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Analysis of Organic Carbon and Moisture in Hanford Single-Shell Tank Waste

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May 1995

Prepared for
Westinghouse Hanford Company
Waste Tank Organic Safety Program
and the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

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Richland, Washington 99352

Summary

This report documents a revised analysis performed by Pacific Northwest Laboratory (PNL) involving the organic carbon laboratory measurement data for Hanford single-shell tanks (SSTs) obtained from a review of the laboratory analytical data. This activity, undertaken at the request of Westinghouse Hanford Company (WHC), has as its objective to provide a best-estimate, including confidence levels, of total organic carbon (TOC) and moisture in each of the 149 SSTs at Hanford. The TOC and moisture information presented in this report is useful as part of the criteria to identify SSTs for additional measurements, or monitoring for the Organic Safety Program.

In April 1994, an initial study of the organic carbon in Hanford single-shell tanks was completed at PNL. That study reflected the estimates of TOC based on tank characterizations datasets that were available at the time. Also in that study, estimation of dry basis TOC was based on generalized assumptions pertaining to the moisture of the tank wastes. The new information pertaining to tank moisture and TOC data that has become available from the current study influences the best estimates of TOC in each of the SSTs. This investigation of tank TOC and moisture has resulted in improved estimates based on waste phase: saltcake, sludge, or liquid.

This report details the assumptions and methodologies used to develop the estimates of TOC and moisture in each of the 149 SSTs at Hanford. Major factors included in the study are:

1. Determining the effect of phase on TOC and moisture concentration. Phase effects on TOC and moisture were found to be significant.

2. Grouping tanks according to the SORWT (Sort on Radioactive Waste Type) model to establish waste type.

3. Estimating the moisture levels for each phase (saltcake, sludge and liquid) in each of the 149 SSTs.

4. Estimating the TOC and moisture based on an Analysis of Variance Model (ANOVA), allowing for conservative estimates of each of the 149 SST conditions. For those tanks with wastes that have not been measured, attributes of tanks in the same SORWT group and phase are used to estimate tank waste conditions.

5. Combining the estimates of TOC and Moisture to postulate a probability that the waste in each tank exceeds the preliminary safety criteria.

The moisture of saltcakes was found to be correlated to waste type, tank ventilation, and interim stabilization (jet-pump) status. The saltcake phase was found to be the waste of most concern from a safety perspective, and the least known. Saltcake comprises one-third of all

single-shell tank waste, but only one of the 65 saltcake tank wastes has been sampled since 1980. There is a high degree of uncertainty surrounding the saltcake waste TOC estimates. Interim stabilization by jet-pumping and active tank ventilation were found to be significant in reducing moisture level in saltcake wastes.

The methodology for estimating the distribution and levels of TOC in SSTs used a logarithmic scale that was reported in the previous study. The methodology grouped tanks according to waste type using the SORWT grouping method. The SORWT model categorizes Hanford SSTs into groups of tanks expected to exhibit similar characteristics based on major waste types and processing histories. The methodology to estimate moisture and TOC makes use of laboratory data for the particular tank and information about the SORWT group of which the tank is a member.

Acronyms and Initialisms

ANOVA	Analysis of Variance statistical technique
°C	degree(s) centigrade
DF	degrees of freedom
DOE	Department of Energy
DQO	data quality objectives
DSC	differential scanning calorimeter/calorimetry
DTA	differential thermal analysis
E	residual error term estimating measurement and spatial variation in the analysis of variance model
EDTA	ethylenediaminetetraacetate
G	group effect term in analysis of variance model
gm	grams
H_2O	moisture or weight percent free (non-hydrated) water
HEDTA	hydroxyethylethylenediamiaminetriacetate
IR	infrared spectrophotometry
log	logarithm, base 10
LogTOC	the base 10 logarithms of TOC, μg/g wet basis
N	number of datapoints
NPH	normal paraffin hydrocarbon
μ	mean estimate of waste condition in model analysis of variance
M	% free water (term used in analysis of variance model) weight % water/total weight
MM	million
MT	metric ton, equal to 1,000 kilograms
%TOC	Percent total organic carbon, as measured on a weight basis, and wet or as-sampled condition, unless otherwise noted.
PNL	Pacific Northwest Laboratory
PUREX	plutonium and uranium extraction
R	high-level REDOX waste
REDOX	The waste generated from the reaction/oxidation processing of spent nuclear fuel
RI	Rockwell International
RL	Richland Operations Office
SE	standard error
SORWT	Sort on Radioactive Waste Type
SST	single-shell tank
T	tank effect term in analysis of variance model
TGA	thermogravimetric analysis/analyzer
TOC	total organic carbon
TRAC	Track Radioactive Components
WHC	Westinghouse Hanford Company

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1.0 Background

Between 1943 and 1964, 149 single-shell tanks (SSTs) were built for the storage of large quantities of liquid and solid radioactive wastes at the U.S. Department of Energy's Hanford Site. These SSTs, located in tank farms in the 200 West Area and 200 East Area of the Site, contain organic chemicals mixed with nitrate/nitrite salts in potentially hazardous concentrations. Concerns about these potentially hazardous concentrations in the 149 SSTs are being addressed by the Organic Safety Program, led by Westinghouse Hanford Company to develop criteria in identifying SSTs for additional measures including sampling and monitoring.

The TOC and moisture information presented in this report is useful as part of the criteria to identify the SSTs for the additional measures. The actual composition of the organics in the wastes in each of the SSTs is not fully characterized; however, preliminary safety criteria established by the Organic Safety Program (Webb 1995) classify tank waste based on key characteristics, which at a minimum, include the concentration of organic chemicals and the moisture content of the waste.

The Hanford Tank Waste Remediation System is using the Data Quality Objectives (DQO) concept which is a seven-step interative procedure for selecting and analyzing data so that the results are supportable and defensible and can be used by decisionmakers. The DQO process has become one of the accepted support tools used by the DOE and the U.S. Environmental Protection Agency (EPA). The DQO process is specifically used to build a database of characterization data, with an understanding of its confidence level, using process knowledge and laboratory data.

The information provided in this report is a continuation of the initial Pacific Northwest Laboratory study (PNL)[a] completed in April 1994 (Toth et al. 1994) that estimated TOC based on available tank characterization datasets. This initial study used historical TOC laboratory data from WHC characterization datasets. A methodology was developed for estimating the distribution levels of TOC in SSTs using a logarithmic scale and an analysis of variance (ANOVA) technique. The organic constituents of the TRAC code waste inventories were also used to estimate organic constituents in each SST. TRAC organic waste concentrations were compared with laboratory data when available, but no correlation between TRAC estimates and laboratory data was found. Therefore, the TRAC estimates of TOC were deemed inappropriate for further analysis.

This report contains recent work on the method for assessing organic carbon levels based on an ANOVA model of waste phase, waste type, and tank measurements. Moisture levels were also estimated from laboratory characterization data, based on waste phase, and type, and tank surveillance information.

(a) Pacific Northwest Laboratory is operated for the U.S. Department of Energy by Battelle Memorial Institute under Contract DE-AC06-76RLO 1830.

The SORWT (Sort on Radioactive Waste Type) grouping technique was developed as a methodology to group tanks of similar radioactive waste types (Hill and Simpson 1994). In the SORWT methodology, tanks are fit into families or groups according to the types of wastes admitted to the tanks. The resulting groups can be used to compare tank properties within the same group. In this report, the organic carbon and moisture levels are determined from laboratory measurements of tanks and are grouped according to the waste phase, SORWT groups, and selected tank surveillance information.

Earlier studies were examined as a starting point for this investigation. Klem (1990)[a] estimated values of TOC for 47 SSTs, averaging laboratory measurements when multiple data were available. Schulz (1980) reported on results of the organic complexant concentrations for the purpose of understanding the effect of strontium removal in an ion exchange process. The Schulz results indicated high levels of TOC, up to 10% TOC for tank number U-106 liquid. Fisher (1990) presented assessments for TOC of selected tanks based on laboratory values.

(a) Letter, M. J. Klem, WHC to R. E. Raymond, WHC, "Total Organic Carbon Concentration of Single-Shell Tank Waste," 82316-90-032, dated April 27, 1990.

2.0 Scope

This report provides estimates of TOC and moisture for the SST wastes by using statistical evaluations applied to chemical analysis information gathered from tank reports. The laboratory data are collected from historical tank characterization information and process laboratory reports. The laboratory measurements collected are used to estimate the median TOC level in the tank, the moisture levels, and variation of the estimates within each phase of the tanks. Organic carbon and moisture level assessments of selected tanks without laboratory measurements are also estimated. These estimates are providd by comparing tanks of similar waste phase and waste type.

The laboratory data used in this report were obtained from two types of reports: characterization reports and process laboratory documents. Characterization reports involved full laboratory analysis of core samples and included multiple sample analysis. Laboratory procedures and standards were often documented in the core report characterization studies. The core characterization reports were prepared to provide detailed characterization about the tank in question.

The major objectives of this investigation are listed below:

- Identify additional laboratory analytical data and measurements for SST composite core, auger, and supernatant samples for available TOC data.

- Review laboratory analytical data for SST composite core, auger, and supernatant samples for available moisture data.

- Search for relationships to correlate the TOC and moisture data for SSTs with known parameters related to the tank waste, surveillance data, or historical records.

- From the laboratory analytical data and identified relationships, estimate the TOC content and moisture content of each median tank phase condition and the condition of the worst 5% of each tank waste phase.

- The condition of the worst 5% of each tank phase waste is compared to the preliminary safety criteria for organic tanks. Using the tank condition and safety criteria, estimate the probability that the tank phase condition exceeds the preliminary safety criteria.

- Review process history reports for major process contributors of organic constituents to the tank farms and compare those estimates to the total estimate of TOC content for each of the 149 SSTs.

The estimates of TOC concentration in each SST utilize laboratory data reporting TOC measurements as the sample exists in the tank (i.e., wet basis, or with moisture present). In addition to TOC, the preliminary safety criteria for organic watchlist tanks include a moisture criteria (Webb et al. 1995). Tanks will be subject to a minimum moisture content of 20% or more if the TOC criteria are exceeded. Additional measures will be specified for these tanks to maintain safe conditions. The actual limits were developed based upon information from other evaluations (Webb et al. 1995).

3.0 Study Approach, Data Sources, and Assumptions

The purpose of this study is to provide best estimates of TOC and moisture in the 149 SSTs using historical data measurements and statistical evaluation of the historical data measurements. The study must produce realistic and up-to-date results. It should be noted that the results are based on specific assumptions and methodology and that different approaches or assumptions could potentially lead to significantly different results.

3.1 Study Approach

The first step in conducting this study was to thoroughly review the earlier investigation "Organic Carbon in Hanford Single-Shell Tank Waste" (Toth et al. 1994). Those results were reexamined in this study to reflect new laboratory data. In addition to the TOC reevaluation, moisture in the tank waste was estimated, and the combined results of TOC and moisture were compared against the preliminary organic safety criteria.

The tank TOC and moisture estimates provided in this report are based on the sampled tank measurement data, tank waste history, and waste phase. About half the SSTs are represented in the database with TOC data, so direct estimates of TOC can be calculated for only half the tanks. For unsampled tanks, a statistical model was constructed that used attributes of tanks with similar characteristics to estimate the tank waste conditions, for both TOC and moisture

A key attribute used to group the tanks to estimate the TOC and moisture is waste phase. The tanks are grouped into three phases: saltcake, sludge, and liquid. Sample measurement information from the tanks permits identification of the phase. Measurements for supernatant, drainable liquid, liquor, filtrate, and slurry are ranked as the liquid phase. Sludge and sludge composite are ranked as sludge phase measurements, and salts and salts/slurries are ranked as saltcake measurements.

The contents of each tank are also divided into the three phases, according to tank surveillance records (Hanlon 1994b). The phase attribute is a key characteristic that is used to estimate the tank waste conditions, for both TOC and moisture, in all tanks. If a tank contains any of the saltcake waste phase, it is designated as a saltcake tank. For example, a tank containing any saltcake is designated as a saltcake tank, and it may or may not contain the other phases.

In addition to waste phase, the TOC and moisture estimates use chemical composition groups that are defined by utilizing the SORWT model. The SORWT model categorizes tanks into groups with waste of similar process history. The premise for the SORWT model is that tanks containing the same waste types will exhibit similar chemical properties. SORWT (previously described in Hill and Simpson 1994) divides the 149 SSTs into 29 groups and 14 ungrouped tanks. The SORWT group model is continually updated based on new process history information (Hill et al. 1995).

An analysis of variance (ANOVA)-based tank model is applied to produce estimates of TOC and moisture concentrations in all tanks. The ANOVA model uses average or group mean values of the characteristic group to which the tank belongs (phase and SORWT group) to estimate its tank conditions. A very important benefit of the ANOVA-based model is its ability to assign reasonable uncertainties to all produced estimates.

The process waste streams added to the SSTs were added at different times, which could have resulted in unique stratified layers. Unique layers could have been produced as a new waste stream was added because insoluble solids would settle as a layer on top of a previously added layer. If the waste stream contained different TOC concentrations, a potential TOC layer effect could be present in the tank. As a result, measurements of TOC (and moisture) taken from a tank at a particular layer may not be representative of the entire tank contents.

The median concentrations for both TOC and moisture are estimated using the ANOVA model. The TOC estimates are on a wet basis. In addition, the concentrations of the worst 5% of the waste for both TOC and moisture are estimated. The worst 5% of the waste is defined to be the 5% of the waste with the highest TOC concentration (i.e., upper 95% quantile on TOC) and the 5% with the lowest moisture concentration (i.e., lower 5% quantile on moisture). The worst 5% of the waste is defined on a weight basis, and accounts for the spatial variability of the TOC and moisture concentrations.

For example, given a tank with a mass of 1000 metric tons (MT), the 50 MT of waste containing the highest TOC is represented as the worst 5% of the waste TOC, and the driest 50 MT is represented as the worst 5% of the waste moisture. In the safety analysis, it is assumed the driest and highest TOC concentrations are concurrent.

3.2 Description of Available Data

Available data refers to data of three main types. First, there is the chemical and physical characterization that has been performed on laboratory samples for various reasons, including records of compatibility assays and current tank characterization reports. This type of data is referred to as measurement or sampling data.

The second type of data is tank surveillance and waste status reports. These data include the status of the tanks over time, for example, total inventory of waste in the tank measured by surface heights, surface pictures, vertical profile data, or other means; the status of tank ventilation and interim stabilization, and tank temperature and heat load.

The third type of data consists of transaction record data, describing the waste additions and subsequent transfers. Currently, the transaction record data consist of using the SORWT model based on information from Anderson (1990), which is a record of liquid waste transfers and storage in the Hanford 200 West and 200 East Area Tank Farms.

The tank measurement data were compiled from a variety of sources ranging from letter reports to tank characterization reports. The reports date back to the late 1970s. Because the dataset was compiled from such a variety of sources and spanned such a length of time, some assumptions had to be made. These assumptions and some of the findings from the data-gathering exercise are described in the following sections.

Tank conditions and waste status data (the second type of data) were based on records from Hanlon (1994b). This includes the status of which of the three phases were contained within each tank. A listing of the tanks with each of the three phases is presented in Appendix A. There are 65 tanks containing saltcake, 131 tanks containing sludge, and 129 liquid tanks. The total volume of saltcake, sludge, and liquid is 23 MM, 12 MM and 36 MM gallons, respectively, indicating the liquid phase comprises the majority of waste.

Tank transaction record data (the third type of data) from Anderson (1990) were the primary source of information to build the SORWT model that categorizes tanks into groups expected to have similar chemical or physical properties. Hill (1994). The SORWT groups used are those currently available, as listed in Appendix D. Updates to the SORWT model groupings are in progress, and these changes will be incorporated into future estimates.

The TOC and moisture measurement data were the primary source for estimating the contents of the tank. The TOC values previously reported in Toth et al. (1994) formed the framework for the dataset presented here. All data are reported as wet basis TOC. The reported values have all been converted to weight percent values (wet) to facilitate analysis. In addition, a portion of the values have been validated by comparison with the reports from which they were taken. Additional datapoints have been included in the TOC dataset as a result of additional core reports becoming available. The values for moisture (weight percent water) have also been validated in a manner similar to that for TOC. Similar to the TOC values, the simplifying assumption was made that data obtained by different analytical methods were comparable. The values for water have also been validated in a manner similar to that for TOC.

When values for TOC and moisture were provided for the same dataset, dry basis TOC values were calculated and are reported in a separate column on the dataset. Tables 3.1 and 3.2 summarize the TOC analytical dataset in Appendix F.

Table 3.1. Distribution of TOC Measurements According to Tank (Total Number of Tanks with TOC Measurements: 78)

Number of Measurements	Number of Tanks
More than 10 TOC Measurements	10
Between 5 and 9 TOC values	13
Tanks with 5 TOC values	2
Tanks with 4 TOC values	7
Tanks with 3 TOC values	9
Tanks with 2 TOC values	10
Tanks with 1 TOC value	27

Table 3.2. Distribution of Measurement Results by Phase

wt% TOC, Wet Basis Distribution	Liquid	Sludge	Saltcake
0.0 - 1.0	123	188	14
1.0 - 2.0	10	2	4
2.0 - 3.0	4	1	2
3.0 - 5.0	2	3	1
> 5.0	3	0	1

Some reported weight percent values for a variety of analytes were found to be internally inconsistent in their method of calculation, or as a result of measurement technique. This inconsistency had previously been reported in 1980 (Bratzel 1980)[(a)] and 1992 (Herting 1992). In (Bratzel 1980) values were recalculated from the original data for a limited number of samples. The following order of preference was used in including data for a particular TOC value in the dataset:

1. Weight percent value, reported directly in the reference.

2. Weight percent value calculated from more directly measured values (molar concentration and density, for example.

In some cases, the values from 1 and 2 agreed. When there was discrepancy, the value calculated from 2 was used. This order of preference resulted in keeping data unless there was written evidence that the data point was not credible.

The TOC data reports used in preparing the dataset did not always give the analytical method. As a corollary, many of the reports presented data for more than one waste fraction. The most typical two cases were: 1) supernatant and solid fractions and 2) water soluble and insoluble (acid digest fractions). There were further and other separations included. But for this dataset, all TOC values were included for both the reported water-soluble and insoluble fractions. They are, however, reported as separate data points.

Typically, percent water values were obtained by drying a weighed sample at constant temperature (usually 120°C) until a constant weight was obtained (gravimetric analysis) or by measuring the weight loss over a particular temperature range of a small sample while constantly increasing the temperature (thermogravimetric analysis, TGA). Typically, the weight percent water value for gravimetric analysis is smaller than the TGA value. Additionally, it is obtained from a larger sample size and is thus more representative of the tank waste. Many of the reports gave weight percent water with no method

(a) Letter, D. R. Bratzel, RI, to F. M. Jungfleisch, RI, "Evaluation of Waste Storage Tank Physical and Chemical Characterization Data," 65453-80-2G5, dated September 18, 1980.

reported. The order of preference for weight percent water values used in this study is: 1) gravimetric analysis, 2) TGA analysis, and 3) weight percent water reported but no method given. Analytical measurement techniques of weight percent water are given in Appendix E.

The breakdown of moisture measurements by tank and phase are presented in Table 3.3. All salt-cake sample measurement data used in the statistical analysis are provided in Table 3.4.

Table 3.3. Distribution of Moisture Measurements According to Tank (Total Number of Tanks with Moisture Measurements: 85)

Number of Measurements	Tanks with Sludge Values	Tanks with Liquid Values	Tanks with Saltcake Values
More than 20 Measurements	1	0	0
Between 10 and 19 Measurements	3	0	0
Between 5 and 9 Measurements	0	2	0
Tanks with 5 Measurements	0	0	0
Tanks with 4 Measurements	0	0	1
Tanks with 3 Measurements	2	5	1
Tanks with 2 Measurements	9	5	2
Tanks with 1 Measurement	20	41	9

When documentation about a laboratory measurement indicated the data were suspect, the documentation result superseded the original laboratory result. For example, analysis of tank T-104, 10.49% TOC was determined to be suspect (Richardson 1993)[a] and not included in the dataset. Tank TOC and data not included in the dataset are listed in Appendix H.

3.3 Approach to Statistical Analysis

Since the waste within a single tank may exhibit significant variability, it is important to estimate more than "typical" TOC and moisture in a waste phase. Therefore, it is necessary to estimate TOC and moisture concentrations for the "worst" 5% of the waste in the tank as well as concentrations for "typical" (i.e., median) waste.

(a) Letter, D. C. Richardson, WHC, to R. E. Gerton, RL, "Evaluation of High Total Organic Carbon Results on 1979 Data from Tank 241-TY-106 and 241-TY-T-104," 9253912, dated June 8, 1992.

Table 3.4. Listing of Available Saltcake Sampling Information

Tank	Sample ID	R or Non-R Waste Type	SORWT Group	wt% TOC H_20	TOC Wt %	Reference	Ref Date
S109	NA	R	I	.	0.05	Schulz, 1980	1/1/80
SX102	T-2959	R	I	.	0.82	I.L. 65453-80-250 Rockwell 9/3/80	9/3/80
SX102	NA	R	I	.	0.20	Schulz, 1980	1/1/80
SX103	1104	R	I	.		I.L. from JL Starr Rockwell 12/16/7	10/10/77
SX103	NA	R	I	.	0.20	Schulz, 1980	1/1/80
U103	8793	Non-R	VII	.	3.38	I.L. from JL Starr 12/14/77 Rockwell	8/15/77
TX118	RAT-TX118-6	Non-R	XXII	.	1.06	65453-81-331 Rockwell 10/16/81	10/16/81
TY102	RAT-TY102-1	Non-R	II	58.000	0.24	65124-80-077 Rockwell 2/1/80	2/1/80
BX107	RAT-BX107-2	Non-R	XI	53.700	0.07	65453-80-265 Rockwell 9/18/80	9/18/80
BX 110	NA	Non-R	XXIV	51.900		65453-80-265 Rockwell	9/18/80
A101	RAT-A101-4A	Non-R	IX	42.370	0.58	I.L. 65453-80-337 Rockwell	11/10/80
U111	RAT-U111-2	Non-R	VII	39.120	0.52	65453-80-273 Rockwell 9/23/80	9/23/80
TY101	NA	Non-R	XXXG	37.270		65453-80-265 Rockwell 9/18/80, Table 7.0.1	9/18/80
A101	RAT-A101-5A	Non-R	IX	34.190	0.84	I.L. 65453-80-337 Rockwell Int.	11/11/80
U111	RAT-U111-3	Non-R	VII	33.620	0.54	65453-80-273 Rockwell 9/23/80	9/23/80
U105	RAT-U105-3	R	X	20.800	2.80	60120-78-125 Rockwell 12/4/78	12/4/78
S111	1009-C	R	I	18.100	2.34	I.L. 60120-78-087 Rockwell 8/25/75	8/25/78
S111	1003/1004-C	R	I	17.400	1.54	I.L. 60120-78-087 Rockwell 8/25/75	8/25/78
BY104	riser5/auger	Non-R	III	17.000	0.60	WHC-SD-WM-RPT-068 REV 0	5/3/93
BY104	riser5/auger	Non-R	III	17.000	0.90	WHC-SD-WM-RPT-068 REV 0	5/1/93
BY104	riser10b/auger	Non-R	III	15.000	1.10	WHC-SD-WM-RPT-068 REV 0	5/2/93
BY104	riser10b/auger	Non-R	III	15.000	1.10	WHC-SD-WM-RPT-068 REV 0	5/4/93
SX102	RAT-SX-102	R	I	13.900		I.L. ARHC From J.S. Buckingham to R.E. Van der Cook, March 18,1976	3/18/76
SX105	RAT-SX-105	R	I	13.000		Internal Memo to D.C. Lini, Engineering Assistance Waste Concentration	2/1/77
SX104	NA	R	I	11.400		Internal Memo to D.C. Lini, Engineering Assistance Waste Concentration	3/1/77
S111	1001-C	R	I	10.700	0.10	I.L. 60120-78-087 Rockwell 8/25/75	8/25/78
SX107	1345	R	VI	10.000		Internal Memo to D.C. Lini, Engineering Assistance Waste Concentration	1/29/77

Note: R = REDOX

The Organic Safety Program has established preliminary safety criteria that address the hazard of a propagating chemical reaction in the tanks. The preliminary safety criteria are based on the TOC concentration of the waste and the moisture content. The criteria are based on conservative experimental results from sodium acetate properties and are fully explained in (Webb et al. 1995). The preliminary safety criteria are:

$$\text{wt\% TOC} = 4.5 + 0.17*(\text{wt\% Moisture})$$

In addition, the unsafe region is bound by moisture < 20%. Using the above equation, the safety cri terion is defined by the two points, (H_2O=0, TOC=4.5%, and H_2O=20%, TOC=7.9%). The safety criterion is assumed to be linear between the two points. The wt% Moisture represents free (non-hydrated) water.

The safety criteria can be applied to any available TOC, moisture estimates to determine whether or not a particular tank is safe. However, such a calculation does not properly take uncertainty in the (TOC, moisture) estimates into account. The available estimates may fall below the safety threshold but, because of uncertainty, have a substantial chance of actually being above the threshold. It is therefore important to calculate the "exceedance probability" associated with any (TOC, moisture) estimate. The exceedance probability is defined to be the probability that a particular tank exceeds the safety criteria, given the actual (TOC, moisture) estimate available.

This study is concerned with the exceedance probability associated with the worst 5% of the waste. In this study, the term "exceedance probability" refers to the probability that the worst 5% of the waste is in the unsafe region identified in Figure 5.4 (Section 5.4).

Since data are not available on every tank, it is not possible to directly estimate what is in each tank. To produce the desired estimates of TOC and moisture, this study utilizes tank grouping models, which divide the Hanford tanks into groups of "similar" tanks. An effective grouping is one that produces homogeneous groups and therefore allows the group average (or some other group statistic) to be used as a reasonable estimate for unsampled tanks.

In order for this grouping strategy to be effective, data must be present for most of the defined groups. This places an important constraint on the tank groupings that will be useful for this study. The most severe problem in this regard occurs with the saltcake estimates; only 20 saltcake measurements exist, so the tank grouping model used for saltcake must be simple.

The information that is used to define the groupings in this study includes:

- SORWT groupings (for TOC and moisture)
- Tank ventilation (for moisture)
- Pump status: Has the tank been jet pumped? (for moisture)

The tank grouping models employed in this study are actually ANOVA models. Once such an ANOVA model is specified, it is possible to use standard statistical algorithms to estimate the contents of each tank as well as the uncertainty of the estimate. An ANOVA model will provide a fairly complete description of the distribution of TOC (or moisture) within the tank, between tanks, and between the postulated tank groupings. With this information, it possible to describe the (TOC, moisture) content of typical waste in a tank, as well as calculate the (TOC, moisture) content of the worst 5% of the waste.

The ability of ANOVA models to produce such a detailed description of the waste and also to assign uncertainties to the estimates is the principal reason for choosing ANOVA analysis over simple averaging methodologies.

3.3.1 ANOVA Model for TOC

The TOC in each of the three waste phases (liquid, sludge, saltcake) is described by an ANOVA model of the form:

$$\log(TOC_{ijk}) = \mu + G_i + T_{ij} + E_{ijk}$$

where the indices i identifies a particular SORWT group, ij a particular tank, and ijk a particular sample from the tank. Thus, the term μ represents the mean value for log(TOC) in all Hanford tanks, the term G_i represents the deviation of SORWT group i from that grand mean, the term T_{ij} represents the deviation of tank ij from the mean group value, and E_{ijk} represents the deviation of sample ijk from the tank mean value. Each of the three terms G_i, T_{ij}, and E_{ijk} is assumed to be normally distributed with a variance of σ^2_G, σ^2_T, and σ^2_E, respectively.

The TOC values are logged in order to make the three terms conform to a normal distribution. Without logging the data, these terms are not normally distributed. Section 4.1 discusses this issue in greater depth and provides distributional plots that justify the use of the log transformation.

Given a set of data, the ANOVA procedure is capable of estimating the unknown parameters in the model (i.e., μ, G_i, σ^2_G, etc.). These parameters can be combined to produce tank estimates. For example, to estimate the median TOC value[(a)] for a tank, use the quantity

$$\mu + G_i + T_{ij}$$

If good sampling data existed for the tank, the term T_{ij} would be non-zero and the quantity

$$\mu + G_i + T_{ij}$$

(a) Since the TOC values are converted to the lognormal form, the log-mean and median are the same.

would be equivalent to the average of the sampling data. When no data exist for the tank of interest,

$$T_{ij}=0$$

and the estimate for the unsampled tank reduces to the SORWT group estimate,

$$\mu + G_i$$

ANOVA also produces uncertainties for these estimates in the form of a mean squared error (MSE). When the TOC for an unsampled tank is estimated, its mean squared error is larger than the MSE associated with a sampled tank.

3.3.2 ANOVA Models for Moisture

An attempt was made to use the same ANOVA model developed for TOC. However, an analysis of the resulting fits indicated problems that required alterations to the model.

Two principal problems existed with the moisture measurements:

1. A distributional analysis of the model terms indicated that a log-normal relationship was not appropriate for the sludge or liquid phases.

2. An ANOVA model utilizing the SORWT grouping was inadequate for the saltcake phase.

Groups defined by two variables 1) the ventilation state of the tank (active, passive) and 2) the pump status of the tank (jet-pumped, not jet-pumped) were found to have a very strong effect on measured moisture in the tank. Consequently, they were used to define groups in saltcake.

Because only 20 saltcake moisture measurements exist, it is not be useful to employ the SORWT grouping, which contains 29 groups plus 14 solidary tanks. For saltcake, the SORWT groupings were simplified to two (REDOX waste and non-REDOX waste). This binary grouping segregates waste into that which should not have much water of hydration (REDOX waste) and that which should (non-REDOX waste).

Thus, the ANOVA model fit to sludge and liquid phase moisture measurements has the form:

$$M_{ijk} = \mu + G_i + T_{ij} + E_{ijk}$$

where the indices are defined exactly as in the TOC model: i represents a SORWT group, ij a tank, and ijk a sample from the tank.

μ = mean moisture value of all moisture data for the sludge or liquid phase (model-calculated value), percent.

$\mu + G_i$ = mean moisture value for SORWT Group i, model calculated value, percent.

E_{ijk} = moisture residual variability (includes sample location variability (core, riser) and measurement technique variability.

The moisture ANOVA model described in the above equation is a random effects model. That is, the terms μ, and G_i are assumed to be normally distributed random variables. The assumption that these terms are random effects provides enough information to allow us to estimate moisture in tanks with no measurements. The random effects model used to assess the moisture in each tank utilizes the characteristic information known about the tanks. The tank moisture estimates tend to be shrunk towards the phase means. The moisture ANOVA model estimated the standard deviation components using the restricted maximum likelihood (REML) technique (Corbeil and Searle 1976). This algorithm was the basis for the *Splus* computations.

The ANOVA model for saltcake utilizes a different grouping methodology. This methodology utilizes the variables ventilation V_i, pump-status P_j, and waste type R_k and has the form:

$$\log(M_{ijk}) = \mu + V_i + P_j + R_k + T_{ijk} + E_{ijk}$$

A logarithmic transformation is necessary to produce normally-distributed terms for saltcake. Also, the log transformation constrains all estimates to positive values. Without such a constraint, moisture estimates for the worst 5% of the waste could sometimes be negative.

In this model, the index i indicates whether tank ijk is ventilated, j indicates whether it has been jet-pumped, and k indicates whether it contains principally REDOX waste. Utilization of these three binary variables for tank grouping produces eight groups. It so happens that some of the groups lack measurements. For example, the group of actively ventilated, jet-pumped, REDOX-waste tanks is lacking any measurements. Nevertheless, the model is capable of making a reasonable prediction for this group because the effects of the grouping variables are assumed to be linear (on the log scale).

The proposed saltcake model is reasonable and does fit the existing data quite well. However, this model can be considered the weakest part of the present analysis. If more saltcake measurements are taken, it is quite possible that inadequacies with this model would become apparent. The saltcake predictions are the set of measurements most likely to change significantly when new data are collected. Even though the ANOVA models produce the most reasonable description of the current data, there is always the possibility that future data may reveal inadequacies with the present models.

3.4 Study Assumptions

For ease of reference, the assumptions used in this evaluation are presented below:

1. All TOC and moisture data, each laboratory measurement, are weighted equally.

2. All TOC and moisture laboratory data available are used in this study except where conflicting information indicates the data are implausible. All laboratory measurements resulting from different pretreatment methods are also included in the dataset.

3. Waste phase of the data is assumed to belong to one of the following three phases: saltcake, liquid or sludge. Liquid waste includes supernatant and interstitial liquid. Saltcake is formed from thermal evaporation and subsequent crystallization. Sludge is formed from the waste settling process. The waste phases are significantly different from each other.

4. The TOC data are represented by a lognormal distribution, and making a logarithmic transformation of the data results in a normally distributed dataset.

5. The SSTs can be grouped together based on information pertaining to the waste type in the tank. A qualitative grouping methodology based on significant waste types and processing history can used to distinguish tanks with respect to TOC and moisture. The SORWT model accurately predicts groups of tanks.

6. The ANOVA technique is used to calculate the TOC and moisture estimates, conditions of the worst 5% of the waste, and exceedance probabilities.

7. TOC and moisture are independently estimated. It is assumed the high TOC regions of the waste are highly correlated to the low moisture regions.

8. The maximum level of TOC in a tank waste is 25%. This is equal to 85 wt% sodium acetate.

The statistical assumptions can be tested by preparing histogram plots of the data, and by conducting ANOVA-test evaluations. This is discussed in the next section. For example, the null hypothesis tested would be that the deviations between the mean concentrations of the phases or SORWT groups were due to only random variability within the entire dataset. If the null hypothesis was proved valid, then no phase or group effects were present and the method described above would be discredited. However, if the null hypothesis was proved incorrect, then the converse is true and the data would support the presence of phase and group effects and validate the methodology.

4.0 Evaluation of SSTs Using ANOVA Models

The objective of the statistical data analysis of TOC and moisture data is to provide estimates of concentrations of each in all 149 Hanford SSTs individually. In addition, the uncertainty surrounding these TOC and moisture estimates and the probability of exceeding the watchlist threshold concentration is equally important and is also presented.

4.1 Appropriate Distribution of TOC Data

The statistical tests and probability of exceeding threshold analyses are considered valid only for normally distributed datasets. A histogram of the TOC data in units of μg/g was prepared from the entire dataset (Figure 4.1). Notice that this distribution of the data is heavily skewed to the left because the vast majority of the data is relatively near zero. Because of the skewedness of the data, the statistical tests and probability of exceedance would not be considered valid for this dataset. A second histogram was generated from a log transformation of the TOC data (Figure 4.2). Notice that the log transformed data appears normally distributed. This transformation is reported in detail in Toth et al. (1994). Also, similar observations have been made for the data within any particular phase.

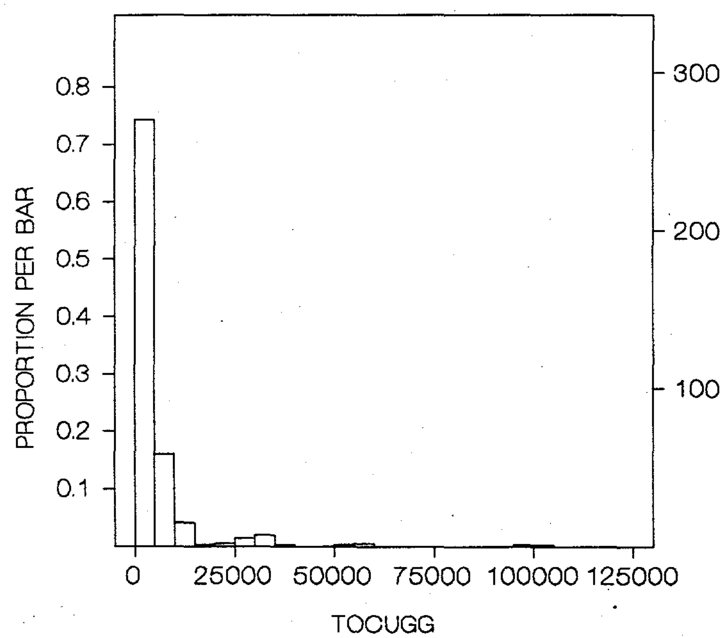


Figure 4.1. Histogram of Entire TOC Dataset

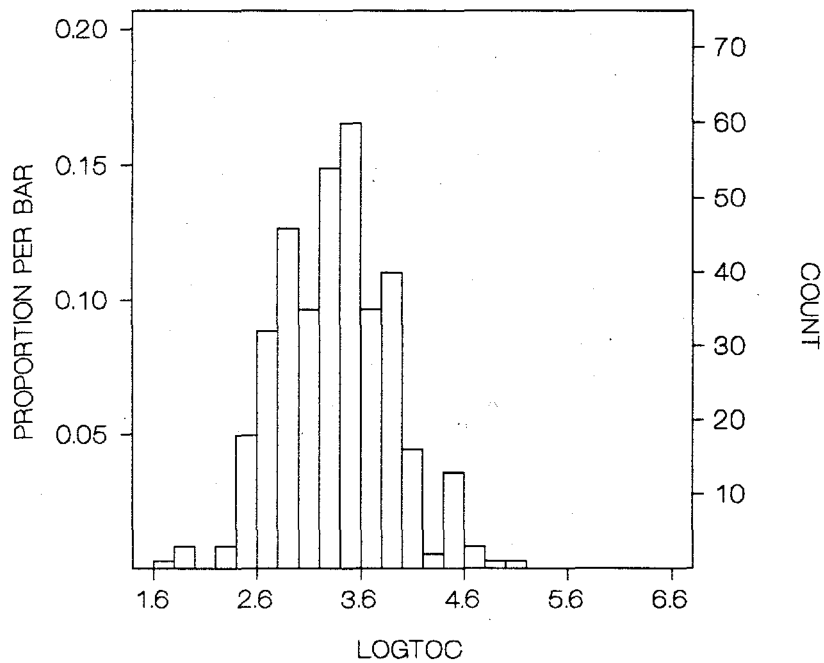


Figure 4.2. Histogram of Entire TOC Dataset, Logarithmic Transformation

4.2 Importance of Waste Phase

Another assumption tested was the presence of a waste phases effect. The ANOVA test used is a quantitative method to test the significance of the effect a particular treatment has on the response or dependent variable. In this application, the treatment being studied is waste phase and the dependent variable is the log of TOC concentration. An ANOVA will test whether the mean concentration of a particular phase is statistically significantly different from the mean concentration of other phases.

The ANOVA test was performed for phase (liquid, saltcake, and sludge) using the general linear model of the SYSTAT for Windows[a] statistical data analysis software package.

The null hypothesis tested was that there were no differences between waste phases. The ANOVA-test table provides two estimates for the variance, one between phases and one within phases. If the null hypothesis is accurate, then the estimate for the between-phases variance should be similar in magnitude to the within-phase estimate of the variance. Conversely, if the between-phase estimate of the variance is significantly greater than the within-phase estimate, then the null hypothesis would be untenable and some of the between-phase variation must be caused by real differences between treatment groups. The output reports generated by the statistical software for this analysis are shown in Appendix B. The first page of

(a) SYSTAT for Windows is a registered trademark of SYSTAT, Inc.

