Chemical Characterization of an Envelope A Sample from Hanford Tank 241-AN-103

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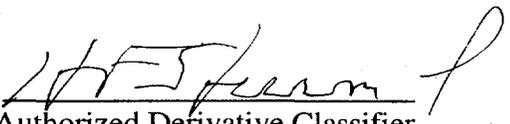
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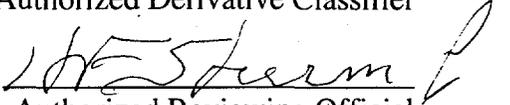
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SUMMARY

A whole tank composite sample from Hanford waste tank 241-AN-103 was received at the Savannah River Technology Center (SRTC) and chemically characterized. Prior to characterization the sample was diluted to ~5 M sodium concentration. The filtered supernatant liquid, the total dried solids of the diluted sample, and the washed insoluble solids obtained from filtration of the diluted sample were analyzed.

A mass balance calculation of the three fractions of the sample analyzed indicate the analytical results appear relatively self-consistent for major components of the sample. However, some inconsistency was observed between results where more than one method of determination was employed and for species present in low concentrations. A direct comparison to previous analyses of material from tank 241-AN-103 was not possible due to unavailability of data for diluted samples of tank 241-AN-103 whole tank composites. However, the analytical data for other types of samples from 241-AN-103 were mathematically diluted and compare reasonably with the current results. Although the segments of the core samples used to prepare the sample received at SRTC were combined in an attempt to produce a whole tank composite, determination of how well the results of the current analysis represent the actual composition of the Hanford waste tank 241-AN-103 remains problematic due to the small sample size and the large size of the non-homogenized waste tank.

INTRODUCTION

The BNFL River Protection Project contracted SRTC to provide pretreatment development and testing services to support the BNFL mission to treat Hanford tank waste. As part of the program, SRTC received radioactive Hanford tank waste samples to allow testing of the pretreatment processes with actual waste samples. The first step in this program entails detailed characterization of the radioactive waste samples. The characterization data provides a basis for rational development of pretreatment processes, determination of reagent requirements, and development of physical design parameters for the pretreatment plant.

The characterization portion of the STRC program was conducted under an approved task and quality assurance plan.[1,2,3] The results and the associated uncertainties presented provide a description of the sample received at SRTC. The highly radioactive nature of the samples adds complexity to the analysis. Sub-sampling, large dilutions, and remote handling potentially add error to the analytical accuracy. Replicate sample analysis and submission of standards allow some definition of the magnitude of this error. However, the error associated with obtaining small samples from large non-homogenized waste tanks will be significant. Recent experience at SRS indicates a combined sampling and analytical error on the order of 15 - 20% associated with obtaining small samples from a well mixed waste tank.[4]

The data presented in this report documents the chemical characterization of a 1.2 L
sample of Hanford waste tank 241-AN-103.

EXPERIMENTAL

Sample History
A total of 12 samples of 241-AN-103 were received at SRTC on 9-28-98. The sample jar
labels from the 12 samples received at SRTC are listed in Table 1. Each jar is a
composite formed by combining portions of segments from extrusion samples.[5] The
composites in each jar provide an average tank composition of 241-AN-103. The portions
of each segment used to form the composites (P1 - P13) are listed in Tables 2 and 3.

After loading the samples into the Shielded Cells facility, the 12 samples were
composited. The total volume of the composited samples was ~1200 mL. After sitting for
several days, a thick layer of white solids formed on the bottom of the bottle. The volume
of the settled solids was approximately half the volume of the sample.

The sample was thoroughly mixed by vigorously shaking the bottle and then split with
one half stored as an archive for future work. The other half of the sample (500 mL) was
diluted with 1025 mL of 0.01 M NaOH to a sodium concentration of ~5 M. The sample
was filtered through a 0.45 μ nylon disposable filter to remove the small amount of
insoluble solids present. Samples of the total dried solids of the diluted sample, the
filtered supernatant liquid from the diluted material, and dried insoluble solids remaining
after dilution were prepared for analysis and fully characterized. Weight percent solids
and density measurements were made on the as-received composite sample, the sample
after dilution to ~5 M sodium, and the filtered supernatant liquid from the diluted
material. Due to the low solids content of the diluted sample a direct measurement of the
weight percent insoluble solids was necessary. The filtered material was sent on for use
in ion exchange studies.

The decision was made to process the other half (450 mL) of the as-received 241-AN-103
composite sample. After diluting to ~5 M sodium by adding 900 mL of 0.01 M NaOH
and filtering to remove insoluble solids, the two halves of diluted 241-AN-103 were
combined prior to ion exchange studies. A sample of the combined filtered supernatant
liquid was also fully characterized.

Sample Preparation
A 12-fold dilution with deionized, distilled water was generally necessary to lower the
radiation levels on filtered supernatant samples before submittal for analysis. Standards
were not submitted with the supernatant samples, however, the Analytical Development
Section periodically measures standards and blanks to check the calibration and
background of the instruments. The total dried solids for the sample were obtained by
thoroughly mixing the sample and any insoluble solids present by vigorously shaking the
bottle, removing an aliquot of the sample, and drying the aliquot at 100 °C to constant
weight to remove free water. The dried insoluble solids were obtained by filtering a

portion of the sample through a 0.45 μ filter and washing the solids obtained with a small amount of 0.01 M NaOH to remove interstitial supernatant liquid. The washed insoluble solids were then dried at 100 °C to constant weight to remove free water. Dissolution of samples of total dried solids and dried insoluble solids were performed in triplicate by contacting with aqua-regia or by fusion with sodium peroxide. The digested solids samples were diluted to 250 mL with deionized, distilled water before analysis. Quality control included dissolving a glass standard of known composition concurrently with the dried solids samples. The glass standard indicates potential problems with sample contamination or incomplete dissolution during the digestion procedure and systematic problems with the analytical procedures. Unless otherwise noted the glass standards showed a successful dissolution and accurate analyses.

Analytical Methods
Analytical Development Section (ADS) performed all analytical measurements with the exception of the weight percent solids and density measurements conducted in the Shielded Cells. ADS uses the following analytical methods for determination of specific species. Nitrate, nitrite, sulfate, oxalate, phosphate, formate, chloride, and fluoride were measured by ion chromatography (IC). Chloride and fluoride were also determined by the ion selective electrode (ISE) method. Aluminate, carbonate, and hydroxide were measured using a titration method employing $SrCl_2$ to precipitate carbonate allowing the determination of all three species. Sodium, aluminum, and iron, as well as other metallic elements, were measured using inductively-coupled plasma-emission spectroscopy (ICP-ES). Potassium and mercury were measured using atomic adsorption spectroscopy (AA) with mercury determined using the cold-vapor technique (CV). Gamma emitting fission products were measured using gamma spectroscopy. Actinides were determined by inductively-coupled plasma mass spectrometry (ICP-MS) and alpha counting spectroscopy. Sr^{90} was determined from beta liquid scintillation counting. Tc^{99} was measured by ICP-MS and ICP-ES.

