**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
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Pacific Northwest National Laboratory
Richland, Washington 99352

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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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

(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
(RCRW 4)

Tank

Vol (kL)
solids

TBP Sludge 7570 kL ~16% SST Sludge ~5% SST Waste	TBP Sludge 3790 kL	TBP/Sr 570 kL	C-105 368
		TBP/DiaE 64 kL	TY-106 64
Evaporator Bottoms SaltCake 87400 kL ~65% SST Waste	TFeCN Sludge 1130 kgal PFeCN Sludge 2650 kgal	TBP/EB Sludge 814 kL	XXI T-109 TX-103 TY-105 874
		TBP Sludge 874 kL	BX-101 BX-102 BX-103 BX-104 380 BX-105* 160
		TBP/CW Sludge 2560 kL SaltCake 10 kL	V BX-102 BX-103 BX-104 380 BX-105* 160
		TBP/IC(F) Sludge 776 kL	XXII TY-103 613 TY-104 160
		TBP(FY)IC Sludge 1090 kL	XIII C-108 250 C-109 230
		TBP(F)/EB Sludge 2410 kL BYts Cake 12700 kL	BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			III BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
			BY-101 BY-103 BY-104 1540 BY-105 BY-106 BY-107 BY-108 BY-110 1510 BY-111 BY-112
		TBP/EBits Sludge 310 kL SaltCake 2580 kL	XIX BY-102 BY-109
BYits SaltCake 15200 kL ~17% SST SaltCake	BYits SaltCake 15200 kL ~17% SST SaltCake	BYits SaltCake 15200 kL ~17% SST SaltCake	C-106 BX-108 BX-109 731 C-101
			C-111 C-112 394

*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 (SOWW)	Tank	Vol (kL) solids
REDOX Sludge 12900 kL ~17% SST Sludge ~10% SST Waste	Flowsheet #4 Flowsheet #5 Flowsheet #6 Flowsheet #7 Flowsheet #8 Flowsheet #9 Sludge 12900 kL	REDOX Sludge 4650 kL	S-104*	1110 Boil
			SX-107	Boil
			SX-108**	329 Boil
			SX-109	Boil
			SX-110	
			SX-111	Boil
			SX-112	Boil
			U-204	
			SX-113	
			U-104	
Evaporator Bottoms (Cont)	S1 Salt Cake 26700 kL ~31% SST Salt Cake	R-RCW/EB Sludge 5440 kL S1 Cake 26700 kL T2 Cake 5590 kL	R/2C	8 kL
			R/Dia	560 kL
			R/Mix	318 kL
			RCW/Mix	382 kL
			RCW	38 kL
			XXIV	
			XVII	
			XVIII	
			U-201	
			U-202	
			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-Type
(RCRW #)

Tank

Vol (kL)
SolidsEvaporator Bottoms
(cont)

S1 (cont)

R-RCW/EB (cont)

I

T2

Salt Cake 22300 kL

~28% SST Salt Cake

EB/IC

Sludge 151 kL

B1 Cake 1160 kL

T2 Cake 13800 kL

T1 Cake 2420 kL

II

B-105 1160

TX-109

TX-110

TX-111

TX-112

TX-113

TX-114

TY-102 242

TX-116 2390

TX-117

Process	LANL Defined Waste Stream	Characteristic Waste-Type (30RWT #)	Tank	Vol (kL) Solids
Evaporator Bottoms (cont)	T2 (cont)	EB/1C (cont)	II	
		EB/DW 507 kL	TX-108	
	R1 SaltCake 10400 kL ~12% SST SaltCake	EB/R Sludge 481 kL T2 Cake 2420 kL R1 Cake 4630 kL	IX TX-115 U-102 U-103 U-106 U-111 Boil	
	T1 SaltCake 3750 kL ~7% SST SaltCake	EB/CW Sludge 1190 kL B1 Cake 38 kL T1 Cake 1310 kL R1 Cake 5750 kL	VI B-101 B-102 B-103 TX-118 U-105 U-107 U-108 U-109	
	B1 SaltCake 2040 kL ~2% SST SaltCake			
		CC/DSSF 560 kL	XXIII AX-102	AX-103
	A1 SaltCake 7040 kL ~8% SST SaltCake	DSSF Sludge 1460 kL A1 Cake 6500 kL	XI A-101 A-102 140 A-103 1304 AX-101	

Process

Waste Streams

Characteristic Waste-Type
(SORWT #)

Tank

Vol (kL)
Solids

PUREX Supernatant and Sludge
Supernatant (PSN) to Cs Recovery
Sludge (PSL) to Sr Recovery

DSSF (cont)

XI

- Sludge Supernatant (PSS)
- Acidified Sludge (PAS)
- Neutralized PAS -- > AR sludge

