f), BiPO4 1C] Experimental Results*

| | |
|---|---|
| 1.2 | Density (g/mL) |
| 235 | Volume (kL) |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 54000 - 140000 | | 122000 | 34.36 | 5 | 1.718 | 80 | 26.110 | 76 |
| As | 12 - 510 | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | 14 - 350 | | 91 | 0.03 | 0 | 0.000 | 0 | 0.000 | |
| Ba | 120 - 250 | | 64.3 | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | |
| Bi | 1900 - 4600 | | 12300 | 3.46 | | 0.000 | 0 | 0.000 | 0 |
| Ca | 8000 - 13000 | | 19800 | 5.58 | 1 | 0.056 | 1 | 0.056 | 1 |
| Cd | | | 10 | 0.00 | | 0.000 | 0 | 0.000 | |
| Ce | 96 - 540 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | |
| Co | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cr | 340 - 450 | | 245 | 0.07 | 73 | 0.050 | 52 | 0.010 | 14 |
| Cu | | | 71 | 0.02 | | 0.000 | 0 | 0.000 | |
| Fe | 9100 - 16000 | | 18900 | 5.32 | 4 | 0.213 | 1 | 0.053 | 1 |
| K | | | 517 | 0.15 | | 0.000 | 0 | 0.000 | |
| La | 770 - 1300 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 240 - 970 | | 491 | 0.14 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 810 - 1400 | | 123 | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 57000 | | 84200 | 23.71 | 76 | 18.020 | 0 | 0.000 | |
| Ni | | | 13300 | 3.75 | | 0.000 | 0 | 0.000 | |
| Pb | 3400 - 5000 | | 4740 | 1.33 | 0 | 0.000 | 43 | 0.574 | 43 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | 16 - 460 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | |
| Si | 5400 - 49000 | | 9040 | 2.55 | 3 | 0.076 | 13 | 0.331 | 13 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 140 - 290 | | 186 | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 7300 - 19000 | | 8490 | 2.39 | 0 | 0.000 | 0 | 0.000 | 0 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 62 - 180 | | 369 | 0.10 | 0 | 0.000 | 0 | 0.000 | 0 |
| Zr | 120 - 400 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 36500 | 10.28 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 39000 | 10.98 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 22200 - 28800 | | 58600 | 16.50 | 30 | 4.951 | 17 | 1.980 | 12 |
| SO4-2 | | | 6950 | 1.96 | | 0.000 | 0 | 0.000 | |
| F- | | | 400 | 0.11 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 700 | 0.20 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **range uCi/g sample (Lumetta 1994)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | | | 0.448 | 126.16 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.225 | 63.36 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 405 - 4170 | | 715 | 201346.86 | 5 | 10067.343 | 98 | 187252.580 | 93 |
| Co-60 | | | 0.014 | 3.94 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 610 - 1640 | | 1055 | 297092.22 | 0 | 0.000 | 1 | 2970.922 | 1 |
| Tc-99 | 0.04 - 0.044 | | 0.101 | 28.44 | 95 | 27.020 | 40 | 0.569 | 2 |

***Notes:***

Less than wash, leach values entered above as zero.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Lumetta, G. J. and B. M. Rapko. 1994. *Washing and Alkaline Leaching of Hanford Sludges: A Status Report*, PNL-10078, Pacific Northwest National Laboratory, Richland Washington.

***C-112 [TBP(f), BiPO4 1C] Experimental Results***

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 394 | Volume (kL) |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 4500 - 11000 | | 18100 | 10.69 | 25 | 2.672 | 80 | 6.412 | 60 |
| As | 17 - 2900 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | |
| B | 840 - 2900 | | 128 | 0.08 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ba | 36 - 290 | | 86.9 | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 760 - 12000 | | 6400 | 3.78 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 11000 - 26000 | | 24700 | 14.58 | 1 | 0.146 | 0 | 0.000 | 0 |
| Cd | | | 5.5 | 0.00 | | 0.000 | 0 | 0.000 | |
| Ce | 66 - 480 | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | 45 - 3400 | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cr | 270 - 1400 | | 251 | 0.15 | 47 | 0.070 | 75 | 0.059 | 40 |
| Cu | 59 - 370 | | 57.3 | 0.03 | 0 | 0.000 | 0 | 0.000 | |
| Fe | 18000 - 68000 | | 24400 | 14.41 | 2 | 0.288 | 4 | 0.576 | 4 |
| K | | | 625 | 0.37 | | 0.000 | 0 | 0.000 | |
| La | 33 - 240 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 170 - 5400 | | 563 | 0.33 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 160 - 770 | | 236 | 0.14 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 160000 | | 118000 | 69.67 | 72 | 50.165 | 46 | 9.058 | 13 |
| Ni | | | 14200 | 8.38 | | 0.000 | 0 | 0.000 | |
| Pb | 770 - 2600 | | 2190 | 1.29 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 980 - 28000 | | 2550 | 1.51 | 4 | 0.060 | 14 | 0.196 | 13 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 370 - 920 | | 319 | 0.19 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 99000 - 240000 | | 59700 | 35.25 | 0 | 0.000 | 0 | 0.000 | 0 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 170 - 700 | | 357 | 0.21 | 0 | 0.000 | 0 | 0.000 | 0 |
| Zr | 60 - 1800 | | 25.7 | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 75700 | 44.70 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 57300 | 33.83 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 126000 - 177000 | | 88100 | 52.02 | 45 | 23.409 | 71 | 20.288 | 39 |
| SO4-2 | | | 14700 | 8.68 | | 0.000 | 0 | 0.000 | |
| F- | | | 725 | 0.43 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 1170 | 0.69 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **range uCi/g sample (Lumetta 1994)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | | | 0.107 | 63.18 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.342 | 201.94 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 870 - 27000 | | 795 | 469415.70 | 4 | 18776.628 | 98 | 441250.758 | 94 |
| Co-60 | | | 0.02 | 11.81 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 68 - 250 | | 2000 | 1180920.00 | 0 | 0.000 | 1 | 11809.200 | 1 |
| Tc-99 | 0.073 | | 0.124 | 73.22 | 97 | 71.021 | 0 | 0.000 | 0 |

***Notes:***

Less than wash, leach values entered above as zero.