Weight Percent Solids Analysis
The weight percent of total solids in the samples were measured using a conventional drying oven at 100 °C and stainless steel or polymethylpentene beakers. The weight percent of dissolved solids in a sample of the filtered supernate were measured in the same manner. The weight percent insoluble solids and soluble solids in the sample were calculated from the measurements of the weight percent total solids of the sample and the weight percent dissolved solids in the filtered supernate. Obtaining the weight percent solids analysis of samples in this manner avoids difficulties associated with reproducibly measuring the insoluble solids directly. For samples with less than 3 wt % insoluble solids a direct measurement is required. Equations 1 and 2 allow calculation of the weight percent of insoluble and soluble solids from the total solids and dissolved solids measurements. The weight percent of soluble solids gives the mass of the dissolved solids in the supernate expressed as a percentage of the mass of the sample. The weight percent of insoluble solids represents the mass of insoluble solids expressed as a percentage of the mass of the sample. A 15 wt % NaCl standard solution was measured concurrently during the analysis of the samples. All measurements of the 15 wt % NaCl standard solution were within 5 % of the expected value.

w_{ds} = weight fraction of dissolved solids   (wt dissolved solids/ wt of supernate)
w_{ts} = weight fraction of total solids   (wt total solids/ wt of sludge slurry)
w_{is} = weight fraction of insoluble solids   (wt insoluble solids/ wt of sludge slurry)
w_{ss} = weight fraction of soluble solids   (wt dissolved solids/ wt of sludge slurry)

$$w_{is} = (w_{ts} - w_{ds}) / (1 - w_{ds}) \qquad\qquad \text{Eq. 1}$$

$$w_{ss} = w_{ts} - w_{is} \qquad\qquad \text{Eq. 2}$$

Density Measurements

Density measurements were made on both the total sample and the filtered supernate using a pipette tip with the small end heat-sealed. After heat sealing, these pipette tips provide a reproducible volume of 8.25 mL. The sample does not wet the pipette tips eliminating problems with entrained air bubbles when filling a narrow cylinder with thick slurries.

RESULTS

The 241-AN-103 sample received at SRTC consisted of a concentrated slurry containing a significant amount of precipitated salts as evidenced by the weight percent solids data shown in Table 4. Nearly all of the insoluble solids present in the as-received sample dissolved during dilution of the sample. The sodium, Sr^{90}, and free hydroxide concentrations were monitored during the several steps required to dilute the as-received sample to the ~5 M sodium concentration needed for the ion exchange process (see Table 5). The sodium concentration gradually dropped with each successive dilution. The free hydroxide concentration dropped precipitously with the first dilution most likely due to the dissolution of aluminum salts. In contrast, the Sr^{90} concentration initially increased with the first dilution and then remained constant throughout the following dilution steps. This indicates significant dissolution of Sr^{90} from the insoluble solids present in the original as-received sample with each step of the dilution.

After diluting the first half of the 241-AN-103 sample to ~5 M sodium concentration, the weight percent solids and density were measured again (see Table 4). Due to the low quantity of insoluble solids present after dilution a direct measurement of the weight percent insoluble solids was necessary. The single direct measurement of the insoluble solids content does not provide any accuracy statistics, however at these low solids concentrations the weight percent insoluble solids result of 0.1 probably should have error bands of $\pm$ 50%. The diluted 241-AN-103 sample was then dead-end filtered to remove the small amount of insoluble solids.

The filtered supernatant liquid from the diluted sample was fully characterized. Table 6 lists the results for the analysis of non-radioactive species found in the filtered supernatant liquid. The sodium concentration at 5.25 M was close to the targeted 5 M

required by the ion exchange process. Other metals with a significant concentration in the supernatant include aluminum, phosphorus, potassium, and chromium. The main anions in solution include nitrate, nitrite, and hydroxide. The cation concentrations versus anion concentrations show reasonable agreement (within 10%) indicating a reasonably accurate and complete analysis. The cation/anion balance provides an indication of whether any significant species were missed or whether bias was present in the analytical methods for cations versus anions. The TIC result, assuming all of the inorganic carbon present as carbonate, equates to a carbonate concentration of 12600 mg/L. Since the carbonate concentration was below the detection limits of the titration method no direct comparison can be made. However, the TIC result expressed as a carbonate concentration appears reasonable being less than the lower detection limit for carbonate by the titration method. The TOC (376 mg/L) is somewhat low with respect to the sum of the carbon concentrations calculated from the oxalate and formate anion concentrations (457 mg/L). Both aluminum and phosphorus metals as measured by ICP-ES do not agree well with the values obtained for the anionic equivalents (AlO_2^- and PO_4^{3-}) measured by different methods. The aluminate and carbonate measured by titration after treatment with $SrCl_2$ may be subject to potential error due to precipitation of other anions along with the carbonate or incomplete carbonate precipitation. The precipitation of aluminate and other anions along with the carbonate would lower the observed aluminate concentration and produce a high bias for the carbonate measurement assuming complete precipitation of carbonate. The method dilutes the sample by ~40X which should reduce the potential of significant precipitation of other anions. However, the aluminum result by ICP-ES indicates that precipitation of aluminate along with the carbonate may have occurred. Precipitation of aluminate has not been observed with a standard containing .0.5 M aluminate, 0.5 M carbonate , and 0.5 M free hydroxide using the $SrCl_2$ method. The precipitation of aluminate may also reduce the free hydroxide concentration.

Table 7 shows the results of the measurement of radioactive isotopes for the filtered supernatant liquid. The Sr^{90} value agrees well with concentration measured during the dilution of the 241-AN-103 sample (see Table 5). The Cs^{137} value listed in Table 7, obtained from gamma spectroscopy, agrees reasonably well with the value obtained for mass 137 from ICP-MS (172 μCi/mL). Other gamma emitters were not detected due to the high Cs^{137} concentration. These comparisons between different analytical methods provide some level of assurance as to the quality of the data.

The total solids and insoluble solids of the diluted 241-AN-103 sample were fully characterized and the results shown in Tables 8 and 9. The total solids includes the insoluble solids present in the sample as well as all of the dissolved salts. The insoluble solids were collected by filtration of the sample and washed with small portions of 0.01 M NaOH to remove interstitial supernatant liquid. The higher number of species below detection limits and larger percent relative standard deviations for the analysis of the total solids with respect to the analysis of the insoluble solids results from the dilution of metals and radioisotopes by salts. For most of the elements listed in Table 8 the values represent the average of six replicate samples, three from the aqua-regia dissolution and three from the sodium peroxide fusion method. In some cases, only aqua-regia data or the data from the sodium peroxide fusion method were used. For example, only the sodium

peroxide fusion data was used to calculate an average silicon value because silicon does not dissolve well with the aqua-regia method. Sodium data cannot be obtained from the sodium peroxide fusion method so only the aqua-regia data was used to calculate an average value. A standard glass of known composition dissolved along with the sample provides an indication of the quality of the dissolution and the presence of contamination introduced during the dissolution procedure.