P Sludge 178 kL

A-104

A-105

CC/AR 473 kL

A-106 473

AR Sludge 26 kL

AX-104

Sludge 6430 kL

AR/PCW

XX

C-103 235

Sludge 980 kL

C-106 519

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, PO₄, Si, Sr, U, and Zr) and 2 radioactive analytes (¹³⁷Cs and ⁹⁰Sr). 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) 94 ^(c)	45 ^(a) 46 ^(c)
Bi	0.3	0.3	Ni	2 - 5	~ 0
Ca	4	2	PO ₄	76 ^(a) 75 ^(c)	70 ^(a) 70 ^(c)
Cd	15	< 1	Si	12	13
Cr	61 ^(a) 59 ^(b)	10 ^(a) 14 ^(b)	Sr	< 1	~ 0
¹³⁷ Cs	60 ^(a) 59 ^(c)	60 ^(a) 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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	697	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	0.84	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	28.1882	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

		Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
Waste Type	Waste Type Vol (kL)			MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{Ball}	4280	S-104	1109	6.575	27.87	62.9	266.57	126.525	536.22	196	830.66
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	7470	S-107	1423	19.2	112.74	156	916.05	64.8	380.51	240	1409.30
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356										
		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											
DSSF	7960	A-103 (w)	1385	27.7	170.40	1.76	10.83	1.44	8.86	30.9	190.09
CC/DSSF	560										
	8520										
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	C-106 (w)	746	0.0229							43.6
AR Sludge	26										
HS	42										
AR/PCW	980										
	1228	C-103	235	0		2.19				4.56	
			981	0.0229	0.02	2.19	9.13	45.0471	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 TWR5 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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{Red}	4280	S-104	1109	0.0005	0.00		0.00	0.0595	0.25	0.06	0.25
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	7470	S-107	1423		0.00		0.00	0.04	0.23	0.04	0.23
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356										
R-RCW/EB	32300	SX-102	2029	0.0025						0.005	
EB/R	7050	S-105	1718	0.0025						0.005	
EB/CW	7100	S-109	2150	0.0025						0.005	
EB/DW	507	S-110	980	0.0025						0.005	
	46957	SX-103	1612	0.0025						0.005	
			8489	0.0125	0.07		0.00	0.0125	0.07	0.025	0.14
Total (MT)				(based on TY-102)						(based on TY-102)	
% Inventory					0.07		0.00		0.56		0.63
					0.17		0.00		1.35		1.52
PUREX											
DSSF	7960	A-103 (w)	1385	0.008	0.05		0.00	1.062	6.53	1.07	6.58
CC/DSSF	560										
	8520										
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	C-106 (w)	746	0.0031						5.21	
AR Sludge	26										
HS	42										
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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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		482.66
% 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		Leach		Residual Solids (after washing & leaching)		Total		
Waste Type	Vol (kL)					MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	
R-Sludge ^{Det}	4280	S-104	1109											
RCW/Mix	382													
RCW	38													
	4700					0	0.00	0	0.00	0.03	0.13	0.03	0.13	
R-Sludge	7470	S-107	1423											
R/DiaE	560													
R/Mix	318													
R/2C	8													
	8356			0	0.00	0.01	0.06	0.07	0.41	0.08	0.47			
R-RCW/EB	32300	S-105	1718	0								NA		
EB/R	7050	S-109	2150	0								NA		
EB/CW	7100	S-110	980	0								NA		
EB/DW	507	SX-102	2029	0								NA		
	46957	SX-103	1612	0								NA		
			8489	0	0.00		0.00	0	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														
DSSF	7960	A-103 (w)	1385											
CC/DSSF	560													
	8520			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	C-106 (wash)	746											
AR Sludge	26													
HS	42					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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
1C	1670										
1C/?	170										
1C/EB	3050										
1C(?)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	
1C/TBP	2610	BX-107	1302	0.227		0.227				1.62	
			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	0.31	0	0.00	0	0.00	0.02	0.31
				(Assumed)							
					2.02		0.97		38.34		41.32
					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(?)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(?)	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(?)1C	1090		879	0.211	0.26	0.056	0.07	24.043	29.81	24.31	30.15
					0.63		0.07		92.92		93.61
					0.30		0.03		44.38		44.71
Total (MT) % Inventory											

Element: Ca (Continued)