Bi value based on average of values reported in Lumetta 1994; no value reported in characterization report used for Colton 1995.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Lumetta, G. J. and B. M. Rapko. 1994. *Washing and Alkaline Leaching of Hanford Sludges: A Status Report*, PNL-10078, Pacific Northwest National Laboratory, Richland Washington.

***S-104 (REDOX) LANL Experimental Results***

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 1109 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 121000 | 111 | 118000 | 196.29 | 4 | 7.263 | 30 | 57.122 | 29 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | | | 39.2 | 0.07 | 50 | 0.032 | 22 | 0.007 | 11 |
| Ba | 37.4 | 145 | 33.3 | 0.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 16.8 | 40 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 264 | 130 | 1910 | 3.18 | 2 | 0.077 | 0 | 0.008 | 0 |
| Cd | 0.782 | | | 0.001 | 0 | 0.000 | 5 | 0.000 | 5 |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | 6.73 | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cr | 2060 | 102 | 4290 | 7.14 | 87 | 6.194 | 73 | 0.684 | 10 |
| Cu | 50.3 | 107 | 51.8 | 0.09 | 1 | 0.001 | 43 | 0.037 | 42 |
| Fe | 2530 | 98 | 2490 | 4.14 | 0 | 0.000 | 0 | 0.014 | 0 |
| K | | | 300 | 0.50 | 1 | 0.004 | 0 | 0.002 | 0 |
| La | 15.9 | | | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | 1.68 | 79 | | 0.00 | | 0.000 | 1 | 0.000 | 1 |
| Mg | 65.9 | 82 | 53.5 | 0.09 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 1110 | 93 | 1090 | 1.81 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 15.1 | | | 0.03 | 63 | 0.016 | 24 | 0.002 | 9 |
| Na | 288000 | 254 | 119000 | 197.96 | 38 | 75.481 | 94 | 114.697 | 58 |
| Ni | | | 56 | 0.09 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pb | 40.1 | 116 | 38.5 | 0.06 | 1 | 0.001 | 24 | 0.015 | 24 |
| Pd | 0.672 | 120 | | 0.00 | 36 | 0.000 | 23 | 0.000 | 15 |
| Rh | 4.13 | 121 | | 0.01 | 0 | 0.000 | 1 | 0.000 | 1 |
| Ru | 13 | 123 | | 0.02 | 0 | 0.000 | 1 | 0.000 | 1 |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 3180 | 267 | 1460 | 2.43 | 60 | 1.466 | 8 | 0.079 | 3 |
| Sn | 5.92 | 112 | | 0.01 | 40 | 0.004 | 49 | 0.003 | 29 |
| Sr | 338 | 81 | 418 | 0.70 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 13.5 | 126 | | 0.02 | 1 | 0.000 | 1 | 0.000 | 1 |
| U | 5610 | 131 | 6620 | 11.01 | 0 | 0.000 | 0 | 0.006 | 0 |
| V | 26.5 | 114 | | 0.04 | 7 | 0.003 | 3 | 0.001 | 3 |
| W | 18.8 | 118 | | 0.03 | 57 | 0.018 | 94 | 0.013 | 41 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 25.4 | 83 | 325 | 0.54 | 26 | 0.138 | 43 | 0.175 | 32 |
| Zr | | | 645 | 1.07 | 0 | 0.000 | 0 | 0.002 | 0 |

***S-104 (REDOX) LANL Experimental Results (Continued)***

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 186000 | 309.41 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 20800 | 34.60 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 176 | 106 | 289 | 0.48 | 0 | 0.000 | 8 | 0.040 | 8 |
| SO4-2 | 2760 | 87 | 2370 | 3.94 | 47 | 1.846 | 5 | 0.103 | 3 |
| F- | 289 | 68 | 145 | 0.24 | 30 | 0.072 | 9 | 0.015 | 6 |
| Cl- | | | 3170 | 5.27 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | | | 0.284 | 472.44 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | | | 0.118 | 196.29 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | | | 63.2 | 105133.67 | 86 | 90551.633 | 71 | 10376.694 | 10 |
| Co-60 | | | 0.033 | 54.90 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | | | 303 | 504042.77 | 0 | 0.000 | 0 | 252.021 | 0 |
| Tc-99 | | | 0.025 | 41.59 | 0 | 0.000 | 0 | 0.000 | 0 |

***Notes:***


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Temer, D. J. and R. Villarreal. 1995. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: A Status Report*, LAUR 95-2070, Los Alamos National Laboratory, Los Alamos, New Mexico.