Table 4.1. Analysis of Variance Test for Phase Effect

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Phase	18.87	2	9.435	40.575	0.000
Error	82.549	355	0.233		

Table 4.2. Least Squares Means for Phase Effect

	LS Mean	SE	N
Liquid	3.569	0.04	142
Saltcake	3.771	0.103	22
Sludge	3.145	0.035	194

Appendix B represents the ANOVA test for phase. The ANOVA table is also illustrated by Tables 4.1 and 4.2. As shown in these two tables, the items included in the ANOVA table are the sum of the squares, degrees of freedom (DF), and the mean sum of the squares (Mean-Square). The least square (LS) means, standard error (SE), and number of observations for each phase are also presented. Each of these items was calculated for treatments and error. The treatment calculations are for variance between individual treatments, which in this study represents different waste phases (PHASE). The error components denote the variance within the individual treatments or waste phases. The mean sum of the squares is the quotient of the sum of the squares and the number of degrees of freedom.

The F-Ratio is defined as the ratio of the between-treatment variance (mean sum of the squares) and the within-treatment variance. (This value is also reported in the ANOVA table.) This ratio should follow an F distribution for the appropriate numbers of degrees of freedom. The significance of the F-Ratio is called a P-value and can be determined from the relevant F distribution. The significance is the fractional probability of the F-Test ratio happening due only to random chance. The benchmark probabilities typically used to test the significance of differences between means is 5% and 1%, which correspond to significance of 0.05 and 0.01. For the purposes of the TOC study, the 5% benchmark was selected. If the significance is greater than the benchmarks, then the differences between treatment means can be explained by random chance. If the significance is below the benchmarks, then the discrepancies between treatment means cannot be explained by random chance, and real differences exist between the phases. The P-Value is included in Table 4.1.

As shown in Table 4.1, the effect of phase has a significance well below the benchmark 5% level. In fact, it has a significance below 0.1%. The ANOVA indicates there is virtually no probability that the differences between the means of the waste phases are due only to random chance. Therefore, the null hypothesis is invalid and the data strongly supports the premise that waste phases should be analyzed separately. This is supported by organic concentration mechanism investigations (Gerber 1994).

Since a significant phase effect was observed, a Tukey pairwise comparison was performed to identify which phases were significantly different from one another. This comparison can be found on the bottom portion of the first page of Appendix B. The Tukey pairwise comparison first generates a matrix of pairwise mean differences. These are the differences between the mean concentration of a pair of phases. The routine then compares this difference to the mean square error from the ANOVA table and calculates a P-value (probability) that the difference between the mean concentration of any two phases is due to random chance. These P-values are presented in Table 4.3.

Table 4.3. Tukey Multiple Comparisons Matrix of Pairwise Comparison Probabilities

	Liquid	Saltcake	Sludge
Liquid	1.000		
Saltcake	0.161	1.000	
Sludge	0.000	0.000	1.000

The test for significance is the 0.000 probability in the column for liquid versus sludge, and saltcake versus sludge. The Tukey pairwise comparison of TOC data indicates that TOC in sludge is significantly different from liquid and saltcake TOC, with comparison probabilities of 0.000. However, the difference between saltcake TOC and liquid TOC cannot be called statistically significant with a pairwise comparison probability of 0.161. This is probably due to the small number (20) of observations for saltcake. For the purposes of this model, the three phases were considered independent from one another.

4.3 Nominal Characteristics of Waste Phase

The nominal characteristics of each phase were determined. The laboratory data for the tank samples are presented in Appendix F. Section B.2 of Appendix B presents descriptive statistics of each waste phase for TOC in units of µg/g (TOCUGG), log of TOC (LOGTOC), density in g/mL (GML), and weight percent water (H2O). Section B.3 presents the 95% confidence intervals for each phase. This information has been summarized below in Table 4.4. It is important to note that the mean and confidence intervals for TOC were calculated from the log transformed data and converted back to units of µg/g.

From Table 4.4, it can be seen that saltcake is expected to have the highest concentration of TOC relative to the other phases and that sludge is expected to have the lowest. The 95% confidence intervals around the liquid and sludge data are generally approaching the means value. The saltcake confidence intervals are larger due to the small number of observations available on that waste phase. Saltcake also appears to be the most dense phase and contains the least amount of water. Because there are only 22 TOC measurements and 18 moisture measurements for saltcake, it appears that saltcake is both the worst material from a safety standpoint and the least known. The indication that saltcake contains the highest organic level suggests a redistribution of the organic form the liquid phase. The saltcake data, for both moisture and TOC, are shown in Table 4.4. Liquids are the lightest phase and contain the greatest amount of water.

The confidence intervals shown in Table 4.4 are a result of statistical analysis. It is possible, due to data spread, that overlap of phases will occur. For example, the lower limit moisture estimates for liquid overlap with the upper limit moisture estimates for saltcake.

Table 4.4. Nominal Characteristics of Waste Phases

Waste Characteristic	Waste Phase	Number of Samples	Lower 95% Confidence Interval	Mean Value	Upper 95% Confidence Interval
TOC, µg/g	Liquid	143	3,106	3,775	4,588
	Saltcake	20	3,161	5,296	8,870
	Sludge	202	1,096	1,294	1,527
Wt % H2O	Liquid	78	40.28	66.3	87.3
	Saltcake	20	0	25.99	50.89
	Sludge	135	18.65	44.21	69.77
Density, (g/mL)	Liquid	43	1.31	1.37	1.43
	Saltcake	8	1.43	1.64	1.84
	Density	77	1.40	1.45	1.50

4.4 Significance of SORWT Grouping

The next assumption to be tested is the presence of groups of tanks as predicted by the SORWT model. A description of the SORWT groups is shown on Appendix M. Although SORWT groups have been shown to be significant in Hill and Simpson (1994) and Hill et al. (1995), the present dataset must also be tested. Since waste phase has already been shown to be important, the presence of SORWT groups will be tested for each phase individually using the general linear model of the SYSTAT for Windows statistical data analysis software package. If a significant grouping effect was observed, then a Tukey pairwise comparison was also made for each analyte to investigate which groups were significantly different from one another. The results for the ANOVA of SORWT groups for each of the phases are similar in design to the ANOVA results described above. The results have been summarized in Table 4.5.

The ANOVA test summary table indicates that there is not a significant grouping effect for saltcakes but a very strong grouping effect for both liquids and sludge because of the low "P" values.

Table 4.5. Analysis of Variance Test for SORWT Group Effect by Phase

Source	Sum-Square	DF	Mean-Square	F-Ratio	P
Saltcake					
SORWT	1.946	7	0.278	0.898	0.534
Error	4.330	14	0.309		
Liquid					
SORWT	14.155	25	0.566	3.147	0.000
Error	20.873	116	0.180		
Sludge					
SORWT	19.890	20	0.994	8.056	0.000
Error	21.356	173	0.123		

4.5 Nominal Composition of SORWT Groups

The nominal characteristics of each SORWT group by phase were determined. Appendix C presents descriptive statistics of each waste phase for TOC in the same units as Appendix B. Appendix C is divided into two sections. Section C.1 presents the descriptive statistics of each SORWT group with data for liquid samples. Section C.2 presents the same information for sludge samples.

4.6 Effect of Jet-Pumping, Ventilation, and Waste Type on Saltcake Moisture

Moisture estimates for saltcakes are fundamentally different than for sludge since saltcake does not retain moisture as effectively as sludge. Due to the low number of saltcake moisture observations (20) and the number of SORWT groups, it is not useful to use the SORWT group to estimate saltcake moisture. In lieu of the SORWT group, a waste category based on the SORWT group was developed. Each SORWT group was placed into a category of waste depending upon if REDOX waste is the primary waste type in the tank. The REDOX waste is the high-level radioactive waste component from the REDOX process operated at Hanford. The composition varied, but the following is considered the nominal composition for REDOX wastes, as shown on Table 4.6. Saltcakes and sludges resulting from this waste are also designated as REDOX wastes (Anderson 1990). Characterisitics of REDOX waste include very high nitrate and sodium, high aluminum, and low phosphate and low bismuth concentrations (Hill and Simpson 1994) SORWT Groups I, VI, X, XVI, and XXIX are REDOX SORWT groups, based on Hill and Simpson (1994). Non-REDOX or non-R waste is characteristic of all other saltcakes.

Table 4.6. Nominal Composition of REDOX Waste Type, Liquid

$NaAlO_2$	1.2 M
NaO4	0.7 M
$NaNO_3$	4.8 M
Na_2CrO_7	0.07 M
$Cr(O4)_3$	0.04 M
$Na_2(SO_{4)}$	0.03 M
$Fe(OH)_4$	0.02 M
U	0.05%
Pu	0.04%
density	1.3 g/l

Further grouping of saltcake depending on surveillance status is included. Jet pumping and tank ventilation status was included in the grouping. Jet pumping refers to a tank draining technique whereby liquid is pumped from the saltwell of tank. Unlike supernatant pumping, interstitial liquid is removed from the tank during jet-pumping. Tank ventilation may be active or passive. Active ventilation indicates the installation of an operating exhauster on the tank as recorded by Hanlon (1994b).

Figure 4.3 displays the results of the saltcake moisture categories. Each saltcake waste is grouped into one of eight moisture groups. The eight moisture groups are listed in Table 4.7. From the available data for four moisture groups, it can be seen that the saltcake data from the group belonging to passively ventilated tanks, not jet-pumped, with non-REDOX waste, contains the highest moisture. Figure 4.3 indicates the variability of the moisture is directly proportional to its magnitude, suggesting a lognormal distribution for this model.

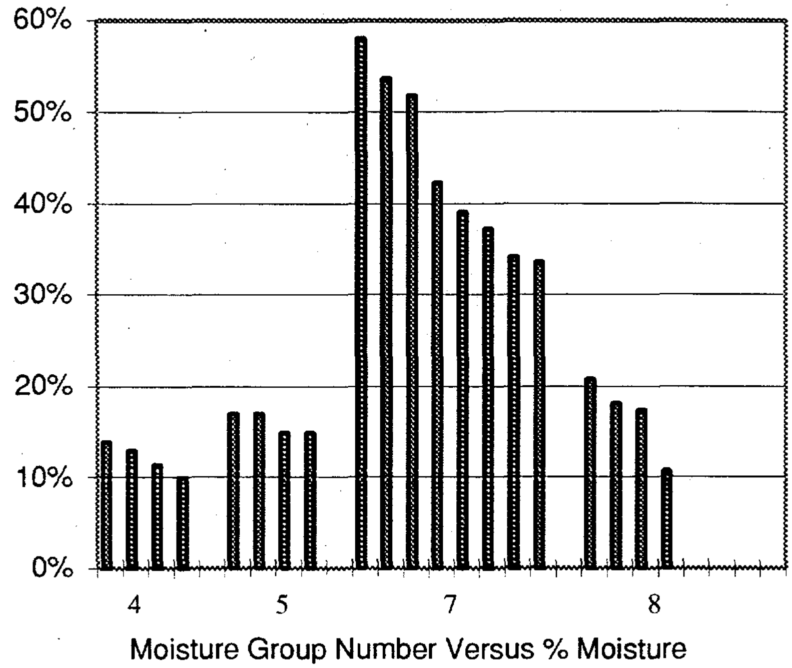


Figure 4.3. Saltcake Moisture Data Grouped According to Categories Shown in Table 4.6

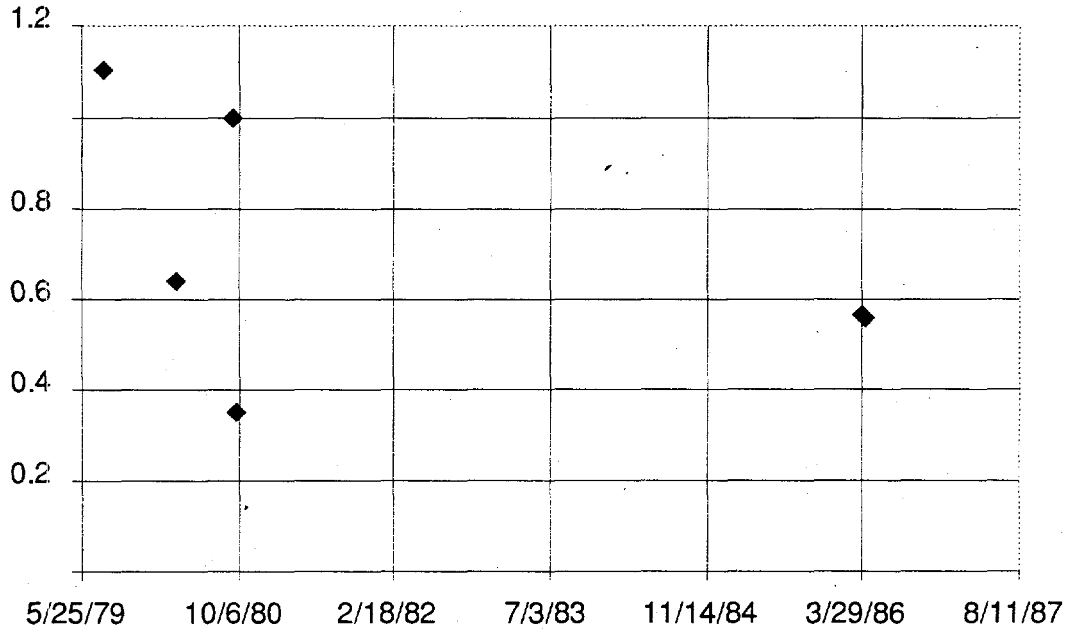
Table 4.7. Moisture Groups for Saltcake Waste

	Description of Saltcake Waste			
Data Available	Ventilation	Waste Type	Pump Status	Group Number
Not Available	Active	Non-REDOX	Jet Pumped	1
Not Available	Active	REDOX	Jet Pumped	2
Not Available	Active	Non-REDOX	Not Pumped	3
Available	Active	REDOX	Not Pumped	4
Available	Passive	Non-REDOX	Jet Pumped	5
Not Available	Passive	REDOX	Jet Pumped	6
Available	Passive	Non REDOX	Not Pumped	7
Available	Passive	REDOX	Not Pumped	8

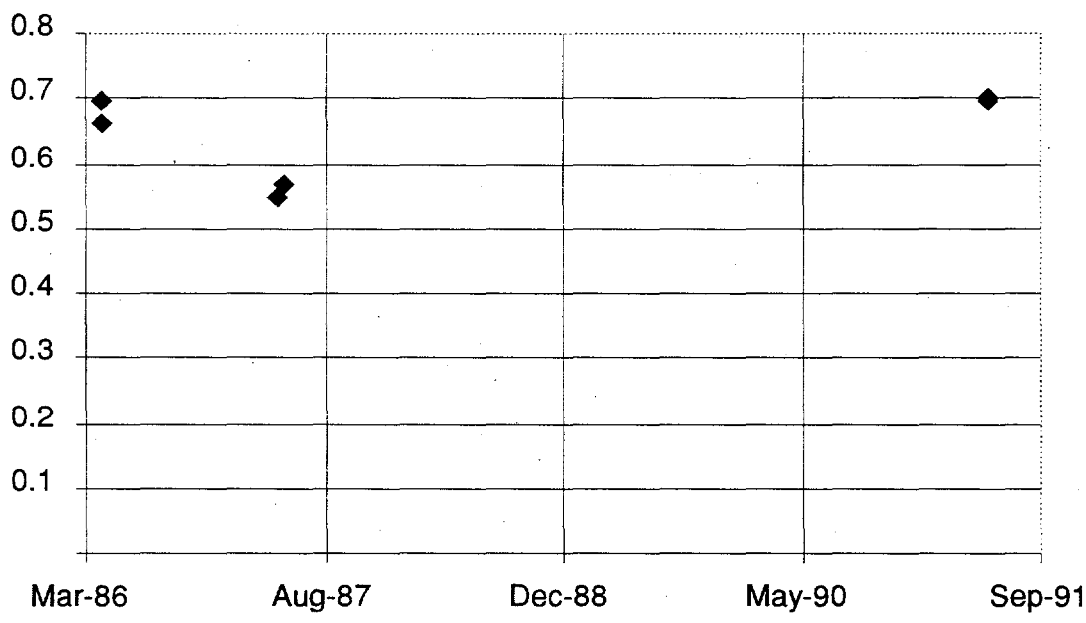
4.7 Comparison of TOC Measurement Data

As described in Section 4.3, the nominal characeristics of the waste phase are important in determining the TOC values for the tanks. Since TOC measurements of samples span a period of 1978 to 1994, it is worthwhile to illustrate how the TOC measurements vary with time, across a given a phase. Sufficient TOC data on selected tanks for the liquid phase is available to permit an illustration of the consistency of TOC measurement data for a given tank, for liquid measurements. Ideally, the measurements would be compared that have been taken at identical sample locations within a tank waste. However, sufficient sample location data is not adequately available to compare identical sample locations over time. Therefore, variations in measurement data for samples include spatial variation of TOC within a tank, as well as analytic technique measurement variation, TOC degradation effects, plus any other residual error terms. Sufficient measurement data for TOC in SST liquids that span a significant interval of time, more than five years, is available for four SSTs: A-103, C-103, S-107, and T-107. Sufficient TOC data for the saltcake and sludge phase is not available for similar comparison as is conducted for liquids.

The results of the TOC measurements of liquid samples are shown in Figure 4.4. Single-shell tank T-107 consistently reported lower TOC measurements than the other three single-shell tanks by almost an order of magnitude. The reported measurements for liquid samples, on the four SSTs with available data that span a significant interval of time, indicate that within-tank measurements of %TOC are generally consistent over time, 1978-1994.

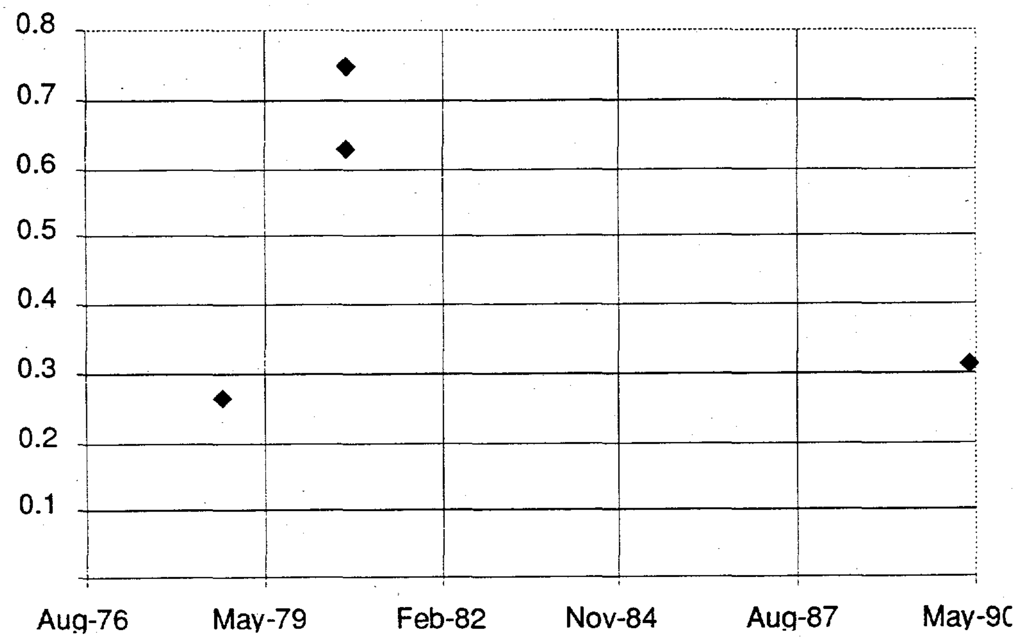


a) %TOC measurements for SST A-103

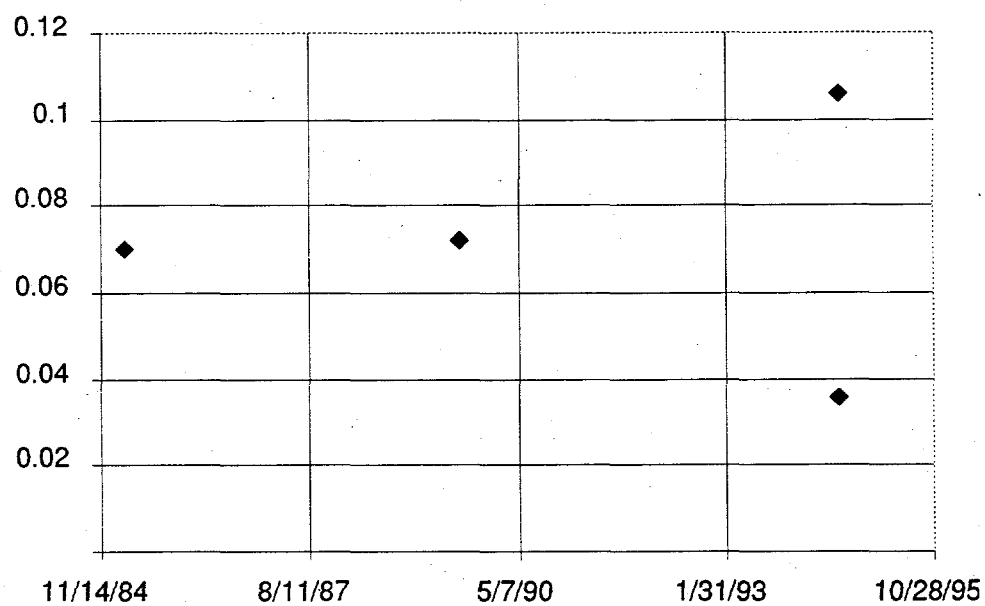


b) %TOC measurements for SST C-103

Figure 4.4 TOC Measurements (%TOC) for Liquid Samples Over Time on Four Selected Single-Shell Tanks



c) %TOC measurements for SST S-107



d) %TOC measurements for SST T-107

Figure 4.4. (contd)

5.0 ANOVA Model Results

The principal products of the ANOVA model fits described in Section 4.0 produce median and "worst 5%" TOC and moisture estimates for each tank. Two other important products of the fits are the standard errors of the median and worst 5% estimates. These standard errors allow the uncertainty associated with each estimate to be evaluated. The median estimates provide a description for the TOC, moisture concentrations in "typical" tank waste, while the "worst 5%" estimates describe the concentration in the worst 5%.

5.1 ANOVA Results for TOC

Section 3.3.1 provides the ANOVA model description of a TOC measurement. There are three variabilities associated with this model: σ^2_G, between-group variability; σ^2_T, between-tank variability; and, finally, σ_E^2, within-tank variability. This model is fit to each phase separately, so an individual tank may have three sets for TOC and moisture measurements.

Table 5.1 summarizes the results of the TOC model fits. The term μ describes the median level (%) of TOC in all SSTs. The median TOC is generally less than 0.5%, with the median sludge level being the least (0.14%), and saltcake being the greatest (0.56%).

The variance components show that within-tank variability σ_E is generally the largest, with a relative standard deviation of about 90%. This means that repeated TOC measurements within a tank would be within 90% of each other about 68% of the time. Material displaying variability this high is usually classified as "inhomogeneous." The fact that the within-tank variability is high will mean that the worst 5% of the waste in the tank will be substantially different from the median waste. In fact, with a within-tank relative standard deviation (RSD), the waste can be expected to have a TOC concentration that is 238% the median value.

For the two solid phases (sludge and saltcake), the between-group variability σ_G is much larger than between-tank variability σ_T, providing further proof that the SORWT grouping is an effective strategy for

Table 5.1. Estimated Terms in TOC Model Fit

Phase	Median (% TOC) Wet Basis, μ	Variability Between-Group, σ_G	Variability Between-Tank, σ_T	Variability Within-Tank, σ_E
Liquid	0.27%	53%	68%	83%
Saltcake	0.56%	39%	0%	112%
Sludge	0.14%	99%	58%	83%
Average	0.32%	64%	42%	93%

estimating TOC in unsampled tanks. In fact, the present ANOVA fit on the saltcake data shows that between tank variability is essentially zero. If this is confirmed by further measurements, this would imply that the group TOC estimate would be the most effective method for estimating TOC in all tanks (both sampled and unsampled).

The variabilities presented in Table 5.1 for sludge are graphically illustrated in Figure 5.1. In this figure, the estimated model terms for groups G_i, tanks T_{ij}, and residuals E_{ijk} are plotted so that the reader can judge the variability due to each set of terms. The variabilities σ_G, σ_T, and σ_E simply represent the standard deviations of the three populations presented in Figure 5.1.

In Figure 5.2, the tank median estimates produced by the ANOVA model are visually compared against the actual data. For each tank, the plot presents 1) the median estimate (denoted by "o"), 2) the 95% confidence bounds on this estimate (identified by square brackets "[ ]"), 3) the log-mean of the data (denoted by "f", and 4) the data values (denoted by "*"). Since the data are log-normally distributed, the points are plotted on a log scale.

As shown, that when more than three samples are taken from a tank, the ANOVA model estimate is essentially equivalent to the log-mean. (For example, compare the two estimates in U110, TY106). On the other hand, when fewer samples have been taken from the tank (for example, U103), then the ANOVA model forms an estimate by taking a weighted average of the group and tank means (on the log scale). Such an estimate is justified because it is more accurate than the simple tank mean; a tank mean computed from one or two measurements contains substantial uncertainty, and in this case, a group mean is a better estimate.

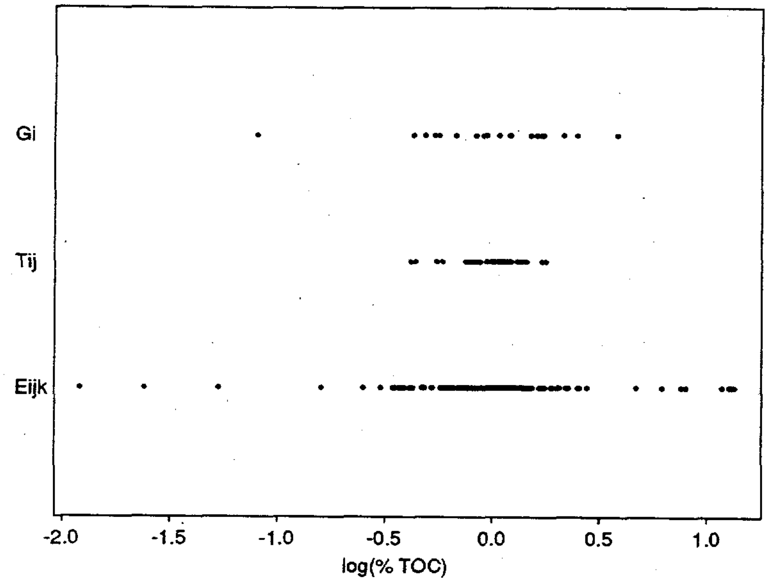


Figure 5.1. Model Terms for Sludge TOC Phase Waste

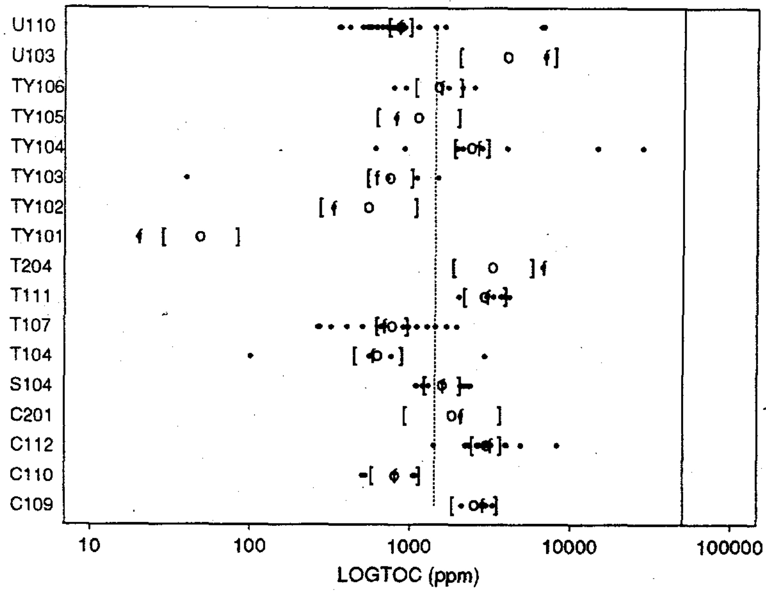


Figure 5.2. Plot of Median Sludge Estimates Versus Data for Selected Tanks

This method of estimation can sometimes produce estimates that are smaller than the simple log-mean estimates. (Estimates are said to be shrunk to the mean.) Nevertheless, if the distributional assumptions regarding the data are correct, that the data are log-normally distributed, this should be a better estimate.

Figure 5.3a, b, and c presents quantile-quantile ("Q-Q") plots of the model terms G_i, T_{ij}, and E_{ijk} for the liquid phase measurements. Q-Q plots compare the terms against the values that should originate from a normal distribution. If the terms are normally distributed, the points in the Q-Q plot will fall on a straight line. As depicted in the figures, terms generally fall on a straight line, and would consequently be considered normally distributed.

Tables 5.2, through 5.4 contain a summary of the tank wastes estimates for liquids, saltcakes, and sludges, respectively. These tables present the tanks with the highest "worst 5%" TOC measurements in the three phases. Note there are a few tanks (such as SX106, A106, in Table 5.2, and B202 in Table 5.4) that have very large TOC estimates for the worst 5% of the waste. These are caused by an unusually high in-tank variability in these tanks. The two tables of most interest are those associated with the saltcake and sludge phases. As can be seen from the table, the worst 5% of the waste in saltcake is estimated to have just a little over 5% TOC. In sludge waste, one tank has a 7.6% TOC (B202), and this is again due to an anomalously high within-tank variability. The worst 5% of other sludge waste is below 3% TOC, according to Table 5.4. Appendix J presents the ANOVA TOC results for the 149 SSTs for all three phases.

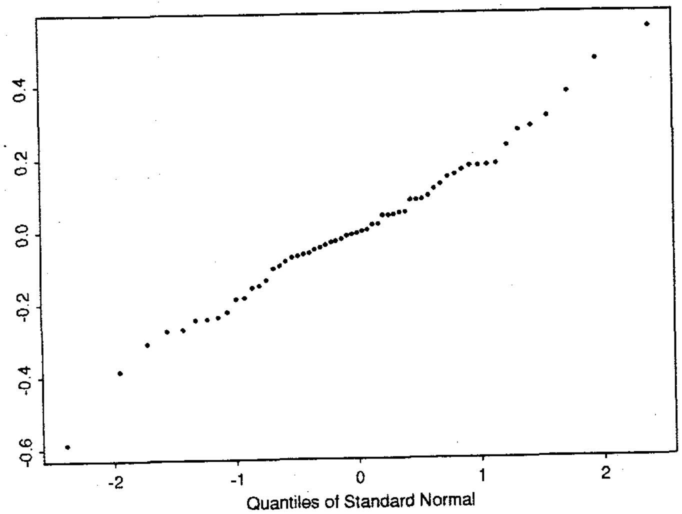


Figure 5.3a. Quantile/Quantile Plots for the Terms; T (tank) Terms from the Liquid ANOVA Fit (A linear relationship in each case indicates a good model fit.)

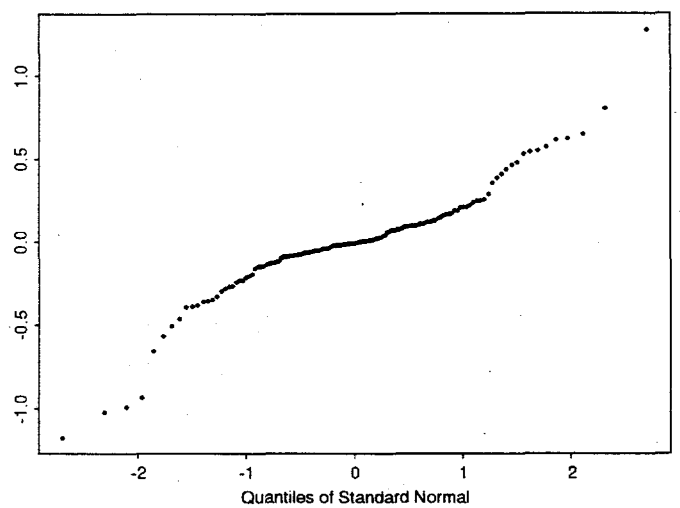


Figure 5.3b. Quantile/Quantile Plots for the Terms; G (SORWT group) Terms from the Liquid ANOVA Fit (A linear relationship in each case indicates a good model fit.)

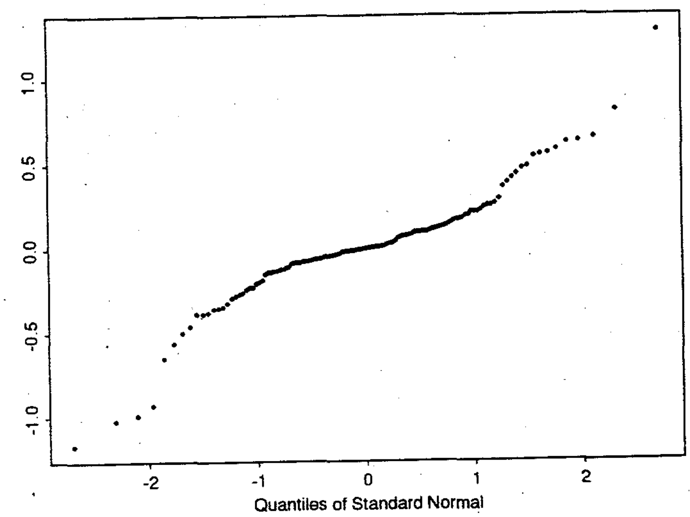


Figure 5.3c. Quantile/Quantile Plots for the Terms; E (residuals) Terms from the Liquid ANOVA Fit (A linear relationship in each case indicates a good model fit.)

Table 5.2. Highest "Worst 5%" TOC Estimates in the Liquid Phase

		% TOC (wet basis)		% TOC (wet basis) 95% Confidence Bound
Tank	SORWT Group	Median Estimate	Worst 5%	Worst 5%
SX106	I	2.0	25	25
A106	XXXA	0.1	25	25
U106	VII	1.6	6.2	16.6
AX102	XXVIII	1.1	4.4	8.9
TX118	XXII	0.2	4.2	25
U111	VII	1.0	4.2	11.0
A101	IX	0.9	3.8	5.7
S102	I	0.9	3.5	7.7
AX103	XXVIII	0.8	3.3	6.2
AX101	IX	0.8	3.0	5.4

Table 5.3. Highest "Worst 5%" TOC Estimates in the Saltcake Phase

		% TOC (wet basis)		% TOC (wet basis) 95% Confidence Bound
Tank	SORWT Group	Median Estimate	Worst 5%	Worst 5%
U105	X	0.7	5.2	17.9
U107	X	0.7	5.2	17.9
U108	X	0.7	5.2	17.9
U109	X	0.7	5.2	17.9
BY101	III	0.7	5.1	16.4
BY103	III	0.7	5.1	16.4
BY104	III	0.7	5.1	16.4
BY105	III	0.7	5.1	16.4
BY106	III	0.7	5.1	16.4
BY107	III	0.7	5.1	16.4
BY108	III	0.7	5.1	16.4
BY110	III	0.7	5.1	16.4
BY111	III	0.7	5.1	16.4
BY112	III	0.7	5.1	16.4
TX115	VII	0.6	5.0	16.6
U102	VII	0.6	5.0	16.6
U103	VII	0.6	5.0	16.6
U106	VII	0.6	5.0	16.6
U111	VII	0.6	5.0	16.6
TX108	XXII	0.6	4.7	16.1

Table 5.4. Highest "Worst 5%" TOC Estimates in the Sludge Phase

		% TOC (wet basis)		% TOC (wet basis) 95% Confidence Bound
Tank	SORWT Group	Median Estimate	Worst 5%	Worst 5%
B202	V	0.2	7.6	25
A103	IX	0.7	2.6	5.7
A102	IX	0.6	2.5	5.5
A101	IX	0.6	2.4	6.1
AX101	IX	0.5	2.1	7.3
A106	XXXA	0.5	1.9	4.6
BX112	XII	0.4	1.6	3.3
U103	VII	0.4	1.6	4.9
T204	V	0.3	1.3	3.2
B107	XII	0.3	1.2	4.9

5.2 ANOVA Results for Moisture in Sludge and Liquid

A moisture measurement in the sludge and liquid phases is assumed to obey the following ANOVA model:

$$M_{ijk} = \mu + G_i + T_{ij} + E_{ijk}$$

where i represents a SORWT group, ij a tank, and ijk a measurement taken from tank ij. This ANOVA model is exactly the same as the TOC model, except the data are not in the logarthmic form. There are three variabilities associated with this model: σ_G, σ_T, and σ_E σ_G, between-group variability; σ_T, between-tank variability; and σ_E, within-tank variability. This model is fit to each phase separately.

Table 5.5 presents the a summary of the variables present in the moisture measurements. The liquids are, on average, 65% water, and sludges are 45% water. It is interesting that liquid waste displays an in-tank variability of 15%. This is not representative of a well-mixed liquid.

Moisture in sludge displays a large within-tank variability (28%), a strong SORWT group effect and no between-tank variability. The SORWT grouping seems to be effective in predicting the moisture in sludges.

Table 5.5. Estimated Terms for Moisture Model Fit of the Sludge and Liquid Phases

	Model Terms			
Phase	μ	σ_G	σ_T	σ_E
Liquid	65%	12%	15%	14%
Sludge	45%	24%	0%	28%
Average	55%	18%	8%	21%

5.3 ANOVA Results for Moisture in Saltcake

The moisture measurements for saltcake were treated differently than the sludge and liquid phases. The following ANOVA model was employed:

$$\log(M_{ijk}) = \mu + V_i + P_j + R_k + T_{ijk} + E_{ijk}$$

where the tank groups are defined by indices i, j, and k. The index i identifies whether or not the tank is actively ventilated, j whether or not the tank has been jet-pumped, and k whether or not the tank contains REDOX waste. This more complicated model was adopted for three reasons:

1. An evaluation of ANOVA residuals indicated that a logarthmic distribution is appropriate.

2. Tank ventilation and jet-pumping tank waste were shown to have an important effect on moisture.

3. There were too many SORWT groups to use with the saltcake moisture data (only 20 measurements), so the SORWT model was reduced to just two groups, REDOX and non-REDOX waste.

Table 5.6 provides the estimated terms for the saltcake moisture fit. This table shows that the typical moisture content in saltcake is about 14%. The grouping variables (ventilation, pumping, and waste type) are significant, accounting for about 28% of the variability in the data. Within-tank variability is about the same as that reported for liquid, but lower than the variability reported for sludge.

From Table 5.6 the effect of pumping a tank or putting it on active ventilation can be calculated. Suppose, for example, that the moisture content of a saltcake tank waste is 25% and it is jet-pumped. Its moisture content after jet-pumping would be estimated as:

$$\text{Moisture After Pumping} = \frac{63}{160} * 25\% = 9.8\%$$

Table 5.6. Estimated Terms for Moisture Model Fit of the Saltcake Phase

Term	Moisture
Mean	14%
R=REDOX	71%
R=Non-REDOX	141%
P=Pumped	63%
P=Not Pumped	160%
V=Active	76%
V=Not Active	132%
σ_T Between-Tank Variability	22%
σ_E Within-Tank Variability	17%

Similarly, if the tank waste condition was changed from passive to active ventilation, its moisture content upon active ventilation would be estimated as:

$$\text{Moisture of Waste in Active Ventilated Tank} = \frac{76}{132} * 25\% = 14\ \%$$

Appendix L presents the moisture grouping for each saltcake waste. Appendix G presents the estimates of moisture for all SSTs.