REDOX

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{new}	4280	S-104	1109	0.372	1.58	0.258	1.09	2.55	10.81	3.18	13.48
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	7470	S-107	1423	0.14	0.82	0.251	1.47	0.609	3.58	1	5.87
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356										
R-RCW/EB	32300	S-105	1718	0						NR	
EB/R	7050	S-109	2150	0						NR	
EB/CW	7100	S-110	980	0						NR	
EB/DW	507	SX-102	2029	0.0578						0.0578	
		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	A-103 (w)	1385	0.262	1.61	0	0.00	2.938	18.07	3.2	19.69
CC/DSSF	560										
	8520										
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	C-106 (wash)	746	0.0486		0	0.00			12.7	
AR Sludge	26										
HS	42										
AR/PCW	980	C-103	235	0.035		0	0.00			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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	853	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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{RAH}	4280	S-104	1109								
RCW/Mix	382										
RCW	38										
	4700			0	0.00		0.00	0.001	0.00	0.001	0.00
R-Sludge	7470	S-107	1423								
R/DiaE	560										
R/Mix	318										
R/ZC	8				0.00		0.00	0.01	0.06	0.01	0.06
R-RCW/EB	32300	TY-102	242								
EB/R	7050										
EB/CW	7100										
EB/DW	507			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	A-103 (w)	1385								
CC/DSSF	560										
	8520			0.129	0.79		0.00	0.04	0.25	0.189	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	C-106 (w)	746								
AR Sludge	26										
HS	42			0.0128						0.395	
AR/PCW	980			0.002						0.16	
	1228	C-103	235	0.0148	0.02	0	0.00	0.5402	0.68	0.555	0.69
			981			0	0.00				
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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	0.288	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	2.96		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 (low [Cr])	12050	BY-105	1900	0.246		0.004				0.35	
TBP/EBIts	2890	BY-108	863	0.638		0.009				0.91	
	14940		2763	0.684	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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{3.33}	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	2.4785	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	0.0893	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 TWR3 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		Leach		Residual Solids (after washing & leaching)		Total	
				Cl Tank	Cl Waste Type	Cl Tank	Cl Waste Type	Cl Tank	Cl Waste Type	Cl Tank	Cl Waste Type
1C	1670										
1C/?	170										
1C/EB	3050										
1C(?)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	060		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 (Cl)					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(?)EB	15100										
TBP/EBits	2890	BY-110	1510	0		130800				130800	
	18804		1510	0	0	130800	1628850	0	0.00	130800	1628850
						(Assumed)					
TBP	874	TY-105 (w)	874	6706.192	6706	3184.528	3165	9.095E-13	0.00	9870.72	9871
						(Assumed)					
		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(?)	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				406847.4	
TBP(?)1C	1090		879	26682.35	33063	584257.05	724505	11610.3	14397.30	622529.7	771965
Total (Cl)					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		Leach		Residual Solids (after washing & leaching)		Total	
				Cl Tank	Cl Waste Type	Cl Tank	Cl Waste Type	Cl Tank	Cl Waste Type	Cl Tank	Cl Waste Type
R-Sludge _{ext}	4280	S-104	1109	80642	341763	8184	34684	2717	11513	91542	387960
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	7470	S-107	1423	115500	678228	34500	202587	0	0.00	150000	880815
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356										
R-RCW/EB	32300	S-105	1718	71983		58200 (Assumed)				105699	
EB/R	7050	S-109	2150	196555						196656	
EB/CW	7100	S-110	980	33039						33039	
EB/DW	507	SX-102	2029	196871						196871	
	46957	SX-103	1612	89850						89850	
			8489	588299	3254181		0	34017	188164	622315	3442344
Total (Cl)					4.27E+6		2.37E+5		2.00E+5		4.71E+6
% Inventory					38		2		1.77		42
PUREX											
DSSF	7960	A-103 (w)	1385	288439	1774370	0	0	2716	16708	291155	1791077
CC/DSSF	560										
	8520										
P Sludge	180	C-103	235	2899	3060	3479	3671	8118	8567	14496	15298
AR Sludge	26										
HS	42										
	248										
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	C-106 (wash)	746	51449						273307	
AR Sludge	26										
HS	42										
AR/PCW	980										
	1228	C-103	235	2902		4463				14496	
			981	54351	68036	4483	23426	228969	286620	287803	378081
Total (Cl)					1.93E+6		5.78E+4		3.84E+5		2.37E+6
% Inventory					17.06		0.51		3.40		20.97
TOTAL (Cl)					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.