***S-104 (REDOX) PNNL Experimental Results***

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 1109 | Volume (kL) |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 2.15 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Al | 115000 | 118 | 118000 | 196.29 | 3 | 5.889 | 36 | 68.703 | 35 |
| As | 153 | 117 | | 0.25 | 0 | 0.000 | 58 | 0.148 | 58 |
| B | 216 | 19 | 39.2 | 0.07 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ba | 38.7 | 99 | 33.3 | 0.06 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 17.2 | | | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 610 | 42 | 1910 | 3.18 | 21 | 0.667 | 20 | 0.508 | 16 |
| Cd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ce | 19.4 | | | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| Co | 4.3 | | 6.73 | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cr | 2670 | 87 | 4290 | 7.14 | 90 | 6.423 | 60 | 0.428 | 6 |
| Cu | 52.6 | 38 | 51.8 | 0.09 | 0 | 0.000 | 2 | 0.002 | 2 |
| Fe | 2610 | 118 | 2490 | 4.14 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | | | 300 | 0.50 | | 0.000 | 0 | 0.000 | |
| La | 12.9 | | | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 86 | 66 | 53.5 | 0.09 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 1550 | 108 | 1090 | 1.81 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 0.446 | | | 0.00 | 0 | 0.000 | 100 | 0.001 | 100 |
| Na | | | 119000 | 197.96 | 76 | 150.448 | 0 | 0.000 | |
| Ni | | | 56 | 0.09 | | 0.000 | 0 | 0.000 | |
| Pb | | | 38.5 | 0.06 | | 0.000 | 0 | 0.000 | |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | 20.4 | | | 0.03 | 0 | 0.000 | 26 | 0.009 | 26 |
| Si | 1090 | 25 | 1460 | 2.43 | 0 | 0.000 | 0 | 0.000 | 0 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 474 | | 418 | 0.70 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 14 | | | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| U | 7630 | 116 | 6620 | 11.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | 4.3 | | | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Zn | 96.5 | 148 | 325 | 0.54 | 54 | 0.292 | 52 | 0.130 | 24 |
| Zr | 34.4 | | 645 | 1.07 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | 154000 | | 186000 | 309.41 | 94 | 290.848 | 100 | 18.565 | 6 |
| NO2- | 90600 | | 20800 | 34.60 | 36 | 12.456 | 100 | 22.145 | 64 |
| PO4-3 | | | 289 | 0.48 | 45 | 0.216 | 0 | 0.000 | |
| SO4-2 | 1240 | 9 | 2370 | 3.94 | 100 | 3.943 | #DIV/0! | #DIV/0! | |
| F- | | | 145 | 0.24 | | 0.000 | 0 | 0.000 | |
| Cl- | 2570 | | 3170 | 5.27 | 91 | 4.799 | 89 | 0.422 | 8 |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Rapko 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.584 | 123 | | 971.49 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.434 | 122 | 0.284 | 472.44 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | 0.151 | 126 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | 0.157 | 97 | 0.118 | 196.29 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 57.1 | 96 | 63.2 | 105133.67 | 90 | 94620.307 | 80 | 8410.694 | 8 |
| Co-60 | | | 0.033 | 54.90 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 351 | 110 | 303 | 504042.77 | | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | 0.021 | 118 | 0.025 | 41.59 | 95 | 39.508 | 100 | 2.079 | 5 |

***Notes:***

Na measurement impractical due to method of sample prep (Rapko 1995); therefore, Na wash factor based on Colton 1995.
PO4 measurement below detection limit for Rapko 1995; therefore PO4 wash factor based on Colton 1995.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Rapko, B. M., G. J. Lumetta, M. J. Wagner. 1995. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY1995 Studies*, PNL-10712, Pacific Northwest National Laboratory, Richland Washington.

***S-107 (R-RCW/EB) Experimental Results***

| | |
|---|---|
| 1.4 | Density (g/mL) |
| 1370 | Volume (kL) |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | 19 | 0.04 | | 0.000 | 0 | 0.000 | |
| Al | 127000 | 99 | 125000 | 239.78 | 8 | 19.182 | 71 | 155.857 | 65 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | | | 100 | 0.19 | 79 | 0.152 | 90 | 0.036 | 19 |
| Ba | 24.8 | 103 | 21.3 | 0.04 | | 0.000 | 0 | 0.000 | |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | | | 42.7 | 0.08 | | 0.000 | 12 | 0.010 | 12 |
| Ca | 1370 | 127 | 523 | 1.00 | 14 | 0.140 | 29 | 0.251 | 25 |
| Cd | | | 3.98 | 0.01 | | 0.000 | 0 | 0.000 | |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | 8.53 | 0.02 | | 0.000 | 0 | 0.000 | |
| Cr | 3510 | 96 | 2840 | 5.45 | 24 | 1.307 | 39 | 1.634 | 30 |
| Cu | | | 27.3 | 0.05 | | 0.000 | 16 | 0.008 | 16 |
| Fe | 2520 | 96 | 2280 | 4.37 | 0 | 0.000 | 3 | 0.131 | 3 |
| K | | | 547 | 1.05 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 195 | | 133 | 0.26 | 11 | 0.028 | 27 | 0.061 | 24 |
| Mn | 677 | 88 | 587 | 1.13 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 41.5 | | | 0.08 | 100 | 0.080 | #DIV/0! | #DIV/0! | |
| Na | 63440 | 65 | 92700 | 177.82 | 93 | 165.373 | 0 | 0.000 | |
| Ni | | | 797 | 1.53 | | 0.000 | 0 | 0.000 | |
| Pb | 471 | | 127 | 0.24 | 0 | 0.000 | 60 | 0.146 | 60 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 6590 | 151 | 4540 | 8.71 | 44 | 3.832 | 80 | 3.919 | 45 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 300 | 102 | 234 | 0.45 | | 0.000 | 0 | 0.000 | |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 32.7 | 89 | | 0.06 | | 0.000 | 0 | 0.000 | |
| U | 6950 | 81 | 7380 | 14.16 | 0 | 0.000 | 4 | 0.566 | 4 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 306 | 78 | 181 | 0.35 | 3 | 0.010 | 23 | 0.076 | 22 |
| Zr | 10248 | 173 | 5300 | 10.17 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Lumetta 1996) | % recovery | ug/g sample (Appendix) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 58000 | 111.26 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 31300 | 60.04 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 7880 | 293 | 6320 | 12.12 | 100 | 12.123 | #DIV/0! | #DIV/0! | |
| SO4-2 | | | 2790 | 5.35 | | 0.000 | 0 | 0.000 | |
| F- | | | 14000 | 26.86 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 1920 | 3.68 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Lumetta 1996)** | **% recovery** | **uCi/g sample (Appendix)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 1.01 | 96 | 1.13 | 2167.61 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.508 | 93 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | 0.487 | 101 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | 0.379 | 98 | 0.701 | 1344.68 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | 69 | | 0.00 | | 0.000 | 0 | 0.000 | 0 |
| Cs-137 | 83.6 | 97 | 78.2 | 150006.21 | 77 | 115504.783 | 100 | 34501.429 | 23 |
| Co-60 | 0.0854 | 93 | 0.093 | 178.40 | 0 | 0.000 | 3 | 5.352 | 3 |
| Eu-154 | 0.112 | 99 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Eu-155 | 0.0726 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Sr-90 | 134 | 95 | 174 | 333773.41 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | 0.0714 | 84 | | 136.96 | 98 | 134.223 | 0 | 0.000 | 0 |