5.4 Exceedance Probabilities for the Worst 5% of the Waste

The TOC and moisture estimates discussed in the last section can be plotted on the safety diagram presented in Figure 5.4 to determine whether or not an individual tank is safe. This would be a reasonable procedure if the uncertainty in the estimates is small. However, as can be seen from the results presented in the last two sections, it is not; any evaluations should attempt to understand and account for these uncertainties.

One common methodology for presenting these uncertainties is through the use of "confidence bounds." All TOC and moisture estimate tables presented in Appendix I also include their 95% confidence bounds. These 95% bounds can be plotted on the safety diagram to allow the reader to gauge the uncertainty in the estimates.

Figures 5.5 through 5.7 simultaneously illustrate the three most important TOC and moisture estimates from this study. Each set of connected lines in this plot represents a tank. The open point on the line represents the median TOC and moisture estimate, while the solid point represents our estimate for

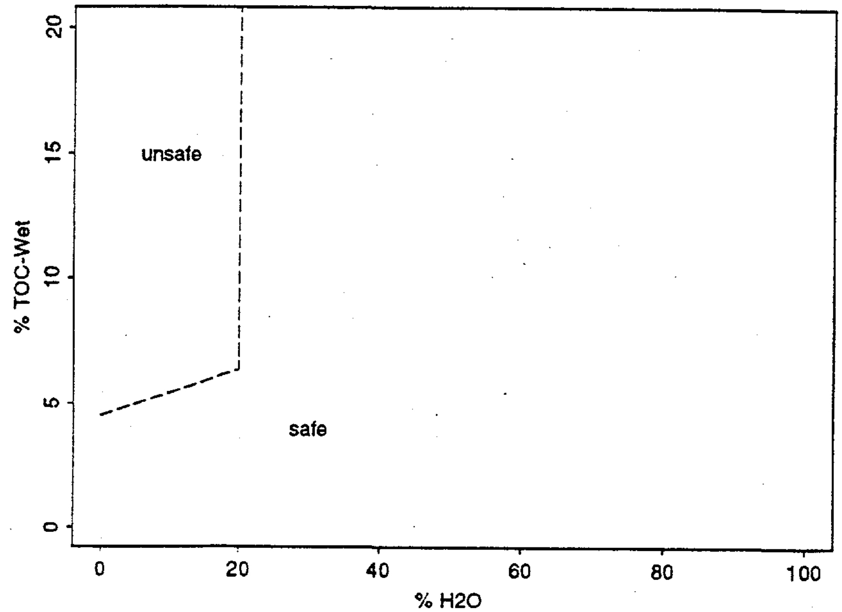


Figure 5.4. Preliminary Organics Tank Safety Criteria Identified by the TOC Moisture Concentrations

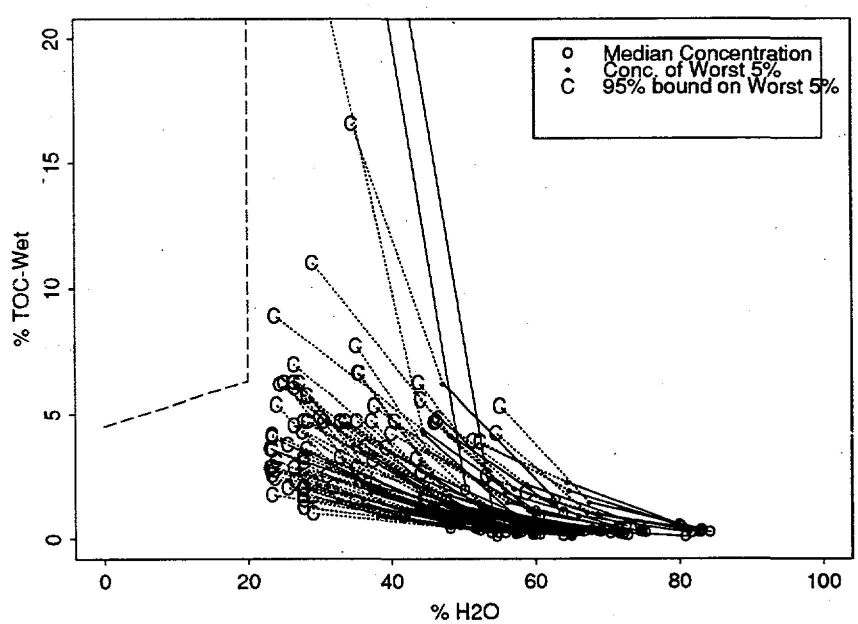


Figure 5.5. ANOVA Estimates for the Median, Worst 5% of the Waste, and 95% Confidence Bound on the "Worst 5%" of the Liquid Phase Tank Wastes (Note: the dotted line indicates the safety criteria.)

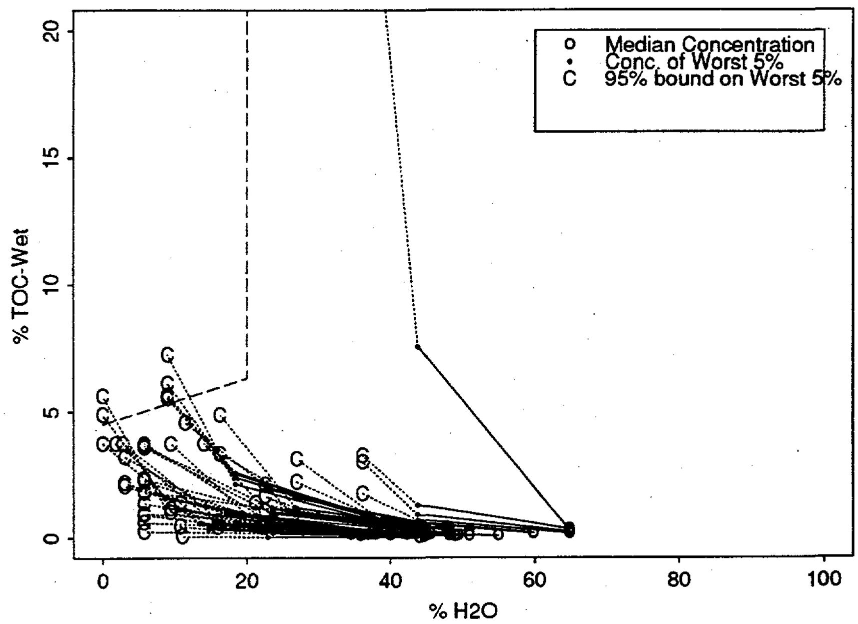


Figure 5.6. ANOVA Estimates for the Median, Worst 5% of the Waste, and 95% Confidence Bound on the "Worst 5%" of the Sludge Phase Tank Wastes (Note: the dotted line indicates the safety criteria.)

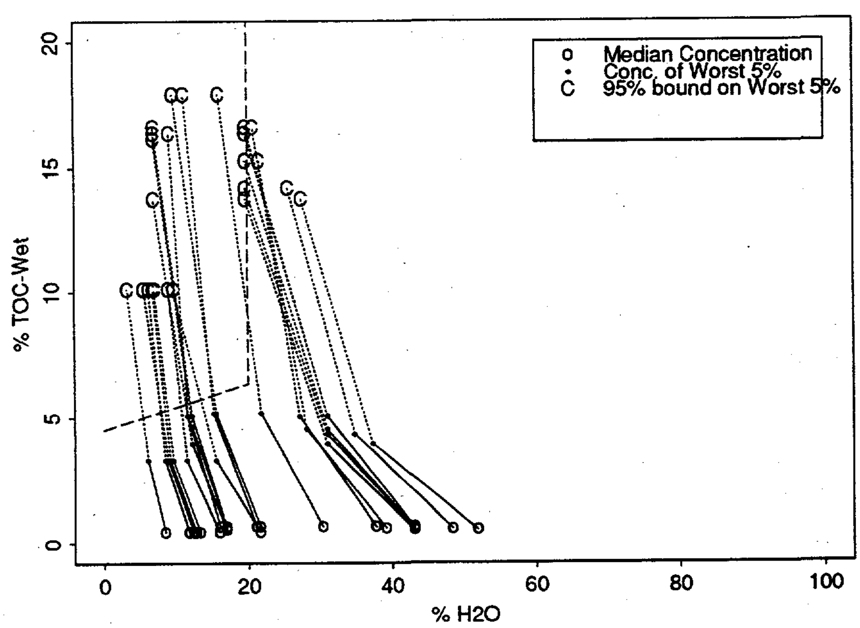


Figure 5.7. ANOVA Estimates for the Median, Worst 5% of the Waste, and 95% Confidence Bound on the "Worst 5%" of the Saltcake Phase Tank Wastes (Note: the dotted line indicates the safety criteria.)

the worst 5%. Finally, the point identified with a "C" represents the 95% confidence bound on the worst 5%. Thus the distance between the open and closed dot represents the consequences of going from a tank median to worst 5% measurement (and also describes within tank variability), while the distance between the "C" and closed dot represents uncertainty in the worst 5% estimate.

Figures 5.5 through 5.7 give perhaps the most concise summary of the state of the waste. As seen in the safety diagram, there are no problems with the liquid phase in any of the tanks; even the 95% bounds on the worst 5% do not cross into the unsafe region. For the sludge phase, no worst 5% values are in the unsafe region, but five 95% bounds are. Finally, a substantial proportion of the saltcake 95% bounds are in the unsafe region, indicating that it would be valuable to take more measurements in saltcake tanks. However, even in saltcake, none of the worst 5% estimates are actually in the unsafe region.

Another alternative for evaluating the uncertainty in the TOC and moisture estimates is to utilize an "exceedance probability." This probability is defined to be the probability that the actual tank TOC and moisture value is in the unsafe region, given the available information (i.e., the current TOC and moisture estimate and its associated uncertainty). The exceedance probability is very similar to a confidence bound, except that it attempts to account for the shape of the safety region more appropriately.

The exceedance probability provides the best estimate that an individual tank is actually of concern from an organic safety perspective. When exceedance probability is near 0 (i.e., less than 2%), an individual tank waste should be classified as safe. Alternatively, when the exceedance probability is large (say, above 50%), then the tank should be considered from a safety perspective, and it probably is wise to characterize the tank further and consider mitigation measures. The current study indicates there are no tank wastes with exceedance probabilities greater than approximately 35%.

When the exceedance probability is neither high nor low (i.e., between 50% and 2%), then additional measurements may be advantageous. In this case, more measurements will reduce the estimate's uncertainty and drive the exceedance probability to either 1 or 0. All 65 saltcake wastes and 22 of the sludge wastes fall into this category.

Tables 5.7 through 5.8 present the exceedance probabilities for the three waste phases. The tables list two sets of exceedance probabilities, one for the median (TOC and moisture) and the other for the "worst 5%" of the waste. The important exceedance probability is that associated with the " worst 5%"; the exceedance probability associated with the median value is given only for the sake of comparison. The tanks listed in the tables are ordered by the exceedance probability on the "worst 5%" of the waste, so the tables present the tanks that are most likely to be of concern from a safety perspective.

Table 5.7 demonstrates that the exceedance probability in the liquid phase is very low; Tank AX102, the worst tank, only has a 1% exceedance probability, so no liquid in any of the tanks would be considered unsafe.

For many saltcake tanks, the exceedance probability is quite substantial (Table 5.8) . The saltcake tank wastes have an exceedance probability that ranges up to 36%. Saltcake tank wastes are good

Table 5.7. Tanks with the Highest Exceedance Probability for the "Worst 5%" of Liquid Phase Waste

		Median			Worst 5%		
Tank	SORWT Group	% TOC[(a)]	% H_2O	Exceed. Prob.	% TOC[(a)]	% H_2O	Exceed. Prob.
AX102	XXVIII	1.10	59.99	0.00	4.39	44.31	1.05
TX118	XXII	0.15	60.13	0.01	4.22	44.45	1.01
SX106	I	1.97	50.25	0.00	20.00	34.57	0.57
U111	VII	1.04	63.88	0.00	4.15	48.20	0.29
S110	I	0.69	59.72	0.00	2.77	44.03	0.18
AX103	XXVIII	0.82	53.12	0.00	3.27	37.44	0.17
TX105	I	0.60	59.72	0.00	2.39	44.03	0.12
S103	I	0.46	59.72	0.00	1.85	44.03	0.11
S108	I	0.46	59.72	0.00	1.85	44.03	0.11
S109	I	0.46	59.72	0.00	1.85	44.03	0.11

(a) wet basis

candidates for further sampling. Table 5.9 lists 22 sludge tanks with an exceedance probability that is greater than 2%. The highest exceedance probability for sludges is 10% on U102, indicating that a few extra measurements in sludge might be beneficial.

Since four SORWT groups contain all but one of the tanks with high exceedance probabilities, just four or five extra measurements might be sufficient to reduce all sludge tank exceedance probabilities to below 2%.

5.5 Mass Balance Comparison

The TOC estimates predicted for each of the SSTs according to the weighted average and ANOVA models can be compared to estimated quantities of total inventories of organics added to the tank farm. The tank estimates in this report do not include the inventory of organics in double-shell tanks, so the comparison may be incomplete. However, a mass balance comparison is useful for providing an estimate for validation.

Several of Hanford's process plants have used organic chemicals. PUREX Plant, B-Plant, Z-Plant, U-Plant and C-Plant all involved the use of organic chemicals that may have discharged to the tank farms

Table 5.8. Tanks with the Highest Exceedance Probability for the "Worst 5%" of Saltcake Phase Waste

		Median			Worst 5%		
Tank	SORWT Group	% TOC[(a)]	% H_2O	Exceed. Prob.	% TOC[(a)]	% H_2O	Exceed. Prob.
BY104	III	0.65	1.21	0	5.07	1.06	36.52
TX115	VII	0.65	1.23	0	5.05	1.09	33.16
BY101	III	0.65	1.23	0	5.07	1.09	33.14
BY107	III	0.65	1.23	0	5.07	1.09	33.14
BY108	III	0.65	1.23	0	5.07	1.09	33.14
BY110	III	0.65	1.23	0	5.07	1.09	33.14
BY111	III	0.65	1.23	0	5.07	1.09	33.14
BY112	III	0.65	1.23	0	5.07	1.09	33.14
TX108	XXII	0.60	1.23	0	4.65	1.09	30.10
TX118	XXII	0.60	1.23	0	4.65	1.09	30.10
S105	I	0.42	0.93	0	3.30	0.79	28.10
TX102	I	0.42	0.93	0	3.30	0.79	28.10
TX105	I	0.42	0.93	0	3.30	0.79	28.10
TX106	I	0.42	0.93	0	3.30	0.79	28.10
U105	X	0.66	1.32	0	5.17	1.18	27.78
U107	X	0.66	1.33	0	5.17	1.19	25.26
U108	X	0.66	1.33	0	5.17	1.19	25.26
TX109	II	0.51	1.23	0	3.96	1.09	23.51
TX110	II	0.51	1.23	0	3.96	1.09	23.51
TX111	II	0.51	1.23	0	3.96	1.09	23.51
TX112	II	0.51	1.23	0	3.96	1.09	23.51

(a) wet basis

Table 5.9. Tanks with the Highest Exceedance Probability for the "Worst 5%" of Sludge Phase Waste

		Median			Worst 5%		
Tank	SORWT Group	% TOC[a]	% H_2O	Exceed. Prob.	% TOC[a]	% H_2O	Exceed. Prob.
U102	VII	0.31	29.78	0.02	1.21	8.67	10.21
U106	VII	0.31	29.78	0.02	1.21	8.67	10.21
U111	VII	0.31	29.78	0.02	1.21	8.67	10.21
U103	VII	0.40	29.78	0.00	1.58	8.67	9.56
AX101	IX	0.54	39.52	0.00	2.14	18.41	8.63
A101	IX	0.61	39.52	0.00	2.39	18.41	7.07
A103	IX	0.65	39.52	0.00	2.58	18.41	6.28
A102	IX	0.64	39.52	0.00	2.52	18.41	5.83
B101	XVIII	0.14	34.51	0.00	0.56	13.40	3.35
B102	XVIII	0.14	34.51	0.00	0.56	13.40	3.35
B103	XVIII	0.14	34.51	0.00	0.56	13.40	3.35
U204	XXXL	0.14	36.96	0.00	0.56	15.85	2.74
BY101	III	0.14	37.92	0.00	0.56	16.81	2.50
BY102	III	0.14	37.91	0.00	0.56	16.81	2.50
BY103	III	0.14	37.91	0.00	0.56	16.81	2.50
U204	III	0.14	37.91	0.00	0.56	16.81	2.50
BY101	III	0.14	37.91	0.00	0.56	16.81	2.50
BY103	III	0.14	37.91	0.00	0.56	16.81	2.50
BY104	III	0.14	37.91	0.00	0.56	16.81	2.50
BY105	III	0.14	37.91	0.00	0.56	16.81	2.50
BY106	III	0.14	37.91	0.00	0.56	16.81	2.50
BY107	III	0.14	37.91	0.00	0.56	16.81	2.50
BY108	III	0.14	37.91	0.00	0.56	16.81	2.50
BY110	III	0.14	37.91	0.00	0.56	16.81	2.50
BY111	III	0.14	37.91	0.00	0.56	16.81	2.50
BY112	III	0.14	37.91	0.00	0.56	16.81	2.50
BY101	IV	0.23	38.24	0.00	0.91	17.14	1.38

(a) wet basis

(Schneider, 1951, Long, 1967; Jungfleish, 1984). PUREX Plant was a major contributor of organic additions to the tank farm, via the use of tributyl phosphate and diluent used in the PUREX solvent extraction process. The waste fractionization cesium-strontium removal process operated in the B-Plant also used organic chemicals. Reports of selected organics estimated from these two main organic contributors processes are compared to the organic inventory estimates in SSTs developed in this report.

The amount of organics added to the tank farms from these two major contributors is listed in the tables below. The amount of organics going to the tank farms from the PUREX process is estimated to be 655,000 gallons to organic wash waste and about 2,000 gallons to high-level waste (Sederburg and Reddick 1994). Knowing the two components from the PUREX Process, tributyl phosphate and normal paraffin hydrocarbon, the distribution of the organics is converted to a TOC basis and shown in Table 5.10. The total estimated TOC added to the tank farm from the PUREX process is estimated to be 1500 MT.

Estimated quantity of organics added to the SSTs from the B-Plant have been provided from consumption records (Allen 1967). Assuming all organics were sent to the tank farms, the estimate of total mass of the four organic carbon species sent to the tank farms is 850 Mkg for the B-Plant cesium-stontium removal process (Table 5.11).

The estimate of the TOC inventory in each SST is listed in Appendix K, based on the median estimate of TOC for each tank. The best estimate TOC concentrations for each SST, according to phase, were used to determine inventory values. The phase quantities in each of the 149 SSTs were based on Tank Farm Surveillance Reports (Hanlon 1994). Also, assumptions pertaining to the density of the phase are required. Density values were obtained for all three phases from the laboratory dataset as shown in Table 4.4. The results for the ANOVA inventory estimate are shown in Table 5.12, and estimate the amount of TOC to be 1057 MT.

The sum of the TOC admitted to the tank farms, from the reports for the B-Plant and the PUREX processes, is 2300 Mkg. The total estimated inventory of TOC in the SSTs using the ANOVA model is about

Table 5.10. Estimate of Organic Carbon Inventory to Tank Farm from B-Plant Consumption (Allen 1967)

Component	Process	Grams Moles Added to Tank Farm	Grams Carbon Mole	Mkg
Hydroacetic Acid	B-Plant	9.00E+06	24	216
Citric Acid	B-Plant	3.30E+06	72	237.6
HEDTA	B-Plant	2.70E+06	120	324
EDTA	B-Plant	5.70E+05	120	68.4
	B-Plant Total			846

Table 5.11. Estimate of Organic Carbon Added from PUREX Operation, 1955-1991

Component	Gallons to Tank Farm (Sederburg and Reddick 1994)	Density of Organic (g/ml)	Weight Carbon/ Weight Organic	Mass of Carbon to Tank Farms, (Mkg)
Tributyl Phosphate (Organic Wash Waste)	202,219	0.973	0.541	403
Normal Paraffin Hydrocarbon (Organic Wash Waste)	452,741	0.76	0.847	1,103
NPH to High-Level Waste	2,119	0.76	0.847	5
Total from PUREX				1,511

Table 5.12. Estimated Distribution of Total Organic Carbon in 149 Single-Shell Tanks, Median Concentrations, ANOVA Technique

Phase	Estimated TOC (Mkg)
Liquid	186
Saltcake	756
Sludge	114
Total TOC	1,057

Table 5.13. Estimated Distribution of Total Organic Carbon in 149 Single-Shell Tanks Compared to PUREX and B-Plant Tank Additions

Process	TOC Process Additions (Mkg)	TOC ANOVA Estimation (Mkg)
ANOVA Estimation		1,057
B-Plant Addition Estimate from Consumption Records	846	
PUREX Process Estimate	1,511	
Total TOC	2,357	1,057

1,000 Mkg. As shown in Table 5.13, the sum of the ANOVA model results is about 50% less than the estimated TOC from the two major organic tank farm processes identified. Reasons for the discrepancy include: TOC in the double-shell tanks is not inventoried; organic aging effects are unaccounted for; or assuming the total consumption of organic chemicals admitted to the tank farm is too conservative (B-Plant).

5.6 Comparison of Present Results to Organic Watchlist Tanks

Single-shell tanks can be placed on the organics watchlist according to several potential safety conditions, including estimates for dry basis TOC. For the organic watchlist tanks, estimates in this report were converted to a dry basis using the methodology described in Appendix I. These estimates were compared to the existing estimates for these tanks according to previous analytic results (Schulz 1980), TRAC and the previous TOC study (Toth et al. 1994). Since the current study distinguishes each phase, each estimate is compared to the TOC estimate developed in this study for each phase. The comparison shown in Table 5.14 indicates generally the new estimates for TOC are less than the previous watchlist estimates.

Table 5.14. Comparison of TOC Estimates for Organic Watchlist Tanks

Watchlist Tank No.	Tank TOC, (wt%) Dry Basis, TRAC	Tank TOC, (wt%) (Dry Basis), Schultz (1980)	Tank TOC (Dry Basis) per Toth et al (1994)	Current Study % TOC, Sludge (Dry Basis)	Current Study % TOC, Saltcake (Dry Basis)	Current Study % TOC, Liquid (Dry Basis), median
A101	0	7.16	3.28	0.99	0.098	1.81
AX102		2.83	3.03	0.18	1.05	2.75
B103	3.17			0.15		
C102				0.18		0.85
C103[a]			7.12	0.54		3.01
S102		6.1		0.17	0.51	2.29
S111		2.34		0.17	0.475	0.82
SX103		4.6	2.69	0.17	0.456	1.24
SX106	5.02	5.96	3.82	0.17	0.456	4.02
T111				0.54		1.21
TX105	4.94			0.41	0.437	1.48
TX118		3.22			0.722	0.5
TY104		2.8		0.41		0.57
U103		3.38		0.57	1.05	1.09
U105		3.38	3.41	0.18	0.887	0.84
U106		9.96	3.47	0.43	1.05	4.3
U107	4.81			0.18	0.89	0.84
U111		3.65		0.43	0.96	2.77
U203			3.01	0.18		0.97
U204			3.01	0.16		0.85

(a) Organic watchlist tank due to floating organic layer

6.0 Conclusions and Recommendations

This document provides estimates and confidence levels of TOC and moisture for each of the 149 Hanford SSTs, with a methodology of ranking that can be used to select additional SSTs for monitoring and/or measuring. The methodology makes use of chemical analysis information provided in tank process laboratory results and tank characterization reports. The methodology also makes use of weighted average statistical methodology and a tank grouping method based on the different types of wastes introduced into each SST (SORWT grouping technique). The data indicated a significant correlation of TOC values to waste phase (liquid, saltcake, and sludge). Therefore, waste phase dependence (saltcake, sludge, and liquid) was included in the statistical model for this study.

Characteristic reports and laboratory analytical results from 78 of the 149 SSTs were provided. Most of the reports provide data on the liquid phase TOC, but core composite, sludge, and saltcake data are also represented. Saltcake measurements are not well characterized. When saltcake data are reported, only one measurement since 1982 is represented. Saltcake was found to have the highest TOC content compared to the other two phases, sludges and liquids. Only 20 saltcake TOC measurements are recorded.

Although the TOC and moisture information compiled and modeled statistically in this report represents a significant improvement in our knowledge about TOC in SSTs, the dataset could be improved upon. Specifically, it is recommended that:

- available data be examined to determine if another analyte may be used as an indicator for high organic content;
- double-shell tank data be included in the model of TOC;
- distinction be made for the preparatory methods and analytical methods for water and TOC measurements;
- moisture sampling data, including liquid observation well probe readings, be investigated for use for the moisture ANOVA model;
- the data be grouped into families of SOWRT groups depending on knowledge of TOC content of waste types (the tank grouping scheme should be simplified);
- a TOC dataset be constructed that can be updated with additional TOC measurements as they become available; and
- the availability of information on TOC and moisture spatial variations (riser/core information) be determined (include spatial variations in the statistical model).

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Appendix A

Phase Inventory for 149 Single-Shell Tanks

Phase Inventory for 149 Single Shell Tanks

Tank Number	Total Liquid Volume, KGal	Tank Number	Total Liquid Volume , KGal	Tank Number	Total Liquid Volume KGal	Tank Number	Total Liquid Volume , Kgal
A101	413	BX112	8	S112	110	TX107	2
A102	6	BY101	5	SX101	146	TX109	10
A103	20	BY102	41	SX102	183	TX110	15
A105	4	BY103	160	SX103	233	TX111	9
A106	7	BY104	18	SX104	201	TX112	24
AX101	320	BY105	192	SX105	261	TX113	16
AX102	17	BY106	235	SX106	255	TX114	15
AX103	36	BY107	25	SX107	5	TX115	19
B101	6	BY108	9	SX108	5	TX116	23
B102	4	BY109	78	SX109	10	TX117	8
B104	47	BY110	9	SX111	7	TX118	27
B105	23	BY112	8	SX112	3	TY102	14
B106	7	C101	3	SX114	14	TY103	5
B107	13	C102	37	T101	17	TY104	15
B108	4	C103	133	T102	13	U101	3
B109	8	C104	11	T103	4	U102	144
B110	23	C105	11	T104	50	U103	189
B111	22	C106	48	T105	23	U104	7
B112	3	C107	26	T106	2	U105	179
B201	4	C109	4	T107	22	U106	83
B202	3	C110	7	T110	42	U107	178
B203	6	C112	32	T111	51	U108	196
B204	6	S101	96	T112	7	U109	182
BX101	1	S102	230	T201	4	U110	15
BX102	4	S103	102	T202	2	U111	122
BX103	4	S104	29	T203	4	U112	4
BX104	33	S105	35	T204	4	U201	1
BX105	11	S106	190	TX101	5	U202	1
BX106	15	S107	59	TX102	22	U203	1
BX107	30	S108	127	TX103	15	U204	1
BX108	1	S109	141	TX104	15		
BX109	13	S110	110	TX105	20		
BX110	15	S111	205	TX106	10		

Note: Tanks without inventory are not listed.

Phase Inventory for 149 Single- Shell Tanks

Tank Number	Total Saltcake Volume, Kgal	Tank No	Total Saltcake Volume, Kgal	Tank Number	Total Saltcake Volume, Kgal
A101	950	S110	259	U108	415
A102	22	S111	447	U109	396
AX101	745	S112	518	U111	303
AX102	29	SX101	343		
AX103	110	SX102	426		
B102	10	SX103	536		
B104	69	SX104	478		
B105	266	SX105	610		
BX105	3	SX106	465		
BX110	9	TX102	217		
BX111	143	TX104	64		
BY101	278	TX105	609		
BY102	341	TX106	453		
BY103	395	TX107	35		
BY104	366	TX108	134		
BY105	459	TX109	384		
BY106	547	TX110	462		
BY107	206	TX111	370		
BY108	74	TX112	649		
BY109	340	TX113	607		
BY110	295	TX114	535		
BY111	438	TX115	640		
BY112	286	TX116	631		
S101	171	TX117	626		
S102	545	TX118	347		
S103	221	TY102	64		
S105	454	U102	313		
S106	447	U103	423		
S107	69	U105	349		
S108	600	U106	185		
S109	555	U107	360		

Note: Tanks without inventory are not listed.

Phase Inventory for 149 Single-Shell Tanks

Tank No	Total Sludge, Kgal	Tank No	Total Sludge, Kgal	Tank No	Total Sludge, Kgal	Tank No	Total Sludge, Kgal	Tank No	Total Sludge, Kgal
A101	3	BX107	344	C204	3	T106	19	U203	2
A102	15	BX108	26	S102	4	T107	171	U204	2
A103	366	BX109	193	S103	10	T108	44		
A104	28	BX110	189	S104	293	T109	58		
A105	19	BX111	68	S105	2	T110	376		
A106	125	BX112	164	S106	28	T111	456		
AX101	3	BY101	109	S107	293	T112	60		
AX102	7	BY103	5	S108	4	T201	28		
AX103	2	BY104	40	S109	13	T202	21		
AX104	7	BY105	44	S110	131	T203	35		
B101	113	BY106	95	S111	139	T204	38		
B102	18	BY107	60	S112	5	TX101	84		
B103	59	BY108	154	SX101	112	TX103	157		
B104	301	BY109	83	SX102	117	TY101	118		
B105	40	BY110	103	SX103	115	TY103	162		
B106	116	BY111	21	SX104	136	TY104	43		
B107	164	BY112	5	SX105	73	TY105	231		
B108	94	C101	88	SX106	12	TY106	17		
B109	127	C102	423	SX107	104	U101	22		
B110	245	C103	62	SX108	87	U102	43		
B111	236	C104	295	SX109	250	U103	32		
B112	30	C105	150	SX110	62	U104	122		
B201	28	C106	197	SX111	125	U105	32		
B202	27	C107	275	SX112	92	U106	26		
B203	50	C108	66	SX113	26	U107	15		
B204	49	C109	62	SX114	181	U108	29		
BX101	42	C110	187	SX115	12	U109	48		
BX102	96	C111	57	T101	101	U110	186		
BX103	62	C112	104	T102	19	U111	26		
BX104	96	C201	2	T103	23	U112	45		
BX105	43	C202	1	T104	442	U201	4		
BX106	31	C203	5	T105	98	U202	4		

Note: Tanks without inventory are not listed.

Appendix B

Nominal Characteristics of Each Phase

Appendix B - Analysis of Phase Characteristics

B.1 Analysis of Variance

```
TUE 9/20/94 1:44:38 PM    D:\TOC\TOCLOCK.SYS
 LEVELS ENCOUNTERED DURING PROCESSING ARE:
 NEWPHASE$
  Liquid        Saltcake      Sludge

   113 CASES DELETED DUE TO MISSING DATA.

 DEP VAR:  LOGTOC      N:      358  MULTIPLE R: 0.431  SQUARED MULTIPLE R: 0.186
```

ESTIMATES OF EFFECTS $B = (X'X)^{-1} X'Y$

		LOGTOC
CONSTANT		3.495
NEWPHASE$	Liquid	0.074
NEWPHASE$	Saltcake	0.276

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
NEWPHASE$	18.870	2	9.435	40.575	0.000
ERROR	82.549	355	0.233		

LEAST SQUARES MEANS.

		LS MEAN	SE	N
NEWPHASE$	=Liquid	3.569	0.040	142
NEWPHASE$	=Saltcake	3.771	0.103	22
NEWPHASE$	=Sludge	3.145	0.035	194

```
TUE 9/20/94 1:45:54 PM    D:\TOC\TOCLOCK.SYS
COL/
ROWNEWPHASE$
  1  Liquid
  2  Saltcake
  3  Sludge

USING LEAST SQUARES MEANS.

POST HOC TEST OF   LOGTOC

USING MODEL MSE OF        .233 WITH    355. DF.
MATRIX OF PAIRWISE MEAN DIFFERENCES:
```

	1	2	3
1	0.000		
2	0.202	0.000	
3	-0.424	-0.626	0.000

TUKEY HSD MULTIPLE COMPARISONS.
MATRIX OF PAIRWISE COMPARISON PROBABILITIES:

	1	2	3
1	1.000		
2	0.161	1.000	
3	0.000	0.000	1.000

B.2 Nominal Characteristics of Phases

TUE 9/20/94 1:47:06 PM D:\TOC\TOCLOCK.SYS

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Liquid

TOTAL OBSERVATIONS: 147

	TOCUGG	LOGTOC	GML	H2O
N OF CASES	143	142	43	36
MINIMUM	0.000	1.980	1.020	34.000
MAXIMUM	99600.000	4.998	1.970	96.480
RANGE	99600.000	3.018	0.950	62.480
MEAN	7040.272	3.569	1.370	55.669
VARIANCE	.136633E+09	0.248	0.040	249.079
STANDARD DEV	11689.009	0.498	0.199	15.782
STD. ERROR	977.484	0.042	0.030	2.630
SKEWNESS(G1)	4.878	-0.242	0.553	1.328
KURTOSIS(G2)	30.018	0.968	1.024	1.081
SUM	1006758.897	506.770	58.898	2004.070
C.V.	1.660	0.140	0.145	0.284
MEDIAN	3840.000	3.585	1.378	50.850

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Saltcake

TOTAL OBSERVATIONS: 23

	TOCUGG	LOGTOC	GML	H2O
N OF CASES	22	22	8	13
MINIMUM	470.000	2.672	1.270	10.700
MAXIMUM	56296.875	4.750	2.000	53.700
RANGE	55826.875	2.078	0.730	43.000
MEAN	11259.672	3.771	1.635	25.692
VARIANCE	.181096E+09	0.299	0.062	177.734
STANDARD DEV	13457.193	0.547	0.249	13.332
STD. ERROR	2869.083	0.117	0.088	3.698
SKEWNESS(G1)	2.038	-0.260	0.083	0.801
KURTOSIS(G2)	3.910	-0.601	-1.201	-0.625
SUM	247712.791	82.954	13.080	334.000
C.V.	1.195	0.145	0.153	0.519
MEDIAN	7083.601	3.845	1.600	18.100

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Sludge

TOTAL OBSERVATIONS: 301

	TOCUGG	LOGTOC	GML	H2O
N OF CASES	202	194	77	115
MINIMUM	20.000	1.602	1.000	3.080
MAXIMUM	33200.000	4.521	1.930	95.600
RANGE	33180.000	2.919	0.930	92.520
MEAN	2584.570	3.145	1.451	43.205
VARIANCE	.212291E+08	0.214	0.043	216.909
STANDARD DEV	4607.510	0.462	0.208	14.728
STD. ERROR	324.183	0.033	0.024	1.373
SKEWNESS(G1)	5.010	0.315	0.103	-0.473
KURTOSIS(G2)	28.057	0.596	-0.060	2.210
SUM	522083.190	610.064	111.764	4968.580
C.V.	1.783	0.147	0.143	0.341
MEDIAN	1205.000	3.095	1.460	43.500

SUMMARY STATISTICS FOR TOCUGG

BARTLETT TEST FOR HOMOGENEITY OF GROUP VARIANCES

CHI-SQUARE = 150.855 DF= 2 PROBABILITY = 0.000

ANALYSIS OF VARIANCE

SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	PROBABILITY
BETWEEN GROUPS	.262653E+10	2	.131326E+10	17.401	0.000
WITHIN GROUPS	.274720E+11	364	.754724E+08		

SUMMARY STATISTICS FOR LOGTOC

BARTLETT TEST FOR HOMOGENEITY OF GROUP VARIANCES

CHI-SQUARE = 1.687 DF= 2 PROBABILITY = 0.430

ANALYSIS OF VARIANCE

SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	PROBABILITY
BETWEEN GROUPS	18.870	2	9.435	40.575	0.000
WITHIN GROUPS	82.549	355	0.233		

SUMMARY STATISTICS FOR GML

BARTLETT TEST FOR HOMOGENEITY OF GROUP VARIANCES

CHI-SQUARE = 0.656 DF= 2 PROBABILITY = 0.720

ANALYSIS OF VARIANCE

SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	PROBABILITY
BETWEEN GROUPS	0.524	2	0.262	6.091	0.003
WITHIN GROUPS	5.378	125	0.043		

SUMMARY STATISTICS FOR H2O

BARTLETT TEST FOR HOMOGENEITY OF GROUP VARIANCES

CHI-SQUARE = 0.535 DF= 2 PROBABILITY = 0.765

ANALYSIS OF VARIANCE

SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	PROBABILITY
BETWEEN GROUPS	9281.433	2	4640.716	21.000	0.000
WITHIN GROUPS	35578.200	161	220.983		

B.3 Confidence Intervals for Phases

B.3.1 TOC

TUE 9/20/94 1:50:00 PM D:\TOC\TOCLOCK.SYS

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Liquid

ITERATION	LOSS	PARAMETER VALUES
0	.1743655D+04	.1000D+00
1	.3502766D+02	.3569D+01
2	.3502766D+02	.3569D+01
3	.3502766D+02	.3569D+01

DEPENDENT VARIABLE IS LOGTOC

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	1808.561	1	1808.561
RESIDUAL	35.028	141	0.248
TOTAL	1843.588	142	
CORRECTED	35.028	141	

RAW R-SQUARED (1-RESIDUAL/TOTAL) = 0.981
CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) = 0.000

PARAMETER	ESTIMATE	A.S.E.	LOWER	<95%> UPPER
MEAN	3.569	0.042	3.486	3.651

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Saltcake

ITERATION	LOSS	PARAMETER VALUES
0	.7171590D+01	.3569D+01
1	.6404870D+01	.3694D+01
2	.6275246D+01	.3771D+01
3	.6275246D+01	.3771D+01

DEPENDENT VARIABLE IS LOGTOC

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	312.792	1	312.792
RESIDUAL	6.275	21	0.299
TOTAL	319.067	22	
CORRECTED	6.275	21	

RAW R-SQUARED (1-RESIDUAL/TOTAL) = 0.980
CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) = 0.000

PARAMETER	ESTIMATE	A.S.E.	LOWER	<95%> UPPER
MEAN	3.771	0.117	3.528	4.013

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Sludge

ITERATION	LOSS	PARAMETER VALUES
0	.1172677D+03	.3771D+01
1	.4124624D+02	.3145D+01
2	.4124624D+02	.3145D+01
3	.4124624D+02	.3145D+01

DEPENDENT VARIABLE IS LOGTOC

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	1918.444	1	1918.444
RESIDUAL	41.246	193	0.214

TOTAL	1959.691	194
CORRECTED	41.246	193

RAW R-SQUARED (1-RESIDUAL/TOTAL) = 0.979
CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) = 0.000

PARAMETER	ESTIMATE	A.S.E.	LOWER	<95%> UPPER
MEAN	3.145	0.033	3.079	3.210

B.3.2 Weight % Water

TUE 9/20/94 2:35:38 PM D:\TOC\TOCLOCK.SYS

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Liquid

ITERATION	LOSS	PARAMETER VALUES
0	.1198811D+06	.1000D+00
1	.7986210D+05	.1001D+03
2	.9829546D+04	.5011D+02
3	.8717763D+04	.5567D+02
4	.8717763D+04	.5567D+02
5	.8717763D+04	.5567D+02

DEPENDENT VARIABLE IS H2O

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	111563.786	1	111563.786
RESIDUAL	8717.763	35	249.079

TOTAL	120281.556	36
CORRECTED	8717.763	35

RAW R-SQUARED (1-RESIDUAL/TOTAL) = 0.928
CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) = 0.000