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

Element: Fe

BiPO4

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
1C	1670										
1C/7	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	
1C/TBP	2610	BX-107	1302	0.185		0	0.00	27.66	33.17	17.3	
			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				35.6	
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									11.8	
TBP(f)/EB	15100	BY-104	1540			0				2.17	
TBP/EBits	2890	BY-110	1510	0.065		0	0.00	13.91	85.73	13.97	86.13
	18804		3050	0.085	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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge ₂₀₀	4280	S-104	1109								
RCW/Mix	382										
RCW	38										
	4700			0	0.00	0.014	0.06	4.13	17.49	4.14	17.55
R-Sludge	7470	S-107	1423								
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356			0	0.00	0.131	0.77	4.24	24.89	4.37	25.66
R-RCW/EB	32300	S-105	1718	0.0256						NR	
EB/R	7050	S-109	2150	0						10.7	
EB/CW	7100	S-110	980	0						NR	
EB/DW	507	SX-102	2029	0						6.18	
	46957	SX-103	1612	0						1.7	
			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											
DSSF	7960	A-103 (w)	1385								
CC/DSSF	560										
	8520			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	C-106 (wash)	746								
AR Sludge	26										
HS	42			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 TWR5 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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	
1C/TBP	2610	BX-107	1302	0.0257		0				0.25	
			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	1.08	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	0.08
Total (MT)					0.60		0.02		8.91	(Assumed)	
% Inventory					0.89		0.03		13.09		
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		
% Inventory					0.09		0.00		19.79		

Element: Mg (Continued)

REDOX

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge	4280	S-104	1109	0.0075	0.03		0.00	0.0825	0.35	0.09	0.38
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	7470	S-107	1423	0.028	0.16	0.061	0.36	0.171	1.00	0.26	1.53
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356										
R-RCW/EB	32300	S-105	1718	0						0.01	
EB/R	7050	S-109	2150	0						0.01	
EB/CW	7100	S-110	980	0						0.005	
EB/DW	507	SX-102	2029	0						0.01	
	46957	SX-103	1612	0						0.01	
			8489	0	0.00		0.00	0.045	0.25	0.045	0.25
Total (MT)					0.20		0.36		1.60	(Assumed)	2.16
% Inventory					0.29		0.53		2.35		3.17
PUREX											
DSSF	7960	A-103 (w)	1385	0.0054	0.03		0.00	1.4746	9.07	1.48	9.10
CC/DSSF	560										
	8520										
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
CG/AR	473	A-106 (w)	473	0.0004	0.00		0.00	2.0796	2.08	2.08	2.08
P Sludge	180	C-106 (w)	746	0.0122		0	0.00	8.9148	11.16	6.99	
AR Sludge	26										
HS	42										
AR/PCW	980	C-103	235	0.003						1.94	
	1228		981	0.0152	0.02		0	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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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-105 (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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{nat}	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/ZC	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
GC/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:		170-238*	

"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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
1C	1670										
1C/?	170										
1C/EB	3050										
1C(f)/EB	447										
	<u>5337</u>	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	
	<u>18804</u>		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

PUREX				Wash		Leach		Residual Solids (after washing & leaching)		Total		
Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	
R-Sludge	4280	S-104	1109	75.5	319.97	115	487.38	7.5	31.79	198	839.13	
RCW/Mix	382											
RCW	38											
	4700											
R-Sludge	7470	S-107	1423	165	968.90		0.00	13	76.34	178	1045.23	
R/DiaE	560											
R/Mix	318											
R/2C	8											
	8356											
R-RCW/EB	32300	S-105	1718	831						835		
EB/R	7050	S-109	2150	971						990		
EB/CW	7100	S-110	980	418						418		
EB/DW	507	SX-102	2029	915						919		
	46957	SX-103	1612	677						679		
			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	A-103 (w)	1385	380	2337.62		0.00	9	55.36	389	2392.98	
CC/DSSF	560											
	8520											
AR/PCW	980	C-106 (wash)	746	48.5		0	0.00	90.02	112.69	140.9	176.38	
P Sludge	180											
AR Sludge	26											
HS	42	C-103	235	2.38								
	1228		981	50.88	63.69							
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	% of (Expected) SST Inventory Accounted For:						97
Leach Factor				46	% washed solids							

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		Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	
	18904		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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{nat}	4280	S-104	1109	0.0028	0.01	0.00	0.00	0.0884	0.37	0.0812	0.39
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	6100	S-104	1109	0.00	0.00	0.00	0.00	0.09	0.57	0.09	0.57
R/DiaE	560										
R/Mix	318										
R/ZC	8										
	6986										
R-RCW/EB	32300	S-109	2150	0.0283	0.94	0.00	0.00	0	0.00	0.0283	0.94
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						0.1361	
Redox (w/Zr)	1370	S-107	1370	0	0.00	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											
DSSF	7960	A-103 (w)	1385	0.0689	0.42	0.00	0.00	0.1051	0.65	0.174	1.07
CC/DSSF	560										
	8520										
PCW/Mix	159	T-102 (w)	72	0	0.00	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	0.00	2.065	5.73	2.17	6.02
CC/AR	473	A-106 (w)	473	0.009	0.01	0.00	0.00	0.449	0.45	0.458	0.46
P Sludge	180	C-106 (w)	746	0.0343	0.06	0	0.00	0.7916	0.98	0.84	1.05
AR Sludge	26										
HS	42										
AR/PCW	980	C-103	235	0.0141		0	0.00			0.29	
	1228		981	0.0484		0	0.00			0.84	
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 concentrations appear high in Zr-cladding wastes.