***Notes:***
Characterization worksheet provided in Appendix.

Lumetta, G. J., B. M. Rapko, M. J. Wagner, and J. Liu. 1996. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY 1996 Studies,* PNNL-11278, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington.

*T-104 (BiPO4 1C) LANL Experimental Results*

| | |
|---|---|
| 1.15 | Density (g/mL) |
| 1673 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 5 | 0.000 | 5 |
| Al | 15939.2 | 102 | 16200 | 31.17 | 1 | 0.293 | 63 | 19.536 | 63 |
| As | | | | 0.00 | | 0.000 | 36 | 0.000 | 36 |
| B | | | 13.9 | 0.03 | | 0.000 | 0 | 0.000 | |
| Ba | 8.487 | 100 | 8.8 | 0.02 | 1 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 15177.4 | 127 | 18900 | 36.36 | 0 | 0.000 | 0 | 0.087 | 0 |
| Ca | 147.086 | 125 | 664 | 1.28 | 4 | 0.045 | 6 | 0.070 | 6 |
| Cd | | | 5.53 | 0.01 | 0 | 0.000 | 13 | 0.001 | 13 |
| Ce | 160.564 | | | 0.31 | | 0.000 | 0 | 0.000 | |
| Co | 0.83212 | | 10.9 | 0.02 | 7 | 0.001 | 1 | 0.000 | 1 |
| Cr | 735.43 | 117 | 916 | 1.76 | 17 | 0.300 | 40 | 0.585 | 33 |
| Cu | 22.5903 | 144 | 46.9 | 0.09 | 0 | 0.000 | 32 | 0.029 | 32 |
| Fe | | | 9020 | 17.35 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | 958.11 | 52 | 85.7 | 0.16 | | 0.000 | 0 | 0.000 | |
| La | 0.6446 | 103 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | | | 159 | 0.31 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | | | 59.6 | 0.11 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 2.2268 | 109 | | 0.00 | 71 | 0.003 | 70 | 0.001 | 20 |
| Na | 158220 | 269 | 64500 | 124.09 | 25 | 31.271 | 95 | 88.391 | 71 |
| Ni | | | 12.7 | 0.02 | 0 | 0.000 | 2 | 0.001 | 2 |
| Pb | 48.638 | 113 | 61.2 | 0.12 | 0 | 0.000 | 2 | 0.003 | 2 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | 0.09376 | 80 | | 0.00 | 21 | 0.000 | 18 | 0.000 | 14 |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 3398.8 | 72 | 6440 | 12.39 | 42 | 5.179 | 38 | 2.774 | 22 |
| Sn | | | | 0.00 | | 0.000 | 86 | 0.000 | 86 |
| Sr | 82.333 | 105 | 98.8 | 0.19 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | 1.08703 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 835.05 | 93 | 867 | 1.67 | 1 | 0.010 | 14 | 0.233 | 14 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | 0.223559 | | | 0.00 | 60 | 0.000 | 70 | 0.000 | 28 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | | | 152 | 0.29 | 0 | 0.000 | 32 | 0.095 | 32 |
| Zr | 144.156 | 94 | 69.1 | 0.13 | 1 | 0.001 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 58000 | 111.59 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 4070 | 7.83 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 65200 | 110 | 73900 | 142.18 | 27 | 37.748 | 100 | 104.500 | 74 |
| SO4-2 | | | 3890 | 7.48 | 60 | 4.459 | 20 | 0.598 | 8 |
| F- | | | 8580 | 16.51 | 27 | 4.457 | 98 | 11.869 | 72 |
| Cl- | | | 670 | 1.29 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.60944 | 82 | | 1172.51 | 0 | 0.000 | 1 | 17.470 | 1 |
| Pu-239, 240 | 0.19924 | 64 | | 383.32 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | | | 0.017 | 32.71 | 0 | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 0.13478 | 94 | | 259.31 | 12 | 31.895 | 18 | 41.489 | 16 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 1.23939 | 70 | 2.61 | 5021.42 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | | | 0.001 | 1.92 | | 0.000 | 0 | 0.000 | |

***Notes:***


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Temer, D. J. and R. Villarreal. 1995. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: A Status Report*, LAUR 95-2070, Los Alamos National Laboratory, Los Alamos, New Mexico.