The sodium concentration at 29 wt % dominates the total solids analysis. Other metals of significant concentration include aluminum, potassium, and silicon. In contrast, the insoluble solids contain high concentrations of aluminum, chromium, silicon, and calcium in addition to sodium.

The radionuclide data in Table 9 was obtained through counting techniques and ICP-MS. Gamma spectroscopy identified only Cs^{137} in the total solids but also detected Co^{60} in the insoluble solids. The Tc^{99} value for the insoluble solids, determined by ICP-MS (17.0 μCi/g), agrees well with the value determined by ICP-ES in Table 8 when converted to similar units (17.1 μCi/g). The significantly higher detection limits for Tc in the ICP-ES compared to ICP-MS do not allow the same comparison to be made for the total solids. The low actinide concentrations in both the total solids and the insoluble solids combined with the dilution necessary to analyze the samples account for the low precision of the replicates. The uranium isotopics show consistency between both sets of solids data with U^{238} accounting for ~99% and U^{235} for ~0.7% by weight of the total uranium. The plutonium isotopics between the total dried solids sample and the insoluble solids sample do not show good agreement indicating a problem with the data at least with respect to the two methods used for obtaining the data. A Pu^{240} value obtained by subtracting the Pu^{239} value from the ICP-MS from the $Pu^{239/240}$ value from alpha counting indicates poor agreement for the plutonium isotopics between the two samples. A ratio for Pu^{239} to Pu^{240} of 0.1 on a mass basis was found in the total solids sample while the insoluble solids show a ratio of ~1.0. Very low levels of Cm^{244} detected in the both the total solids and insoluble solids data appears to be the result of contamination introduced during sample preparation.

The second half of the 241-AN-103 sample was diluted to ~5 M sodium concentration and filtered through a 0.45 μ disposable filter to provide additional material for ion exchange tests. The filtrate was combined with the filtrate from the first half of the 241-AN-103 sample to form a diluted composite sample and re-analyzed. As shown in Table 10 the sodium, potassium, phosphorus, and chromium agree within 5% of the analysis of the first half of the sample. The aluminum concentration in the diluted composite exceeds the concentration found in the first half of the sample by approximately 20%. However, in contrast to the first half of the 241-AN-103 sample, the aluminum concentration in the diluted composite sample agrees well with the aluminate concentration as determined by titration method. The anion concentrations in the diluted composite show some variation with respect to the analysis of the first half of the 241-AN-103 sample. The nitrate, nitrite, and phosphate concentrations in the diluted composite are significantly lower while the aluminum, sulfate, oxalate, are significantly higher as compared to the analysis of the first half of the 241-AN-103 sample. The sum of the cation concentrations versus

the sum of the anion concentrations agree within 5%. The TIC and TOC in the diluted composite are each ~50% higher than in the first half sample. The TIC does not correlate well with the carbonate result being approximately 80% higher indicating incomplete precipitation of the carbonate by $SrCl_2$. The TOC result agrees within 10% to the sum of the formate and oxalate as organic carbon sources. Some of the differences between the diluted composite and the first half sample may result from unequal amounts of insoluble solids in the two halves of the 241-AN-103 sample when originally split into two portions.

The data for the radionuclide concentrations in the diluted composite shown in Table 11 indicates fair agreement for the Cs^{137}, Sr^{90}, and uranium isotopes compared to the first half sample. However, the Tc^{99} concentration in the diluted composite exceeds the concentration in the first half sample by nearly 50%.

Table 12 shows a check on the self-consistency of the data for the first half of 241-AN-103 sample diluted ~5 M sodium. The table was generated by converting the filtered supernatant data to a total dried solids concentration basis followed by adding the converted filtered supernatant and insoluble solids data together based on the weight percent solids and density data. Theoretically, the sum of these two samples should be equal to the total dried solids analysis minus any material leached from the insoluble solids during washing with 0.01 M NaOH. With the exception of sodium, potassium, aluminum and Cs^{137}, all predominantly soluble species present in high concentrations, the data indicates relatively poor agreement between the filtered supernatant liquid, the total dried solids, and the insoluble solids samples. The poorest agreement exists for species predominantly found in the insoluble solids at low concentrations. Most of the values with high percent differences show combined filtered supernatant and insoluble solids values lower then the total solids values indicating the possibility that some material was washed from the insoluble solids or the value used for the weight percent insoluble solids in the calculation was low.

COMPARISON TO PREVIOUS ANALYSES OF 241-AN-103 SAMPLES

The samples from 241-AN-103 sent to SRTC were made up from two push core samples originally collected in 1996. The composition of the 1996 samples, Core 166 and Core 167, were determined for the various segments of these cores. The composition of composites made by mixing various segments were also determined. These results have been reported in the tank characterization report for Tank 241-AN-103.[6] Neither the composite nor sectional samples were diluted to a ~5 M sodium concentration so a direct comparison to the experimental data in this report cannot be made. Two comparisons have been made; the first to values calculated from a weighted addition of segment compositions to simulate the makeup of the samples received at SRTC, and the second to a simple dilution of the core 166 composite values.

Table 13 shows the calculated chemical composition expected for the composites received at SRTC for nine chemical species. The calculated composite concentrations

were calculated utilizing the makeup of P1 as listed in Table 3. The sum of all sample weights added to P1 was used to determine the weight percent each jar added to the P1 composite. The density and concentration, of each segment of the core were used to calculate a species concentration in μg/g for each sample added to composite P1. For crust samples and few suspended solids samples without concentrations available, the composite solid values were used. The weight percent of each added jar sample was multiplied by its species concentration, thus giving the weight added by each jar to the composite sample P1. The density of each jar was also multiplied by its respective weight percent and summed to give a composite density of the resulting P1 sample. The sum of the jar weights was then divided by the composite density to determine the composite species concentration in mg/L The first column of Table 13 contains this calculated composite composition converted to molar concentration. The referenced report contained sufficient data to calculate a composite concentration for only the nine species shown in the table.