PARAMETER	ESTIMATE	A.S.E.	LOWER	<95%> UPPER
MEAN	55.669	2.630	50.329	61.009

```
THE FOLLOWING RESULTS ARE FOR:
       NEWPHASE$     = Saltcake

ITERATION        LOSS         PARAMETER VALUES
    0          .1381434D+05  .5567D+02
    1          .3071746D+04  .3419D+02
    2          .2132811D+04  .2569D+02
    3          .2132811D+04  .2569D+02

      DEPENDENT VARIABLE IS      H2O

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

   SOURCE   SUM-OF-SQUARES   DF  MEAN-SQUARE

REGRESSION       8581.231     1     8581.231
  RESIDUAL       2132.811    12      177.734

            TOTAL      10714.042   13
        CORRECTED       2132.811   12

      RAW R-SQUARED (1-RESIDUAL/TOTAL)      =        0.801
 CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) =        0.000

PARAMETER        ESTIMATE       A.S.E.        LOWER  <95%> UPPER
   MEAN            25.692        3.698       17.636        33.749

      THE FOLLOWING RESULTS ARE FOR:
             NEWPHASE$     = Sludge

ITERATION        LOSS         PARAMETER VALUES
    0          .5999766D+05  .2569D+02
    1          .2472763D+05  .4321D+02
    2          .2472763D+05  .4321D+02
    3          .2472763D+05  .4321D+02

      DEPENDENT VARIABLE IS      H2O

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

   SOURCE   SUM-OF-SQUARES   DF  MEAN-SQUARE

REGRESSION     214667.701     1   214667.701
  RESIDUAL      24727.626   114      216.909

            TOTAL     239395.341  115
        CORRECTED      24727.626  114

      RAW R-SQUARED (1-RESIDUAL/TOTAL)      =        0.897
 CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) =        0.000

PARAMETER        ESTIMATE       A.S.E.        LOWER  <95%> UPPER
   MEAN            43.205        1.373       40.484        45.926
```

B.3.3 Density

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Liquid

ITERATION	LOSS	PARAMETER VALUES
0	.7099059D+02	.1000D+00
1	.1665353D+01	.1370D+01
2	.1665353D+01	.1370D+01

DEPENDENT VARIABLE IS GML

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	80.675	1	80.675
RESIDUAL	1.665	42	0.040
TOTAL	82.340	43	
CORRECTED	1.665	42	

RAW R-SQUARED (1-RESIDUAL/TOTAL) = 0.980
CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) = 0.000

PARAMETER	ESTIMATE	A.S.E.	LOWER	<95%> UPPER
MEAN	1.370	0.030	1.308	1.431

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Saltcake

ITERATION	LOSS	PARAMETER VALUES
0	.9981444D+00	.1370D+01
1	.4720395D+00	.1567D+01
2	.4352000D+00	.1635D+01
3	.4352000D+00	.1635D+01
4	.4352000D+00	.1635D+01

DEPENDENT VARIABLE IS GML

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	21.386	1	21.386
RESIDUAL	0.435	7	0.062
TOTAL	21.821	8	
CORRECTED	0.435	7	

RAW R-SQUARED (1-RESIDUAL/TOTAL) = 0.980
CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) = 0.000

PARAMETER	ESTIMATE	A.S.E.	LOWER	<95%> UPPER
MEAN	1.635	0.088	1.427	1.843

THE FOLLOWING RESULTS ARE FOR:
NEWPHASE$ = Sludge

ITERATION	LOSS	PARAMETER VALUES
0	.5870643D+01	.1635D+01
1	.3277329D+01	.1451D+01
2	.3277329D+01	.1451D+01

DEPENDENT VARIABLE IS GML

MISSING DATA OR ESTIMATES REDUCED DEGREES OF FREEDOM

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	162.223	1	162.223
RESIDUAL	3.277	76	0.043
TOTAL	165.501	77	
CORRECTED	3.277	76	

RAW R-SQUARED (1-RESIDUAL/TOTAL) = 0.980
CORRECTED R-SQUARED (1-RESIDUAL/CORRECTED) = 0.000

PARAMETER	ESTIMATE	A.S.E.	LOWER	<95%> UPPER
MEAN	1.451	0.024	1.404	1.499

Appendix C

Descriptive Tank Statistics by Sort on Radioactive Waste Type

Appendix C - Nominal Characteristics of SORWT Groups by Phase

C.1 - Liquid Phase

TUE 9/20/94 2:54:05 PM D:\TOC\TOCLOCK.SYS

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = I

TOTAL OBSERVATIONS: 29

	TOCUGG	LOGTOC	GML	H20
N OF CASES	28	28	15	10
MINIMUM	288.288	2.460	1.020	41.650
MAXIMUM	59611.679	4.775	1.970	96.480
RANGE	59323.391	2.316	0.950	54.830
MEAN	8823.890	3.651	1.387	60.675
VARIANCE	.193944E+09	0.241	0.080	376.214
STANDARD DEV	13926.374	0.491	0.282	19.396
STD. ERROR	2631.837	0.093	0.073	6.134
SKEWNESS(G1)	2.813	0.228	0.549	1.073
KURTOSIS(G2)	6.897	0.739	-0.487	-0.288
SUM	247068.906	102.214	20.811	606.750
C.V.	1.578	0.135	0.203	0.320
MEDIAN	3924.915	3.594	1.400	54.820

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = II

TOTAL OBSERVATIONS: 8

	TOCUGG	LOGTOC	GML	H20
N OF CASES	8	8	1	1
MINIMUM	800.000	2.903	1.388	45.800
MAXIMUM	6718.310	3.827	1.388	45.800
RANGE	5918.310	0.924	0.000	0.000
MEAN	3593.400	3.480	1.388	45.800
VARIANCE	4118714.242	0.088	.	.
STANDARD DEV	2029.462	0.296	.	.
STD. ERROR	717.523	0.105	.	.
SKEWNESS(G1)	0.354	-0.727	.	.
KURTOSIS(G2)	-1.053	-0.105	.	.
SUM	28747.203	27.843	1.388	45.800
C.V.	0.565	0.085	0.000	0.000
MEDIAN	2961.095	3.471	1.388	45.800

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = III

TOTAL OBSERVATIONS: 6

	TOCUGG	LOGTOC	GML	H20
N OF CASES	6	6	0	0
MINIMUM	1882.759	3.275	.	.
MAXIMUM	3080.000	3.489	.	.
RANGE	1197.241	0.214	.	.
MEAN	2247.935	3.346	.	.
VARIANCE	184810.449	0.006	.	.
STANDARD DEV	429.896	0.076	.	.
STD. ERROR	175.504	0.031	.	.
SKEWNESS(G1)	1.392	1.226	.	.
KURTOSIS(G2)	0.530	0.281	.	.
SUM	13487.610	20.076	.	.
C.V.	0.191	0.023	.	.
MEDIAN	2142.709	3.331	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = IV

TOTAL OBSERVATIONS: 7

	TOCUGG	LOGTOC	GML	H20
N OF CASES	7	7	0	0
MINIMUM	2238.806	3.350	.	.
MAXIMUM	7820.268	3.893	.	.
RANGE	5581.462	0.543	.	.
MEAN	5336.777	3.690	.	.
VARIANCE	4780033.163	0.041	.	.
STANDARD DEV	2186.329	0.203	.	.
STD. ERROR	826.355	0.077	.	.
SKEWNESS(G1)	-0.123	-0.543	.	.
KURTOSIS(G2)	-1.461	-0.964	.	.
SUM	37357.437	25.831	.	.
C.V.	0.410	0.055	.	.
MEDIAN	4717.557	3.674	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = IX

TOTAL OBSERVATIONS: 35

	TOCUGG	LOGTOC	GML	H20
N OF CASES	35	34	19	17
MINIMUM	0.000	3.094	1.280	34.860
MAXIMUM	33640.624	4.527	1.685	65.860
RANGE	33640.624	1.432	0.405	31.000
MEAN	8078.484	3.824	1.422	48.864
VARIANCE	.437084E+08	0.083	0.010	53.267
STANDARD DEV	6611.229	0.288	0.100	7.298
STD. ERROR	1117.502	0.049	0.023	1.770
SKEWNESS(G1)	2.344	0.062	0.646	0.832
KURTOSIS(G2)	6.211	0.684	0.588	1.134
SUM	282746.935	130.031	27.013	830.690
C.V.	0.818	0.075	0.071	0.149
MEDIAN	6387.097	3.810	1.430	48.260

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = VI

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	1	1
MINIMUM	3870.968	3.588	1.240	69.320
MAXIMUM	3870.968	3.588	1.240	69.320
RANGE	0.000	0.000	0.000	0.000
MEAN	3870.968	3.588	1.240	69.320
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	3870.968	3.588	1.240	69.320
C.V.	0.000	0.000	0.000	0.000
MEDIAN	3870.968	3.588	1.240	69.320

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = VII

TOTAL OBSERVATIONS: 4

	TOCUGG	LOGTOC	GML	H20
N OF CASES	4	4	1	1
MINIMUM	251.969	2.401	1.306	61.910
MAXIMUM	99600.000	4.998	1.306	61.910
RANGE	99348.031	2.597	0.000	0.000
MEAN	34266.050	3.704	1.306	61.910
VARIANCE	.218544E+10	1.611	.	.
STANDARD DEV	46748.733	1.269	.	.
STD. ERROR	23374.367	0.635	.	.
SKEWNESS(G1)	0.760	-0.004	.	.
KURTOSIS(G2)	-1.062	-1.844	.	.
SUM	137064.199	14.815	1.306	61.910
C.V.	1.364	0.343	0.000	0.000
MEDIAN	18606.115	3.707	1.306	61.910

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = VIII

TOTAL OBSERVATIONS: 8

	TOCUGG	LOGTOC	GML	H20
N OF CASES	6	6	3	4
MINIMUM	354.000	2.549	1.020	34.000
MAXIMUM	2000.000	3.301	1.200	95.100
RANGE	1646.000	0.752	0.180	61.100
MEAN	1005.667	2.943	1.110	71.425
VARIANCE	325824.667	0.065	0.008	699.329
STANDARD DEV	570.811	0.255	0.090	26.445
STD. ERROR	233.032	0.104	0.052	13.222
SKEWNESS(G1)	0.780	-0.179	-0.000	-0.783
KURTOSIS(G2)	-0.344	-0.677	-1.500	-0.916
SUM	6034.000	17.657	3.330	285.700
C.V.	0.568	0.087	0.081	0.370
MEDIAN	890.000	2.941	1.110	78.300

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XI

TOTAL OBSERVATIONS: 2

	TOCUGG	LOGTOC	GML	H20
N OF CASES	2	2	0	0
MINIMUM	526.667	2.722	.	.
MAXIMUM	2213.115	3.345	.	.
RANGE	1686.448	0.623	.	.
MEAN	1369.891	3.033	.	.
VARIANCE	1422053.576	0.194	.	.
STANDARD DEV	1192.499	0.441	.	.
STD. ERROR	843.224	0.312	.	.
SKEWNESS(G1)	0.000	0.000	.	.
KURTOSIS(G2)	-2.000	-2.000	.	.
SUM	2739.781	6.067	.	.
C.V.	0.871	0.145	.	.
MEDIAN	1369.891	3.033	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XII

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	3108.333	3.493	.	.
MAXIMUM	3108.333	3.493	.	.
RANGE	0.000	0.000	.	.
MEAN	3108.333	3.493	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	3108.333	3.493	.	.
C.V.	0.000	0.000	.	.
MEDIAN	3108.333	3.493	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XIV

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	1900.000	3.279	.	.
MAXIMUM	1900.000	3.279	.	.
RANGE	0.000	0.000	.	.
MEAN	1900.000	3.279	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	1900.000	3.279	.	.
C.V.	0.000	0.000	.	.
MEDIAN	1900.000	3.279	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XIX

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	500.000	2.699	.	.
MAXIMUM	500.000	2.699	.	.
RANGE	0.000	0.000	.	.
MEAN	500.000	2.699	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	500.000	2.699	.	.
C.V.	0.000	0.000	.	.
MEDIAN	500.000	2.699	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXI

TOTAL OBSERVATIONS: 5

	TOCUGG	LOGTOC	GML	H20
N OF CASES	5	5	0	0
MINIMUM	1418.440	3.152	.	.
MAXIMUM	3700.000	3.568	.	.
RANGE	2281.560	0.416	.	.
MEAN	2645.745	3.388	.	.
VARIANCE	1164456.562	0.040	.	.
STANDARD DEV	1079.100	0.200	.	.
STD. ERROR	482.588	0.090	.	.
SKEWNESS(G1)	-0.316	-0.377	.	.
KURTOSIS(G2)	-1.767	-1.778	.	.
SUM	13228.725	16.941	.	.
C.V.	0.408	0.059	.	.
MEDIAN	3153.846	3.499	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXII

TOTAL OBSERVATIONS: 7

	TOCUGG	LOGTOC	GML	H20
N OF CASES	7	7	0	0
MINIMUM	174.472	2.242	.	.
MAXIMUM	32200.000	4.508	.	.
RANGE	32025.528	2.266	.	.
MEAN	6196.312	3.272	.	.
VARIANCE	.134986E+09	0.498	.	.
STANDARD DEV	11618.347	0.706	.	.
STD. ERROR	4391.323	0.267	.	.
SKEWNESS(G1)	1.938	0.452	.	.
KURTOSIS(G2)	1.919	-0.233	.	.
SUM	43374.182	22.906	.	.
C.V.	1.875	0.216	.	.
MEDIAN	1402.851	3.147	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXIII

TOTAL OBSERVATIONS: 7

	TOCUGG	LOGTOC	GML	H20
N OF CASES	7	7	0	0
MINIMUM	1900.000	3.279	.	.
MAXIMUM	7018.868	3.846	.	.
RANGE	5118.868	0.568	.	.
MEAN	5810.702	3.733	.	.
VARIANCE	3363846.910	0.042	.	.
STANDARD DEV	1834.079	0.205	.	.
STD. ERROR	693.217	0.077	.	.
SKEWNESS(G1)	-1.590	-1.858	.	.
KURTOSIS(G2)	1.124	1.748	.	.
SUM	40674.915	26.128	.	.
C.V.	0.316	0.055	.	.
MEDIAN	6639.640	3.822	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXIV

TOTAL OBSERVATIONS: 2

	TOCUGG	LOGTOC	GML	H20
N OF CASES	2	2	0	0
MINIMUM	3958.333	3.598	.	.
MAXIMUM	4087.591	3.611	.	.
RANGE	129.258	0.014	.	.
MEAN	4022.962	3.604	.	.
VARIANCE	8353.803	0.000	.	.
STANDARD DEV	91.399	0.010	.	.
STD. ERROR	64.629	0.007	.	.
SKEWNESS(G1)	0.000	0.000	.	.
KURTOSIS(G2)	-2.000	-2.000	.	.
SUM	8045.925	7.209	.	.
C.V.	0.023	0.003	.	.
MEDIAN	4022.962	3.604	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXVI

TOTAL OBSERVATIONS: 3

	TOCUGG	LOGTOC	GML	H20
N OF CASES	3	3	0	0
MINIMUM	2680.412	3.428	.	.
MAXIMUM	2768.000	3.442	.	.
RANGE	87.588	0.014	.	.
MEAN	2722.804	3.435	.	.
VARIANCE	1923.796	0.000	.	.
STANDARD DEV	43.861	0.007	.	.
STD. ERROR	25.323	0.004	.	.
SKEWNESS(G1)	0.117	0.107	.	.
KURTOSIS(G2)	-1.500	-1.500	.	.
SUM	8168.412	10.305	.	.
C.V.	0.016	0.002	.	.
MEDIAN	2720.000	3.435	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXVII

TOTAL OBSERVATIONS: 4

	TOCUGG	LOGTOC	GML	H20
N OF CASES	4	4	0	0
MINIMUM	1564.516	3.194	.	.
MAXIMUM	2042.373	3.310	.	.
RANGE	477.857	0.116	.	.
MEAN	1726.138	3.235	.	.
VARIANCE	47399.328	0.003	.	.
STANDARD DEV	217.714	0.052	.	.
STD. ERROR	108.857	0.026	.	.
SKEWNESS(G1)	0.952	0.909	.	.
KURTOSIS(G2)	-0.842	-0.880	.	.
SUM	6904.552	12.939	.	.
C.V.	0.126	0.016	.	.
MEDIAN	1648.832	3.217	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXVIII

TOTAL OBSERVATIONS: 7

	TOCUGG	LOGTOC	GML	H20
N OF CASES	7	7	0	0
MINIMUM	3300.000	3.519	.	.
MAXIMUM	28300.000	4.452	.	.
RANGE	25000.000	0.933	.	.
MEAN	14577.003	4.069	.	.
VARIANCE	.967001E+08	0.106	.	.
STANDARD DEV	9833.623	0.325	.	.
STD. ERROR	3716.760	0.123	.	.
SKEWNESS(G1)	0.588	-0.313	.	.
KURTOSIS(G2)	-1.198	-0.669	.	.
SUM	102039.023	28.482	.	.
C.V.	0.675	0.080	.	.
MEDIAN	10351.967	4.015	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXA

TOTAL OBSERVATIONS: 2

	TOCUGG	LOGTOC	GML	H20
N OF CASES	2	2	2	2
MINIMUM	95.588	1.980	1.350	51.500
MAXIMUM	4177.778	3.621	1.360	52.400
RANGE	4082.190	1.641	0.010	0.900
MEAN	2136.683	2.801	1.355	51.950
VARIANCE	8332135.730	1.346	0.000	0.405
STANDARD DEV	2886.544	1.160	0.007	0.636
STD. ERROR	2041.095	0.820	0.005	0.450
SKEWNESS(G1)	0.000	0.000	0.000	0.000
KURTOSIS(G2)	-2.000	-2.000	-2.000	-2.000
SUM	4273.366	5.601	2.710	103.900
C.V.	1.351	0.414	0.005	0.012
MEDIAN	2136.683	2.801	1.355	51.950

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXB

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	2782.609	3.444	.	.
MAXIMUM	2782.609	3.444	.	.
RANGE	0.000	0.000	.	.
MEAN	2782.609	3.444	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	2782.609	3.444	.	.
C.V.	0.000	0.000	.	.
MEDIAN	2782.609	3.444	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXC

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	8728.814	3.941	.	.
MAXIMUM	8728.814	3.941	.	.
RANGE	0.000	0.000	.	.
MEAN	8728.814	3.941	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	8728.814	3.941	.	.
C.V.	0.000	0.000	.	.
MEDIAN	8728.814	3.941	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXD

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	2333.333	3.368	.	.
MAXIMUM	2333.333	3.368	.	.
RANGE	0.000	0.000	.	.
MEAN	2333.333	3.368	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	2333.333	3.368	.	.
C.V.	0.000	0.000	.	.
MEDIAN	2333.333	3.368	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXE

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	903.509	2.956	.	.
MAXIMUM	903.509	2.956	.	.
RANGE	0.000	0.000	.	.
MEAN	903.509	2.956	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	903.509	2.956	.	.
C.V.	0.000	0.000	.	.
MEDIAN	903.509	2.956	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXF

TOTAL OBSERVATIONS: 2

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	1	0
MINIMUM	492.000	2.692	1.100	.
MAXIMUM	492.000	2.692	1.100	.
RANGE	0.000	0.000	0.000	.
MEAN	492.000	2.692	1.100	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	492.000	2.692	1.100	.
C.V.	0.000	0.000	0.000	.
MEDIAN	492.000	2.692	1.100	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXG

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	184.162	2.265	.	.
MAXIMUM	184.162	2.265	.	.
RANGE	0.000	0.000	.	.
MEAN	184.162	2.265	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	184.162	2.265	.	.
C.V.	0.000	0.000	.	.
MEDIAN	184.162	2.265	.	.

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THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = II

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	327.000	2.515	.	.
MAXIMUM	327.000	2.515	.	.
RANGE	0.000	0.000	.	.
MEAN	327.000	2.515	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	327.000	2.515	.	.
C.V.	0.000	0.000	.	.
MEDIAN	327.000	2.515	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = IV

TOTAL OBSERVATIONS: 5

	TOCUGG	LOGTOC	GML	H20
N OF CASES	5	5	0	0
MINIMUM	1780.000	3.250	.	.
MAXIMUM	4400.000	3.643	.	.
RANGE	2620.000	0.393	.	.
MEAN	2890.000	3.431	.	.
VARIANCE	1372400.000	0.032	.	.
STANDARD DEV	1171.495	0.180	.	.
STD. ERROR	523.908	0.080	.	.
SKEWNESS(G1)	0.249	0.053	.	.
KURTOSIS(G2)	-1.556	-1.661	.	.
SUM	14450.000	17.157	.	.
C.V.	0.405	0.052	.	.
MEDIAN	2710.000	3.433	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = IX

TOTAL OBSERVATIONS: 5

	TOCUGG	LOGTOC	GML	H20
N OF CASES	5	5	4	4
MINIMUM	7200.000	3.857	1.340	29.400
MAXIMUM	8040.000	3.905	1.660	40.920
RANGE	840.000	0.048	0.320	11.520
MEAN	7703.739	3.886	1.468	37.680
VARIANCE	108091.645	0.000	0.023	30.592
STANDARD DEV	328.773	0.019	0.153	5.531
STD. ERROR	147.032	0.008	0.076	2.766
SKEWNESS(G1)	-0.609	-0.654	0.388	-1.141
KURTOSIS(G2)	-0.850	-0.805	-1.496	-0.677
SUM	38518.696	19.432	5.870	150.720
C.V.	0.043	0.005	0.104	0.147
MEDIAN	7730.000	3.888	1.435	40.200

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = V

TOTAL OBSERVATIONS: 27

	TOCUGG	LOGTOC	GML	H20
N OF CASES	17	13	3	3
MINIMUM	30.000	3.005	1.140	40.000
MAXIMUM	33200.000	4.521	1.250	76.000
RANGE	33170.000	1.516	0.110	36.000
MEAN	7759.762	3.685	1.213	52.000
VARIANCE	.139631E+09	0.259	0.004	432.000
STANDARD DEV	11816.568	0.508	0.064	20.785
STD. ERROR	2865.939	0.141	0.037	12.000
SKEWNESS(G1)	1.634	0.770	-0.707	0.707
KURTOSIS(G2)	0.782	-0.748	-1.500	-1.500
SUM	131915.948	47.910	3.640	156.000
C.V.	1.523	0.138	0.052	0.400
MEDIAN	2300.000	3.562	1.250	40.000

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = VI

TOTAL OBSERVATIONS: 13

	TOCUGG	LOGTOC	GML	H20
N OF CASES	11	11	0	0
MINIMUM	1090.000	3.037	.	.
MAXIMUM	2380.000	3.377	.	.
RANGE	1290.000	0.339	.	.
MEAN	1669.091	3.199	.	.
VARIANCE	327629.091	0.023	.	.
STANDARD DEV	572.389	0.150	.	.
STD. ERROR	172.582	0.045	.	.
SKEWNESS(G1)	0.198	0.132	.	.
KURTOSIS(G2)	-1.834	-1.840	.	.
SUM	18360.000	35.187	.	.
C.V.	0.343	0.047	.	.
MEDIAN	1300.000	3.114	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = VII

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	1	1
MINIMUM	6862.857	3.837	1.400	8.700
MAXIMUM	6862.857	3.837	1.400	8.700
RANGE	0.000	0.000	0.000	0.000
MEAN	6862.857	3.837	1.400	8.700
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	6862.857	3.837	1.400	8.700
C.V.	0.000	0.000	0.000	0.000
MEDIAN	6862.857	3.837	1.400	8.700

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = VIII

TOTAL OBSERVATIONS: 49

	TOCUGG	LOGTOC	GML	H20
N OF CASES	38	38	10	31
MINIMUM	265.000	2.423	1.190	5.760
MAXIMUM	8200.000	3.914	1.710	95.600
RANGE	7935.000	1.491	0.520	89.840
MEAN	2293.158	3.228	1.513	48.318
VARIANCE	2515155.974	0.152	0.020	285.071
STANDARD DEV	1585.924	0.389	0.143	16.884
STD. ERROR	257.271	0.063	0.045	3.032
SKEWNESS(G1)	1.231	-0.792	-0.785	-0.123
KURTOSIS(G2)	3.158	-0.364	1.006	1.690
SUM	87140.000	122.669	15.130	1497.860
C.V.	0.692	0.121	0.095	0.349
MEDIAN	2450.000	3.388	1.510	51.400

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = X

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	0	0	0	0
MINIMUM	.	.	.	.
MAXIMUM	.	.	.	.
RANGE	.	.	.	.
MEAN	.	.	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	.	.	.	.
C.V.	.	.	.	.
MEDIAN	.	.	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XI

TOTAL OBSERVATIONS: 32

	TOCUGG	LOGTOC	GML	H20
N OF CASES	14	14	2	14
MINIMUM	500.000	2.699	1.440	34.600
MAXIMUM	1090.000	3.037	1.440	64.500
RANGE	590.000	0.338	0.000	29.900
MEAN	717.929	2.837	1.440	49.464
VARIANCE	51523.764	0.017	0.000	76.712
STANDARD DEV	226.988	0.130	0.000	8.759
STD. ERROR	60.665	0.035	0.000	2.341
SKEWNESS(G1)	0.678	0.492	0.000	0.111
KURTOSIS(G2)	-1.111	-1.327	0.000	-0.669
SUM	10051.000	39.722	2.880	692.500
C.V.	0.316	0.046	0.000	0.177
MEDIAN	625.000	2.793	1.440	50.450

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XII

TOTAL OBSERVATIONS: 3

	TOCUGG	LOGTOC	GML	H20
N OF CASES	3	3	2	2
MINIMUM	1220.000	3.086	1.380	57.470
MAXIMUM	10150.000	4.006	1.380	57.470
RANGE	8930.000	0.920	0.000	0.000
MEAN	6766.667	3.681	1.380	57.470
VARIANCE	.234462E+08	0.266	0.000	0.000
STANDARD DEV	4842.131	0.516	0.000	0.000
STD. ERROR	2795.606	0.298	0.000	0.000
SKEWNESS(G1)	-0.657	-0.698	0.000	0.000
KURTOSIS(G2)	-1.500	-1.500	0.000	0.000
SUM	20300.000	11.044	2.760	114.940
C.V.	0.716	0.140	0.000	0.000
MEDIAN	8930.000	3.951	1.380	57.470

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XIII

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	2070.690	3.316	.	.
MAXIMUM	2070.690	3.316	.	.
RANGE	0.000	0.000	.	.
MEAN	2070.690	3.316	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	2070.690	3.316	.	.
C.V.	0.000	0.000	.	.
MEDIAN	2070.690	3.316	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XIV

TOTAL OBSERVATIONS: 8

	TOCUGG	LOGTOC	GML	H20
N OF CASES	8	8	0	0
MINIMUM	2000.000	3.301	.	.
MAXIMUM	4120.000	3.615	.	.
RANGE	2120.000	0.314	.	.
MEAN	3118.750	3.480	.	.
VARIANCE	630926.786	0.015	.	.
STANDARD DEV	794.309	0.121	.	.
STD. ERROR	280.831	0.043	.	.
SKEWNESS(G1)	-0.374	-0.622	.	.
KURTOSIS(G2)	-1.144	-1.036	.	.
SUM	24950.000	27.841	.	.
C.V.	0.255	0.035	.	.
MEDIAN	3150.000	3.498	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XV

TOTAL OBSERVATIONS: 48

	TOCUGG	LOGTOC	GML	H20
N OF CASES	22	22	0	0
MINIMUM	298.000	2.474	.	.
MAXIMUM	1620.000	3.210	.	.
RANGE	1322.000	0.735	.	.
MEAN	633.500	2.729	.	.
VARIANCE	183095.595	0.058	.	.
STANDARD DEV	427.897	0.241	.	.
STD. ERROR	91.228	0.051	.	.
SKEWNESS(G1)	1.402	0.918	.	.
KURTOSIS(G2)	0.473	-0.459	.	.
SUM	13937.000	60.036	.	.
C.V.	0.675	0.088	.	.
MEDIAN	447.500	2.651	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XVII

TOTAL OBSERVATIONS: 52

	TOCUGG	LOGTOC	GML	H20
N OF CASES	32	32	40	44
MINIMUM	352.000	2.547	1.000	3.080
MAXIMUM	6750.000	3.829	1.930	47.700
RANGE	6398.000	1.283	0.930	44.620
MEAN	1136.031	2.921	1.450	35.609
VARIANCE	2122882.547	0.077	0.063	161.565
STANDARD DEV	1457.012	0.278	0.250	12.711
STD. ERROR	257.566	0.049	0.040	1.916
SKEWNESS(G1)	3.412	1.998	0.060	-1.729
KURTOSIS(G2)	10.159	4.554	-0.660	1.593
SUM	36353.000	93.487	57.980	1566.800
C.V.	1.283	0.095	0.173	0.357
MEDIAN	737.000	2.867	1.460	39.150

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXIII

TOTAL OBSERVATIONS: 4

	TOCUGG	LOGTOC	GML	H20
N OF CASES	4	4	0	0
MINIMUM	800.000	2.903	.	.
MAXIMUM	4620.000	3.665	.	.
RANGE	3820.000	0.762	.	.
MEAN	2987.500	3.395	.	.
VARIANCE	2803558.333	0.118	.	.
STANDARD DEV	1674.383	0.343	.	.
STD. ERROR	837.191	0.172	.	.
SKEWNESS(G1)	-0.443	-0.870	.	.
KURTOSIS(G2)	-1.263	-0.916	.	.
SUM	11950.000	13.579	.	.
C.V.	0.560	0.101	.	.
MEDIAN	3265.000	3.506	.	.

SORWTGRO$ = XXIV

TOTAL OBSERVATIONS: 3

	TOCUGG	LOGTOC	GML	H20
N OF CASES	3	3	2	2
MINIMUM	169.000	2.228	1.450	51.900
MAXIMUM	700.000	2.845	1.450	51.900
RANGE	531.000	0.617	0.000	0.000
MEAN	489.667	2.617	1.450	51.900
VARIANCE	79620.333	0.115	0.000	0.000
STANDARD DEV	282.171	0.339	0.000	0.000
STD. ERROR	162.911	0.196	0.000	0.000
SKEWNESS(G1)	-0.609	-0.676	0.000	0.000
KURTOSIS(G2)	-1.500	-1.500	0.000	0.000
SUM	1469.000	7.851	2.900	103.800
C.V.	0.576	0.129	0.000	0.000
MEDIAN	600.000	2.778	1.450	51.900

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXV

TOTAL OBSERVATIONS: 7

	TOCUGG	LOGTOC	GML	H20
N OF CASES	7	5	3	3
MINIMUM	780.000	2.906	1.310	35.500
MAXIMUM	2480.000	3.394	1.860	39.200
RANGE	1700.000	0.489	0.550	3.700
MEAN	1552.143	3.181	1.493	37.967
VARIANCE	502565.476	0.052	0.101	4.563
STANDARD DEV	708.919	0.228	0.318	2.136
STD. ERROR	267.946	0.102	0.183	1.233
SKEWNESS(G1)	-0.008	-0.377	0.707	-0.707
KURTOSIS(G2)	-1.664	-1.745	-1.500	-1.500
SUM	10865.000	15.904	4.480	113.900
C.V.	0.457	0.072	0.213	0.056
MEDIAN	1700.000	3.320	1.310	39.200

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXVII

TOTAL OBSERVATIONS: 18

	TOCUGG	LOGTOC	GML	H20
N OF CASES	18	18	4	5
MINIMUM	40.000	1.602	1.410	52.670
MAXIMUM	28000.000	4.447	1.500	53.000
RANGE	27960.000	2.845	0.090	0.330
MEAN	3795.778	3.207	1.433	52.772
VARIANCE	.469005E+08	0.349	0.002	0.017
STANDARD DEV	6848.395	0.591	0.045	0.130
STD. ERROR	1614.182	0.139	0.023	0.058
SKEWNESS(G1)	2.867	-0.425	1.155	1.342
KURTOSIS(G2)	7.140	2.092	-0.667	0.078
SUM	68324.000	57.721	5.730	263.860
C.V.	1.804	0.184	0.031	0.002
MEDIAN	1720.000	3.232	1.410	52.730

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXA

TOTAL OBSERVATIONS: 2

	TOCUGG	LOGTOC	GML	H20
N OF CASES	2	2	2	2
MINIMUM	6230.000	3.794	1.540	43.000
MAXIMUM	7150.000	3.854	1.560	45.100
RANGE	920.000	0.060	0.020	2.100
MEAN	6690.000	3.824	1.550	44.050
VARIANCE	423200.000	0.002	0.000	2.205
STANDARD DEV	650.538	0.042	0.014	1.485
STD. ERROR	460.000	0.030	0.010	1.050
SKEWNESS(G1)	0.000	0.000	0.000	0.000
KURTOSIS(G2)	-2.000	-2.000	-2.000	-2.000
SUM	13380.000	7.649	3.100	88.100
C.V.	0.097	0.011	0.009	0.034
MEDIAN	6690.000	3.824	1.550	44.050

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXC

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	4410.000	3.644	.	.
MAXIMUM	4410.000	3.644	.	.
RANGE	0.000	0.000	.	.
MEAN	4410.000	3.644	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	4410.000	3.644	.	.
C.V.	0.000	0.000	.	.
MEDIAN	4410.000	3.644	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXD

TOTAL OBSERVATIONS: 1

	TOCUGG	LOGTOC	GML	H20
N OF CASES	1	1	0	0
MINIMUM	999.000	3.000	.	.
MAXIMUM	999.000	3.000	.	.
RANGE	0.000	0.000	.	.
MEAN	999.000	3.000	.	.
VARIANCE	.	.	.	.
STANDARD DEV	.	.	.	.
STD. ERROR	.	.	.	.
SKEWNESS(G1)	.	.	.	.
KURTOSIS(G2)	.	.	.	.
SUM	999.000	3.000	.	.
C.V.	0.000	0.000	.	.
MEDIAN	999.000	3.000	.	.

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXF

TOTAL OBSERVATIONS: 17

	TOCUGG	LOGTOC	GML	H20
N OF CASES	6	6	2	2
MINIMUM	100.000	2.000	1.307	62.200
MAXIMUM	2900.000	3.462	1.307	62.200
RANGE	2800.000	1.462	0.000	0.000
MEAN	901.667	2.761	1.307	62.200
VARIANCE	1005416.667	0.217	0.000	0.000
STANDARD DEV	1002.705	0.466	0.000	0.000
STD. ERROR	409.352	0.190	0.000	0.000
SKEWNESS(G1)	1.593	-0.201	0.000	0.000
KURTOSIS(G2)	0.895	-0.066	0.000	0.000
SUM	5410.000	16.564	2.614	124.400
C.V.	1.112	0.169	0.000	0.000
MEDIAN	550.000	2.740	1.307	62.200

THE FOLLOWING RESULTS ARE FOR:
SORWTGRO$ = XXXG

TOTAL OBSERVATIONS: 2

	TOCUGG	LOGTOC	GML	H20
N OF CASES	2	0	2	2
MINIMUM	20.000	.	1.640	43.500
MAXIMUM	20.000	.	1.640	43.500
RANGE	0.000	.	0.000	0.000
MEAN	20.000	.	1.640	43.500
VARIANCE	0.000	.	0.000	0.000
STANDARD DEV	0.000	.	0.000	0.000
STD. ERROR	0.000	.	0.000	0.000
SKEWNESS(G1)	0.000	.	0.000	0.000
KURTOSIS(G2)	0.000	.	0.000	0.000
SUM	40.000	.	3.280	87.000
C.V.	0.000	.	0.000	0.000
MEDIAN	20.000	.	1.640	43.500

Appendix D

Description of Sort on Radioactive Waste Types

Appendix D. Description of SORWT Waste Type Groups

To further elaborate on the results of the SORWT Model, brief descriptions of each of the waste type groups predicted by the model have been developed.

Group I - R, EB

This waste type group is the most significant group predicted by SORWT in terms of number of tanks and total waste volume. The 22 tanks within this group contain 10,465,000 gallons of total waste--8,884,000 gallons of salt cake and 1,440,000 gallons of sludge. All 22 Group I tanks can be found in three different 200 West Area Tank Farms--S, SX, and TX Farms. These tanks typically received a large amount of high-level REDOX waste (R) during the 1950s. This waste is most likely responsible for the sludge accumulation in these tanks. These tanks also received large amounts of evaporator bottoms (EB), usually from the 242-S Evaporator in the early 1970s. This super-saturated, high-nitrate waste cooled in the SSTs and formed an extremely hard salt cake. Although the processing history of these tanks between the addition of the R in the 1950s and the EB in the 1970s differs slightly, it is believed that these two waste types predominantly dictate the physical and chemical characteristics of the waste. Some of the tanks in this group have no reported sludge accumulation, probably because poor measurements were taken before salt cake formation. Once the salt cake crystallized in a tank, it became impossible to measure the volume of sludge. Because of the extreme hardness of the salt cake, there are technical obstacles that prevent core sampling any of these tanks at this time.

Group II - EB, 1C

This 10-tank group contains approximately 4,634,000 gallons of waste. The vast majority of this waste--4,594,000 gallons--is salt cake. All but two of these tanks are located in the TX Tank Farm; one is located in B Tank Farm. These tanks are characterized as having received large quantities of EB, mainly from the 242-T Evaporator. They also received modest quantities of 1C waste. Tank B-105 received 1C before the EB, which might explain the limited sludge accumulation in this tank that is not exhibited by the others. Once again, the hard salt cake formation raises significant technical issues that must be solved before sampling these tanks.

Group III - TBP-F, EB-ITS

This group contains 10 tanks and is the second most significant in terms of number of tanks and total waste volume. The tanks in this group hold 3,980,00 gallons of waste. The majority of this waste--3,344,000 gallons--is presumed to be salt cake. However, these tanks also contain substantial amounts of sludge. All 10 of these tanks, which originally held metal waste (MW) from the bismuth phosphate process, can be found in the BY Farm located in the 200 East Area. They were completely sluiced out in the early 1950s, and no significant amounts of MW remain in the tanks, so they are not considered by the SORWT model. After sluicing, these tanks received tributyl phosphate (TBP) ferrocyanide-scavenged waste from U Plant, which is probably responsible for the sludge buildup. During the late 1960s and early 1970s, these tanks were connected to the in-tank solidification (ITS-2) loops. This process, in which one tank in the loop was used as an in-tank evaporator and the rest of the tanks as liquid holders, concentrated the waste and reduced the liquid volume, resulting in salt cake formation. Because of high concentrations of ferrocyanide in these tanks and the hardness of the salt cake, there are significant safety and technical difficulties associated with sampling this waste type group.

Group IV - TBP, CW

This nine-tank group, located almost entirely in BX Tank Farm, contains 687,000 gallons of waste. Nearly all of the contents of this group is sludge. Salt cake has only been observed in one tank (BX-105), and the 3,000 gallons of salt cake is due to a small transfer of EB into that particular tank. These tanks were originally filled with MW in the 1940s. In the early 1950s they were sluiced of their contents to provide room for TBP waste. Additions of this waste type began in the mid-1950s. The addition of cladding waste began in the mid-1960s. The various other transfers that occurred in these tanks should not affect the characteristic of the waste significantly relative to the primary and secondary wastes. Tanks BX-105 and Tank BX-106 were core sampled previously and provide insight into their chemical composition. Additional sampling of these tanks poses no technical or safety issues.