***T-104 (BiPO4 1C) PNNL Experimental Results***

| | |
|---|---|
| 1.15 | Density (g/mL) |
| 1673 | Volume (kL) |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Al | 12600 | 91 | 16200 | 31.17 | 1 | 0.312 | 62 | 19.012 | 61 |
| As | 26.7 | | | 0.00 | 0 | 0.000 | 51 | 0.000 | 51 |
| B | 163 | 25 | 13.9 | 0.03 | 2 | 0.001 | 0 | 0.000 | 0 |
| Ba | 10.2 | | 8.8 | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 16100 | 105 | 18900 | 36.36 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 357 | 94 | 664 | 1.28 | 23 | 0.294 | 5 | 0.051 | 4 |
| Cd | | | 5.53 | 0.01 | | 0.000 | 0 | 0.000 | |
| Ce | 204 | 174 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Co | 4.37 | 50 | 10.9 | 0.02 | 17 | 0.004 | 0 | 0.000 | 0 |
| Cr | 914 | 101 | 916 | 1.76 | 0 | 0.000 | 10 | 0.176 | 10 |
| Cu | 67.1 | 327 | 46.9 | 0.09 | | 0.000 | 0 | 0.000 | 0 |
| Fe | 8610 | 105 | 9020 | 17.35 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | | | 85.7 | 0.16 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 73 | 83 | 159 | 0.31 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 108 | 61 | 59.6 | 0.11 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | | | 64500 | 124.09 | 72 | 89.347 | 0 | 0.000 | |
| Ni | | | 12.7 | 0.02 | | 0.000 | 0 | 0.000 | |
| Pb | 43.6 | 75 | 61.2 | 0.12 | 0 | 0.000 | 0 | 0.000 | |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | 14.6 | | | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| Si | 5600 | 83 | 6440 | 12.39 | 0 | 0.000 | 1 | 0.124 | 1 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 97.6 | | 98.8 | 0.19 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 13.7 | | | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| U | 1190 | | 867 | 1.67 | 1 | 0.017 | 8 | 0.133 | 8 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 82.3 | | 152 | 0.29 | 46 | 0.135 | 13 | 0.020 | 7 |
| Zr | 36.6 | | 69.1 | 0.13 | 0 | 0.000 | 1 | 0.001 | 1 |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 58000 | 111.59 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 4070 | 7.83 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 60400 | 100 | 73900 | 142.18 | 26 | 36.966 | 97 | 102.368 | 72 |
| SO4-2 | 3580 | | 3890 | 7.48 | 89 | 6.661 | 0 | 0.000 | |
| F- | 7090 | | 8580 | 16.51 | 57 | 9.409 | 100 | 7.098 | 43 |
| Cl- | 853 | | 670 | 1.29 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Rapko 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.187 | 122 | | 359.77 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.156 | 142 | | 300.13 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | 0.027 | 66 | | 51.95 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | 0.0261 | 124 | 0.017 | 32.71 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 0.181 | 26 | | 348.23 | 0 | 0.000 | 69 | 240.278 | 69 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 3.78 | 103 | 2.61 | 5021.42 | 0 | 0.000 | 1 | 50.214 | 1 |
| Tc-99 | 0.0001 | | 0.001 | 1.92 | 0 | 0.000 | 0 | 0.000 | 0 |

***Notes:***

Na measurement impractical due to method of sample prep (Rapko 1995); therefore, Na wash factor based on Colton 1995.
PO4 leach factor based on Rapko 1996.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Rapko, B. M., G. J. Lumetta, M. J. Wagner. 1995. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY1995 Studies*, PNL-10712, Pacific Northwest National Laboratory, Richland Washington.