The calculated composite values were then diluted mathematically. The dilution calculation used the ratio of the sodium concentration in the filtered supernatant liquid from the diluted first half of the 241-AN-103 received at SRTC (see Table 6) to the sodium concentration of the calculated composite (5.25/13.9). This calculation assumes that no solids precipitated during the dilution and that all solids present prior to dilution dissolve. The data from the calculated diluted composite and the filtered supernatant show reasonably good agreement given the assumptions required for the diluted composite calculation. The values for the diluted composite sample obtained by combining the first and second halves of the 241-AN-103 received at SRTC (see Table 10) shows even better agreement with the referenced data. The percent difference for aluminum drops from 29% to 3%, the nitrate from 39% to 9%, the nitrite from 19% to 7%, and the chloride from 41% to 2%. For all of the other species in the table the differences remain unchanged except for Si which increases from 35% to 70%.

The average liquid composite and solid composite sample data from tank characterization report[6] can also be compared to the data for the sample received at SRTC. The composite liquid sample was made by adding 40 mL of supernate from Core 166 segments 3, 4, 6, 7, 8, 9, 10, 11, and 12. The solid composite sample, also called the non-convective layer salt slurry, was made by adding 10 g of each of Core 166 segments 1-19. Only species with an actual measured value were included in the comparison.

The chemical composition of the liquid composite was mathematically diluted to a 5.25 M sodium concentration using the ratio of the sodium concentration in the filtered supernatant liquid from the diluted first half of the 241-AN-103 received at SRTC (see Tables 6 and 7) to sodium concentration of the calculated composite (5.25/10.98). The comparison in Table 14 shows fair agreement for some species but large differences for others. Much of the difference in the compositions can be attributed to the fact that the sample received at SRTC was a whole tank composite containing 50% solids that dissolved during dilution. The liquid composite sample contained only supernatant liquid from select segments of Core 166.

Table 15 shows a comparison of the solids composite to the total solids of the first half of the 241-AN-103 received at SRTC (see Tables 8 and 9). Only unit conversions were made on the solids composite data shown in the table. The two data sets show agreement of roughly ±50%.

CONCLUSIONS

The data obtained for the sample of 241-AN-103 received at SRTC appears relatively self-consistent for major components of the sample. Some inconsistency was observed between results where more than one method of determination was employed. Results for radionuclides present in low concentrations, namely the actinides, generally exhibit larger errors due to the difficulties in analyzing species present in low concentrations and the potential for introduction of small amounts of contamination during sample handling causing large uncertainties. The comparison to previous analyses of samples from 241-AN-103 indicates general agreement with the current analytical results. However, since a direct comparison was not possible due to the differences in the type of samples that were analyzed, the validity or usefulness of the comparison should not be overstated.

Again, it should be stressed that the 241-AN-103 sample was made from combining portions of two core samples obtained from a large non-homogenized waste tank. Although the segments of the core samples were combined in an attempt to produce a whole tank composite, how the results of the current analysis relate to the actual composition of the Hanford waste tank 241-AN-103 is uncertain.

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APPROVALS

Authors
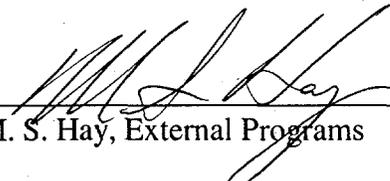
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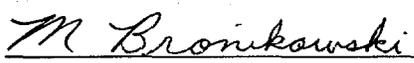
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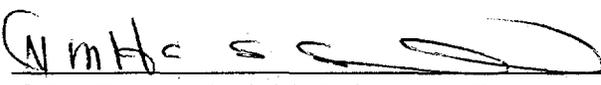
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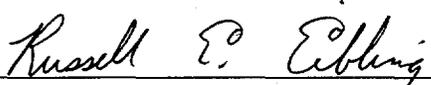
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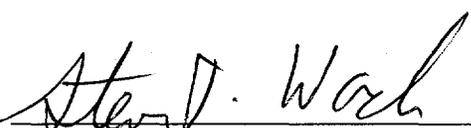
Steven J. Wach _____   8/01/00
S. T. Wach, Manager, External Programs   Date

Table 1. Listing of Sample Labels from Bottles of AN-103 Sample Received at SRTC.

Jar No.	Jar Label	
Jar 1	AN-103 Composite P-1	222S-98-000086
Jar 2	AN-103 Composite P-2	222S-98-000087
Jar 3	AN-103 Composite P-3	222S-98-000088
Jar 4	AN-103 Composite P-4	222S-98-000089
Jar 5	AN-103 Composite P-5	222S-98-000090
Jar 6	AN-103 Composite P-6	222S-98-000091
Jar 7	AN-103 Composite P-7	222S-98-000092
Jar 8	AN-103 Composite P-9	222S-98-000093
Jar 9	AN-103 Composite P-10	222S-98-000094
Jar 10	AN-103 Composite P-11	222S-98-000095
Jar 11	AN-103 Composite P-12	222S-98-000096
Jar 12	AN-103 Composite P-13	222S-98-000097

Table 2. Descriptions of Source Material for the Parent Jar No.

Parent Jar No.	Description of source material
11396	Slurried solids from core #166 segment #15U
11402	Slurried solids from core #166 segment #15L
11413	Drainable liquid from core #166 segment #3
11485	Suspended solids from core #167 segment #6
11500	Suspended solids from core #167 segment #5
11502	Slurried solids from core #167 segment #12L
11503	Slurried solids from core #167 segment #12U
11504	Slurried solids from core #167 segment #14U
11508	Slurried solids from core #166 segment #15U
11509	Slurried solids from core #166 segment #15L
11510	Slurried solids from core #166 segment #17U
11511	Slurried solids from core #166 segment #17L
11512	Slurried solids from core #167 segment #14L
11515	Slurried solids from core #166 segment #13U
11524	Drainable liquid from core #166 segment #3
11524	Solids from core #166 segment #3
11525	Drainable liquid from core #167 segment #6
11527	Slurried solids from core #167 segment #15L
11528	Drainable liquid from core #166 segment #10
11531	Slurried solids from core #166 segment #16U
11533	Slurried solids from core #166 segment #16L
11534	Drainable liquid from core #167 segment #8
11536	Tank Crust Material
11537	Drainable liquid from core #166 segment #6
11539	Drainable liquid from core #166 segment #11
11546	Drainable liquid from core #167 segment #2
11553	Slurried solids from core #166 segment #18L
11558	Drainable liquid from core #166 segment #12
11560	Drainable liquid from core #167 segment #9
11569	Drainable liquid from core #167 segment #6
11616	Suspended solids from core #166 segment #4
11617	Suspended solids from core #166 segment #9
11618	Suspended solids from core #166 segment #10
11621	Slurried solids from core #167 segment #17L
11622	Slurried solids from core #167 segment #17U
11624	Suspended solids from core #166 segment #11
11634	Slurried solids from core #166 segment #13L
11635	Slurried solids from core #166 segment #18U
11636	Slurried solids from core #166 segment #18L
11638	Suspended solids from core #167 segment #7
11775	Tank Crust Material
11776	Suspended solids from core #166 segment #12
11777	Slurried solids from core #166 segment #16U
11778	Slurried solids from core #166 segment #16L
11779	Suspended solids from core #166 segment #7
11781	Slurried solids from core #166 segment #19U
11782	Slurried solids from core #166 segment #19L
11784	Suspended solids from core #167 segment #9
11785	Tank Crust Material
11786	Tank Crust Material
11790	Slurried solids from core #167 segment #15U
11791	Slurried solids from core #167 segment #15L