Element: PO₄

BiPO₄

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
1C	1670										
1C/?	170										
1C/EB	3050										
1C(?)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(?)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(?)	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(?)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: PO₄ (Continued)

REDOX

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{non}	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											
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

"Provisional" Best-basis Total	(MT)
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 PO ₄ of the 5960 MT PO ₄ Inventory is in DSTs (LANL estimates 714 MT PO ₄ in DSTs). Potential more than expected in DSTs.	

Element: Si

BiPO4

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
1C	1670										
1C/7	170										
1C/EB	3050										
1C(7)/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(7)/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	1.838	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	54.88
TBP/1C(7)	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(7)/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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge ₂₋₄	4280	S-104	1109	0.735	3.11	0.0395	0.17	1.6555	7.02	2.43	10.30
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	7470	S-107	1423	3.83	22.49	3.82	23.02	0.96	5.64	8.71	51.15
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356										
R-RCW/EB	32300	S-105	1718	0.188						NR	
EB/R	7050	S-109	2150	0.203						2.21	
EB/CW	7100	S-110	980	0.116						NR	
EB/DW	507	SX-102	2029	1.66						NR	
	46957	SX-103	1612	NR						0	
			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	A-103 (w)	1385	0.714	4.39	0.206	1.27	19.68	121.06	20.6	126.72
CC/DSSF	560										
	8520										
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	C-106 (wash)	746	0.0263	0	0.222	1.16	97.6517	122.24	75.7	22.2
AR Sludge	26										
HS	42										
AR/PCW	980	C-103	235	0							
	1228		981	0.0263	0.03					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 TWR5 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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	2368	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				0.18	
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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{Sett}	4280	S-104	1109	0.001	0.00	0	0.00	0.699	2.96	0.7	2.97
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	7470	S-107	1423	0	0.00	0	0.00	0.45	2.64	0.45	2.64
R/DiaE	560										
R/Mix	318										
R/2C	8										
	8356										
R-RCW/EB	32300	S-105	1718	0.006 (based on 1/5th of [Ca])						0.006	
EB/R	7050	S-109	2150	NR						NR	
EB/CW	7100	S-110	980	NR						NR	
EB/DW	507	SX-102	2029	0.009 (based on 1/5th of [Ca])						0.009	
	46957	SX-103	1612	NR						NR	
			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	A-103 (w)	1385	0	0.00		0.00	0.0223	0.14	0.0223	0.14
CC/DSSF	560										
	8520										
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	C-106 (wash)	746	0						0.11	
AR Sludge	26										
HS	42										
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

"Provisional" Best-basis Total	(MT)
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: ⁹⁰Sr

BiPO4

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				Ci Tank	Ci Waste Type	Ci Tank	Ci Waste Type	Ci Tank	Ci Waste Type	Ci Tank	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: ⁹⁰Sr (Continued)

REDOX

Waste Type	Waste Type Vol (kL)	Representative Tanks	Tank Vol (kL)	Wash		Leach		Residual Solids (after washing & leaching)		Total	
				Ci Tank	Ci Waste Type	Ci Tank	Ci Waste Type	Ci Tank	Ci Waste Type	Ci Tank	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						316290
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							1614878
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		1.89E+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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	
1C/TBP	2610	BX-107	1302	0.567		0.142				3.55	
			1469	0.725	1.29	0.142	0.28	2.865	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			0		0				6.59	
TBP(f)/EB	15100	BY-104	1540	0.187		0				9.35	
TBP/EBits	2890	BY-110	1510	0.187	1.15	0	0.00	15.753	97.12	15.94	98.27
	18804		3050								
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		0				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		Leach		Residual Solids (after washing & leaching)		Total	
Waste Type	Vol (KL)					MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{part}	4280	S-104	1109			0	0.00	0.003	0.01	10.997	46.61	11	46.62
RCW/Mix	382												
RCW	38												
	4700												
R-Sludge	7470	S-107	1423			0	0.00	0.566	3.32	13.634	80.06	14.2	83.38
R/DiaE	560												
R/Mix	318												
R/2C	8												
	8356												
		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													
DSSF	7960	A-103 (w)	1385			0.018	0.11	0.05	0.31	2.602	16.01	2.67	16.42
CC/DSSF	560												
	8520												
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	32.7883	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	C-106 (wash)	746			0.0097						0.436	
AR Sludge	26												
HS	42												
AR/PCW	980												
	1228	C-103	235			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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	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	794	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	
1C/TBP	2610	BX-107	1302	0		0.002				0.21	
			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	0.5381	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		Leach		Residual Solids (after washing & leaching)		Total	
				MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type	MT Tank	MT Waste Type
R-Sludge _{all}	4280	S-104	1109	0	0.00	0.002	0.01	1.068	4.53	1.07	4.53
RCW/Mix	382										
RCW	38										
	4700										
R-Sludge	6047	S-104	1109	0	0.00	0.002	0.01	1.068	6.68	1.07	6.69
R/DiaE	560										
R/Mix	318										
R/2C	8										
	6933										
Redox (Zr)	1423	S-107	1423	0	0.00		0.00	10.2	10.20	10.2	10.20
R-RCW/EB	32300	TY-102	242	0.0017	0.33	0	0.00	0.0022	0.43	0.0039	0.76
EB/R	7050										
EB/CW	7100										
EB/DW	507										
	46957										
Total (MT)					0.33		0.02		21.83		22.18
% Inventory					0.12		0.01		7.95		8.08
PUREX											
DSSF	7960	A-103 (w)	1385	0.0257	0.16		0.00	0.3633	2.23	0.389	2.39
CC/DSSF	560										
	8520										
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	C-106 (w)	746	0.121	0.038	0	0.00	5.991	7.50	2.31	7.70
AR Sludge	26										
HS	42										
AR/PCW	980										
	1228	C-103	235	0.159	0.20	0	0.00			3.84	
			981							6.15	
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		% of (Expected) SST Inventory Accounted For:					
Leach Factor			0	% washed solids				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 needed 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 Na₂O content in residual solids, on an oxide basis, may be similar to the 14% used in past planning activities.