*T-107 (TBP(f), BiPO4 1C) Experimental Results*

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 655 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 0.82 | | | 0.00 | 45 | 0.000 | 5 | 0.000 | 3 |
| Al | 30900 | 109 | 16300 | 16.01 | 4 | 0.570 | 77 | 11.910 | 74 |
| As | | | | 0.00 | 28 | 0.000 | 0 | 0.000 | |
| B | | | 13 | 0.01 | 44 | 0.006 | 17 | 0.001 | 9 |
| Ba | 46 | | | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 13500 | | 12000 | 11.79 | 0 | 0.004 | 0 | 0.041 | 0 |
| Ca | 635 | 111 | 761 | 0.75 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cd | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cr | 337 | 94 | 360 | 0.35 | 42 | 0.148 | 32 | 0.066 | 19 |
| Cu | | | | 0.00 | 0 | 0.000 | 4 | 0.000 | 4 |
| Fe | 26300 | 116 | 31500 | 30.94 | 0 | 0.025 | 0 | 0.006 | 0 |
| K | | | 315 | 0.31 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | | | 226 | 0.22 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | | | 221 | 0.22 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 11.8 | | | 0.01 | 89 | 0.010 | 84 | 0.001 | 9 |
| Na | 82000 | 68 | 130000 | 127.69 | 51 | 65.120 | 78 | 48.559 | 38 |
| Ni | | | 290 | 0.28 | 1 | 0.002 | 0 | 0.000 | 0 |
| Pb | 565 | 69 | 796 | 0.78 | 0 | 0.000 | 1 | 0.011 | 1 |
| Pd | 2.09 | | | 0.00 | 16 | 0.000 | 12 | 0.000 | 10 |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | 16.3 | | | 0.02 | 44 | 0.007 | 9 | 0.001 | 5 |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 5000 | 82 | 6060 | 5.95 | 28 | 1.649 | 6 | 0.276 | 5 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 835 | 110 | 962 | 0.94 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 18800 | 94 | 25400 | 24.95 | 4 | 0.943 | 0 | 0.077 | 0 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | 63.5 | | | 0.06 | | 0.000 | 40 | 0.025 | 40 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zr | | | 93.2 | 0.09 | 1 | 0.001 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 74500 | 73.17 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 11700 | 11.49 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 84700 | 104 | 96200 | 94.49 | 85 | 80.315 | 87 | 12.397 | 13 |
| SO4-2 | 9750 | 71 | 10600 | 10.41 | 79 | 8.225 | 0 | 0.000 | 0 |
| F- | 5750 | 127 | 11400 | 11.20 | 87 | 9.742 | 0 | 0.000 | 0 |
| Cl- | | | 540 | 0.53 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 2.26 | 67 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.28 | 27 | 0.152 | 149.30 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | 0.01 | 54 | 0.014 | 13.75 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 6.4 | 82 | 21.5 | 21117.46 | 25 | 5226.572 | 88 | 13918.519 | 66 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 103 | 118 | 109 | 107060.62 | 0 | 53.530 | 0 | 0.000 | 0 |
| Tc-99 | | | 0.051 | 50.09 | 83 | 41.507 | 0 | 0.000 | 0 |

***Notes:***


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Temer, D. J. and R. Villarreal. 1995. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: A Status Report*, LAUR 95-2070, Los Alamos National Laboratory, Los Alamos, New Mexico.

*T-111 (BiPO42C, BiPO4 224) Experimental Results*

| | |
|---|---|
| 1.1 | Density (g/mL) |
| 1715 | Volume (kL) |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 57.6 | 120 | | 0.11 | 2 | 0.002 | 0 | 0.000 | 0 |
| Al | 883 | 75 | 570 | 1.08 | 0 | 0.000 | 13 | 0.140 | 13 |
| As | 26.9 | | | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| B | 442 | | 32.1 | 0.06 | 60 | 0.036 | 18 | 0.004 | 7 |
| Ba | 44.4 | 93 | 69 | 0.13 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 14800 | 98 | 25900 | 48.85 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 2980 | 78 | 2420 | 4.56 | 0 | 0.000 | 1 | 0.046 | 1 |
| Cd | 8.06 | 67 | | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | 26.9 | | | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Co | 8.06 | 34 | 11.5 | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cr | 1180 | 109 | 1970 | 3.72 | 24 | 0.892 | 53 | 1.486 | 40 |
| Cu | 34.1 | 4 | 33.6 | 0.06 | 0 | 0.000 | 5 | 0.003 | 5 |
| Fe | 17500 | 122 | 18500 | 34.89 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | | | 1130 | 2.13 | | 0.000 | 0 | 0.000 | |
| La | 2690 | 122 | 4220 | 7.96 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 566 | 118 | 377 | 0.71 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 12900 | 102 | 6330 | 11.94 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mo | 5.38 | | | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Na | | | 37000 | 69.78 | 89 | 62.108 | 0 | 0.000 | |
| Ni | | | 131 | 0.25 | | 0.000 | 0 | 0.000 | |
| Pb | 478 | 100 | 365 | 0.69 | 0 | 0.000 | 2 | 0.014 | 2 |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | 13.5 | | | 0.03 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | 53.8 | | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Si | 11300 | 100 | 5670 | 10.69 | 20 | 2.139 | 50 | 4.278 | 40 |
| Sn | 135 | | | 0.25 | 0 | 0.000 | 0 | 0.000 | 0 |
| Sr | 175 | 107 | 298 | 0.56 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 148 | 171 | | 0.28 | 0 | 0.000 | 0 | 0.000 | 0 |
| U | 5420 | 100 | 2800 | 5.28 | 0 | 0.000 | 2 | 0.106 | 2 |
| V | 0.237 | | | 0.00 | 0 | 0.000 | 100 | 0.000 | 100 |
| W | 135 | | | 0.25 | 0 | 0.000 | 0 | 0.000 | 0 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 151 | 48 | 106 | 0.20 | 0 | 0.000 | 27 | 0.054 | 27 |
| Zr | 16.1 | | 4 | 0.01 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Rapko 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 41300 | 77.89 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 793 | 1.50 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 18900 | 101 | 31300 | 59.03 | 50 | 29.517 | 46 | 13.578 | 23 |
| SO4-2 | 4130 | 86 | 3670 | 6.92 | 64 | 4.430 | 0 | 0.000 | |
| F- | | | 2310 | 4.36 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 450 | 0.85 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Rapko 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | 0.42 | 103 | | 792.15 | 0 | 0.000 | 0 | 0.000 | 0 |
| Pu-239, 240 | 0.384 | 107 | 0.139 | 262.16 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | 0.0358 | 65 | | 67.52 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241 (gamma) | 0.0638 | 106 | 0.043 | 81.10 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 0.326 | 118 | 0.166 | 313.09 | 25 | 78.272 | 41 | 97.057 | 31 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 10.8 | 109 | 5.42 | 10222.48 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | 0.0003 | | | 0.57 | 12 | 0.068 | 0 | 0.000 | 0 |

***Notes:***

Na measurement impractical due to method of sample prep (Rapko 1995); therefore, Na wash factor based on Colton 1995.