Table 3. Weights in Grams of each Parent Jar used to Form Composites Samples P1 - P13

Parent Jar	P1	P2	P3	P4	P5	P6	P7	P8	P9
11396	2.73	2.70	2.70	2.75	2.77	2.73	2.74	2.71	2.74
11402	2.79	2.74	2.76	2.75	2.81	2.76	2.77	2.76	2.83
11413	0.79	0.75	0.76	0.76	0.72	0.71	0.76	0.73	0.79
11485	1.17	1.24	1.21	1.19	1.17	0.45	0.29	1.18	1.18
11500	1.54	1.69	1.62	1.63	1.67	2.09	1.55	1.57	1.54
11502	3.56	3.57	3.58	3.69	3.69	3.64	3.59	3.63	3.64
11503	3.50	3.52	3.51	3.51	3.50	3.53	3.54	3.51	3.55
11504	3.58	3.51	3.54	3.49	3.53	3.54	3.53	3.48	3.55
11508	2.93	2.97	3.07	3.02	2.88	2.99	2.95	3.05	2.97
11509	3.44	3.41	3.37	3.43	3.38	3.39	3.44	3.35	3.40
11510	2.60	2.63	2.63	2.63	2.62	2.66	2.65	2.63	2.61
11511	2.98	3.00	2.99	2.99	3.05	2.99	3.01	2.99	3.04
11512	4.05	4.03	3.98	4.01	4.00	4.07	4.08	4.02	3.97
11515	3.17	3.14	3.21	3.13	3.16	3.21	3.16	3.14	3.17
11524	7.34	7.34	7.34	7.32	7.38	7.34	7.32	7.34	7.36
11524	1.37	1.39	1.36	1.58	1.40	1.38	1.61	1.46	1.40
11525	9.47	9.53	9.47	9.48	9.55	9.47	9.48	9.47	9.46
11527	1.48	1.39	1.40	1.36	1.40	1.39	1.42	1.35	1.46
11528	7.43	7.43	7.45	7.41	7.41	7.42	7.46	7.45	7.43
11531	2.11	2.03	2.00	2.14	2.14	2.09	2.06	2.01	2.00
11533	2.55	2.51	2.61	2.45	2.51	2.51	2.60	2.48	2.49
11534	7.53	7.56	7.55	7.51	7.55	7.59	7.52	7.56	7.55
11536	1.40	1.42	1.43	1.43	1.42	1.44	1.40	1.40	1.42
11537	7.62	7.45	7.44	7.63	7.43	7.44	7.41	7.48	7.49
11539	7.24	7.23	7.31	7.27	6.26	7.27	7.28	7.23	7.21
11546	6.28	6.79	6.19	6.03	6.06	6.06	6.07	6.11	6.05
11553	1.98	1.98	1.97	1.96	1.97	1.97	1.96	1.98	1.99
11558	6.91	6.88	7.02	6.90	6.89	6.89	6.92	6.87	6.93
11560	9.72	9.78	9.74	9.73	9.74	9.72	9.76	9.78	9.77
11569	9.04	9.03	9.11	9.02	9.03	9.01	9.04	9.04	9.01
11616	1.22	1.24	1.21	1.22	1.27	1.34	1.24	1.21	1.48
11617	1.06	1.03	1.02	1.09	1.05	1.11	1.13	1.10	1.03
11618	1.09	1.05	1.06	1.02	1.12	1.04	1.09	1.08	1.12
11621	3.08	3.15	3.06	3.09	3.08	3.06	3.10	3.06	3.09
11622	3.90	3.89	3.88	3.87	3.88	3.92	3.90	3.88	3.87
11624	0.63	0.65	0.61	0.58	0.64	0.58	0.68	0.66	0.62
11634	2.92	2.88	2.86	2.88	2.91	2.91	2.92	2.90	2.86
11635	3.48	3.51	3.50	3.46	3.46	3.48	3.49	3.53	3.48
11636	3.20	3.13	3.12	3.12	3.14	3.15	3.12	3.11	3.13
11638	0.94	0.93	1.10	1.13	1.00	0.94	0.95	0.97	0.99
11775	0.75	0.75	0.71	0.76	0.72	0.75	0.73	0.78	0.71
11776	0.55	0.47	0.51	0.51	0.52	0.48	0.62	0.53	0.53
11777	3.47	3.48	3.46	3.40	3.51	3.46	3.38	3.51	3.46
11778	3.25	3.15	3.33	3.28	3.23	3.25	3.27	3.26	3.27
11779	0.72	0.77	0.85	0.74	0.76	0.72	0.75	0.73	0.78
11781	2.97	2.96	2.97	2.95	2.99	2.98	2.97	2.98	2.98
11782	2.44	2.42	2.44	2.42	2.46	2.44	2.44	2.52	2.43
11784	1.60	1.33	1.39	1.35	1.30	1.31	1.32	1.34	1.36
11785	2.81	2.78	2.82	2.80	2.80	2.80	2.81	2.79	2.84
11786	3.29	3.27	3.31	3.28	3.31	3.35	3.29	3.34	3.27
11790	4.16	4.19	4.16	4.19	4.15	4.20	4.18	4.21	4.20
11791	3.93	3.98	3.97	3.92	3.94	3.91	3.94	3.96	3.91

Table 3. Weights in Grams of each Parent Jar used to Form Composites Samples P1 - P13 (Continued).