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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									Overall Mean				TOTAL	
		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	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			RESIDUAL SOLIDS								TOTAL	
		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)	g/g sludge (oxide)	% element dissolved	ug/g sludge (element)	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	0.000	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		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	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			ACID				FUSION				TOTAL	
		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	18.600	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	2.08	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		126582.423					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									OVERALL MEAN				TOTAL	
		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	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	568.000	732.0	719.436	100.00	568.000	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	1.335	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 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)	2456736
Solids (ug/g)	770000
~pH	NR

Component	Oxide Factor	WATER			ACID				FUSION				TOTAL	
		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									Average Segments				TOTAL	
		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	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	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									LANL Direct Analyses			TOTAL	
		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)	ug/g sludge (element)	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	Average Samples			Average Samples			Average Samples			TOTAL			
		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	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
TQC	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			RESIDUAL SOLIDS								TOTAL	
		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	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									Core Composites				TOTAL	
		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	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	1118.101	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			RESIDUAL SOLIDS				TOTAL			
		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
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
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!
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!
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!
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!
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!
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
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!
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!
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
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!
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!
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
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
Phosphate	1.000	LT	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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!
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
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
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
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!
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!
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!
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
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
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!
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!
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
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
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
Nitrite	1.000	LT	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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
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	
Pu-239,240		NR	0.0	0.00	0.039	142.5	100.00		0.000	0.0	0.00	
C-14		NR	0.0	#DIV/0!	NA	0.0	#DIV/0!		0.000	0.0	#DIV/0!	
Sr-90		0.748	2733.8	0.54	137.280	501730.4	99.46		0.000	0.0	0.00	
Tc-99		0.007	24.1	5.28	0.118	432.7	94.72		0.000	0.0	0.00	
Am-241		NR	0.0	0.00	0.308	1126.0	100.00		0.000	0.0	0.00	
Co-60		0.002	6.2	0.49	0.343	1254.3	99.51		0.000	0.0	0.00	
Cs-137		83.380	304736.9	99.95	0.043	156.8	0.05		0.000	0.0	0.00	
I-129		NR	0.0	#DIV/0!	NA	0.0	#DIV/0!		0.000	0.0	#DIV/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