Anion measurements could not be accurately determined due to matrix effects (Rapko 1995).


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Rapko, B. M., G. J. Lumetta, M. J. Wagner. 1995. *Washing and Caustic Leaching of Hanford Tank Sludges: Results of FY1995 Studies*, PNL-10712, Pacific Northwest National Laboratory, Richland Washington.

*TY-104 [TBP, BiPO4 1C(f)] Experimental Results*

| | |
|---|---|
| 1.69 | Density (g/mL) |
| 163 | Volume (kL) |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 15 | 90 | 12.4 | 0.00 | 68 | 0.002 | 73 | 0.001 | 24 |
| Al | 17300 | 94 | 9090 | 2.50 | 9 | 0.228 | 60 | 1.354 | 54 |
| As | 4.82 | 112 | | 0.00 | 60 | 0.001 | 76 | 0.000 | 30 |
| B | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ba | 75.7 | 91 | | 0.02 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 27000 | 60 | 17700 | 4.87 | 0 | 0.002 | 1 | 0.038 | 1 |
| Ca | 748 | 92 | | 0.21 | 1 | 0.002 | 0 | 0.000 | 0 |
| Cd | 9.03 | 92 | 12.8 | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ce | 188 | 85 | | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Co | 3.34 | 82 | | 0.00 | 3 | 0.000 | 0 | 0.000 | 0 |
| Cr | 1360 | 83 | 2310 | 0.64 | 72 | 0.460 | 50 | 0.087 | 14 |
| Cu | 35 | 95 | | 0.01 | 0 | 0.000 | 12 | 0.001 | 12 |
| Fe | 26000 | 88 | 32600 | 8.97 | 1 | 0.058 | 0 | 0.008 | 0 |
| K | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| La | 9.93 | 86 | | 0.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| Li | 1.61 | 93 | | 0.00 | 11 | 0.000 | 9 | 0.000 | 8 |
| Mg | 286 | 93 | | 0.08 | 1 | 0.001 | 0 | 0.000 | 0 |
| Mn | 263 | 128 | 2090 | 0.57 | 0 | 0.000 | 0 | 0.001 | 0 |
| Mo | 23.3 | 148 | | 0.01 | 83 | 0.005 | 96 | 0.001 | 16 |
| Na | 264000 | 258 | 113000 | 31.09 | 41 | 12.652 | 93 | 17.053 | 55 |
| Ni | 2090 | 87 | 1550 | 0.43 | 0 | 0.001 | 0 | 0.000 | 0 |
| Pb | 826 | 71 | | 0.23 | 0 | 0.001 | 8 | 0.018 | 8 |
| Pd | 2.27 | 139 | 580 | 0.16 | 35 | 0.056 | 40 | 0.042 | 26 |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | 9.93 | 141 | | 0.00 | 59 | 0.002 | 39 | 0.000 | 16 |
| Sb | 0.882 | 96 | | 0.00 | 11 | 0.000 | 4 | 0.000 | 3 |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 6790 | 114 | 8090 | 2.23 | 55 | 1.224 | 13 | 0.132 | 6 |
| Sn | 19.7 | 76 | | 0.01 | 1 | 0.000 | 64 | 0.003 | 63 |
| Sr | 619 | 149 | | 0.17 | 0 | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | 38.2 | 122 | | 0.01 | 1 | 0.000 | 1 | 0.000 | 1 |
| U | 28000 | 94 | 19500 | 5.36 | 1 | 0.034 | 0 | 0.008 | 0 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | 53.7 | 79 | | 0.01 | 46 | 0.007 | 64 | 0.005 | 35 |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 235 | 81 | | 0.06 | 0 | 0.000 | 14 | 0.009 | 14 |
| Zr | 192 | 91 | 181 | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | summation ug/g sample (Temer 1995) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | 1290 | 0.35 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 46600 | 12.82 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 12200 | 3.36 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 83300 | 160 | 78600 | 21.62 | 83 | 18.005 | 19 | 0.688 | 3 |
| SO4-2 | 3450 | 121 | 5230 | 1.44 | 90 | 1.301 | 0 | 0.000 | |
| F- | 7090 | 193 | 5350 | 1.47 | 97 | 1.433 | 50 | 0.020 | 1 |
| Cl- | | | 598 | 0.16 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **summation uCi/g sample (Temer 1995)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | 0.176 | | 0.181 | 49.79 | 0 | 0.000 | 0 | 0.000 | 0 |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.034 | 9.35 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 50.3 | | 45.4 | 12489.07 | 41 | 5080.556 | 22 | 1598.602 | 13 |
| Co-60 | | | 0.023 | 6.33 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 144 | | 132 | 36311.85 | 0 | 0.000 | 0 | 0.000 | 0 |
| Tc-99 | | | 0.033 | 9.08 | 0 | 0.000 | 0 | 0.000 | 0 |

***Notes:***


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Temer, D. J. and R. Vallarreal. 1996. *Sludge Washing and Alkaline Leaching Tests on Actual Hanford Tank Sludge: FY 1996 Results*, LAUR96-2839, Los Alamos National Laboratory, Los Alamos, New Mexico.