Parent Jar	P10	P11	P12	P13
11396	2.76	2.79	2.76	2.82
11402	2.78	2.80	2.76	2.77
11413	0.73	0.73	0.72	0.73
11485	1.16	1.18	1.20	1.26
11500	1.61	1.54	1.55	1.60
11502	3.57	3.59	3.63	3.63
11503	3.50	3.47	3.53	3.55
11504	3.48	3.57	3.58	3.70
11508	2.98	3.04	2.99	2.99
11509	3.35	3.45	3.42	3.38
11510	2.66	2.65	2.69	2.64
11511	3.00	3.03	3.01	3.01
11512	4.02	4.12	4.13	4.07
11515	3.20	3.18	3.18	3.17
11524	7.35	7.39	7.37	7.34
11524	1.43	1.56	1.33	1.58
11525	9.49	9.50	9.44	9.45
11527	1.43	1.36	1.39	1.39
11528	7.43	7.48	7.45	7.46
11531	2.07	2.08	2.04	2.14
11533	2.64	2.47	2.42	2.43
11534	7.52	7.54	7.58	7.59
11536	1.41	1.43	1.42	1.41
11537	7.42	7.41	7.46	7.46
11539	7.21	7.27	7.23	7.24
11546	6.07	6.07	6.03	6.04
11553	1.95	1.98	1.97	1.98
11558	6.88	6.87	6.88	6.87
11560	9.76	9.74	9.74	9.76
11569	9.07	9.03	9.11	9.03
11616	1.20	1.23	1.23	1.18
11617	1.05	1.06	1.08	1.11
11618	1.11	1.05	1.05	1.02
11621	3.08	3.08	3.06	3.09
11622	3.90	3.88	3.87	3.87
11624	0.59	0.62	0.60	0.65
11634	2.96	2.92	2.88	2.87
11635	3.43	3.53	3.46	3.49
11636	3.13	3.13	3.13	3.14
11638	1.09	0.92	0.96	0.92
11775	0.75	0.81	0.75	0.75
11776	0.60	0.46	0.57	0.51
11777	3.49	3.53	3.49	3.44
11778	3.27	3.21	3.24	3.24
11779	0.76	0.75	0.75	0.73
11781	2.96	2.97	2.97	2.96
11782	2.41	2.44	2.43	2.43
11784	1.34	1.35	1.31	1.35
11785	2.80	2.80	2.79	2.81
11786	3.31	3.27	3.31	3.31
11790	4.23	4.23	4.19	4.20
11791	3.97	3.92	3.93	3.95

Table 4. Results of Weight Percent Solids and Density Measurements for 241-AN-103 Sample As-Received and for the First Half of the Sample Diluted to ~5 M Sodium.

	As Received AN-103	AN-103 Diluted to 5.25 M Na
wt % Total Solids	64.7 (3)	31.5 (2)
wt % Dissolved Solids	53.1 (3)	30.4 (1)
wt % Insoluble Solids	24.7*	0.1**
wt % Soluble Solids	40.0***	31.4***
Density of Supernate, g/mL	1.49	1.26
Density of Slurry, g/mL	1.58	1.28

Percent relative standard deviation for triplicate measurements are shown in parentheses.

* Calculated from the wt % total solids and wt % dissolved solids.
**Result of a single direct measurement.
***Calculated from the difference between the wt % total solids and wt % insoluble solids.

Table 5. Behavior of Na, Sr, OH During Dilution of the First Half of the 241-AN-103 Sample to ~5 M Sodium with 0.01 M NaOH

	[Na$^+$] M	Sr^{90} μCi/mL	[OH$^-$] M	Total Volume
As Received	11.7	0.012	6.28	500 mL
1st Dilution	~8.5*	0.020	2.64	1025 mL
2nd Dilution	7.5	0.022	2.40	1150 mL
3rd Dilution	5.25	0.020	2.17	1525 mL

*Estimated from the sodium concentration of the resulting solution (7.5 M) and the amount of 0.01 M NaOH added assuming simple dilution with no solids dissolution.

Table 6. Concentration of Non-Radioactive Species in Filtered Supernatant of the First Half of the 241-AN-103 Sample Diluted to ~5 M Sodium.

Element	Average Concentration mg/L	Average Concentration M	% Relative Standard Deviation
Ag	4.38E-01	4.06E-06	32
Al	1.88E+04	6.98E-01	0.7
B	1.30E+01	1.20E-03	3.1
Ba	<2.55E-01	<1.85E-06	
Ca	<1.29E+00	<3.21E-05	
Cd	5.73E-01	5.09E-06	5.5
Co	5.31E-01	9.01E-06	18
Cr	7.33E+01	1.41E-03	0.4
Cu	7.60E-01	1.20E-05	15
Fe	<5.30E-01	<9.50E-06	
Hg	<1.27E-01	<6.35E-07	
K	4.74E+03	1.21E-01	2.2
La	<1.36E+00	<9.81E-06	
Li	1.51E+00	2.18E-04	7.5
Mg	<1.06E+00	<4.35E-05	
Mn	1.57E-01	2.86E-06	9.7
Mo	3.41E+01	3.56E-04	1.2
Na	1.21E+05	5.25E+00	1.0
Ni	7.67E-01	1.31E-05	22
P	3.01E+02	9.71E-03	0.4
Pb	3.55E+01	1.71E-04	2.9
Si	1.26E+02	4.48E-03	1.2
Sn	2.62E+01	2.20E-04	1.3
Sr	<2.04E-01	<2.33E-06	
Ti	<3.06E-01	<6.38E-06	
V	4.51E-01	8.84E-06	31
Zn	<1.30E+00	<1.99E-05	
Zr	1.15E+00	1.27E-05	16

Percent relative standard deviations are for analysis of three replicate samples.

Table 6. Concentration of Non-Radioactive Species in Filtered Supernatant of the First Half of the 241-AN-103 Sample Diluted to ~5 M Sodium. (Continued)

Analyte	Average Concentration mg/L	Average Concentration M	% Relative Standard Deviation
$[NO_3^-]$	9.74E+04	1.57E+00	1.4
$[NO_2^-]$	4.77E+04	1.04E+00	2.5
$[PO_4^{3-}]$	6.54E+02	6.88E-03	0.8
$[SO_4^{2-}]$	7.43E+02	7.73E-03	0.8
$[C_2O_4^{2-}]$	5.18E+02	5.88E-03	4.9
$[Cl^-]$	2.18E+03	6.15E-02	8.7
$[F^-]$	1.61E+02	8.49E-03	4.9
$[CHO_2^-]$	1.18E+03	2.63E-02	1.2
$[OH^-]$ free	4.27E+04	2.17E+00	3.9
$[CO_3^{2-}]$	<1.53E+04	<2.55E-01	
$[AlO_2^-]$	2.36E+04	3.99E-01	13
TIC	2.52E+03	*	14
TOC	3.76E+02	*	38

Percent relative standard deviations are for analysis of three replicate samples.

*Cannot calculate molar concentrations without knowing the specific compounds represented by the analytical result.

Table 7. Concentration of Radioactive Species in Filtered Supernatant of the First Half of the 241-AN-103 Sample Diluted to ~5 M Sodium.

Analyte	Average Concentration mg/L	Average Concentration μCi/mL	% Relative Standard Deviation
Sr^{90}	1.45E-04	1.99E-02	38
Tc^{99} *	1.94E+00	3.30E-02	32
Cs^{133} *	3.61E+00	Stable	5.6
Cs^{135} *	1.48E+00	1.70E-03	4.2
Cs^{137} *	1.98E+00	1.72E+02	3.2
Cs^{137}	2.23E+00	1.94E+02	0.5
U^{235} *	4.20E-02	9.01E-08	4.2
U^{238} *	5.52E+00	1.85E-06	0.3
Total Alpha	**	1.80E-03	16

Percent relative standard deviations are for analysis of three replicate samples.