Component	Oxide Factor	WATER			RESIDUAL SOLIDS				TOTAL			
		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
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
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!
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!
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!
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!
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!
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
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!
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!
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!
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!
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!
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!
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
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!
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!
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
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!
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
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!
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
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!
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!
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
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!
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!
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
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
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!
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
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
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			RESIDUAL SOLIDS								TOTAL	
		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	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			RESIDUAL SOLIDS								TOTAL	
		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	1.869	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			ACID				FUSION				TOTAL	
		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	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	8831.1	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		108.200	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				ACID				FUSION				TOTAL	
		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	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			RESIDUAL SOLIDS				TOTAL			
		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
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
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
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
Boron	3.220	NA	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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
Calcium	1.399	NA	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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
Cobalt	1.271	NA	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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!
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
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
Magnesium	1.658	NA	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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
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
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
Potassium	1.000	NA	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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
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
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
Strontium	1.183	NA	0.0	#DIV/0!	0.000	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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!
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
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
Nitrate	1.000	444000.000	182842.8	100.00	NA	0.0	0.000	0.00	0.000	0.0	0.000	0.00
Chloride	1.000	NR	0.0	#DIV/0!	NA	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/0!
Fluoride	1.000	NR	0.0	#DIV/0!	NA	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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
Carbonate	1.000	NR	0.0	#DIV/0!	NA	0.0	0.000	#DIV/0!	0.000	0.0	0.000	#DIV/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
Nitrite	1.000	1000.000	411.8	100.00	NA	0.0	0.000	0.00	0.000	0.0	0.000	0.00
Sulfate	1.000	14000.000	5765.3	100.00	MA	0.0	0.000	0.00	0.000	0.0	0.000	0.00
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
Radionuclides		uCi/g	Ci/tank	dissolved	uCi/g	Ci/tank	dissolved		uCi/g	Ci/tank	dissolved	
Pu-239,240		0.001	0.4	100.00		0.0	0.00		0.000	0.0	0.00	
C-14		0.000	0.0	#DIV/0!		0.0	#DIV/0!		0.000	0.0	#DIV/0!	
Sr-90		0.056	23.1	1.23	4.510	1857.3	98.77		0.000	0.0	0.00	
Tc-99		0.000	0.0	#DIV/0!		0.0	#DIV/0!		0.000	0.0	#DIV/0!	
Am-241		0.002	0.8	40.00	0.003	1.2	60.00		0.000	0.0	0.00	
Co-60		0.001	0.4	50.00	0.001	0.4	50.00		0.000	0.0	0.00	
Cs-137		2.620	1078.9	78.75	0.707	291.1	21.25		0.000	0.0	0.00	
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			RESIDUAL SOLIDS								TOTAL	
		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	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	365.068	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Tl	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1996)	% recovery	uCi/g sample (Appendix)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% leach initial solids
Ag	700 - 2200		86.7	0.11		0.000	0	0.000	
Al			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	21000 - 25000			0.00		0.000	0	0.000	
Bi			20100	25.16	0	0.000	0	0.000	0
Ca			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	890 - 970			0.00		0.000	0	0.000	
Cr			972	1.22	10	0.122	53	0.584	48
Cu			59.3	0.07	0	0.000	0	0.000	0
Fe			19300	24.16	0	0.000	0	0.000	
K			467	0.58		0.000	0	0.000	
La	20000 - 23000			0.00		0.000	0	0.000	
Li				0.00		0.000	0	0.000	
Mg			191	0.24	9	0.022	0	0.000	0
Mn			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	960 - 1300		88.5	0.11		0.000	0	0.000	
Pb			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	7000 - 14000			0.00		0.000	0	0.000	
Se				0.00		0.000	0	0.000	
Si			9850	12.33	28	3.453	53	4.686	38
Sn				0.00		0.000	0	0.000	
Sr			217	0.27	0	0.000	0	0.000	0
Te	220 - 270			0.00		0.000	0	0.000	
Th				0.00		0.000	0	0.000	
Ti				0.00		0.000	0	0.000	
U			404	0.51	14	0.071	34	0.147	29
V				0.00		0.000	0	0.000	
W	6.4 - 180			0.00		0.000	0	0.000	
Y				0.00		0.000	0	0.000	
Zn			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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	range uCi/g sample (Lumetta 1994)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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	82	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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			0.00	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			0.00	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	0
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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Rapko 1995)	% recovery	uCi/g sample Colton 1995	Ci (tank)	Wash		Leach		
					% 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	77624.284	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% leach initial solids
Ag	2600 - 3920		4850	0.00		0.000	0	0.000	
Al				0.64	0	0.000	28	0.180	28
As				0.00		0.000	0	0.000	
B	104 - 200		65	0.01		0.000	0	0.000	
Ba				0.05	0	0.000	0	0.000	0
Be				0.00		0.000	0	0.000	
Br	72000 - 96000		103400	13.70	0	0.000	0	0.000	0
Ca				1.83	0	0.000	1	0.018	1
Cd				0.01		0.000	0	0.000	
Ce			39.5	0.00		0.000	0	0.000	
Co				0.01		0.000	0	0.000	
Cr				0.44	34	0.151	35	0.102	23
Cu	12000 - 13600		119	0.02		0.000	0	0.000	
Fe				2.00	0	0.000	1	0.020	1
K				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				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				5.50	74	4.068	0	0.000	
Ni	32000 - 40000		41500	0.00		0.000	0	0.000	
Pb				0.20	3	0.006	14	0.028	14
Pd				0.00		0.000	0	0.000	
Rh	520 - 1200		1510	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				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				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				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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	range uCi/g sample (Lumetta 1994)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Br	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	

Component	summation ug/g sample (Temer 1995)	% recovery	ug/g sample (Appendix)	MT (tank)	Wash		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample (Appendix)	Ci (tank)	Wash		Leach		
					% 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	2.700	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