***U-110 (BiPO4 1C, RCW) Experimental Results***

| | |
|---|---|
| 1.5 | Density (g/mL) |
| 704 | Volume (kL) |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % leach initial solids |
|---|---|---|---|---|---|---|---|---|---|
| Ag | | | 67.5 | 0.07 | | 0.000 | 0 | 0.000 | |
| Al | 111000 - 155000 | | 168000 | 177.41 | 1 | 1.774 | 83 | 145.477 | 82 |
| As | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| B | 525 - 2660 | | 285 | 0.30 | 82 | 0.247 | 67 | 0.036 | 12 |
| Ba | 54.7 - 1330 | | 52 | 0.05 | 0 | 0.000 | 0 | 0.000 | 0 |
| Be | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Bi | 5920 - 7400 | | 13900 | 14.68 | 0 | 0.000 | 0 | 0.000 | 0 |
| Ca | 740 - 5250 | | 2850 | 3.01 | 0 | 0.000 | 0 | 0.000 | 0 |
| Cd | | | 16 | 0.02 | | 0.000 | 0 | 0.000 | |
| Ce | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Co | 1040 - 1480 | | 117 | 0.12 | | 0.000 | 0 | 0.000 | |
| Cr | 155 - 962 | | 612 | 0.65 | 68 | 0.439 | 16 | 0.032 | 5 |
| Cu | 89 | | 288 | 0.30 | 0 | 0.000 | 0 | 0.000 | |
| Fe | 5770 - 14800 | | 10100 | 10.67 | 0 | 0.000 | 0 | 0.000 | 0 |
| K | | | 1210 | 1.28 | | 0.000 | 0 | 0.000 | |
| La | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Li | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Mg | 15 - 437 | | 1360 | 1.44 | 0 | 0.000 | 0 | 0.000 | 0 |
| Mn | 2000 - 3770 | | 2360 | 2.49 | | 0.000 | 0 | 0.000 | 0 |
| Mo | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Na | 81400 - 370000 | | 109000 | 115.11 | 69 | 79.423 | 0 | 0.000 | |
| Ni | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pb | 670 - 730 | | 491 | 0.52 | 0 | 0.000 | 0 | 0.000 | |
| Pd | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Rh | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ru | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sb | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Se | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Si | 5250 - 13300 | | 10900 | 11.51 | 5 | 0.576 | 4 | 0.460 | 4 |
| Sn | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr | 252 - 481 | | 402 | 0.42 | | 0.000 | 0 | 0.000 | 0 |
| Te | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Th | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Ti | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| U | 311 - 13300 | | 8520 | 9.00 | 0 | 0.000 | 0 | 0.000 | 0 |
| V | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| W | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Y | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Zn | 133 - 888 | | 183 | 0.19 | 1 | 0.002 | 64 | 0.122 | 63 |
| Zr | 104 - 660 | | 219 | 0.23 | 0 | 0.000 | 0 | 0.000 | 0 |

| Component | range ug/g sample (Lumetta 1994) | % recovery | ug/g sample (Colton 1995) | MT (tank) | Wash % removed initial solids | Wash MT removed | Leach % removed washed solids | Leach MT removed | Leach % removed initial solids |
|---|---|---|---|---|---|---|---|---|---|
| OH- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| NO3- | | | 31700 | 33.48 | | 0.000 | 0 | 0.000 | |
| NO2- | | | 6620 | 6.99 | | 0.000 | 0 | 0.000 | |
| PO4-3 | 15500 - 42200 | | 43900 | 46.36 | 90 | 41.723 | 80 | 3.709 | 8 |
| SO4-2 | | | 1290 | 1.36 | | 0.000 | 0 | 0.000 | |
| F- | | | 7430 | 7.85 | | 0.000 | 0 | 0.000 | |
| Cl- | | | 975 | 1.03 | | 0.000 | 0 | 0.000 | |
| Br- | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| | **range uCi/g sample (Lumetta 1994)** | **% recovery** | **uCi/g sample (Colton 1995)** | **Ci (tank)** | **% removed initial solids** | **Ci removed** | **% removed washed solids** | **Ci removed** | **% removed initial solids** |
| Total alpha | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Pu-239, 240 | | | 0.172 | 181.63 | | 0.000 | 0 | 0.000 | |
| Am-241+Pu-238 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Am-241 (gamma) | | | 0.064 | 67.58 | | 0.000 | 0 | 0.000 | |
| Cm-243, 244 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Cs-137 | 13.9 - 38.6 | | 17.7 | 18691.47 | 7 | 1308.403 | 14 | 2429.891 | 13 |
| Co-60 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-154 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Eu-155 | | | | 0.00 | | 0.000 | 0 | 0.000 | |
| Sr-90 | 222 - 411 | | 261 | 275619.92 | 0 | 0.000 | 1 | 2756.199 | 1 |
| Tc-99 | | | 0.005 | 5.28 | | 0.000 | 0 | 0.000 | |

***Notes:***

Cr concentration has been adjusted from reported value of 391 ug/g in Colton 1995.

Less than wash, leach values entered above as zero.


Colton, N. G. 1995. *Sludge Pretreatment Chemistry Evaluation: Enhanced Sludge Washing Separation Factors*, PNL-10512, Pacific Northwest National Laboratory, Richland Washington.

Lumetta, G. J. and B. M. Rapko. 1994. *Washing and Alkaline Leaching of Hanford Sludges: A Status Report*, PNL-10078, Pacific Northwest National Laboratory, Richland Washington.

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