*Determined by ICP-MS
**Cannot calculate mg/L concentrations without knowing the specific isotopes represented by the analytical result.

Table 8. Concentration of Non-Radioactive Species in Total Dried Solids and Insoluble Dried Solids of the First Half of the 241-AN-103 Sample after Dilution to ~5.0 M Sodium.

Element	241-AN-103 Total Solids		241-AN-103 Insoluble Solids	
	Average Concentration Wt%	% Relative Standard Deviation	Average Concentration Wt%	% Relative Standard Deviation
Al	5.94E+00	33	1.23E+01	2.2
B	<1.5E-02		3.79E-02	15
Ba	<8.2E-03		3.07E-02	4.7
Ca	9.89E-02	26	1.07E+00	7.7
Cd	<3.1E-03		8.59E-02	2.4
Co	<6.1E-03		<1.5E-02	
Cr	6.61E-02	35	6.02E+00	1.6
Cu	<1.9E-02		5.07E-02	34
Fe	7.47E-02	42	9.86E-01	3.7
Hg	1.01E-03	1.6	9.99E-04	0.5
K	1.05E+00	0.5	3.15E-02	9.5
La	<2.9E-02		<2.8E-02	
Li	<1.4E-02		6.44E-01	2.2
Mg	9.64E-03	66	7.69E-02	8.1
Mn	1.82E-02	9.7	8.02E-02	1.6
Mo	9.85E-03	39	<8.1E-03	
Na	2.93E+01	1.9	1.36E+01	0.8
Ni	<1.7E-02		2.15E-01	2.1
P	7.40E-02	13	<8.9E-02	
Pb	<6.4E-02		2.72E-01	5.0
Ru	<5.0E-03		<4.9E-02	
Si	1.44E-01	21	4.86E+00	1.8
Sn	1.91E-02	6.7	<1.7E-02	
Sr	<3.1E-03		4.88E-03	10
Tc	<1.8E-02		1.01E-01	5.1
Ti	<1.5E-02		<1.2E-02	
V	<1.6E-02		<1.6E-02	
Zn	7.55E-03	24	2.05E-01	1.9
Zr	<1.88E-02		5.09E-02	22

Percent relative standard deviations are for analysis of three to six replicate samples.

Table 9. Concentration of Radioactive Species in Total Dried Solids and Insoluble Dried Solids of the First Half of the 241-AN-103 Sample after Dilution to ~5.0 M Sodium.

Isotope	241-AN-103 Total Solids		241-AN-103 Insoluble Solids	
	Average Concentration μCi/g	% Relative Standard Deviation	Average Concentration μCi/g	% Relative Standard Deviation
Co^{60}	Not detected		3.49E-01	9.9
Sr^{90}	4.79E+00	35	3.14E+02	17
Tc^{99} *	2.86E-01	32	1.70E+01	4.6
Cs^{137}	5.12E+02	34	1.18E+03	1.7
U^{233} *	Not detected		4.99E-02	8.7
U^{235} *	9.05E-07	34	6.76E-05	8.0
U^{238} *	1.86E-05	28	1.54E-03	5.6
Pu^{238}/Am^{241}	1.52E+00	38	3.27E+00	16
$Pu^{239/240}$	1.04E+00	57	4.45E-01	34
Pu^{239} *	2.85E-02	29	1.00E-01	58
Pu^{240} **	1.02E+00		3.44E-01	
Np^{237} *	Not detected		9.19E-04	8.6

Percent relative standard deviations are for analysis of three to six replicate samples.

*Determined by ICP-MS
**Calculated by subtracting the Pu^{239} value from the ICP-MS from the $Pu^{239/240}$ value from alpha counting.

Table 10. Concentration of Non-Radioactive Species in Filtered Supernatant of a Composite of the First and Second Halves of the 241-AN-103 Sample after each was Diluted to ~5.0 M Sodium.

Element	Average Concentration mg/L	Average Concentration M	% Relative Standard Deviation
Al	2.25E+04	8.34E-01	3.9
B	1.35E+01	1.25E-03	4.3
Ba	<2.97E-01	<2.16E-06	
Ca	6.04E+00	1.51E-04	4.2
Cd	5.78E-01	5.14E-06	28
Co	<8.06E-01	<1.37E-05	
Cr	7.46E+01	1.44E-03	4.2
Cu	<8.91E-01	<1.40E-05	
Fe	<6.04E-01	<1.08E-05	
Hg	<1.49E-01	<7.40E-07	
K	4.57E+03	1.17E-01	2.8
La	<1.93E+00	<1.39E-05	
Li	1.10E+00	1.59E-04	33
Mg	<1.49E-01	<6.11E-06	
Mn	<1.78E-01	<3.24E-06	
Mo	3.73E+01	3.89E-04	4.9
Na	1.15E+05	4.99E+00	3.1
Ni	<1.93E+00	<3.29E-05	
P	3.07E+02	9.90E-03	3.4
Pb	3.68E+01	1.78E-04	10
Ru	<7.28E+00	<7.20E-05	
Si	9.47E+01	3.37E-03	80
Sn	6.52E+01	5.50E-04	92
Sr	<9.58E+00	<1.09E-04	
Tc	<1.81E+00	<1.83E-05	
Ti	<3.44E-01	<7.19E-06	
V	<1.30E+00	<2.56E-05	
Zn	<4.46E-01	<6.81E-06	
Zr	<8.29E-01	<9.09E-06	

Percent relative standard deviations are for analysis of three replicate samples.

Table 10. Concentration of Non-Radioactive Species in Filtered Supernatant of a Composite of the First and Second Halves of the 241-AN-103 Sample after each was Diluted to ~5.0 M Sodium (Continued)

Analyte	Average Concentration mg/L	Average Concentration M	% Relative Standard Deviation
$[NO_3^-]$	6.19E+04	9.98E-01	8.8
$[NO_2^-]$	3.98E+04	8.66E-01	3.7
$[PO_4^{3-}]$	5.59E+02	5.89E-03	17
$[SO_4^{2-}]$	8.66E+02	9.02E-03	12
$[C_2O_4^{2-}]$	6.04E+02	6.86E-03	15
$[Cl^-]$	3.00E+03	8.46E-02	12
$[F^-]$	9.40E+01	4.95E-03	8.3
$[CHO_2^-]$	1.25E+03	2.77E-02	11
$[OH^-]$ free	3.18E+04	1.87E+00	1.4
$[CO_3^{2-}]$	1.01E+04	1.68E-01	11
$[AlO_2^-]$	4.81E+04	8.16E-01	2.2
TIC	3.68E+03	*	7.4
TOC	5.68E+02	*	26

Percent relative standard deviations are for analysis of three replicate samples.