BX-100 (TDR, CNY) 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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 discrepancies in projected inventories derived from core samples obtained in 1986 and auger surface samples obtained in 1994. Auger 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.				
Bi	4.34	62	776	0.23					
Ca	47.7	118	6210	1.83					
Cd	0.834	140	44.3	0.01					
Ce				0.00					
Co	0.394	72	0.57	0.00					
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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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)		Experimental Results							
1302 Volume (kL)									
Component	summation ug/g sample (Rapko 1995)	% recovery	ug/g sample (Colton 1995)	MT (tank)	Wash		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	1.889	100	0.108	6
Br-				0.00		0.000	0	0.000	
Component	summation uCi/g sample (Rapko 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1996)	% recovery	uCi/g sample (Appendix)	Ci (tank)	Wash		Leach		
					% 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	15185.326	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(I), EB]

1.6 Density (g/mL) 1537 Volume (kL)											
Component	summation ug/g sample (Lumetta 1996)	% recovery	ug/g sample (Appendix)	MT (tank)	Wash		Leach			% leach	
					% removed initial solids	MT removed	% removed washed solids	MT removed	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		38.5	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		

Component	summation ug/g sample (Lumetta 1996)	% recovery	ug/g sample (Appendix)	MT (tank)	Wash		Leach			% removed initial solids	
					% removed initial solids	MT removed	% removed washed solids	MT 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			
Component	summation uCi/g sample (Lumetta 1996)	% recovery	uCi/g sample	Ci (tank)	Wash		Leach			% removed initial solids	
					% removed initial solids	Ci removed	% removed washed solids	Ci 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(0), EB]

15 Density (g/mL) 1506 Volume (kL)					Wash		Leach		
Component	summation ug/g sample (Lumetta 1996)	% recovery	ug/g sample (Appendix)	MT (tank)	% removed initial solids	MT removed	% removed washed solids	MT removed	% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Lumetta 1996)	% recovery	uCi/g sample (Appendix)	Ci (tank)	Wash		Leach		
					% 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)		C-105 (FOREX, SAS) Experimental Results					
Component	summation ug/g sample (Rapko 1995)	% recovery	ug/g sample (Colton 1995)	MT (tank)	Wash		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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
Br	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Rapko 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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.

Br 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% leach initial solids
Ag	212	79	267	0.36	5	0.018	2	0.006	2
Al	41500	86	48300	64.89	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	6790	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample (Temer 1995)	CI (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Nr			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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Lumetta 1996)	% recovery	uCi/g sample (Temer 1995)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample Appendix	Ci (tank)	Wash		Leach		
					% 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(I), 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	range uCi/g sample (Lumetta 1994)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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	128.16		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)		Experimental Results							
Component	range ug/g sample (Lumetta 1994)	% recovery	ug/g sample (Colton 1995)	MT (tank)	Wash		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	180 - 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	

Component	range ug/g sample (Lumetta 1994)	% recovery	ug/g sample (Colton 1995)	MT (tank)	Wash		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	range uCi/g sample (Lumetta 1994)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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)		S-104 (REDUX) LEACH Experimental Results							
Component	summation ug/g sample (Temer 1995)	% recovery	ug/g sample (Colton 1995)	MT (tank)	Wash		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	0.08	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	0.08	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	0.657	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	

Component	summation ug/g sample (Rapko 1995)	% recovery	ug/g sample (Colton 1995)	MT (tank)	Wash		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Rapko 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	2640	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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-			1820	3.68		0.000	0	0.000	
Br-				0.00		0.000	0	0.000	
Component	summation uCi/g sample (Lumetta 1996)	% recovery	uCi/g sample (Appendix)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	8.497	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	86.391	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Rapko 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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. Lumeeta, 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		Leach		
					% removed		% removed		% leach
					initial solids	MT removed	washed solids	MT removed	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	0.006	0
Te				0.00		0.000	0	0.006	
Th				0.00		0.000	0	0.000	
Ti				0.00		0.000	0	0.000	
U	18800	94	25400	24.85	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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	0.29	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

11 Density (g/mL) 1715 Volume (KL)										
Component	summation ug/g sample (Rapko 1995)	% recovery	ug/g sample (Colton 1995)	MT (tank)	Wash		Leach			
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Rapko 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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	85		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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	15
Na	264000	258	113000	31.09	41	12.852	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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	summation uCi/g sample (Temer 1995)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	547 - 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		Leach		
					% removed initial solids	MT removed	% removed washed solids	MT removed	% 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	
Component	range uCi/g sample (Lumetta 1994)	% recovery	uCi/g sample (Colton 1995)	Ci (tank)	Wash		Leach		
					% 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	67.56		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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