Group V - 224

This eight tank group represents 280,000 gallons of waste. The majority of the waste is sludge; no salt cake formation has been observed in these tanks. All eight tanks are 55,000-gallon, 200 Series tanks located in B and T Tank Farms. These tanks received 224 waste exclusively. In light of the singularity of the waste type introduced into these tanks and the similarity of process history (i.e., the near absence of any intertank transfers), the composition among tanks of this group should be very uniform. There are no safety or technical issues prohibiting sampling of these tanks.

Group VI - R

Group V is a seven-tank group containing high-level R exclusively. These tanks hold 892,000 gallons of waste. The majority of waste--888,000 gallons--is sludge, no salt cake formation has been observed. Five of these tanks can be found in the SX Tank Farm, and all are located in the 200 West Area. There are no safety or technical sampling issues associated with the majority of this group; the exception is Tank SX-109, which is on the watch list as a gas-generating tank. Sampling and analysis of S-104 has been performed; assessment of the data is currently pending and will contribute greatly to the existing body of characterization knowledge. The analysis of this tank significantly aids in characterizing this particular seven-tank group and also several other groups containing large amounts of R-type waste. It is of interest to note that R forms sludge without any further waste volume reduction processes.

Group VII - EB, R

Group VII consists of five 200 West Area tanks, mostly from U Farm. These tanks contain 2,037,000 gallons of waste, the vast majority of which is salt cake. The tanks were filled with MW in the 1940s, but were completely sluiced out in the early 1950s. Large quantities of high-level R were introduced into these tanks and allowed to remain there for many years. In the early 1970s, large volumes of R supernate were transferred from the tanks and replaced with EB from the 242-S Evaporator, which caused a salt cake to form in the majority of the tanks. The small amount of sludge that accumulated in these tanks is probably due to the R present before the EB. Because of the hardness of the salt cake, these tanks offer technical difficulties that must be solved before sampling. These tanks should be very similar to Group I tanks and differ from them mainly in the ratios of R to EB. These tanks might be so similar that they can be included with that group; however, these similarities can only be verified by core samples.

Group VIII - TBP-F, 1C

This five-tank group contains 478,000 gallons of waste, and approximately 465,000 gallons of that is sludge. No salt cake has been observed in these tanks. The four C Farm tanks were used as the primary settling tanks during the In-Farm Scavenging campaign during the 1950s, and they were originally filled with 1C waste in the 1940s. The supernate was transferred out of the tanks to make room for the TBP-scavenged waste that was allowed to settle. These two wastes formed the vast majority of the solids located in these two tanks. The other tank in this group (T-107) has a processing history similar to that of the rest of this group, except that it received its ferrocyanide-scavenged TBP waste from the U Plant scavenge test. These two TBP-F wastes may be slightly different. All of these tanks are on the watch list because of their ferrocyanide content.

Group IX - DSSF, NCPLX

This four-tank group contains a total of 2,113,000 gallons of waste. Salt cake comprises 1,717,000 gallons of this waste, while 387,000 gallons are sludge. These tanks initially received either plutonium-uranium extraction (PUREX) high-activity, neutralized acid waste (P) or B Plant high-level waste (B). However, all of these tanks were sluiced of their contents in 1976. The waste types added to these tanks after sluicing were DSSF and noncomplexed waste, which are generic terms describing the potential for further processing of the waste instead of the original source of the waste. Because these terms are so general, little can be determined about the homogeneity of the waste in this group. In fact, one tank in this group contains only sludge, while the rest contain mostly salt cake. Although the total volume of this group is highly significant, the uncertainty of the waste types in these tanks makes this group less important.

Group X - EB, CW

These four tanks (all in U Farm) contain 1,755,000 gallons of waste. Salt cake comprises 1,520,000 gallons of this waste, while sludge comprises only 124,000 gallons. These tanks were filled with MW in the late 1940s or early 1950s; in the mid- to late 1950s, the MW was sluiced from the tank to provide room for CW. The supernatant portions of the CW were flushed out of the tanks in the early 1970s by various liquid transfers. In the mid- to late 1970s, large amounts of EB from the REDOX evaporator and the 242-S Evaporator were added to these tanks. (The EB are responsible for the salt cake formation.) All of the tanks are on the watch list for either gas generation or acetate contents; therefore, there are safety and technical issues pertaining to sampling this tank.

Group XI - 1C, TBP

This five-tank group contains 715,000 gallons of waste, the vast majority of which is sludge. Even though this group transcends four different tank farms in both the 200 East and West Areas, these tanks have very similar processing histories. They were filled with 1C waste in the 1940s. A portion of this volume was drained in the early 1950s, and the tanks began receiving TBP waste. The solids volume that was measured at this time did not accumulate further during the rest of these tanks' histories. The additional transfers were mostly liquid in nature and had little effect on the sludge volume. No salt cake has been observed in these tanks, even though a small amount of EB was introduced into T-108 (apparently not enough to catalyze crystallization).

Group XII - 1C, EB

This four-tank group of B and BX Farm tanks contains 553,000 gallons of waste, nearly all of which is sludge. These tanks all received 1C waste in the late 1940s and early 1950s. In the mid-1950s the supernatant portion of the 1C waste was transferred from the tanks and they began receiving EB waste. The EB must not have been very concentrated, because the characteristic salt cake did not form. All of these tanks also received appreciable amounts of CW in the 1960s.

Group XIII - HS

This four-tank group of 55,000-gallons, 200-Series tanks is located in the C Tank Farm. These tanks received MW in the 1940s but were sluiced in the early 1950s. After sluicing, these tanks received waste only from the Hot Semiworks. The majority of this waste was removed from these tanks in the late 1960s and early 1970s; the total waste remaining is only 11,000 gallons. This minor volume designates this tank group as being insignificant compared with other groups or even single tanks.

Group XIV - 2C, 224

This three-tank group contains 904,000 gallons of total waste. The majority of which, 892,000 gallons, is sludge. These SSTs were connected in a three-tank cascade. The processing history of these tanks is very similar. They all received 2C waste in the 1940s and early 1950s until the cascade was full. In 1952, they began receiving 224 waste, and the excess supernate was cascaded to a crib. The first two tanks in the cascade (T-110 and T-111) received only these two wastes. Tank T-112 received dilute decontamination waste (DW) and a mixture of liquid wastes in the late 1960s and early 1970s. These transfers would not have significantly altered the characteristics of the waste relative to the first two waste types. Tank T-110 is on the watch list for gas generation.

Group XV - 2C, 5-6

This three-tank group, located in the B Tank Farm of the 200 East Area, contains 516,000 gallons of waste. The majority of waste--511,000 gallons--is sludge. These three tanks also were connected in a three-tank cascade. The cascade was originally filled with 2C waste in the 1940s, cribbed in 1950, and refilled with 2C waste. The continuous overflow in B-112 was cribbed. The cascade began receiving 5-6 waste from B Plant in 1952 and fission products in 1963. The cascade received B Plant low-level waste (BL) and ion exchange waste (IX) in the late 1960s and early 1970s, but these were mostly liquid in nature and are not considered significant contributors to the physical and chemical characteristics of the solids remaining in the tank, relative to the previous three wastes. Tank B-112 received EB and recycle from the ITS loop. This EB-ITS waste did not cause the formation of salt cake typically exhibited by this waste form. Seven cores from Tank B-110 were obtained in 1989 and 1990 as part of Phase 1A and 1B of the Waste Characterization Program. These core samples underwent extensive analytical testing and provide excellent data for physical and chemical characterization of this group.

Group XVI - R, RIX

Group XVI consists of three SX farm tanks, which hold 368,000 gallons of waste. All of this waste is sludge. These tanks received REDOX high-level waste after they were released to operations in the mid- to late 1950s. These tanks received only R until the early 1970s, when RIX was introduced. In the mid- to late 1970s, these tanks received minor quantities of various waste types, mostly liquid in nature. Tank SX-114 received a small amount of EB waste but not in sufficient concentrations to catalyze crystal formation.

Group XVII - 1C, CW

This three-tank group contains 305,000 gallons of waste, the majority of which--303,000 gallons is sludge. No salt cake has been observed in these tanks. These tanks initially received 2C waste in 1947. The cascade was then filled with 1C waste from 1948 until 1955 and then began receiving CW in large quantities. A large amount of solids accumulated from these three waste types. In the 1970s, a number of different liquid wastes were transferred through these three tanks, but these wastes did not affect the solids content to the degree of the previous three wastes.

Group XVIII - CW, EB

This three-tank group contains 204,000 gallons of waste, the vast majority of which is sludge; but 10,000 gallons of salt cake has formed in one of the tanks. These tanks also were connected in a three-tank cascade. The cascade was originally filled with MW in the 1940s and, as was typical with MW, sluiced out in the early 1950s. The cascade then began receiving evaporated cladding waste (CW). Apparently the CW was not concentrated to the point of salt cake formation because of the limited amount of this waste form observed in the tank. The cascade also received unconcentrated CW in the 1960s. These tanks received BL and IX in the 1970s, but these predominantly liquid wastes are not considered to have contributed significantly to the solids formation in the tank.

Group XIX - CW, MIX

This three-tank cascade currently holds 192,000 gallons of waste, most of which (145,000 gallons) is sludge. No salt cake has been observed in these tanks. The cascade was initially filled with MW in the 1940s and emptied in 1951. Tank T-101 received a small amount of TBP-scavenged waste from a plant pilot test of the process; this waste was then flushed from the tank. The cascade was again filled with MW in 1955 but emptied the following year. Tank T-101 is listed as a ferrocyanide tank, but this waste was removed, and the tank was effectively sluiced twice afterwards, so it is unlikely that any appreciable amount of ferrocyanide remains. The empty cascade was then filled with CW beginning in 1957. This single waste type remained until the early 1970s, when a mixture of liquid waste was flushed through this cascade. The liquid wastes are considered to have had only a limited impact on the characteristics of the solid waste remaining in the tank.

Group XX - CW

These three 200-Series tanks from U Farm contain only 13,000 gallons of waste. The history of these tanks indicates that the predominant waste type is CW. The insignificant amount of waste contained in these tanks makes this group virtually irrelevant.

Group XXI-TBP,EB-ITS

This pair of BY Farm tanks contains a combined total of 907,000 gallons of waste. The majority of this waste--771,000 gallons--is salt cake, while 87,000 gallons is sludge. Both tanks received MW before 1955 but were sluiced of their contents. Beginning in 1955, both tanks received TBP waste. Both tanks received quantities of CW in the early 1960s and were connected to an ITS loop in the late 1960s. Tank BY-102 belonged to ITS-1, and BY-109 belonged to ITS-2. Despite being connected to different ITS loops (and operated by different principles), the solids remaining in the two tanks can be expected to be relatively similar. These tanks both received TBP and CW before ITS. The hardness of the salt cake will prohibit sampling until a hard cake sampler is developed.

Group XXII - EB, TBP

This pair of TX Farm tanks contains 481,000 gallons of waste, and all of it is salt cake. The processing history of these two tanks is slightly different; however, the major waste types are the same. Tank TX-108 received MW in the late 1940s, which was sluiced out in the early 1950s. A minor quantity of R waste was introduced into this tank in the mid-1950s. On top of this R heel, a substantial amount of TBP waste was added. Tank TX-118 received 1C waste in the early 1950s. Most of this waste type was transferred out of the tank, and the TBP waste was added on top of this heel. In the late 1960s and early 1970s, significant quantities of EB from the 242-T Evaporator were added to both of these tanks, causing salt cake formation. Tank TX-118 is on the watch list because of transfers of ferrocyanide-scavenged waste.

Group XXIII - SRS, SL-WASH

Both of the tanks in this group are located in C Farm and contain 429,000 gallons of waste, the bulk of which--372,000 gallons--is sludge. This group received MW in the 1940s, but this waste was removed from these tanks in the early 1950s. The tanks were then filled with TBP waste. During the 1960s, these tanks received various quantities of P and CW. In the early 1970s, these tanks received large quantities of a highly mixed liquid waste, which was later transferred out. This liquid probably did not greatly affect the solids. In 1976 and 1977, these tanks received a large transfer of strontium leached sludge (SRS), which greatly added to the solids volume in the tank. These tanks also received a large quantity of high-level solids as suspended particulates from a sludge wasting campaign in the AR vault. These suspended solids settled in the tanks and are considered a significant contributor to the solids characteristics and high radioactivity. Both of the tanks were previously core sampled. Tank C-103 is on the watch list as an "organic" tank, because it has a separate organic liquid layer. Tank C-106 is on the same list as a "high heat" tank.

Group XXIV - 1C, EB-ITS

The two BX Farm tanks contain 429,000 gallons of waste--152,000 gallons of salt cake and 257,000 gallons of sludge. Both of these tanks received 1C waste in the late 1940s and early 1950s. Tank BX-110 received some EB in the mid- to late 1950s. Both tanks received CW and IX wastes in the 1960s before receiving EB from one of the ITS loops. The physical forms of the waste, as reported by Hanlon (1990), are very different for these two tanks. The majority of BX-110 is sludge, and only 9,000 gallons ($\approx$ 3¼ in.) is salt cake. Tank BX-111 exhibits a greater amount of salt cake (143,000 gallons) than sludge (68,000 gallons). These differences in the reported physical form might result from imprecise sludge measurements during the early history of these tanks, or it might be the consequence of real differences between the tanks. This question cannot be answered until one or both of the tanks has been core sampled.

Group XXV - TBP

This pair of TY Farm tanks contains 248,000 gallons of waste, all of which is sludge. These tanks had a very simple processing history; they received only one waste type--TBP. These tanks have been previously core sampled.

Group XXVI - TBP, EB

This pair of 200 West Area tanks hold a total of 215,000 gallons of waste, all of which is sludge. Although these tanks received an appreciable amount of evaporative bottoms (EB), the characteristic salt cake did not form.

Group XXVII - TBP, 1C

This pair of ferrocyanide tanks is located in TY Farm and contains 208,000 gallons of waste. The majority of waste--205,000 gallons--is sludge. No salt cake has been observed in these tanks. These tanks received TBP waste in the early 1950s, then during the mid-1950s, the supernate was transferred out and ferrocyanide-scavenged 1C waste placed on top of the TBP heel. These two waste types caused significant solids accumulation. During the 1960s and 1970s, a variety of waste was transferred into and out of these tanks. The solids accumulation did not substantially change during these transfers; therefore, these later transfers are not considered to have affected the physical and chemical characteristics of the solids already present in the tank. Both of these tanks have been previously sampled.

Group XVIII - CCPLX, DSSF

This group of two AX Farm tanks contains 151,000 gallons of waste, consisting of 40,000 gallons of salt cake and 9,000 gallons of sludge, with the remainder supernatant liquid. Both of these tanks were sluiced of their contents in 1977, leaving a 6,000-gallon heel of P waste. The tanks then received wastes identified by unspecific waste names like concentrated complexed waste (CCPLX), double-shell slurry feed (DSSF), and evaporator feed (EVAP). Using such broad waste identifiers--based on suitability for further treatment, not waste source--precludes grouping by radioactive waste type.

Group XXIX - R, DIA

This pair of assumed leaker tanks contains 148,000 gallons of waste, all of which is sludge. Tank U-104 initially received MW in the 1940s, but this waste type was sluiced from the tank in the early 1950s. Tank SX-113 was not released to operation until the mid-1950s. Both tanks exclusively received R after 1958. Diatomaceous earth was added to both tanks after they were declared leakers, in an attempt to prevent the escape of liquid waste.

Group XXX - Solitary Tanks (Ungrouped)

Of the 149 SSTs, only 19 did not fall into groups based on radioactive waste types. These 19 tanks transcend almost every waste type and every tank farm in the 200 East and West Areas. They contain mostly sludge. These ungrouped tanks represent 2,461,000 gallons of waste--69,000 gallons of salt cake and 2,377,000 gallons of sludge. Several of these tanks have significant quantities of waste in them, and others have relatively little waste. Many of these tanks might also be related to some of the groups previously described.

Appendix E

Analytical Techniques for Percent Water and TOC Measurements

Appendix E

Measurement of Total Organic Carbon-

Measurement of TOC may be broken down into two major steps: sample preparation and analyte measurement. Both of these steps affect how much of the actual TOC is detected.

TOC Sample Preparation

TOC measurements are made on the soluble TOC fractions. Because TOC is not directly measured from solid phase waste tank waste samples, these are leached or digested first. The three preparation methods that have typically been used are water digestion, acid digestion, persulfate digestion, and fusion. Note that using a different preparatory method on the same sample will result in different TOC values measured even with the same analytical test.

Direct Measurement - No sample preparation i needed if the sample is liquid.

Water Digestion- The sample is leached with water to dissolve the water soluble portion of the waste into solution. Any non-water soluble portion is consequently not measured.

Acid Digestion - A variety of different acids have been used for acid digestion. Some, such as nitric acid have additional properties. Inorganic carbon is converted to carbon dioxide in this step ,thus removed from the sample.

Persulfate: The solid sample is dissolved/digested in hot (+90° C) to liberate carbonate (inorganic carbon). Subsequently, potassium persulfate is added to convert the organic carbon to carbon dioxide, which is measured coulometrically.

Fusion - This is a multistep process. First, the potassium hydroxide is used to digest the waste sample; this step effectively decomposes the organic chemicals. The material from this step is then acidified.

Analytic Technique for Measurement of TOC

Combustion - This process is typically used with acid digestion preparation to first remove the inorganic carbon. First, the samples are oxidized to convert the organic forms of carbon to carbon dioxide. The combustion temperature is selected to oxidize the organic carbon components. The combustion products are swept through a catalyst and scrubbed to insure complete oxidation of the carbon to carbon dioxide. The quantity of carbon dioxide in the gas phase is measured as the indicator of TOC.

Chemical Oxidation/Coulometric - Samples are oxidized with potassium persulfate or potassium permaganate followed by coulometric measurement of the carbon dioxide gas, to indicate sample TOC.

Analytic Measurement of Percent Water

Weight percent water may be measured in a number of ways. In many cases,. the data reports do not specify the method used. The two methods used in the majority of cases are described below.

Thermalgravimetric (TGA) analysis- A small sample, (10 mg) is heated at a constant rate while the weight loss is recorded. The loss in the region around 30 to 140 Celsius is attributed to water loss. Often the value reported is for a larger temperature range and is attributed to loss of both free water and waters of hydration.

Gravimetric analysis - A weighed sample is heated at a constant temperature (120 degrees celsius) until no further loss occurs. All weight loss is attributed to water. The weight percent water obtained by this method is consistently lower than by the TGA method.

Appendix F

Laboratory Measurement Sample Dataset

TOC and Moisture Measurements

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
A101	4218	Liquid	NA	NA	1.2083	NA	9/22/80
A101	4378	Liquid	NA	NA	0.8864	NA	9/22/80
A101	4493	Sludge	NA	NA	0.7609	NA	9/22/80
A101	7879	Liquid	1.4	NA	0.3840	NA	10/10/83
A101	7898	Liquid	1.7	NA	0.6530	NA	10/11/83
A101	RAT-A101-1	Liquid	1.3	45.42	0.8201	1.50	10/13/80
A101	RAT-A101-2	Liquid	1.3	45.49	0.9021	1.65	10/13/80
A101	RAT-A101-3	Liquid	1.5	46.10	1.3218	2.45	10/22/80
A101	RAT-A101-4A	Salt	1.6	42.37	0.5764	1.00	11/10/80
A101	RAT-A101-4B	Liquid	1.4	48.26	0.5109	0.99	11/10/80
A101	RAT-A101-5A	Salt	1.9	34.19	0.8438	1.28	11/11/80
A101	RAT-A101-5B	Liquid	1.5	34.86	0.6855	1.05	11/11/80
A101	RAT-A101-7B	Liquid	1.4	50.25	1.4514	2.92	11/2/79
A101	T-2691	Liquid	1.3	63.92	2.7439	7.60	8/22/80
A101	T-2692	Liquid	1.3	65.86	3.3641	9.85	8/22/80
A102	91DX00XX	Liquid	1.5	48.90	0.5303	1.04	3/6/86
A102	91XC00XX	Sludge	1.5	40.92	0.7200	1.22	3/6/86
A102	92DX00XX	Liquid	1.5	49.60	0.5086	1.01	3/8/86
A102	92XC00XX	Sludge	1.7	29.40	0.7940	1.12	3/8/86
A102	R-4656	Liquid	NA	NA	0.9610	NA	3/14/89
A102	RAT-A102-1	Liquid	NA	NA	0.1243	NA	12/23/80
A102	RAT-A102-3	Liquid	NA	NA	0.2114	NA	10/23/79
A102	RAT-A102-4	Liquid	NA	NA	0.3500	NA	3/14/79
A102	T-1243	Liquid	NA	NA	0.0000	NA	7/17/80
A102	T-1244	Liquid	NA	NA	0.3508	NA	7/17/80
A102	T-1245	Liquid	NA	NA	0.2925	NA	7/17/80
A102	T-2404	Liquid	NA	NA	0.4932	NA	8/4/80
A102	T-2405	Liquid	NA	NA	0.5288	NA	8/4/80
A102	T-6176	Liquid	NA	NA	0.4020	NA	12/8/79
A102	RAT-A102-2	Liquid	NA	41.46	NA	NA	12/23/80
A103	B1XC00XX	Sludge	1.3	40.10	0.8040	1.34	3/26/86
A103	B1XD00XX	Liquid	1.5	50.90	0.5664	1.15	3/26/86
A103	B2XC00XX	Sludge	1.4	40.30	0.7730	1.29	4/3/86
A103	B2XD00XX	Liquid	1.5	51.00	0.5581	1.14	4/3/86
A103	RAT-A103-5	Liquid	NA	NA	0.3531	NA	10/2/80
A103	RAT-A103-6	Liquid	NA	NA	1.0028	NA	9/22/80
A103	RAT-A103-7	Liquid	NA	53.00	1.1016	NA	8/2/79
A103	T-8951	Liquid	NA	NA	0.6387	NA	3/19/80
A106	A1XC00XX	Sludge	1.6	45.10	0.6230	1.13	3/11/86
A106	A1XD00XX	Liquid	1.4	52.40	0.4178	0.88	3/11/86

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
A106	A2XC00XX	Sludge	1.5	43.00	0.7150	1.25	3/13/86
A106	A2XD00XX	Liquid	1.4	51.50	0.0096	0.02	3/13/86
AX101	5169	Liquid	1.4	42.46	0.5348	0.93	10/7/80
AX101	RAT-AX101-2	Liquid	1.4	44.66	1.1029	1.99	11/11/80
AX101	RAT-AX101-3	Liquid	1.4	43.40	1.0784	1.91	11/11/80
AX101	T-3102	Liquid	1.4	51.79	0.8997	1.87	8/19/80
AX101	T-3103	Liquid	1.5	47.82	0.7540	1.44	8/19/80
AX102	7701	Liquid	NA	NA	0.9104	NA	2/22/80
AX102	RAT-AX102-1	Liquid	NA	NA	1.4465	NA	1/23/80
AX102	RAT-AX102-3	Liquid	NA	NA	2.8300	NA	11/14/88
AX103	4516	Liquid	NA	NA	2.8000	NA	9/24/80
AX103	7595	Liquid	NA	NA	0.3300	NA	3/14/79
AX103	S-1423	Liquid	NA	47.02	0.8518	NA	8/6/79
AX103	S-1439	Liquid	NA	NA	1.0352	NA	8/6/79
B110	C10COMP1	Sludge	NA	NA	0.0421	NA	2/2/91
B110	C10COMP1	Sludge	NA	NA	0.0463	NA	2/3/91
B110	C16COMP1	Sludge	NA	NA	0.0407	NA	2/6/91
B110	C16COMP1	Sludge	NA	NA	0.0457	NA	2/7/91
B110	C1COMP1	Sludge	NA	NA	0.0398	NA	1/1/91
B110	C1COMP1	Sludge	NA	NA	0.0439	NA	1/2/91
B110	C2COMP1	Sludge	NA	NA	0.0312	NA	1/9/91
B110	C2COMP1	Sludge	NA	NA	0.0328	NA	1/10/91
B110	C3COMP1	Sludge	NA	NA	0.0300	NA	1/13/91
B110	C3COMP1	Sludge	NA	NA	0.0358	NA	1/14/91
B110	C4COMP1	Sludge	NA	NA	0.0396	NA	1/25/91
B110	C4COMP1	Sludge	NA	NA	0.0456	NA	1/26/91
B110	C9COMP1	Sludge	NA	NA	0.0298	NA	1/29/91
B110	C9COMP1	Sludge	NA	NA	0.0304	NA	1/30/91
B111	C29COMP1	Sludge	NA	NA	0.0680	NA	9/3/91
B111	C29COMP1	Sludge	NA	NA	0.0820	NA	9/4/91
B111	C29COMP2	Sludge	NA	NA	0.0560	NA	9/1/91
B111	C29COMP2	Sludge	NA	NA	0.0670	NA	9/2/91
B111	C32COMP1	Sludge	NA	NA	0.1590	NA	9/7/91
B111	C32COMP1	Sludge	NA	NA	0.1620	NA	9/8/91
B111	C32COMP2	Sludge	NA	NA	0.1320	NA	9/5/91
B111	C32COMP2	Sludge	NA	NA	0.1340	NA	9/6/91
B201	1898	Sludge	NA	72.20	NA	NA	12/4/78
B202	2509	Sludge	1.3	NA	0.0030	0.01	12/4/78
B202	2509	Sludge	1.3	NA	0.0060	0.01	12/4/78
B202	2509	Sludge	NA	40.00	NA	NA	12/4/78

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
B202	2509	Sludge	NA	71.00	NA	NA	12/4/78
B202	C24COMP1	Sludge	NA	NA	0.1900	NA	6/15/91
B202	C24COMP1	Sludge	NA	NA	0.2200	NA	6/14/91
B202	C24COMP1	Sludge	NA	NA	3.1400	NA	6/12/91
B202	C24COMP1	Sludge	NA	NA	3.3200	NA	6/13/91
B202	C24COMP2	Sludge	NA	NA	0.1900	NA	6/9/91
B202	C24COMP2	Sludge	NA	NA	0.2200	NA	6/10/91
B202	C24COMP2	Sludge	NA	NA	0.3770	NA	6/11/91
B202	C25COMP1	Sludge	NA	NA	0.3360	NA	6/19/91
B202	C25COMP1	Sludge	NA	NA	0.3800	NA	6/21/91
B202	C25COMP2	Sludge	NA	NA	0.2100	NA	6/17/91
B202	C25COMP2	Sludge	NA	NA	0.2300	NA	6/18/91
B202	C25COMP2	Sludge	NA	NA	0.3650	NA	6/20/91
B202	composite	Sludge	NA	NA	3.2300	NA	4/10/90
B204	1974	Sludge	1.1	NA	0.1011	0.42	12/4/78
B204	1974	Sludge	NA	76.00	NA	NA	12/4/78
B204	1974	Sludge	NA	76.00	NA	NA	12/4/78
BX104	71XCOOXX	Sludge	NA	NA	0.1780	NA	2/14/86
BX104	71XD00XX	Liquid	NA	NA	0.4718	NA	2/14/86
BX104	72XCOOXX	Sludge	NA	NA	0.2710	NA	2/26/86
BX104	72XD00XX	Liquid	NA	NA	0.4645	NA	2/26/86
BX104	RAT-BX104-1	Sludge	NA	NA	0.4400	NA	4/27/90
BX104	T-1785	Liquid	NA	NA	0.7820	NA	8/14/80
BX104	T-9510	Liquid	NA	87.97	NA	NA	
BX105	81XCOOXX	Sludge	NA	NA	0.3760	NA	3/3/86
BX105	81XD00XX	Liquid	NA	NA	0.7070	NA	3/3/86
BX105	82XCOOXX	Sludge	NA	NA	0.1800	NA	3/4/86
BX105	82XD00XX	Liquid	NA	NA	0.7558	NA	3/4/86
BX105	T-8924	Liquid	NA	76.88	NA	NA	
BX106	R-6037	Liquid	NA	NA	0.3308	NA	3/16/90
BX106	T-3855	Liquid	NA	57.80	NA	NA	4/21/85
BX107	C40COMP1	Sludge	NA	NA	0.0700	NA	8/4/94
BX107	C40COMP1	Sludge	NA	NA	0.0700	NA	8/5/94
BX107	C40COMP1	Sludge	NA	56.45	NA	NA	8/1/94
BX107	C40COMP2	Sludge	NA	NA	0.0550	NA	8/2/94
BX107	C40COMP2	Sludge	NA	NA	0.0550	NA	8/3/94
BX107	C40COMP2	Sludge	NA	63.50	NA	NA	8/1/94
BX107	C40S2	Sludge	NA	44.35	NA	NA	8/1/94
BX107	C40S4	Sludge	NA	51.30	NA	NA	8/1/94
BX107	C40S5	Sludge	NA	52.85	NA	NA	8/1/94

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
BX107	C40S6	Sludge	NA	46.10	NA	NA	8/1/94
BX107	C40S7	Sludge	NA	49.60	0.0550	0.11	8/1/94
BX107	C41COMP1	Sludge	NA	NA	0.0500	NA	8/13/94
BX107	C41COMP1	Sludge	NA	NA	0.0550	NA	8/14/94
BX107	C41COMP1	Sludge	NA	55.95	NA	NA	8/13/94
BX107	C41COMP1	Sludge	NA	64.50	NA	NA	8/6/94
BX107	C41COMP2	Sludge	NA	NA	0.0897	0.19	8/7/94
BX107	C41COMP2	Sludge	NA	NA	0.0796	NA	8/15/94
BX107	C41COMP2	Sludge	NA	52.50	NA	NA	8/7/94
BX107	C41S2	Sludge	NA	44.35	NA	NA	8/8/94
BX107	C41S3	Sludge	NA	53.30	NA	NA	8/9/94
BX107	C41S5	Sludge	NA	37.90	NA	NA	8/10/94
BX107	C41S6	Sludge	NA	41.20	NA	NA	8/11/94
BX107	C41S7	Sludge	NA	34.60	NA	NA	8/12/94
BX107	R-6038	Liquid	NA	NA	0.2213	NA	3/16/90
BX107	RAT-BX107-2	Salt	1.5	53.70	0.0730	0.16	9/18/80
BX109	R-6039	Liquid	NA	59.80	0.2239	NA	3/16/90
BX110	1010-C	Sludge	NA	NA	0.0700	NA	2/14/79
BX110	R-6040	Liquid	NA	NA	0.4088	NA	3/16/90
BX110	RAT-BX110-1	Sludge	1.5	51.90	0.0169	0.04	9/18/80
BX111	R-6041	Liquid	NA	53.30	0.3958	NA	3/16/90
BX111	RAT-BX110-2	Sludge	1.5	51.90	0.0600	0.12	9/18/80
BX112	R-6042	Liquid	NA	NA	0.3108	NA	3/16/90
BX112	RAT-BX112-1	Sludge	NA	NA	1.0150	NA	6/11/79
BX112	Table3.0.0-1	Sludge	1.4	57.47	0.1220	0.29	9/18/80
BX112	Table3.0.0-2	Sludge	1.4	57.47	0.8930	2.10	9/18/80
BY102	R-8081	Liquid	NA	54.00	0.1549	NA	6/3/91
BY102	R-8091	Liquid	NA	NA	0.1418	NA	6/3/91
BY103	R-8088	Liquid	NA	52.00	0.1883	NA	6/3/91
BY104	riser10b/auger	Salt	NA	NA	1.1000	1.29	5/2/93
BY104	riser10b/auger	Salt	NA	NA	1.0750	1.29	5/4/93
BY104	riser10b/auger	Salt	NA	15.00	NA	NA	5/2/93
BY104	riser10b/auger	Salt	NA	15.00	NA	NA	5/4/93
BY104	riser5/auger	Salt	NA	NA	0.6000	0.72	5/3/93
BY104	riser5/auger	Salt	NA	NA	0.9100	1.08	5/1/93
BY104	riser5/auger	Salt	NA	17.00	NA	NA	5/3/93
BY104	riser5/auger	Salt	NA	17.00	NA	NA	5/1/93
BY104	RAT-BY-104	Sludge	NA	28.30	NA	NA	2/6/76
BY105	R-8082	Liquid	NA	NA	0.2217	NA	6/3/91
BY105	R-8092	Liquid	NA	54.00	0.1993	NA	6/3/91

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
BY106	R-8083	Liquid	NA	NA	0.2247	NA	6/3/91
BY106	R-8093	Liquid	NA	50.00	0.2068	NA	6/3/91
BY107	S-1450	Liquid	NA	NA	0.3080	NA	7/16/79
BY109		Liquid	NA	NA	0.3700	NA	1/1/91
BY109	R-8084	Liquid	NA	58.00	0.3154	NA	6/3/91
BY109	R-8094	Liquid	NA	NA	0.3407	NA	6/3/91
C102	R-8089	Liquid	NA	NA	0.2783	NA	6/3/91
C103	F1XCOOXX	Sludge	NA	NA	0.3900	NA	5/7/86
C103	F1XD00XX	Liquid	NA	NA	0.6640	NA	5/7/86
C103	F2XCOOXX	Sludge	NA	NA	0.2630	NA	5/14/86
C103	F2XD00XX	Liquid	NA	NA	0.6944	NA	5/14/86
C103	R-8108	Liquid	NA	NA	0.6972	NA	6/3/91
C103	R-8109	Liquid	NA	NA	0.7019	NA	6/3/91
C103	riser2	Liquid	NA	NA	0.5700	NA	5/19/87
C103	riser8	Liquid	NA	NA	0.5500	NA	5/19/87
C103	T-9661	Liquid	NA	87.78	NA	NA	5/20/75
C104	D1XCOOXX	Sludge	NA	NA	0.4410	NA	4/15/86
C104	D1XDOOXX	Liquid	NA	NA	0.8729	NA	4/15/86
C104	T-225	Liquid	NA	76.64	NA	NA	12/1/85
C105	C1XCOOXX	Sludge	NA	NA	0.0999	NA	4/11/86
C105	C1XD00XX	Liquid	NA	NA	0.2333	NA	4/11/86
C106		Sludge	NA	NA	0.0800	NA	5/8/87
C106	G1XCOOXX	Sludge	NA	NA	0.4620	NA	5/19/86
C106	g1xdxxxx	Liquid	NA	NA	0.1900	NA	5/19/86
C107	R-8046	Liquid	NA	NA	0.0904	NA	6/3/91
C109	C47COMP1	Sludge	NA	NA	0.3000	NA	11/1/91
C109	C47COMP1	Sludge	NA	NA	0.3300	NA	11/2/91
C109	C48COMP1	Sludge	NA	NA	0.2900	NA	11/3/91
C109	C48COMP1	Sludge	NA	NA	0.3000	NA	11/4/91
C109	C49COMP1	Sludge	NA	NA	0.2100	NA	11/5/91
C109	C49COMP1	Sludge	NA	NA	0.2800	NA	11/6/91
C109	T-5490	Liquid	NA	73.54	NA	NA	
C110	C37COMP1	Sludge	NA	NA	0.0500	NA	8/1/92
C110	C37COMP1	Sludge	NA	NA	0.1050	NA	8/2/92
C110	C37COMP2	Sludge	NA	NA	0.1090	NA	8/3/92
C110	C37COMP2	Sludge	NA	NA	0.1090	NA	8/4/92
C110	C39COMP1	Sludge	NA	NA	0.0528	NA	8/7/92
C110	R-8087	Liquid	NA	75.00	0.0527	NA	6/3/91
C112	C34COMP	Sludge	NA	38.00	0.3100	0.50	9/1/93
C112	C34COMP	Liquid	NA	NA	0.2000	NA	9/1/93

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
C112	C34COMP1	Sludge	NA	NA	0.3050	NA	9/3/93
C112	C34COMP1	Sludge	NA	NA	0.3200	NA	9/5/93
C112	C34S1D	Sludge	NA	45.00	0.4900	0.89	9/7/93
C112	C34S2B	Sludge	NA	53.00	0.3000	0.64	9/2/93
C112	C34S2C	Sludge	NA	58.00	0.3100	0.74	9/4/93
C112	C34S2D	Sludge	NA	52.00	0.4000	0.83	9/6/93
C112	C35COMP	Liquid	NA	34.00	0.1200	0.18	9/1/93
C112	C35COMP1	Sludge	NA	NA	0.2200	NA	9/8/93
C112	C35COMP1	Sludge	NA	NA	0.2900	NA	9/10/93
C112	C35S2D	Sludge	NA	34.00	0.2600	0.38	9/9/93
C112	C36COMP	Sludge	NA	45.00	0.1400	0.25	9/11/93
C112	C36S1C	Sludge	NA	49.00	0.8200	1.61	9/17/93
C112	C36S1D	Sludge	NA	58.00	0.3900	1.17	9/16/93
C112	C36S2A	Sludge	NA	57.00	0.3900	0.91	9/15/93
C112	C36S2B	Sludge	NA	41.00	0.2700	0.46	9/13/93
C112	C36S2C	Sludge	NA	64.00	0.2900	0.81	9/14/93
C112	C36S2D	Sludge	NA	56.00	0.2300	0.52	9/12/93
C112	T-6185	Liquid	NA	78.49	NA	NA	11/20/74
C201	T-3421	Sludge	NA	68.00	0.2071	NA	12/4/78
S102		Liquid	NA	NA	2.4200	NA	1/1/80
S102	RAT-S102-3	Liquid	1.3	61.74	0.8433	2.20	1/31/79
S102	T-7300	Liquid	NA	60.48	NA	NA	10/14/74
S104	C42COMP1	Sludge	NA	NA	0.2190	NA	8/3/92
S104	C42COMP1	Sludge	NA	NA	0.2380	NA	8/4/92
S104	C42COMP2	Sludge	NA	NA	0.1300	NA	8/1/92
S104	C42COMP2	Sludge	NA	NA	0.1300	NA	8/2/92
S104	C43COMP1	Sludge	NA	NA	0.2060	NA	8/7/92
S104	C43COMP1	Sludge	NA	NA	0.2350	NA	8/8/92
S104	C43COMP2	Sludge	NA	NA	0.1090	NA	8/5/92
S104	C43COMP2	Sludge	NA	NA	0.1190	NA	8/6/92
S104	C44COMP2	Sludge	NA	NA	0.1100	NA	8/9/92
S104	C44COMP2	Sludge	NA	NA	0.1100	NA	8/10/92
S104	Composite	Sludge	NA	NA	0.2300	NA	4/13/90
S107	3148	Liquid	1.2	53.70	0.9768	2.11	9/7/78
S107	4251	Liquid	NA	NA	0.2623	NA	10/16/78
S107	RAT-S107-1	Liquid	NA	NA	0.3100	NA	4/27/90
S107	RAT-S107-2	Liquid	1.4	41.65	0.6289	1.08	9/22/80
S107	RAT-S107-3	Liquid	1.1	55.94	0.7473	1.70	9/22/80
S109		Salt	NA	NA	0.0470	NA	1/1/80
S110		Liquid	NA	NA	1.2500	NA	1/1/80