*Cannot calculate molar concentrations without knowing the specific compounds represented by the analytical result.

Table 11. Concentration of Radioactive Species in Filtered Supernatant of a Composite of the First and Second Halves of the 241-AN-103 Sample after each was Diluted to ~5.0 M Sodium.

Analyte	Average Concentration mg/L	Average Concentration μCi/mL	% Relative Standard Deviation
Sr^{90}	1.13E-04	1.55E-02	2.5
Tc^{99} *	3.08E+00	5.23E-02	6.3
Cs^{133} *	4.31E+00	stable	3.6
Cs^{135} *	1.33E+00	1.53E-03	3.8
Cs^{137} *	1.76E+00	1.52E+02	4.0
Cs^{137}	2.30E+00	2.00E+02	2.4
U^{235} *	3.10E-02	6.75E-08	3.9
U^{238} *	4.08E+00	1.37E-06	4.6
Pu^{238}	3.19E-05	5.46E-04	5.5
$Pu^{239/240}$	**	2.00E-04	17
Am^{241}	3.67E-05	1.25E-04	22
Cm^{244}	4.43E-07	3.58E-05	46
Total Alpha	**	9.07E-04	3.8

Percent relative standard deviations are for analysis of three replicate samples.

*Determined by ICP-MS
**Cannot calculate mg/L concentrations without knowing the specific isotopes represented by the analytical result.

Table 12. Comparison of the Concentrations in the Total Dried Solids Sample Versus the Sum of the Filtered Supernatant and Insoluble Dried Solids Samples of the First Half of the 241-AN-103 Sample Diluted to ~5 M Sodium.

	Units	Total Dried Solids	Filtrate and Insoluble Solids	Percent Difference
Counting				
Cs^{137}	uCi/g	5.12E+02	5.10E+02	0.5%
Sr^{90}	uCi/g	4.79E+00	1.05E+00	78%
ICP-ES				
Al	wt%	5.94E+00	4.96E+00	16%
Ca	wt%	9.89E-02	3.73E-03	96%
Cr	wt%	6.61E-02	3.83E-02	42%
Hg	wt%	1.01E-03	3.65E-05	96%
K	wt%	1.05E+00	1.24E+00	18%
Mn	wt%	1.82E-02	2.96E-04	98%
Na	wt%	2.93E+01	3.16E+01	8%
Si	wt%	1.44E-01	4.83E-02	67%
Zn	wt%	7.55E-03	9.91E-04	87%
ICP-MS				
U^{235}	wt%	4.19E-05	2.08E-05	50%
U^{238}	wt%	5.52E-03	2.90E-03	48%
Tc^{99}	wt%	1.68E-03	8.25E-04	51%

Table 13. Composition of the Calculated Composite and Diluted Composite from Data Contained in the Tank Characterization Report[6] Compared with the Filtered Supernatant of the First Half of the 241-AN-103 Sample Received at SRTC Diluted to ~5 M Sodium.

	Units	Calculated Composite	Calculated Diluted Composite	Filtered Supernatant (from Table 6)	Percent Difference
Na	M	1.39E+01	5.25E+00	5.25E+00	0%
Al	M	2.39E+00	9.03E-01	6.98E-01	29%
Cr	M	1.40E-02	5.29E-03	1.41E-03	275%
K	M	3.60E-01	1.36E-01	1.21E-01	12%
Si	M	1.60E-02	6.04E-03	4.48E-03	35%
[NO$_3^-$]	M	2.53E+00	9.56E-01	1.57E+00	39%
[NO$_2^-$]	M	2.24E+00	8.46E-01	1.04E+00	19%
[Cl$^-$]	M	2.30E-01	8.69E-02	6.15E-02	41%
[F$^-$]	M	5.80E-02	2.19E-02	8.49E-03	158%

Table 14. Composition of the Calculated Diluted Liquid Composite from Data Contained in the Tank Characterization Report[6] Compared with the Filtered Supernatant of the First Half of the 241-AN-103 Sample Received at SRTC Diluted to ~5 M Sodium.

	Units	Calculated Diluted Liquid Composite[6]	Filtered Supernatant (from Table 6, 7)	Percent Difference
Cs^{137}	$\mu Ci/ml$	3.53E+02	1.94E+02	82%
Tc^{99}	$\mu Ci/ml$	7.98E-05	3.30E-02	100%
Sr^{90}	$\mu Ci/ml$	9.95E-03	1.99E-02	50%
$[NO_3^-]$	M	8.99E-01	1.57E+00	43%
$[NO_2^-]$	M	1.38E+00	1.04E+00	32%
$[C_2O_4^{2-}]$	M	1.56E-02	5.88E-03	165%
$[Cl^-]$	M	1.33E-01	6.15E-02	117%
$[F^-]$	M	1.50E-02	8.49E-03	77%
$[CH_2O^-]$	M	1.73E-02	2.63E-02	34%
$[OH^-]_{free}$	M	2.76E+00	2.17E+00	27%
Al	M	5.69E-01	6.98E-01	18%
Cr	M	5.16E-03	1.41E-03	266%
K	M	2.11E-01	1.21E-01	75%
Li	M	1.05E-03	2.18E-04	380%
Mo	M	5.40E-04	3.56E-04	52%
Na	M	5.25E+00	5.25E+00	0%
P	M	4.23E-03	9.71E-03	56%
Si	M	3.24E-03	4.48E-03	28%
TIC	mg/L	5.18E+02	2.52E+03	79%
TOC	mg/L	1.37E+03	3.76E+02	263%
Total U	mg/L	3.46E-06	1.90E-06	82%

Table 15. Composition of the Solids Composite from Data Contained in the Tank Characterization Report[6] Compared with the Total Dried Solids of the First Half of the 241-AN-103 Sample Received at SRTC Diluted to ~5 M Sodium.

	Units	Solids Composite[6]	Total Dried Solids (from Tables 8, 9)	Percent Difference
Cs^{137}	µCi/g	2.74E+02	5.12E+02	46%
Tc^{99}	µCi/g	1.44E-01	2.86E-01	50%
Sr^{90}	µCi/g	2.66E+00	4.79E+00	44%
Al	wt%	3.82E+00	5.94E+00	36%
Cr	wt%	4.38E-02	6.61E-02	34%
Fe	wt%	4.85E-03	7.47E-02	94%
K	wt%	6.54E-01	1.05E+00	38%
Mo	wt%	4.27E-03	9.85E-03	57%
Na	wt%	2.17E+01	2.93E+01	26%
P	wt%	1.15E-01	7.40E-02	55%
Si	wt%	8.38E-02	1.44E-01	42%
Zn	wt%	7.12E-04	7.55E-03	91%