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
S111	1001-C	Salt	1.3	10.70	0.1016	0.11	8/25/78
S111	1003/1004-C	Salt	1.9	17.40	1.5400	1.86	8/25/78
S111	1009-C	Liquid	1.5	44.60	0.4247	0.77	8/25/78
S111	1009-C	Salt	1.4	18.10	2.3353	2.85	8/25/78
S111	RAT-S111-1	Liquid	NA	NA	0.2800	NA	4/27/90
S111	RAT-S111-3	Liquid	NA	NA	0.4000	NA	8/25/78
SX101	E-00162	Liquid	NA	NA	0.2400	NA	2/7/79
SX101	R-4884	Liquid	1.1	NA	0.0288	NA	4/26/89
SX101	RAT-SX101-1	Liquid	1.0	96.48	0.3838	10.90	10/29/80
SX101	RAT-SX101-2	Liquid	1.0	93.84	0.5655	9.18	10/29/80
SX102		Salt	NA	NA	0.1980	NA	1/1/80
SX102	T-2959	Salt	NA	NA	0.8167	NA	9/3/80
SX102	RAT-SX-102-	Salt	NA	13.90	NA	NA	3/18/76
SX103		Salt	NA	NA	0.1980	NA	1/1/80
SX104	RAT-SX104-3B	Liquid	1.4	NA	0.1029	0.27	8/15/88
SX104	RAT-SX104-3B	Liquid	1.7	NA	0.2570	NA	8/15/88
SX104	RAT-SX104-3B	Liquid	1.8	NA	0.2870	NA	
SX104	RAT-SX104-3B	Liquid	NA	61.90	NA	NA	8/15/88
SX104	RAT-SX104-3T	Liquid	1.4	NA	0.2284	0.46	5/14/88
SX104	RAT-SX104-3T	Liquid	2.0	NA	0.2430	NA	
SX104	RAT-SX104-3T	Liquid	1.5	NA	0.8990	NA	
SX104	RAT-SX104-3T	Liquid	NA	50.80	NA	NA	5/14/88
SX106	5268	Liquid	NA	NA	0.0900	NA	11/13/78
SX106	8301	Liquid	1.4	46.10	5.9612	11.06	4/18/78
SX106	RAT-SX106-2	Liquid	NA	NA	5.0276	NA	2/28/77
SX106	RAT-SX106-2	Liquid	NA	NA	5.6297	NA	2/28/77
SX106	RAT-SX106-2	Liquid	NA	46.00	NA	NA	2/28/77
SX106	RAT-SX106-2	Salt	NA	39.00	NA	NA	2/28/77
SX106	RAT-SX106-	Sludge	NA	37.00	NA	NA	2/28/77
SX107	RAT-SX107-1	Liquid	1.2	69.32	0.3871	1.26	9/5/79
SX107	1345	Salt	NA	10.00	NA	NA	1/29/77
T101	RAT-T101-2	Liquid	NA	NA	0.0500	NA	4/27/90
T104		Sludge	NA	NA	0.0100	NA	9/1/92
T104	175COMP1	Sludge	NA	NA	0.0760	NA	1/1/93
T104	176COMP1	Sludge	NA	NA	0.0550	NA	1/3/93
T104	179COMP2	Sludge	NA	NA	0.0550	NA	1/5/93
T104	180COMP2	Sludge	NA	NA	0.0550	NA	1/7/93
T104	204COMP	Liquid	1.1	NA	0.0492	NA	1/13/93
T104	RAT-T104-2	Sludge	1.3	NA	0.2900	0.77	9/18/80
T104	RAT-T104-2	Sludge	NA	62.20	NA	NA	9/18/80

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
T104	RAT-T104-2	Sludge	NA	62.20	NA	NA	9/18/80
T107	C50COMP	Liquid	NA	95.10	NA	NA	8/1/94
T107	C50S1R	Sludge	NA	NA	0.0505	0.05	8/1/94
T107	C50S1R	Sludge	NA	5.76	NA	NA	8/1/94
T107	C50S1R	Sludge	NA	26.20	NA	NA	8/1/94
T107	C50S2	Sludge	1.7	NA	0.0655	0.08	8/1/94
T107	C50S2	Sludge	NA	18.00	NA	NA	8/1/94
T107	C50S2	Sludge	NA	43.00	NA	NA	8/1/94
T107	C50S3	Sludge	NA	41.50	NA	NA	8/1/94
T107	C51COMP	Sludge	1.5	NA	0.0400	0.08	8/1/94
T107	C51COMP	Sludge	NA	NA	0.1440	0.30	8/1/94
T107	C51COMP	Liquid	1.2	73.70	0.1060	0.40	8/1/94
T107	C51COMP	Sludge	NA	49.50	NA	NA	8/1/94
T107	C51COMP	Sludge	NA	51.90	NA	NA	8/1/94
T107	C51S2	Sludge	NA	95.60	0.1100	2.50	8/1/94
T107	C51S3L	Sludge	1.7	55.10	0.0905	0.20	8/1/94
T107	C51S3U	Sludge	1.5	60.20	0.1270	0.32	8/1/94
T107	C51S4L	Sludge	1.5	55.00	0.0270	0.06	8/1/94
T107	C51S4U	Sludge	1.5	52.90	0.0265	0.06	8/1/94
T107	C52COMP	Sludge	NA	NA	0.0320	0.06	8/1/94
T107	C52COMP	Liquid	1.1	82.90	0.0354	0.21	8/1/94
T107	C52COMP	Sludge	1.2	NA	0.1690	NA	8/1/94
T107	C52COMP	Sludge	NA	47.80	NA	NA	8/1/94
T107	C52S1	Sludge	NA	75.30	0.1950	0.79	8/1/94
T107	C52S2	Sludge	1.6	16.70	0.0970	0.12	8/1/94
T107	C52S3L	Sludge	1.5	51.40	0.0265	0.05	8/1/94
T107	C52S3U	Sludge	1.5	48.50	0.0685	0.13	8/1/94
T107	C52S4	Sludge	NA	53.50	NA	NA	8/1/94
T107	R-3872	Liquid	NA	NA	0.0700	NA	3/5/85
T107	RAT-T107-1	Liquid	NA	NA	0.0720	NA	8/1/89
T111	C31COMP1	Sludge	NA	NA	0.3300	NA	12/1/91
T111	C31COMP1	Sludge	NA	NA	0.3680	NA	12/2/91
T111	C31COMP2	Sludge	NA	NA	0.3850	NA	12/3/91
T111	C31COMP2	Sludge	NA	NA	0.4120	NA	12/4/91
T111	C33COMP1	Sludge	NA	NA	0.2000	NA	12/5/91
T111	C33COMP1	Sludge	NA	NA	0.2000	NA	12/6/91
T111	C33COMP2	Sludge	NA	NA	0.3000	NA	12/7/91
T111	C33COMP2	Sludge	NA	NA	0.3000	NA	12/8/91
T112	RAT-T112-1	Liquid	NA	NA	0.1900	NA	10/27/87
T112	T-5821	Liquid	NA	87.32	NA	NA	8/14/74

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
T204	1914	Sludge	NA	73.00	0.6735	NA	12/4/78
TX102	RAT-TX102-1	Salt	NA	NA	0.1909	NA	2/3/81
TX102	RAT-TX102-1	Sludge	NA	44.51	NA	NA	2/3/81
TX102	RAT-TX102-1A	Liquid	NA	NA	0.3850	NA	2/3/81
TX102	RAT-TX102-2	Liquid	NA	NA	0.1639	NA	2/3/81
TX103	T-1465	Liquid	NA	NA	0.2720	NA	9/21/79
TX103	T-1467	Liquid	NA	NA	0.2680	NA	9/21/79
TX103	T-1470	Liquid	NA	NA	0.2768	NA	9/21/79
TX103	T-2955	Liquid	NA	51.03	NA	NA	
TX105	RAT-TX105-1	Liquid	NA	NA	0.8724	NA	2/3/81
TX106	RAT-TX106-1	Liquid	NA	NA	0.4281	NA	2/3/81
TX108	RAT-TX108-1	Liquid	NA	NA	0.5931	NA	2/5/81
TX108	T-1989	Liquid	NA	56.07	NA	NA	2/2/76
TX109	RAT-TX109-2	Liquid	NA	NA	0.6718	NA	2/3/81
TX110	RAT-TX110-1	Liquid	NA	NA	0.6068	NA	8/4/79
TX110	RAT-TX110-2	Liquid	1.4	45.80	0.2961	0.55	2/10/81
TX110	RAT-TX110-4	Liquid	NA	NA	0.2961	NA	2/3/81
TX111	RAT-TX111-1	Liquid	NA	NA	0.4563	NA	2/3/81
TX112	RAT-TX112-1	Liquid	NA	NA	0.2690	NA	2/3/81
TX114	RAT-TX114-1	Liquid	NA	NA	0.1986	NA	2/3/81
TX115	RAT-TX115-1	Liquid	NA	NA	0.0252	NA	2/3/81
TX115	RAT-TX116-1	Liquid	NA	NA	0.0712	NA	2/3/81
TX116		Liquid	NA	NA	0.0800	NA	2/3/81
TX118		Liquid	NA	NA	3.2200	NA	1/1/80
TX118	8385	Liquid	NA	NA	0.0174	NA	3/21/79
TX118	RAT-TX118-1	Liquid	NA	NA	0.1566	NA	1/28/80
TX118	RAT-TX118-3	Liquid	NA	NA	0.1403	NA	1/28/80
TX118	RAT-TX118-4	Liquid	NA	NA	0.1000	NA	10/16/81
TX118	RAT-TX118-5	Liquid	NA	NA	0.1100	NA	10/16/81
TX118	RAT-TX118-6	Salt	NA	NA	1.0600	NA	10/16/81
TY101	51XC00XX/R6788	Sludge	1.6	43.50	0.0020	0.00	9/11/85
TY101	51XC00XX/R6793	Sludge	1.6	43.50	0.0020	0.00	9/11/85
TY101	T-3533	Liquid	NA	NA	0.0184	NA	12/6/82
TY102	41XCOOOO	Sludge	NA	NA	0.0327	NA	9/9/85
TY102	RAT-TY102-1	Salt	NA	58.00	0.2360	NA	2/1/80
TY103	31XCOOOO	Sludge	NA	NA	0.0715	NA	8/21/85
TY103	32XCOOOO	Sludge	NA	NA	0.1490	NA	8/21/85
TY103	33XCOOO	Liquid	NA	NA	0.1565	NA	8/21/85
TY103	C31XCCOMP1	Sludge	NA	NA	0.0715	NA	9/15/85
TY103	C31XDCOMP1	Sludge	NA	NA	0.1490	NA	9/15/85

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
TY103	RAT-TY103-1	Sludge	1.5	52.67	0.1100	0.23	9/18/80
TY103	RAT-TY103-2	Sludge	NA	53.00	0.0040	0.01	2/1/80
TY104	211DOOOO	Liquid	NA	NA	0.1603	NA	8/6/85
TY104	232DOOOO	Liquid	NA	NA	0.1694	NA	8/12/85
TY104	232SOOOO	Sludge	NA	NA	0.2100	NA	8/6/85
TY104	241DOOOO	Liquid	NA	NA	0.2042	NA	8/6/85
TY104	241SOOOO	Sludge	NA	NA	0.2780	NA	8/6/85
TY104	251SOOOO	Sludge	NA	NA	0.1950	NA	8/14/85
TY104	261SOOOO	Sludge	NA	NA	0.0907	NA	8/16/85
TY104	C241SCOMP1	Sludge	NA	NA	0.2780	NA	9/15/85
TY104	C251SCOMP1	Sludge	NA	NA	0.1950	NA	9/15/85
TY104	C261SCOMP1	Sludge	NA	NA	0.0907	NA	9/15/85
TY104	C32XSCOMP1	Sludge	NA	NA	0.2100	NA	9/15/85
TY104	RAT-TY104-1	Sludge	NA	NA	0.4000	NA	12/20/79
TY104	RAT-TY104-2	Sludge	1.4	NA	0.0600	0.13	9/18/80
TY104	RAT-TY104-2	Sludge	1.4	NA	1.4700	3.11	9/18/80
TY104	RAT-TY104-2	Sludge	1.4	NA	2.8000	5.92	9/18/80
TY104	RAT-TY104-2	Sludge	NA	52.73	NA	NA	9/18/80
TY104	RAT-TY104-2	Sludge	NA	52.73	NA	NA	9/18/80
TY104	RAT-TY104-2	Sludge	NA	52.73	NA	NA	9/18/80
TY105	61XCOOOO	Sludge	NA	39.40	0.0805	NA	9/13/85
TY106	111COOOO	Sludge	NA	NA	0.2480	NA	7/31/85
TY106	111CXCOMP1	Sludge	1.3	NA	0.0780	0.13	9/14/85
TY106	111CXCOMP1	Sludge	1.3	NA	0.1700	0.28	9/14/85
TY106	111CXCOMP1	Sludge	NA	39.20	NA	NA	9/14/85
TY106	111CXCOMP1	Sludge	NA	39.20	NA	NA	9/14/85
TY106	161COOOO	Sludge	NA	NA	0.2090	NA	9/26/85
TY106	161CXCOMP1	Sludge	NA	NA	0.2090	NA	9/15/85
TY106	RAT-TY106-2	Sludge	1.9	35.50	0.0920	0.14	9/18/80
U103		Sludge	NA	8.70	NA	NA	12/4/78
U103	3064	Sludge	1.4	NA	0.6863	0.75	12/4/78
U103	8793	Salt	NA	NA	3.3800	NA	8/15/77
U103	RAT-U103-1	Liquid	NA	63.20	NA	NA	4/16/76
U105	RAT-U105-3	Salt	1.6	20.80	2.8000	3.54	12/4/78
U106		Liquid	1.3	61.91	9.9600	26.15	1/1/80
U110	C12S2	Sludge	1.8	NA	0.0794	0.13	9/1/93
U110	C12S2	Sludge	1.8	NA	0.0779	0.14	9/1/93
U110	C12S2	Sludge	NA	38.19	NA	NA	9/1/93
U110	C12S2	Sludge	NA	43.60	NA	NA	9/1/93
U110	C12S3	Sludge	1.0	NA	0.0713	0.12	9/1/93

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
U110	C12S3	Sludge	1.0	NA	0.0734	0.12	9/1/93
U110	C12S3	Sludge	NA	39.06	NA	NA	9/1/93
U110	C12S3	Sludge	NA	39.04	NA	NA	9/1/93
U110	C12S4	Sludge	1.5	NA	0.0715	0.13	9/1/93
U110	C12S4	Sludge	1.5	NA	0.0898	0.16	9/1/93
U110	C12S4	Sludge	NA	44.36	NA	NA	9/1/93
U110	C12S4	Sludge	NA	44.10	NA	NA	9/1/93
U110	C13S3	Sludge	1.1	NA	0.0409	0.07	9/1/93
U110	C13S3	Sludge	1.1	NA	0.0708	0.12	9/1/93
U110	C13S3	Sludge	NA	43.18	NA	NA	9/1/93
U110	C13S3	Sludge	NA	42.98	NA	NA	9/1/93
U110	C13S4	Sludge	1.5	NA	0.0785	0.15	9/1/93
U110	C13S4	Sludge	1.5	NA	0.0896	0.16	9/1/93
U110	C13S4	Sludge	NA	46.78	NA	NA	9/1/93
U110	C13S4	Sludge	NA	44.68	NA	NA	9/1/93
U110	C14S1	Sludge	1.5	NA	0.0361	0.04	9/1/93
U110	C14S1	Sludge	1.5	NA	0.0494	0.05	9/1/93
U110	C14S1	Sludge	NA	4.75	NA	NA	9/1/93
U110	C14S1	Sludge	NA	5.59	NA	NA	9/1/93
U110	C14S2	Sludge	1.4	NA	0.0599	0.08	9/1/93
U110	C14S2	Sludge	1.4	NA	0.0653	0.09	9/1/93
U110	C14S2	Sludge	NA	29.10	NA	NA	9/1/93
U110	C14S2	Sludge	NA	26.90	NA	NA	9/1/93
U110	C14S3	Sludge	1.4	NA	0.0352	0.06	9/1/93
U110	C14S3	Sludge	1.4	NA	0.0540	0.09	9/1/93
U110	C14S3	Sludge	NA	42.51	NA	NA	9/1/93
U110	C14S3	Sludge	NA	42.64	NA	NA	9/1/93
U110	C14S4	Sludge	1.6	NA	0.1100	0.18	9/1/93
U110	C14S4	Sludge	1.6	NA	0.1110	0.18	9/1/93
U110	C14S4	Sludge	NA	37.30	NA	NA	9/1/93
U110	C14S4	Sludge	NA	37.27	NA	NA	9/1/93
U110	C15S2	Sludge	1.3	NA	0.6430	1.08	9/1/93
U110	C15S2	Sludge	1.3	NA	0.6750	1.17	9/1/93
U110	C15S2	Sludge	NA	40.60	NA	NA	9/1/93
U110	C15S2	Sludge	NA	42.50	NA	NA	9/1/93
U110	C15S3	Sludge	NA	41.60	NA	NA	9/1/93
U110	C15S3	Sludge	NA	44.30	NA	NA	9/1/93
U110	C15S4	Sludge	NA	39.90	NA	NA	9/1/93
U110	C15S4	Sludge	NA	42.30	NA	NA	9/1/93
U110	C5S3	Sludge	1.0	NA	0.0530	0.09	9/1/93

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
U110	C5S3	Sludge	1.0	NA	0.0554	0.09	9/1/93
U110	C5S3	Sludge	NA	39.20	NA	NA	9/1/93
U110	C5S3	Sludge	NA	39.06	NA	NA	9/1/93
U110	C5S4	Sludge	NA	NA	0.0859	0.14	9/1/93
U110	C5S4	Sludge	NA	NA	0.1100	0.18	9/1/93
U110	C5S4	Sludge	NA	38.80	NA	NA	9/1/93
U110	C5S4	Sludge	NA	39.10	NA	NA	9/1/93
U110	C6S2	Sludge	NA	37.60	NA	NA	9/1/93
U110	C6S2	Sludge	NA	39.50	NA	NA	9/1/93
U110	C6S3	Sludge	NA	44.40	NA	NA	9/1/93
U110	C6S3	Sludge	NA	44.60	NA	NA	9/1/93
U110	C6S4	Sludge	1.8	NA	0.0693	0.11	9/1/93
U110	C6S4	Sludge	1.8	NA	0.0726	0.12	9/1/93
U110	C6S4	Sludge	NA	37.30	NA	NA	9/1/93
U110	C6S4	Sludge	NA	38.50	NA	NA	9/1/93
U110	C7S1	Sludge	1.8	NA	0.0605	0.06	9/1/93
U110	C7S1	Sludge	1.8	NA	0.0740	0.08	9/1/93
U110	C7S1	Sludge	NA	3.08	NA	NA	9/1/93
U110	C7S1	Sludge	NA	4.16	NA	NA	9/1/93
U110	C7S2	Sludge	1.5	NA	0.1410	0.22	9/1/93
U110	C7S2	Sludge	1.5	NA	0.1610	0.25	9/1/93
U110	C7S2	Sludge	NA	37.30	NA	NA	9/1/93
U110	C7S2	Sludge	NA	34.50	NA	NA	9/1/93
U110	C7S3	Sludge	NA	47.20	NA	NA	9/1/93
U110	C7S3	Sludge	NA	47.70	NA	NA	9/1/93
U110	C7S4	Sludge	NA	35.40	NA	NA	9/1/93
U110	C7S4	Sludge	NA	39.40	NA	NA	9/1/93
U110	C8S1	Sludge	NA	NA	0.0828	0.09	9/1/93
U110	C8S1	Sludge	NA	NA	0.0878	0.10	9/1/93
U110	C8S1	Sludge	NA	8.04	NA	NA	9/1/93
U110	C8S1	Sludge	NA	8.73	NA	NA	9/1/93
U111		Liquid	NA	NA	3.6500	NA	1/1/80
U111	RAT-U111-2	Salt	NA	39.12	0.5200	0.85	9/23/80
U111	RAT-U111-3	Salt	NA	33.62	0.5400	0.81	9/23/80
B101	RAT-B101-1	Sludge	NA	20.10	NA	NA	1/5/76
B102	RAT-B102-1	Liquid	NA	62.60	NA	NA	6/29/73
B103	T-4289	Liquid	NA	85.34	NA	NA	5/9/75
B105	RAT-B105-1	Sludge	NA	45.70	NA	NA	1/16/76
B106	T-8577	Liquid	NA	72.77	NA	NA	10/6/75
B107	RAT-B107-1	Sludge	NA	32.90	NA	NA	1/19/76

Tank	Sample ID	Waste Phase	(g/mL) Density	% H_2O	% TOC	Dry % TOC	Ref. Date
B109	T-8578	Liquid	NA	79.62	NA	NA	10/6/75
B203	2782	Sludge	NA	74.30	NA	NA	12/4/78
BX101	RAT-BX-101	Sludge	NA	29.10	NA	NA	
BX103	T-8630	Liquid	NA	93.28	NA	NA	
C108	T-5489	Liquid	NA	81.94	NA	NA	6/19/75
C204	T-1914	Sludge	NA	73.00	NA	NA	12/4/78
S101	T-8084	Liquid	NA	81.90	NA	NA	9/13/74
S105	T-737	Liquid	NA	48.90	NA	NA	1/21/74
S106	T-8035	Liquid	NA	46.62	NA	NA	12/16/74
SX105	RAT-SX-105-	Salt	NA	13.00	NA	NA	2/1/77
SX111	RAT-SX111-	unknown	NA	33.80	NA	NA	8/10/75
SX111	RAT-SX111-	Liquid	NA	71.30	NA	NA	8/1/75
T106	RAT-T106-1	Sludge	NA	36.60	NA	NA	2/27/75
T108	T-3391	Liquid	NA	77.80	NA	NA	5/13/74
T109	T-2289	Liquid	NA	77.57	NA	NA	3/13/74
T110	T-5313	Liquid	NA	89.68	NA	NA	1/20/75
TX104	T-4391	Liquid	NA	50.54	NA	NA	4/19/76
TX113	T-848	Liquid	NA	51.58	NA	NA	1/18/74
U102	RAT-U102-1	Liquid	NA	63.60	NA	NA	3/1/76
U107	RAT-U107-1	Sludge	NA	50.00	NA	NA	12/9/74
U108	RAT-U108-1	Sludge	NA	51.20	NA	NA	
U109	RAT-U109-1	Liquid	NA	63.30	NA	NA	
U109	RAT-U109-1	Sludge	NA	36.70	NA	NA	
U202	T-8245	Liquid	NA	79.90	NA	NA	9/25/75
U204	RAT-U204-1	Sludge	NA	26.00	NA	NA	12/4/78

Appendix G

Moisture Estimates for 149 Single-Shell Tanks

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
A101	liq	8	19	50.4	6.2	44.1	34.7	11.3	26.9
A102	liq	3	19	48.2	10	38.6	32.5	16.4	21.8
A103	liq	3	19	52	9.2	42.4	36.4	14.7	25.7
A105	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
A106	liq	2	2	54.6	10.7	42.9	38.9	16.2	26.3
AX101	liq	5	19	47.1	8.2	39.4	31.5	14.4	22.4
AX102	liq	0	1	60	20.5	35.4	44.3	28.2	19.3
AX103	liq	1	1	53.1	14.3	38	37.4	21.2	21.6
B101	liq	0	2	68.9	17.1	45.4	53.2	22.5	29.3
B102	liq	1	2	65.6	11.3	50.8	49.9	15.5	34.4
B104	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
B105	liq	0	1	59.6	20.6	35.1	44	28.4	19
B106	liq	1	3	71.7	10.1	57.2	56	13.6	40.8
B107	liq	0	1	69.1	17.8	44.5	53.4	23.4	28.4
B108	liq	0	1	69.1	17.8	44.5	53.4	23.4	28.4
B109	liq	1	1	74.7	10.1	59.5	59	13.4	43.1
B110	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
B111	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
B112	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
B201	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
B202	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
B203	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
B204	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
BX101	liq	0	5	71.7	15.3	49.7	56	20.1	33.5
BX102	liq	0	5	71.7	15.3	49.7	56	20.1	33.5
BX103	liq	1	5	83.1	8.6	68.9	67.4	11.1	52.5
BX104	liq	1	5	80.3	8.9	66.1	64.6	11.6	49.6
BX105	liq	1	5	74.4	9.6	60.2	58.8	12.8	43.8
BX106	liq	1	5	64.3	11.1	50.1	48.7	15.4	33.7
BX107	liq	0	3	70.5	16.2	47.7	54.8	21.3	31.5
BX108	liq	0	5	71.7	15.3	49.7	56	20.1	33.5
BX109	liq	1	5	65.4	10.9	51.1	49.7	15.1	34.7
BX110	liq	0	1	61.7	19.9	37.2	46.1	27.1	21.1
BX112	liq	0	1	69.1	17.8	44.5	53.4	23.4	28.4
BY101	liq	0	3	58	19.7	35.2	42.3	27.5	19
BY102	liq	1	2	57.3	12.9	42.6	41.6	18.6	26.2
BY103	liq	1	3	54.8	13.3	40.3	39.1	19.5	23.9
BY104	liq	0	3	58	19.7	35.2	42.3	27.5	19
BY105	liq	1	3	55.9	13	41.4	40.2	19	24.9
BY106	liq	1	3	53.8	13.5	39.2	38.1	20	22.8
BY107	liq	0	3	58	19.7	35.2	42.3	27.5	19

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
BY108	liq	0	3	58	19.7	35.2	42.3	27.5	19
BY109	liq	1	2	59.4	12.4	44.7	43.8	17.7	28.3
BY110	liq	0	3	58	19.7	35.2	42.3	27.5	19
BY112	liq	0	3	58	19.7	35.2	42.3	27.5	19
C101	liq	0	5	71.7	15.3	49.7	56	20.1	33.5
C102	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
C103	liq	1	1	80.1	9.5	64.9	64.4	12.3	48.5
C104	liq	1	1	72.7	10.4	57.6	57	13.9	41.2
C105	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
C106	liq	0	1	71.4	17.2	46.8	55.7	22.4	30.7
C107	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
C109	liq	1	7	72.2	9.9	57.9	56.5	13.3	41.5
C110	liq	1	3	72.9	10	58.3	57.2	13.3	41.9
C112	liq	2	7	60.7	9.3	49.4	45	13.6	32.8
S101	liq	1	16	71.5	9.7	57.6	55.8	13.1	41.1
S102	liq	2	16	60.7	9.1	49.6	45	13.4	33
S103	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
S104	liq	0	1	66.2	18.5	41.7	50.5	24.7	25.5
S105	liq	1	16	54	12.9	40.1	38.3	19.1	23.7
S106	liq	1	16	52.8	13.1	38.9	37.1	19.7	22.5
S107	liq	3	16	52.6	9.1	43	36.9	14.4	26.3
S108	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
S109	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
S110	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
S111	liq	1	16	51.7	13.4	37.8	36	20.3	21.4
S112	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
SX101	liq	2	16	84.3	6.6	73.2	68.6	8.8	56.5
SX102	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
SX103	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
SX104	liq	2	16	57.4	9.7	46.3	41.7	14.4	29.7
SX105	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
SX106	liq	2	16	50.3	11	39.1	34.6	17.4	22.5
SX107	liq	1	1	67.9	11.2	52.7	52.2	15.2	36.3
SX108	liq	0	1	66.2	18.5	41.7	50.5	24.7	25.5
SX109	liq	0	1	66.2	18.5	41.7	50.5	24.7	25.5
SX111	liq	1	1	69.2	10.9	54	53.5	14.8	37.6
SX112	liq	0	1	66.2	18.5	41.7	50.5	24.7	25.5
SX114	liq	0	1	66.8	18.4	42.2	51.1	24.5	26.1
T101	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T102	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T103	liq	0	0	65	19.9	39.2	49.3	26.6	23.1

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
T104	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T105	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T106	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T107	liq	3	7	80.9	6	71.2	65.2	8.2	54.5
T110	liq	1	2	82.9	8.9	68.1	67.2	11.5	51.7
T111	liq	0	2	75.3	15.6	51.8	59.6	20.1	35.6
T112	liq	1	2	81.7	9	66.9	66	11.7	50.5
T201	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T202	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T203	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
T204	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
TX101	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
TX102	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
TX103	liq	1	2	57.5	12.9	42.7	41.8	18.5	26.3
TX104	liq	1	16	54.9	12.6	41	39.2	18.7	24.5
TX105	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
TX106	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
TX107	liq	0	16	59.7	17.5	38.8	44	24.3	22.6
TX109	liq	0	1	59.6	20.6	35.1	44	28.4	19
TX110	liq	1	1	52.3	14.5	37.2	36.6	21.6	20.8
TX111	liq	0	1	59.6	20.6	35.1	44	28.4	19
TX112	liq	0	1	59.6	20.6	35.1	44	28.4	19
TX113	liq	1	1	59.6	20.6	35.1	44	28.4	19
TX114	liq	0	1	59.6	20.6	35.1	44	28.4	19
TX115	liq	0	3	63.9	17.9	41	48.2	24.2	24.9
TX116	liq	0	1	59.6	20.6	35.1	44	28.4	19
TX117	liq	0	1	59.6	20.6	35.1	44	28.4	19
TX118	liq	0	2	60.1	19.6	36.6	44.4	27	20.5
TY102	liq	0	1	59.6	20.6	35.1	44	28.4	19
TY103	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
TY104	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
U101	liq	0	1	66.2	18.5	41.7	50.5	24.7	25.5
U102	liq	1	3	63.7	11.4	49.2	48	15.9	32.8
U103	liq	1	3	63.5	11.4	49	47.8	16	32.6
U104	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
U105	liq	0	1	64.5	19	40	48.9	25.6	23.9
U106	liq	1	3	62.8	11.6	48.3	47.2	16.2	31.9
U107	liq	0	1	64.5	19	40	48.9	25.6	23.9
U108	liq	0	1	64.5	19	40	48.9	25.6	23.9
U109	liq	1	1	63.9	11.9	48.7	48.2	16.4	32.4
U110	liq	0	0	65	19.9	39.2	49.3	26.6	23.1

Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate			Worst 5% of the Waste		
				Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
U111	liq	0	3	63.9	17.9	41	48.2	24.2	24.9
U112	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
U201	liq	0	1	69.2	17.7	44.6	53.5	23.4	28.5
U202	liq	1	1	74.9	10.1	59.7	59.2	13.4	43.3
U203	liq	0	1	69.2	17.7	44.6	53.5	23.4	28.5
U204	liq	0	0	65	19.9	39.2	49.3	26.6	23.1
A101	salt	2	2	39.1	11.1	31.4	28.2	16.3	20.3
A102	salt	0	2	43.1	24.9	26.2	31	27.6	17.8
AX101	salt	0	2	43.1	24.9	26.2	31	27.6	17.8
AX102	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
AX103	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
B102	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
B104	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
B105	salt	0	1	43.1	24.9	26.2	31	27.6	17.8
BX105	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
BX110	salt	0	0	48.4	14.3	36.3	34.8	18.7	24
BX111	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
BY101	salt	0	4	16.9	32.3	8.9	12.2	34.5	6.1
BY102	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
BY103	salt	0	4	43.1	24.9	26.2	31	27.6	17.8
BY104	salt	4	4	16.1	8.7	13.5	11.6	14.7	8.6
BY105	salt	0	4	43.1	24.9	26.2	31	27.6	17.8
BY106	salt	0	4	43.1	24.9	26.2	31	27.6	17.8
BY107	salt	0	4	16.9	32.3	8.9	12.2	34.5	6.1
BY108	salt	0	4	16.9	32.3	8.9	12.2	34.5	6.1
BY109	salt	0	0	43.1	24.9	26.2	31	27.6	17.8
BY110	salt	0	4	16.9	32.3	8.9	12.2	34.5	6.1
BY111	salt	0	4	16.9	32.3	8.9	12.2	34.5	6.1
BY112	salt	0	4	16.9	32.3	8.9	12.2	34.5	6.1
S101	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S102	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S103	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S105	salt	0	6	8.5	36.9	4.1	6.1	38.7	2.8
S106	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S107	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S108	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S109	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S110	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
S111	salt	3	6	15.9	9.5	13.2	11.5	15.3	8.4
S112	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
SX101	salt	0	6	12.4	26.3	7.3	8.9	28.9	5

Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate			Worst 5% of the Waste		
				Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
SX102	salt	1	6	13.3	14.7	9.9	9.6	19	6.5
SX103	salt	0	6	12.4	26.3	7.3	8.9	28.9	5
SX104	salt	0	6	11.8	14.7	8.8	8.5	19	5.8
SX105	salt	1	6	12.8	14.7	9.5	9.2	19	6.3
SX106	salt	1	6	12.4	26.3	7.3	8.9	28.9	5
TX102	salt	0	6	8.5	36.9	4.1	6.1	38.7	2.8
TX104	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
TX105	salt	0	6	8.5	36.9	4.1	6.1	38.7	2.8
TX106	salt	0	6	8.5	36.9	4.1	6.1	38.7	2.8
TX107	salt	0	6	21.6	26.8	12.6	15.5	29.3	8.7
TX108	salt	0	0	16.9	32.3	8.9	12.2	34.5	6.1
TX109	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX110	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX111	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX112	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX113	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX114	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX115	salt	0	2	16.9	32.3	8.9	12.2	34.5	6.1
TX116	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX117	salt	0	1	16.9	32.3	8.9	12.2	34.5	6.1
TX118	salt	0	0	16.9	32.3	8.9	12.2	34.5	6.1
TY102	salt	1	1	51.9	14.3	38.9	37.3	18.7	25.7
U102	salt	0	2	43.1	24.9	26.2	31	27.6	17.8
U103	salt	0	2	43.1	24.9	26.2	31	27.6	17.8
U105	salt	1	1	21.1	14.8	15.7	15.2	19	10.4
U106	salt	0	2	43.1	24.9	26.2	31	27.6	17.8
U107	salt	0	1	21.6	26.8	12.6	15.5	29.3	8.7
U108	salt	0	1	21.6	26.8	12.6	15.5	29.3	8.7
U109	salt	0	1	30.4	14.8	22.6	21.8	19	14.9
U111	salt	2	2	37.7	11.1	30.2	27.2	16.3	19.6
A101	sludge	0	4	39.5	14	28.5	18.4	31.1	6.9
A102	sludge	2	4	39.5	14	28.5	18.4	31.1	6.9
A103	sludge	2	4	39.5	14	28.5	18.4	31.1	6.9
A104	sludge	0	0	44.7	24	23.3	23.6	45.9	2
A105	sludge	0	0	44.7	24	23.3	23.6	45.9	2
A106	sludge	2	2	44.3	15.8	30.3	23.2	30.9	8.9
AX101	sludge	0	4	39.5	14	28.5	18.4	31.1	6.9
AX102	sludge	0	0	44.7	24	23.3	23.6	45.9	2
AX103	sludge	0	0	44.7	24	23.3	23.6	45.9	2
AX104	sludge	0	0	44.7	24	23.3	23.6	45.9	2
B101	sludge	1	1	34.5	24.3	17.7	13.4	63.6	-3.6

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
B102	sludge	0	1	34.5	24.3	17.7	13.4	63.6	-3.6
B103	sludge	0	1	34.5	24.3	17.7	13.4	63.6	-3.6
B104	sludge	0	0	44.7	24	23.3	23.6	45.9	2
B105	sludge	1	1	45.1	18.6	28.4	24	35.5	7
B106	sludge	0	15	49.5	6.4	43.1	28.3	12.3	21.3
B107	sludge	1	3	47.8	12.8	35.6	26.7	23.7	14.1
B108	sludge	0	3	47.8	12.8	35.6	26.7	23.7	14.1
B109	sludge	0	3	47.8	12.8	35.6	26.7	23.7	14.1
B110	sludge	0	0	44.7	24	23.3	23.6	45.9	2
B111	sludge	0	0	44.7	24	23.3	23.6	45.9	2
B112	sludge	0	0	44.7	24	23.3	23.6	45.9	2
B201	sludge	1	7	64.9	6.8	56	43.8	10.7	34.4
B202	sludge	2	7	64.9	6.8	56	43.8	10.7	34.4
B203	sludge	1	7	64.9	6.8	56	43.8	10.7	34.4
B204	sludge	2	7	64.9	6.8	56	43.8	10.7	34.4
BX101	sludge	1	1	38.2	21.9	21.5	17.1	49.7	0.1
BX102	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
BX103	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
BX104	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
BX105	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
BX106	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
BX107	sludge	15	15	49.5	6.4	43.1	28.3	12.3	21.3
BX108	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
BX109	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
BX110	sludge	1	2	48.9	14.3	34.9	27.8	25.7	13.5
BX111	sludge	1	2	48.9	14.3	34.9	27.8	25.7	13.5
BX112	sludge	2	3	47.8	12.8	35.6	26.7	23.7	14.1
BY101	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY103	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY104	sludge	1	1	37.9	22.1	21.1	16.8	50.7	0
BY105	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY106	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY107	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY108	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY109	sludge	0	0	44.7	24	23.3	23.6	45.9	2
BY110	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY111	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
BY112	sludge	0	1	37.9	22.1	21.1	16.8	50.7	0
C101	sludge	0	1	38.2	21.9	21.5	17.1	49.7	0.1
C102	sludge	0	0	44.7	24	23.3	23.6	45.9	2
C103	sludge	0	0	44.7	24	23.3	23.6	45.9	2

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
C104	sludge	0	0	44.7	24	23.3	23.6	45.9	2
C105	sludge	0	0	44.7	24	23.3	23.6	45.9	2
C106	sludge	0	0	44.7	24	23.3	23.6	45.9	2
C107	sludge	0	0	44.7	24	23.3	23.6	45.9	2
C108	sludge	0	31	48.2	4.7	43.7	27.1	10	21.6
C109	sludge	0	31	48.2	4.7	43.7	27.1	10	21.6
C110	sludge	0	15	49.5	6.4	43.1	28.3	12.3	21.3
C111	sludge	0	31	48.2	4.7	43.7	27.1	10	21.6
C112	sludge	13	31	48.2	4.7	43.7	27.1	10	21.6
C201	sludge	1	2	59.8	11.7	45.8	38.7	18.5	24.4
C202	sludge	0	2	59.8	11.7	45.8	38.7	18.5	24.4
C203	sludge	0	2	59.8	11.7	45.8	38.7	18.5	24.4
C204	sludge	1	2	59.8	11.7	45.8	38.7	18.5	24.4
S101	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S102	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S103	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S104	sludge	0	0	44.7	24	23.3	23.6	45.9	2
S105	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S106	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S107	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S108	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S109	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S110	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S111	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
S112	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
SX101	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
SX102	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
SX103	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
SX104	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
SX105	sludge	0	2	42.4	16.5	28.4	21.3	33.7	7
SX106	sludge	1	2	42.4	16.5	28.4	21.3	33.7	7
SX107	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX108	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX109	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX110	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX111	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX112	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX113	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX114	sludge	0	0	44.7	24	23.3	23.6	45.9	2
SX115	sludge	0	0	44.7	24	23.3	23.6	45.9	2
T101	sludge	0	0	44.7	24	23.3	23.6	45.9	2

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of Moisture %	Relative Standard Deviation on Median	95% Confidence Bound on Tank Moisture Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, Moisture	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
T102	sludge	0	0	44.7	24	23.3	23.6	45.9	2
T103	sludge	0	0	44.7	24	23.3	23.6	45.9	2
T104	sludge	2	2	55	12.7	41	33.9	21.2	19.5
T105	sludge	0	45	35.9	5.2	32.2	14.8	16.3	10
T106	sludge	1	45	35.9	5.2	32.2	14.8	16.3	10
T107	sludge	18	31	48.2	4.7	43.7	27.1	10	21.6
T108	sludge	0	15	49.5	6.4	43.1	28.3	12.3	21.3
T109	sludge	0	0	44.7	24	23.3	23.6	45.9	2
T110	sludge	0	0	44.7	24	23.3	23.6	45.9	2
T111	sludge	0	0	44.7	24	23.3	23.6	45.9	2
T112	sludge	0	0	44.7	24	23.3	23.6	45.9	2
T201	sludge	0	7	64.9	6.8	56	43.8	10.7	34.4
T202	sludge	0	7	64.9	6.8	56	43.8	10.7	34.4
T203	sludge	0	7	64.9	6.8	56	43.8	10.7	34.4
T204	sludge	1	7	64.9	6.8	56	43.8	10.7	34.4
TX101	sludge	0	0	44.7	24	23.3	23.6	45.9	2
TX103	sludge	0	0	44.7	24	23.3	23.6	45.9	2
TY101	sludge	2	2	44	15.9	30	22.9	31.3	8.6
TY103	sludge	2	5	51	9.9	40.9	29.9	17.7	19.3
TY104	sludge	3	5	51	9.9	40.9	29.9	17.7	19.3
TY105	sludge	1	4	40	13.8	28.9	18.9	30.4	7.4
TY106	sludge	3	4	40	13.8	28.9	18.9	30.4	7.4
U101	sludge	0	0	44.7	24	23.3	23.6	45.9	2
U102	sludge	0	1	29.8	28.1	13	8.7	98.2	0
U103	sludge	1	1	29.8	28.1	13	8.7	98.2	0
U104	sludge	0	0	44.7	24	23.3	23.6	45.9	2
U105	sludge	0	3	45.6	13.5	33.3	24.5	25.8	11.8
U106	sludge	0	1	29.8	28.1	13	8.7	98.2	0
U107	sludge	1	3	45.6	13.5	33.3	24.5	25.8	11.8
U108	sludge	1	3	45.6	13.5	33.3	24.5	25.8	11.8
U109	sludge	1	3	45.6	13.5	33.3	24.5	25.8	11.8
U110	sludge	44	45	35.9	5.2	32.2	14.8	16.3	10
U111	sludge	0	1	29.8	28.1	13	8.7	98.2	0
U112	sludge	0	0	44.7	24	23.3	23.6	45.9	2
U201	sludge	0	0	44.7	24	23.3	23.6	45.9	2
U202	sludge	0	0	44.7	24	23.3	23.6	45.9	2
U203	sludge	0	0	44.7	24	23.3	23.6	45.9	2
U204	sludge	1	1	37	22.7	20.2	15.9	53.7	0

Appendix H

Total Organic Carbon Data not Included in ANOVA Estimates

Tank	U110	U110	T104	SX103
Core	6	6		
Segment	COMP	COMP		
Sample ID			RAT-T104-2	1104
QA	P	D		
SORWT Group	XVII	XVII	XXXF	I
Phase	Sludge	Sludge	Sludge	Saltcake
SmplDate				
pH	12.91	12.97		
g/mL			1.307	2
PrepMthd	water digestion	water digestion	water insoluble	
Analysis Method	data bad? pB-5 (TIC + TOC not Total)	data bad? pB-5 (TIC + TOC not Total)		
TC ug/g				
TIC ug/g				
TOC Wt %	.	.	10.20	
TOC ug/g	.	.	102,000	
LOGTOC	.	.	5.008600172	
TOCug/gDRY				
Reference	WHC-EP-0643 REV 1	WHC-EP-0643 REV 1	65453-80-265 Rockwell 9/18/80	I.L. from JL Starr Rockwell 12/16/7
Ref Date	9/1/93	9/1/93	9/18/80	10/10/77
Sample Era	B	B	A	A
Comments			TOC value recorded as 1.02E-1 g/g	Recorded TOC 920 mol/L @ 2 g/mL

Appendix I

Single-Shell Tank Safety Criteria Exceedance Probability

Exceedance Probabilities

		Median		Exceed.	Worst 5%		Exceed.
Tank	phase	% TOC	% H2O	Prob.	% TOC	% H2O	Prob.
A101	liq	0.9	50.4	0	3.8	34.7	0.0
A101	salt	0.6	39.1	0	4.5	28.2	0.3
A101	sludge	0.6	39.5	0	2.4	18.4	7.1
A102	liq	0.4	48.2	0	1.6	32.5	0.0
A102	salt	0.6	43.1	0	4.5	31.0	1.0
A102	sludge	0.6	39.5	0	2.5	18.4	5.8
A103	liq	0.6	52.0	0	2.5	36.4	0.0
A103	salt	NA	NA	NA	NA	NA	NA
A103	sludge	0.7	39.5	0	2.6	18.4	6.3
A104	liq	NA	NA	NA	NA	NA	NA
A104	salt	NA	NA	NA	NA	NA	NA
A104	sludge	0.1	44.7	0	0.6	23.6	1.4
A105	liq	0.3	65.0	0	1.1	49.3	0.1
A105	salt	NA	NA	NA	NA	NA	NA
A105	sludge	0.1	44.7	0	0.6	23.6	1.4
A106	liq	0.1	54.6	0	27.4	38.9	0.1
A106	salt	NA	NA	NA	NA	NA	NA
A106	sludge	0.5	44.3	0	1.9	23.2	1.4
AX101	liq	0.8	47.1	0	3.0	31.5	0.0
AX101	salt	0.6	43.1	0	4.5	31.0	1.0
AX101	sludge	0.5	39.5	0	2.1	18.4	8.6
AX102	liq	1.1	60.0	0	4.4	44.3	1.1
AX102	salt	0.6	43.1	0	4.3	31.0	0.9
AX102	sludge	0.1	44.7	0	0.6	23.6	1.4
AX103	liq	0.8	53.1	0	3.3	37.4	0.2
AX103	salt	0.6	43.1	0	4.3	31.0	0.9
AX103	sludge	0.1	44.7	0	0.6	23.6	1.4
AX104	liq	NA	NA	NA	NA	NA	NA
AX104	salt	NA	NA	NA	NA	NA	NA
AX104	sludge	0.1	44.7	0	0.6	23.6	1.4
B101	liq	0.3	68.9	0	1.1	53.2	0.0
B101	salt	NA	NA	NA	NA	NA	NA
B101	sludge	0.1	34.5	0	0.6	13.4	3.3
B102	liq	0.3	65.6	0	1.1	49.9	0.0
B102	salt	0.6	43.1	0	4.3	31.0	0.9
B102	sludge	0.1	34.5	0	0.6	13.4	3.3
B103	liq	NA	NA	NA	NA	NA	NA
B103	salt	NA	NA	NA	NA	NA	NA
B103	sludge	0.1	34.5	0	0.6	13.4	3.3
B104	liq	0.3	65.0	0	1.1	49.3	0.1
B104	salt	0.6	43.1	0	4.3	31.0	0.9
B104	sludge	0.1	44.7	0	0.6	23.6	1.4

		Median		Exceed.	Worst 5%		Exceed.
Tank	phase	% TOC	% H2O	Prob.	% TOC	% H2O	Prob.
B105	liq	0.3	59.6	0	1.1	44.0	0.1
B105	salt	0.5	43.1	0	4.0	31.0	0.8
B105	sludge	0.1	45.1	0	0.3	24.0	0.0
B106	liq	0.2	71.7	0	0.8	56.0	0.0
B106	salt	NA	NA	NA	NA	NA	NA
B106	sludge	0.1	49.5	0	0.3	28.3	0.0
B107	liq	0.3	69.1	0	1.1	53.4	0.0
B107	salt	NA	NA	NA	NA	NA	NA
B107	sludge	0.3	47.8	0	1.2	26.7	0.7
B108	liq	0.3	69.1	0	1.1	53.4	0.0
B108	salt	NA	NA	NA	NA	NA	NA
B108	sludge	0.3	47.8	0	1.2	26.7	0.7
B109	liq	0.3	74.7	0	1.1	59.0	0.0
B109	salt	NA	NA	NA	NA	NA	NA
B109	sludge	0.3	47.8	0	1.2	26.7	0.7
B110	liq	0.3	65.0	0	1.1	49.3	0.1
B110	salt	NA	NA	NA	NA	NA	NA
B110	sludge	0.0	44.7	0	0.2	23.6	0.0
B111	liq	0.3	65.0	0	1.1	49.3	0.1
B111	salt	NA	NA	NA	NA	NA	NA
B111	sludge	0.1	44.7	0	0.4	23.6	0.0
B112	liq	0.3	65.0	0	1.1	49.3	0.1
B112	salt	NA	NA	NA	NA	NA	NA
B112	sludge	0.1	44.7	0	0.3	23.6	0.0
B201	liq	0.3	65.0	0	1.1	49.3	0.1
B201	salt	NA	NA	NA	NA	NA	NA
B201	sludge	0.2	64.9	0	0.9	43.8	0.0
B202	liq	0.3	65.0	0	1.1	49.3	0.1
B202	salt	NA	NA	NA	NA	NA	NA
B202	sludge	0.2	64.9	0	7.6	43.8	0.0
B203	liq	0.3	65.0	0	1.1	49.3	0.1
B203	salt	NA	NA	NA	NA	NA	NA
B203	sludge	0.2	64.9	0	0.9	43.8	0.0
B204	liq	0.3	65.0	0	1.1	49.3	0.1
B204	salt	NA	NA	NA	NA	NA	NA
B204	sludge	0.2	64.9	0	0.7	43.8	0.0
BX101	liq	0.4	71.7	0	1.5	56.0	0.0
BX101	salt	NA	NA	NA	NA	NA	NA
BX101	sludge	0.2	38.2	0	0.9	17.1	1.4
BX102	liq	0.4	71.7	0	1.5	56.0	0.0
BX102	salt	NA	NA	NA	NA	NA	NA
BX102	sludge	0.2	38.2	0	0.9	17.1	1.4
BX103	liq	0.4	83.1	0	1.5	67.4	0.0
BX103	salt	NA	NA	NA	NA	NA	NA

		Median		Exceed.	Worst 5%		Exceed.
Tank	phase	% TOC	% H2O	Prob.	% TOC	% H2O	Prob.
BX103	sludge	0.2	38.2	0	0.9	17.1	1.4
BX104	liq	0.5	80.3	0	1.9	64.6	0.0
BX104	salt	NA	NA	NA	NA	NA	NA
BX104	sludge	0.3	38.2	0	1.0	17.1	0.0
BX105	liq	0.5	74.4	0	2.2	58.8	0.0
BX105	salt	0.6	43.1	0	4.3	31.0	0.9
BX105	sludge	0.2	38.2	0	1.0	17.1	0.1
BX106	liq	0.4	64.3	0	1.4	48.7	0.0
BX106	salt	NA	NA	NA	NA	NA	NA
BX106	sludge	0.2	38.2	0	0.9	17.1	1.4
BX107	liq	0.2	70.5	0	0.8	54.8	0.0
BX107	salt	NA	NA	NA	NA	NA	NA
BX107	sludge	0.1	49.5	0	0.3	28.3	0.0
BX108	liq	0.4	71.7	0	1.5	56.0	0.0
BX108	salt	NA	NA	NA	NA	NA	NA
BX108	sludge	0.2	38.2	0	0.9	17.1	1.4
BX109	liq	0.3	65.4	0	1.2	49.7	0.0
BX109	salt	NA	NA	NA	NA	NA	NA
BX109	sludge	0.2	38.2	0	0.9	17.1	1.4
BX110	liq	0.3	61.7	0	1.4	46.1	0.0
BX110	salt	0.6	48.4	0	4.3	34.8	0.0
BX110	sludge	0.0	48.9	0	0.2	27.8	0.0
BX111	liq	NA	NA	NA	NA	NA	NA
BX111	salt	0.6	43.1	0	4.3	31.0	0.9
BX111	sludge	0.1	48.9	0	0.2	27.8	0.0
BX112	liq	0.3	69.1	0	1.2	53.4	0.0
BX112	salt	NA	NA	NA	NA	NA	NA
BX112	sludge	0.4	47.8	0	1.6	26.7	0.1
BY101	liq	0.2	58.0	0	1.0	42.3	0.1
BY101	salt	0.7	16.9	0	5.1	12.2	33.1
BY101	sludge	0.1	37.9	0	0.6	16.8	2.5
BY102	liq	0.2	57.3	0	0.7	41.6	0.0
BY102	salt	0.6	43.1	0	4.3	31.0	0.9
BY102	sludge	NA	NA	NA	NA	NA	NA
BY103	liq	0.2	54.8	0	0.9	39.1	0.0
BY103	salt	0.7	43.1	0	5.1	31.0	1.2
BY103	sludge	0.1	37.9	0	0.6	16.8	2.5
BY104	liq	0.2	58.0	0	1.0	42.3	0.1
BY104	salt	0.7	16.1	0	5.1	11.6	36.5
BY104	sludge	0.1	37.9	0	0.6	16.8	2.5
BY105	liq	0.2	55.9	0	0.9	40.2	0.0
BY105	salt	0.7	43.1	0	5.1	31.0	1.2
BY105	sludge	0.1	37.9	0	0.6	16.8	2.5
BY106	liq	0.2	53.8	0	0.9	38.1	0.0

Tank	phase	Median % TOC	Median % H2O	Exceed. Prob.	Worst 5% % TOC	Worst 5% % H2O	Exceed. Prob.
BY106	salt	0.7	43.1	0	5.1	31.0	1.2
BY106	sludge	0.1	37.9	0	0.6	16.8	2.5
BY107	liq	0.3	58.0	0	1.1	42.3	0.0
BY107	salt	0.7	16.9	0	5.1	12.2	33.1
BY107	sludge	0.1	37.9	0	0.6	16.8	2.5
BY108	liq	0.2	58.0	0	1.0	42.3	0.1
BY108	salt	0.7	16.9	0	5.1	12.2	33.1
BY108	sludge	0.1	37.9	0	0.6	16.8	2.5
BY109	liq	0.3	59.4	0	1.2	43.8	0.0
BY109	salt	0.6	43.1	0	4.3	31.0	0.9
BY109	sludge	0.1	44.7	0	0.6	23.6	1.4
BY110	liq	0.2	58.0	0	1.0	42.3	0.1
BY110	salt	0.7	16.9	0	5.1	12.2	33.1
BY110	sludge	0.1	37.9	0	0.6	16.8	2.5
BY111	liq	NA	NA	NA	NA	NA	NA
BY111	salt	0.7	16.9	0	5.1	12.2	33.1
BY111	sludge	0.1	37.9	0	0.6	16.8	2.5
BY112	liq	0.2	58.0	0	1.0	42.3	0.1
BY112	salt	0.7	16.9	0	5.1	12.2	33.1
BY112	sludge	0.1	37.9	0	0.6	16.8	2.5
C101	liq	0.4	71.7	0	1.5	56.0	0.0
C101	salt	NA	NA	NA	NA	NA	NA
C101	sludge	0.2	38.2	0	0.9	17.1	1.4
C102	liq	0.3	65.0	0	1.1	49.3	0.0
C102	salt	NA	NA	NA	NA	NA	NA
C102	sludge	0.1	44.7	0	0.6	23.6	1.4
C103	liq	0.6	80.1	0	2.3	64.4	0.0
C103	salt	NA	NA	NA	NA	NA	NA
C103	sludge	0.3	44.7	0	1.0	23.6	0.1
C104	liq	0.5	72.7	0	2.0	57.0	0.0
C104	salt	NA	NA	NA	NA	NA	NA
C104	sludge	0.3	44.7	0	1.2	23.6	1.1
C105	liq	0.3	65.0	0	1.0	49.3	0.0
C105	salt	NA	NA	NA	NA	NA	NA
C105	sludge	0.1	44.7	0	0.4	23.6	0.0
C106	liq	0.3	71.4	0	1.1	55.7	0.0
C106	salt	NA	NA	NA	NA	NA	NA
C106	sludge	0.2	44.7	0	0.8	23.6	0.0
C107	liq	0.2	65.0	0	0.6	49.3	0.0
C107	salt	NA	NA	NA	NA	NA	NA
C107	sludge	0.1	44.7	0	0.6	23.6	1.4
C108	liq	NA	NA	NA	NA	NA	NA
C108	salt	NA	NA	NA	NA	NA	NA
C108	sludge	0.2	48.2	0	0.7	27.1	0.0

Tank	phase	Median % TOC	Median % H2O	Exceed. Prob.	Worst 5% % TOC	Worst 5% % H2O	Exceed. Prob.
C109	liq	0.2	72.2	0	0.7	56.5	0.0
C109	salt	NA	NA	NA	NA	NA	NA
C109	sludge	0.2	48.2	0	1.0	27.1	0.0
C110	liq	0.1	72.9	0	0.5	57.2	0.0
C110	salt	NA	NA	NA	NA	NA	NA
C110	sludge	0.1	49.5	0	0.3	28.3	0.0
C111	liq	NA	NA	NA	NA	NA	NA
C111	salt	NA	NA	NA	NA	NA	NA
C111	sludge	0.2	48.2	0	0.7	27.1	0.0
C112	liq	0.2	60.7	0	0.7	45.0	0.0
C112	salt	NA	NA	NA	NA	NA	NA
C112	sludge	0.3	48.2	0	1.2	27.1	0.0
C201	liq	NA	NA	NA	NA	NA	NA
C201	salt	NA	NA	NA	NA	NA	NA
C201	sludge	0.2	59.8	0	0.7	38.7	0.0
C202	liq	NA	NA	NA	NA	NA	NA
C202	salt	NA	NA	NA	NA	NA	NA
C202	sludge	0.2	59.8	0	0.7	38.7	0.0
C203	liq	NA	NA	NA	NA	NA	NA
C203	salt	NA	NA	NA	NA	NA	NA
C203	sludge	0.2	59.8	0	0.7	38.7	0.0
C204	liq	NA	NA	NA	NA	NA	NA
C204	salt	NA	NA	NA	NA	NA	NA
C204	sludge	0.2	59.8	0	0.7	38.7	0.0
S101	liq	0.5	71.5	0	1.9	55.8	0.0
S101	salt	0.4	21.6	0	3.3	15.5	9.6
S101	sludge	0.1	42.4	0	0.6	21.3	1.4
S102	liq	0.9	60.7	0	3.5	45.0	0.0
S102	salt	0.4	21.6	0	3.3	15.5	9.6
S102	sludge	0.1	42.4	0	0.6	21.3	1.4
S103	liq	0.5	59.7	0	1.9	44.0	0.1
S103	salt	0.4	21.6	0	3.3	15.5	9.6
S103	sludge	0.1	42.4	0	0.6	21.3	1.4
S104	liq	0.3	66.2	0	1.2	50.5	0.0
S104	salt	NA	NA	NA	NA	NA	NA
S104	sludge	0.2	44.7	0	0.6	23.6	0.0
S105	liq	0.5	54.0	0	1.9	38.3	0.1
S105	salt	0.4	8.5	0	3.3	6.1	28.1
S105	sludge	0.1	42.4	0	0.6	21.3	1.4
S106	liq	0.5	52.8	0	1.9	37.1	0.1
S106	salt	0.4	21.6	0	3.3	15.5	9.6
S106	sludge	0.1	42.4	0	0.6	21.3	1.4
S107	liq	0.5	52.6	0	2.0	36.9	0.0
S107	salt	0.4	21.6	0	3.3	15.5	9.6

Tank	phase	Median % TOC	Median % H2O	Exceed. Prob.	Worst 5% % TOC	Worst 5% % H2O	Exceed. Prob.
S107	sludge	0.1	42.4	0	0.6	21.3	1.4
S108	liq	0.5	59.7	0	1.9	44.0	0.1
S108	salt	0.4	21.6	0	3.3	15.5	9.6
S108	sludge	0.1	42.4	0	0.6	21.3	1.4
S109	liq	0.5	59.7	0	1.9	44.0	0.1
S109	salt	0.4	21.6	0	3.3	15.5	9.6
S109	sludge	0.1	42.4	0	0.6	21.3	1.4
S110	liq	0.7	59.7	0	2.8	44.0	0.2
S110	salt	0.4	21.6	0	3.3	15.5	9.6
S110	sludge	0.1	42.4	0	0.6	21.3	1.4
S111	liq	0.4	51.7	0	1.6	36.0	0.0
S111	salt	0.4	15.9	0	3.3	11.5	16.4
S111	sludge	0.1	42.4	0	0.6	21.3	1.4
S112	liq	0.5	59.7	0	1.9	44.0	0.1
S112	salt	0.4	21.6	0	3.3	15.5	9.6
S112	sludge	0.1	42.4	0	0.6	21.3	1.4
SX101	liq	0.2	84.3	0	1.0	68.6	0.0
SX101	salt	0.4	12.4	0	3.3	8.9	21.5
SX101	sludge	0.1	42.4	0	0.6	21.3	1.4
SX102	liq	0.5	59.7	0	1.9	44.0	0.1
SX102	salt	0.4	13.3	0	3.3	9.6	20.2
SX102	sludge	0.1	42.4	0	0.6	21.3	1.4
SX103	liq	0.5	59.7	0	1.9	44.0	0.1
SX103	salt	0.4	12.4	0	3.3	8.9	21.5
SX103	sludge	0.1	42.4	0	0.6	21.3	1.4
SX104	liq	0.3	57.4	0	1.2	41.7	0.0
SX104	salt	0.4	11.8	0	3.3	8.5	22.7
SX104	sludge	0.1	42.4	0	0.6	21.3	1.4
SX105	liq	0.5	59.7	0	1.9	44.0	0.1
SX105	salt	0.4	12.8	0	3.3	9.2	21.1
SX105	sludge	0.1	42.4	0	0.6	21.3	1.4
SX106	liq	2.0	50.3	0	20	34.6	0.6
SX106	salt	0.4	12.4	0	3.3	8.9	21.5
SX106	sludge	0.1	42.4	0	0.6	21.3	1.4
SX107	liq	0.3	67.9	0	1.3	52.2	0.0
SX107	salt	NA	NA	NA	NA	NA	NA
SX107	sludge	0.2	44.7	0	0.6	23.6	0.3
SX108	liq	0.3	66.2	0	1.2	50.5	0.0
SX108	salt	NA	NA	NA	NA	NA	NA
SX108	sludge	0.2	44.7	0	0.6	23.6	0.3
SX109	liq	0.3	66.2	0	1.2	50.5	0.0
SX109	salt	NA	NA	NA	NA	NA	NA
SX109	sludge	0.2	44.7	0	0.6	23.6	0.3
SX110	liq	NA	NA	NA	NA	NA	NA

Tank	phase	Median % TOC	% H2O	Exceed. Prob.	Worst 5% % TOC	% H2O	Exceed. Prob.
SX110	salt	NA	NA	NA	NA	NA	NA
SX110	sludge	0.1	44.7	0	0.6	23.6	1.4
SX111	liq	0.3	69.2	0	1.1	53.5	0.0
SX111	salt	NA	NA	NA	NA	NA	NA
SX111	sludge	0.1	44.7	0	0.6	23.6	1.4
SX112	liq	0.3	66.2	0	1.2	50.5	0.0
SX112	salt	NA	NA	NA	NA	NA	NA
SX112	sludge	0.2	44.7	0	0.6	23.6	0.3
SX113	liq	NA	NA	NA	NA	NA	NA
SX113	salt	NA	NA	NA	NA	NA	NA
SX113	sludge	0.1	44.7	0	0.6	23.6	1.4
SX114	liq	0.3	66.8	0	1.1	51.1	0.0
SX114	salt	NA	NA	NA	NA	NA	NA
SX114	sludge	0.1	44.7	0	0.6	23.6	1.4
SX115	liq	NA	NA	NA	NA	NA	NA
SX115	salt	NA	NA	NA	NA	NA	NA
SX115	sludge	0.2	44.7	0	0.6	23.6	0.3
T101	liq	0.1	65.0	0	0.5	49.3	0.0
T101	salt	NA	NA	NA	NA	NA	NA
T101	sludge	0.1	44.7	0	0.6	23.6	1.4
T102	liq	0.2	65.0	0	0.8	49.3	0.0
T102	salt	NA	NA	NA	NA	NA	NA
T102	sludge	0.1	44.7	0	0.6	23.6	1.4
T103	liq	0.2	65.0	0	0.8	49.3	0.0
T103	salt	NA	NA	NA	NA	NA	NA
T103	sludge	0.1	44.7	0	0.6	23.6	1.4
T104	liq	0.1	65.0	0	0.5	49.3	0.0
T104	salt	NA	NA	NA	NA	NA	NA
T104	sludge	0.1	55.0	0	0.2	33.9	0.0
T105	liq	0.3	65.0	0	1.1	49.3	0.1
T105	salt	NA	NA	NA	NA	NA	NA
T105	sludge	0.1	35.9	0	0.4	14.8	0.1
T106	liq	0.3	65.0	0	1.1	49.3	0.1
T106	salt	NA	NA	NA	NA	NA	NA
T106	sludge	0.1	35.9	0	0.4	14.8	0.1
T107	liq	0.1	80.9	0	0.3	65.2	0.0
T107	salt	NA	NA	NA	NA	NA	NA
T107	sludge	0.1	48.2	0	0.3	27.1	0.0
T108	liq	NA	NA	NA	NA	NA	NA
T108	salt	NA	NA	NA	NA	NA	NA
T108	sludge	0.1	49.5	0	0.3	28.3	0.0
T109	liq	NA	NA	NA	NA	NA	NA
T109	salt	NA	NA	NA	NA	NA	NA
T109	sludge	0.1	44.7	0	0.6	23.6	1.4

Tank	phase	Median % TOC	Median % H2O	Exceed. Prob.	Worst 5% % TOC	Worst 5% % H2O	Exceed. Prob.
T110	liq	0.3	82.9	0	1.0	67.2	0.0
T110	salt	NA	NA	NA	NA	NA	NA
T110	sludge	0.2	44.7	0	0.9	23.6	1.1
T111	liq	0.3	75.3	0	1.0	59.6	0.0
T111	salt	NA	NA	NA	NA	NA	NA
T111	sludge	0.3	44.7	0	1.1	23.6	0.0
T112	liq	0.2	81.7	0	0.9	66.0	0.0
T112	salt	NA	NA	NA	NA	NA	NA
T112	sludge	0.2	44.7	0	0.9	23.6	1.1
T201	liq	0.3	65.0	0	1.1	49.3	0.1
T201	salt	NA	NA	NA	NA	NA	NA
T201	sludge	0.2	64.9	0	0.9	43.8	0.0
T202	liq	0.3	65.0	0	1.1	49.3	0.1
T202	salt	NA	NA	NA	NA	NA	NA
T202	sludge	0.2	64.9	0	0.9	43.8	0.0
T203	liq	0.3	65.0	0	1.1	49.3	0.1
T203	salt	NA	NA	NA	NA	NA	NA
T203	sludge	0.2	64.9	0	0.9	43.8	0.0
T204	liq	0.3	65.0	0	1.1	49.3	0.1
T204	salt	NA	NA	NA	NA	NA	NA
T204	sludge	0.3	64.9	0	1.3	43.8	0.0
TX101	liq	0.3	65.0	0	1.1	49.3	0.1
TX101	salt	NA	NA	NA	NA	NA	NA
TX101	sludge	0.1	44.7	0	0.6	23.6	1.4
TX102	liq	0.3	59.7	0	1.3	44.0	0.0
TX102	salt	0.4	8.5	0	3.3	6.1	28.1
TX102	sludge	NA	NA	NA	NA	NA	NA
TX103	liq	0.3	57.5	0	1.1	41.8	0.0
TX103	salt	NA	NA	NA	NA	NA	NA
TX103	sludge	0.1	44.7	0	0.6	23.6	1.4
TX104	liq	0.5	54.9	0	1.9	39.2	0.0
TX104	salt	0.4	21.6	0	3.3	15.5	9.6
TX104	sludge	NA	NA	NA	NA	NA	NA
TX105	liq	0.6	59.7	0	2.4	44.0	0.1
TX105	salt	0.4	8.5	0	3.3	6.1	28.1
TX105	sludge	NA	NA	NA	NA	NA	NA
TX106	liq	0.4	59.7	0	1.8	44.0	0.0
TX106	salt	0.4	8.5	0	3.3	6.1	28.1
TX106	sludge	NA	NA	NA	NA	NA	NA
TX107	liq	0.5	59.7	0	1.9	44.0	0.1
TX107	salt	0.4	21.6	0	3.3	15.5	9.6
TX107	sludge	NA	NA	NA	NA	NA	NA
TX108	liq	NA	NA	NA	NA	NA	NA
TX108	salt	0.6	16.9	0	4.7	12.2	30.1

Tank	phase	Median % TOC	Median % H2O	Exceed. Prob.	Worst 5% % TOC	Worst 5% % H2O	Exceed. Prob.
TX108	sludge	NA	NA	NA	NA	NA	NA
TX109	liq	0.4	59.6	0	1.6	44.0	0.1
TX109	salt	0.5	16.9	0	4.0	12.2	23.5
TX109	sludge	NA	NA	NA	NA	NA	NA
TX110	liq	0.3	52.3	0	1.4	36.6	0.0
TX110	salt	0.5	16.9	0	4.0	12.2	23.5
TX110	sludge	NA	NA	NA	NA	NA	NA
TX111	liq	0.3	59.6	0	1.4	44.0	0.0
TX111	salt	0.5	16.9	0	4.0	12.2	23.5
TX111	sludge	NA	NA	NA	NA	NA	NA
TX112	liq	0.3	59.6	0	1.1	44.0	0.0
TX112	salt	0.5	16.9	0	4.0	12.2	23.5
TX112	sludge	NA	NA	NA	NA	NA	NA
TX113	liq	0.3	59.6	0	1.1	44.0	0.1
TX113	salt	0.5	16.9	0	4.0	12.2	23.5
TX113	sludge	NA	NA	NA	NA	NA	NA
TX114	liq	0.2	59.6	0	1.0	44.0	0.0
TX114	salt	0.5	16.9	0	4.0	12.2	23.5
TX114	sludge	NA	NA	NA	NA	NA	NA
TX115	liq	0.1	63.9	0	0.5	48.2	0.0
TX115	salt	0.6	16.9	0	5.0	12.2	33.2
TX115	sludge	NA	NA	NA	NA	NA	NA
TX116	liq	0.2	59.6	0	0.7	44.0	0.0
TX116	salt	0.5	16.9	0	4.0	12.2	23.5
TX116	sludge	NA	NA	NA	NA	NA	NA
TX117	liq	0.3	59.6	0	1.1	44.0	0.1
TX117	salt	0.5	16.9	0	4.0	12.2	23.5
TX117	sludge	NA	NA	NA	NA	NA	NA
TX118	liq	0.2	60.1	0	4.2	44.4	1.0
TX118	salt	0.6	16.9	0	4.7	12.2	30.1
TX118	sludge	NA	NA	NA	NA	NA	NA
TY101	liq	NA	NA	NA	NA	NA	NA
TY101	salt	NA	NA	NA	NA	NA	NA
TY101	sludge	0.0	44.0	0	0.0	22.9	0.0
TY102	liq	0.3	59.6	0	1.1	44.0	0.1
TY102	salt	0.5	51.9	0	4.0	37.3	0.0
TY102	sludge	NA	NA	NA	NA	NA	NA
TY103	liq	0.2	65.0	0	0.8	49.3	0.0
TY103	salt	NA	NA	NA	NA	NA	NA
TY103	sludge	0.1	51.0	0	0.3	29.9	0.0
TY104	liq	0.2	65.0	0	0.8	49.3	0.0
TY104	salt	NA	NA	NA	NA	NA	NA
TY104	sludge	0.2	51.0	0	0.9	29.9	0.0
TY105	liq	NA	NA	NA	NA	NA	NA

		Median		Exceed.	Worst 5%		Exceed.
Tank	phase	% TOC	% H2O	Prob.	% TOC	% H2O	Prob.
TY105	salt	NA	NA	NA	NA	NA	NA
TY105	sludge	0.1	40.0	0	0.4	18.9	0.0
TY106	liq	NA	NA	NA	NA	NA	NA
TY106	salt	NA	NA	NA	NA	NA	NA
TY106	sludge	0.1	40.0	0	0.6	18.9	0.0
U101	liq	0.3	66.2	0	1.2	50.5	0.0
U101	salt	NA	NA	NA	NA	NA	NA
U101	sludge	0.2	44.7	0	0.6	23.6	0.3
U102	liq	0.4	63.7	0	1.8	48.0	0.0
U102	salt	0.6	43.1	0	5.0	31.0	1.2
U102	sludge	0.3	29.8	0	1.2	8.7	10.2
U103	liq	0.4	63.5	0	1.8	47.8	0.0
U103	salt	0.6	43.1	0	5.0	31.0	1.2
U103	sludge	0.4	29.8	0	1.6	8.7	9.6
U104	liq	0.3	65.0	0	1.1	49.3	0.1
U104	salt	NA	NA	NA	NA	NA	NA
U104	sludge	0.1	44.7	0	0.6	23.6	1.4
U105	liq	0.3	64.5	0	1.1	48.9	0.0
U105	salt	0.7	21.1	0	5.2	15.2	27.8
U105	sludge	0.1	45.6	0	0.6	24.5	0.7
U106	liq	1.6	62.8	0	6.2	47.2	0.0
U106	salt	0.6	43.1	0	5.0	31.0	1.2
U106	sludge	0.3	29.8	0	1.2	8.7	10.2
U107	liq	0.3	64.5	0	1.1	48.9	0.0
U107	salt	0.7	21.6	0	5.2	15.5	25.3
U107	sludge	0.1	45.6	0	0.6	24.5	0.7
U108	liq	0.3	64.5	0	1.1	48.9	0.0
U108	salt	0.7	21.6	0	5.2	15.5	25.3
U108	sludge	0.1	45.6	0	0.6	24.5	0.7
U109	liq	0.3	63.9	0	1.1	48.2	0.0
U109	salt	0.7	30.4	0	5.2	21.8	7.5
U109	sludge	0.1	45.6	0	0.6	24.5	0.7
U110	liq	0.3	65.0	0	1.1	49.3	0.1
U110	salt	NA	NA	NA	NA	NA	NA
U110	sludge	0.1	35.9	0	0.3	14.8	0.0
U111	liq	1.0	63.9	0	4.2	48.2	0.3
U111	salt	0.6	37.7	0	5.0	27.2	0.6
U111	sludge	0.3	29.8	0	1.2	8.7	10.2
U112	liq	0.3	65.0	0	1.1	49.3	0.1
U112	salt	NA	NA	NA	NA	NA	NA
U112	sludge	0.1	44.7	0	0.6	23.6	1.4
U201	liq	0.3	69.2	0	1.1	53.5	0.0
U201	salt	NA	NA	NA	NA	NA	NA
U201	sludge	0.1	44.7	0	0.6	23.6	1.4

		Median		Exceed.	Worst 5%		Exceed.
Tank	phase	% TOC	% H2O	Prob.	% TOC	% H2O	Prob.
U202	liq	0.3	74.9	0	1.1	59.2	0.0
U202	salt	NA	NA	NA	NA	NA	NA
U202	sludge	0.1	44.7	0	0.6	23.6	1.4
U203	liq	0.3	69.2	0	1.1	53.5	0.0
U203	salt	NA	NA	NA	NA	NA	NA
U203	sludge	0.1	44.7	0	0.6	23.6	1.4
U204	liq	0.3	65.0	0	1.1	49.3	0.1
U204	salt	NA	NA	NA	NA	NA	NA
U204	sludge	0.1	37.0	0	0.6	15.9	2.7

Appendix J

TOC Estimates for 149 Single-Shell Tanks

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
A101	liq	12	34	0.9	23	1.5	3.8	25.5	6.3
A102	liq	11	34	0.4	24	0.6	1.6	26.3	2.7
A103	liq	6	34	0.6	31.2	1.2	2.5	33	4.8
A105	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
A106	liq	2	2	0.1	385.3	140.4	25.00	599.2	25.00
AX101	liq	5	34	0.8	33.6	1.5	3	35.3	6.1
AX102	liq	3	7	1.1	41.7	2.5	4.4	43.1	10.4
AX103	liq	4	7	0.8	37.3	1.7	3.3	38.9	7.1
B101	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B102	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B104	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B105	liq	0	8	0.3	76.8	1.3	1.1	77.5	5.4
B106	liq	0	2	0.2	82.5	1.1	0.8	83.2	4.3
B107	liq	0	1	0.3	85.1	1.6	1.1	85.8	6.3
B108	liq	0	1	0.3	85.1	1.6	1.1	85.8	6.3
B109	liq	0	1	0.3	85.1	1.6	1.1	85.8	6.3
B110	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B111	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B112	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B201	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B202	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B203	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
B204	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
BX101	liq	0	7	0.4	78.1	1.7	1.5	78.8	7
BX102	liq	0	7	0.4	78.1	1.7	1.5	78.8	7
BX103	liq	0	7	0.4	78.1	1.7	1.5	78.8	7
BX104	liq	3	7	0.5	41.3	1.1	1.9	42.7	4.5
BX105	liq	2	7	0.5	47.5	1.4	2.2	48.7	5.8
BX106	liq	1	7	0.4	57.5	1.1	1.4	58.5	4.5
BX107	liq	1	2	0.2	59.6	0.7	0.8	60.6	2.8
BX108	liq	0	7	0.4	78.1	1.7	1.5	78.8	7
BX109	liq	1	7	0.3	57.5	0.9	1.2	58.5	3.9
BX110	liq	1	2	0.3	59.6	1.2	1.4	60.6	4.7
BX112	liq	1	1	0.3	60.9	1	1.2	61.9	4.1
BY101	liq	0	6	0.2	78.3	1.2	1	79	4.8
BY102	liq	2	5	0.2	48.2	0.5	0.7	49.4	2
BY103	liq	1	6	0.2	57.6	0.7	0.9	58.6	2.9
BY104	liq	0	6	0.2	78.3	1.2	1	79	4.8
BY105	liq	2	6	0.2	47.5	0.6	0.9	48.8	2.4
BY106	liq	2	6	0.2	47.5	0.6	0.9	48.8	2.4
BY107	liq	1	6	0.3	57.6	0.9	1.1	58.6	3.5
BY108	liq	0	6	0.2	78.3	1.2	1	79	4.8
BY109	liq	3	5	0.3	41.8	0.7	1.2	43.2	3

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
BY110	liq	0	6	0.2	78.3	1.2	1	79	4.8
BY112	liq	0	6	0.2	78.3	1.2	1	79	4.8
C101	liq	0	7	0.4	78.1	1.7	1.5	78.8	7
C102	liq	1	1	0.3	60.9	0.9	1.1	61.9	3.8
C103	liq	6	7	0.6	31.7	1.1	2.3	33.5	4.4
C104	liq	1	1	0.5	60.9	1.7	2	61.9	7
C105	liq	1	1	0.3	60.9	0.9	1	61.9	3.5
C106	liq	1	7	0.3	58.7	0.9	1.1	59.7	3.5
C107	liq	1	1	0.2	60.9	0.5	0.6	61.9	2.1
C109	liq	0	6	0.2	80.3	0.9	0.7	81	3.5
C110	liq	1	2	0.1	59.6	0.4	0.5	60.6	1.6
C112	liq	2	6	0.2	48.1	0.4	0.7	49.3	1.7
S101	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
S102	liq	2	29	0.9	46.1	2.2	3.5	47.4	9.2
S103	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
S104	liq	0	1	0.3	85.1	1.6	1.2	85.8	6.6
S105	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
S106	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
S107	liq	5	29	0.5	33.3	1	2	35.1	4.1
S108	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
S109	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
S110	liq	1	29	0.7	55.2	2.1	2.8	56.3	8.5
S111	liq	3	29	0.4	40.4	0.9	1.6	41.8	3.6
S112	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
SX101	liq	4	29	0.2	36.4	0.5	1	37.9	2.1
SX102	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
SX103	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
SX104	liq	6	29	0.3	31	0.6	1.2	32.8	2.3
SX105	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
SX106	liq	4	29	2	477.2	25	20	594	25
SX107	liq	1	1	0.3	60.9	1.1	1.3	61.9	4.6
SX108	liq	0	1	0.3	85.1	1.6	1.2	85.8	6.6
SX109	liq	0	1	0.3	85.1	1.6	1.2	85.8	6.6
SX111	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
SX112	liq	0	1	0.3	85.1	1.6	1.2	85.8	6.6
SX114	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
T101	liq	1	1	0.1	60.9	0.4	0.5	61.9	1.6
T102	liq	0	1	0.2	85.1	1.1	0.8	85.8	4.4
T103	liq	0	1	0.2	85.1	1.1	0.8	85.8	4.4
T104	liq	1	1	0.1	60.9	0.4	0.5	61.9	1.6
T105	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
T106	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
T107	liq	4	6	0.1	37.4	0.2	0.3	38.9	0.7

Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate			Worst 5% of the Waste		
				Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
T110	liq	0	1	0.3	85.1	1.4	1	85.8	5.7
T111	liq	0	1	0.3	85.1	1.4	1	85.8	5.7
T112	liq	1	1	0.2	60.9	0.8	0.9	61.9	3.1
T201	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
T202	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
T203	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
T204	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
TX101	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
TX102	liq	2	29	0.3	46.1	0.8	1.3	47.4	3.4
TX103	liq	3	3	0.3	42.4	0.6	1.1	43.8	2.6
TX104	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
TX105	liq	1	29	0.6	55.2	1.8	2.4	56.3	7.4
TX106	liq	1	29	0.4	55.2	1.4	1.8	56.3	5.5
TX107	liq	0	29	0.5	73.4	2	1.9	74.2	8.2
TX109	liq	1	8	0.4	56.8	1.3	1.6	57.9	5.1
TX110	liq	3	8	0.3	41.1	0.8	1.4	42.5	3.2
TX111	liq	1	8	0.3	56.8	1.1	1.4	57.9	4.4
TX112	liq	1	8	0.3	56.8	0.9	1.1	57.9	3.5
TX113	liq	0	8	0.3	76.8	1.3	1.1	77.5	5.4
TX114	liq	1	8	0.2	56.8	0.8	1	57.9	3.1
TX115	liq	2	4	0.1	48	0.3	0.5	49.3	1.2
TX116	liq	1	8	0.2	56.8	0.5	0.7	57.9	2.2
TX117	liq	0	8	0.3	76.8	1.3	1.1	77.5	5.4
TX118	liq	6	7	0.2	411.2	25	4.2	434.2	25
TY102	liq	0	8	0.3	76.8	1.3	1.1	77.5	5.4
TY103	liq	1	4	0.2	59	0.6	0.8	60	2.6
TY104	liq	3	4	0.2	42	0.4	0.8	43.4	1.8
U101	liq	0	1	0.3	85.1	1.6	1.2	85.8	6.6
U102	liq	0	4	0.4	80	2.2	1.8	80.8	8.9
U103	liq	0	4	0.4	80	2.2	1.8	80.8	8.9
U104	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U105	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U106	liq	1	4	1.6	58.4	5	6.2	59.4	20.5
U107	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U108	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U109	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U110	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U111	liq	1	4	1	58.4	3.3	4.2	59.4	13.6
U112	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U201	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U202	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U203	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4
U204	liq	0	0	0.3	87.2	1.6	1.1	87.8	6.4

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
A101	salt	2	2	0.6	42.6	1.4	4.5	73.8	19.9
A102	salt	0	2	0.6	42.6	1.4	4.5	73.8	19.9
AX101	salt	0	2	0.6	42.6	1.4	4.5	73.8	19.9
AX102	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
AX103	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
B102	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
B104	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
B105	salt	0	1	0.5	45.5	1.3	4	75.6	18
BX105	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
BX110	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
BX111	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
BY101	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY102	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
BY103	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY104	salt	4	4	0.7	37.9	1.4	5.1	71.2	21.1
BY105	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY106	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY107	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY108	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY109	salt	0	0	0.6	39.1	1.2	4.3	71.9	18.3
BY110	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY111	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
BY112	salt	0	4	0.7	37.9	1.4	5.1	71.2	21.1
S101	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S102	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S103	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S105	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S106	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S107	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S108	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S109	salt	1	8	0.4	31.8	0.8	3.3	68.2	12.9
S110	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
S111	salt	3	8	0.4	31.8	0.8	3.3	68.2	12.9
S112	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
SX101	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
SX102	salt	2	8	0.4	31.8	0.8	3.3	68.2	12.9
SX103	salt	1	8	0.4	31.8	0.8	3.3	68.2	12.9
SX104	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
SX105	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
SX106	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
TX102	salt	1	8	0.4	31.8	0.8	3.3	68.2	12.9
TX104	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
TX105	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9

Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate			Worst 5% of the Waste		
				Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
TX106	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
TX107	salt	0	8	0.4	31.8	0.8	3.3	68.2	12.9
TX108	salt	0	1	0.6	45.5	1.5	4.7	75.6	21.1
TX109	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX110	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX111	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX112	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX113	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX114	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX115	salt	0	3	0.6	40	1.4	5	72.4	21.5
TX116	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX117	salt	0	1	0.5	45.5	1.3	4	75.6	18
TX118	salt	1	1	0.6	45.5	1.5	4.7	75.6	21.1
TY102	salt	1	1	0.5	45.5	1.3	4	75.6	18
U102	salt	0	3	0.6	40	1.4	5	72.4	21.5
U103	salt	1	3	0.6	40	1.4	5	72.4	21.5
U105	salt	1	1	0.7	45.5	1.7	5.2	75.6	23.4
U106	salt	0	3	0.6	40	1.4	5	72.4	21.5
U107	salt	0	1	0.7	45.5	1.7	5.2	75.6	23.4
U108	salt	0	1	0.7	45.5	1.7	5.2	75.6	23.4
U109	salt	0	1	0.7	45.5	1.7	5.2	75.6	23.4
U111	salt	2	3	0.6	40	1.4	5	72.4	21.5
A101	sludge	1	5	0.6	56.6	1.9	2.4	57.1	7.5
A102	sludge	2	5	0.6	47.3	1.6	2.5	47.9	6.6
A103	sludge	2	5	0.7	47.3	1.7	2.6	47.9	6.7
A104	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
A105	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
A106	sludge	2	2	0.5	52.6	1.4	1.9	53.1	5.5
AX101	sludge	0	5	0.5	73.9	2.4	2.1	74.3	9.5
AX102	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
AX103	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
AX104	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
B101	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
B102	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
B103	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
B104	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
B105	sludge	0	1	0.1	92.7	0.4	0.3	93.1	1.8
B106	sludge	0	14	0.1	72.4	0.3	0.3	72.8	1.4
B107	sludge	0	3	0.3	84.2	1.7	1.2	84.6	6.6
B108	sludge	0	3	0.3	84.2	1.7	1.2	84.6	6.6
B109	sludge	0	3	0.3	84.2	1.7	1.2	84.6	6.6
B110	sludge	14	22	0	21.4	0.1	0.2	22.7	0.3
B111	sludge	8	22	0.1	27.5	0.2	0.4	28.6	0.6

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
B112	sludge	0	22	0.1	71.4	0.3	0.3	71.8	1.2
B201	sludge	0	17	0.2	72.3	1	0.9	72.7	3.9
B202	sludge	15	17	0.2	424.4	25	7.6	430.2	25
B203	sludge	0	17	0.2	72.3	1	0.9	72.7	3.9
B204	sludge	1	17	0.2	55.6	0.5	0.7	56.2	2.1
BX101	sludge	0	5	0.2	76.2	1.1	0.9	76.5	4.2
BX102	sludge	0	5	0.2	76.2	1.1	0.9	76.5	4.2
BX103	sludge	0	5	0.2	76.2	1.1	0.9	76.5	4.2
BX104	sludge	3	5	0.3	42	0.6	1	42.7	2.4
BX105	sludge	2	5	0.2	48.2	0.6	1	48.8	2.6
BX106	sludge	0	5	0.2	76.2	1.1	0.9	76.5	4.2
BX107	sludge	9	14	0.1	26.2	0.1	0.3	27.3	0.4
BX108	sludge	0	5	0.2	76.2	1.1	0.9	76.5	4.2
BX109	sludge	0	5	0.2	76.2	1.1	0.9	76.5	4.2
BX110	sludge	2	3	0	49.6	0.1	0.2	50.2	0.5
BX111	sludge	1	3	0.1	60	0.2	0.2	60.5	0.8
BX112	sludge	3	3	0.4	44.4	1	1.6	45.1	3.9
BY101	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY103	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY104	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY105	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY106	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY107	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY108	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY109	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY110	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY111	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
BY112	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
C101	sludge	0	5	0.2	76.2	1.1	0.9	76.5	4.2
C102	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
C103	sludge	2	4	0.3	48.7	0.7	1	49.2	2.8
C104	sludge	1	1	0.3	67.9	1.2	1.2	68.3	4.6
C105	sludge	1	1	0.1	67.9	0.4	0.4	68.3	1.7
C106	sludge	2	4	0.2	48.7	0.5	0.8	49.2	2.1
C107	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
C108	sludge	0	38	0.2	67.8	0.7	0.7	68.2	2.7
C109	sludge	6	38	0.2	30.6	0.5	1	31.5	1.9
C110	sludge	5	14	0.1	33.7	0.2	0.3	34.5	0.6
C111	sludge	0	38	0.2	67.8	0.7	0.7	68.2	2.7
C112	sludge	17	38	0.3	19.4	0.4	1.2	20.8	1.8
C201	sludge	1	1	0.2	67.9	0.7	0.7	68.3	2.8
C202	sludge	0	1	0.2	92.7	1.1	0.7	93.1	4.3
C203	sludge	0	1	0.2	92.7	1.1	0.7	93.1	4.3

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
C204	sludge	0	1	0.2	92.7	1.1	0.7	93.1	4.3
S101	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S102	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S103	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S104	sludge	11	11	0.2	24.5	0.3	0.6	25.6	1
S105	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S106	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S107	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S108	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S109	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S110	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S111	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
S112	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX101	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX102	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX103	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX104	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX105	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX106	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX107	sludge	0	11	0.2	79.4	0.8	0.6	79.8	3
SX108	sludge	0	11	0.2	79.4	0.8	0.6	79.8	3
SX109	sludge	0	11	0.2	79.4	0.8	0.6	79.8	3
SX110	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX111	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX112	sludge	0	11	0.2	79.4	0.8	0.6	79.8	3
SX113	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX114	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
SX115	sludge	0	11	0.2	79.4	0.8	0.6	79.8	3
T101	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
T102	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
T103	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
T104	sludge	6	6	0.1	32.6	0.1	0.2	33.5	0.5
T105	sludge	0	32	0.1	78	0.5	0.4	78.4	1.8
T106	sludge	0	32	0.1	78	0.5	0.4	78.4	1.8
T107	sludge	15	38	0.1	20.5	0.1	0.3	21.9	0.5
T108	sludge	0	14	0.1	72.4	0.3	0.3	72.8	1.4
T109	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
T110	sludge	0	8	0.2	80.2	1.2	0.9	80.6	4.8
T111	sludge	8	8	0.3	28.5	0.5	1.1	29.5	2.1
T112	sludge	0	8	0.2	80.2	1.2	0.9	80.6	4.8
T201	sludge	0	17	0.2	72.3	1	0.9	72.7	3.9
T202	sludge	0	17	0.2	72.3	1	0.9	72.7	3.9
T203	sludge	0	17	0.2	72.3	1	0.9	72.7	3.9

				Tank Median Estimate			Worst 5% of the Waste		
Tank	Phase	Number of Samples for Tank Waste	Number of Samples in SORWT Group	Tank Median Estimate of TOC wt% (wet)	Relative Standard Deviation on Median	95% Confidence Bound on Tank TOC Estimate wt% TOC (wet)	Estimate of Worst 5% of Waste, wt% (wet)	Relative Standard Deviation on Worst 5% of the Waste	95% Confidence Bound on Worst 5% of the Waste
T204	sludge	1	17	0.3	55.6	1	1.3	56.2	4
TX101	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
TX103	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
TY101	sludge	2	2	0	52.6	0	0	53.1	0.1
TY103	sludge	6	18	0.1	31.2	0.1	0.3	32.1	0.6
TY104	sludge	12	18	0.2	23	0.4	0.9	24.2	1.5
TY105	sludge	1	7	0.1	58	0.4	0.4	58.5	1.4
TY106	sludge	6	7	0.1	31.9	0.3	0.6	32.7	1.1
U101	sludge	0	11	0.2	79.4	0.8	0.6	79.8	3
U102	sludge	0	1	0.3	92.7	2	1.2	93.1	7.8
U103	sludge	1	1	0.4	67.9	1.6	1.6	68.3	6.2
U104	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U105	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U106	sludge	0	1	0.3	92.7	2	1.2	93.1	7.8
U107	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U108	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U109	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U110	sludge	32	32	0.1	14.6	0.1	0.3	16.4	0.5
U111	sludge	0	1	0.3	92.7	2	1.2	93.1	7.8
U112	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U201	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U202	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U203	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6
U204	sludge	0	0	0.1	115.1	1.4	0.6	115.3	5.6

Appendix K

TOC Inventory Estimates for 149 Single-Shell Tanks

tank	Total Liquid Volume K Gal	Liquid Amount, MT	Median TOC, %, (wet basis)	Inventory Total Organic Carbon, MT	tank	Total Liquid Volume K Gal	Liquid Amount, MT	Median TOC, %, (wet basis)	Inventory Total Organic Carbon, MT
A101	413	2141	0.90	19	S111	205	1063	0.40	4
A102	6	31	0.40	0	S112	110	570	0.50	3
A103	20	103	0.60	1	SX101	146	757	0.20	2
A105	4	21	0.30	0	SX102	183	948	0.50	5
A106	7	36	0.10	0	SX103	233	1208	0.50	6
AX101	320	1659	0.80	13	SX104	201	1042	0.30	3
AX102	17	88	1.10	1	SX105	261	1354	0.50	7
AX103	36	187	0.80	1	SX106	255	1322	2.00	26
B101	6	31	0.30	0	SX107	5	26	0.30	0
B102	4	21	0.30	0	SX108	5	26	0.30	0
B104	47	243	0.30	1	SX109	10	52	0.30	0
B105	23	119	0.30	0	SX111	7	36	0.30	0
B106	7	36	0.20	0	SX112	3	15	0.30	0
B107	13	67	0.30	0	SX114	14	73	0.30	0
B108	4	21	0.30	0	T101	17	88	0.10	0
B109	8	41	0.30	0	T102	13	67	0.20	0
B110	23	119	0.30	0	T103	4	21	0.20	0
B111	22	114	0.30	0	T104	50	260	0.10	0
B112	3	15	0.30	0	T105	23	119	0.30	0
B201	4	21	0.30	0	T106	2	11	0.30	0
B202	3	15	0.30	0	T107	22	114	0.10	0
B203	6	31	0.30	0	T110	42	217	0.30	1
B204	6	31	0.30	0	T111	51	264	0.30	1
BX101	1	5	0.40	0	T112	7	36	0.20	0
BX102	4	21	0.40	0	T201	4	21	0.30	0
BX103	4	21	0.40	0	T202	2	11	0.30	0
BX104	33	171	0.50	1	T203	4	21	0.30	0
BX105	11	57	0.50	0	T204	4	21	0.30	0
BX106	15	78	0.40	0	TX101	5	26	0.30	0
BX107	30	155	0.20	0	TX102	22	114	0.30	0
BX108	1	5	0.40	0	TX103	15	78	0.30	0
BX109	13	67	0.30	0	TX104	15	78	0.50	0
BX110	15	78	0.30	0	TX105	20	103	0.60	1
BX112	8	41	0.30	0	TX106	10	52	0.40	0
BY101	5	26	0.20	0	TX107	2	11	0.50	0
BY102	41	213	0.20	0	TX109	10	52	0.40	0
BY103	160	830	0.20	2	TX110	15	78	0.30	0
BY104	18	93	0.20	0	TX111	9	47	0.30	0
BY105	192	995	0.20	2	TX112	24	125	0.30	0
BY106	235	1219	0.20	2	TX113	16	83	0.30	0
BY107	25	129	0.30	0	TX114	15	78	0.20	0
BY108	9	47	0.20	0	TX115	19	99	0.10	0
BY109	78	404	0.30	1	TX116	23	119	0.20	0
BY110	9	47	0.20	0	TX117	8	41	0.30	0
BY112	8	41	0.20	0	TX118	27	140	0.20	0
C101	3	15	0.40	0	TY102	14	73	0.30	0
C102	37	192	0.30	1	TY103	5	26	0.20	0
C103	133	690	0.60	4	TY104	15	78	0.20	0
C104	11	57	0.50	0	U101	3	15	0.30	0
C105	11	57	0.30	0	U102	144	746	0.40	3
C106	48	249	0.30	1	U103	189	980	0.40	4
C107	26	135	0.20	0	U104	7	36	0.30	0
C109	4	21	0.20	0	U105	179	928	0.30	3
C110	7	36	0.10	0	U106	83	430	1.60	7
C112	32	166	0.20	0	U107	178	923	0.30	3
S101	96	498	0.50	2	U108	196	1016	0.30	3
S102	230	1193	0.90	11	U109	182	944	0.30	3
S103	102	529	0.50	3	U110	15	78	0.30	0
S104	29	150	0.30	0	U111	122	632	1.00	6
S105	35	181	0.50	1	U112	4	21	0.30	0
S106	190	985	0.50	5	U201	1	5	0.30	0
S107	59	306	0.50	2	U202	1	5	0.30	0
S108	127	658	0.50	3	U203	1	5	0.30	0
S109	141	731	0.50	4	U204	1	5	0.30	0
S110	110	570	0.70	4	MT of TOC in Liquid Phase				187

Saltcake tank	Total Saltcake Volume K Gal	Saltcake Amount, MT	Median TOC, %, (wet basis)	Total Organic Carbon,
A101	950	5897	0.6	35.382
A102	22	137	0.6	0.822
AX101	745	4625	0.6	27.75
AX102	29	180	0.6	1.08
AX103	110	683	0.6	4.098
B102	10	62	0.6	0.372
B104	69	428	0.6	2.568
B105	266	1651	0.5	8.255
BX105	3	19	0.6	0.114
BX110	9	56	0.6	0.336
BX111	143	888	0.6	5.328
BY101	278	1726	0.7	12.082
BY102	341	2117	0.6	12.702
BY103	395	2452	0.7	17.164
BY104	366	2272	0.7	15.904
BY105	459	2849	0.7	19.943
BY106	547	3395	0.7	23.765
BY107	206	1279	0.7	8.953
BY108	74	459	0.7	3.213
BY109	340	2111	0.6	12.666
BY110	295	1831	0.7	12.817
BY111	438	2719	0.7	19.033
BY112	286	1775	0.7	12.425
S101	171	1061	0.4	4.244
S102	545	3383	0.4	13.532
S103	221	1372	0.4	5.488
S105	454	2818	0.4	11.272
S106	447	2775	0.4	11.1
S107	69	428	0.4	1.712
S108	600	3724	0.4	14.896
S109	555	3445	0.4	13.78
S110	259	1608	0.4	6.432
S111	447	2775	0.4	11.1
S112	518	3215	0.4	12.86
SX101	343	2129	0.4	8.516
SX102	426	2644	0.4	10.576
SX103	536	3327	0.4	13.308
SX104	478	2967	0.4	11.868
SX105	610	3787	0.4	15.148
SX106	465	2886	0.4	11.544
TX102	217	1347	0.4	5.388
TX104	64	397	0.4	1.588
TX105	609	3780	0.4	15.12
TX106	453	2812	0.4	11.248
TX107	35	217	0.4	0.868
TX108	134	832	0.6	4.992
TX109	384	2384	0.5	11.92
TX110	462	2868	0.5	14.34
TX111	370	2297	0.5	11.485
TX112	649	4029	0.5	20.145
TX113	607	3768	0.5	18.84
TX114	535	3321	0.5	16.605
TX115	640	3973	0.6	23.838
TX116	631	3917	0.5	19.585
TX117	626	3886	0.5	19.43
TX118	347	2154	0.6	12.924
TY102	64	397	0.5	1.985
U102	313	1943	0.6	11.658
U103	423	2626	0.6	15.756
U105	349	2166	0.7	15.162
U106	185	1148	0.6	6.888
U107	360	2235	0.7	15.645
U108	415	2576	0.7	18.032
U109	396	2458	0.7	17.206
U111	303	1881	0.6	11.286
Total Saltcake Estimate				756.082

Sludge tank	Total Sludge Volume K Gal	Sludge Amount, MT	Median TOC, %, (wet basis)	Inventory Total Organic Carbon, MT	Sludge tank	Total Sludge Volume K Gal	Sludge Amount, MT	Median TOC, %, (wet basis)	Inventory Total Organic Carbon, MT
A101	3	16	0.6	0.096	S101	224	1339	0.1	1.339
A102	15	82	0.6	0.492	S102	4	22	0.1	0.022
A103	366	2009	0.7	14.063	S103	10	55	0.1	0.055
A104	28	154	0.1	0.154	S104	293	1608	0.2	3.216
A105	19	104	0.1	0.104	S105	2	11	0.1	0.011
A106	125	686	0.5	3.43	S106	28	154	0.1	0.154
AX101	3	16	0.5	0.08	S107	293	1608	0.1	1.608
AX102	7	38	0.1	0.038	S108	4	22	0.1	0.022
AX103	2	11	0.1	0.011	S109	13	71	0.1	0.071
AX104	7	38	0.1	0.038	S110	131	719	0.1	0.719
B101	113	620	0.1	0.62	S111	139	763	0.1	0.763
B102	18	99	0.1	0.099	S112	5	27	0.1	0.027
B103	59	324	0.1	0.324	SX101	112	615	0.1	0.615
B104	301	1652	0.1	1.652	SX102	117	642	0.1	0.642
B105	40	220	0.1	0.22	SX103	115	631	0.1	0.631
B106	116	637	0.1	0.637	SX104	136	746	0.1	0.746
B107	164	900	0.3	2.7	SX105	73	401	0.1	0.401
B108	94	516	0.3	1.548	SX106	12	66	0.1	0.066
B109	127	697	0.3	2.091	SX107	104	571	0.2	1.142
B110	245	1345	0	0	SX108	87	477	0.2	0.954
B111	236	1295	0.1	1.295	SX109	250	1372	0.2	2.744
B112	30	165	0.1	0.165	SX110	62	340	0.1	0.34
B201	28	154	0.2	0.308	SX111	125	686	0.1	0.686
B202	27	148	0.2	0.296	SX112	92	505	0.2	1.01
B203	50	274	0.2	0.548	SX113	26	143	0.1	0.143
B204	49	269	0.2	0.538	SX114	181	993	0.1	0.993
BX101	42	231	0.2	0.462	SX115	12	66	0.2	0.132
BX102	96	527	0.2	1.054	T101	101	554	0.1	0.554
BX103	62	340	0.2	0.68	T102	19	104	0.1	0.104
BX104	96	527	0.3	1.581	T103	23	126	0.1	0.126
BX105	43	236	0.2	0.472	T104	442	2426	0.1	2.426
BX106	31	170	0.2	0.34	T105	98	538	0.1	0.538
BX107	344	1888	0.1	1.888	T106	19	104	0.1	0.104
BX108	26	143	0.2	0.286	T107	171	938	0.1	0.938
BX109	193	1059	0.2	2.118	T108	44	241	0.1	0.241
BX110	189	1037	0	0	T109	58	318	0.1	0.318
BX111	68	373	0.1	0.373	T110	376	2064	0.2	4.128
BX112	164	900	0.4	3.6	T111	456	2503	0.3	7.509
BY101	109	598	0.1	0.598	T112	60	329	0.2	0.658
BY103	5	27	0.1	0.027	T201	28	154	0.2	0.308
BY104	40	220	0.1	0.22	T202	21	115	0.2	0.23
BY105	44	241	0.1	0.241	T203	35	192	0.2	0.384
BY106	95	521	0.1	0.521	T204	38	209	0.3	0.627
BY107	60	329	0.1	0.329	TX101	84	461	0.1	0.461
BY108	154	845	0.1	0.845	TX103	157	862	0.1	0.862
BY109	83	456	0.1	0.456	TY101	118	648	0	0
BY110	103	565	0.1	0.565	TY103	162	889	0.1	0.889
BY111	21	115	0.1	0.115	TY104	43	236	0.2	0.472
BY112	5	27	0.1	0.027	TY105	231	1268	0.1	1.268
C101	88	483	0.2	0.966	TY106	17	93	0.1	0.093
C102	423	2322	0.1	2.322	U101	22	121	0.2	0.242
C103	62	340	0.3	1.02	U102	43	236	0.3	0.708
C104	295	1619	0.3	4.857	U103	32	176	0.4	0.704
C105	150	823	0.1	0.823	U104	122	670	0.1	0.67
C106	197	1081	0.2	2.162	U105	32	176	0.1	0.176
C107	275	1509	0.1	1.509	U106	26	143	0.3	0.429
C108	66	362	0.2	0.724	U107	15	82	0.1	0.082
C109	62	340	0.2	0.68	U108	29	159	0.1	0.159
C110	187	1026	0.1	1.026	U109	48	263	0.1	0.263
C111	57	313	0.2	0.626	U110	186	1021	0.1	1.021
C112	104	571	0.3	1.713	U111	26	143	0.3	0.429
C201	2	11	0.2	0.022	U112	45	247	0.1	0.247
C202	1	5	0.2	0.01	U201	4	22	0.1	0.022
C203	5	27	0.2	0.054	U202	4	22	0.1	0.022
C204	3	16	0.2	0.032	U203	2	11	0.1	0.011

Sludge tank	Total Sludge Volume K Gal	Sludge Amount, MT	Median TOC, %, (wet basis)	Inventory Total Organic Carbon, MT
U204	2	11	0.1	0.011
Total Sludge Inventory				115

Appendix L

Saltcake Waste Moisture Grouping

Moisture Group Number	Ventilation	Redox or Non Redox Waste	Jet Pumped Indicator
1	Active	Non-Redox Waste	Jet-Pumped
2	Active	Redox Waste	Jet-Pumped
3	Active	Non-Redox Waste	Not Jet Pumped
4	Active	Redox Waste	Not Jet Pumped
5	Passive	Non-Redox Waste	Jet-Pumped
6	Passive	Redox Waste	Jet-Pumped
7	Passive	Non-Redox Waste	Not Jet Pumped
8	Passive	Redox Waste	Not Jet Pumped

Tank No.	Ventilation	Redox or Non Redox Waste	Jet Pumped Indicator	Volume of Saltcake (Kgal) from Hanlon, 1994	Moisture Group
A-101	Passive	NON-R	Not Jet Pumped	950	7
A-102	Passive	NON-R	Not Jet Pumped	22	7
AX-101	Passive	NON-R	Not Jet Pumped	745	7
AX-102	Passive	NON-R	Not Jet Pumped	29	7
AX-103	Passive	NON-R	Not Jet Pumped	110	7
B-102	Passive	NON-R	Not Jet Pumped	10	7
B-104	Passive	NON-R	Not Jet Pumped	69	7
B-105	Passive	NON-R	Not Jet Pumped	266	7
BX-105	Passive	NON-R	Not Jet Pumped	3	7
BX-110	Passive	NON-R	Not Jet Pumped	9	7
BX-111	Passive	NON-R	Not Jet Pumped	143	7
BY-101	Passive	NON-R	Jet Pumped	278	5
BY-102	Passive	NON-R	Not Jet Pumped	341	7
BY-103	Passive	NON-R	Not Jet Pumped	395	7
BY-104	Passive	NON-R	Jet Pumped	366	5
BY-105	Passive	NON-R	Not Jet Pumped	459	7
BY-106	Passive	NON-R	Not Jet Pumped	547	7
BY-107	Passive	NON-R	Jet Pumped	206	5
BY-108	Passive	NON-R	Jet Pumped	74	5
BY-109	Passive	NON-R	Not Jet Pumped	340	7
BY-110	Passive	NON-R	Jet Pumped	295	5
BY-111	Passive	NON-R	Jet Pumped	438	5
BY-112	Passive	NON-R	Jet Pumped	286	5
S-101	Passive	R	Not Jet Pumped	171	8
S-102	Passive	R	Not Jet Pumped	545	8
S-103	Passive	R	Not Jet Pumped	221	8
S-105	Passive	R	Jet Pumped	454	6
S-106	Passive	R	Not Jet Pumped	447	8
S-107	Passive	R	Not Jet Pumped	69	8
S-108	Passive	R	Not Jet Pumped	600	8
S-109	Passive	R	Not Jet Pumped	555	8
S-110	Passive	R	Not Jet Pumped	259	8
S-111	Passive	R	Not Jet Pumped	447	8
S-112	Passive	R	Not Jet Pumped	518	8
SX-101	Active	R	Not Jet Pumped	343	4
SX-102	Active	R	Not Jet Pumped	426	4
SX-103	Active	R	Not Jet Pumped	536	4
SX-104	Active	R	Not Jet Pumped	478	4
SX-105	Active	R	Not Jet Pumped	610	4
SX-106	Active	R	Not Jet Pumped	465	4
TX-102	Passive	R	Jet Pumped	217	6
TX-104	Passive	R	Not Jet Pumped	64	8
TX-105	Passive	R	Jet Pumped	609	6
TX-106	Passive	R	Jet Pumped	453	6
TX-107	Passive	R	Not Jet Pumped	35	8
TX-108	Passive	NON-R	Jet Pumped	134	5
TX-109	Passive	NON-R	Jet Pumped	384	5
TX-110	Passive	NON-R	Jet Pumped	462	5
TX-111	Passive	NON-R	Jet Pumped	370	5
TX-112	Passive	NON-R	Jet Pumped	649	5
TX-113	Passive	NON-R	Jet Pumped	607	5
TX-114	Passive	NON-R	Jet Pumped	535	5
TX-115	Passive	NON-R	Jet Pumped	640	5
TX-116	Passive	NON-R	Jet Pumped	631	5
TX-117	Passive	NON-R	Jet Pumped	626	5
TX-118	Passive	NON-R	Jet Pumped	347	5
TY-102	Passive	NON-R	Not Jet Pumped	64	7
U-102	Passive	NON-R	Not Jet Pumped	313	7
U-103	Passive	NON-R	Not Jet Pumped	423	7
U-105	Passive	R	Not Jet Pumped	349	8
U-106	Passive	NON-R	Not Jet Pumped	185	7
U-107	Passive	R	Not Jet Pumped	360	8
U-108	Passive	R	Not Jet Pumped	415	8
U-109	Passive	R	Not Jet Pumped	396	8
U-111	Passive	NON-R	Not Jet Pumped	303	7

Appendix M

SORWT Group Data for 149 Single-Shell Tanks

Tank No.	SORWT Group	Primary Waste Type	Secondary Waste Type	Tertiary Waste Type	Other Waste Type	Watch List Status, G= Gas Generation, O= Organics, F= Ferrocyanide, H= High Heat, N= Not Watchlist Tank
A-101	IX	DSSF	NCPLX	EVAP		G
A-102	IX	DSSF	NCPLX	EVAP		N
A-103	IX	DSSF	NCPLX	EVAP		N
A-104	XXXK	SLUICE	P	H20	B	H
A-105	XXXJ	P	IX			H
A-106	XXXA	CCPLX	NCPLX	EVAP	B	N
AX-101	IX	DSSF	NCPLX	EVAP		G
AX-102	XXVIII	CCPLX	DSSF	EVAP		N
AX-103	XXVIII	CCPLX	DSSF	EVAP		G
AX-104	XXXI	EVAP	NCPLX	P		N
B-101	XVIII	CW	EB	BL		N
B-102	XVIII	CW	EB	BL	IX	N
B-103	XVIII	CW	EB	IX	MIX	O
B-104	XXXH	2C	EB	TBP	1C	N
B-105	II	EB	1C			N
B-106	XI	1C	TBP	HLO	MIX	N
B-107	XII	1C	EB	CW	TBP	N
B-108	XII	1C	EB	CW	IX-TBP	N
B-109	XII	1C	EB	CW	IX	N
B-110	XV	2C	6-May	FP	IX	N
B-111	XV	2C	6-May	FP	IX	N
B-112	XV	2C	6-May	FP	EB-ITS	N
B-201	V	224				N
B-202	V	224				N
B-203	V	224				N
B-204	V	224				N
BX-101	IV	TBP	CW	BL	IX	N
BX-102	IV	TBP	CW	BL	DIA	F
BX-103	IV	TBP	CW	OWW	MIX	N
BX-104	IV	TBP	CW	IX	R	N
BX-105	IV	TBP	CW	IX	EB	N
BX-106	IV	TBP	CW	EB-IX	BL	F
BX-107	XI	1C	TBP	CW	IX	N
BX-108	IV	TBP	CW	1C	IX	N
BX-109	IV	TBP	CW	1C	IX	N

Tank No.	SORWT Group	Primary Waste Type	Secondary Waste Type	Tertiary Waste Type	Other Waste Type	Watch List Status, G= Gas Generation, O= Organics, F= Ferrocyanide, H= High Heat, N= Not Watchlist Tank
BX-110	XXIV	1C	EB-ITS	CW	IX	F
BX-111	XXIV	1C	EB-ITS	CW	IX	F
BX-112	XII	1C	EB	CW	IX	N
BY-101	III	TBP-F	EB-ITS	CW	1C	F
BY-102	XXI	TBP	EB-ITS	CW	1C	N
BY-103	III	TBP-F	EB-ITS	P	CW-OWW	F
BY-104	III	TBP-F	EB-ITS	CW	IX	F
BY-105	III	TBP-F	EB-ITS	CW		F
BY-106	III	TBP-F	EB-ITS	CW		F
BY-107	III	TBP-F	EB-ITS	CW		F
BY-108	III	TBP-F	EB-ITS	1C	CW	F
BY-109	XXI	TBP	EB-ITS	CW	MW	N
BY-110	III	TBP-F	EB-ITS	1C	CW	F
BY-111	III	TBP-F	EB-ITS	OWW	CW	F
BY-112	III	TBP-F	EB-ITS	CW		F
C-101	IV	TBP	CW	P	OWW	N
C-102	XXXB	CW	TBP	OWW		N
C-103	XXIII	SRS	SR-WASH	P	TBP-CW	O
C-104	XXXC	CW	OWW	SR-WASH	H SRS	N
C-105	XXXD	TBP	SR-WASH	CW	P	H
C-106	XXIII	SRS	SR-WASH	P	TBP	H
C-107	XXXE	1C	SRS	CW	IX	N
C-108	VIII	TBP-F	1C	CW	OWW	F
C-109	VIII	TBP-F	1C	CW	IX	F
C-110	XI	1C	TBP	OWW	EB-IX	N
C-111	VIII	TBP-F	1C	CW	HS	F
C-112	VIII	TBP-F	1C	CW	IX	F
C-201	XIII	HS				N
C-202	XIII	HS				N
C-203	XIII	HS				N
C-204	XIII	HS				N
S-101	I	R	EB	IX	MIX	N
S-102	I	R	EB	DSSF		OG
S-103	I	R	EB	DSSF		N
S-104	VI	R				N

Tank No.	SORWT Group	Primary Waste Type	Secondary Waste Type	Tertiary Waste Type	Other Waste Type	Watch List Status, G= Gas Generation, O= Organics, F= Ferrocyanide, H= High Heat, N= Not Watchlist Tank
S-105	I	R	EB			N
S-106	I	R	EB			N
S-107	I	R	EB	CW	IX-MIX	N
S-108	I	R	EB			N
S-109	I	R	EB			N
S-110	I	R	EB	MIX		N
S-111	I	R	EB			G
S-112	I	R	EB			G
SX-101	I	R	EB	RIX		G
SX-102	I	R	EB	RIX		G
SX-103	I	R	EB	CW	OWW	G
SX-104	I	R	EB	RIX		G
SX-105	I	R	EB	RIX	HLO	G
SX-106	I	R	EB	RIX	HLO-MX	OG
SX-107	VI	R				H
SX-108	VI	R				H
SX-109	VI	R				GH
SX-110	XVI	R	RIX	MIX		H
SX-111	XVI	R	RIX			H
SX-112	VI	R				H
SX-113	XXIX	R	DIA			N
SX-114	XVI	R	RIX	EB		H
SX-115	VI	R				N
T-101	XIX	CW	MIX	TBP-F	EVAP	F
T-102	XIX	CW	MIX	IX		N
T-103	XIX	CW	MIX			N
T-104	XXXF	1C				N
T-105	XVII	1C	CW	2C	BL-IX	N
T-106	XVII	1C	CW	2C	MIX	N
T-107	VIII	TBP-F	1C	CW	IX	F
T-108	XI	1C	TBP	EB	HLO	N
T-109	XXVI	TBP	EB	MIX		N
T-110	XIV	2C	224			G
T-111	XIV	2C	224			O
T-112	XIV	2C	224	DW	MIX	N

Tank No.	SORWT Group	Primary Waste Type	Secondary Waste Type	Tertiary Waste Type	Other Waste Type	Watch List Status, G= Gas Generation, O= Organics, F= Ferrocyanide, H= High Heat, N= Not Watchlist Tank
T-201	V	224				N
T-202	V	224				N
T-203	V	224				N
T-204	V	224				N
TX-101	XXXM	R	MIX	MIX		N
TX-102	I	R	EB	MIX		N
TX-103	XXVI	TBP	EB			N
TX-104	I	R	EB	MIX		N
TX-105	I	R	EB	MIX		O
TX-106	I	R	EB	MIX		N
TX-107	I	R	EB			N
TX-108	XXII	EB	TBP	R		N
TX-109	II	EB	1C	TBP		N
TX-110	II	EB	1C	TBP		N
TX-111	II	EB	1C	TBP		N
TX-112	II	EB	1C			N
TX-113	II	EB	1C			N
TX-114	II	EB	1C			N
TX-115	VII	EB	R	CW	DW	N
TX-116	II	EB	1C			N
TX-117	II	EB	1C			N
TX-118	XXII	EB	TBP	CW	1C	FO
TY-101	XXXG	1C-F	EB	TBP	R	F
TY-102	II	EB	1C	MIX		N
TY-103	XXVII	TBP	1C-F	CW	R-MIX	F
TY-104	XXVII	TBP	1C-F	DW	MIX-R	F
TY-105	XXV	TBP				N
TY-106	XXV	TBP				N
U-101	VI	R				N
U-102	VII	EB	R			N
U-103	VII	EB	R	MIX		G
U-104	XXIX	R	DIA			N
U-105	X	EB	CW	R		G
U-106	VII	EB	R	BL	PL	O
U-107	X	EB	CW	MIX		O

Tank No.	SORWT Group	Primary Waste Type	Secondary Waste Type	Tertiary Waste Type	Other Waste Type	Watch List Status, G= Gas Generation, O= Organics, F= Ferrocyanide, H= High Heat, N= Not Watchlist Tank
U-108	X	EB	CW	MIX		G
U-109	X	EB	CW	R		G
U-110	XVII	1C	CW	R	LW	N
U-111	VII	EB	R	1C		O
U-112	XXXN	UK				N
U-201	XX	CW				N
U-202	XX	CW				N
U-203	XX	CW				N
U-204	XXXL	R	2C	CW		N

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